

## 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): 15G413-11C

Remark: "C" denotes to CCT, may be  
1,2,3,5.(1=3000K,2=3500K,3=4000K,5=5000K).

Representative (Tested) Model:

15G413-111  
15G413-113  
15G413-115

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

Test &amp; Report By:

*Candice Liao*

Engineer: Candice Liao

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-Q.

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	15G413-11C	
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	48W	
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-Q1(3000K), Q2(4000K), Q3(5000K),	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



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**1.2 Test Specifications:**

Date of Receipt	Apr.06,2018
Date of Test	Apr.08,2018
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>	2018-04-08	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G413-111		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3694	43.57	0.9828	12.30
70-Q1	277.0	60	0.1696	43.16	0.9188	11.71
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

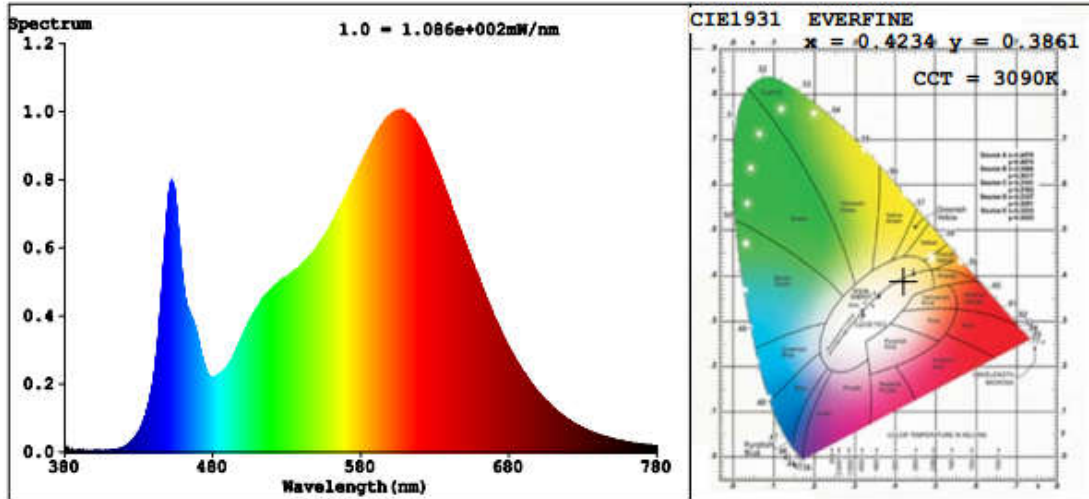
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	87	R9	24
Frequency (Hz)	60	R2	95	R10	89
CCT (K)	3090	R3	95	R11	85
Duv	-0.0054	R4	84	R12	76
Chromaticity (x, y)	x=0.4234 y=0.3861	R5	87	R13	89
Chromaticity (u', v')	u'=0.2495 v'=0.5121	R6	93	R14	98
Color Rendering Index (CRI)	86.1	R7	83	R15	81
R9	24	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)	5548.9	5493.5	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.28	127.28	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	126.08		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.5	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.29	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.21	--	1.0-2.0(±0.1)	
Beam Angle (°)	101.1	--	--	
Center Beam Candle Power (cd)	2219	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

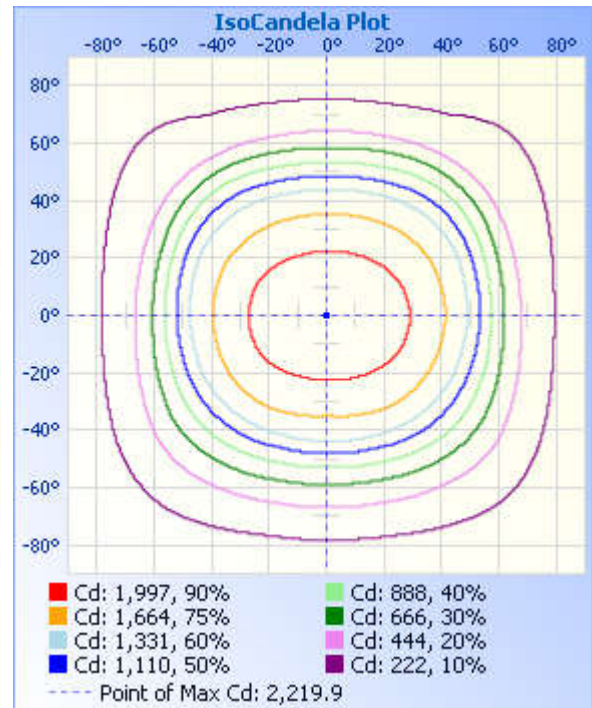
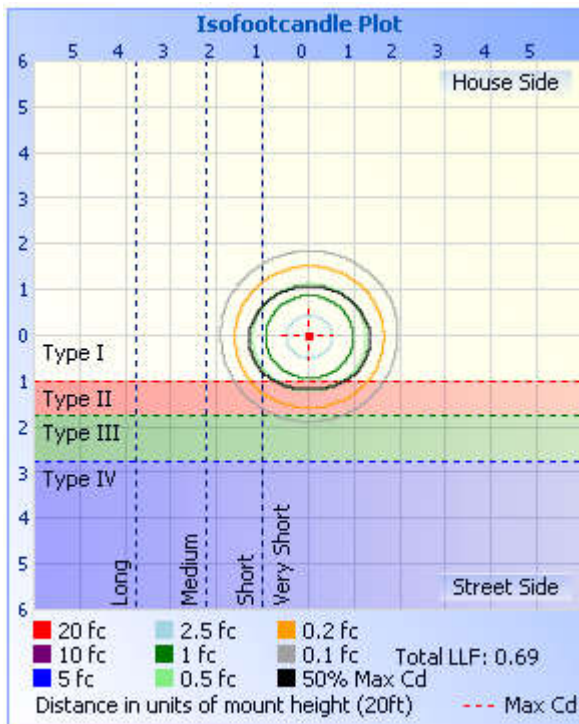
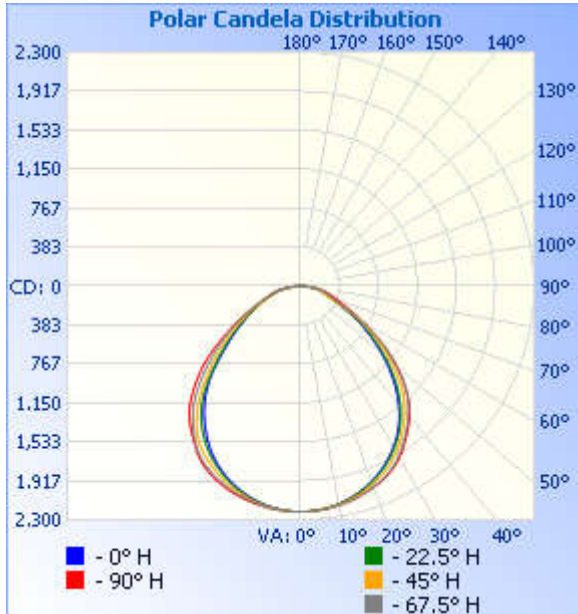


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,733.3	31.2%
0-40	2,828.4	51%
0-60	4,689.1	84.5%
60-90	845.4	15.2%
70-100	369.0	6.7%
90-120	7.2	0.1%
0-90	5,534.5	99.8%
90-180	13.7	0.2%
0-180	5,548.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	210.1	3.8%	90-100	2.8	0.1%
10-20	603.5	10.9%	100-110	2.2	0%
20-30	919.7	16.6%	110-120	2.1	0%
30-40	1,095.1	19.7%	120-130	1.9	0%
40-50	1,057.1	19.1%	130-140	1.6	0%
50-60	803.7	14.5%	140-150	1.2	0%
60-70	479.1	8.6%	150-160	1.0	0%
70-80	271.6	4.9%	160-170	0.6	0%
80-90	94.6	1.7%	170-180	0.2	0%

**Photometric Data**



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Table--1

UNIT: cd

C (DEG) y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	
5	2214	2215	2211	2210	2208	2208	2208	2211	2210	2207	2207	2206	2207	2209	2209	2212	
10	2195	2195	2185	2180	2175	2176	2181	2188	2187	2181	2179	2173	2172	2177	2183	2189	
15	2164	2160	2141	2129	2120	2123	2136	2152	2154	2142	2132	2118	2115	2124	2137	2153	
20	2121	2113	2081	2058	2044	2051	2074	2102	2105	2091	2069	2043	2035	2049	2075	2104	
25	2063	2048	2002	1966	1947	1958	1994	2034	2042	2027	1991	1949	1935	1955	1997	2041	
30	1974	1948	1897	1853	1829	1844	1886	1933	1947	1940	1897	1834	1806	1840	1903	1956	
35	1841	1814	1761	1713	1684	1702	1748	1796	1812	1805	1768	1690	1648	1695	1777	1823	
40	1703	1674	1610	1539	1502	1526	1595	1653	1669	1634	1569	1504	1468	1513	1583	1653	
45	1514	1502	1424	1334	1288	1322	1406	1479	1479	1418	1321	1254	1249	1268	1338	1435	
50	1274	1271	1191	1101	1055	1087	1171	1249	1241	1165	1077	1013	992	1024	1097	1181	
55	1007	999	950	868	822	850	928	979	977	927	856	800	785	806	871	944	
60	739	730	694	645	615	626	668	704	717	721	659	622	617	623	664	729	
65	522	470	432	427	436	418	418	457	504	536	489	475	479	477	489	544	
70	386	339	279	292	314	292	276	335	375	378	351	349	362	352	352	387	
75	294	274	227	225	233	227	225	268	285	262	255	257	270	260	254	271	
80	206	201	181	164	168	163	177	198	199	181	174	175	190	179	180	186	
85	86.5	95.2	90.3	85.8	86.6	84.1	86.3	90.9	83.2	89.5	80.9	86.9	92.2	94.2	85.9	94.6	
90	1.94	1.81	1.94	2.02	2.03	2.30	2.08	2.08	8.57	8.89	1.39	16.6	3.88	18.5	1.66	1.14	
95	1.39	1.28	1.39	1.65	1.52	1.66	1.55	1.27	1.40	3.03	1.20	6.07	1.85	5.94	1.85	1.27	
100	1.86	1.86	1.30	1.65	1.65	1.66	1.66	1.49	2.00	2.07	1.86	3.40	2.18	2.19	2.40	2.07	
105	2.47	2.20	1.49	1.79	1.92	1.79	1.92	2.09	2.16	2.00	2.39	2.70	2.25	2.09	2.20	2.07	
110	2.29	2.23	1.86	1.90	2.05	2.02	2.31	2.34	2.67	2.28	2.32	2.00	1.98	1.99	2.24	2.35	
115	2.59	2.40	2.19	1.80	1.89	1.99	2.46	2.80	2.77	2.46	2.32	1.19	1.39	1.59	2.28	2.43	
120	2.93	2.53	2.32	1.32	1.53	1.51	2.52	2.87	2.87	2.47	2.32	1.19	1.22	1.44	2.31	2.33	
125	3.13	2.91	2.32	1.30	1.55	1.38	2.52	2.89	2.83	2.47	2.26	1.19	1.36	1.29	2.09	2.31	
130	3.13	2.99	2.32	1.28	1.57	1.35	2.52	2.91	2.80	2.47	2.15	1.19	1.59	1.59	1.92	2.28	
135	3.14	2.85	2.04	1.26	1.59	1.41	2.33	2.88	2.64	2.33	1.99	1.68	1.66	1.79	1.53	2.19	
140	3.07	2.70	1.53	1.40	1.61	1.49	1.99	2.74	2.47	2.31	1.46	1.79	1.92	1.99	1.50	2.05	
145	2.90	2.34	1.19	1.52	1.63	1.66	1.51	2.40	2.38	2.29	1.65	2.05	2.12	2.12	1.66	1.96	
150	2.60	2.00	1.19	1.77	1.65	1.92	1.48	2.14	2.39	2.27	1.93	2.24	2.38	2.26	2.19	1.99	
155	2.43	1.90	1.53	1.95	1.81	2.06	1.47	1.80	2.39	2.34	1.99	2.23	2.47	2.28	2.17	2.06	
160	2.39	1.81	1.80	1.98	2.12	2.08	1.66	1.80	2.36	2.34	2.00	2.20	2.51	2.31	2.22	2.10	
165	2.37	1.79	1.84	2.02	2.12	2.20	1.79	1.80	2.33	2.34	2.02	2.14	2.55	2.34	2.27	2.13	
170	2.36	1.85	1.79	2.07	2.12	2.32	1.89	1.86	2.29	2.33	2.05	2.08	2.51	2.36	2.32	2.07	
175	2.34	1.91	2.03	2.11	2.38	2.32	1.96	2.01	2.33	2.33	1.96	2.05	2.31	2.39	2.37	2.02	
180	2.33	1.93	2.19	2.12	2.38	2.45	1.99	1.87	2.13	2.33	1.92	2.05	2.12	2.39	2.46	2.00	

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

<b>Test date</b>	2018-04-08	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G413-113		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3702	43.61	0.9818	12.42
70-Q2	277.0	60	0.1702	43.13	0.9146	11.23
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

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

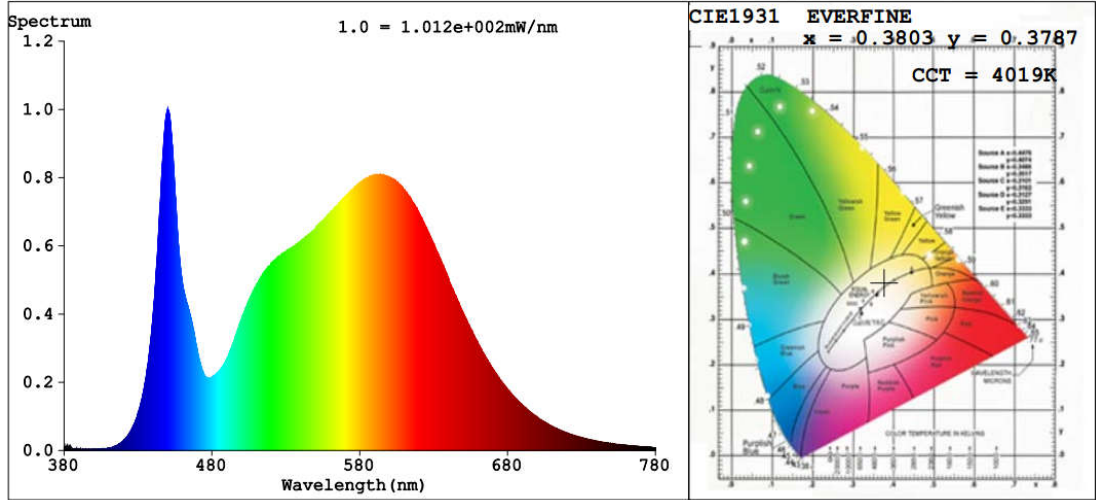
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	6
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4019	R3	94	R11	81
Duv	0.0010	R4	82	R12	60
Chromaticity (x, y)	x=0.3803 y=0.3787	R5	81	R13	82
Chromaticity (u', v')	u'=0.2242 v'=0.5024	R6	84	R14	97
Color Rendering Index (CRI)	82.3	R7	86	R15	74
R9	6	R8	64	--	--

**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)	5583.4	5515.9	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.03	127.89	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	126.48		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>	2018-04-08	<b>Test Ambient:</b>	25.2 ° C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	15G413-115		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3707	43.66	0.9814	12.12
70-Q3	277.0	60	0.1703	43.18	0.9156	11.33
<b>DLC Pass Criteria</b>					<b>&gt;= 0.9(-3%)</b>	<b>&lt;= 20(+5)</b>

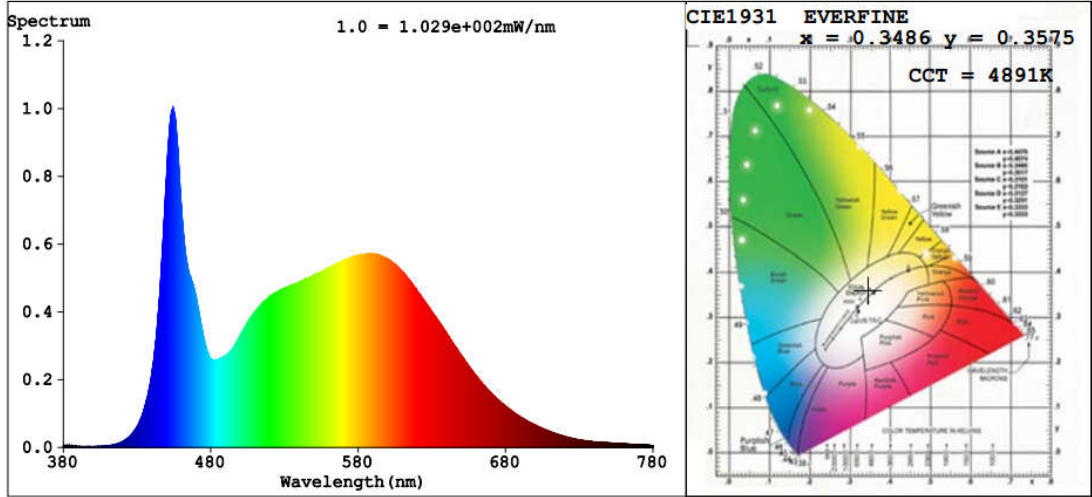
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4 -  
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	4891	R3	95	R11	79
Duv	0.0016	R4	80	R12	56
Chromaticity (x, y)	x=0.3486 y=0.3575	R5	82	R13	86
Chromaticity (u', v')	u'=0.2115 v'=0.4880	R6	87	R14	98
Color Rendering Index (CRI)	84.1	R7	86	R15	77
R9	13	R8	67	--	--

**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)	5624.7	5554.24	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.83	128.63	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	127.22		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)
15G413-111	3000	5548.9	43.57	127.36
15G413-112	3500	5566.2 <sup>*1</sup>	43.62 <sup>*2</sup>	127.61 <sup>*3</sup>
15G413-113	4000	5583.4	43.61	128.03
15G413-115	5000	5624.7	43.66	128.83

\*1: This value is calculated and the calculation formula is as below:  
 $5566.2 = (5583.4 - 5548.9) / 2 + 5548.9$

\*2: This value is calculated and the calculation formula is as below:  
 $43.62 = (43.57 + 43.61) / 2$

\*3: This value is calculated and the calculation formula is as below:  
 $127.61 = 5566.2 / 43.62$

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