NVLAP LAB CODE 200960-0

LM-79-08 Test Report

for

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

LED commercial downlight

Model: 27CDLA8/827/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15120046e

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Reviewed by: April Zou

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Jan. 07, 2016

Approved by:

Manager: Jim Zhang

Jan. 07, 2016

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Sample Tested: **27CDLA8/827/277V**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
77.0	1949.0	25.32	0.9898

CCT (K)	CRI	Stabilization Time (Light & Power)
2712	81.6	60

Table 1 Executive Data Summary

Test specifications:

Date of Receipt : Dec. 30, 2015

Date of Test : Jan. 05, 2016

Test item : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters, Color Uniformity

Reference Standard : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
UL1598C Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits.

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Sample Photo

Figure 1- Overview of the sample

Equipment Under Test (EUT)	
Name	: LED commercial downlight
Model	: 27CDLA8/827/277V
Electrical Ratings	: 120-277Vac, 60Hz, 27W
Product Description	: 2700K, Non-dimmable, CRI80, No Off-State Power Manufacturer of LED light source: Lextar Model of LED light source: PC35H11.V0
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.2℃.

Sample orientation was Light Down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

The photometric distance of Goniophotometer is 2.475m.

Luminous data was taken at 0.5°vertical intervals and 10.0°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.213	0.100
Power Factor	0.9898	0.9201
Test Power (W)	25.32	25.39
THD A%	11.02	18.70
Luminous Efficacy (lm/W)	77.0	
Total Luminous Flux (lm)	1949.0	
Color Rendering Index (CRI)	81.6	
R9	4	
Correlated Color Temperature (CCT) (K)	2712	
Chromaticity (Chroma x, Chroma y)	(0.4595, 0.4114)	
Chromaticity (Chroma u, Chroma v)	(0.2619, 0.3517)	
Chromaticity (Chroma u', Chroma v')	(0.2619, 0.5276)	
Duv	0.0003	
Average Beam Angle (°)	107.2	
Center Beam Candle Power (cd)	752	
Spacing Criteria	1.24 (0°-180°)/ 1.24 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	83.27%	
Zonal Lumens in the 60°-90°Zone	16.63%	
Zonal Lumens in the 90°-120°Zone	0.03%	
Zonal Lumens in the 120°-180°Zone	0.07%	

Special Color Rendering Indices	
R1	80
R2	93
R3	93
R4	78
R5	81
R6	92
R7	80
R8	55
R9	4
R10	84
R11	78
R12	76
R13	83
R14	97

Table 2: Test data per Goniophotometer Method

Note: According to CIE 1976 (u',v') diagram, u' = u = 4x/(-2x+12y+3), v' = 3v/2 = 9y/(-2x+12y+3).

Spectral Power Distribution

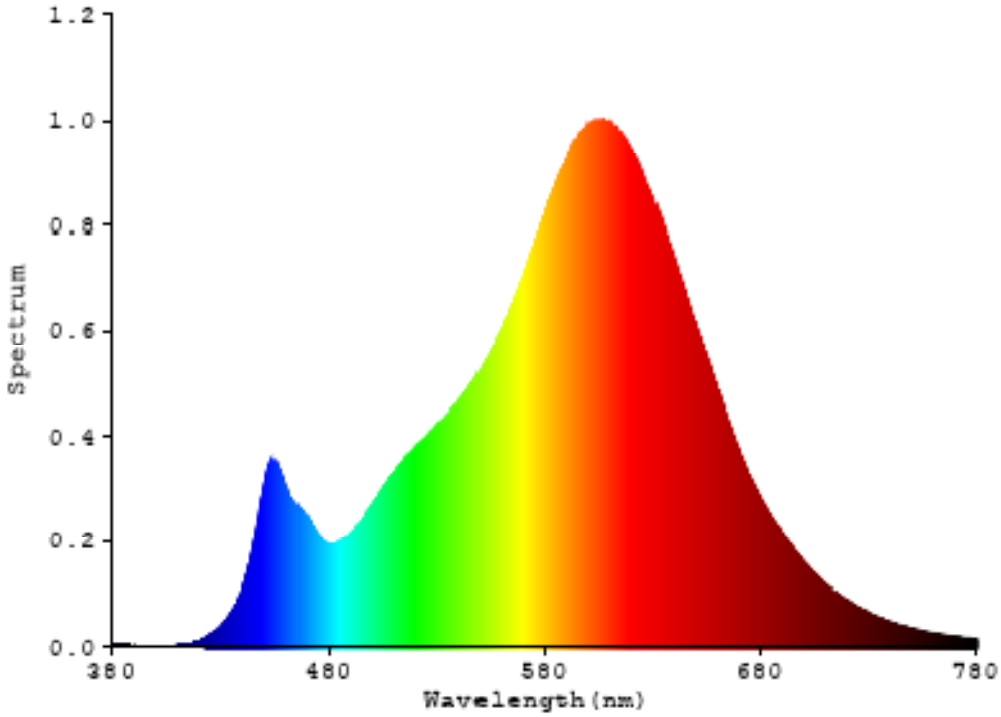


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	71.035	3.64%
10- 20	202.278	10.38%
20- 30	302.839	15.54%
30- 40	359.589	18.45%
40- 50	367.666	18.86%
50- 60	319.538	16.40%
60- 70	220.412	11.31%
70- 80	92.189	4.73%
80- 90	11.526	0.59%
90-100	0.111	0.01%
100-110	0.173	0.01%
110-120	0.217	0.01%
120-130	0.251	0.01%
130-140	0.295	0.02%
140-150	0.311	0.02%
150-160	0.273	0.01%
160-170	0.184	0.01%
170-180	0.068	0.00%
Total	1949.0	100%

γ(°)	Lumens	% Total
0- 60	1622.945	83.27%
60- 90	324.127	16.63%
0-90	1947.072	99.90%
90- 180	1.883	0.10%
0- 180	1949.0	100%

Table 3: Zonal Lumen Data

Illuminance Plots

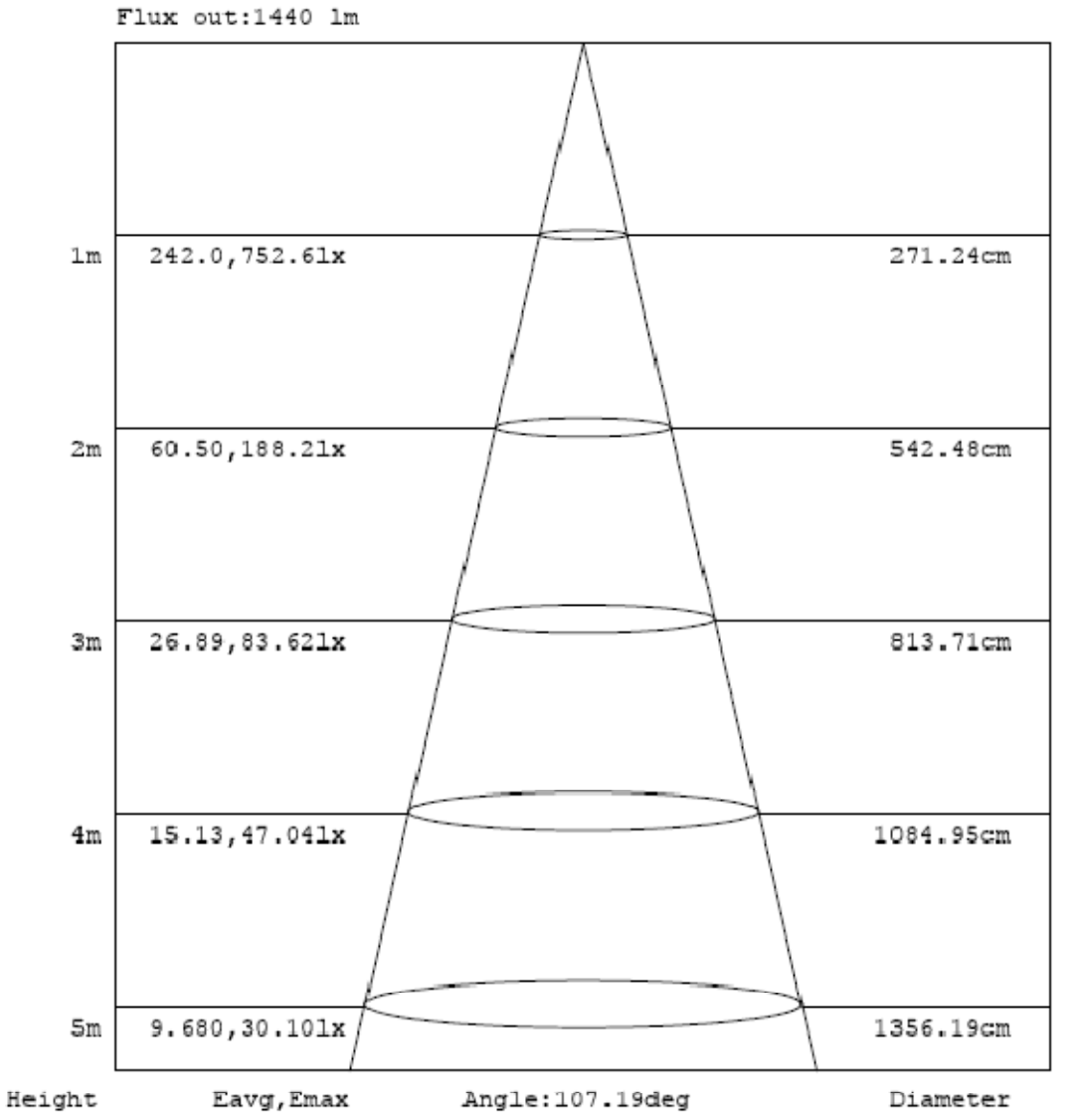


Chart 2: Beam angle

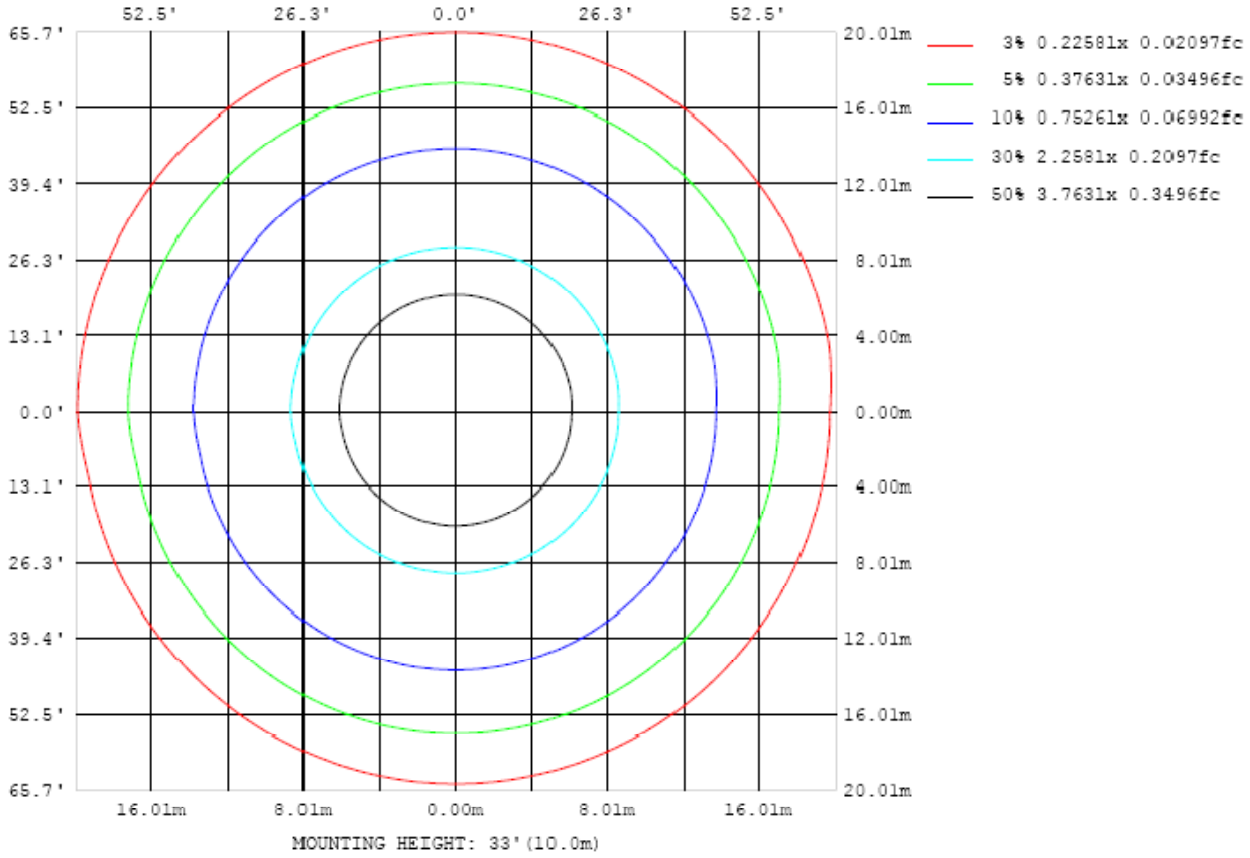


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

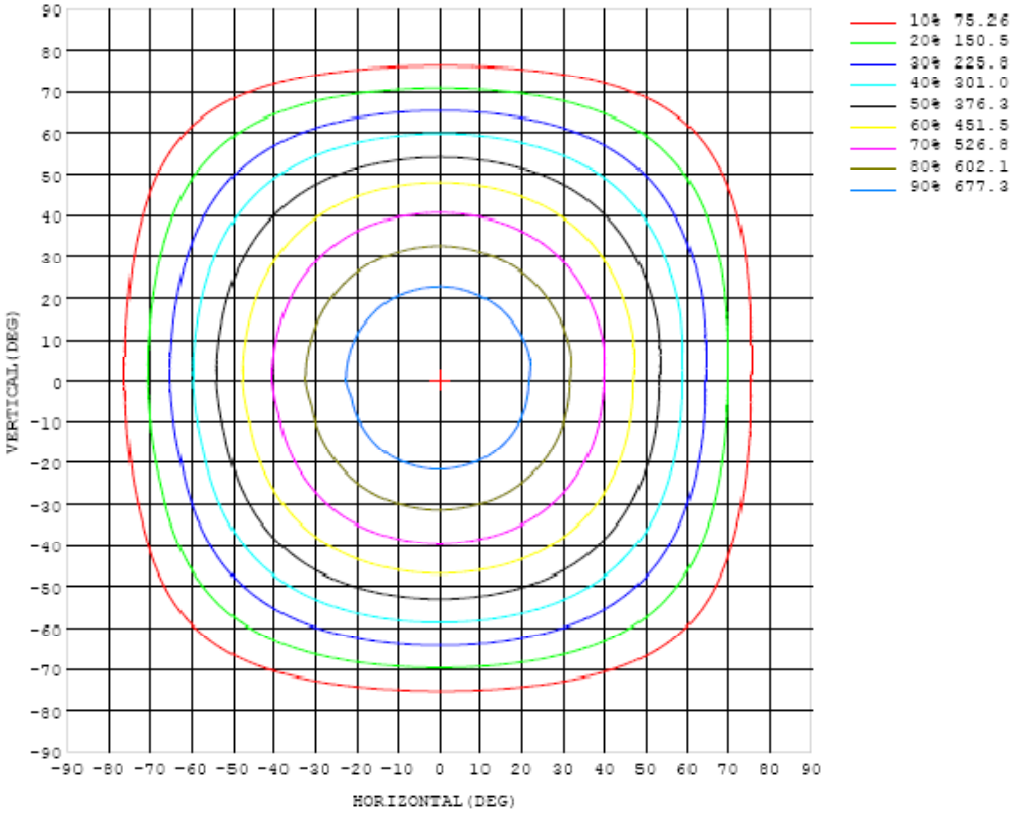


Chart 4: Isocandla Plot

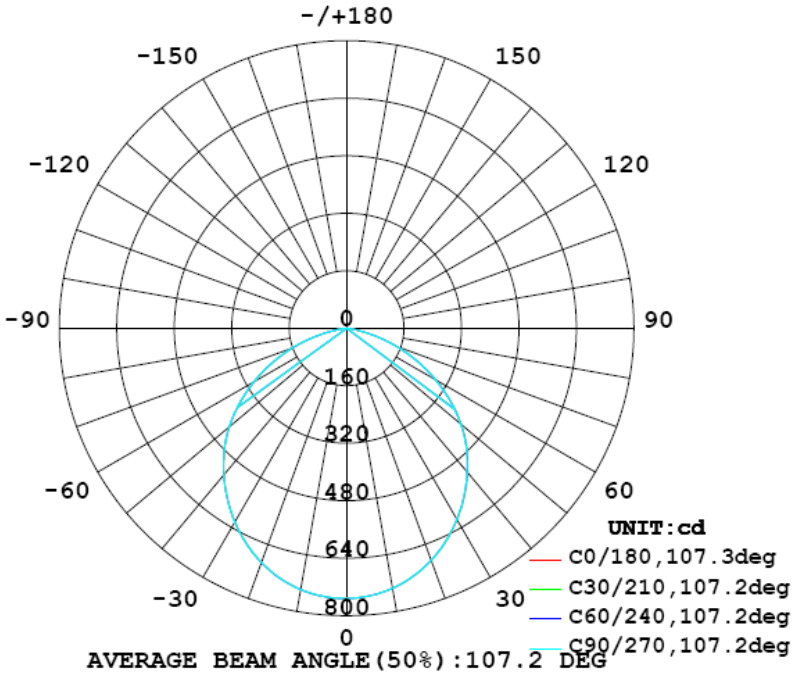


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752
5	747	747	747	747	747	747	747	747	747	747	747	747	748	748	747	747	748	748	749
10	735	735	735	734	735	735	735	735	735	735	735	735	735	735	735	735	736	736	738
15	715	715	715	714	714	714	714	715	715	714	715	715	715	716	715	716	716	716	720
20	688	688	688	688	687	687	687	687	687	687	688	688	688	688	688	689	688	688	693
25	654	654	654	654	654	653	653	653	653	653	653	653	654	654	654	654	654	655	660
30	615	615	615	614	614	614	614	614	614	614	614	614	614	615	615	615	615	615	622
35	571	571	571	571	570	570	569	570	570	569	570	570	570	571	570	571	571	571	579
40	524	524	523	523	523	522	522	522	522	522	522	522	523	523	523	523	523	523	532
45	473	473	473	473	472	472	472	472	472	471	471	472	472	472	472	472	472	472	481
50	417	416	416	416	415	415	415	415	415	414	414	414	414	414	414	415	415	415	426
55	353	353	353	352	352	351	351	351	351	351	351	351	351	351	351	351	352	352	363
60	286	286	285	285	285	285	284	284	284	284	284	284	284	284	284	284	285	285	297
65	217	217	217	216	216	216	216	216	215	216	215	215	215	215	215	216	216	216	229
70	148	148	147	147	147	147	147	147	146	146	146	146	146	146	146	146	146	147	160
75	80.6	80.2	79.9	79.8	79.4	79.1	78.7	78.5	78.3	78.0	77.8	77.7	77.6	77.5	77.5	77.5	77.7	77.8	91.0
80	26.0	25.8	25.6	25.4	25.2	24.9	24.7	24.5	24.4	24.2	24.1	24.1	24.0	24.0	23.9	23.9	24.0	24.1	31.7
85	9.20	9.14	9.08	9.03	8.98	8.92	8.85	8.79	8.72	8.63	8.54	8.47	8.39	8.34	8.30	8.31	8.29	8.30	10.4
90	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.13
95	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.15
100	0.07	0.07	0.07	0.07	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.08	0.08	0.07	0.08	0.08	0.08	0.07	0.19
105	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.23
110	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.25
115	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.25
120	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.26
125	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.27
130	0.33	0.33	0.33	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.31
135	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.38	0.38	0.38
140	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.45
145	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.52
150	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53	0.52	0.52	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.58
155	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.63
160	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.67
165	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.62	0.61	0.61	0.69
170	0.63	0.63	0.63	0.63	0.64	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.72
175	0.72	0.72	0.72	0.72	0.73	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.73	0.73	0.72	0.75
180	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.76	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752	752		
5	749	749	749	749	749	749	749	749	749	749	749	749	749	748	749	748	749		
10	738	739	739	738	738	738	738	739	738	738	738	738	738	738	738	738	738		
15	720	720	720	720	720	720	720	720	720	720	719	720	720	719	720	719	719		
20	694	694	694	693	694	694	694	694	694	694	694	694	694	694	694	694	693		
25	661	661	661	661	661	661	662	661	661	661	661	661	661	661	661	661	661		
30	622	623	623	623	623	623	623	623	623	623	623	623	623	623	622	622	622		
35	579	579	579	580	580	580	580	580	580	580	580	580	580	580	580	579	579		
40	532	532	532	532	532	533	533	533	532	533	533	533	533	533	532	533	532		
45	481	482	482	482	483	483	483	483	483	483	483	483	483	483	482	483	483		
50	426	426	427	427	427	427	426	426	427	426	427	427	426	426	426	427	427		
55	364	364	364	364	365	365	365	365	365	365	365	365	365	365	365	365	365		
60	297	298	298	298	298	299	299	299	299	299	299	299	299	299	299	299	298		
65	229	229	230	230	230	231	231	231	231	231	231	231	231	230	230	230	230		
70	160	161	161	161	161	162	162	162	162	162	162	162	162	162	162	161	161		
75	91.1	91.4	91.7	92.2	92.4	92.6	92.9	93.1	93.5	93.7	93.7	94.2	94.1	94.1	93.9	93.8	93.6		
80	31.9	32.1	32.4	32.7	33.0	33.3	33.5	33.7	33.9	34.1	34.2	34.3	34.3	34.3	34.2	34.0	33.9		
85	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.3	11.4	11.4	11.5	11.5	11.4	11.4	11.3		
90	0.13	0.14	0.14	0.15	0.16	0.18	0.18	0.20	0.22	0.26	0.28	0.30	0.32	0.36	0.36	0.36	0.34		
95	0.15	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.15	0.15	0.14	0.14		
100	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19		
105	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23		
110	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		
115	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		
120	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26		
125	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27		
130	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.32	0.31	0.32	0.31	0.31		
135	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
140	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45		
145	0.51	0.52	0.52	0.51	0.51	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.51		
150	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58		
155	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.63	0.63		
160	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.68	0.68	0.67		
165	0.69	0.69	0.69	0.70	0.70	0.70	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.70	0.70	0.70		
170	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.72	0.73	0.72	0.73	0.73	0.73	0.73	0.73	0.73		
175	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.75		
180	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75		

Table 5: Luminous Intensity Data

Color Spatial Uniformity- Goniophotometer Method

Color uniformity was measured at two horizontal angles, 0°and 90°, the vertical intervals was 1°.

	C Angle = 0°		C Angle = 90°	
γ Angle (°)	Chromaticity Coordinate u'	Chromaticity Coordinate v'	Chromaticity Coordinate u'	Chromaticity Coordinate v'
0	0.2627	0.5278	0.2627	0.5278
1	0.2626	0.5278	0.2624	0.5278
2	0.2626	0.5278	0.2624	0.5278
3	0.2626	0.5278	0.2624	0.5278
4	0.2626	0.5278	0.2624	0.5278
5	0.2626	0.5278	0.2624	0.5278
6	0.2627	0.5278	0.2624	0.5278
7	0.2627	0.5278	0.2624	0.5278
8	0.2626	0.5278	0.2624	0.5278
9	0.2626	0.5278	0.2625	0.5278
10	0.2626	0.5278	0.2624	0.5278
11	0.2626	0.5278	0.2624	0.5278
12	0.2626	0.5278	0.2624	0.5278
13	0.2624	0.5278	0.2624	0.5278
14	0.2624	0.5278	0.2624	0.5278
15	0.2624	0.5278	0.2624	0.5278
16	0.2624	0.5278	0.2624	0.5278
17	0.2624	0.5278	0.2624	0.5278
18	0.2624	0.5278	0.2623	0.5277
19	0.2624	0.5278	0.2623	0.5277
20	0.2624	0.5278	0.2623	0.5277
21	0.2624	0.5278	0.2623	0.5277
22	0.2624	0.5278	0.2623	0.5277
23	0.2624	0.5278	0.2623	0.5277
24	0.2624	0.5278	0.2623	0.5277
25	0.2624	0.5278	0.2622	0.5277
26	0.2624	0.5278	0.2623	0.5277
27	0.2624	0.5278	0.2622	0.5277
28	0.2624	0.5278	0.2622	0.5277
29	0.2624	0.5278	0.2621	0.5277
30	0.2623	0.5277	0.2621	0.5277
31	0.2623	0.5277	0.2621	0.5277
32	0.2621	0.5277	0.2621	0.5277
33	0.2622	0.5277	0.2621	0.5277
34	0.2622	0.5277	0.2621	0.5277
35	0.2621	0.5277	0.2621	0.5277

36	0.2621	0.5277	0.2619	0.5277
37	0.2621	0.5277	0.2619	0.5276
38	0.2621	0.5277	0.2620	0.5276
39	0.2621	0.5277	0.2619	0.5276
40	0.2621	0.5277	0.2619	0.5277
41	0.2621	0.5277	0.2619	0.5276
42	0.2621	0.5277	0.2618	0.5276
43	0.2619	0.5276	0.2618	0.5276
44	0.2619	0.5276	0.2618	0.5276
45	0.2619	0.5276	0.2618	0.5276
46	0.2619	0.5276	0.2618	0.5276
47	0.2619	0.5276	0.2617	0.5276
48	0.2619	0.5276	0.2617	0.5276
49	0.2619	0.5276	0.2617	0.5275
50	0.2617	0.5275	0.2617	0.5275
51	0.2617	0.5276	0.2615	0.5275
52	0.2617	0.5275	0.2615	0.5275
53	0.2617	0.5275	0.2616	0.5275
54	0.2617	0.5275	0.2614	0.5275
55	0.2617	0.5275	0.2614	0.5274
56	0.2615	0.5275	0.2614	0.5274
57	0.2615	0.5274	0.2615	0.5274
58	0.2615	0.5274	0.2614	0.5274
59	0.2615	0.5274	0.2614	0.5274
60	0.2613	0.5274	0.2615	0.5274
61	0.2614	0.5274	0.2612	0.5273
62	0.2614	0.5273	0.2612	0.5273
63	0.2613	0.5273	0.2612	0.5273
64	0.2612	0.5273	0.2613	0.5273
65	0.2612	0.5273	0.2613	0.5273
66	0.2612	0.5272	0.2610	0.5272
67	0.2611	0.5272	0.2610	0.5272
68	0.2611	0.5272	0.2610	0.5271
69	0.2610	0.5271	0.2610	0.5271
70	0.2610	0.5271	0.2610	0.5271
71	0.2609	0.5271	0.2608	0.5271
72	0.2610	0.5271	0.2609	0.5271
73	0.2609	0.5270	0.2610	0.5271
74	0.2608	0.5270	0.2608	0.5270
75	0.2610	0.5271	0.2609	0.5271
76	0.2610	0.5271	0.2608	0.5271

Table 6: Chromaticity per Measurement Angle

Weighted Average	
u'	v'
0.2620	0.5276

The chromaticity measurements need to be made only for the γ angles where the average luminous intensity is more than 10 % of the peak intensity.

γ Angle (°)	C Angle = 0°/180°		C Angle = 90°/270°	
	Δu'	Δv'	Δu'	Δv'
0	0.0007	0.0002	0.0007	0.0002
1	0.0006	0.0002	0.0004	0.0002
2	0.0006	0.0002	0.0004	0.0002
3	0.0006	0.0002	0.0004	0.0002
4	0.0006	0.0002	0.0004	0.0002
5	0.0006	0.0002	0.0004	0.0002
6	0.0007	0.0002	0.0004	0.0002
7	0.0007	0.0002	0.0004	0.0002
8	0.0006	0.0002	0.0004	0.0002
9	0.0006	0.0002	0.0005	0.0002
10	0.0006	0.0002	0.0004	0.0002
11	0.0006	0.0002	0.0004	0.0002
12	0.0006	0.0002	0.0004	0.0002
13	0.0004	0.0002	0.0004	0.0002
14	0.0004	0.0002	0.0004	0.0002
15	0.0004	0.0002	0.0004	0.0002
16	0.0004	0.0002	0.0004	0.0002
17	0.0004	0.0002	0.0004	0.0002
18	0.0004	0.0002	0.0003	0.0001
19	0.0004	0.0002	0.0003	0.0001
20	0.0004	0.0002	0.0003	0.0001
21	0.0004	0.0002	0.0003	0.0001
22	0.0004	0.0002	0.0003	0.0001
23	0.0004	0.0002	0.0003	0.0001
24	0.0004	0.0002	0.0003	0.0001
25	0.0004	0.0002	0.0002	0.0001
26	0.0004	0.0002	0.0003	0.0001
27	0.0004	0.0002	0.0002	0.0001
28	0.0004	0.0002	0.0002	0.0001
29	0.0004	0.0002	0.0001	0.0001
30	0.0003	0.0001	0.0001	0.0001

31	0.0003	0.0001	0.0001	0.0001
32	0.0001	0.0001	0.0001	0.0001
33	0.0002	0.0001	0.0001	0.0001
34	0.0002	0.0001	0.0001	0.0001
35	0.0001	0.0001	0.0001	0.0001
36	0.0001	0.0001	0.0001	0.0001
37	0.0001	0.0001	0.0001	0.0000
38	0.0001	0.0001	0.0000	0.0000
39	0.0001	0.0001	0.0001	0.0000
40	0.0001	0.0001	0.0001	0.0001
41	0.0001	0.0001	0.0001	0.0000
42	0.0001	0.0001	0.0002	0.0000
43	0.0001	0.0000	0.0002	0.0000
44	0.0001	0.0000	0.0002	0.0000
45	0.0001	0.0000	0.0002	0.0000
46	0.0001	0.0000	0.0002	0.0000
47	0.0001	0.0000	0.0003	0.0000
48	0.0001	0.0000	0.0003	0.0000
49	0.0001	0.0000	0.0003	0.0001
50	0.0003	0.0001	0.0003	0.0001
51	0.0003	0.0000	0.0005	0.0001
52	0.0003	0.0001	0.0005	0.0001
53	0.0003	0.0001	0.0004	0.0001
54	0.0003	0.0001	0.0006	0.0001
55	0.0003	0.0001	0.0006	0.0002
56	0.0005	0.0001	0.0006	0.0002
57	0.0005	0.0002	0.0005	0.0002
58	0.0005	0.0002	0.0006	0.0002
59	0.0005	0.0002	0.0006	0.0002
60	0.0007	0.0002	0.0005	0.0002
61	0.0006	0.0002	0.0008	0.0003
62	0.0000	0.0000	0.0000	0.0000
63	0.0000	0.0000	0.0000	0.0000
64	0.0000	0.0000	0.0000	0.0000
65	0.0000	0.0000	0.0000	0.0000

Table 7: Chromatic Spatial Uniformity

Spatial non-uniformity of chromaticity Δu'v': 0.0008

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

Table 8: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.
Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

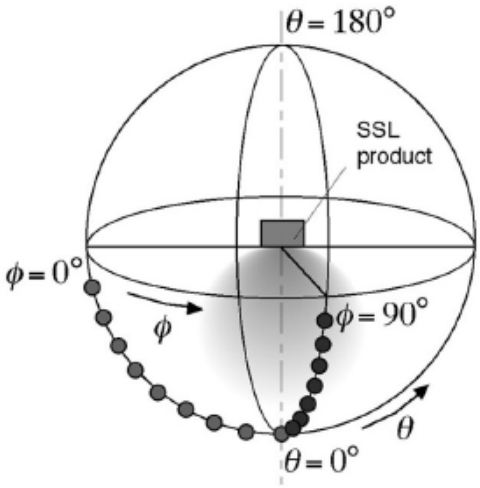
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.
The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.
Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.
Some graphics were created with Photometric Plus software.
The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology China.
The uncertainty of goniophotometer system reported in this document is expended uncertainty is 1.94% with a coverage factor k=2.

Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes (C=0°/180° and C=90°/270°) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u', v' chromaticity coordinates. The spatial non-uniformity of chromaticity, Δu'v', is determined as the maximum deviation (distance on the CIE (u', v') diagram) among all measured points from the spatially averaged chromaticity coordinate.
The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



*** End of Report ***