



## LM-79-08 Test Report

For

**P.Q.L., Inc.**

**(Brand Name: Superior Life®)**

2285 Ward Avenue / Simi Valley, CA 93065

**Item Number(s):**  
**93802, 93803**

**Report Type:** Testing and Report According to IES LM-79-2008  
**Type of Luminaire:** Linear Retrofit Kits for 1x4 Luminaires  
**Report Date:** 2020-07-31  
Ningbo TengLi Testing Co., Ltd  
**Prepared By:** 2nd floor, Block B, Ningbo Testing and Certification Base,  
No. 66 Qingyi Road, Ningbo National Hi-Tech Zone,  
Ningbo, Zhejiang

Test & Report By:

*Xeon Ren*

Engineer: Xeon Ren

Review By:

*Johnson Sun*

Manager: Johnson Sun

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 A2LA, or any agency of the Federal Government.



<b>1.1 Product Information:</b>		
Model Number	25W2X48_XXK	
Remark	Where "XX" represents CCT, XX=35(3500K),40(4000K),45(4500K), 50(5000K)	
Representative (Tested) Model	25W2X48_35K 93803 (50K)	
Model Difference	All construction and rating are the same, except CCT	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Linear Retrofit Kits for 1x4 Luminaires	
LED Manufacturer	ShenZhen JuFei Optoelectronics Co., Ltd.	
LED Model	01.JT.CC2835W80P03	
Dimming	Dimmable	
Integral Controls	No	
Sample Number	STD200730NB-E1(3500K),E2(5000K)	
Date of Receipt	Jul.11,2020	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

<b>1.2 Rated Values:</b>	
Rated Voltage / Frequency	120-277Vac, 50/60Hz
Nominal Power	25W
Rated Initial Lamp Lumen	--
Declared CCT	3500K, 4000K, 4500K,5000K



### 1.3 Test Specifications:

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> </ol>

### 1.4 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ , 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  $1\text{ }^{\circ}$  vertical intervals and  $22.5\text{ }^{\circ}$  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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ . 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 Summary of Test Result**

Criteria Item	Measured Value		Compliance	Requirement (DLC V5.1)
Minimum Total Luminous	2776		Pass	$\geq 1500(-10\%)$
Minimum Luminous Efficacy	106.89		Pass	Standard: $\geq 110(-3\%)$ Premium: $\geq 125(-3\%)$
Minimum Power Factor	0.8879		Pass	$\geq 0.9(-3\%)$
Maximum THD %	11.02		Pass	$\leq 20(+5)$
Minimum CRI	81.4		Pass	$\geq 80(-1)$
Minimum R9	1		Pass	$\geq 0(-1)$
Minimum Rg	95		Pass	$\geq 89(-1)$
Minimum Rf	83		Pass	$\geq 70(-1)$
Rcs, h1	-13		Pass	-12%-23%(-1%)
CCT (K)	3500K	3441	Pass	$\leq 6500K$
	5000K	5122		
Zonal Lumen Requirement	SC: 0-180 °(if applicable):	1.23	Pass	1.0-2.0( $\pm 0.1$ )
	SC: 90-270 °(if applicable):	1.20	Pass	
	0-60 °	84.8	Pass	$\geq 75(-3)$



**2.2 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2020-07-13	<b>Test Ambient:</b>	25 ± 1 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	45
<b>Model Number</b>	25W2X48_35K	<b>Total Operating Time(min)</b>	60

**Electrical Measurement in Lithonia 2GT8 lensed 1x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD200730	120.0	60.01	0.2143	25.41	0.9877	9.87
NB-E1	277.0	60.01	0.1056	25.97	0.8879	11.02

**Photometric Measurement – Goniophotometer Method in Lithonia 2GT8 lensed 1x4 (Tset Dstance: 26.00m):**

Parameter	Result	
	Test Voltage (V)	120
Frequency (Hz)	60	60
Total Luminous (lm)	2783.5	2776.3
Luminous Efficacy (lm/W)	109.55	106.89
Zonal lumens in the 0-60 °	84.8	--
SC: 0-180 °(if applicable):	1.23	--
SC: 90-270 °(if applicable):	1.20	--
Beam Angle ( °)	96.5	--
Center Beam Candle Power (cd)	1187	--

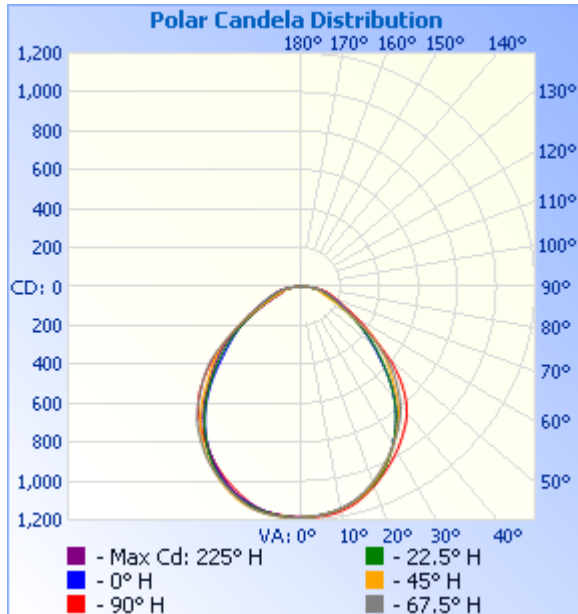


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	906.7	32.6%
0-40	1,455.6	52.3%
0-60	2,360.9	84.8%
60-90	415.3	14.9%
70-100	189.0	6.8%
90-120	3.2	0.1%
0-90	2,776.2	99.8%
90-180	6.9	0.2%
0-180	2,783.1	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	112.4	4.0%	90-100	1.0	0%
10-20	320.1	11.5%	100-110	1.2	0%
20-30	474.2	17.0%	110-120	1.1	0%
30-40	548.9	19.7%	120-130	1.0	0%
40-50	518.4	18.6%	130-140	0.9	0%
50-60	386.9	13.9%	140-150	0.7	0%
60-70	227.3	8.2%	150-160	0.6	0%
70-80	134.5	4.8%	160-170	0.4	0%
80-90	53.5	1.9%	170-180	0.2	0%

**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
3.3ft	109 fc	6.9 ft	8.0 ft
6.7ft	26.4 fc	13.9 ft	16.2 ft
10.0ft	11.9 fc	20.8 ft	24.1 ft
13.3ft	6.71 fc	27.7 ft	32.1 ft
16.7ft	4.25 fc	34.7 ft	40.3 ft
20.0ft	2.97 fc	41.6 ft	48.3 ft

■ Vert. Spread: 92.3°  
■ Horiz. Spread: 100.7°

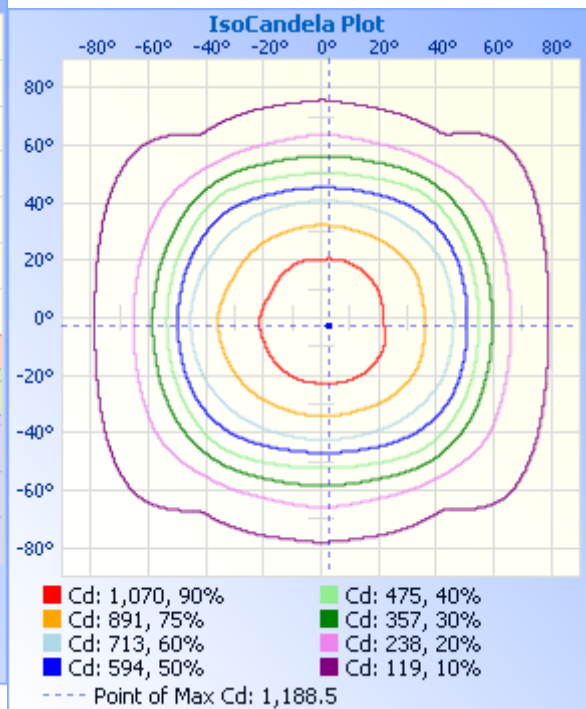
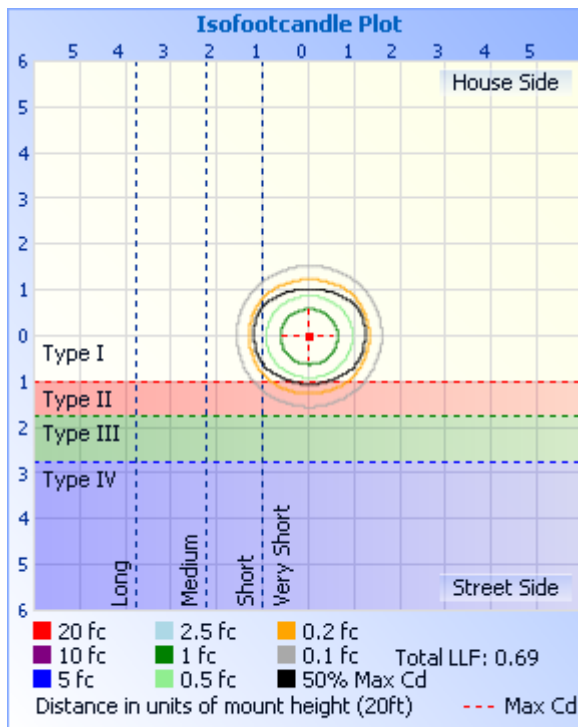




Table--1 UNIT: cd

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	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	1187	
5	1180	1182	1182	1181	1177	1178	1179	1179	1185	1182	1180	1183	1183	1185	1187	1187	
10	1166	1170	1168	1162	1157	1160	1159	1160	1170	1167	1167	1168	1166	1171	1178	1178	
15	1127	1137	1142	1132	1124	1128	1127	1122	1139	1135	1140	1141	1136	1145	1156	1150	
20	1078	1088	1091	1086	1078	1083	1076	1068	1091	1088	1095	1098	1093	1104	1111	1105	
25	1025	1033	1027	1023	1015	1020	1013	1006	1036	1030	1034	1038	1035	1045	1054	1053	
30	962	971	959	940	938	939	943	941	977	968	965	959	959	966	987	992	
35	898	903	878	848	846	845	863	872	913	899	885	864	868	870	903	920	
40	828	824	780	745	738	739	768	790	841	814	787	758	757	765	801	834	
45	733	717	661	623	614	617	655	686	737	711	674	640	631	646	682	728	
50	608	600	561	507	488	501	559	572	603	605	580	529	509	533	583	623	
55	456	448	442	392	387	386	430	420	447	449	459	419	410	419	471	475	
60	339	320	300	286	300	281	288	304	337	331	321	307	320	307	331	343	
65	247	236	196	205	228	203	189	224	246	248	219	222	246	223	220	253	
70	184	180	128	150	170	151	126	172	190	189	145	167	186	167	143	192	
75	146	139	101	112	127	115	102	133	152	144	107	128	137	127	104	145	
80	110	101	84.3	79.4	91.6	80.5	83.5	98.5	112	103	85.0	89.7	103	89.0	85.7	104	
85	59.7	59.0	46.3	43.2	46.0	45.7	43.6	54.6	57.0	57.9	48.4	50.9	56.4	51.0	51.7	61.8	
90	0.23	0.38	0.40	1.23	0.87	1.49	0.35	0.25	0.25	0.24	0.58	1.77	2.34	3.19	0.56	0.28	
95	0.44	0.52	0.65	1.19	1.47	1.38	0.40	0.38	0.77	0.71	0.92	1.24	1.32	1.38	1.02	0.80	
100	0.74	0.73	0.66	1.19	1.94	1.35	0.61	0.49	0.83	0.84	0.89	1.32	1.71	1.56	1.09	0.91	
105	0.74	0.73	0.66	1.19	1.99	1.53	0.67	0.58	0.85	0.87	0.97	1.32	1.97	1.56	1.15	0.93	
110	0.74	0.73	0.68	1.21	1.76	1.53	0.67	0.69	0.85	0.95	1.08	1.32	2.04	1.56	1.23	0.99	
115	0.74	0.79	0.68	1.21	1.53	1.46	0.75	0.74	0.86	1.06	1.10	1.29	1.83	1.59	1.26	1.07	
120	0.74	0.79	0.71	1.19	1.06	1.25	0.72	0.77	0.94	1.06	1.13	1.29	1.55	1.35	1.26	1.07	
125	0.74	0.79	0.81	1.21	1.01	1.27	0.75	0.77	0.97	1.09	1.21	1.29	1.16	1.40	1.31	1.13	
130	0.77	0.79	0.87	1.27	0.98	1.30	0.96	0.80	1.08	1.19	1.26	1.42	1.09	1.51	1.31	1.16	
135	0.80	0.79	0.87	1.29	0.98	1.30	1.07	0.85	1.21	1.22	1.31	1.50	0.91	1.56	1.36	1.24	
140	0.83	0.79	0.89	1.29	0.98	1.30	1.07	1.04	1.21	1.19	1.31	1.50	0.91	1.53	1.39	1.24	
145	0.85	0.81	1.10	1.29	0.98	1.30	1.12	1.07	1.21	1.19	1.31	1.50	0.93	1.27	1.50	1.32	
150	0.88	0.92	1.13	1.29	0.98	1.30	1.25	1.10	1.21	1.19	1.31	1.50	0.98	1.27	1.60	1.37	
155	0.88	1.06	1.21	1.27	0.98	1.30	1.28	1.21	1.19	1.19	1.31	1.50	1.14	1.27	1.63	1.37	
160	1.02	1.14	1.21	1.27	1.14	1.35	1.28	1.26	1.16	1.17	1.31	1.50	1.40	1.27	1.74	1.37	
165	1.16	1.17	1.23	1.37	1.11	1.56	1.31	1.26	1.19	1.17	1.34	1.58	1.55	1.27	1.90	1.49	
170	1.21	1.27	1.49	1.52	1.24	1.66	1.71	1.35	1.38	1.33	1.57	1.70	1.55	1.27	1.76	1.92	
175	1.65	1.63	1.55	1.52	1.29	1.66	1.82	1.68	1.63	1.63	1.60	1.70	1.55	1.27	1.74	1.92	
180	1.63	1.63	1.57	1.52	1.27	1.69	1.87	1.68	1.63	1.60	1.60	1.55	1.53	1.27	1.74	1.92	





**2.3 Electrical, Photometric and Chromaticity Measurements**

<b>Test date</b>	2020-07-13	<b>Test Ambient:</b>	25 ± 1 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	45
<b>Model Number</b>	25W2X48_35K	<b>Total Operating Time(min)</b>	46

**Electrical Measurement in Lithonia 2GT8 lensed 1x4 :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD200730	120.0	60	0.2151	25.53	0.9889	9.84
NB-E1	277.0	60	0.1058	26.07	0.8899	10.63

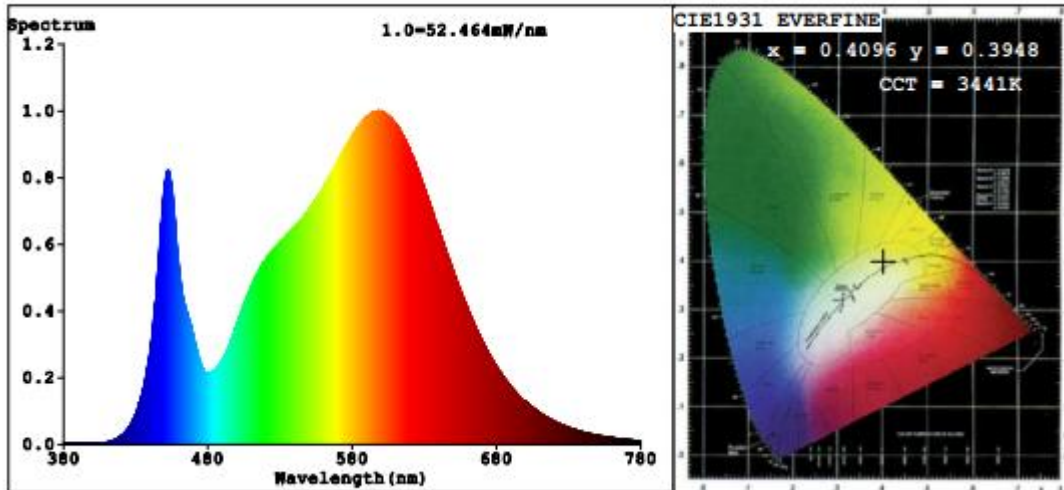
**Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia 2GT8 lensed 1x4 (Self-absorption:1.2560)(4π geometry):**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120	R1	79	R9	1
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	3441	R3	96	R11	78
Duv	0.0009	R4	79	R12	62
Chromaticity (x, y)	x=0.4096 y=0.3948	R5	79	R13	82
Chromaticity (u', v')	u'=-0.2368 v'=-0.5136	R6	85	R14	98
Color Rendering Index (CRI)	81.4	R7	84	R15	72
R9	1	R8	59	--	--
Rg	83				
Rf	95				
Rcs,h1	-13%				

**Photometric Measurement –Sphere-Spectroradiometer Method in Lithonia 2GT8 lensed 1x4:**

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	2776	2807
Luminous Efficacy (lm/W)	108.73	107.67

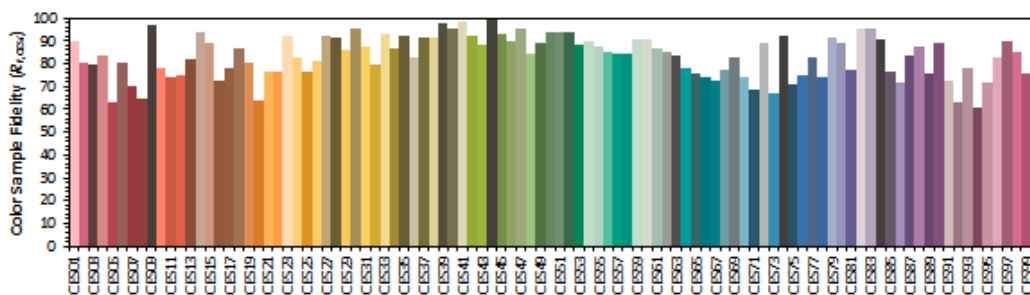
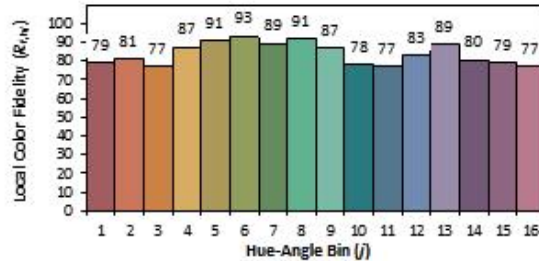
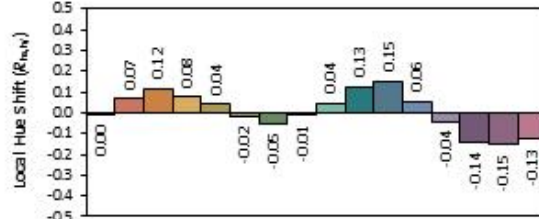
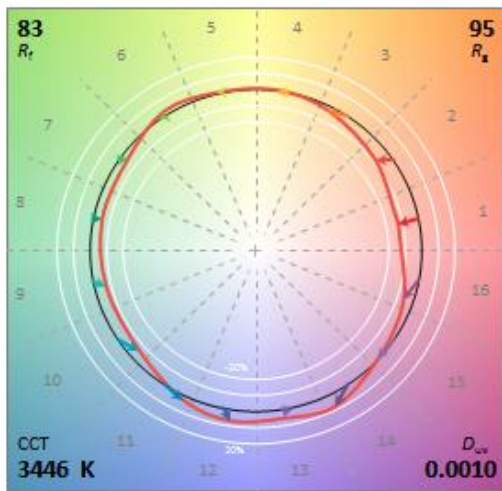
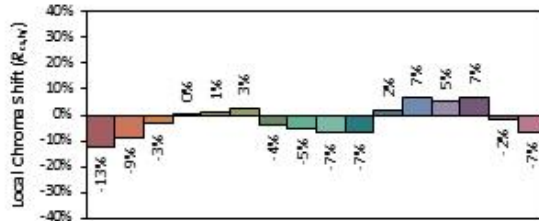
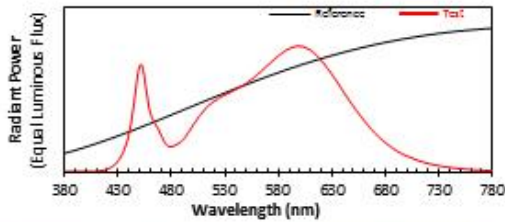
**Spectral Power Distribution & Chromaticity Diagram**



**TM30**

**ANSI/IES TM-30-18 Color Rendition Report**

<b>Source:</b>	01. JT. CC2835W80P03	<b>Manufacturer:</b>	P. Q. L., Inc.
<b>Date:</b>	2020/7/13	<b>Model:</b>	25W2X48_35K



<b>Notes:</b> This is a recommended method for displaying ANSI/IES TM-30-18 information.	$x$	<b>0.4095</b>	CIE 13.3-1995 (CRI) $R_a$ 82 $R_s$ 2
	$y$	<b>0.3951</b>	
	$u'$	<b>0.2366</b>	
	$v'$	<b>0.5137</b>	

rs are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2



**2.4 Electrical, Photometric and Chromaticity Measurements**

Test date	2020-07-13	Test Ambient:	25 ± 1 °C
Test Orientation	As intended	Stabilization Time (min)	45
Model Number	93803	Total Operating Time(min)	46

**Electrical Measurement in Lithonia 2GT8 lensed 1x4:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD200730	120.0	60	0.2156	25.56	0.9878	10.04
NB-E1	277.0	60	0.1040	25.87	0.8977	10.17

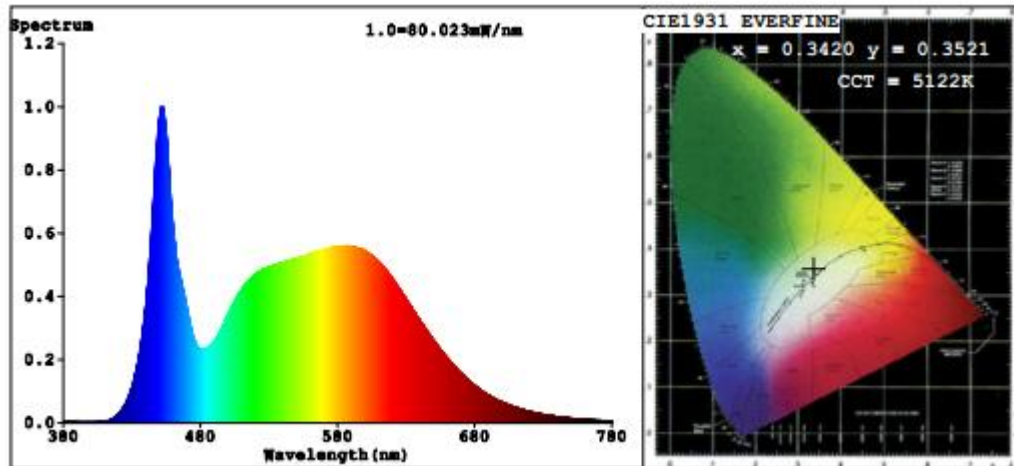
**Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia 2GT8 lensed 1x4 (Self-absorption:1.2568)(4π geometry):**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	83	R9	12
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	5122	R3	93	R11	84
Duv	0.0015	R4	84	R12	62
Chromaticity (x, y)	x=0.3420 y=0.3521	R5	84	R13	85
Chromaticity (u', v')	u'=-0.2091 v'=-0.4845	R6	85	R14	96
Color Rendering Index (CRI)	84.2	R7	87	R15	78
R9	12	R8	69	--	--
Rg	96				
Rf	84				
Rcs,h1	-12%				

**Photometric Measurement – Sphere-Spectroradiometer Method in Lithonia 2GT8 lensed 1x4:**

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	2850	2807
Luminous Efficacy (lm/W)	111.50	108.50

**Spectral Power Distribution & Chromaticity Diagram**

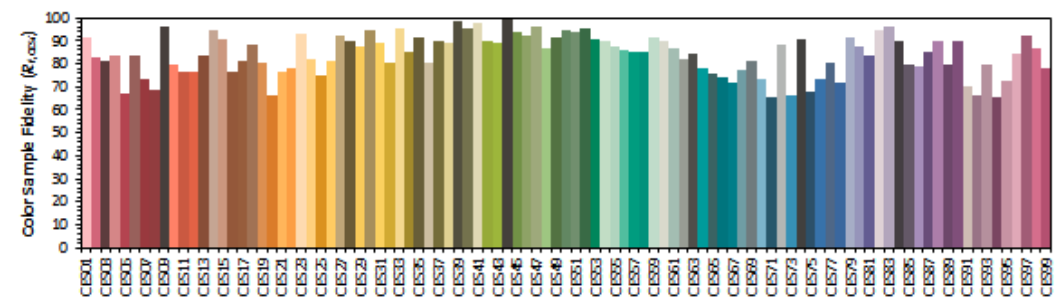
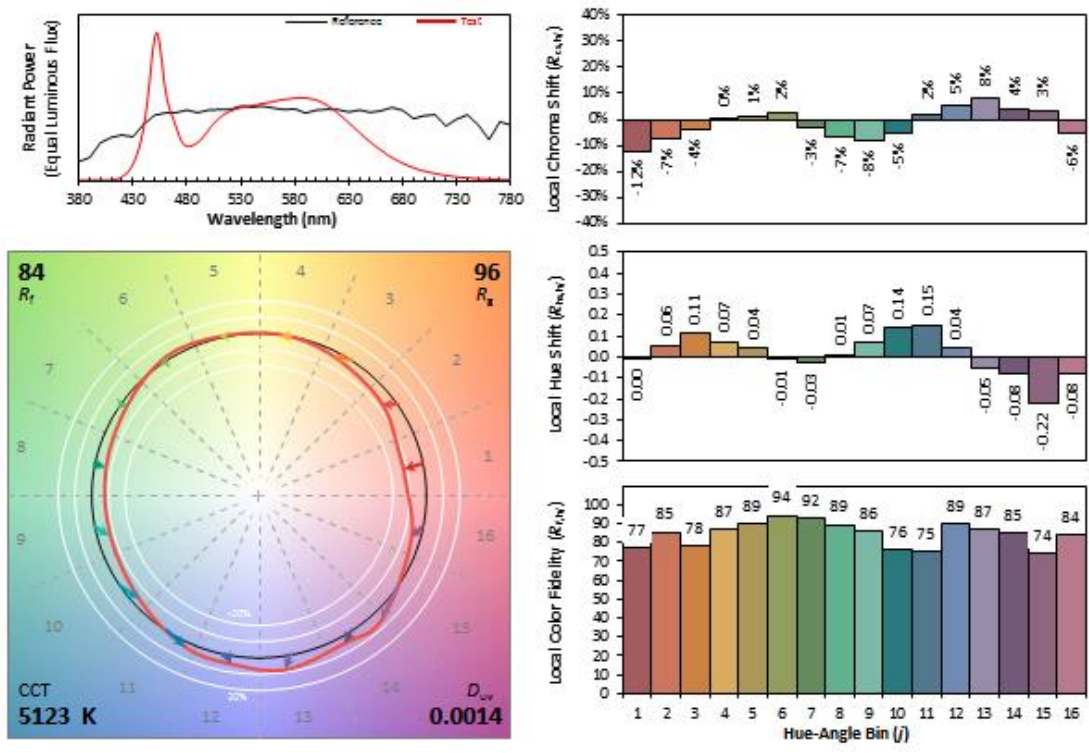




**TM30**

ANSI/IES TM-30-18 Color Rendition Report

Source: 01. JT. CC2835W80P03      Manufacturer: P. Q. L., Inc.  
 Date: 2020/7/13      Model: 93803



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$	<b>0.3420</b>	CIE 13.3-1995 (CRI)
$y$	<b>0.3519</b>	
$x'$	<b>0.2092</b>	
$y'$	<b>0.4844</b>	
		$R_a$ 84
		$R_s$ 12

ors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.



**2.5 Performance Assessment:**

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
25W2X48_35K	3500K	2783.5	25.41	109.55
93802	4000K	2806 <sup>*1</sup>	25.49 <sup>*2</sup>	110.08 <sup>*3</sup>
25W2X48_45K	4500K	2828 <sup>*1</sup>	25.49 <sup>*2</sup>	110.95 <sup>*3</sup>
93803	5000K	2850	25.56	111.50

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

$$2806 = (2850 - 2783.5) / 3 * 1 + 2783.5$$

$$2828 = (2850 - 2783.5) / 3 * 2 + 2783.5$$

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

$$25.49 = (25.41 + 25.56) / 2$$

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

$$110.08 = 2806 / 25.49$$

$$110.95 = 2828 / 25.49$$



### 3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2020-02-22	2021-02-21
ST-R-704	Power Meter for Integrating Sphere	2020-01-05	2021-01-04
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2020-02-22	2021-02-21
ST-R-711	Power Meter for Goniophotometer	2020-01-05	2021-01-04
Uncertainty(K=2): Photometric Measurement (Sphere):3.94% Chromaticity Measurement(Sphere):48.2K Photometric Measurement(Goniophotometer):3.96%			



#### 4. Product Photo



\*\*\*\*\* END OF REPORT \*\*\*\*\*