



LM-79-08 Test Report

for

ABB Lighting, Inc.

3 Adams St Belvidere, NJ 07823.

SLIM WALL PACK

Model: SWP12501-A

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15080033a

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

Reviewed by:

April Zou

Engineer: April Zou
Aug. 25, 2015



Approved by

Jim Zhang

Manager: Jim Zhang
Aug. 25, 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: **SWP12501-A**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
65.8	801.5	12.19	0.9762
CCT (K)	CRI	Stabilization Time (Light & Power)	
5245	73.1	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Aug. 17, 2015
Date of Test	: Aug. 25, 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	: SWP12501-A
Electrical Ratings	: 100~277VAC, 50/60Hz, 12W
Product Description	: 5000K, Outdoor Wall-Mounted Area Luminaires Manufacturer of light source: SAMSUNG Model of light source: LH351B Quantity of LED light source: 6 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 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	72
Voltage frequency (Hz)	60	60	60	R2	77
Test Current (A)	0.104	0.126	0.049	R3	81
Power Factor	0.9762	0.9772	0.8761	R4	75
Test Power (W)	12.19	12.32	11.93	R5	75
THD A%	12.42	9.56	24.45	R6	70
Luminous Efficacy (lm/W)	65.8	64.7	65.8	R7	77
Total Luminous Flux (lm)	801.5	797.2	784.6	R8	58
Color Rendering Index (CRI)	73.1			R9	-28
R9	-28			R10	46
Correlated Color Temperature (CCT) (K)	5245			R11	76
Chromaticity (Chroma x, Chroma y)	(0.3385, 0.3452)			R12	58
Chromaticity (Chroma u, Chroma v)	(0.2094, 0.3203)			R13	71
Chromaticity (Chroma u', Chroma v')	(0.2094, 0.4805)			R14	89
Duv	0.0005				
Average Beam Angle (°)	80.1				
Center Beam Candle Power (cd)	462				
Spacing Criteria	0.31 (0°-180°)/ 1.40 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	93.03%				
Zonal Lumens in the 60°-90°Zone	4.80%				
Zonal Lumens in the 90°-120°Zone	1.78%				
Zonal Lumens in the 120°-180°Zone	0.39%				

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

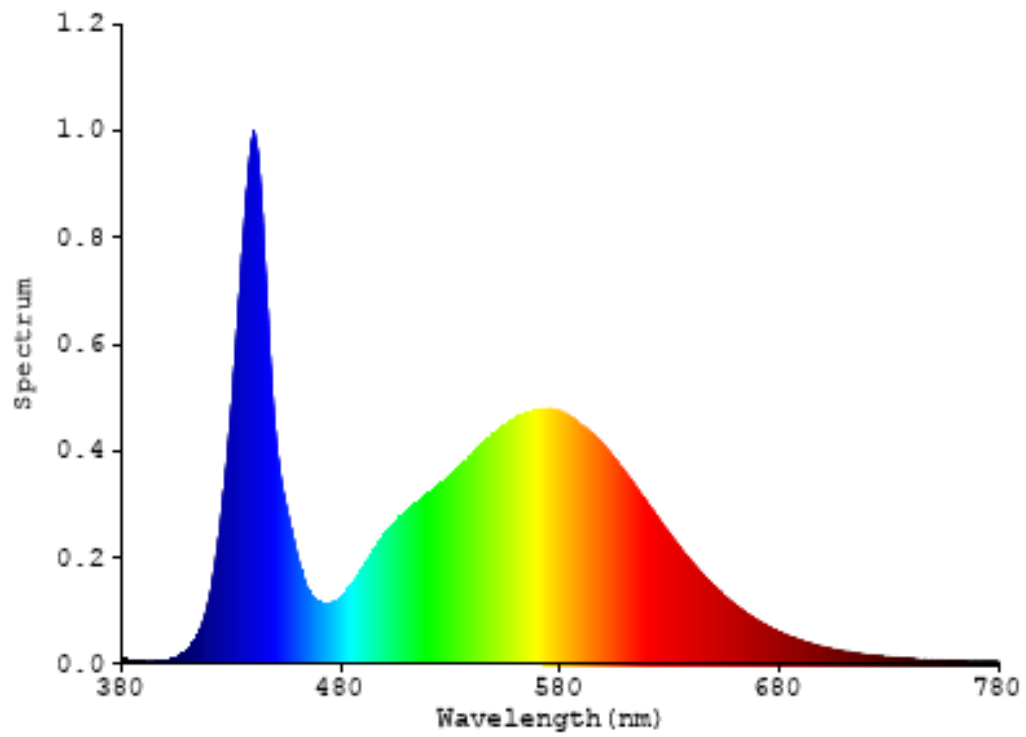


Chart 1: Spectral Power Distribution

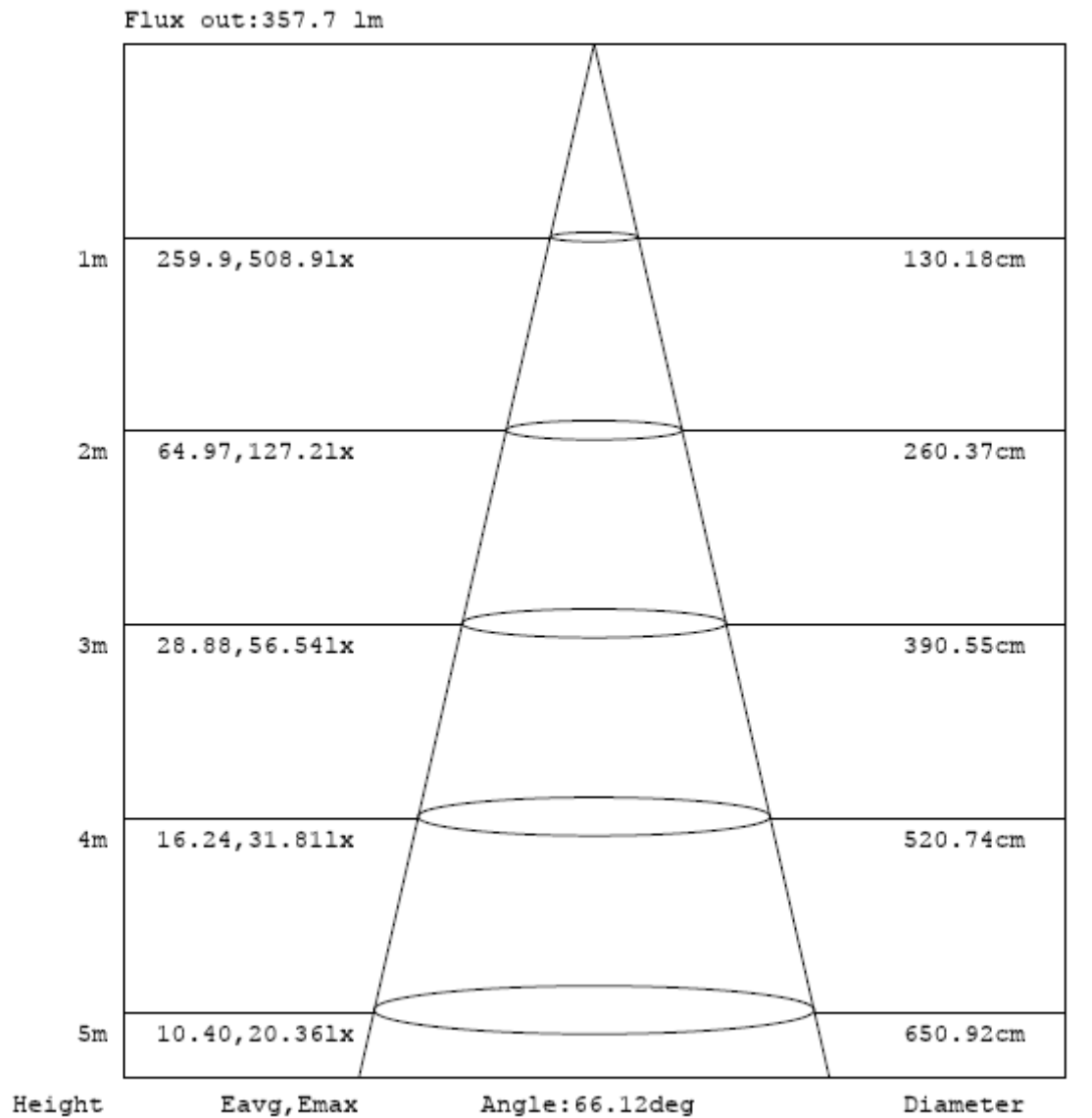
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	44.997	5.61%
10- 20	108.818	13.58%
20- 30	147.048	18.35%
30- 40	166.476	20.77%
40- 50	167.907	20.95%
50- 60	110.403	13.77%
60- 70	20.442	2.55%
70- 80	9.884	1.23%
80- 90	8.173	1.02%
90-100	6.276	0.78%
100-110	4.784	0.60%
110-120	3.171	0.40%
120-130	1.785	0.22%
130-140	0.831	0.10%
140-150	0.296	0.04%
150-160	0.115	0.01%
160-170	0.074	0.01%
170-180	0.028	0.00%
Total	801.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	745.649	93.03%
60- 90	38.499	4.80%
0-90	784.148	97.83%
90- 180	17.36	2.17%
0- 180	801.5	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

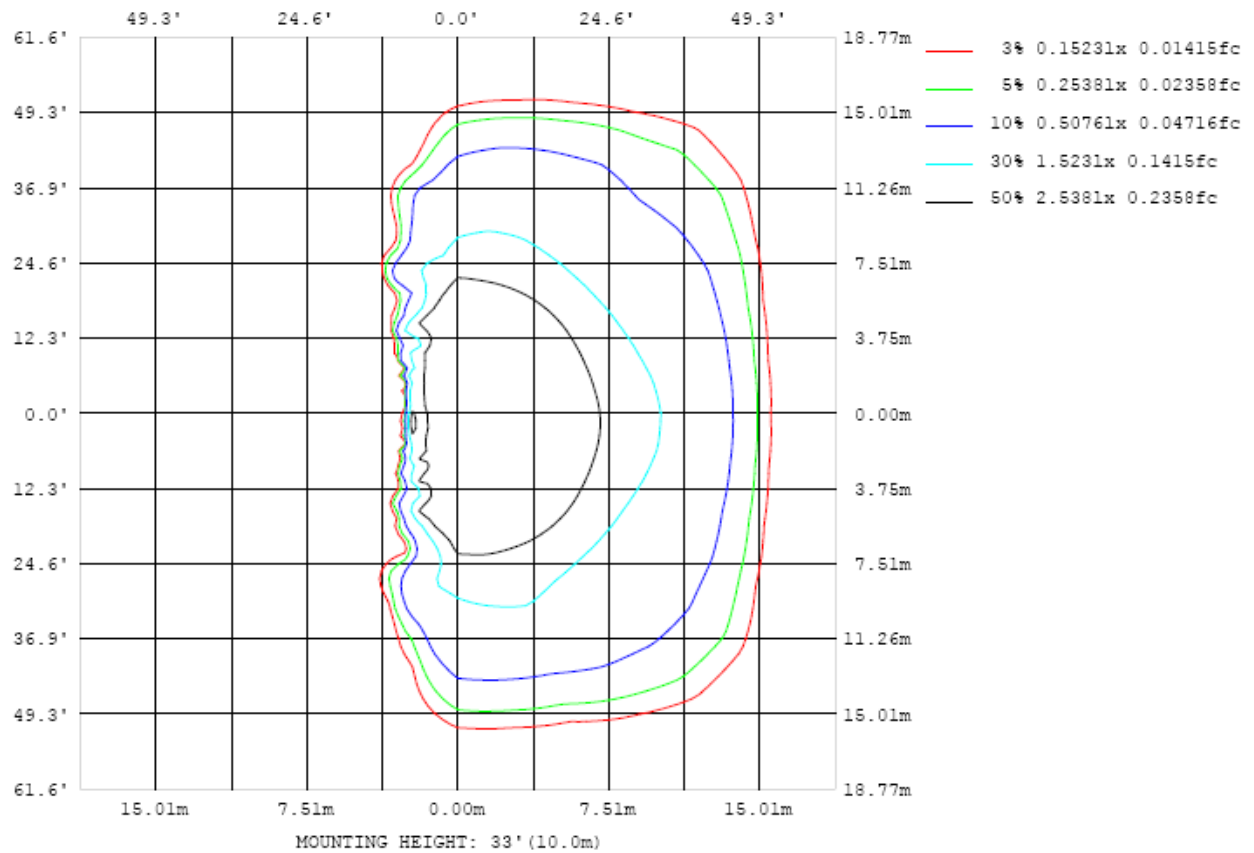


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

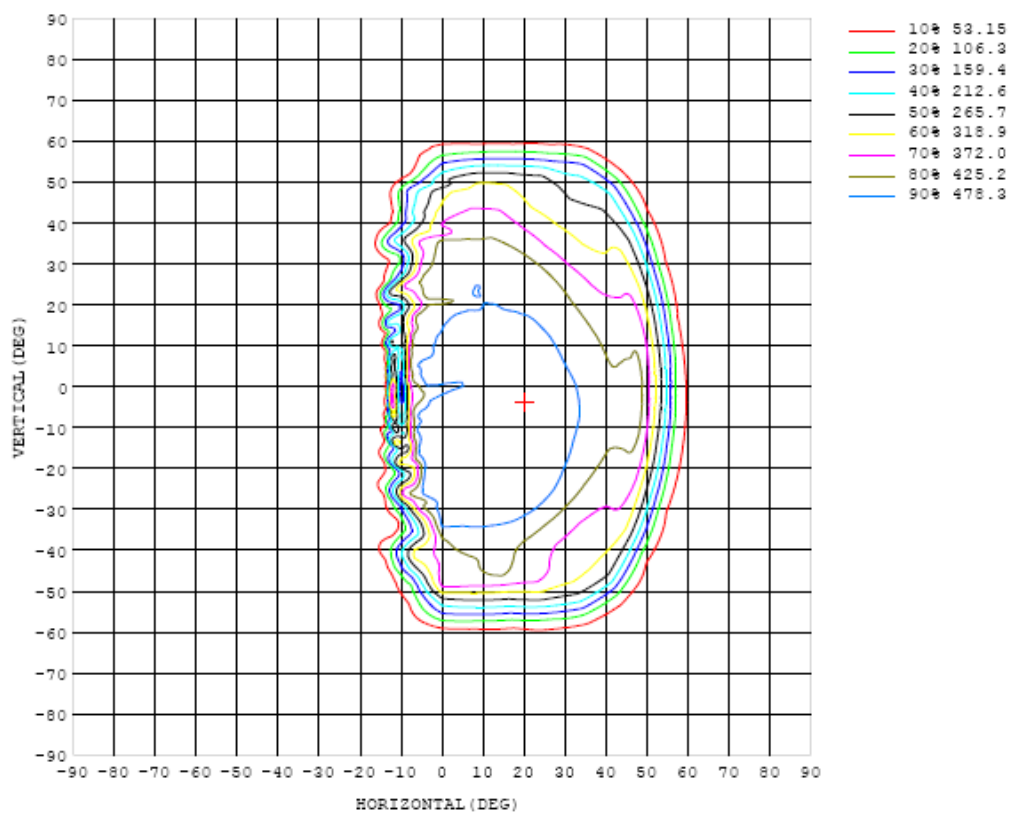


Chart 4: Isocandela Plot

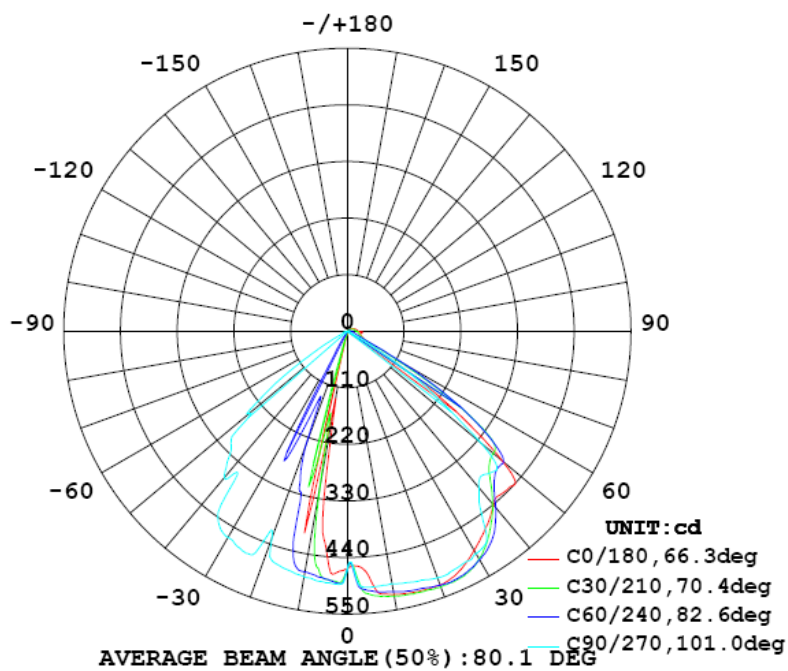


Chart 5: Polar Candela Distribution

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	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462
5	478	506	514	514	513	511	506	502	501	500	494	489	485	477	454	428	420	428	444
10	520	524	524	523	521	518	515	510	503	499	491	488	480	462	386	239	153	133	133
15	524	529	528	526	525	523	520	517	511	504	495	494	372	208	311	133	22.0	34.8	20.7
20	525	531	531	529	526	526	526	524	518	510	512	340	321	140	10.6	1.78	0.81	0.49	0.45
25	514	523	525	527	529	527	525	522	517	507	505	316	94.4	9.16	0.00	0.25	0.14	0.09	0.08
30	492	501	505	511	518	519	513	507	501	499	413	227	41.6	0.00	0.38	0.11	0.08	0.06	0.05
35	467	473	474	480	491	496	491	483	477	465	222	29.1	0.00	0.32	0.15	0.08	0.05	0.04	0.03
40	440	445	442	438	439	442	448	454	449	398	316	75.5	0.00	0.19	0.09	0.04	0.03	0.02	0.02
45	437	436	416	389	381	382	404	447	416	390	242	42.0	0.00	0.09	0.05	0.03	0.02	0.02	0.02
50	392	400	402	370	338	349	395	380	346	339	93.9	0.00	0.00	0.05	0.04	0.03	0.02	0.02	0.02
55	197	208	240	299	314	321	297	224	194	172	43.4	0.00	0.03	0.04	0.03	0.02	0.02	0.02	0.02
60	50.2	52.3	54.9	106	202	199	129	67.0	47.9	35.2	8.05	0.00	0.02	0.04	0.03	0.02	0.02	0.02	0.03
65	36.0	34.7	33.7	34.0	46.3	44.0	30.7	20.4	15.0	8.52	1.74	0.00	0.03	0.03	0.03	0.02	0.02	0.02	0.03
70	29.8	29.6	28.9	27.9	26.5	23.1	18.9	14.5	10.3	4.74	0.70	0.00	0.03	0.03	0.02	0.02	0.02	0.02	0.03
75	26.7	26.6	25.4	24.0	22.1	18.7	14.3	10.3	7.24	2.65	0.21	0.00	0.03	0.03	0.02	0.02	0.02	0.02	0.03
80	25.6	25.3	23.3	21.2	19.0	15.6	11.6	7.91	4.90	1.41	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.03
85	29.7	28.8	25.1	21.1	17.7	13.8	9.74	6.01	2.81	0.59	0.01	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.04
90	21.1	20.9	19.4	17.5	15.1	12.2	8.99	5.26	1.98	0.32	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04
95	19.7	19.6	18.1	16.3	14.0	10.9	7.50	4.13	1.34	0.17	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.04
100	17.9	17.7	16.6	15.0	12.7	9.60	6.11	3.03	0.87	0.11	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05
105	16.4	16.1	15.0	13.2	10.9	7.93	4.88	2.27	0.59	0.09	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.07
110	14.4	14.2	13.1	11.4	9.05	6.47	3.81	1.60	0.41	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.09
115	12.3	12.0	10.9	9.27	7.32	5.09	2.88	1.08	0.27	0.10	0.07	0.07	0.07	0.07	0.06	0.07	0.07	0.07	0.11
120	9.99	9.77	8.87	7.49	5.73	3.79	1.97	0.74	0.21	0.09	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.12
125	7.97	7.73	6.94	5.72	4.22	2.85	1.35	0.49	0.19	0.10	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13
130	5.91	5.69	5.03	4.10	3.14	1.77	0.77	0.38	0.19	0.12	0.13	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16
135	4.14	3.98	3.59	3.06	1.93	1.04	0.55	0.29	0.16	0.14	0.15	0.17	0.19	0.19	0.19	0.19	0.19	0.20	0.21
140	2.98	2.93	2.47	1.66	1.08	0.60	0.31	0.21	0.16	0.16	0.17	0.20	0.21	0.22	0.22	0.22	0.22	0.23	0.25
145	1.38	1.31	1.13	0.90	0.46	0.25	0.22	0.19	0.17	0.17	0.19	0.21	0.23	0.25	0.25	0.24	0.24	0.26	0.28
150	0.64	0.41	0.29	0.25	0.22	0.21	0.21	0.18	0.17	0.18	0.20	0.23	0.25	0.26	0.27	0.27	0.27	0.28	0.31
155	0.16	0.14	0.15	0.18	0.19	0.19	0.18	0.18	0.18	0.19	0.21	0.23	0.25	0.27	0.28	0.28	0.29	0.30	0.33
160	0.18	0.15	0.16	0.17	0.18	0.18	0.18	0.18	0.19	0.21	0.22	0.24	0.26	0.28	0.28	0.29	0.30	0.31	0.33
165	0.22	0.18	0.18	0.18	0.19	0.19	0.20	0.21	0.22	0.23	0.25	0.26	0.28	0.29	0.30	0.30	0.31	0.33	0.33
170	0.25	0.20	0.20	0.20	0.21	0.22	0.23	0.23	0.24	0.26	0.27	0.28	0.30	0.31	0.31	0.32	0.32	0.34	0.32
175	0.27	0.22	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.33	0.34	0.34	0.35	0.35	0.37	0.30
180	0.28	0.24	0.24	0.25	0.26	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.34	0.36	0.28

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462	462		
5	462	478	484	484	483	484	484	487	490	491	494	497	499	500	502	497	476		
10	144	193	312	426	470	475	475	479	485	488	493	497	500	504	507	511	513		
15	14.8	9.97	157	221	230	382	466	472	477	483	488	492	496	501	506	511	515		
20	0.54	0.63	2.74	0.00	269	239	329	428	429	450	476	484	486	491	498	507	515		
25	0.09	0.14	0.19	0.00	18.6	255	370	438	474	476	478	477	476	481	488	496	502		
30	0.05	0.07	0.11	0.27	0.00	45.9	162	385	463	462	467	468	469	468	469	473	480		
35	0.04	0.05	0.07	0.16	0.44	0.00	147	371	439	439	442	444	445	445	441	444	453		
40	0.02	0.03	0.04	0.08	0.36	0.00	103	241	370	415	410	401	392	391	401	416	427		
45	0.02	0.02	0.03	0.04	0.22	0.60	0.00	206	319	364	371	345	337	339	351	386	419		
50	0.02	0.03	0.03	0.02	0.14	0.50	0.00	126	248	318	329	304	294	294	328	371	389		
55	0.03	0.03	0.03	0.03	0.09	0.34	0.00	23.6	145	190	231	274	250	270	274	233	202		
60	0.03	0.03	0.03	0.03	0.06	0.25	0.00	18.6	38.5	43.7	72.8	126	193	185	108	53.1	44.0		
65	0.03	0.03	0.03	0.03	0.05	0.19	0.35	2.37	11.5	16.8	21.7	27.3	43.0	39.6	32.8	32.5	33.2		
70	0.04	0.04	0.04	0.04	0.04	0.14	0.27	1.13	6.95	11.4	15.5	19.1	23.0	25.8	27.0	28.0	28.9		
75	0.04	0.04	0.04	0.04	0.04	0.10	0.23	0.40	4.16	8.16	11.3	14.9	18.8	21.8	23.5	24.8	26.0		
80	0.04	0.04	0.04	0.04	0.03	0.07	0.17	0.22	2.37	5.62	9.00	12.4	16.0	18.8	20.9	22.7	24.3		
85	0.04	0.04	0.04	0.04	0.04	0.06	0.13	0.21	1.15	3.80	7.19	10.6	14.1	17.0	19.9	24.0	27.8		
90	0.04	0.04	0.04	0.04	0.04	0.05	0.11	0.17	0.62	2.60	6.22	10.1	13.0	15.3	17.4	19.4	20.5		
95	0.05	0.05	0.06	0.06	0.06	0.06	0.09	0.14	0.35	2.01	5.26	8.55	11.4	14.0	16.1	18.0	19.2		
100	0.06	0.07	0.08	0.09	0.08	0.08	0.10	0.14	0.34	1.42	3.90	7.17	10.4	12.9	14.9	16.5	17.4		
105	0.10	0.10	0.11	0.12	0.12	0.11	0.13	0.15	0.29	0.98	2.92	5.76	8.72	11.3	13.3	15.0	15.9		
110	0.12	0.12	0.13	0.14	0.14	0.13	0.14	0.16	0.22	0.70	2.14	4.54	7.15	9.59	11.5	13.0	13.8		
115	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.16	0.17	0.56	1.58	3.41	5.70	7.83	9.52	11.0	11.9		
120	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.15	0.40	1.00	2.39	4.29	6.22	7.86	9.02	9.66		
125	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.23	0.72	1.82	3.11	4.58	6.04	7.13	7.72		
130	0.16	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.15	0.19	0.40	1.02	2.22	3.32	4.34	5.23	5.74		
135	0.20	0.20	0.20	0.20	0.20	0.19	0.18	0.17	0.17	0.19	0.28	0.56	1.19	2.33	3.17	3.67	4.01		
140	0.24	0.24	0.24	0.24	0.24	0.23	0.22	0.20	0.19	0.19	0.24	0.33	0.70	1.15	1.78	2.58	2.92		
145	0.28	0.28	0.29	0.29	0.28	0.27	0.25	0.23	0.21	0.21	0.23	0.26	0.31	0.54	0.91	1.18	1.33		
150	0.31	0.30	0.31	0.31	0.31	0.29	0.27	0.25	0.23	0.22	0.22	0.25	0.25	0.27	0.28	0.33	0.58		
155	0.32	0.31	0.31	0.31	0.31	0.29	0.28	0.26	0.25	0.24	0.24	0.24	0.25	0.25	0.24	0.21	0.20		
160	0.33	0.32	0.31	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.26	0.26	0.27	0.26	0.25	0.23	0.23		
165	0.32	0.31	0.31	0.31	0.30	0.29	0.28	0.27	0.27	0.26	0.27	0.27	0.28	0.28	0.28	0.27	0.27		
170	0.31	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.30	0.31	0.31	0.32	0.32	0.32		
175	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.29	0.29	0.30	0.30	0.31	0.32	0.33	0.34	0.34	0.34		
180	0.24	0.24	0.24	0.25	0.26	0.26	0.27	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.34	0.35		

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.

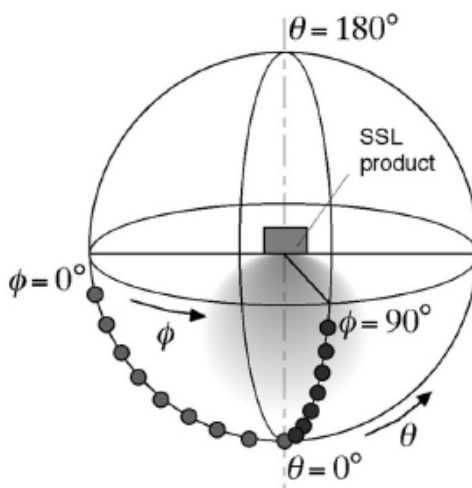
Color Characteristics Measurements

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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