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): DLW0069(WFRL8R239FADWB)

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	120-277Vac, 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	DLW0069(WFRL8R239FADWB)	2700K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310003	120.0	60	0.174	20.78	0.994

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2717
Duv	0.0009
Chromaticity (x, y)	x=0.4569 y=0.4074
Chromaticity (u', v')	u'=0.2620 v'=0.5257
Color Rendering Index (CRI)	91.4
R9	51

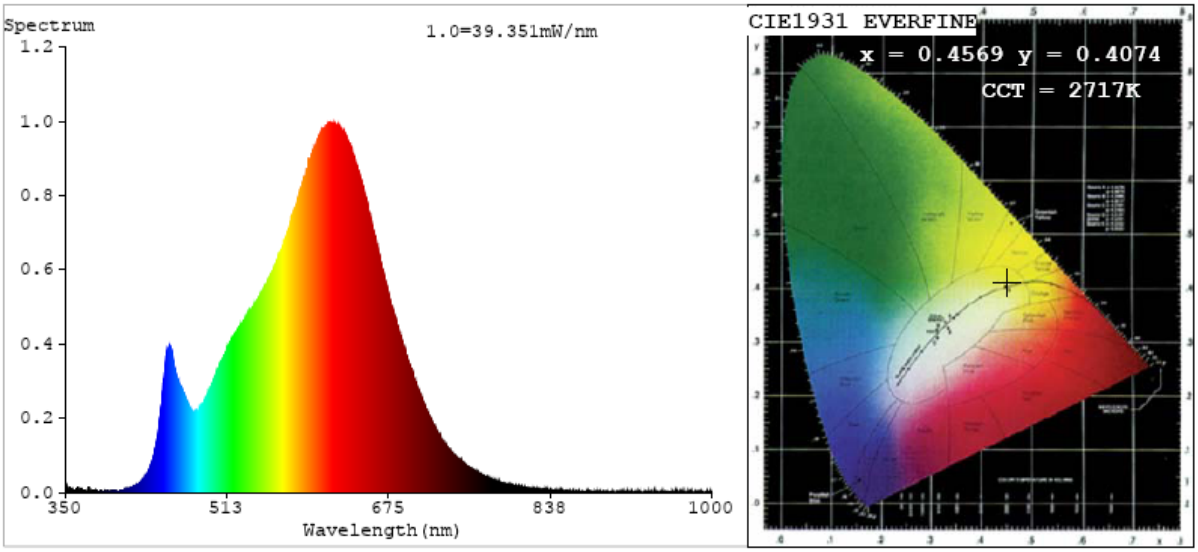
Special Color Rendering Indices			
R1	92	R9	51
R2	98	R10	94
R3	97	R11	92
R4	91	R12	84
R5	92	R13	94
R6	97	R14	99
R7	89	R15	87
R8	77	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1804.5
Luminous Efficacy (lm/W)	86.34
Beam Angle (°)	113.2
Center Beam Candle Power (cd)	622.8

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1801
Luminous Efficacy (lm/W)	85.58

Spectral Power Distribution & Chromaticity Diagram



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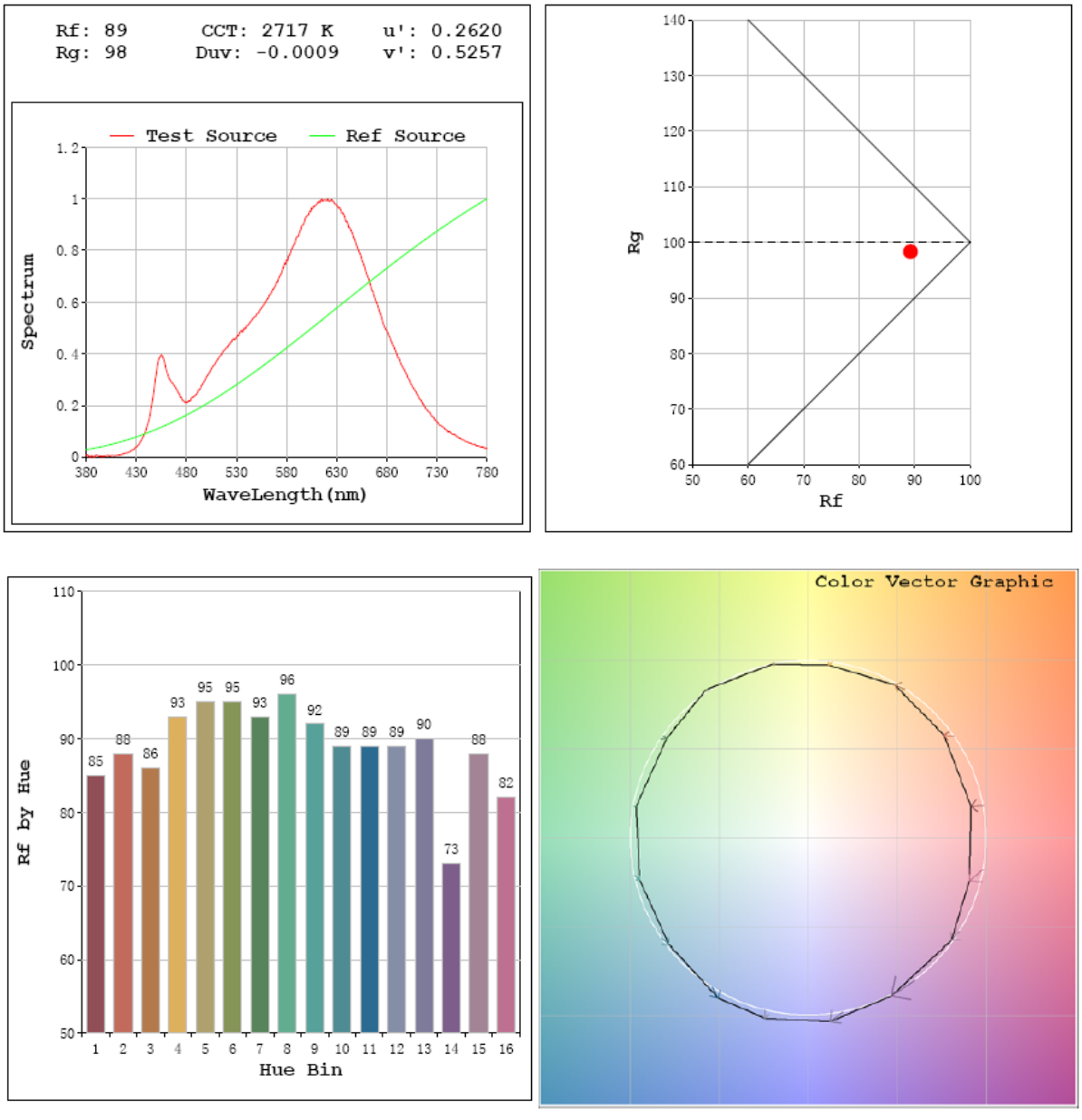
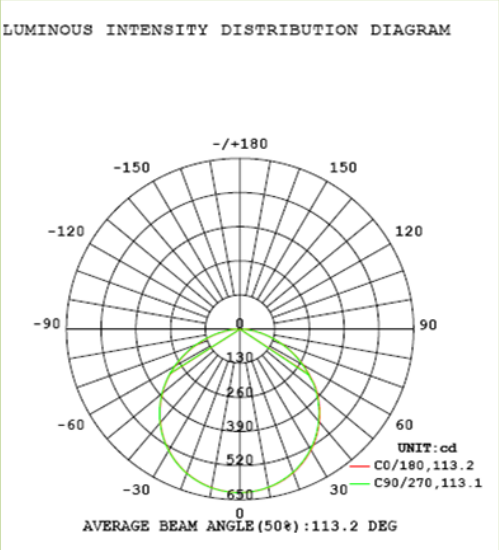


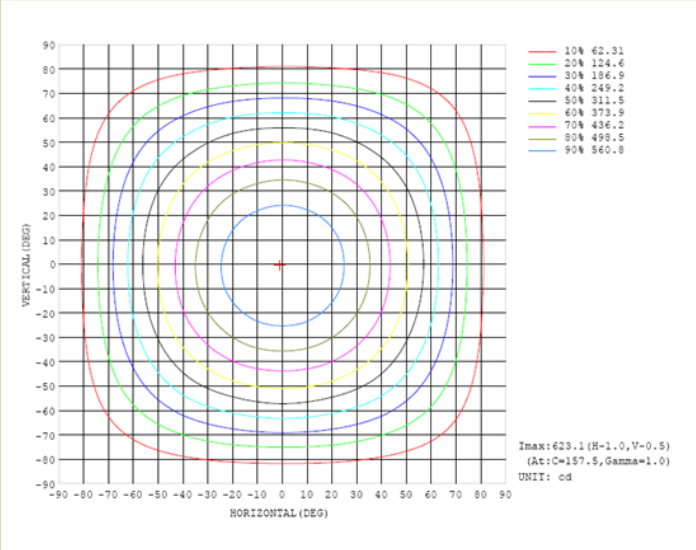
Zonal Lumen Tabulation

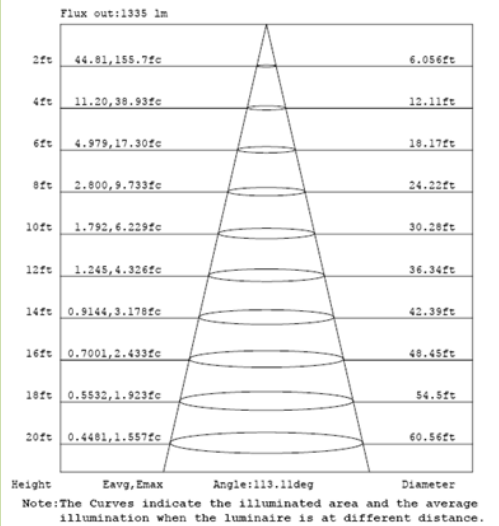
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	486.3	61.4%
0-40	798.6	100.8%
0-60	1417.0	178.8%
60-90	387.5	48.9%
70-100	165.5	20.9%
90-120	0.0	0.0%
0-90	1804.5	227.7%
90-180	0.0	0.0%
0-180	792.4	100.0%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	59.0	7.4%	90-100	0.0	0.0%
10-20	169.4	21.4%	100-110	0.0	0.0%
20-30	257.9	32.5%	110-120	0.0	0.0%
30-40	312.4	39.4%	120-130	0.0	0.0%
40-50	325.2	41.0%	130-140	0.0	0.0%
50-60	293.1	37.0%	140-150	0.0	0.0%
60-70	222.0	28.0%	150-160	0.0	0.0%
70-80	127.2	16.0%	160-170	0.0	0.0%
80-90	38.3	4.8%	170-180	0.0	0.0%

Photometric Data







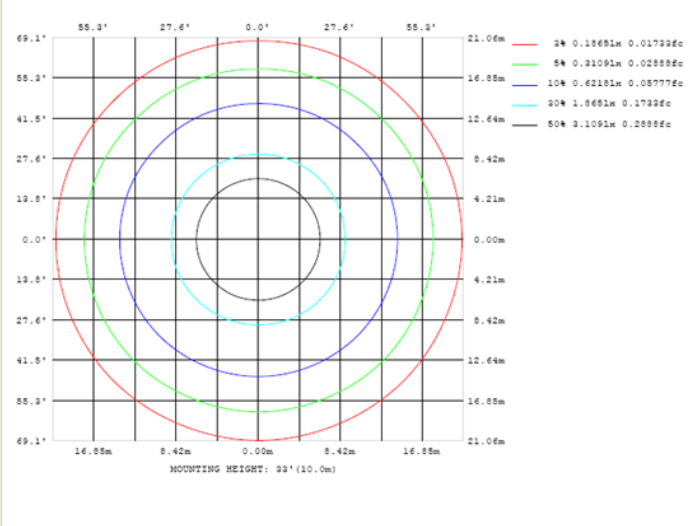


Table--1 UNIT: cd

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	622	622	622	622	622	622	622	622	622	622	622	622	622	622	622	622
5	620	620	620	621	621	621	620	620	620	619	619	619	619	619	620	620
10	613	613	614	614	614	614	613	613	612	612	611	611	611	611	612	613
15	601	602	602	602	602	602	601	601	600	599	598	597	598	598	599	600
20	583	585	584	585	585	585	584	583	582	580	580	579	579	580	582	582
25	561	562	562	563	562	563	561	561	559	557	557	555	556	557	559	560
30	533	535	535	536	535	535	534	533	531	529	528	527	528	528	531	532
35	501	503	503	504	503	503	501	501	499	496	496	494	495	495	498	500
40	464	467	466	468	466	467	465	464	462	459	458	456	458	458	461	463
45	424	426	426	427	426	426	424	423	421	418	417	415	416	417	420	421
50	379	382	382	384	382	382	380	379	377	373	373	371	372	372	376	377
55	331	332	334	333	334	332	331	326	323	325	320	322	319	324	323	329
60	280	279	283	281	283	279	281	276	273	274	270	272	269	274	273	278
65	227	227	231	229	231	228	228	223	221	221	219	220	218	222	222	226
70	172	174	177	178	177	176	174	170	168	165	167	165	167	167	170	171
75	119	122	124	127	125	125	122	119	117	115	116	116	117	117	120	119
80	71.4	74.2	76.0	79.0	77.6	77.6	74.4	71.0	70.0	67.5	69.4	69.6	70.8	71.1	72.8	71.2
85	30.1	32.6	34.7	36.3	35.1	35.1	32.8	30.2	29.5	28.0	29.7	29.0	30.1	30.1	31.9	30.9
90	12.3	12.5	12.7	12.8	12.8	12.6	12.3	12.3	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.9

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	DLW0069(WFRL8R239FADWB)	3000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310003	120.0	60	0.173	20.66	0.994

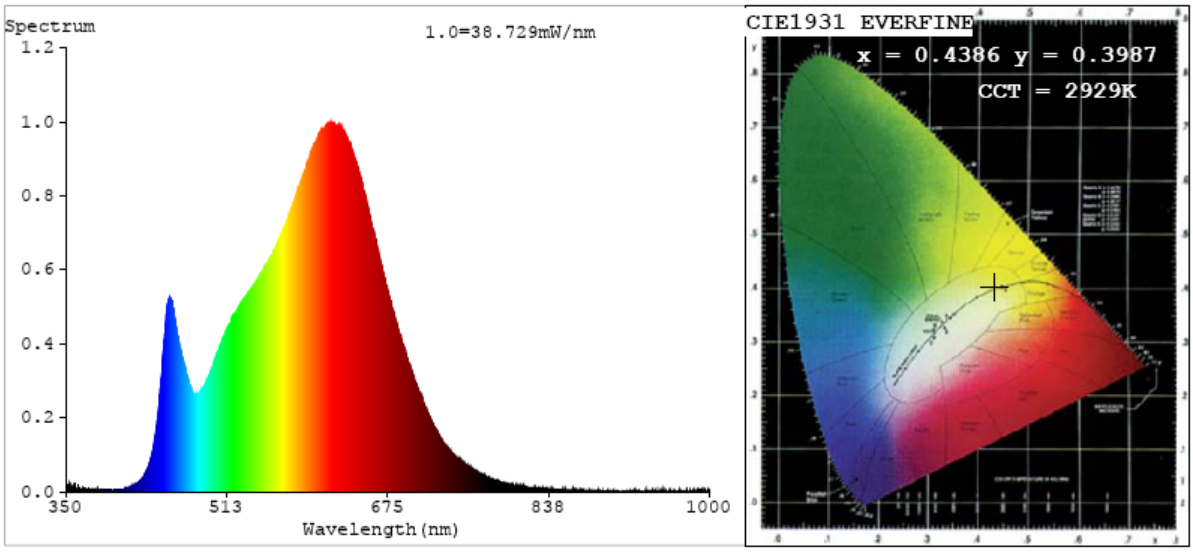
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	2929
Duv	0.0024
Chromaticity (x, y)	x=0.4386 y=0.3987
Chromaticity (u', v')	u'=0.2540 v'=0.5195
Color Rendering Index (CRI)	92.8
R9	59
Total Luminous (lm)	1875
Luminous Efficacy (lm/W)	90.74

Special Color Rendering Indices			
R1	94	R9	59
R2	99	R10	96
R3	97	R11	93
R4	92	R12	83
R5	94	R13	96
R6	96	R14	100
R7	90	R15	90
R8	80	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1857
Luminous Efficacy (lm/W)	88.81

Spectral Power Distribution & Chromaticity Diagram



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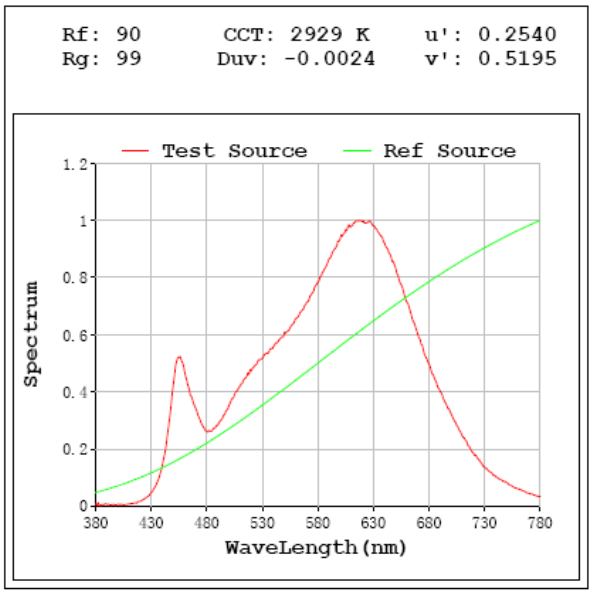
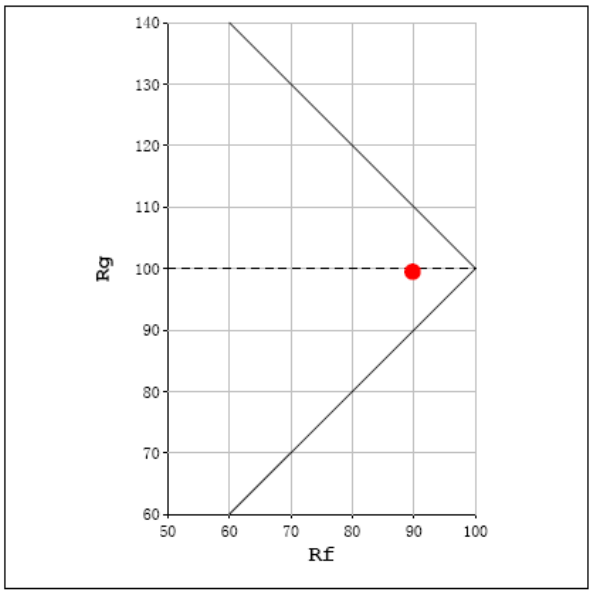
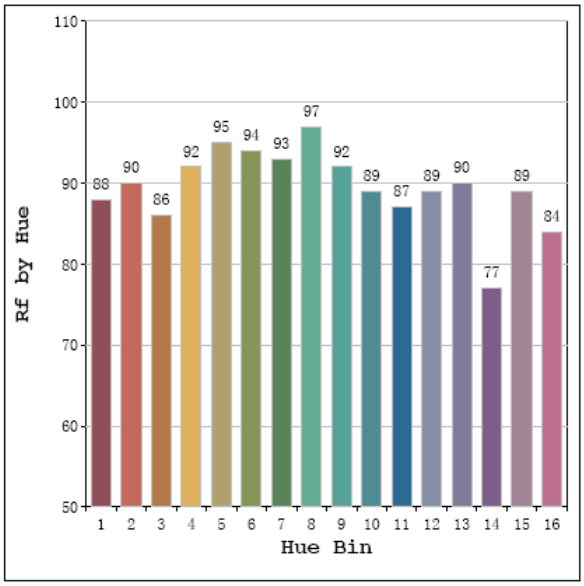

Rf: 90 CCT: 2929 K u': 0.2540
Rg: 99 Duv: -0.0024 v': 0.5195
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
88
90
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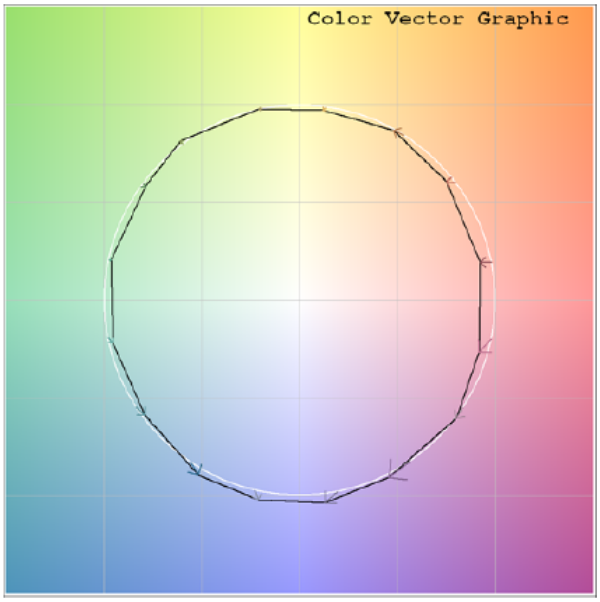

Color Vector Graphic

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	DLW0069(WFRL8R239FADWB)	3500K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310003	120.0	60	0.170	20.28	0.994

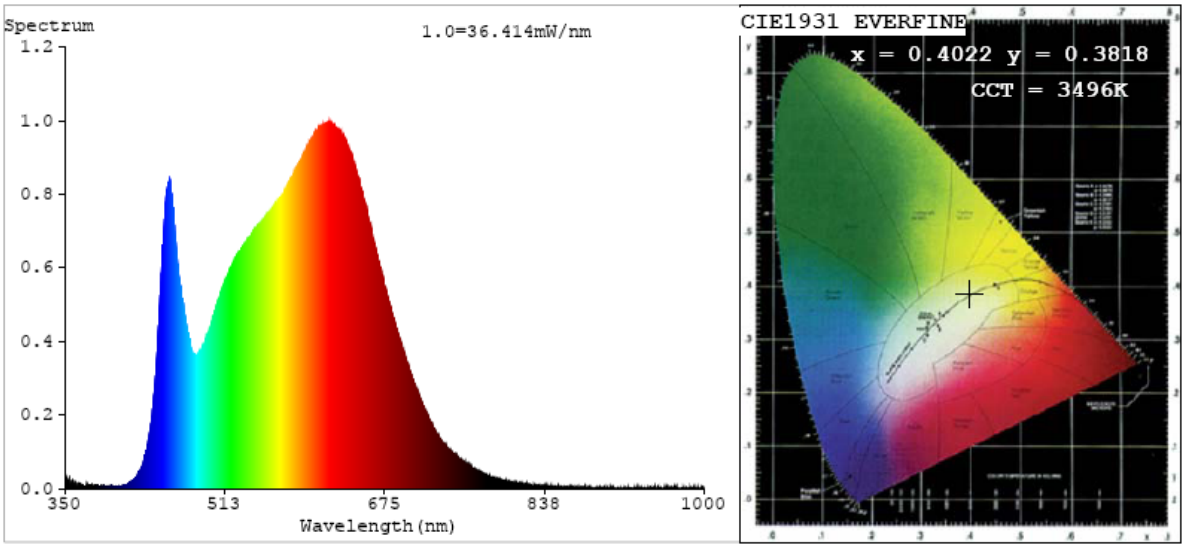
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3496
Duv	0.0033
Chromaticity (x, y)	x=0.4022=0.3818
Chromaticity (u', v')	u'=0.2374'=0.5070
Color Rendering Index (CRI)	94.7
R9	72
Total Luminous (lm)	1989
Luminous Efficacy (lm/W)	98.09

Special Color Rendering Indices			
R1	96	R9	72
R2	99	R10	97
R3	98	R11	95
R4	94	R12	77
R5	95	R13	98
R6	95	R14	99
R7	93	R15	94
R8	87	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1977
Luminous Efficacy (lm/W)	96.04

Spectral Power Distribution & Chromaticity Diagram



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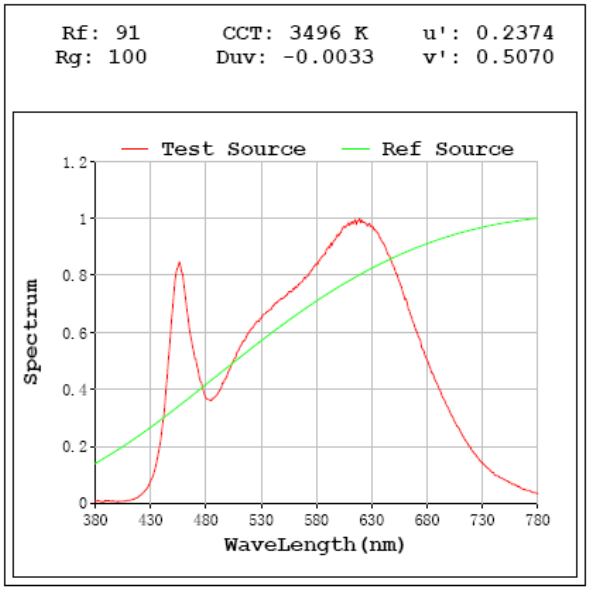
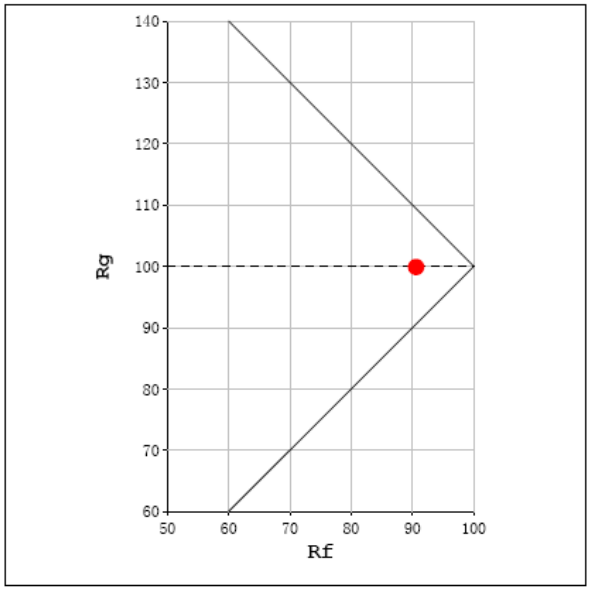
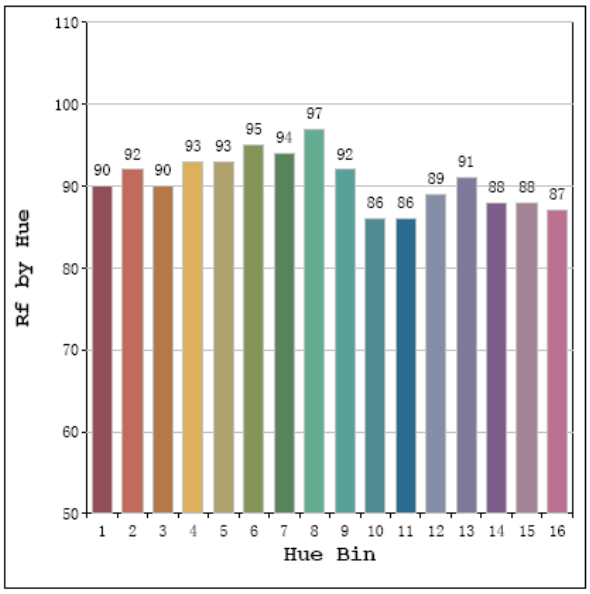
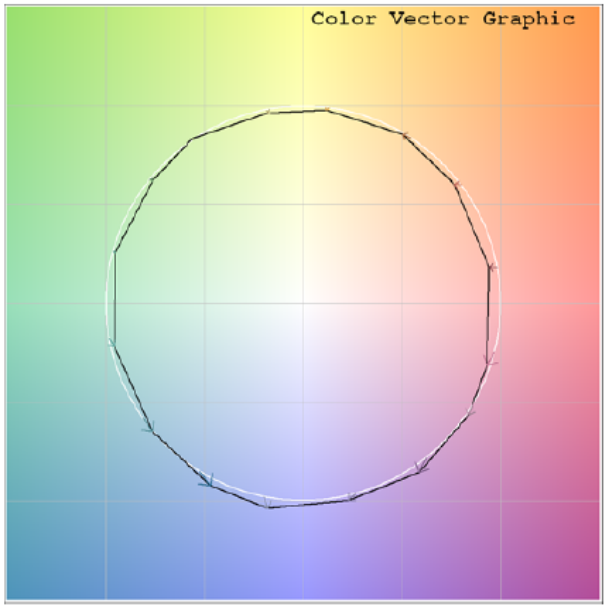

Rf: 91
CCT: 3496 K
u': 0.2374
Rg: 100
Duv: -0.0033
v': 0.5070
Test Source
Ref Source
Spectrum
WaveLength (nm)


Rg
Rf


Rf by Hue
Hue Bin
90 92 90 93 93 95 94 97 92 86 86 89 91 88 88 87


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	DLW0069(WFRL8R239FADWB)	4000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310003	120.0	60	0.171	20.43	0.994

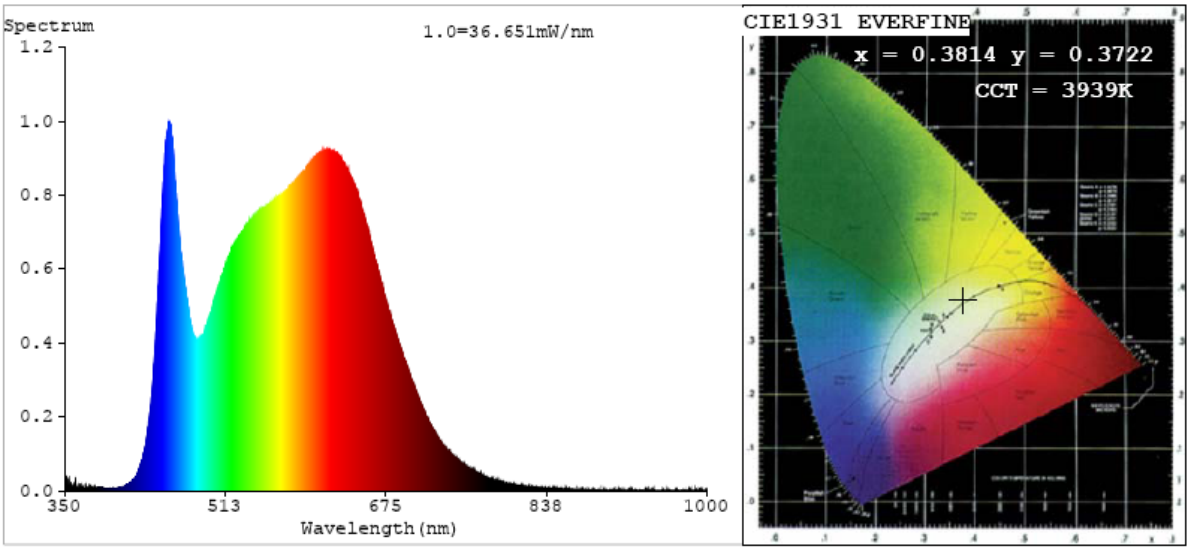
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	3939
Duv	0.0024
Chromaticity (x, y)	x=0.3814=0.3722
Chromaticity (u', v')	u'=0.2276v'=0.4997
Color Rendering Index (CRI)	94.9
R9	76
Total Luminous (lm)	2021
Luminous Efficacy (lm/W)	98.94

Special Color Rendering Indices			
R1	96	R9	76
R2	99	R10	95
R3	98	R11	94
R4	94	R12	73
R5	94	R13	98
R6	95	R14	99
R7	94	R15	95
R8	89	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	2003
Luminous Efficacy (lm/W)	96.77

Spectral Power Distribution & Chromaticity Diagram



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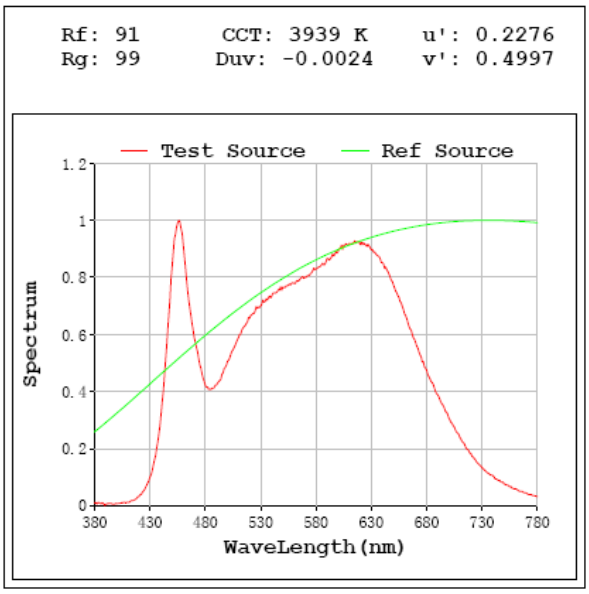
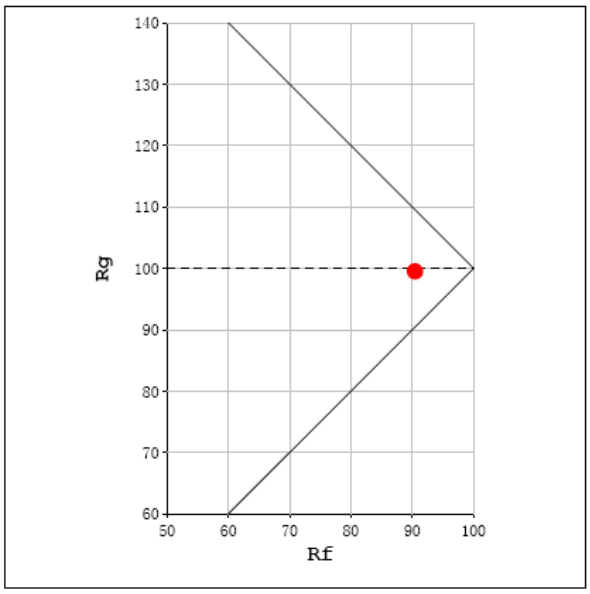
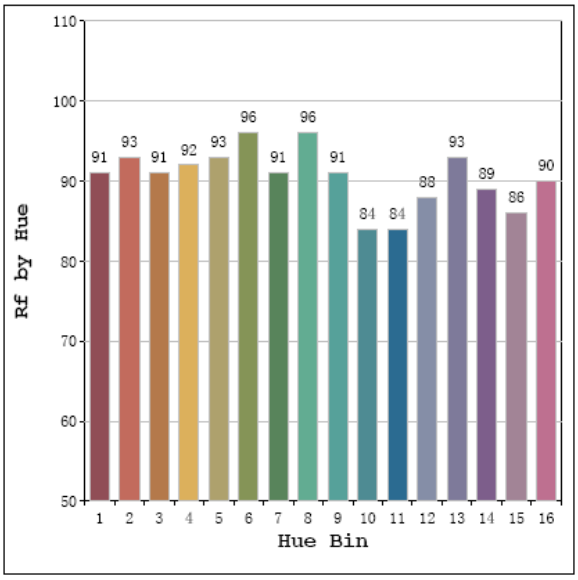

Rf: 91
CCT: 3939 K
u': 0.2276
Rg: 99
Duv: -0.0024
v': 0.4997
Test Source
Ref Source
Spectrum
WaveLength(nm)


Rg
Rf


Rf by Hue
Hue Bin
91
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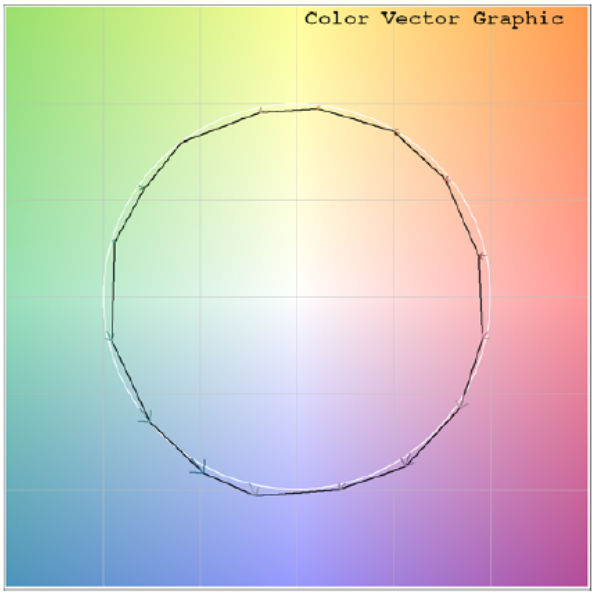

Color Vector Graphic

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	DLW0069(WFRL8R239FADWB)	5000K	

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
202108310003	120.0	60	0.175	20.88	0.994

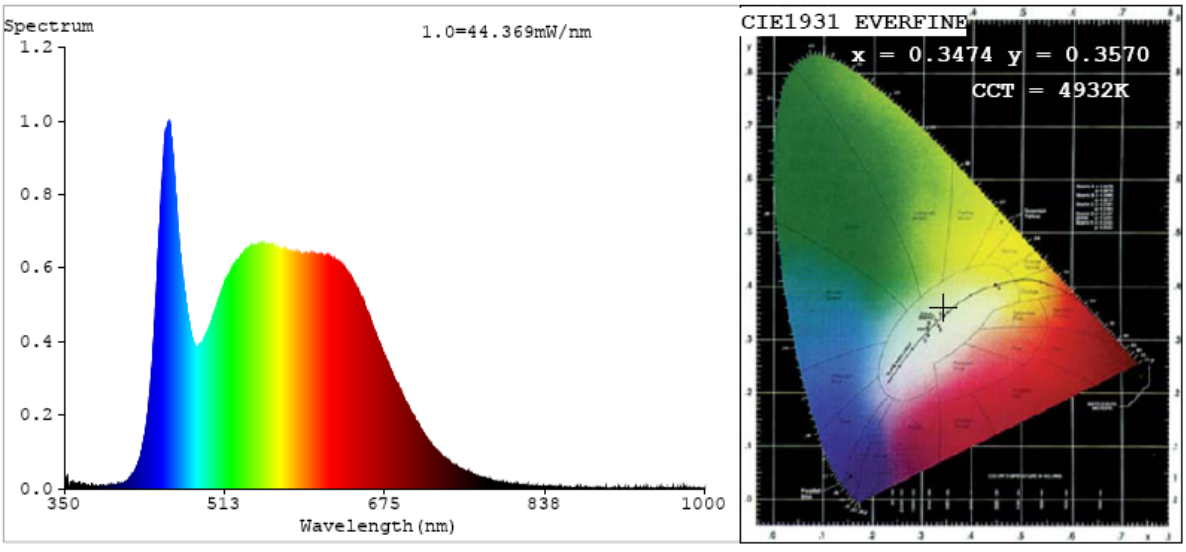
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120
Frequency (Hz)	60
CCT (K)	4932
Duv	0.0017
Chromaticity (x, y)	x=0.3474 y=3570
Chromaticity (u', v')	u'=0.2109 v'=0.4876
Color Rendering Index (CRI)	92.7
R9	72
Total Luminous (lm)	1996
Luminous Efficacy (lm/W)	95.59

Special Color Rendering Indices			
R1	93	R9	72
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	--	--

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1981
Luminous Efficacy (lm/W)	93.78

Spectral Power Distribution & Chromaticity Diagram



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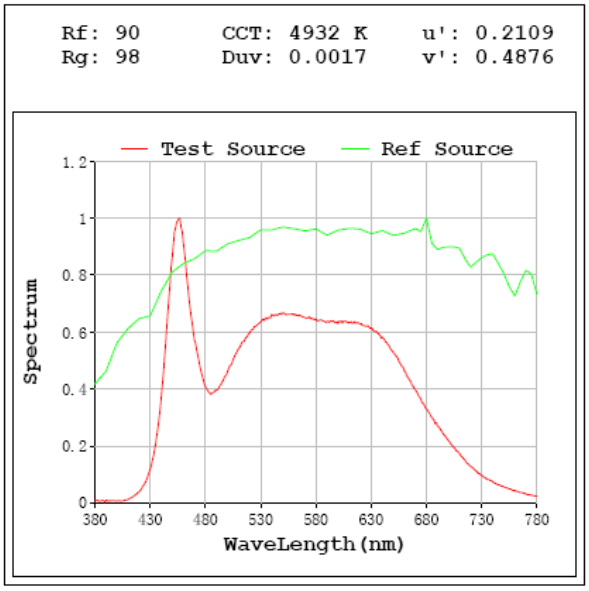

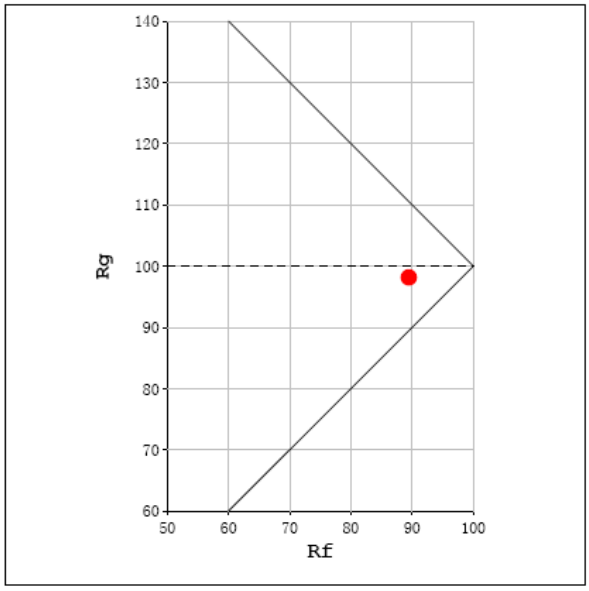

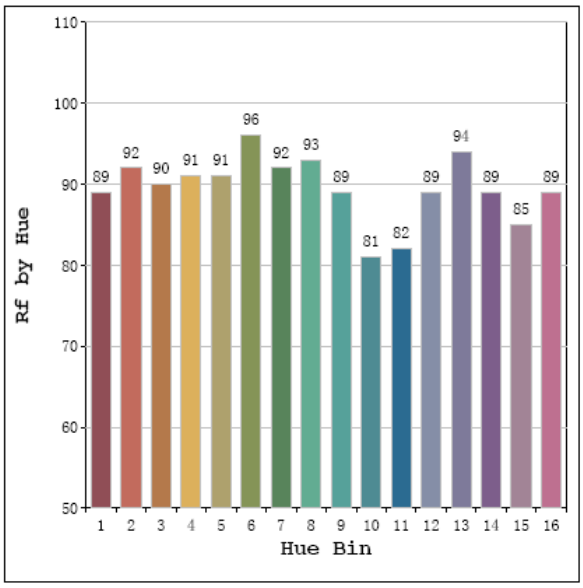

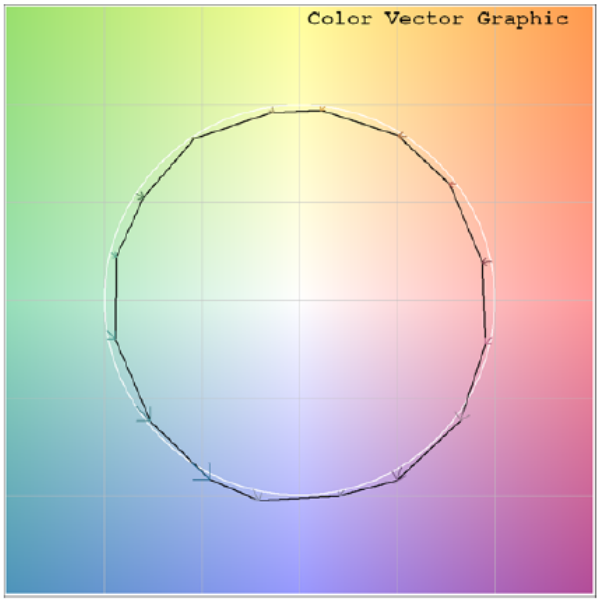

Sample No.	Wattage and CCT setting	Test Voltage(V)	Flux(lm)	P(W)	Luminous Efficacy lm/W
DLW0069(WFRL8R239FADWB)	2700K setting	120.0	1804.5	20.78	86.34
		277.0	1801	21.05	85.58
	3000K setting	120.0	1875	20.66	90.74
		277.0	1857	20.91	88.81
	3500K setting	120.0	1989	20.28	98.09
		277.0	1977	20.58	96.04
	4000K setting	120.0	2021	20.43	98.94
		277.0	2003	20.7	96.77
	5000K setting	120.0	1996	20.88	95.59
		277.0	1981	21.13	93.78

3. Product Photo

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