1.3 Test Specifications:

Test item	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	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

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 ℃ ±1 ℃, 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 ºC ±1 ºC. 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 ºC ±1 ºC. 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.

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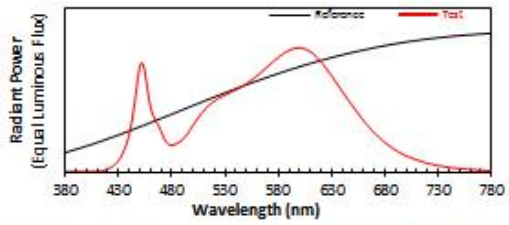
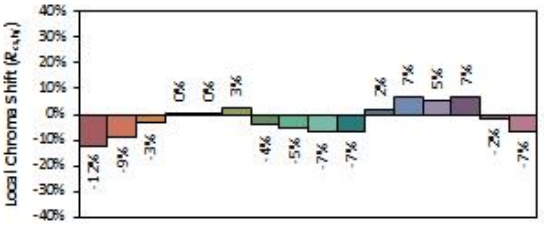
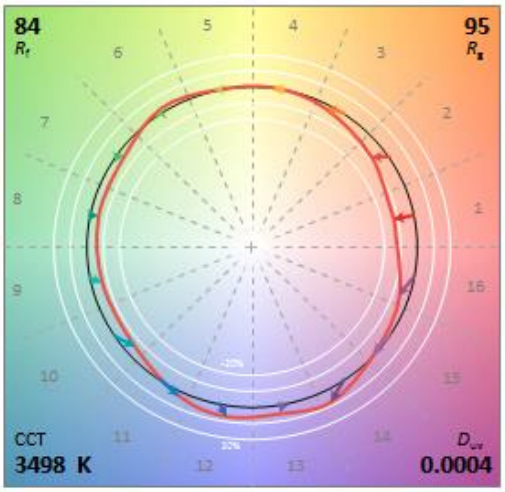
TM30

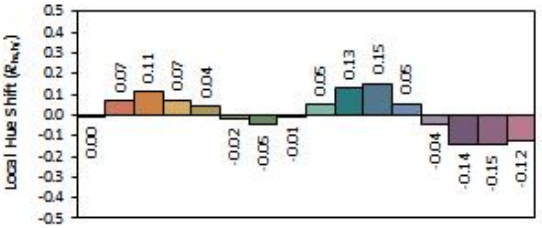
ANSI/IES TM-30-18 Color Rendition Report

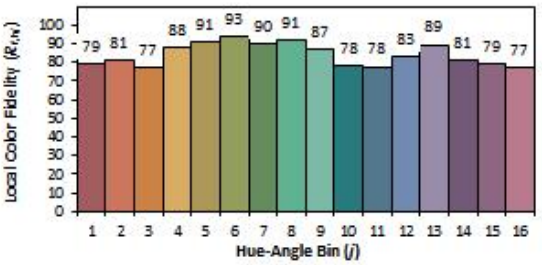
Source:	01.JT.CC2835W80P03	**Manufacturer:**	34/F
Date:	2020/7/14	**Model:**	49W4X48_35K

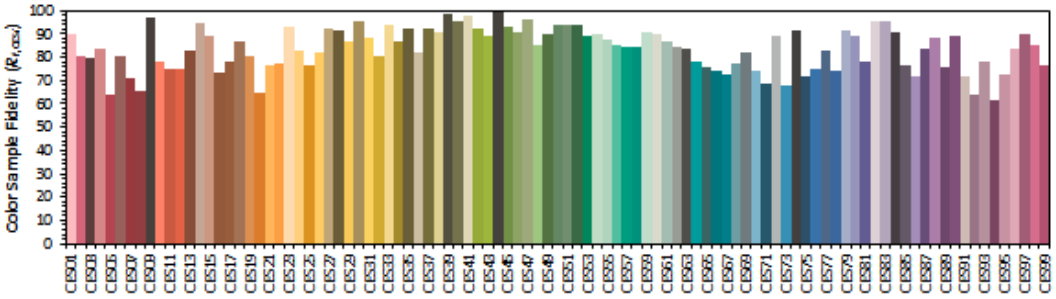












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4058
y	0.3918
u'	0.2356
v'	0.5118

CIE 13.3-1995 (CRI)

R_a	82
R_9	5

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	2020-07-14	**Test Ambient:**	25±1 °C
Test Orientation	As intended	**Stabilization Time (min)**	45
Model Number	93813	**Total Operating Time(min)**	46

Electrical Measurement in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD200730	120.0	60	0.3945	46.80	0.9887	13.21
NB-M1	277.0	60	0.1659	45.19	0.9833	13.53

Chromaticity Measurement - Sphere-Spectroradiometer Method in Lithonia 2GT8 lensed 2x4 (Self-absorption:1.4058)(4π geometry):

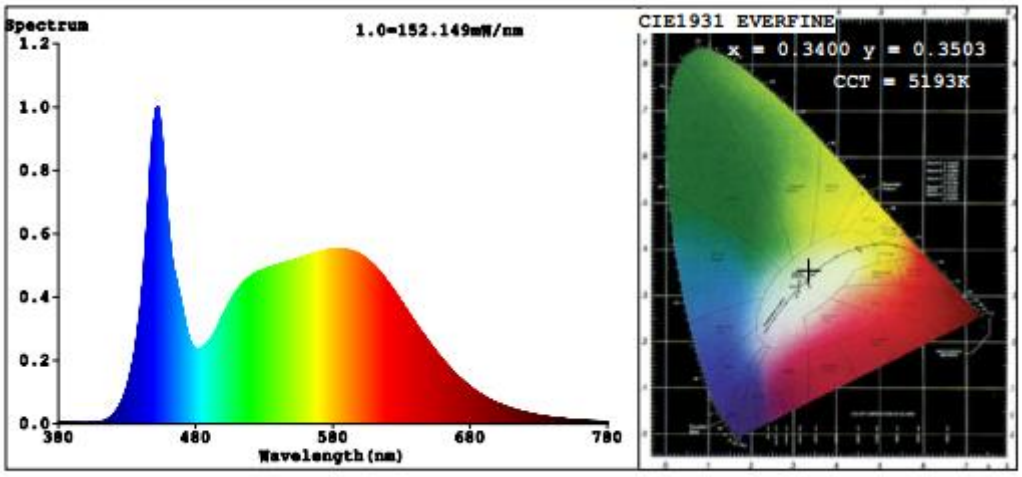
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5193
Duv	0.0014
Chromaticity (x, y)	x=0.3400 y=0.3503
Chromaticity (u', v')	u'=0.2085 v'=0.4833
Color Rendering Index (CRI)	84.3
R9	13
Rg	96
Rf	84
Rcs,h1	-12%

Special Color Rendering Indices			
R1	83	R9	13
R2	89	R10	74
R3	93	R11	84
R4	84	R12	62
R5	84	R13	85
R6	85	R14	96
R7	87	R15	78
R8	69	--	--

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

Parameter	Result	
Test Voltage (V)	120	277
Frequency (Hz)	60	60
Total Luminous (lm)	5353	5194
Luminous Efficacy (lm/W)	114.38	114.94

Spectral Power Distribution & Chromaticity Diagram



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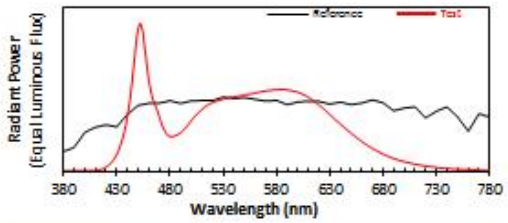
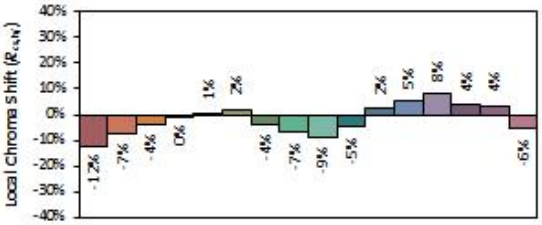
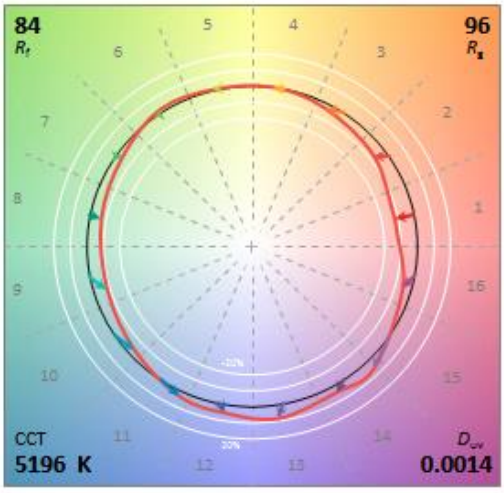
TM30

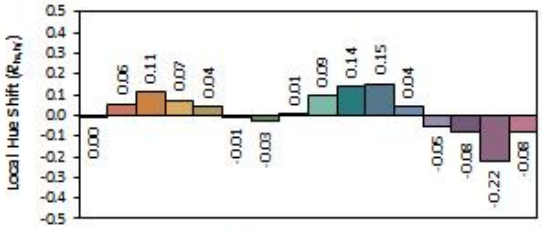
ANSI/IES TM-30-18 Color Rendition Report

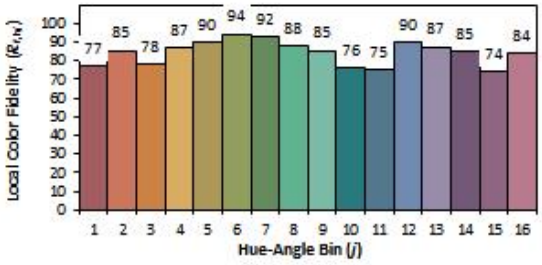
Source:	01.JT.CC2835W80P03	**Manufacturer:**	P.Q.L., Inc.
Date:	2020/7/14	**Model:**	93813

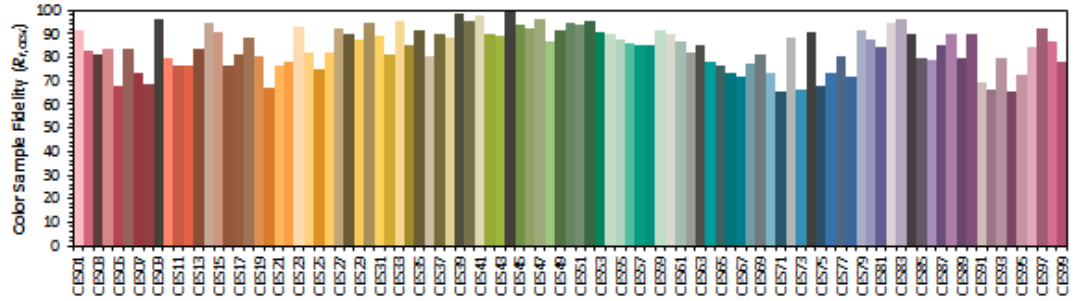












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3400
y	0.3501
u'	0.2085
v'	0.4832

CIE 13.3-1995 (CRI)

R_a	84
R_9	13

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2.5 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
49W4X48_35K	3500K	5268.3	46.33	113.71
93812	4000K	5297*1	46.57*2	113.74*3
49W4X48_45K	4500K	5325*1	46.57*2	114.34*3
93813	5000K	5353	46.80	114.38

*1: This value is calculated and the calculation formula is as below:
5297= (5353-5268.3)/3*1+5268.3
5325= (5353-5268.3)/3*2+5268.3

*2: This value is calculated and the calculation formula is as below:
46.57= (46.33+46.80)/2

*3: This value is calculated and the calculation formula is as below:
113.74=5297/46.57
114.34=5325/46.57

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 ********