Quality Assured

NVLAP LAB CODE 200960-0

LM-79-08 Test Report

for

ABBlighting,Inc.

1501 Industrial Way N. Toms River, NJ 08755

25W Floodlight

Model: ABBFL25LED50-N

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

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Report No.: HZ15060008b

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

Reviewed by:

Engineer: April Zou

Jun. 05, 2015

Approved by:

Manager: Jim Zhang

Jun. 05, 2015

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: **ABBFL25LED50-N**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
83.9	1860.4	22.18	0.9875

CCT (K)	CRI	Stabilization Time (Light & Power)
5077	74.4	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jun. 02, 2015
Date of Test	: Jun. 04, 2015
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

TABLE OF CONTENT

Sample Photo

Figure 1- Overview of the sample

Equipment Under Test (EUT)	
Name	: 25W Floodlight
Model	: ABBFL25LED50-N
Electrical Ratings	: 100~277VAC, 50/60Hz, 25W
Product Description	: 5000K, Architectural Flood and Spot Luminaires Manufacturer of light source: Samsung Model of light source: LH351B Series Quantity of LED light source: 9 pcs
Manufacturer	: ABB Lighting (Shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.7℃.

Base 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 85 minutes.

The photometric distance is 2.475m.

Luminous data was taken at 0.5°vertical intervals and 10°horizontal intervals.

Parameter	Result		
Test Voltage (V)	120.0	100.0	277.0
Voltage frequency (Hz)	60	60	60
Test Current (A)	0.187	0.231	0.088
Power Factor	0.9875	0.9813	0.9148
Test Power (W)	22.18	22.43	22.18
THD A%	7.96	8.24	14.68
Luminous Efficacy (lm/W)	83.9	82.8	83.8
Total Luminous Flux (lm)	1860.4	1856.6	1859.4
Color Rendering Index (CRI)	74.4		
R9	-27		
Correlated Color Temperature (CCT) (K)	5077		
Chromaticity (Chroma x, Chroma y)	(0.3432, 0.3538)		
Chromaticity (Chroma u, Chroma v)	(0.2093, 0.3237)		
Chromaticity (Chroma u', Chroma v')	(0.2093, 0.4855)		
Duv	0.0019		
Average Beam Angle (°)	77.8		
Center Beam Candle Power (cd)	1389		
Spacing Criteria	1.07 (0°-180°)/ 1.08 (90°-270°)		
Zonal Lumens in the 0°-60°Zone	99.63%		
Zonal Lumens in the 60°-90°Zone	0.31%		
Zonal Lumens in the 90°-120°Zone	0.00%		
Zonal Lumens in the 120°-180°Zone	0.06%		

Special Color Rendering Indices	
R1	71
R2	81
R3	87
R4	73
R5	72
R6	73
R7	82
R8	56
R9	-27
R10	54
R11	69
R12	51
R13	73
R14	93

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

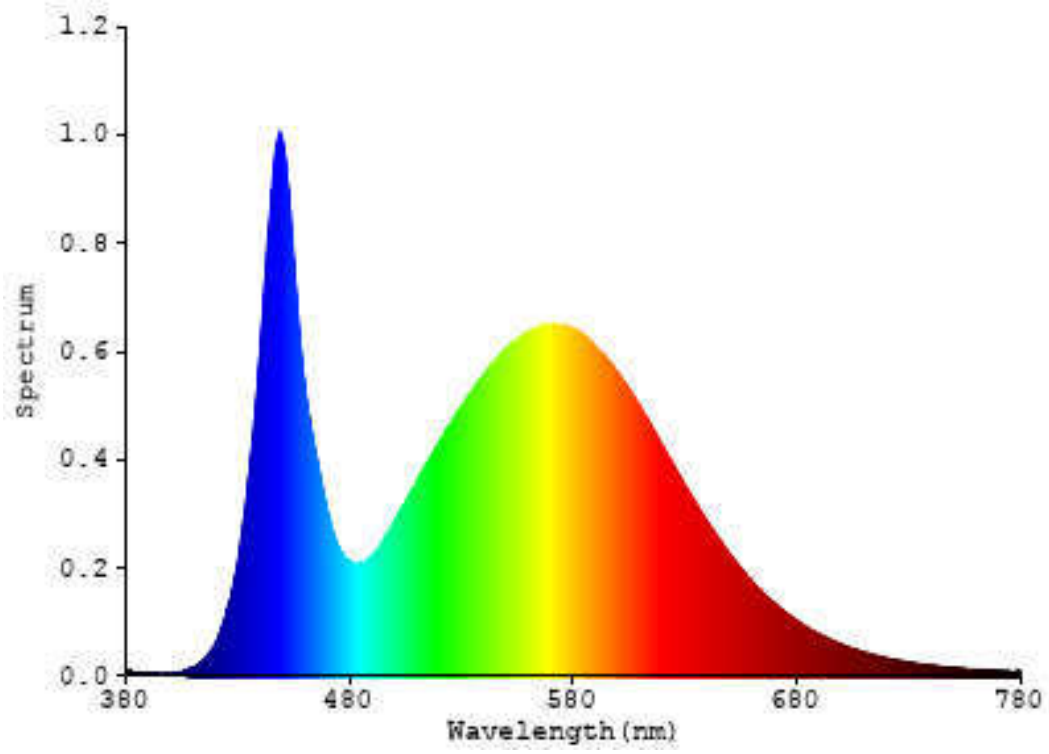


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	131.158	7.05%
10- 20	365.575	19.65%
20- 30	525.264	28.23%
30- 40	552.806	29.71%
40- 50	254.099	13.66%
50- 60	24.572	1.32%
60- 70	4.373	0.24%
70- 80	1.301	0.07%
80- 90	0.113	0.01%
90-100	0.016	0.00%
100-110	0.022	0.00%
110-120	0.049	0.00%
120-130	0.114	0.01%
130-140	0.197	0.01%
140-150	0.252	0.01%
150-160	0.25	0.01%
160-170	0.181	0.01%
170-180	0.067	0.00%
Total	1860.4	100%

γ(°)	Lumens	% Total
0- 60	1853.474	99.63%
60- 90	5.787	0.31%
0-90	1859.261	99.94%
90- 180	1.148	0.06%
0- 180	1860.4	100%

Table 3: Zonal Lumen Data

Illuminance Plots

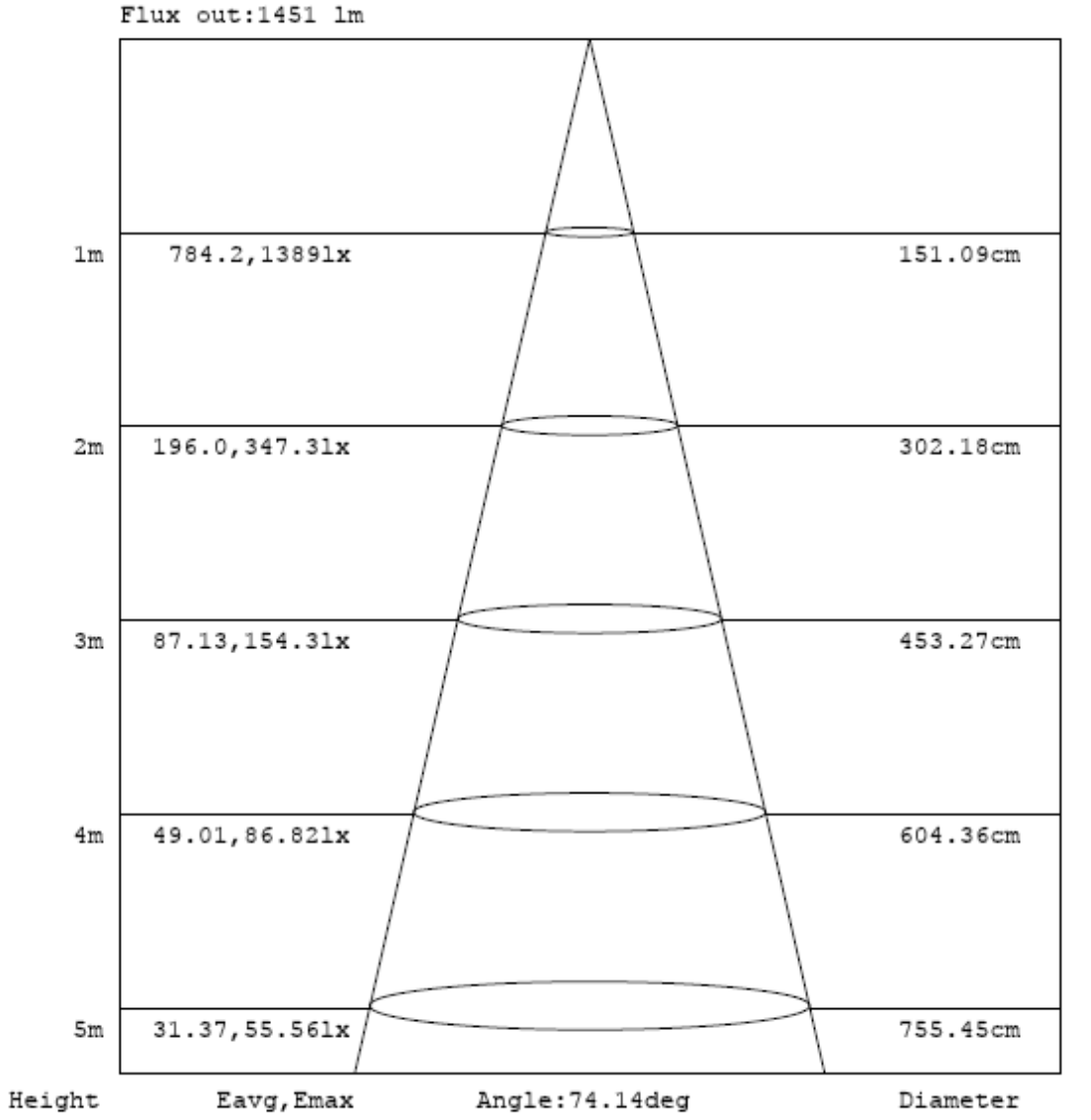


Chart 2: Beam Angle

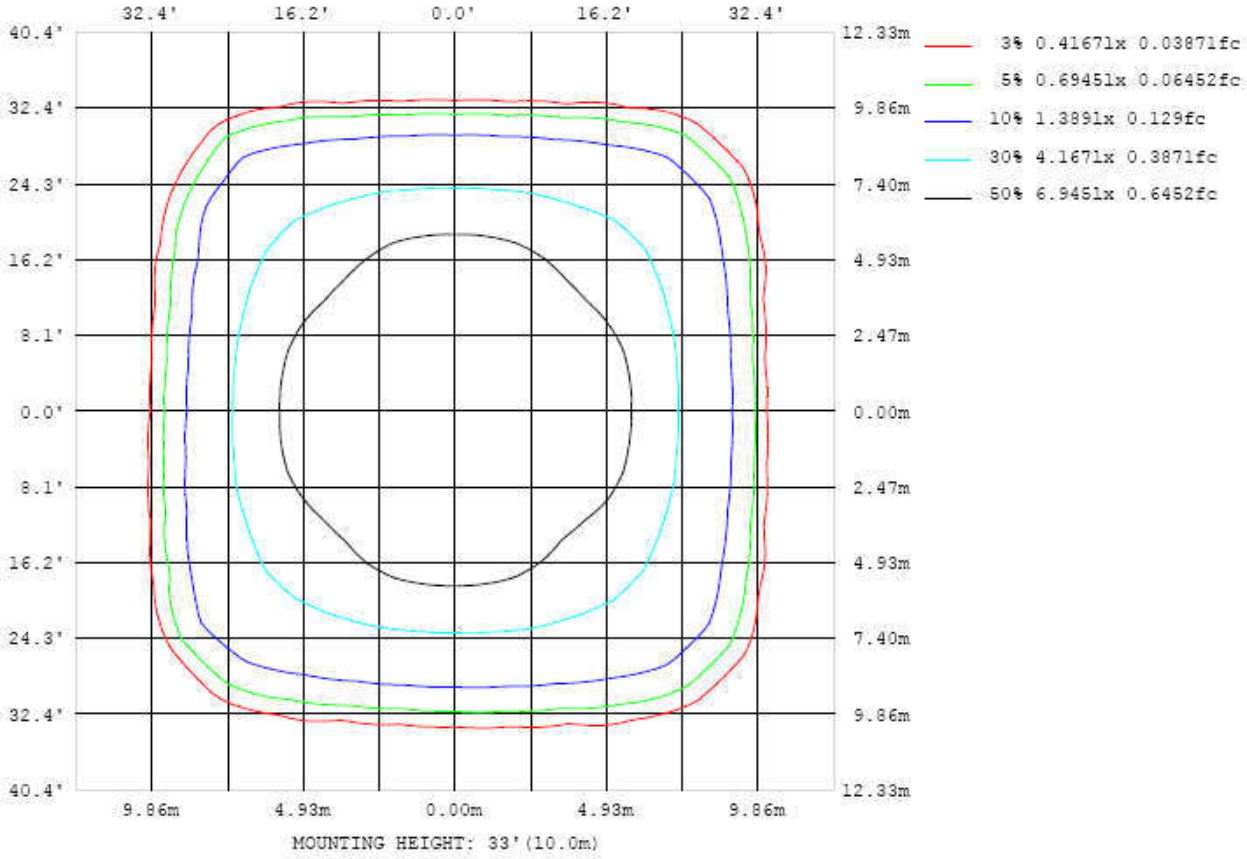


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

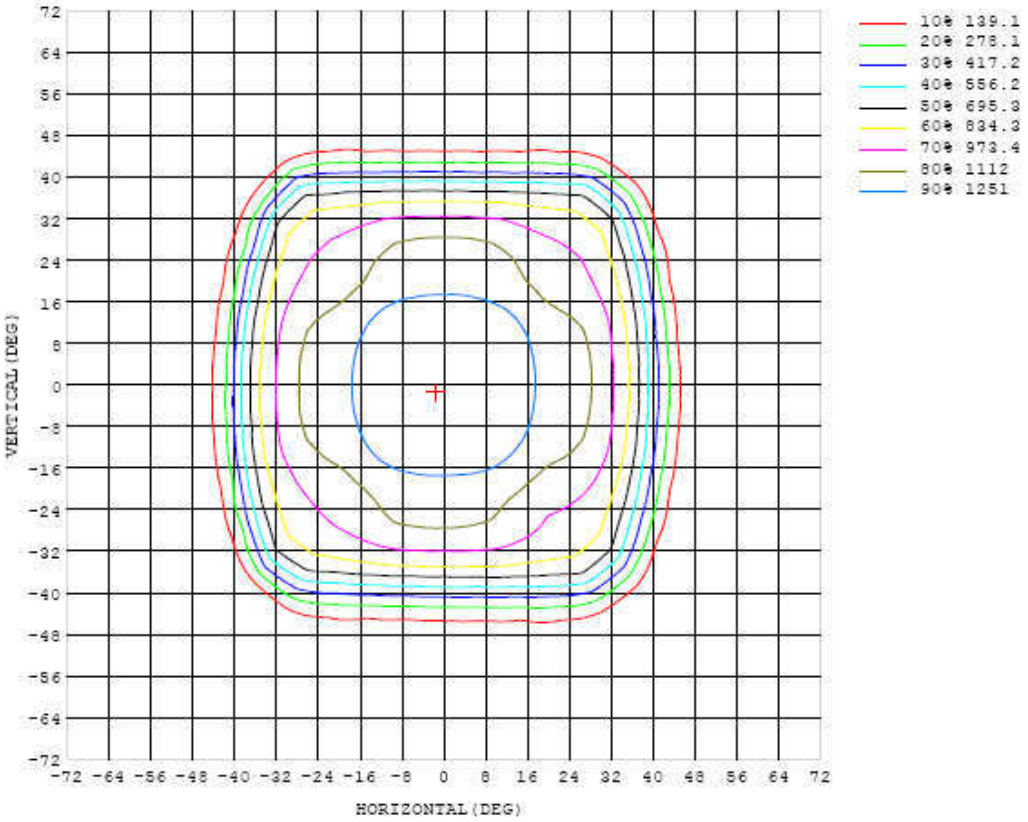


Chart 4: Isocandela Plot

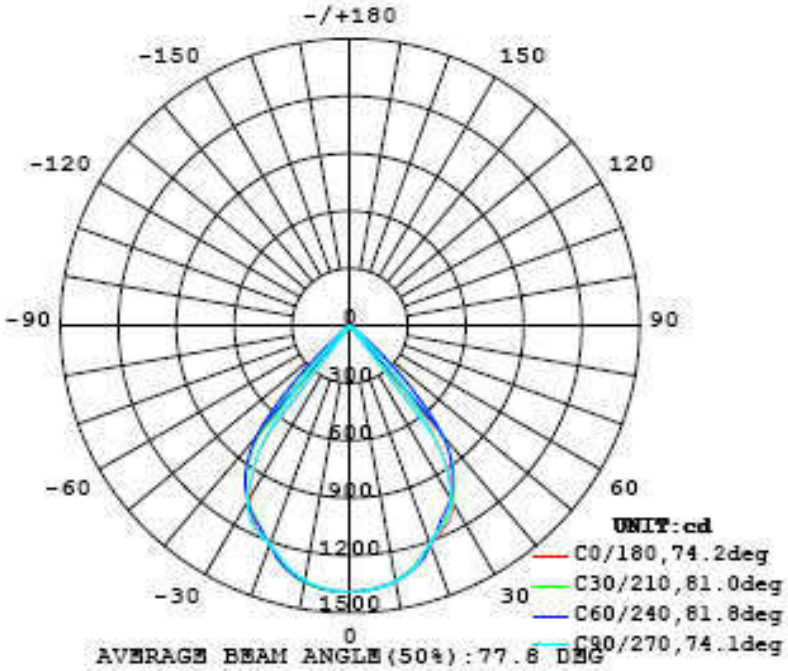


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389
5	1380	1381	1381	1380	1381	1381	1381	1381	1381	1381	1382	1383	1384	1384	1383	1383	1384	1383	1383
10	1354	1355	1356	1357	1357	1357	1357	1357	1355	1355	1356	1359	1360	1362	1364	1363	1362	1359	1359
15	1297	1299	1299	1300	1303	1307	1307	1306	1304	1301	1305	1309	1311	1315	1314	1311	1308	1304	1302
20	1214	1214	1214	1214	1221	1222	1218	1217	1215	1214	1217	1219	1223	1226	1227	1220	1222	1220	1215
25	1162	1160	1152	1131	1106	1105	1115	1140	1147	1149	1151	1149	1127	1111	1111	1135	1154	1157	1157
30	1063	1067	1082	1065	1019	999	1042	1064	1053	1045	1055	1070	1058	1023	1021	1053	1075	1062	1049
35	851	870	918	936	948	944	922	903	860	836	853	897	928	955	953	930	910	865	839
40	488	515	604	740	847	848	743	599	505	476	495	576	714	839	852	756	604	498	439
45	143	172	248	397	608	608	405	249	180	159	167	228	365	566	620	385	196	132	107
50	39.0	40.7	52.8	92.1	225	222	112	71.2	54.7	51.8	52.4	65.9	98.3	191	185	83.1	50.3	34.3	31.6
55	15.2	13.6	17.6	26.4	21.9	21.3	33.4	24.2	18.5	18.7	17.8	21.8	29.2	17.4	16.1	22.4	13.1	8.91	11.0
60	8.38	6.39	6.43	7.70	6.66	6.68	9.10	7.94	7.45	10.4	7.37	7.42	8.64	6.37	6.23	6.37	5.41	5.31	7.06
65	5.10	4.02	4.09	4.42	4.23	4.30	4.68	4.73	4.85	6.81	4.86	4.64	4.71	4.04	3.98	4.12	3.73	3.38	4.35
70	2.95	2.16	2.41	2.79	2.57	2.66	3.07	3.05	2.86	4.32	2.89	2.85	3.12	2.50	2.24	2.63	2.14	1.83	2.48
75	1.30	0.93	1.00	1.35	1.23	1.34	1.60	1.56	1.34	2.63	1.36	1.43	1.51	1.18	1.07	1.20	0.95	0.74	1.06
80	0.28	0.29	0.30	0.33	0.37	0.40	0.45	0.39	0.35	0.52	0.38	0.34	0.39	0.34	0.31	0.28	0.26	0.24	0.22
85	0.08	0.08	0.09	0.10	0.12	0.13	0.14	0.13	0.13	0.12	0.12	0.13	0.12	0.12	0.11	0.10	0.08	0.07	0.06
90	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
100	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
105	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01
110	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.04	0.03	0.03	0.02
115	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.05	0.04	0.04	0.05	0.05	0.06	0.07	0.07	0.06	0.05	0.04	0.04
120	0.07	0.07	0.07	0.08	0.09	0.09	0.09	0.08	0.08	0.07	0.08	0.08	0.09	0.10	0.09	0.09	0.08	0.07	0.07
125	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.12	0.12	0.12	0.11	0.13
130	0.16	0.16	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.19
135	0.23	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.27	0.26	0.25	0.25	0.25	0.24	0.24	0.26
140	0.30	0.31	0.31	0.32	0.32	0.33	0.34	0.35	0.36	0.36	0.35	0.35	0.34	0.33	0.32	0.31	0.31	0.31	0.33
145	0.38	0.39	0.38	0.39	0.40	0.42	0.43	0.45	0.45	0.45	0.45	0.42	0.41	0.40	0.39	0.38	0.39	0.39	0.40
150	0.47	0.47	0.47	0.47	0.48	0.50	0.52	0.53	0.54	0.54	0.50	0.51	0.50	0.49	0.47	0.46	0.48	0.49	0.47
155	0.54	0.54	0.56	0.57	0.57	0.57	0.58	0.58	0.57	0.59	0.59	0.58	0.57	0.55	0.54	0.57	0.57	0.56	0.54
160	0.62	0.62	0.63	0.64	0.64	0.64	0.64	0.63	0.64	0.63	0.63	0.62	0.63	0.61	0.61	0.64	0.63	0.63	0.60
165	0.65	0.65	0.67	0.69	0.70	0.71	0.69	0.68	0.67	0.66	0.66	0.65	0.67	0.67	0.67	0.68	0.67	0.66	0.63
170	0.70	0.70	0.72	0.74	0.75	0.75	0.74	0.73	0.71	0.70	0.70	0.70	0.70	0.69	0.70	0.71	0.72	0.71	0.66
175	0.72	0.74	0.74	0.75	0.75	0.75	0.75	0.73	0.72	0.72	0.69	0.72	0.74	0.72	0.71	0.73	0.75	0.74	0.73
180	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71

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	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389		
5	1384	1385	1384	1384	1384	1383	1381	1380	1379	1380	1380	1381	1381	1381	1382	1381	1381		
10	1363	1364	1363	1361	1359	1358	1354	1351	1349	1350	1352	1355	1356	1358	1358	1357	1355		
15	1306	1308	1310	1311	1308	1306	1300	1296	1291	1295	1299	1303	1305	1307	1304	1301	1300		
20	1218	1220	1219	1218	1222	1219	1219	1216	1215	1217	1223	1219	1222	1223	1218	1215	1215		
25	1157	1152	1130	1107	1108	1139	1161	1165	1166	1168	1164	1144	1116	1110	1132	1155	1162		
30	1058	1069	1057	1028	1033	1059	1085	1072	1062	1070	1080	1066	1035	1033	1062	1082	1072		
35	856	900	931	966	969	946	917	868	846	864	911	936	967	975	947	917	871		
40	466	566	721	850	863	756	614	512	482	508	603	746	861	866	759	613	513		
45	118	169	290	558	624	400	234	150	131	148	230	390	628	618	407	251	154		
50	32.0	45.3	75.8	135	197	94.6	58.9	46.2	45.0	45.7	58.8	93.0	214	221	95.0	52.7	39.3		
55	9.88	11.7	16.4	13.7	12.4	27.2	17.2	12.7	15.7	13.4	19.1	30.3	20.5	14.8	24.2	18.2	12.6		
60	5.51	5.23	6.46	5.56	5.75	6.91	6.50	6.74	10.2	6.98	6.70	8.48	6.30	6.15	7.55	6.33	6.12		
65	3.65	3.38	3.73	3.55	3.67	4.18	4.33	4.37	6.13	4.55	4.37	4.58	3.98	3.82	4.26	3.87	3.84		
70	2.02	1.85	2.19	2.06	2.13	2.47	2.54	2.34	3.51	2.47	2.49	2.77	2.40	2.19	2.64	2.25	1.98		
75	0.83	0.72	0.98	0.93	0.87	1.05	0.94	0.93	1.54	1.03	1.03	1.20	1.05	0.96	1.14	0.95	0.86		
80	0.22	0.22	0.22	0.22	0.23	0.22	0.21	0.21	0.21	0.22	0.23	0.26	0.28	0.28	0.28	0.27	0.27		
85	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07		
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
95	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
105	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01		
110	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02		
115	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04		
120	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07		
125	0.13	0.13	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.12		
130	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.21	0.21	0.21	0.20	0.19	0.19	0.18	0.19	0.19	0.19		
135	0.26	0.26	0.26	0.26	0.27	0.27	0.28	0.28	0.28	0.28	0.27	0.26	0.25	0.24	0.25	0.26	0.26		
140	0.33	0.32	0.32	0.32	0.34	0.35	0.36	0.34	0.36	0.35	0.34	0.32	0.31	0.30	0.30	0.32	0.32		
145	0.39	0.39	0.38	0.39	0.41	0.41	0.42	0.42	0.42	0.41	0.40	0.39	0.38	0.36	0.36	0.38	0.39		
150	0.46	0.47	0.47	0.46	0.46	0.48	0.48	0.48	0.48	0.47	0.46	0.45	0.45	0.44	0.45	0.46	0.45		
155	0.54	0.53	0.55	0.52	0.52	0.53	0.53	0.52	0.52	0.51	0.51	0.51	0.52	0.54	0.54	0.52	0.53		
160	0.59	0.58	0.58	0.58	0.57	0.56	0.55	0.55	0.53	0.55	0.55	0.56	0.59	0.61	0.60	0.58	0.59		
165	0.61	0.62	0.62	0.62	0.61	0.60	0.58	0.58	0.57	0.60	0.62	0.62	0.65	0.65	0.63	0.61	0.62		
170	0.62	0.63	0.64	0.65	0.63	0.60	0.59	0.60	0.59	0.59	0.62	0.62	0.65	0.65	0.64	0.63	0.67		
175	0.70	0.71	0.72	0.73	0.73	0.71	0.70	0.69	0.67	0.70	0.71	0.72	0.74	0.73	0.72	0.72	0.72		
180	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Sep. 18, 2014	Sep. 17, 2015
Digital Power Meter	PF2010A	HZTE028-01	Sep. 18, 2014	Sep. 17, 2015
AC Power Supply	PCR 500L	HZTE001-08	Sep. 18, 2014	Sep. 17, 2015
DC Power Supply	WY12010	HZTE004-03	Sep. 18, 2014	Sep. 17, 2015
Temperature Meter	TES1310	HZTE017-01	Sep. 18, 2014	Sep. 17, 2015
Standard source	D908	HZTE012-01	Sep. 18, 2014	Sep. 17, 2015
Standard source	SCL-1400	HZTE012-02	Sep. 18, 2014	Sep. 17, 2015

Table 6: 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

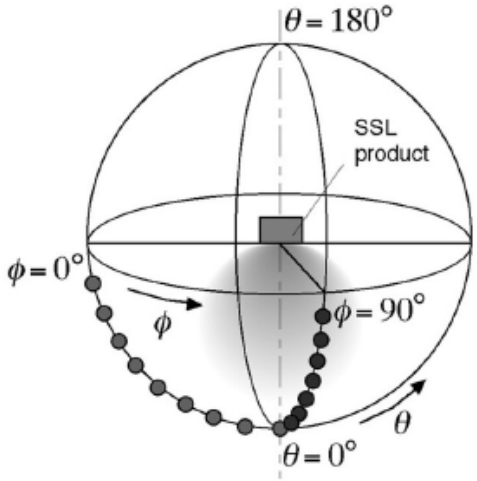
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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 P.R. 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 ***