LM-79-08 Test Report

For

RAB LIGHTING INC

(Brand Name: N/A)

170 Ludlow Ave,PO BOX 970,Northvale, NJ 07647-2305 USA

Model name(s): DLW0064(WFRL8R239FA120WB)

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Downlights
Report Date:	2021-09-01

Prepared By:

Test & Report By:

Engineer: Sun Fangfang

Review By:

Manager: Huang Qichong

1.1 Rated Values:	
Rated Voltage / Frequency	120Vac, 60 Hz
Nominal Power	23W
Rated Initial Lamp Lumen	1800 lm
Declared CCT	2700K/3000K/3500K/4000K/5000K

1.2 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 C78.377-2015 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°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.

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 25ºC ±1ºC. 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 25ºC ±1ºC. 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.

2.1.1 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-01	**Test Ambient:**	25.3 ºC
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	DLW0064(WFRL8R239FA120WB)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310004	120.0	60	0.183	21.48	0.978

Chromaticity Measurement - Sphere-Spectroradiometer Method:

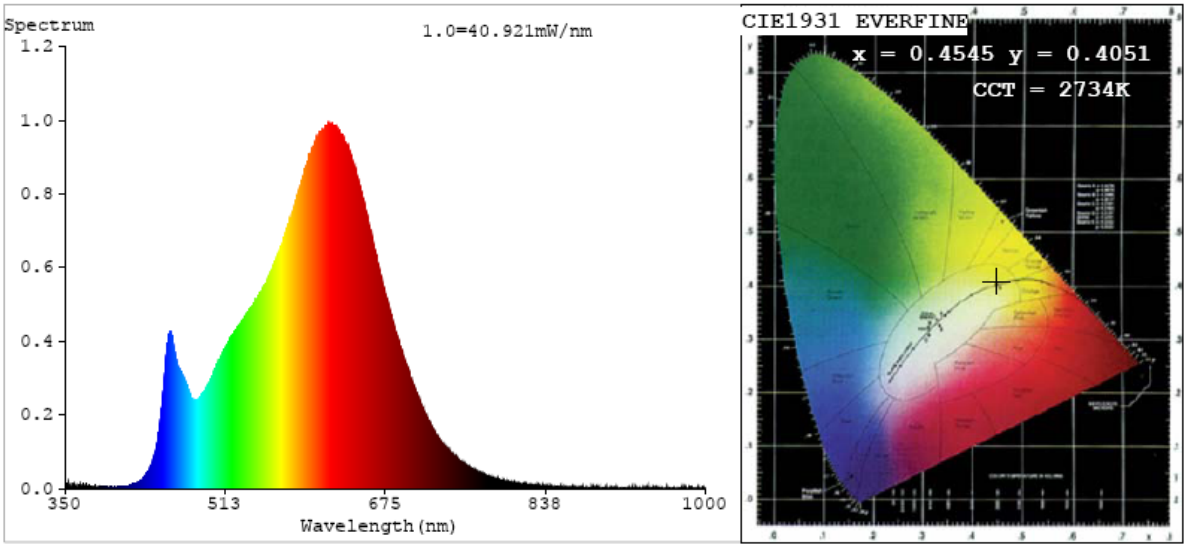
Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2734
Duv	0.0016
Chromaticity (x, y)	x=0.4545 y=0.4051
Chromaticity (u', v')	u'=0.2615 v'=0.5244
Color Rendering Index (CRI)	91.5
R9	53

Special Color Rendering Indices			
R1	93	R9	53
R2	99	R10	97
R3	95	R11	92
R4	91	R12	84
R5	93	R13	95
R6	96	R14	98
R7	88	R15	88
R8	77	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1867.8
Luminous Efficacy (lm/W)	86.87
Beam Angle (°)	111.8
Center Beam Candle Power (cd)	656.6

Spectral Power Distribution & Chromaticity Diagram



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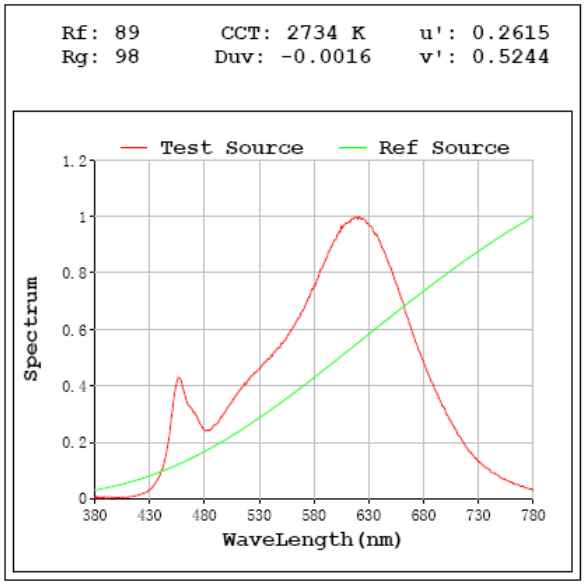
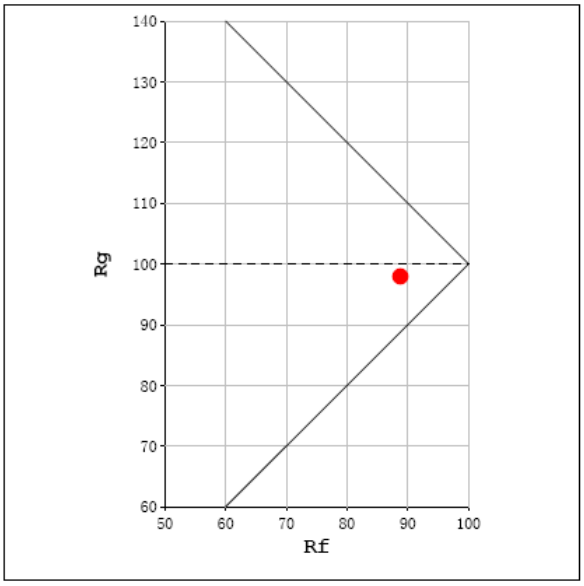
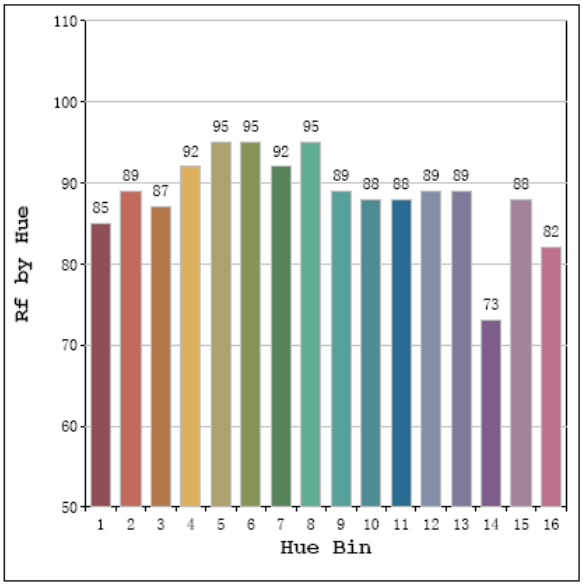
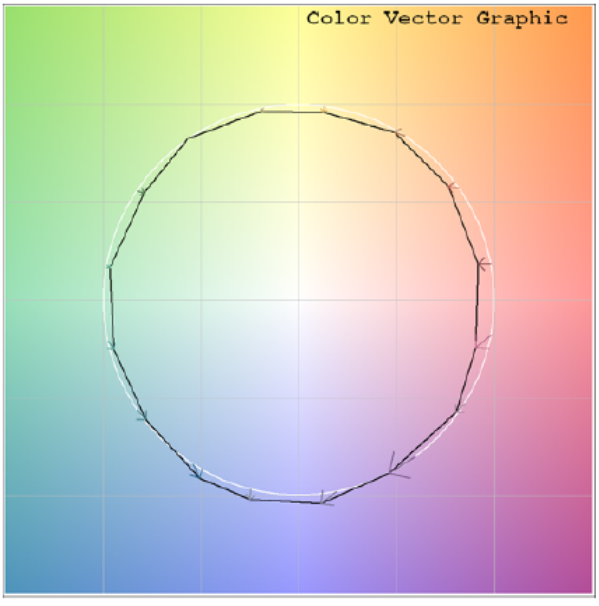






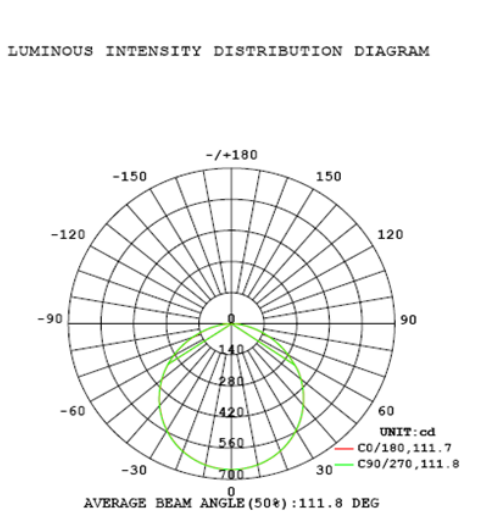


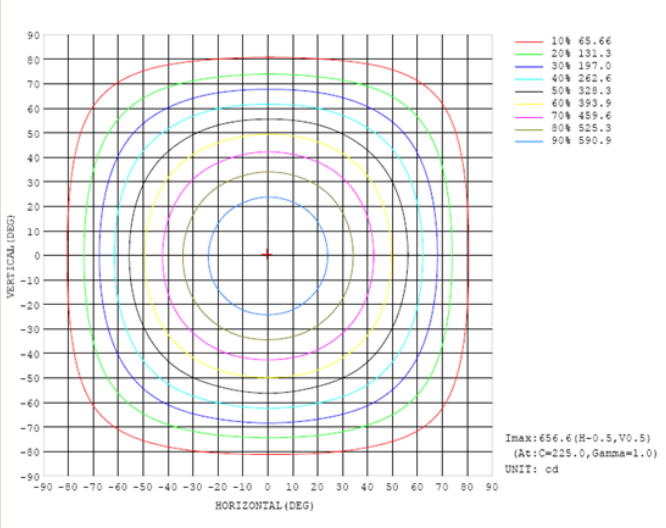
Zonal Lumen Tabulation

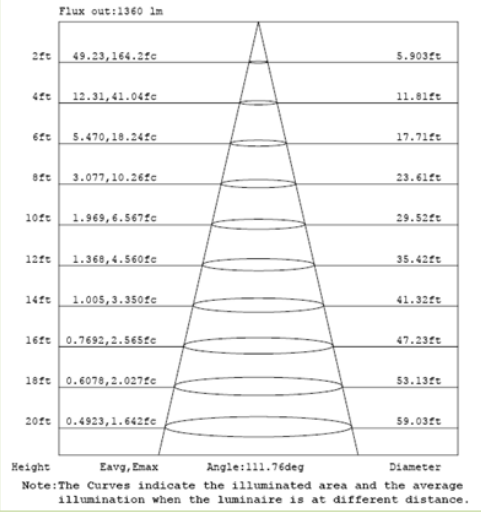
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	509.8	64.3%
0-40	834.6	105.3%
0-60	1473.4	185.9%
60-90	394.4	49.8%
70-100	167.2	21.1%
90-120	0.0	0.0%
0-90	1867.8	235.7%
90-180	0.0	0.0%
0-180	792.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	62.1	7.8%	90-100	0.0	0.0%
10-20	178.0	22.5%	100-110	0.0	0.0%
20-30	269.7	34.0%	110-120	0.0	0.0%
30-40	324.8	41.0%	120-130	0.0	0.0%
40-50	336.6	42.5%	130-140	0.0	0.0%
50-60	302.2	38.1%	140-150	0.0	0.0%
60-70	227.2	28.7%	150-160	0.0	0.0%
70-80	128.6	16.2%	160-170	0.0	0.0%
80-90	38.7	4.9%	170-180	0.0	0.0%

Photometric Data







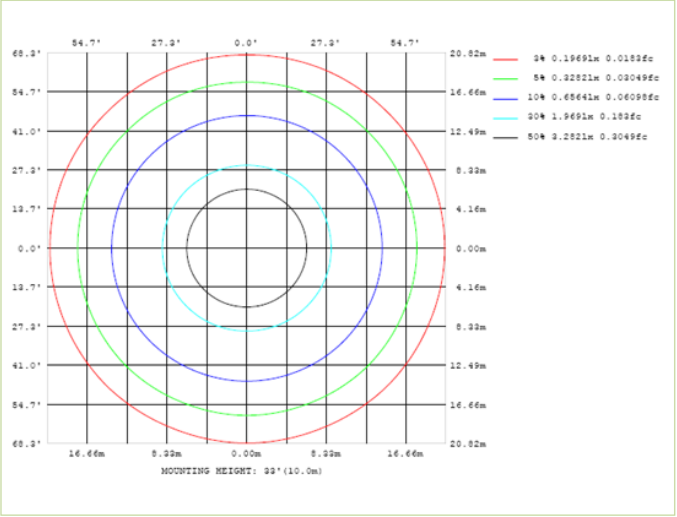


Table--1 UNIT: cd

γ (DEG) \ C (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	657	657	657	657	657	657	657	657	657	657	657	657	657	657	657	657
5	654	654	654	654	654	654	654	654	653	653	653	653	654	653	654	653
10	645	645	645	645	646	646	646	645	645	644	645	644	645	644	645	645
15	631	631	631	632	632	632	631	631	630	629	630	629	630	630	631	630
20	611	611	611	612	612	612	612	611	610	609	609	609	610	610	611	610
25	585	586	586	587	587	587	586	586	585	583	583	583	584	584	586	585
30	555	556	555	556	556	557	556	555	554	552	553	552	553	553	555	554
35	519	521	520	521	521	522	520	520	519	517	517	516	518	518	520	519
40	480	482	481	482	482	483	481	481	479	477	477	476	478	478	480	480
45	437	439	438	440	439	440	438	437	435	433	434	433	435	435	437	436
50	391	393	392	393	392	393	391	390	389	387	387	386	388	388	390	390
55	340	340	342	341	342	340	340	338	336	336	334	335	335	337	338	340
60	287	285	289	286	289	285	287	282	280	282	279	282	280	284	282	286
65	231	230	235	233	235	231	232	227	225	227	226	228	226	229	228	231
70	174	176	179	179	180	177	176	172	171	170	171	172	172	173	175	174
75	120	123	124	126	125	125	122	119	118	117	119	119	120	120	122	120
80	71.6	73.7	74.7	77.6	76.3	76.6	73.4	70.7	70.6	68.7	70.8	71.3	72.5	72.3	73.6	71.7
85	30.5	32.3	33.9	35.4	34.2	34.4	32.4	30.4	30.4	29.3	31.1	30.5	31.5	31.4	32.9	31.4
90	12.6	12.7	12.9	13.0	13.0	12.8	12.7	12.6	13.2	13.2	13.2	13.2	13.2	13.3	13.3	13.3

2.1.2 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-01	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0064(WFRL8R239FA120WB)	3000K	

Electrical Measurement:

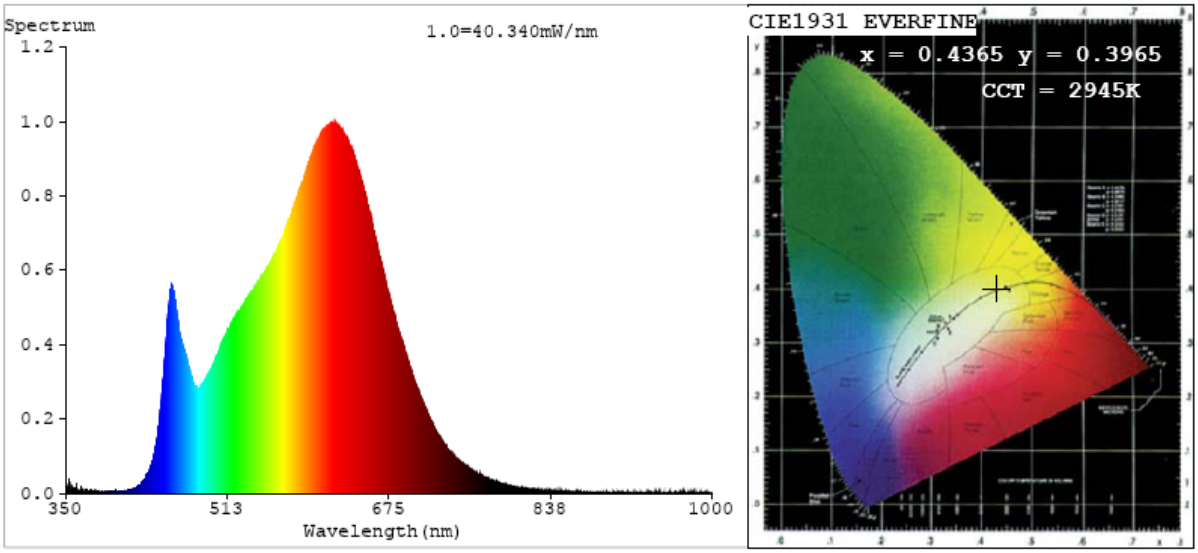
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310004	120.0	60	0.182	21.33	0.978

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2945
Duv	0.0030
Chromaticity (x, y)	x=0.4365 y=0.3965
Chromaticity (u', v')	u'=0.2536 v'=0.5183
Color Rendering Index (CRI)	92.7
R9	61
Total Luminous (lm)	1939
Luminous Efficacy (lm/W)	90.9

Special Color Rendering Indices			
R1	95	R9	61
R2	99	R10	99
R3	96	R11	94
R4	92	R12	82
R5	95	R13	97
R6	95	R14	99
R7	89	R15	91
R8	81	--	--

Spectral Power Distribution & Chromaticity Diagram



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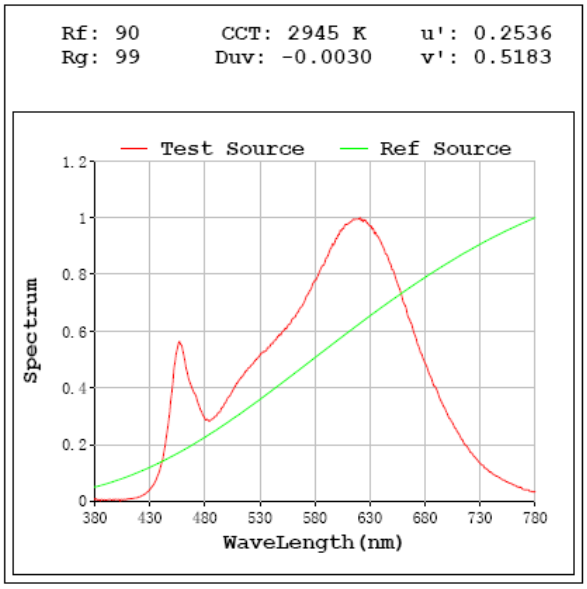
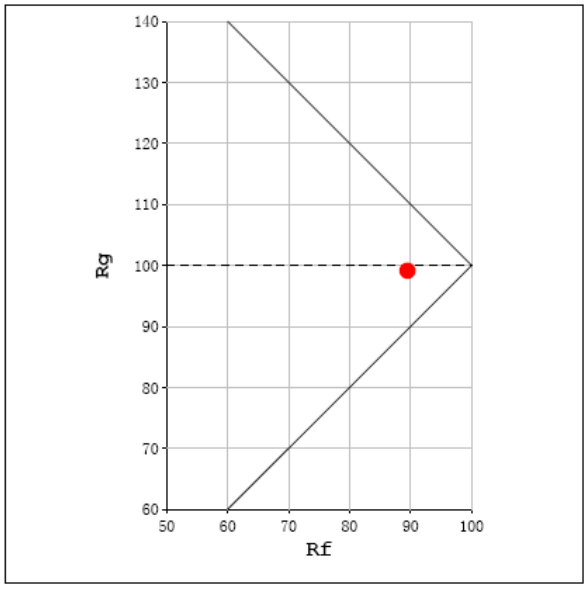
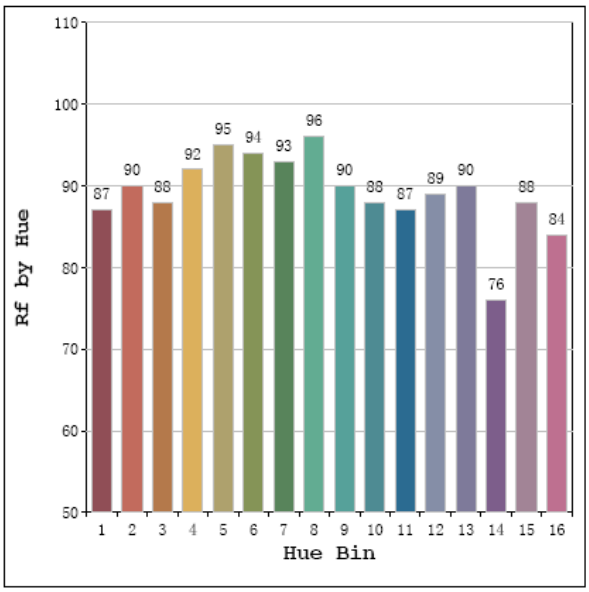

Rf: 90
Rg: 99
CCT: 2945 K
Duv: -0.0030
u': 0.2536
v': 0.5183
Test Source
Ref Source
Spectrum
WaveLength (nm)


Rg
Rf


Rf by Hue
Hue Bin
87
90
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92
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76
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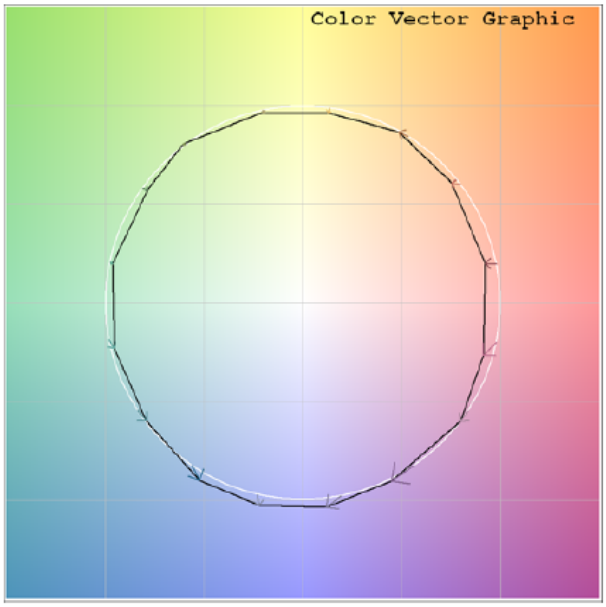
84


Color Vector Graphic

2.1.3 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-01	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0064(WFRL8R239FA120WB)	3500K	

Electrical Measurement:

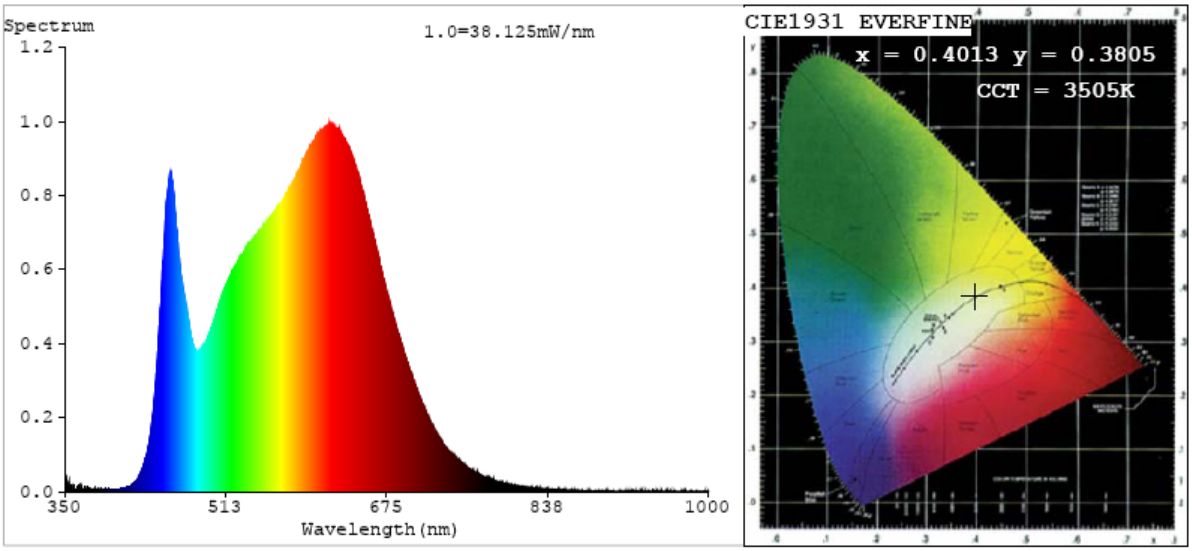
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310004	120.0	60	0.178	20.93	0.977

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3505
Duv	0.0037
Chromaticity (x, y)	x=0.4013 y=0.3805
Chromaticity (u', v')	u'=0.2373 v'=0.5063
Color Rendering Index (CRI)	94.6
R9	73
Total Luminous (lm)	2064
Luminous Efficacy (lm/W)	98.65

Special Color Rendering Indices			
R1	97	R9	73
R2	99	R10	98
R3	98	R11	95
R4	94	R12	78
R5	96	R13	98
R6	95	R14	100
R7	92	R15	95
R8	87	--	--

Spectral Power Distribution & Chromaticity Diagram



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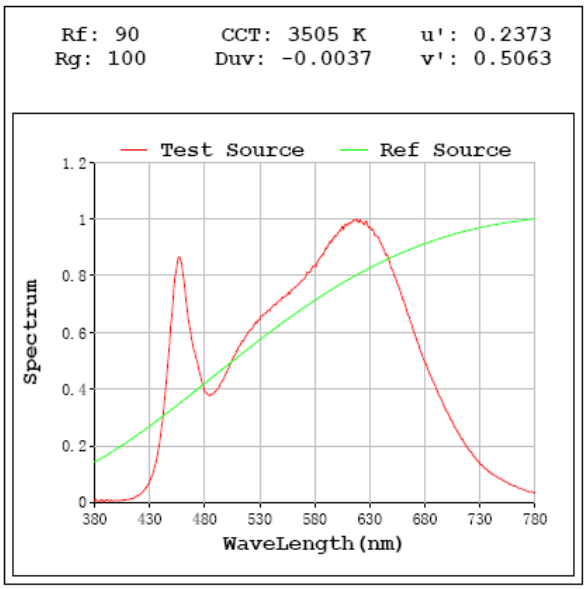
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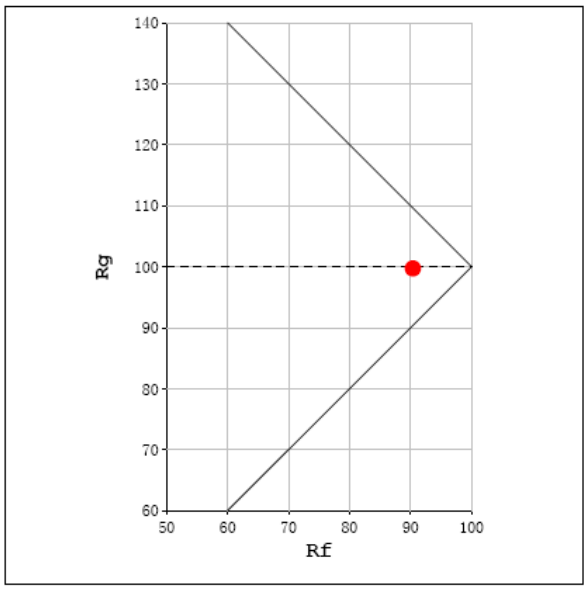
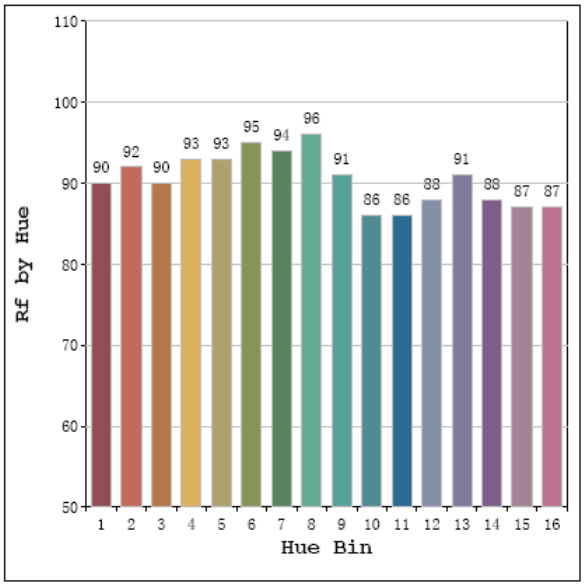
Rg: 100 Duv: -0.0037 v': 0.5063
Test Source
Ref Source
Spectrum
WaveLength (nm)


Rg
Rf


Rf by Hue
Hue Bin
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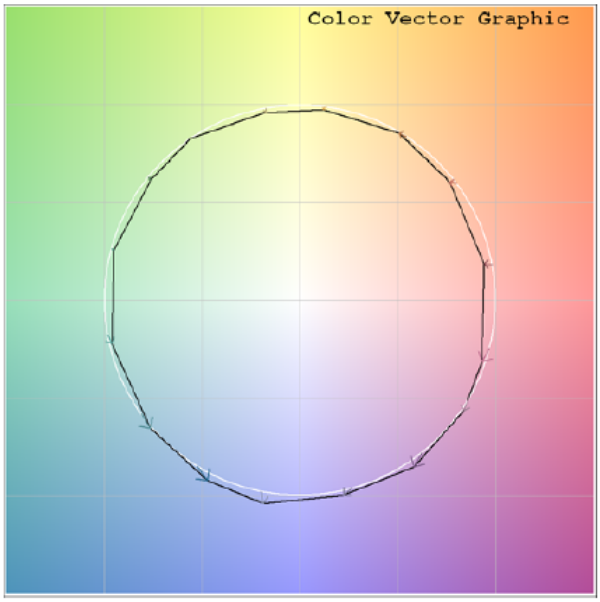

Color Vector Graphic

2.1.4 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-01	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0064(WFRL8R239FA120WB)	4000K	

Electrical Measurement:

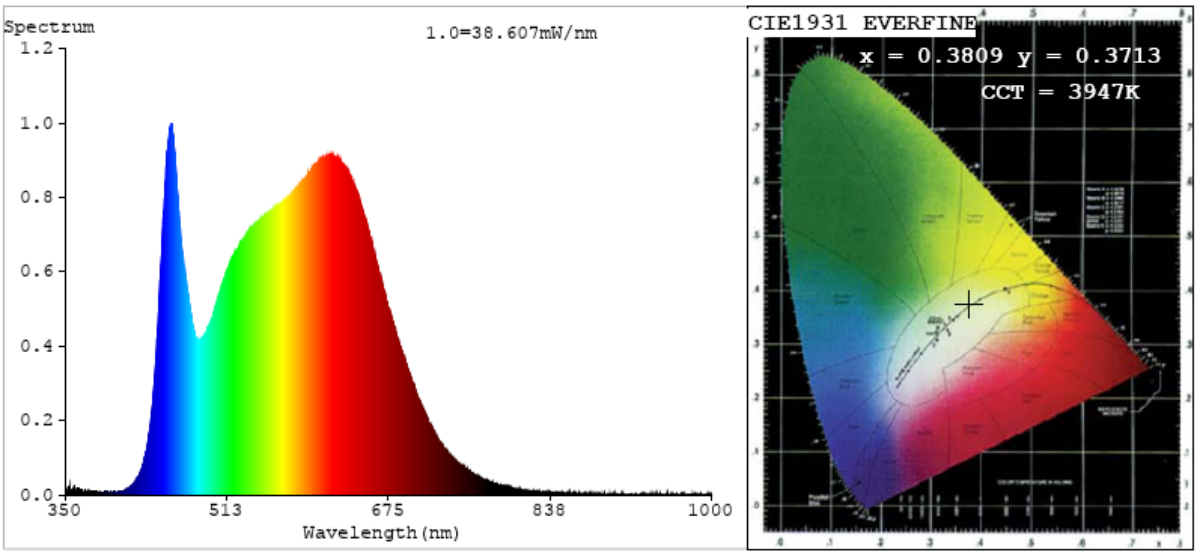
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310004	120.0	60	0.180	21.08	0.978

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3947
Duv	0.0027
Chromaticity (x, y)	x=0.3809 y=0.3713
Chromaticity (u', v')	u'=0.2276 v'=0.4992
Color Rendering Index (CRI)	95.0
R9	77
Total Luminous (lm)	2101
Luminous Efficacy (lm/W)	99.68

Special Color Rendering Indices			
R1	97	R9	77
R2	99	R10	96
R3	98	R11	94
R4	94	R12	74
R5	95	R13	98
R6	95	R14	99
R7	94	R15	95
R8	89	--	--

Spectral Power Distribution & Chromaticity Diagram



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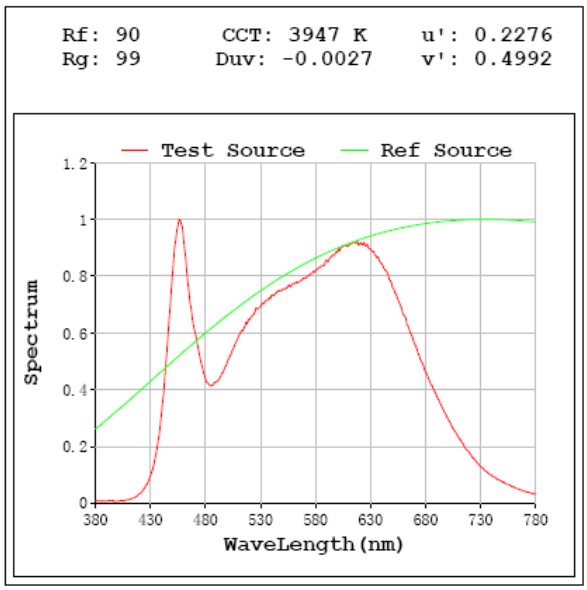
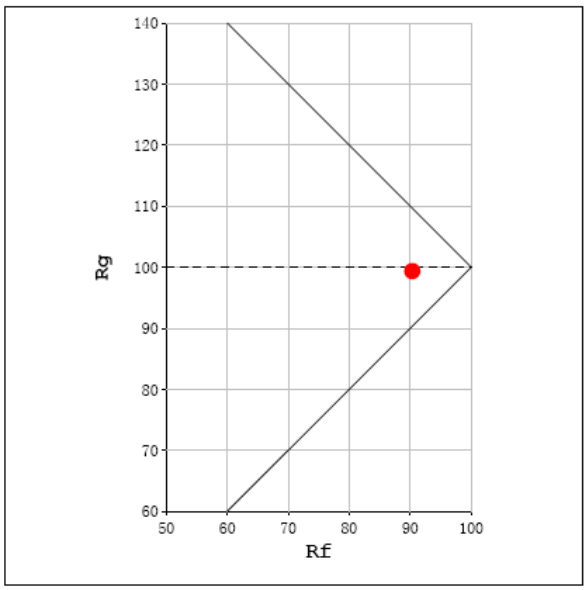
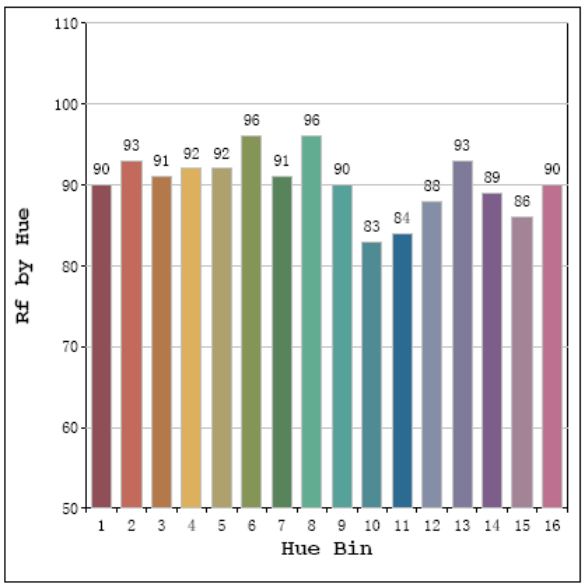

Rf: 90
Rg: 99
CCT: 3947 K
Duv: -0.0027
u': 0.2276
v': 0.4992
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
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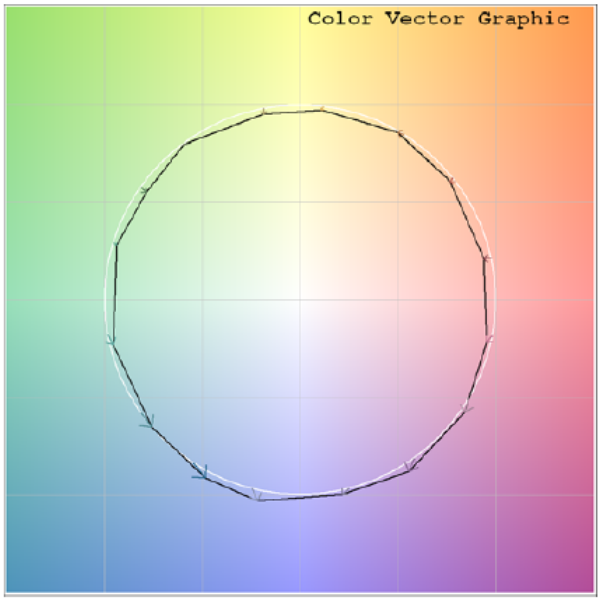

Color Vector Graphic

2.1.5 Electrical, Photometric and Chromaticity Measurements

Test date	2021-09-01	Test Ambient:	25.3 ºC
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	DLW0064(WFRL8R239FA120WB)	5000K	

Electrical Measurement:

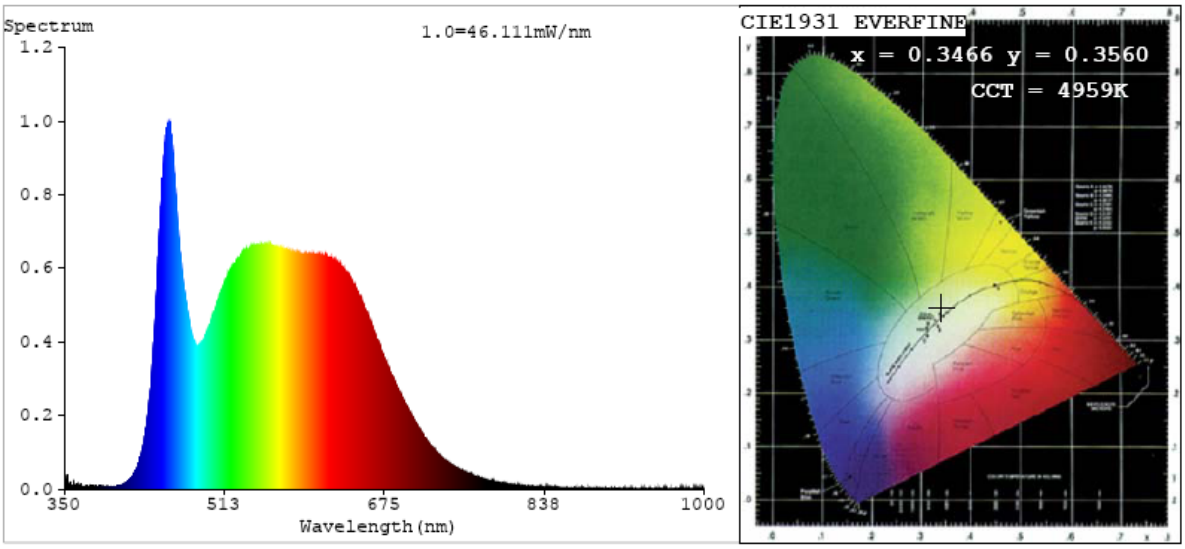
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310004	120.0	60	0.184	21.55	0.978

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4959
Duv	0.0016
Chromaticity (x, y)	x=0.3466 y=0.3560
Chromaticity (u', v')	u'=0.2107 v'=0.4870
Color Rendering Index (CRI)	92.6
R9	71
Total Luminous (lm)	2079
Luminous Efficacy (lm/W)	96.49

Special Color Rendering Indices			
R1	93	R9	71
R2	96	R10	88
R3	96	R11	90
R4	90	R12	65
R5	91	R13	94
R6	92	R14	98
R7	95	R15	91
R8	89	--	--

Spectral Power Distribution & Chromaticity Diagram



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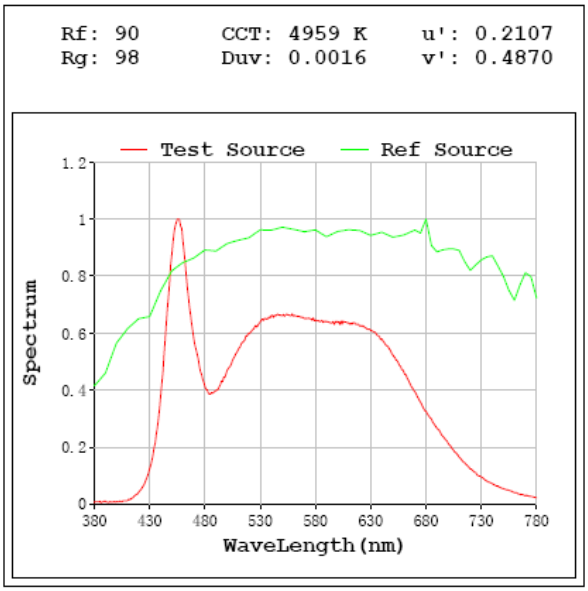
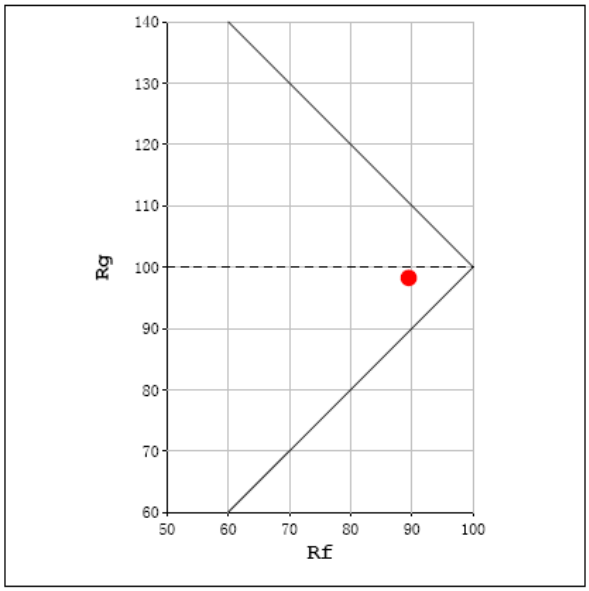
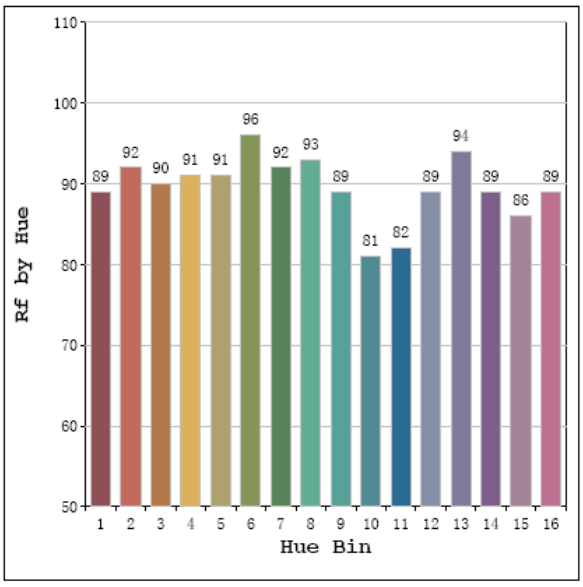
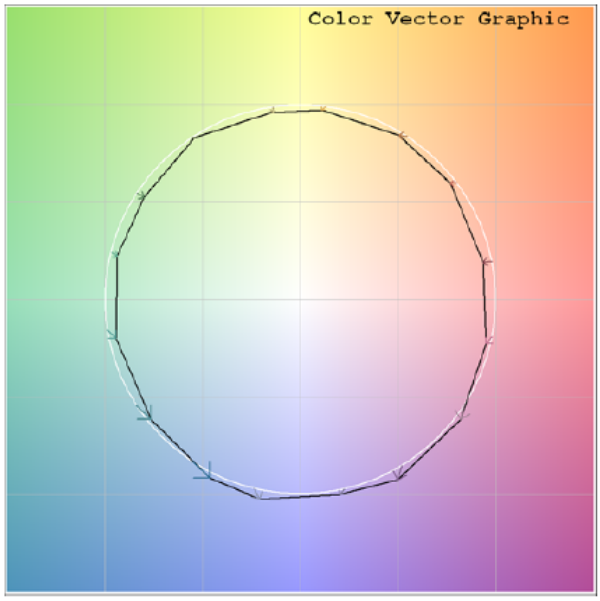


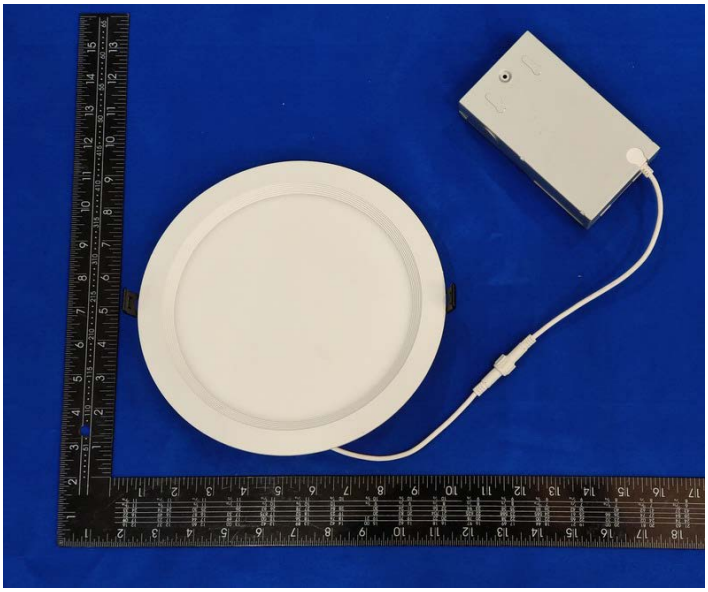






Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLW0064(WFRL8R239FA120WB)	2700K setting	120.0	1867.8	21.48	86.87
	3000K setting	120.0	1939	21.33	90.9
	3500K setting	120.0	2064	20.93	98.65
	4000K setting	120.0	2101	21.08	99.68
	5000K setting	120.0	2079	21.55	96.49

3. Product Photo



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