



LM-79-08 Test Report

for

ABB Lighting, Inc.

3 Adams St Belvidere, NJ 07823.

SLIM WALL PACK

Model: SWP25501-A

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15080016b

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

Reviewed by:

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Aug. 13, 2015



Jim Zhang

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Aug. 13, 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: **SWP25501-A**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
102.2	2538.6	24.84	0.9911
CCT (K)	CRI	Stabilization Time (Light & Power)	
5087	76.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Aug. 10, 2015

Date of Test : Aug. 11, 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

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Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: SLIM WALL PACK
Model	: SWP25501-A
Electrical Ratings	: 100~277VAC, 50/60Hz, 25W
Product Description	: 5000K, Outdoor Wall-Mounted Area Luminaires Manufacturer of light source: SAMSUNG Model of light source: LH351B Quantity of LED light source: 14pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 25.1°C.

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			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	74
Voltage frequency (Hz)	60	60	60	R2	82
Test Current (A)	0.209	0.252	0.099	R3	86
Power Factor	0.9911	0.9897	0.9175	R4	76
Test Power (W)	24.84	25.01	25.28	R5	75
THD A%	11.85	10.41	14.89	R6	74
Luminous Efficacy (lm/W)	102.2	101.0	100.2	R7	83
Total Luminous Flux (lm)	2538.6	2525.3	2533.9	R8	61
Color Rendering Index (CRI)	76.4			R9	-16
R9	-16			R10	56
Correlated Color Temperature (CCT) (K)	5087			R11	72
Chromaticity (Chroma x, Chroma y)	(0.3429, 0.3520)			R12	52
Chromaticity (Chroma u, Chroma v)	(0.2098, 0.3230)			R13	76
Chromaticity (Chroma u', Chroma v')	(0.2098, 0.4845)			R14	92
Duv	0.0011				
Average Beam Angle (°)	93.3				
Center Beam Candle Power (cd)	959				
Spacing Criteria	1.02 (0°-180°)/ 1.49 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	97.43%				
Zonal Lumens in the 60°-90°Zone	2.51%				
Zonal Lumens in the 90°-120°Zone	0.01%				
Zonal Lumens in the 120°-180°Zone	0.05%				

Table 2: Test data per Sphere-Spectroradiometer 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

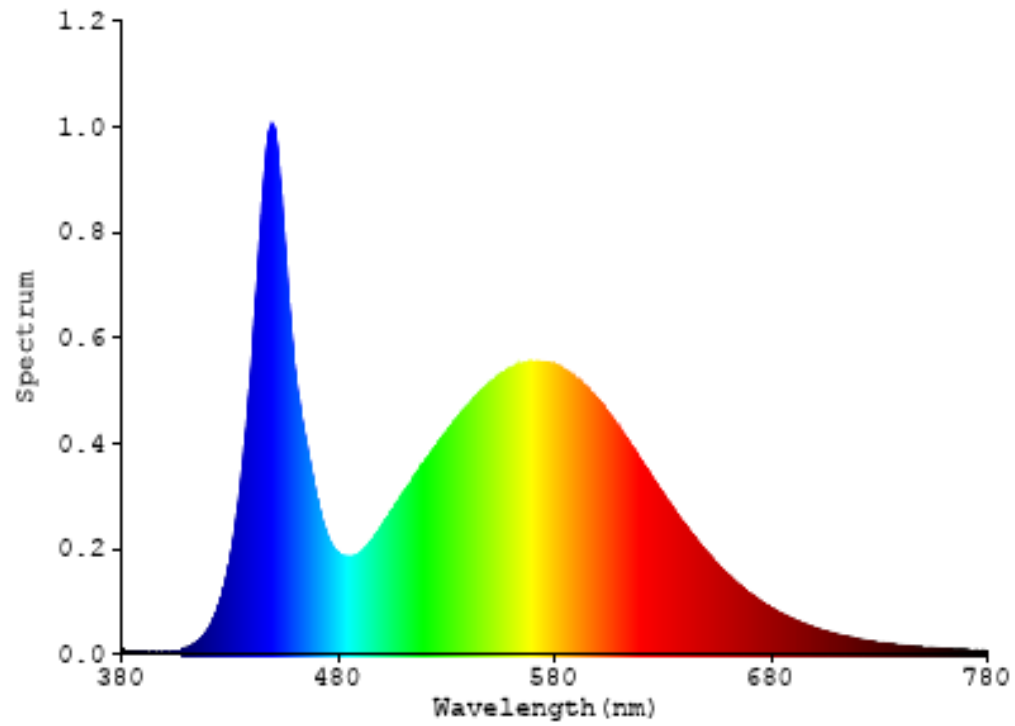


Chart 1: Spectral Power Distribution

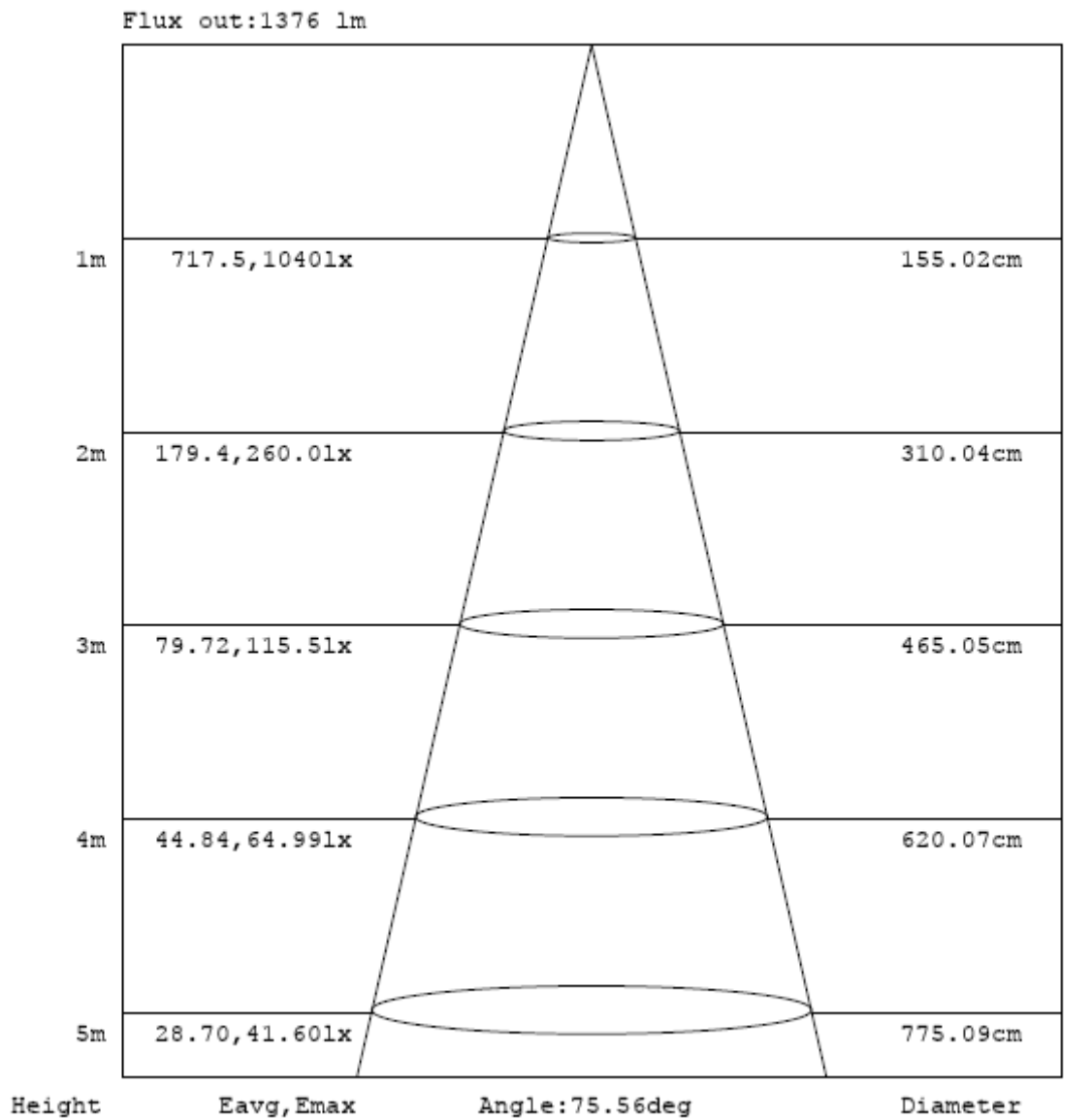
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	91.642	3.61%
10- 20	273.76	10.78%
20- 30	472.241	18.60%
30- 40	683.451	26.92%
40- 50	632.528	24.92%
50- 60	319.864	12.60%
60- 70	54.602	2.15%
70- 80	8.322	0.33%
80- 90	0.732	0.03%
90-100	0.035	0.00%
100-110	0.072	0.00%
110-120	0.125	0.00%
120-130	0.187	0.01%
130-140	0.252	0.01%
140-150	0.278	0.01%
150-160	0.244	0.01%
160-170	0.165	0.01%
170-180	0.062	0.00%
Total	2538.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2473.486	97.43%
60- 90	63.656	2.51%
0-90	2537.142	99.94%
90- 180	1.42	0.06%
0- 180	2538.6	100%

Table 3: Zonal Lumen Data

Illuminance Plots



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Chart 2: Beam Angle

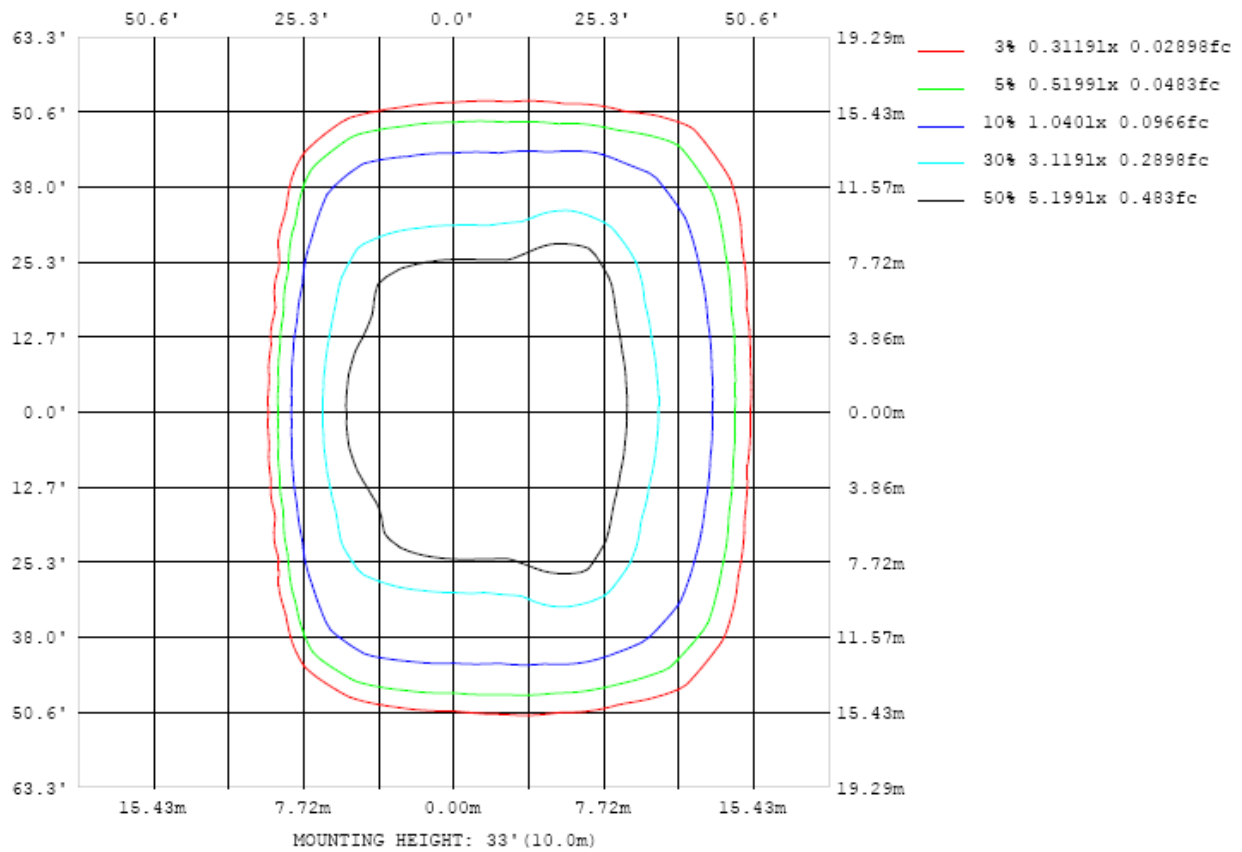


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

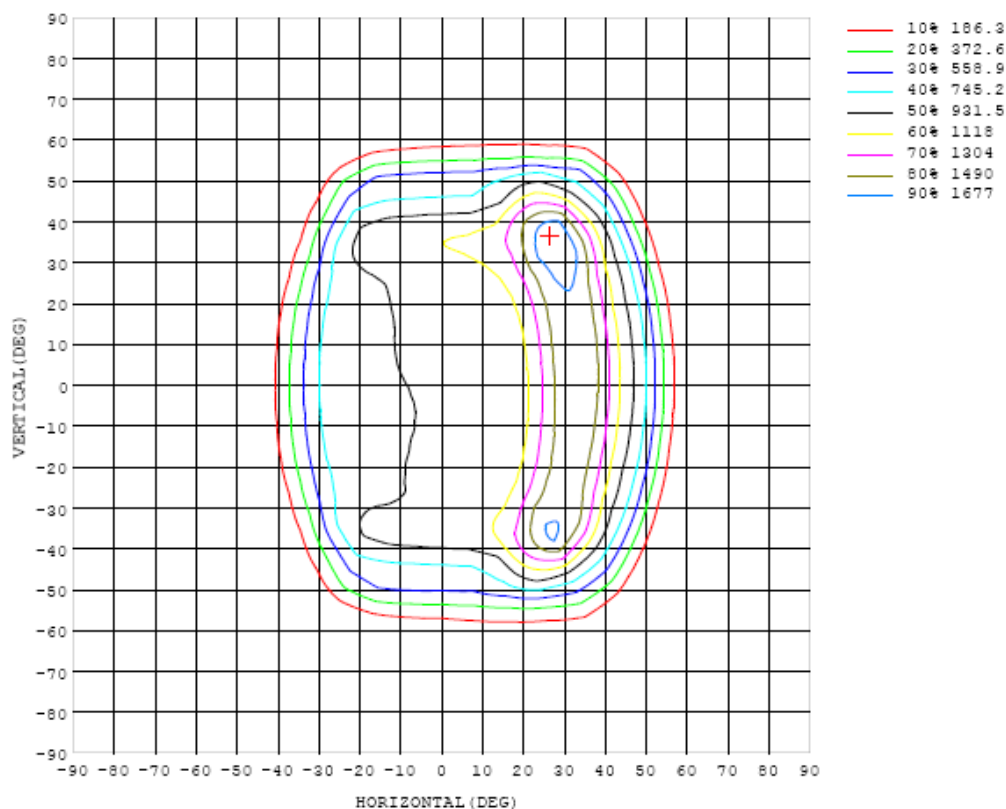


Chart 4: Isocandela Plot

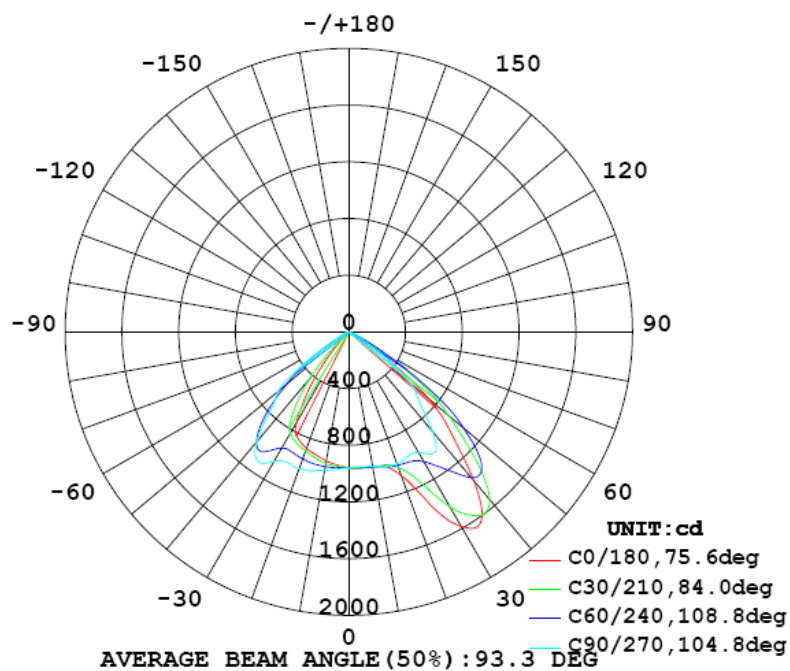


Chart 5: Polar Candela Distribution

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	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
5	967	965	964	964	963	963	963	962	959	956	953	950	947	945	944	941	941	942	943
10	968	966	965	966	966	967	969	971	970	963	954	945	938	931	927	923	922	923	925
15	983	979	976	972	973	979	988	997	998	987	968	948	932	915	903	897	896	896	899
20	1078	1069	1047	1019	996	992	1001	1013	1008	993	970	947	920	887	872	871	873	872	875
25	1333	1305	1240	1155	1080	1030	1011	1011	996	973	956	938	904	862	848	845	842	838	839
30	1585	1564	1514	1427	1283	1140	1057	1024	1000	981	963	943	895	845	814	803	785	753	740
35	1626	1618	1614	1583	1519	1396	1181	1089	1057	1045	1029	1008	963	841	761	661	572	510	489
40	1368	1380	1442	1545	1645	1628	1343	1060	955	920	925	953	957	813	579	420	315	242	219
45	1031	1043	1099	1254	1563	1702	1324	883	730	704	710	742	772	578	325	163	84.2	66.3	64.3
50	739	757	819	922	1169	1317	1055	739	596	569	586	602	541	299	95.1	33.6	42.4	55.5	60.8
55	306	333	427	585	752	785	654	441	336	295	309	344	289	82.2	22.9	31.2	40.2	53.3	56.2
60	73.8	72.4	86.8	196	364	397	246	163	117	98.4	90.9	67.6	59.8	17.3	13.8	25.7	37.6	46.0	46.6
65	34.0	33.8	31.2	36.6	65.5	107	76.8	62.6	70.9	59.6	54.5	17.8	12.9	17.6	9.57	16.5	31.1	38.8	39.4
70	10.7	10.9	11.3	13.8	17.3	29.5	35.2	24.6	33.8	24.2	22.4	7.48	9.58	15.8	7.39	7.67	18.6	23.2	22.2
75	4.85	5.30	6.17	6.33	7.00	8.21	9.30	7.93	9.23	6.80	6.14	4.69	6.70	11.5	3.98	2.67	4.89	5.63	5.32
80	2.38	2.58	2.59	2.64	2.34	2.74	2.86	2.64	2.62	2.35	2.27	2.07	1.83	1.66	1.27	1.03	1.07	1.20	1.15
85	0.60	0.56	0.55	0.57	0.51	0.50	0.48	0.47	0.46	0.38	0.36	0.33	0.29	0.29	0.29	0.30	0.31	0.31	0.30
90	0.03	0.04	0.06	0.06	0.07	0.07	0.07	0.07	0.06	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
95	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02
100	0.04	0.05	0.05	0.05	0.05	0.04	0.06	0.08	0.08	0.03	0.03	0.03	0.04	0.05	0.05	0.04	0.04	0.03	0.02
105	0.04	0.05	0.05	0.05	0.06	0.08	0.11	0.13	0.14	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.05	0.04	0.04
110	0.04	0.04	0.04	0.05	0.08	0.11	0.14	0.16	0.18	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.09	0.08	0.09
115	0.05	0.05	0.05	0.06	0.10	0.13	0.15	0.17	0.18	0.12	0.12	0.14	0.14	0.14	0.16	0.16	0.16	0.15	0.15
120	0.06	0.06	0.07	0.09	0.12	0.15	0.16	0.18	0.20	0.19	0.20	0.18	0.19	0.19	0.21	0.22	0.22	0.22	0.22
125	0.09	0.09	0.10	0.13	0.15	0.17	0.18	0.19	0.21	0.27	0.26	0.25	0.25	0.26	0.28	0.30	0.29	0.31	0.31
130	0.13	0.14	0.15	0.17	0.19	0.20	0.21	0.22	0.24	0.34	0.34	0.33	0.32	0.32	0.34	0.37	0.38	0.38	0.39
135	0.20	0.20	0.21	0.23	0.25	0.26	0.26	0.27	0.29	0.42	0.43	0.41	0.41	0.39	0.43	0.45	0.47	0.44	0.46
140	0.26	0.26	0.27	0.28	0.29	0.30	0.30	0.31	0.33	0.49	0.49	0.49	0.48	0.47	0.51	0.51	0.52	0.50	0.51
145	0.32	0.31	0.31	0.32	0.34	0.34	0.34	0.35	0.38	0.54	0.55	0.57	0.53	0.53	0.55	0.57	0.56	0.57	0.55
150	0.36	0.37	0.37	0.38	0.38	0.38	0.39	0.40	0.43	0.59	0.61	0.63	0.61	0.59	0.58	0.60	0.60	0.58	0.58
155	0.41	0.42	0.41	0.41	0.41	0.41	0.43	0.43	0.45	0.61	0.64	0.64	0.65	0.60	0.58	0.59	0.60	0.58	0.58
160	0.46	0.47	0.46	0.45	0.44	0.45	0.46	0.46	0.48	0.63	0.65	0.65	0.65	0.62	0.58	0.58	0.57	0.57	0.53
165	0.50	0.51	0.52	0.51	0.49	0.50	0.49	0.49	0.49	0.63	0.66	0.68	0.68	0.67	0.61	0.59	0.60	0.58	0.58
170	0.57	0.57	0.58	0.57	0.55	0.56	0.55	0.54	0.53	0.65	0.66	0.68	0.69	0.70	0.64	0.60	0.61	0.63	0.63
175	0.62	0.62	0.64	0.61	0.61	0.62	0.61	0.59	0.59	0.73	0.74	0.75	0.77	0.78	0.74	0.70	0.70	0.68	0.67
180	0.66	0.66	0.65	0.65	0.64	0.65	0.63	0.62	0.62	0.70	0.72	0.72	0.73	0.73	0.71	0.70	0.69	0.66	0.66

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959		
5	945	949	952	954	959	963	966	970	973	975	977	979	976	974	972	970	968		
10	930	936	943	949	956	965	973	982	991	999	999	996	990	985	979	974	971		
15	904	911	920	932	947	964	981	999	1018	1029	1026	1020	1010	1000	992	989	986		
20	879	885	894	904	920	953	980	1002	1027	1046	1053	1044	1030	1028	1043	1063	1076		
25	844	853	868	879	897	939	976	996	1019	1047	1066	1065	1073	1117	1184	1263	1316		
30	758	796	827	844	879	948	1003	1032	1054	1077	1098	1128	1200	1335	1469	1549	1581		
35	511	577	679	789	890	1030	1084	1099	1116	1135	1178	1275	1484	1593	1642	1662	1644		
40	241	314	425	590	845	1014	1035	1010	1011	1040	1143	1447	1761	1764	1618	1488	1404		
45	67.2	83.6	161	325	593	837	823	786	783	811	984	1470	1851	1683	1326	1132	1059		
50	57.3	45.2	35.5	91.4	306	575	655	658	658	674	816	1195	1448	1274	984	854	773		
55	55.3	44.5	32.4	24.9	78.2	317	408	371	365	397	536	842	897	839	634	456	349		
60	47.7	40.9	28.2	15.5	16.8	68.6	108	110	117	147	203	317	542	433	222	97.1	76.2		
65	40.2	34.0	19.8	10.2	17.0	14.6	17.3	49.5	61.2	70.8	64.5	89.0	150	91.2	40.3	31.8	35.9		
70	24.2	21.3	9.21	7.62	15.3	11.7	7.87	20.1	25.2	35.4	25.9	37.1	30.6	18.5	15.3	11.5	11.2		
75	5.79	5.59	2.86	3.93	10.6	8.28	5.11	6.12	6.92	9.27	8.15	9.75	8.36	7.28	7.22	6.38	5.33		
80	1.24	1.15	1.09	1.24	1.77	1.82	2.07	2.36	2.62	2.76	2.83	3.08	2.96	2.66	2.85	2.88	2.57		
85	0.33	0.32	0.30	0.28	0.29	0.30	0.34	0.37	0.46	0.54	0.58	0.61	0.68	0.69	0.69	0.65	0.65		
90	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.06	0.07	0.07	0.05	0.06	0.05		
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03		
100	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.08	0.07	0.07	0.06	0.05	0.06	0.06	0.05	0.05		
105	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.04	0.13	0.13	0.12	0.10	0.08	0.06	0.05	0.05	0.04		
110	0.09	0.09	0.10	0.10	0.09	0.09	0.08	0.07	0.17	0.16	0.14	0.12	0.10	0.07	0.05	0.04	0.04		
115	0.15	0.16	0.15	0.15	0.14	0.14	0.13	0.11	0.18	0.17	0.15	0.14	0.12	0.09	0.07	0.05	0.05		
120	0.23	0.22	0.21	0.20	0.19	0.19	0.18	0.16	0.20	0.19	0.16	0.15	0.13	0.11	0.09	0.07	0.06		
125	0.31	0.30	0.27	0.26	0.24	0.25	0.24	0.22	0.22	0.19	0.17	0.16	0.15	0.13	0.12	0.10	0.09		
130	0.38	0.36	0.33	0.32	0.30	0.31	0.30	0.29	0.26	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.14		
135	0.44	0.43	0.40	0.39	0.38	0.37	0.37	0.36	0.33	0.29	0.26	0.25	0.24	0.24	0.23	0.22	0.20		
140	0.49	0.48	0.45	0.45	0.43	0.43	0.43	0.41	0.40	0.37	0.33	0.32	0.31	0.30	0.29	0.28	0.27		
145	0.54	0.53	0.52	0.49	0.49	0.48	0.50	0.47	0.48	0.44	0.40	0.37	0.36	0.36	0.35	0.35	0.33		
150	0.57	0.56	0.55	0.55	0.54	0.55	0.55	0.52	0.55	0.52	0.48	0.44	0.43	0.42	0.41	0.41	0.39		
155	0.57	0.57	0.57	0.58	0.59	0.60	0.56	0.54	0.59	0.58	0.55	0.53	0.50	0.49	0.46	0.45	0.44		
160	0.57	0.59	0.60	0.61	0.61	0.60	0.57	0.55	0.64	0.63	0.61	0.59	0.57	0.55	0.53	0.51	0.49		
165	0.60	0.64	0.64	0.64	0.61	0.59	0.57	0.55	0.62	0.62	0.62	0.62	0.62	0.62	0.59	0.56	0.52		
170	0.60	0.64	0.64	0.63	0.61	0.58	0.57	0.56	0.66	0.66	0.67	0.68	0.68	0.68	0.67	0.64	0.58		
175	0.69	0.71	0.70	0.68	0.66	0.65	0.63	0.62	0.71	0.71	0.72	0.72	0.73	0.72	0.72	0.69	0.65		
180	0.65	0.66	0.64	0.64	0.63	0.61	0.62	0.61	0.70	0.70	0.71	0.72	0.73	0.72	0.71	0.70	0.68		

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 $k=2$.

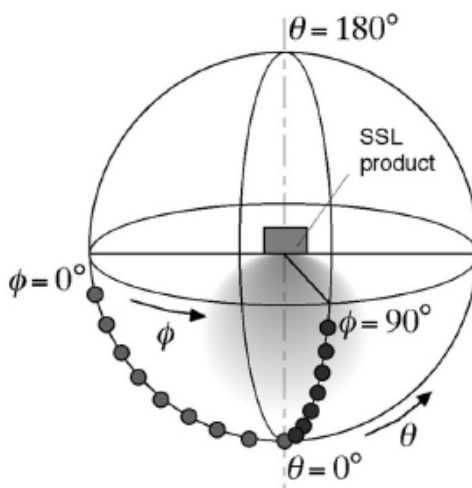
Color Characteristics Measurements

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 ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) 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, $\Delta u'v'$, 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 ***

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