

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): 15G215-11C

Remark: "C" denotes to CCT, may be
1,2,3,5. (1=3000K, 2=3500K, 3=4000K, 4=5000K).

Representative (Tested) Model:

15G215-111

15G215-113

15G215-115

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

Test & 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-I

Note: 1. The results contained in this report pertain only to the rested 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	15G215-11C	
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	30W	
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-I1(3000K), I2(4000K), I3(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"> 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**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° 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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)

Test date	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G215-111		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2831	33.45	0.9848	10.87
0-11	277.0	60	0.1356	33.93	0.9035	13.44
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

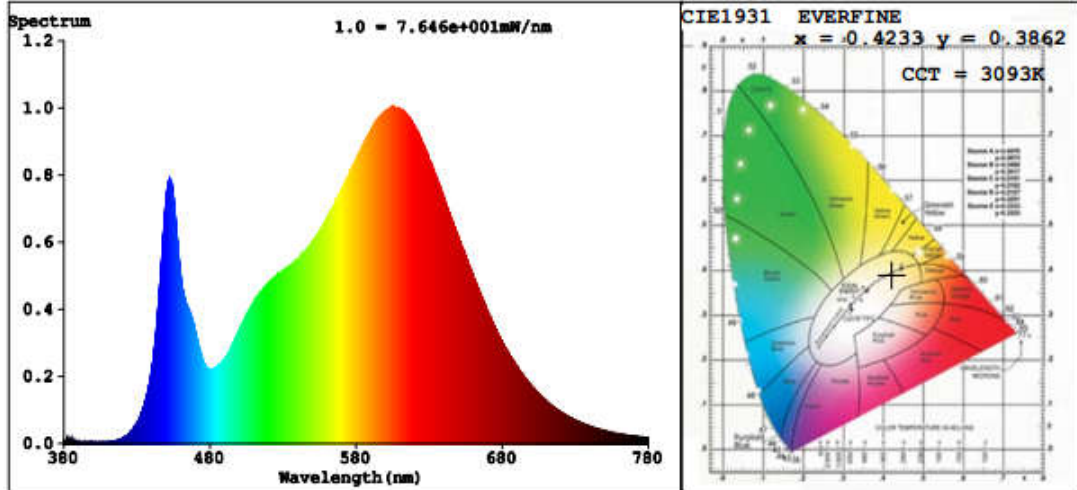
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

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	-0.0054	R4	84	R12	76
Chromaticity (x, y)	x=0.4233 y=0.3862	R5	87	R13	89
Chromaticity (u', v')	u'=0.2494 v'=0.5121	R6	93	R14	98
Color Rendering Index (CRI)	85.9	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)	4224.2	4246.4	>=3000(-10%)	
Luminous Efficacy (lm/W)	126.28	125.15	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	124.50		100(-3%)	125(-3%)
Zonal lumens in the 0-60° zone (%)	84.8	--	>= 75(-3)	
SC: 0-180° (if applicable)	1.24	--	1.0-2.0(±0.1)	
SC: 90-270° (if applicable)	1.21	--	1.0-2.0(±0.1)	
Beam Angle (°)	100.5	--	--	
Center Beam Candle Power (cd)	1696	--	--	

Spectral Power Distribution & Chromaticity Diagram

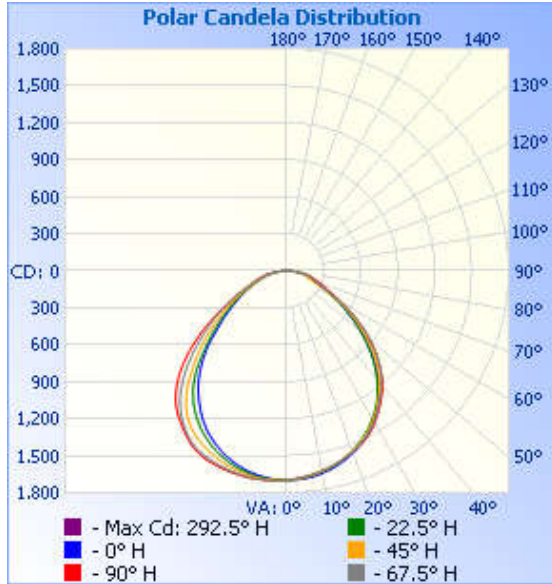


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,328.4	31.5%
0-40	2,167.8	51.3%
0-60	3,582.8	84.8%
60-90	633.3	15%
70-100	274.2	6.5%
90-120	3.7	0.1%
0-90	4,216.1	99.8%
90-180	7.5	0.2%
0-180	4,223.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	%Total
0-10	160.7	3.8%	90-100	1.4	0%
10-20	462.1	10.9%	100-110	1.2	0%
20-30	705.7	16.7%	110-120	1.1	0%
30-40	839.4	19.9%	120-130	1.0	0%
40-50	806.2	19.1%	130-140	0.9	0%
50-60	608.8	14.4%	140-150	0.8	0%
60-70	360.5	8.5%	150-160	0.6	0%
70-80	204.3	4.8%	160-170	0.4	0%
80-90	68.6	1.6%	170-180	0.1	0%

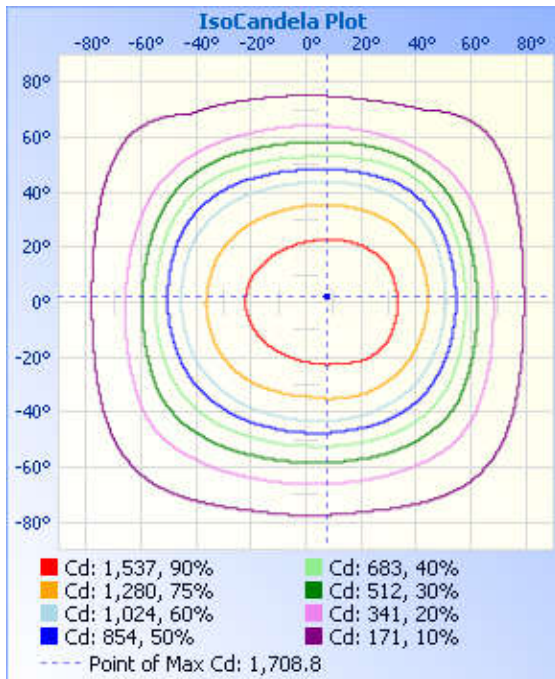
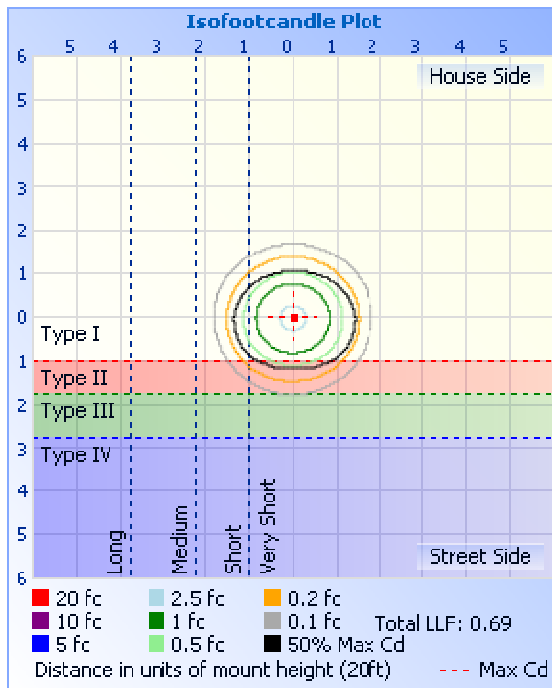
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
12.0ft	11.78 fc	26.7 ft	31.3 ft
24.0ft	2.95 fc	53.4 ft	62.5 ft
36.0ft	1.31 fc	80.1 ft	93.8 ft
48.0ft	0.74 fc	106.8 ft	125.1 ft
60.0ft	0.47 fc	133.4 ft	156.4 ft

■ Vert. Spread: 96.1°
■ Horiz. Spread: 105.0°



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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	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	
5	1705	1707	1701	1697	1690	1684	1680	1676	1676	1674	1677	1683	1688	1694	1700	1704	
10	1706	1708	1692	1680	1667	1654	1650	1647	1646	1642	1645	1651	1661	1676	1690	1700	
15	1695	1698	1669	1647	1626	1612	1607	1609	1608	1602	1600	1603	1617	1639	1664	1688	
20	1678	1679	1634	1600	1569	1551	1552	1561	1562	1553	1544	1540	1555	1585	1627	1665	
25	1650	1645	1587	1535	1497	1478	1486	1501	1507	1496	1476	1463	1476	1517	1576	1633	
30	1590	1577	1510	1454	1406	1386	1398	1416	1424	1420	1394	1367	1374	1430	1514	1575	
35	1503	1483	1410	1346	1294	1274	1287	1307	1319	1310	1281	1249	1250	1320	1413	1480	
40	1403	1382	1294	1209	1151	1135	1165	1194	1206	1174	1128	1099	1107	1174	1262	1349	
45	1251	1244	1147	1050	982	978	1020	1060	1056	1008	943	911	937	979	1061	1168	
50	1051	1047	958	863	803	800	842	888	884	828	767	735	743	790	870	962	
55	818	819	765	681	625	625	664	698	695	663	609	579	588	621	685	763	
60	589	575	545	504	469	457	477	502	512	516	470	450	459	478	519	583	
65	413	370	335	330	334	309	304	332	366	386	349	344	355	362	379	429	
70	302	267	215	225	240	220	205	248	276	275	252	253	267	265	269	301	
75	229	214	175	173	178	172	169	201	213	193	185	186	198	193	194	209	
80	156	154	139	125	127	123	134	149	149	134	125	125	134	128	132	140	
85	59.0	66.1	63.4	64.0	65.8	63.0	64.5	66.0	59.8	62.4	55.6	60.7	64.0	64.7	56.6	62.7	
90	1.70	1.71	1.78	1.90	1.65	1.73	1.59	1.70	1.40	1.05	1.04	3.12	1.17	3.29	0.97	1.25	
95	1.12	1.12	1.11	1.11	0.97	1.17	1.04	1.19	1.13	1.01	0.97	2.53	1.16	1.47	0.90	0.91	
100	1.01	0.97	0.96	1.11	1.01	1.15	0.98	1.03	0.84	0.98	1.22	1.93	1.14	1.31	0.98	0.91	
105	1.18	0.97	1.05	1.06	1.07	1.12	1.07	0.98	1.26	1.23	1.41	1.34	1.11	1.18	1.02	1.19	
110	1.17	1.13	1.13	0.94	1.13	1.11	1.16	1.23	1.49	1.41	1.42	1.05	0.90	1.03	1.05	1.17	
115	1.23	1.24	1.18	0.81	1.04	1.11	1.22	1.53	1.57	1.47	1.43	0.89	0.88	0.69	1.08	1.16	
120	1.30	1.34	1.20	0.77	0.80	0.79	1.30	1.53	1.55	1.47	1.45	0.93	0.69	0.65	1.08	1.15	
125	1.60	1.43	1.22	0.78	0.75	0.72	1.37	1.53	1.53	1.47	1.32	0.96	0.81	0.74	1.03	1.14	
130	1.59	1.44	1.24	0.80	0.70	0.74	1.30	1.53	1.52	1.47	1.21	1.06	0.94	0.90	1.04	1.13	
135	1.58	1.38	1.19	0.82	0.83	0.75	1.20	1.53	1.50	1.47	1.18	1.22	0.97	1.04	0.90	1.12	
140	1.57	1.33	1.04	0.83	0.90	0.81	1.04	1.53	1.49	1.47	1.18	1.25	1.14	1.18	0.90	1.14	
145	1.56	1.27	0.90	0.90	0.97	1.05	1.02	1.53	1.47	1.47	1.18	1.28	1.40	1.26	1.04	1.16	
150	1.55	1.21	0.90	1.10	1.03	1.10	0.99	1.48	1.43	1.47	1.18	1.30	1.43	1.39	1.32	1.18	
155	1.54	1.21	1.00	1.10	1.08	1.08	1.11	1.40	1.38	1.47	1.18	1.33	1.44	1.41	1.33	1.35	
160	1.52	1.21	1.18	1.10	1.13	1.05	1.11	1.31	1.35	1.47	1.18	1.36	1.44	1.38	1.35	1.31	
165	1.50	1.20	1.16	1.11	1.17	1.11	1.11	1.30	1.37	1.47	1.19	1.39	1.44	1.36	1.36	1.26	
170	1.49	1.20	1.14	1.14	1.22	1.33	1.11	1.31	1.39	1.47	1.21	1.42	1.44	1.34	1.37	1.22	
175	1.47	1.19	1.12	1.18	1.24	1.37	1.11	1.32	1.30	1.47	1.24	1.17	1.45	1.32	1.38	1.12	
180	1.46	1.19	1.11	1.66	1.24	1.38	1.11	1.33	1.25	1.47	1.25	1.17	1.45	1.25	1.39	1.12	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G215-113		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2833	33.47	0.9845	10.90
0-12	277.0	60	0.1356	33.94	0.9033	13.46
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

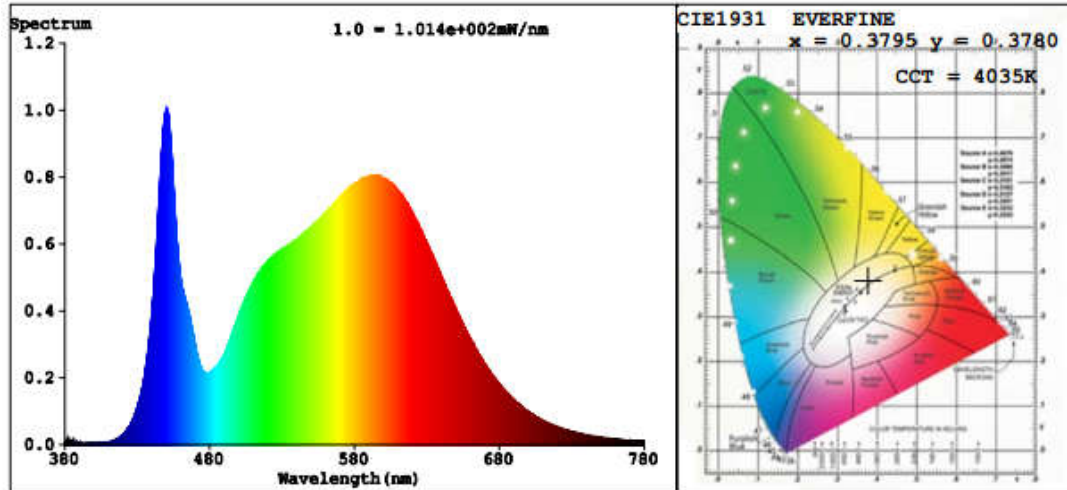
**Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-
 Sphere-Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	7
Frequency (Hz)	60	R2	88	R10	72
CCT (K)	4035	R3	94	R11	81
Duv	0.0008	R4	82	R12	60
Chromaticity (x, y)	x=0.3795 y=0.3780	R5	81	R13	83
Chromaticity (u', v')	u'=0.2240 v'=0.5020	R6	84	R14	97
Color Rendering Index (CRI)	82.5	R7	86	R15	75
R9	7	R8	64	--	--

**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)	4270	4293	>=3000(-10%)	
Luminous Efficacy (lm/W)	127.58	126.49	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	125.81		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	2018-04-07	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	15G215-115		

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE180307	120.0	60	0.2837	33.51	0.9844	10.89
0-I3	277.0	60	0.1360	34.02	0.9031	13.49
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

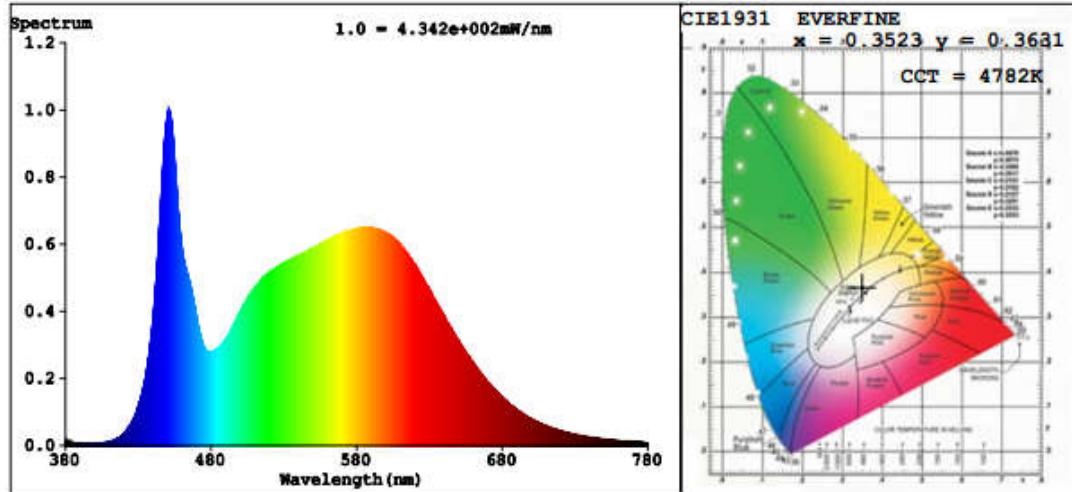
Chromaticity Measurement in Lithonia 2GT8 lensed 2x4-Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	10
Frequency (Hz)	60	R2	90	R10	75
CCT (K)	4782	R3	95	R11	81
Duv	0.0029	R4	82	R12	59
Chromaticity (x, y)	x=0.3523 y=0.3631	R5	82	R13	84
Chromaticity (u', v')	u'=0.2119 v'=0.4912	R6	85	R14	97
Color Rendering Index (CRI)	83.8	R7	88	R15	76
R9	10	R8	67	--	--

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)	4322	4345	>=3000(-10%)	
Luminous Efficacy (lm/W)	128.98	127.72	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	127.04		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)
15G215-111	3000K	4224.2	33.45	126.28
15G215-112	3500K	4247 ^{*1}	33.46 ^{*2}	126.93 ^{*3}
15G215-113	4000K	4270	33.47	127.58
15G215-115	5000K	4322	33.51	128.98

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

$$4247 = (4270 - 4224.2) + 4224.2$$

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

$$33.46 = (33.45 + 33.47) / 2$$

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

$$126.93 = 4247 / 33.46$$

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 *******