ACCREDITED
Certificate#4810.01

LM-79-08 Test Report

For

Beyond LED Technology

(Brand Name: Beyond LED Technology)

Architectural Flood and Spot Luminaires

Model name(s): BLT-FL06-90WCH8A1-BRFMCA30/40/50

Remark: "a" can be two letters for lamp colors, "b" can be "3RP", "3NP", "5RP", "5NP", "7RP" or "7NP" photocontrol provided or blank for no photocontrol provided, "c" can be "10SP", "20SP" for Surge protector provided or blank for no Surge protector provided, "d" can be "1/2AM", "YM", "FM", AM", "DM, "A & DM" for bracket type, CAXX represents for adjustable CCT (any two digits for XX).

Representative (Tested) Model:
BLT-FL06-90WCH8A1-BRFMCA30/40/50

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

Test & Report By:

Sherry Yang

Engineer: Sherry Yang

Review By:

Jason Luo

Manager: Jason Luo

Date: Sep. 04, 2019

Update: Sept 27, 2019(Repeated test for Goniophotometer)

1.1 Product Information:

Model Number	BLT-FL06-90WCH8A1-BRFMCA30/40/50	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz	
Nominal Power	90W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,4000K,5000K	
LED Manufacturer	Seoul Semiconductor Co. Ltd STW8C2SB-NT	
LED Model	BLC1908045E-D1	
Sample Number		
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s
Photo		
		

1/2AM	YM
	
DM	AM
	
FM	A & DM
	

1.2 Test Specifications:

Date of Receipt	Sep. 02, 2019
Date of Test	Sep. 03, 2019
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 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	BL-QP-033

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 25° C ± 1° 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° C ± 1° 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 BL-QP-033)

Test date	2019-09-03	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLT-FL06-90WCH8A1-BRFMCA30/40/50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC190804 5E-D1	120.0	60	0.7546	90.1	0.995	5.9
	277.0	60	0.3349	89.23	0.962	10.1
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3020
Duv	0.00233
Chromaticity (x, y)	x=0.4390 y=0.4107
Chromaticity (u', v')	u(u')=0.2490 v'=0.5243
Color Rendering Index (CRI)	82.2
R9	5

Special Color Rendering Indices			
R1	80	R9	5
R2	89	R10	76
R3	97	R11	80
R4	81	R12	67
R5	80	R13	82
R6	88	R14	99
R7	83	R15	72
R8	59	--	--

Photometric Measurement –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	11321.4	11191.3	>=10000(-10%)
Luminous Efficacy (lm/W)	125.65	125.42	Premium: >= 120(-3%)
Most worst Luminous/Highest	124.21		

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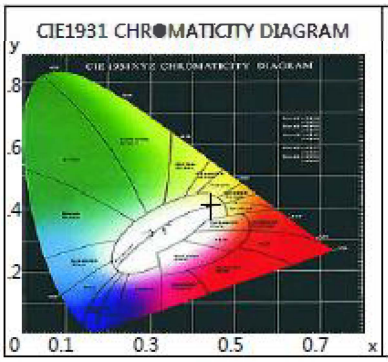
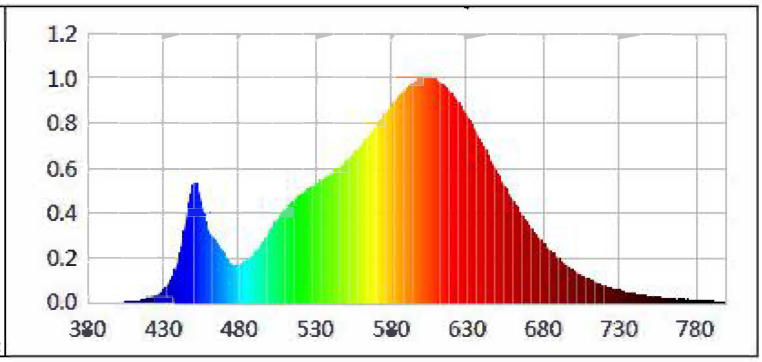
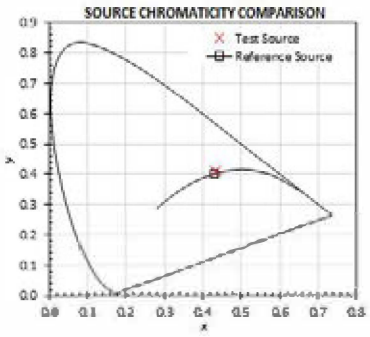
Spectral Power Distribution & Chromaticity Diagram

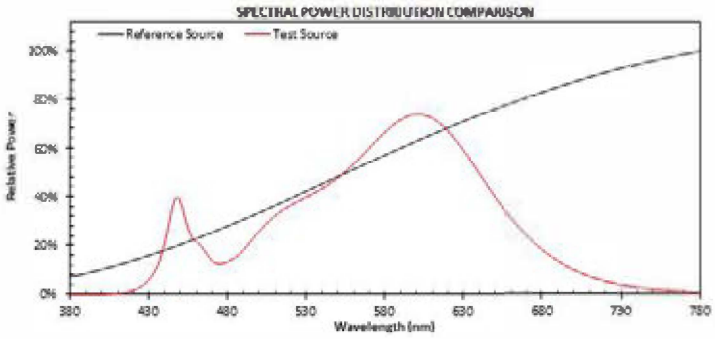


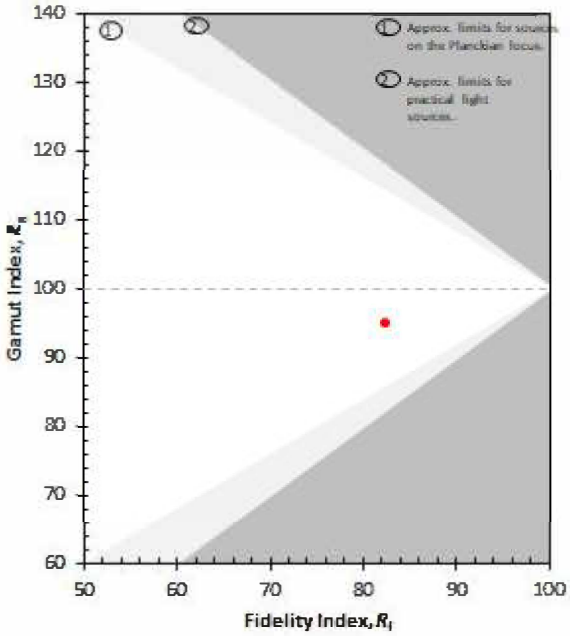


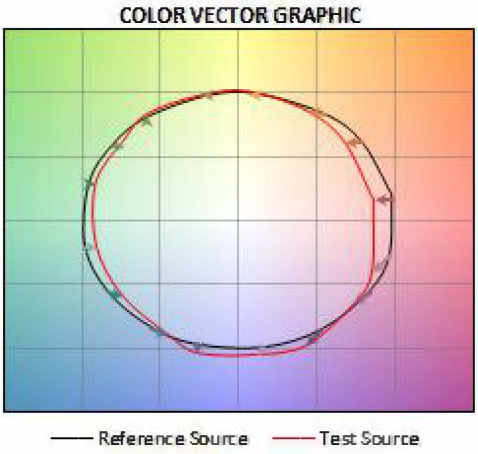
WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0002	0.0571	525	0.5045	149.3428	670	0.3533	104.5767
385	0.0002	0.0550	530	0.5254	155.5253	675	0.3079	91.1509
390	0.0005	0.1465	535	0.5477	162.1415	680	0.2678	79.2928
395	0.0005	0.1379	540	0.5723	169.4305	685	0.2311	68.4117
400	0.0005	0.1485	545	0.5962	176.5013	690	0.1996	59.0791
405	0.0016	0.4812	550	0.6266	185.5121	695	0.1711	50.6668
410	0.0036	1.0748	555	0.6599	195.3435	700	0.1458	43.1569
415	0.0075	2.2286	560	0.6986	206.8176	705	0.1255	37.1512
420	0.0152	4.4989	565	0.7404	219.1978	710	0.1067	31.5829
425	0.0301	8.9082	570	0.7844	232.2221	715	0.0908	26.8682
430	0.0566	16.7463	575	0.8325	246.4392	720	0.0777	22.9923
435	0.1042	30.8499	580	0.8761	259.3586	725	0.0662	19.5920
440	0.1918	56.7926	585	0.9165	271.3282	730	0.0563	16.6719
445	0.3655	108.2119	590	0.9522	281.9007	735	0.0471	13.9310
450	0.5328	157.7186	595	0.9790	289.8234	740	0.0406	12.0153
455	0.4562	135.0548	600	0.9974	295.2783	745	0.0343	10.1563
460	0.3222	95.3947	605	0.9990	295.7279	750	0.0291	8.6142
465	0.2774	82.1289	610	0.9926	293.8433	755	0.0250	7.4002
470	0.2204	65.2499	615	0.9676	286.4607	760	0.0217	6.4175
475	0.1745	51.6596	620	0.9344	276.6222	765	0.0182	5.3953
480	0.1714	50.7464	625	0.8892	263.2491	770	0.0152	4.5101
485	0.1888	55.8864	630	0.8330	246.5897	775	0.0131	3.8853
490	0.2184	64.6480	635	0.7740	229.1448	780	0.0116	3.4403
495	0.2656	78.6337	640	0.7100	210.2005	785	0.0088	2.6184
500	0.3191	94.4741	645	0.6433	190.4417	790	0.0089	2.6415
505	0.3682	109.0040	650	0.5789	171.3779	795	0.0062	1.8463
510	0.4131	122.3069	655	0.5176	153.2284	800	0.0057	1.6771
515	0.4504	133.3390	660	0.4582	135.6403			
520	0.4785	141.6662	665	0.4030	119.3063			

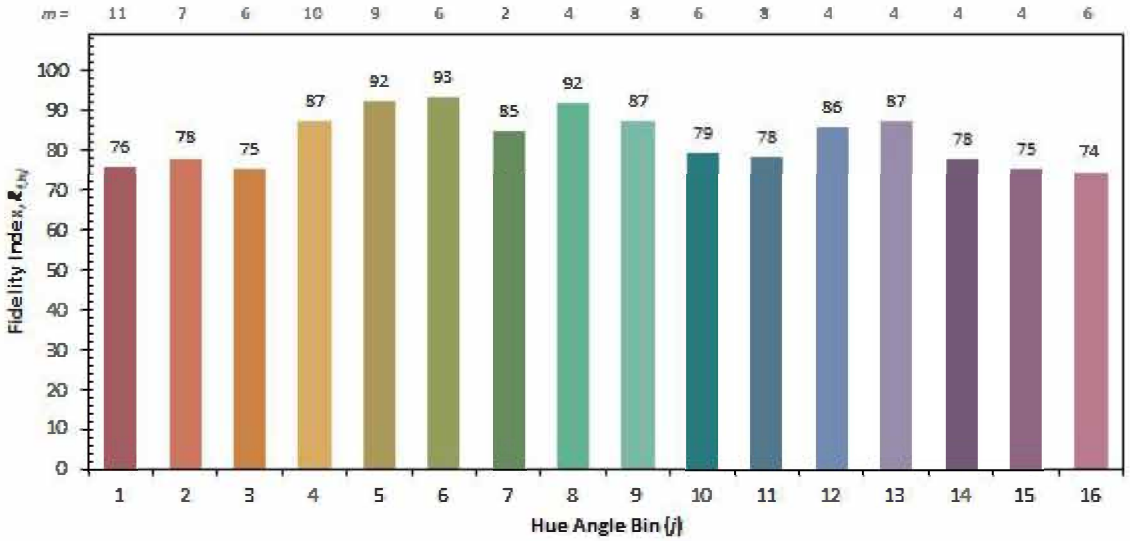
TM30

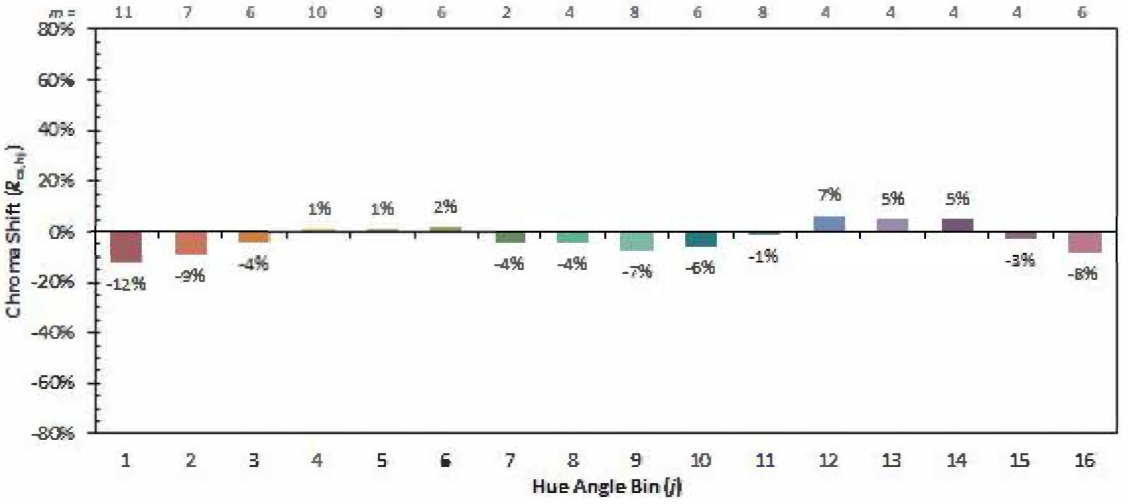

SOURCE CHROMATICITY COMPARISON
Test Source
Reference Source
y
x

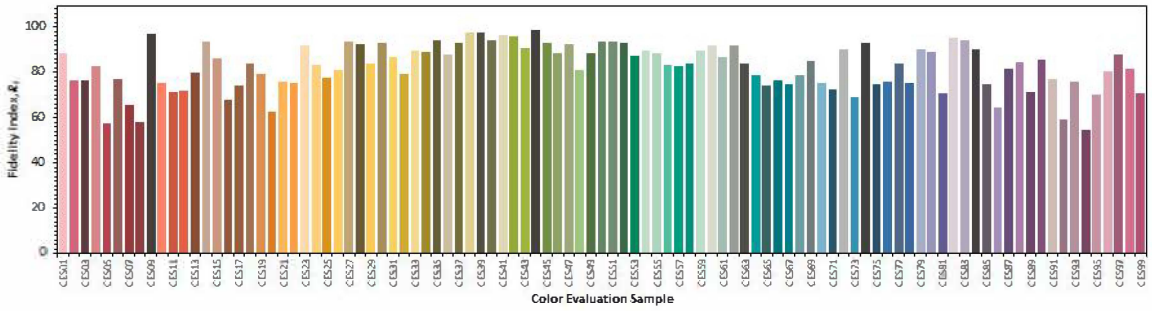

SPECTRAL POWER DISTRIBUTION COMPARISON
Reference Source
Test Source
Relative Power
Wavelength (nm)


Gamut Index, R_g
Fidelity Index, R_f


COLOR VECTOR GRAPHIC
Reference Source
Test Source


m =
11 7 6 10 9 6 2 4 8 6 8 4 4 4 4 6
76 78 75 87 92 93 85 92 87 79 78 86 87 78 75 74
Fidelity Index, $R_{f,hj}$
Hue Angle Bin (j)


m =
11 7 6 10 9 6 2 4 8 6 8 4 4 4 4 6
-12% -9% -4% 1% 1% 2% -4% -4% -7% -6% -1% 7% 5% 5% -3% -8%
Chroma Shift ($R_{a,hj}$)
Hue Angle Bin (j)


Fidelity Index, R_i
Color Evaluation Sample

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2019-9-27	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLT-FL06-90WCH8A1-BRFMCA30/40/50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC1908045E-D1	120.0	60	0.7487	89.49	0.996	6.63
	277.0	60	0.3315	88.34	0.962	10.06
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

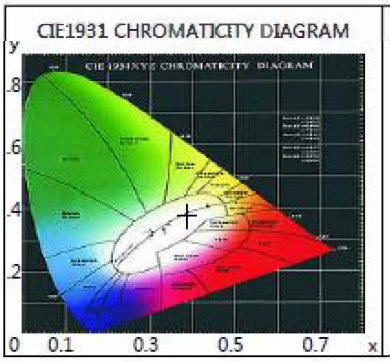
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	3865
Duv	-0.00079
Chromaticity (x, y)	x=0.3860 y=0.3784
Chromaticity (u', v')	u(u')=0.2281 v'=0.5031
Color Rendering Index (CRI)	83.8
R9	14

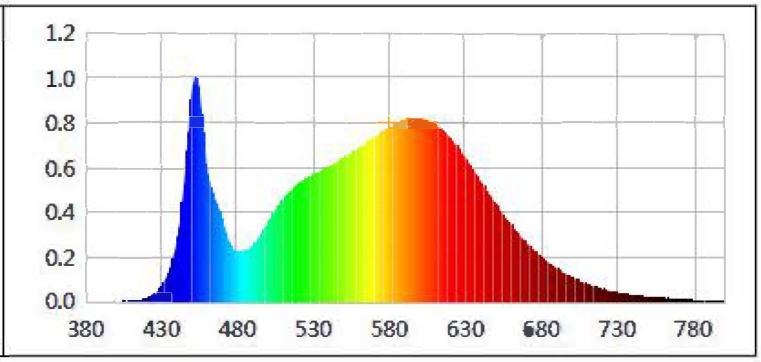
Special Color Rendering Indices			
R1	83	R9	14
R2	91	R10	77
R3	95	R11	81
R4	82	R12	60
R5	8	R13	85
R6	86	R14	98
R7	85	R15	77
R8	65	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	13179.8	12978.1	>=10000(-10%)
Luminous Efficacy (lm/W)	147.28	146.91	Premium: >= 120(-3%)
Most worst Luminous/Highest	145.02		
Zonal lumens in the 0-90° zone (%)	99.4	--	>=85(-3)
Beam Angle (°)	116.6	--	--
Center Beam Candle Power (cd)	5506	--	--

Spectral Power Distribution & Chromaticity Diagram





WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0003	0.0956	525	0.5481	190.3315	670	0.2640	91.6819
385	0.0007	0.2603	530	0.5671	196.9441	675	0.2292	79.5748
390	0.0002	0.0772	535	0.5844	202.9397	680	0.2004	69.5854
395	0.0003	0.1211	540	0.6036	209.6145	685	0.1734	60.2122
400	0.0011	0.3881	545	0.6191	214.9918	690	0.1496	51.9514
405	0.0014	0.4728	550	0.6392	221.9615	695	0.1274	44.2491
410	0.0025	0.8587	555	0.6600	229.1987	700	0.1088	37.7699
415	0.0057	1.9843	560	0.6844	237.6792	705	0.0935	32.4688
420	0.0132	4.5864	565	0.7079	245.8259	710	0.0790	27.4185
425	0.0307	10.6717	570	0.7314	253.9773	715	0.0670	23.2758
430	0.0658	22.8330	575	0.7588	263.5128	720	0.0561	19.4694
435	0.1320	45.8524	580	0.7798	270.7967	725	0.0473	16.4391
440	0.2546	88.4279	585	0.7957	276.3163	730	0.0401	13.9353
445	0.5104	177.2508	590	0.8129	282.2951	735	0.0347	12.0336
450	0.9051	314.2906	595	0.8195	284.5840	740	0.0296	10.2913
455	0.9558	331.9018	600	0.8210	285.1036	745	0.0244	8.4738
460	0.6221	216.0357	605	0.8101	281.2997	750	0.0208	7.2076
465	0.4690	162.8646	610	0.7937	275.6249	755	0.0174	6.0462
470	0.3770	130.9113	615	0.7654	265.8011	760	0.0149	5.1699
475	0.2656	92.2208	620	0.7330	254.5581	765	0.0115	3.9896
480	0.2231	77.4902	625	0.6903	239.7164	770	0.0109	3.7882
485	0.2288	79.4658	630	0.6412	222.6539	775	0.0096	3.3256
490	0.2491	86.5152	635	0.5909	205.2075	780	0.0073	2.5201
495	0.2915	101.2237	640	0.5389	187.1241	785	0.0059	2.0555
500	0.3495	121.3616	645	0.4870	169.0990	790	0.0059	2.0492
505	0.4047	140.5482	650	0.4365	151.5743	795	0.0036	1.2550
510	0.4543	157.7509	655	0.3889	135.0574	800	0.0036	1.2346
515	0.4952	171.9589	660	0.3432	119.1840			
520	0.5244	182.0877	665	0.3010	104.5106			

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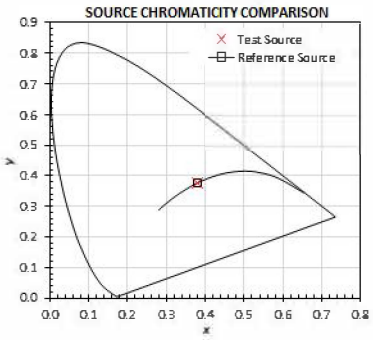
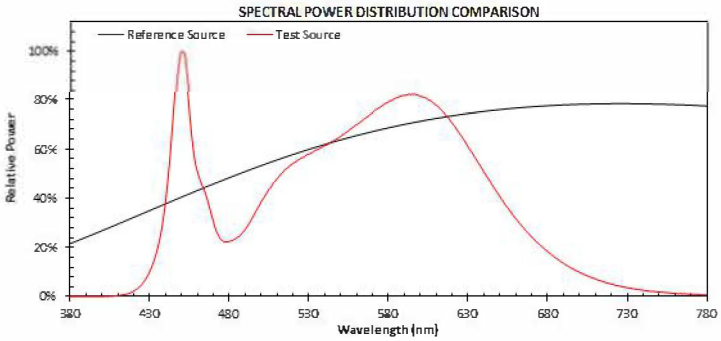
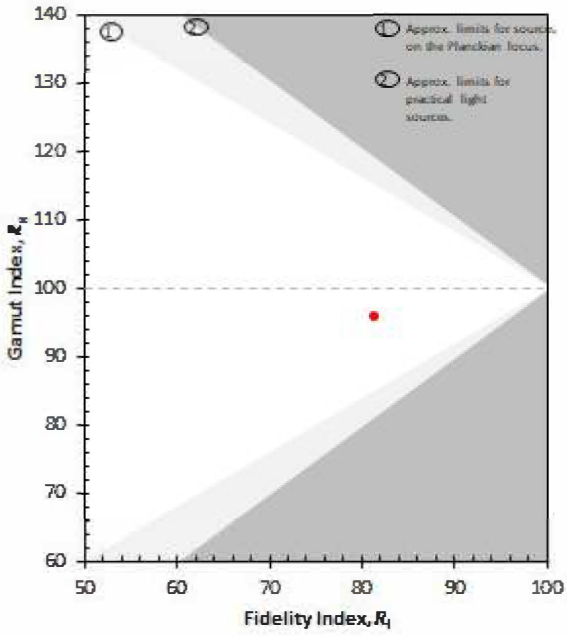
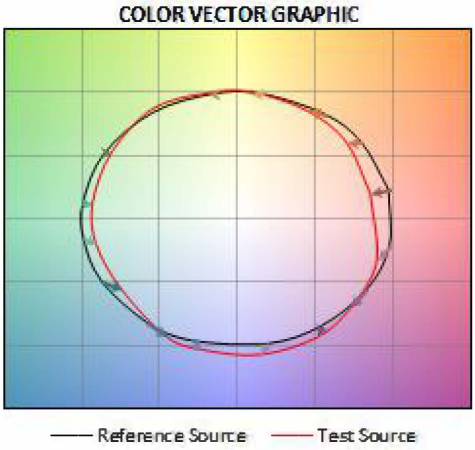
TM30









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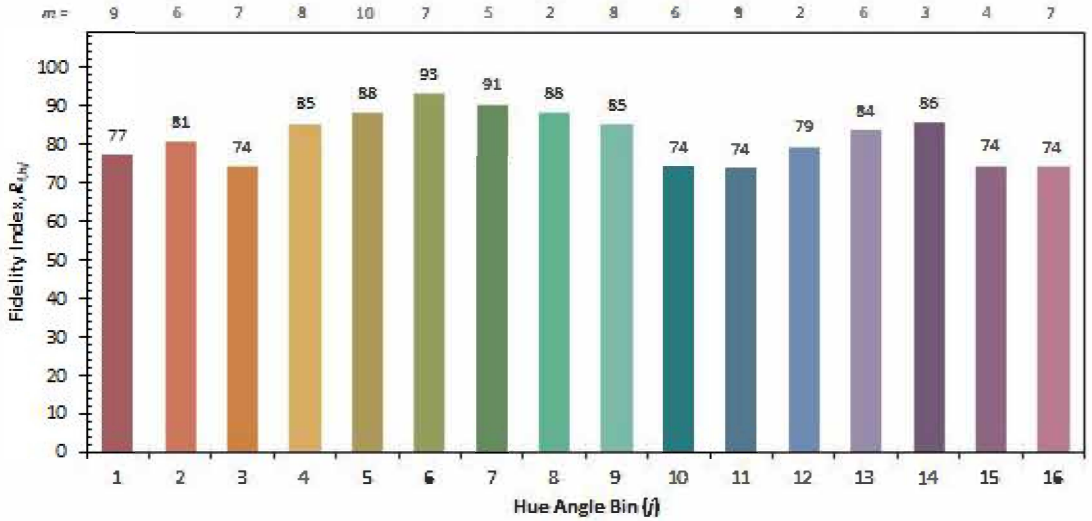

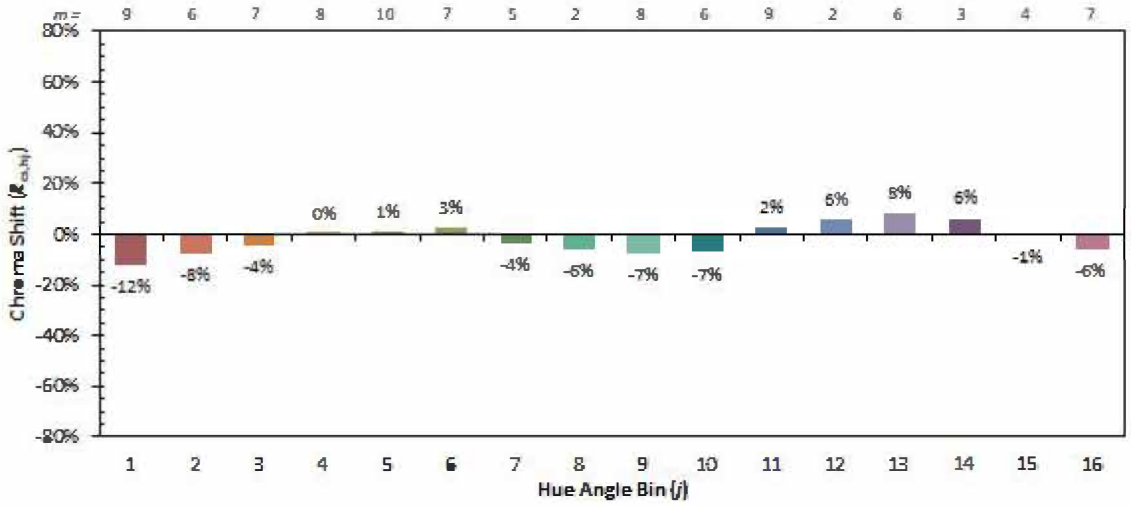

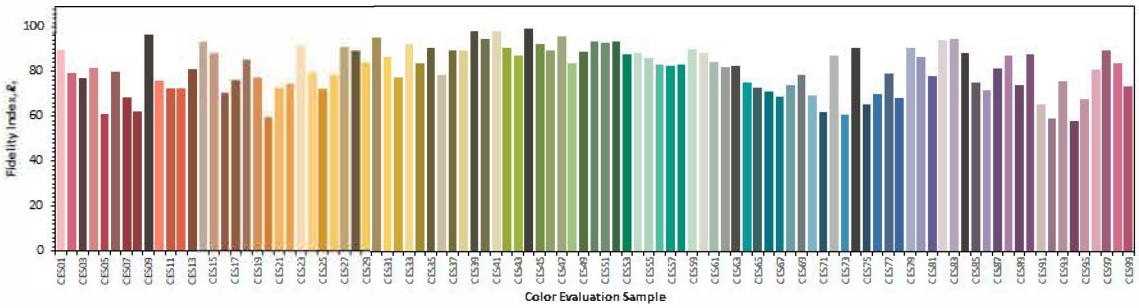

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Zonal Lumen Tabulation

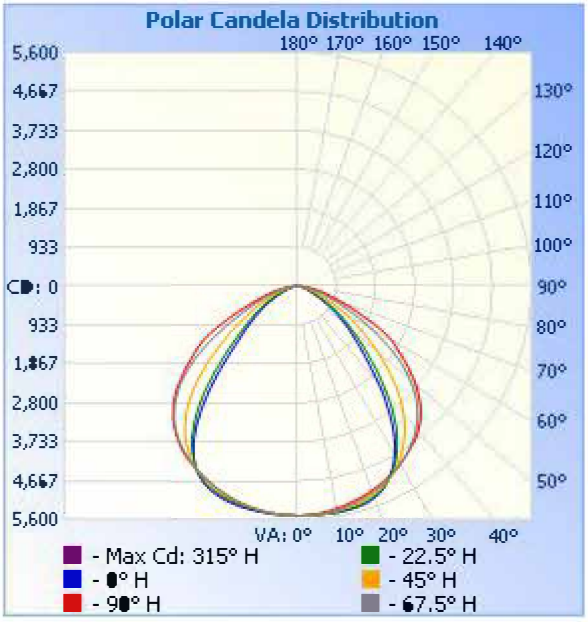
Zonal Lumen Summary

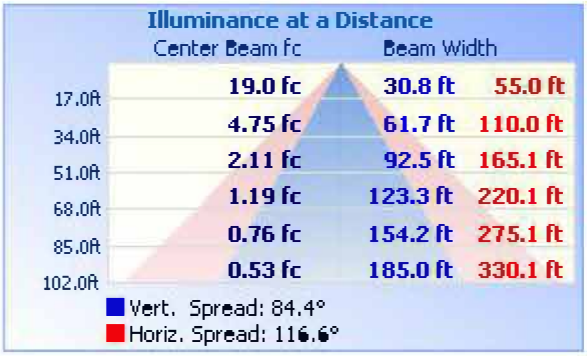
Zone	Lumens	% Lamp	% Luminaire
0-30	4,409.6	33.5%	33.5%
0-40	7,197.6	54.6%	54.6%
0-60	11,599.9	88%	88%
60-90	1,494.3	11.3%	11.3%
70-100	518.8	3.9%	3.9%
90-120	31.9	0.2%	0.2%
0-90	13,094.2	99.4%	99.4%
90-180	83.9	0.6%	0.6%
0-180	13,178.1	100%	100%

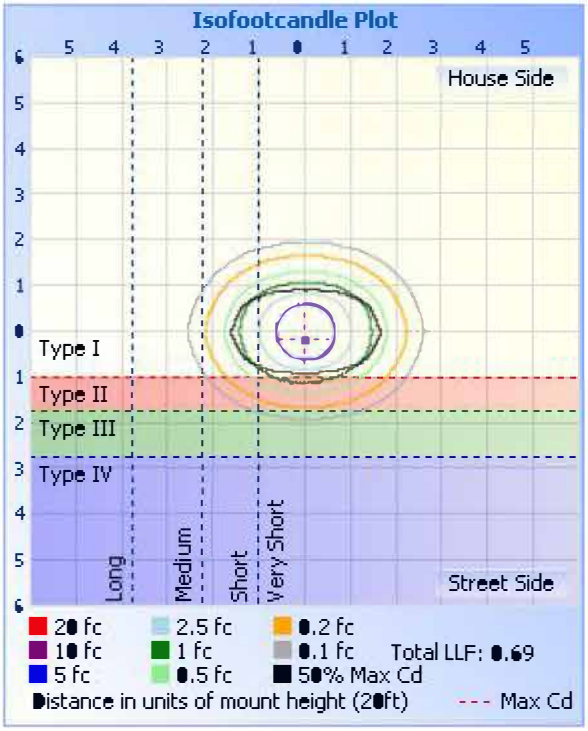
Lumens Per Zone

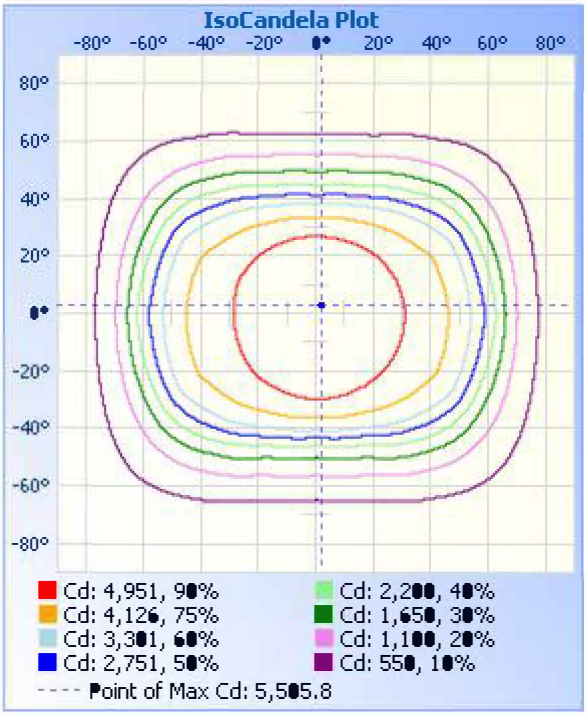
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	522.2	4.0%	90-100	9.9	0.1%
10-20	1,524.1	11.6%	100-110	10.4	0.1%
20-30	2,363.3	17.9%	110-120	11.6	0.1%
30-40	2,788.0	21.2%	120-130	11.6	0.1%
40-50	2,553.2	19.4%	130-140	12.0	0.1%
50-60	1,849.1	14.0%	140-150	11.5	0.1%
60-70	985.4	7.5%	150-160	9.2	0.1%
70-80	407.3	3.1%	160-170	5.8	0%
80-90	101.6	0.8%	170-180	2.0	0%

Photometric Data









Candela Table - Type C

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2	5498	5495	5492	5498	5487	5485	5489	5487	5491	5485	5487	5496	5490	5493	5502	5500	5498
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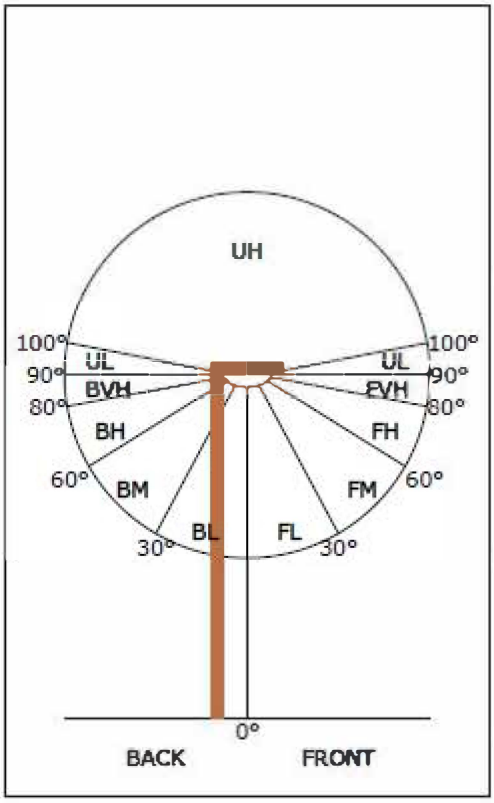
177	22	27	21	22	11	15	19	20	27	21	22	21	18	17	18	17	22
178	25	22	23	16	11	15	23	22	22	20	27	23	17	20	19	22	25
179	26	28	17	23	11	16	20	24	26	28	20	21	14	23	21	21	26
180	22	27	21	21	11	19	20	21	25	26	24	24	18	17	18	25	22



ZONE	LUMENS	% LAMP LUMENS
FORWARD LIGHT	6435	48.8
FL (0°-30°)	2204	16.7
FM (30°-60°)	3520	26.7
FH (60°-80°)	664	5.0
FVH (80°-90°)	47	0.4
BACK LIGHT	6661	50.5
BL (0°-30°)	2205	16.7
BM (30°-60°)	3672	27.9
BH (60°-80°)	729	5.5
BVH (80°-90°)	54	0.4
UP LIGHT	84	0.6
UL (90°-100°)	10	0.1
UH (100°-180°)	74	0.6
TRAPPED LIGHT	NA	NA

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2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

Test date	2019-09-03	Test Ambient:	25.2 ° C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	BLT-FL06-90WCH8A1-BRFMCA30/40/50		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC1908045E-D1	120.0	60	0.7498	89.62	0.9961	6.23
	277.0	60	0.3319	88.53	0.963	10.07
				DLC Pass Criteria	>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement - Sphere-Spectroradiometer Method:

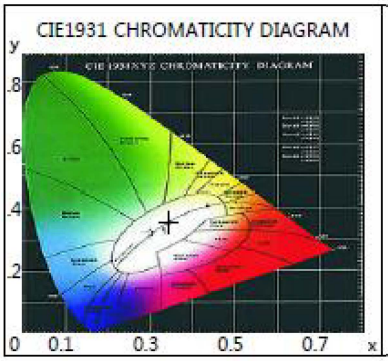
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5020
Duv	0.00093
Chromaticity (x, y)	x=0.3447 y=0.3532
Chromaticity (u', v')	u(u')=0.2106 v'=0.4854
Color Rendering Index (CRI)	82.2
R9	6

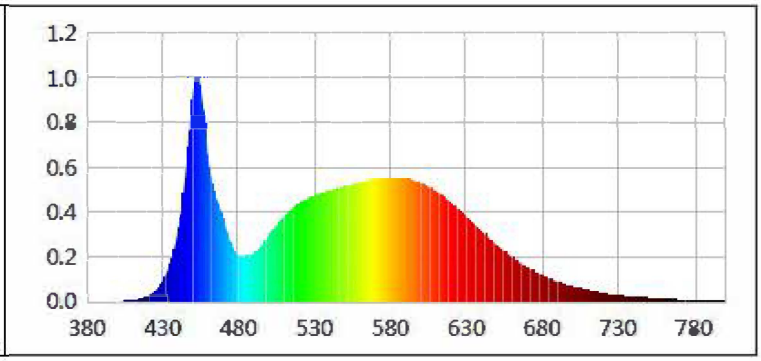
Special Color Rendering Indices			
R1	81	R9	6
R2	88	R10	71
R3	92	R11	80
R4	81	R12	57
R5	81	R13	83
R6	83	R14	96
R7	86	R15	76
R8	66	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	11999.0	11836.9	>=10000(-10%)
Luminous Efficacy (lm/W)	133.89	133.70	Premium: >= 120(-3%)
Most worst Luminous/Highest Watts	132.08		

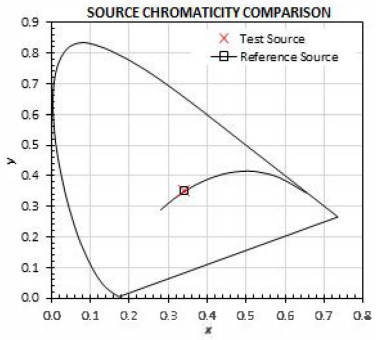
Spectral Power Distribution & Chromaticity Diagram

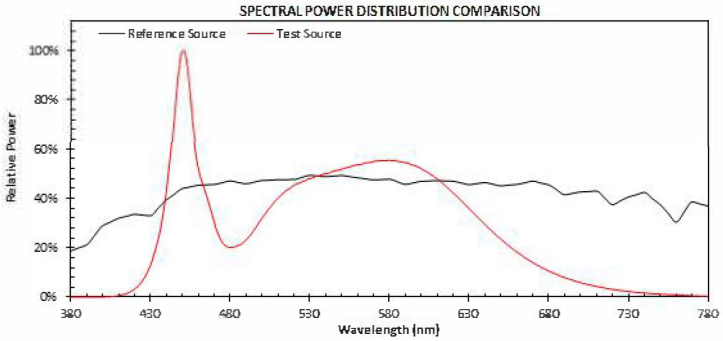


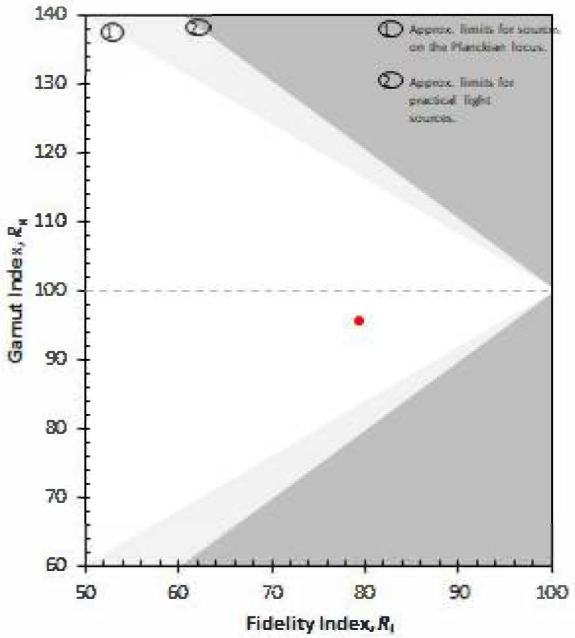


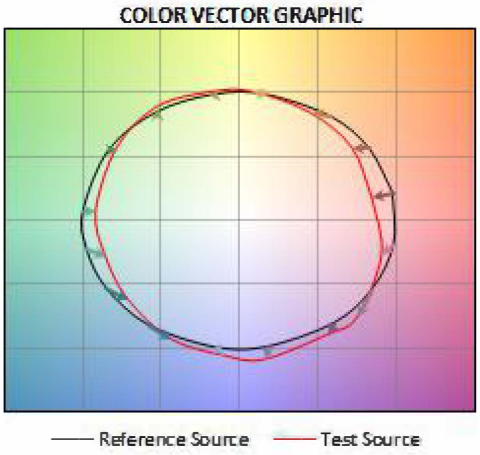
WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0005	0.2429	525	0.4586	204.3061	670	0.1520	67.7050
385	0.0009	0.3956	530	0.4706	209.6564	675	0.1328	59.1862
390	0.0005	0.2185	535	0.4829	215.1539	680	0.1155	51.4413
395	0.0004	0.1648	540	0.4949	220.4972	685	0.1003	44.6972
400	0.0007	0.3165	545	0.5021	223.6931	690	0.0873	38.9121
405	0.0016	0.7175	550	0.5127	228.4236	695	0.0752	33.5089
410	0.0037	1.6505	555	0.5211	232.1788	700	0.0641	28.5598
415	0.0096	4.2789	560	0.5308	236.4729	705	0.0557	24.7950
420	0.0205	9.1440	565	0.5377	239.5852	710	0.0478	21.2775
425	0.0432	19.2506	570	0.5445	242.5960	715	0.0411	18.3303
430	0.0869	38.7369	575	0.5507	245.3460	720	0.0350	15.5942
435	0.1669	74.3747	580	0.5527	246.2525	725	0.0295	13.1321
440	0.2999	133.6064	585	0.5523	246.0907	730	0.0262	11.6732
445	0.5446	242.6538	590	0.5490	244.5841	735	0.0219	9.7470
450	0.9026	402.1256	595	0.5412	241.1389	740	0.0187	8.3299
455	0.9689	431.6776	600	0.5303	236.2608	745	0.0162	7.2197
460	0.6559	292.2053	605	0.5123	228.2487	750	0.0132	5.8959
465	0.4724	210.4560	610	0.4934	219.8253	755	0.0113	5.0434
470	0.3727	166.0708	615	0.4684	208.6664	760	0.0109	4.8504
475	0.2634	117.3737	620	0.4403	196.1896	765	0.0084	3.7614
480	0.2086	92.9258	625	0.4104	182.8328	770	0.0081	3.6135
485	0.2031	90.4868	630	0.3777	168.2610	775	0.0064	2.8497
490	0.2144	95.5085	635	0.3458	154.0575	780	0.0044	1.9561
495	0.2459	109.5590	640	0.3132	139.5615	785	0.0046	2.0574
500	0.2906	129.4763	645	0.2811	125.2196	790	0.0047	2.0722
505	0.3369	150.1051	650	0.2519	112.2124	795	0.0036	1.5885
510	0.3789	168.8050	655	0.2239	99.7574	800	0.0030	1.3575
515	0.4132	184.1051	660	0.1978	88.1383			
520	0.4375	194.9242	665	0.1739	77.4858			

TM30


SOURCE CHROMATICITY COMPARISON
Test Source
Reference Source
y
x


SPECTRAL POWER DISTRIBUTION COMPARISON
Reference Source
Test Source
Relative Power
Wavelength (nm)


Approx. limits for sources on the Planckian locus.
Approx. limits for practical light sources.
Gamut Index, R_g
Fidelity Index, R_f


COLOR VECTOR GRAPHIC
Reference Source
Test Source

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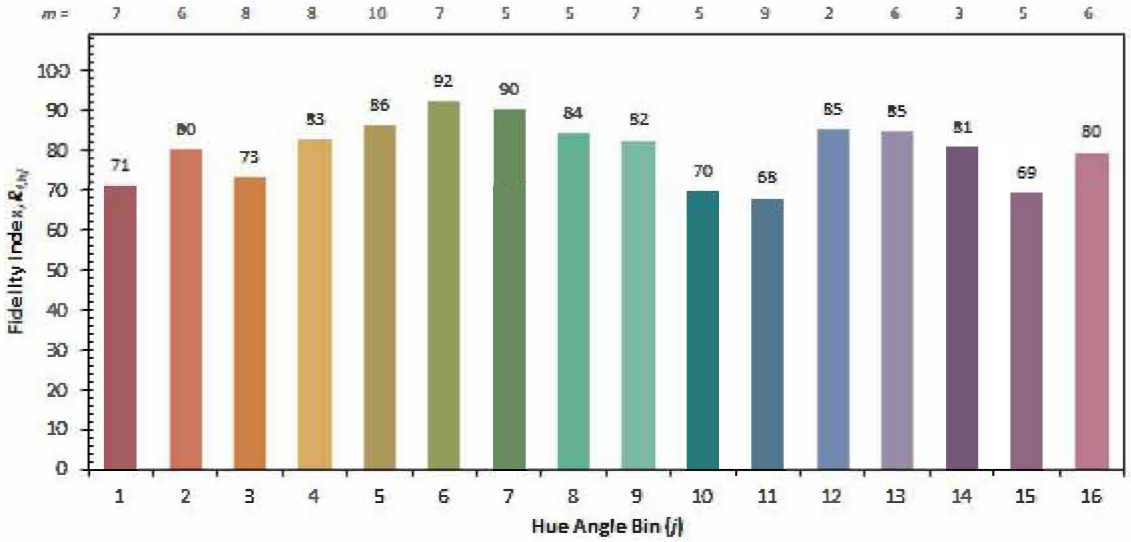

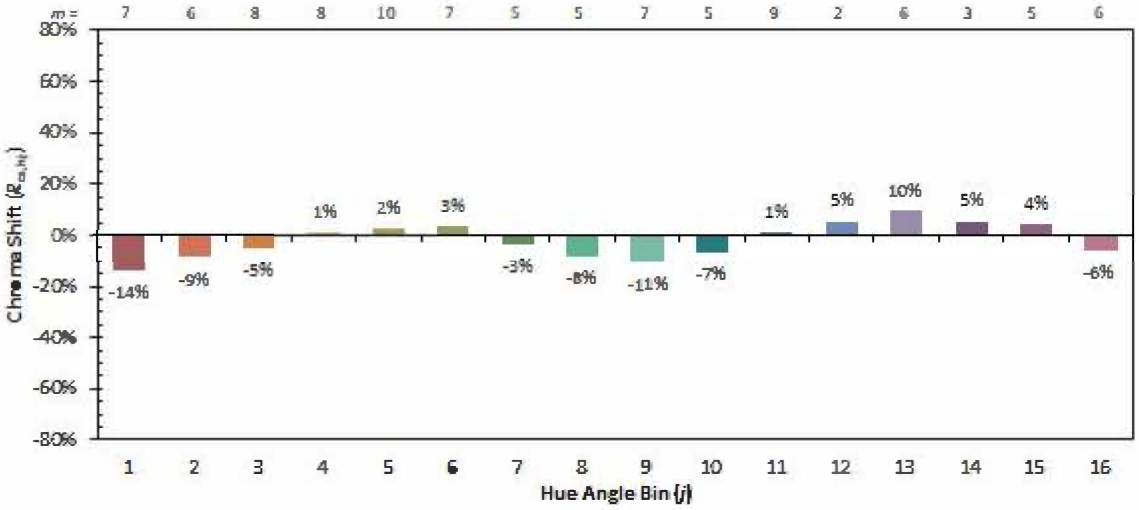

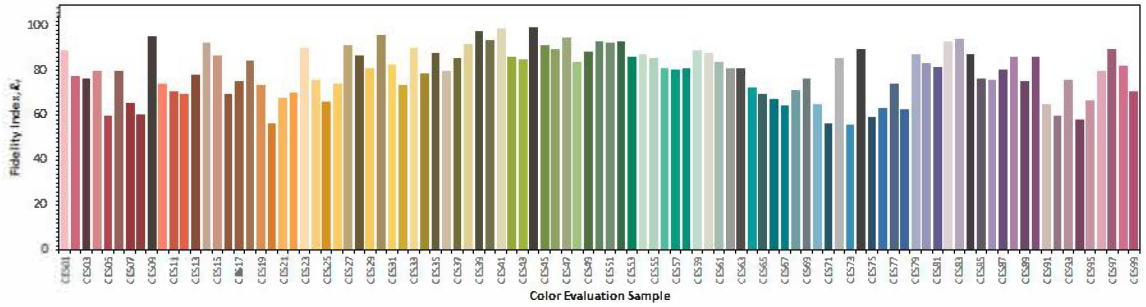

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3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometeric System	GPM-3000	DYHXF120001	2020-01-14
AC Power Source	CHP-500C	N/A	2020-01-13
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2020-01-21
Digital Power Meter	WT500	DYDWQ200006	2020-01-13
Integral Sphere (2M)	2M	DYJCE120067	2020-01-14
Digital Power Meter	WT500	DYDWQ200006	2020-01-13
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2020-01-14
Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2			

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