

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 2x2 Luminaires

Model name(s): 15G412-11C

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

Representative (Tested) Model:

15G412-111

15G412-113

15G412-115

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

Test & Report By:

Candice Liao

Engineer: Candice Liao

Date: Apr.26,2018

Review By:

Univ Xie

Manager: Univ Xie

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

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	15G412-11C	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 2x2 Luminaires	
Rated Voltage / Frequency	100-277 Vac, 50/60 Hz	
Nominal Power	40W	
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-P1(3000K), P2(4000K), P3(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"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

<p>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.</p>
<p>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.</p>
<p>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.</p>

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

Test date	2018-04-08	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G412-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3048	36.06	0.9857	11.01
70-P1	277.0	60	0.1433	36.26	0.9138	13.55
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

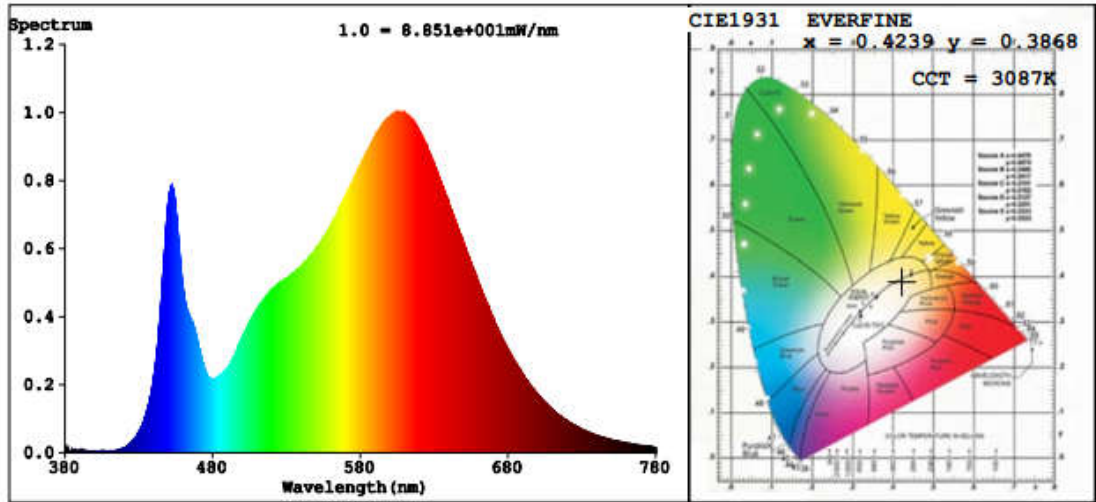
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	86	R9	23
Frequency (Hz)	60	R2	95	R10	88
CCT (K)	3087	R3	95	R11	84
Duv	-0.0052	R4	84	R12	76
Chromaticity (x, y)	x=0.4239 y=0.3868	R5	87	R13	89
Chromaticity (u', v')	u'=0.2496 v'=0.5124	R6	93	R14	98
Color Rendering Index (CRI)	85.9	R7	83	R15	80
R9	23	R8	65	--	--

**Photometric Measurement 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)	4501.3	4511.5	>=2000(-10%)	
Luminous Efficacy (lm/W)	124.83	124.42	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	124.14		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.6	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.30	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.14	--	1.0-2.0(±0.1)	
Beam Angle (°)	95.6	--	--	
Center Beam Candle Power (cd)	1912	--	--	

Spectral Power Distribution & Chromaticity Diagram

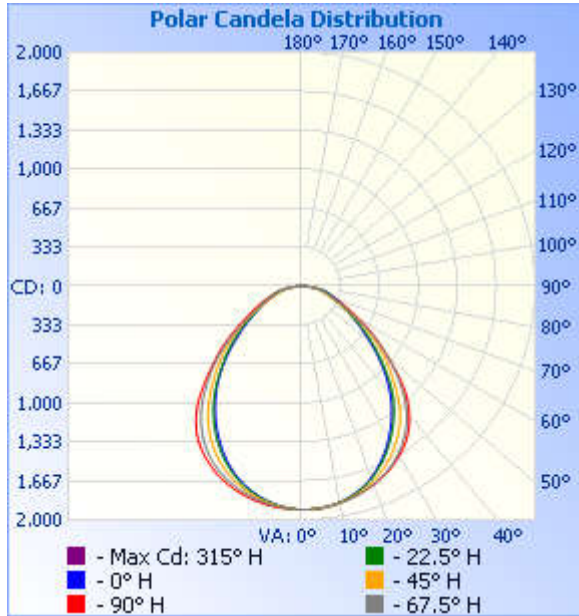


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,468.1	32.6%
0-40	2,363.2	52.5%
0-60	3,809.2	84.6%
60-90	672.5	14.9%
70-100	299.7	6.7%
90-120	8.3	0.2%
0-90	4,481.6	99.6%
90-180	19.0	0.4%
0-180	4,500.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	180.7	4.0%	90-100	2.5	0.1%
10-20	515.7	11.5%	100-110	2.8	0.1%
20-30	771.7	17.1%	110-120	3.1	0.1%
30-40	895.0	19.9%	120-130	3.1	0.1%
40-50	831.0	18.5%	130-140	2.8	0.1%
50-60	615.0	13.7%	140-150	2.1	0%
60-70	375.2	8.3%	150-160	1.5	0%
70-80	222.4	4.9%	160-170	0.9	0%
80-90	74.8	1.7%	170-180	0.3	0%

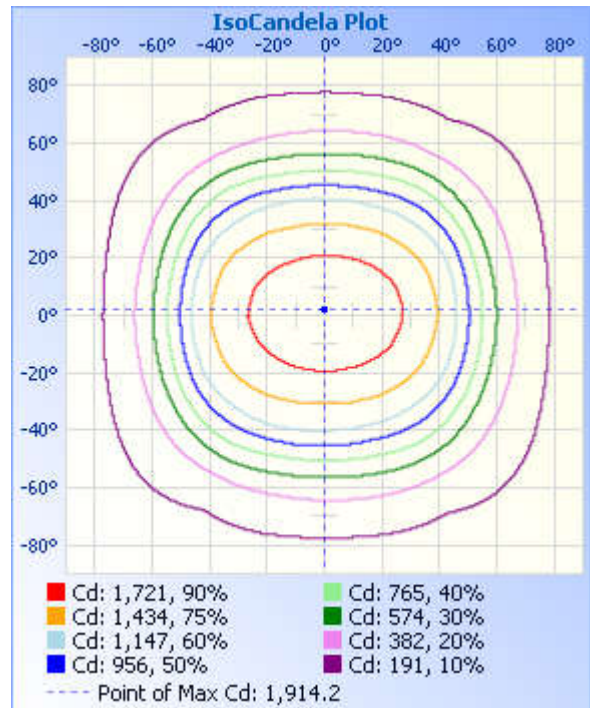
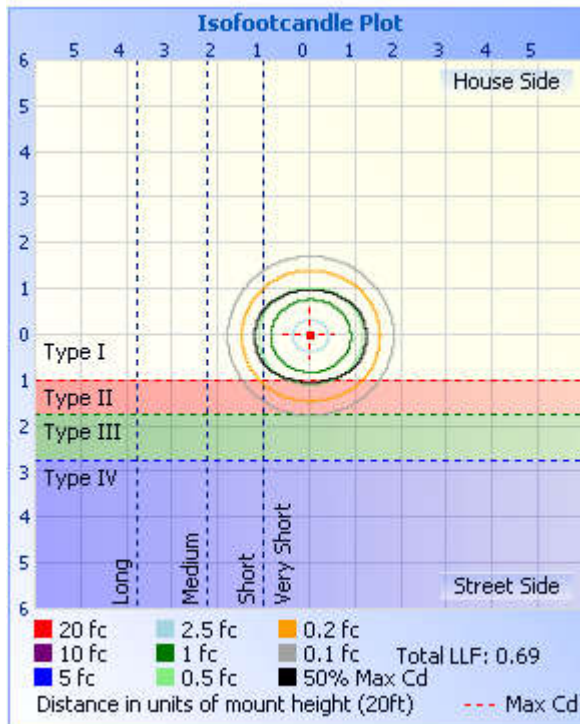
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
4.0ft	119.5 fc	8.1 ft	9.6 ft
8.0ft	29.9 fc	16.2 ft	19.3 ft
12.0ft	13.3 fc	24.2 ft	28.9 ft
16.0ft	7.5 fc	32.3 ft	38.5 ft
20.0ft	4.8 fc	40.4 ft	48.2 ft

■ Vert. Spread: 90.6°
■ Horiz. Spread: 100.6°



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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	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912	1912
5	1907	1908	1907	1906	1907	1908	1906	1906	1902	1901	1896	1894	1891	1893	1896	1901
10	1889	1890	1886	1881	1879	1879	1883	1886	1881	1873	1863	1855	1851	1856	1865	1876
15	1857	1856	1843	1830	1826	1829	1842	1851	1850	1834	1812	1793	1786	1794	1815	1839
20	1815	1809	1785	1757	1744	1752	1780	1805	1805	1781	1744	1709	1697	1709	1747	1787
25	1753	1745	1701	1651	1629	1646	1695	1741	1749	1715	1656	1601	1579	1601	1657	1717
30	1668	1653	1589	1522	1497	1519	1590	1656	1675	1629	1547	1473	1443	1469	1540	1621
35	1561	1531	1446	1372	1346	1376	1463	1544	1576	1513	1419	1331	1292	1318	1399	1494
40	1400	1367	1267	1192	1176	1215	1299	1399	1435	1368	1258	1173	1130	1146	1222	1329
45	1177	1168	1079	1002	985	1016	1099	1202	1240	1174	1061	983	950	962	1039	1133
50	955	954	898	825	790	821	913	986	988	958	878	790	763	791	863	930
55	753	727	699	649	619	641	716	759	772	738	690	618	596	624	676	713
60	561	525	510	491	481	482	517	544	578	529	496	464	464	474	499	516
65	425	384	358	377	376	368	351	378	419	372	337	354	362	365	354	379
70	317	285	251	297	297	291	244	276	311	272	235	280	284	288	250	281
75	231	208	187	226	236	226	187	205	228	202	177	214	219	217	184	207
80	159	142	139	157	167	160	141	139	154	134	130	146	152	146	135	138
85	68.4	66.5	65.4	82.1	80.7	85.5	69.9	66.2	67.4	60.5	61.3	73.3	71.2	71.9	60.4	60.9
90	2.26	2.11	2.35	2.74	2.14	3.49	3.19	2.13	1.65	2.27	2.66	2.18	11.8	2.18	2.49	2.23
95	1.36	1.51	1.85	1.87	2.09	1.89	2.42	1.43	1.65	1.66	2.12	1.79	5.63	1.73	2.15	1.94
100	2.40	2.11	2.06	2.34	2.18	2.41	2.12	1.66	2.48	2.34	2.26	1.75	2.72	1.96	2.65	2.57
105	3.08	2.86	2.49	2.53	2.27	2.49	3.10	2.87	3.31	2.85	2.49	1.96	2.03	2.11	2.84	3.06
110	3.55	3.24	3.24	2.94	2.49	2.64	3.43	3.17	3.68	3.06	2.73	2.19	2.26	2.11	2.93	3.32
115	3.68	3.76	3.48	2.87	2.67	2.75	3.52	3.62	3.85	3.61	2.75	2.11	2.39	2.16	3.01	3.64
120	4.06	3.99	3.58	2.85	2.71	2.79	3.50	3.83	3.96	3.66	2.77	2.72	2.49	2.47	3.07	3.66
125	4.36	4.44	3.61	3.17	3.34	3.46	3.48	3.82	4.07	3.76	2.64	2.86	2.92	3.09	3.04	3.68
130	4.56	4.48	3.55	3.55	3.71	3.69	3.31	3.80	7.92	3.54	2.49	2.85	3.32	3.21	2.95	3.63
135	4.49	4.35	3.11	3.68	3.84	3.68	3.08	3.78	6.93	3.54	2.44	2.84	3.39	3.31	2.87	3.53
140	4.36	3.99	2.64	3.52	3.84	3.48	2.87	3.62	5.94	3.54	2.45	2.82	3.34	3.40	2.87	3.44
145	4.12	3.73	2.45	3.32	3.84	3.09	2.49	3.39	4.95	3.61	2.34	2.81	3.38	3.47	3.18	2.95
150	4.07	3.54	2.34	3.17	3.83	3.20	2.27	3.25	3.96	3.58	2.50	2.80	3.53	3.62	3.35	2.90
155	3.84	3.33	2.36	3.17	3.80	3.22	2.27	3.12	3.65	3.56	2.63	2.70	3.47	3.66	3.39	2.78
160	3.53	3.09	2.37	3.13	3.78	3.18	2.24	2.95	3.57	3.53	2.65	2.58	3.40	3.66	3.43	2.66
165	3.48	2.86	2.39	3.06	3.69	3.17	2.34	2.84	3.38	3.39	2.67	2.50	3.33	3.62	3.47	2.58
170	3.47	2.71	2.41	3.32	3.64	3.46	2.45	2.76	3.57	3.42	2.69	2.44	3.44	4.28	3.86	2.61
175	3.52	2.71	2.41	3.59	4.07	3.57	2.48	2.67	3.49	3.46	2.71	2.42	3.62	4.22	3.85	2.64
180	3.53	2.71	2.41	3.62	3.99	3.77	2.49	2.64	3.61	3.54	2.72	2.42	3.62	3.99	3.70	2.49

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

Test date	2018-04-08	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G412-113		

Electrical Measurement inLithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3074	36.33	0.9846	11.13
70-P2	277.0	60	0.1447	36.57	0.9122	13.35
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

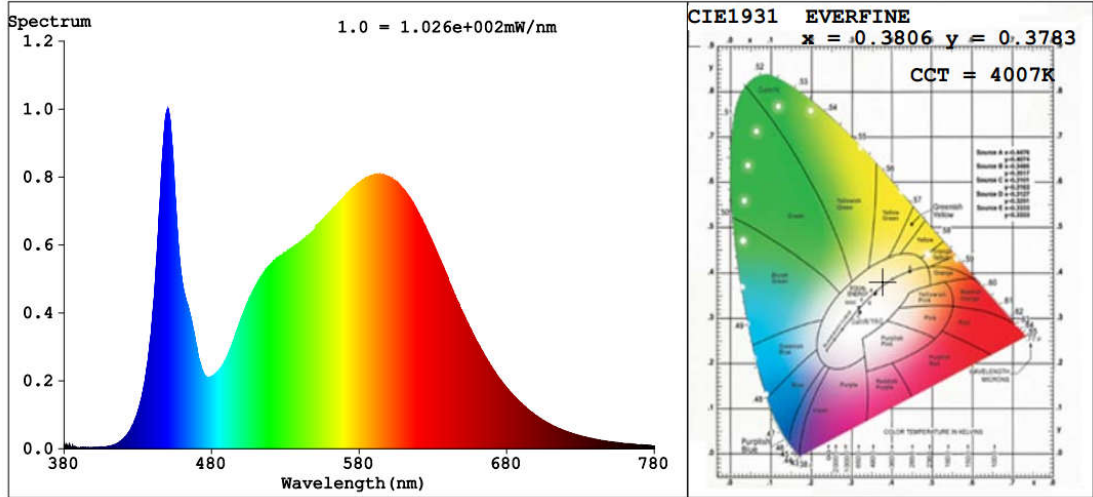
**Chromaticity Measurement inLithonia 2GT8 lensed 2x2 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	5
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4007	R3	94	R11	80
Duv	0.0007	R4	82	R12	60
Chromaticity (x, y)	x=0.3806 y=0.3783	R5	81	R13	82
Chromaticity (u', v')	u'=0.2246 v'=0.5023	R6	84	R14	97
Color Rendering Index (CRI)	82.3	R7	86	R15	74
R9	5	R8	64	--	--

**Photometric Measurement inLithonia 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)	4565.9	4587.3	>=2000(-10%)	
Luminous Efficacy (lm/W)	125.68	125.44	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.68		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)

Test date	2018-04-08	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G412-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x2:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE18030	120.0	60	0.3086	36.41	0.9832	11.54
70-P2	277.0	60	0.1451	36.64	0.9114	13.78
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

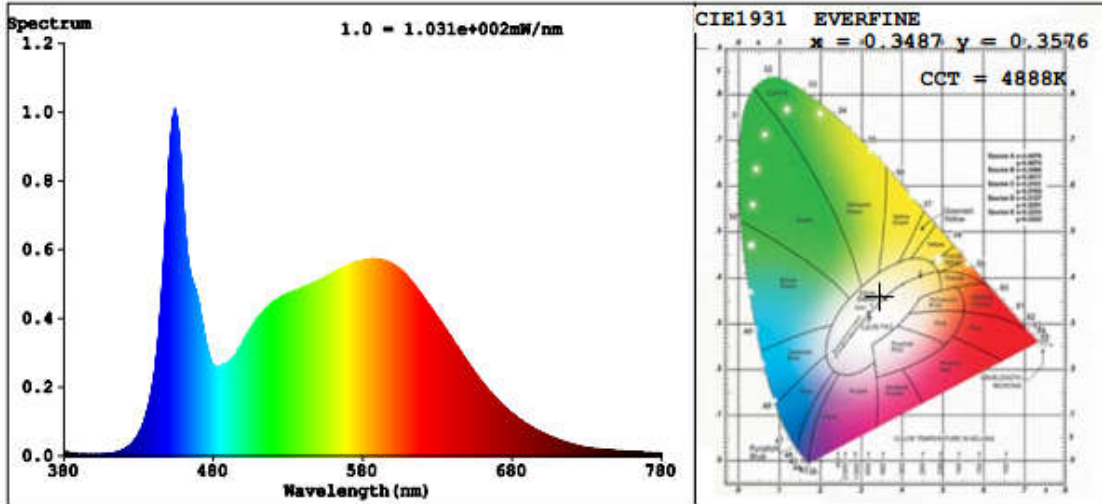
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x2 -
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	80
CCT (K)	4888	R3	95	R11	79
Duv	0.0016	R4	80	R12	56
Chromaticity (x, y)	x=0.3487 y=0.3576	R5	82	R13	86
Chromaticity (u', v')	u'=0.2115 v'=0.4881	R6	87	R14	98
Color Rendering Index (CRI)	84.1	R7	86	R15	77
R9	13	R8	67	--	--

**Photometric Measurement 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)	4614.2	4628.4	>=2000(-10%)	
Luminous Efficacy (lm/W)	126.73	126.32	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.93		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)
15G412-111	3000	4501.3	36.06	124.83
15G412-112	3500	4533.6 ^{*1}	36.20 ^{*2}	125.24 ^{*3}
15G412-113	4000	4565.9	36.33	125.68
15G412-115	5000	4614.2	36.41	126.73

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

$$4533.6 = (4565.9 - 4501.3) / 2 + 4501.3$$

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

$$36.20 = (36.33 + 36.06) / 2$$

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

$$125.24 = 4533.6 / 36.20$$

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 *******