LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL26501

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090j

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

Reviewed by: April Zou

Engineer: April Zou

Apr. 13, 2017

Approved by: Jim Zhang

Manager: Jim Zhang

Apr. 13, 2017

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: **WL26501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
122.5	3060.1	24.98	0.9898
CCT (K)	**CRI**	**BUG**	**Stabilization Time (Light & Power)**
5048	66.5	B1-U1-G1	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Mar. 24, 2017

Date of Test : Apr. 09, 2017

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	: V-Line Wall Pack
Model	: WL26501
Electrical Ratings	: 120~277Vac, 50/60Hz
Product Description	: 5000K Manufacturer of light source: Samsung Model of light source: LH351B
Manufacturer	: ABOVE ALL LIGHTING (SHANGHAI) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.6℃.

Base orientation was Base up. 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 of Goniophotometer is 2.47 m.

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)	0.210	0.099
Power Factor	0.9898	0.9287
Test Power (W)	24.98	25.34
THD A%	7.80	9.17
Luminous Efficacy (lm/W)	122.5	118.2
Total Luminous Flux (lm)	3060.1	2998.0
Color Rendering Index (CRI)	66.5	
R9	-41.3	
Correlated Color Temperature (CCT) (K)	5048	
Chromaticity (Chroma x, Chroma y)	(0.3439, 0.3521)	
Chromaticity (Chroma u, Chroma v)	(0.2104, 0.3231)	
Chromaticity (Chroma u', Chroma v')	(0.2104, 0.4847)	
Duv	0.0007	
Average Beam Angle (°)	79.2	
Center Beam Candle Power (cd)	1031	
Spacing Criteria	0.41 (0°-180°)/ 1.27 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	86.05%	
Zonal Lumens in the 60°-90°Zone	13.87%	
Zonal Lumens in the 90°-120°Zone	0.02%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	64.3
R2	69.0
R3	72.4
R4	69.6
R5	68.0
R6	62.1
R7	74.1
R8	52.5
R9	-41.3
R10	27.4
R11	77.0
R12	37.9
R13	62.3
R14	83.8

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

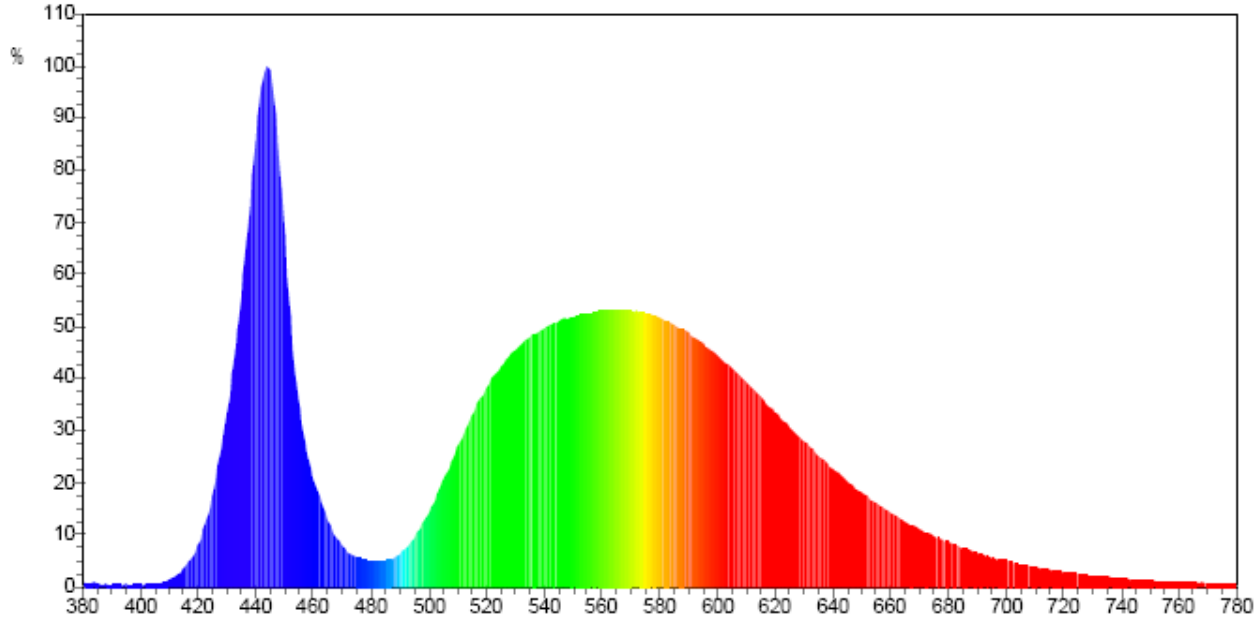


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	97.311	3.18%
10- 20	270.077	8.83%
20- 30	429.597	14.04%
30- 40	584.235	19.09%
40- 50	657.201	21.48%
50- 60	594.963	19.44%
60- 70	353.231	11.54%
70- 80	68.5	2.24%
80- 90	2.732	0.09%
90-100	0.094	0.00%
100-110	0.201	0.01%
110-120	0.267	0.01%
120-130	0.33	0.01%
130-140	0.402	0.01%
140-150	0.404	0.01%
150-160	0.315	0.01%
160-170	0.199	0.01%
170-180	0.068	0.00%
Total	3060.1	100%

γ(°)	Lumens	% Total
0- 60	2633.384	86.05%
60- 90	424.463	13.87%
0-90	3057.847	99.93%
90- 180	2.28	0.07%
0- 180	3060.1	100%

Table 3: Zonal Lumen Data

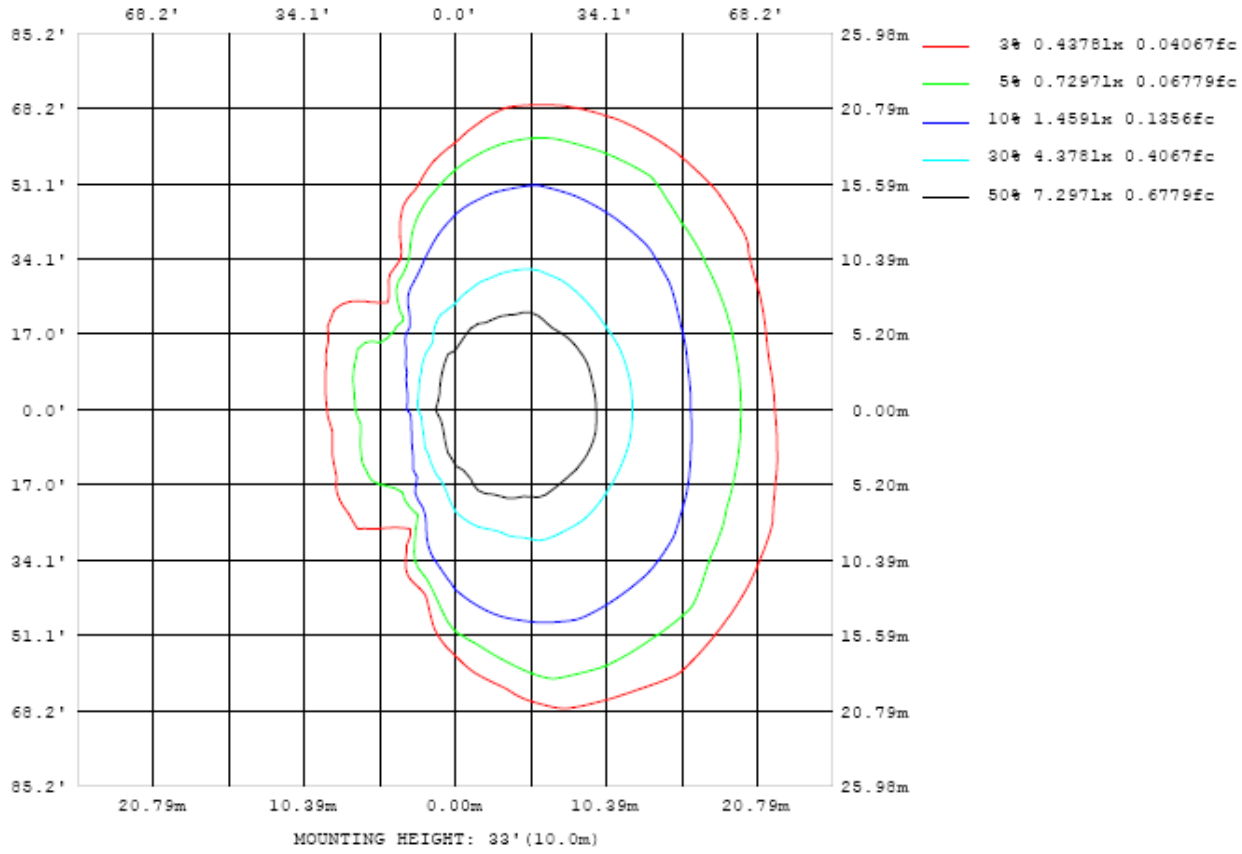


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

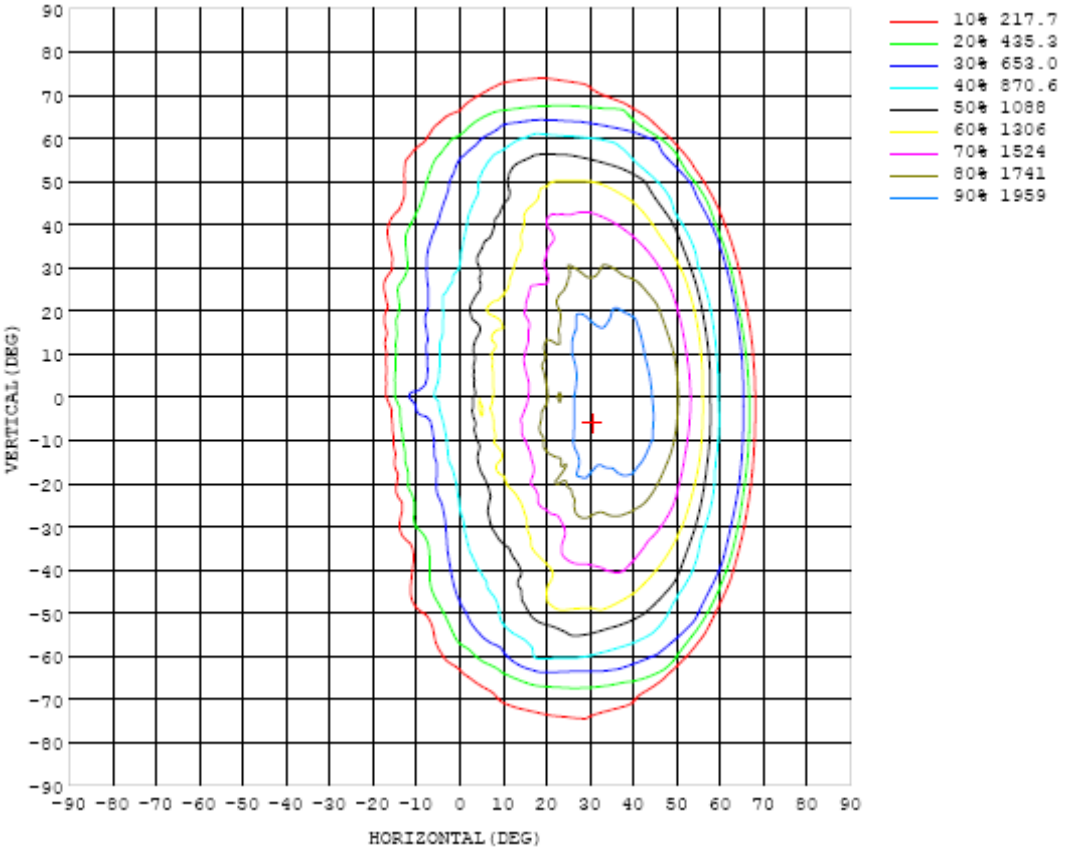


Chart 3: Isocandela Plot

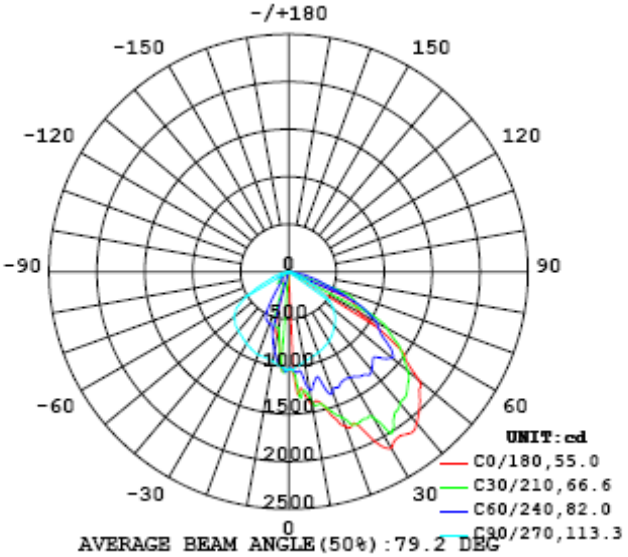


Chart 4: Polar Candela Distribution

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	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031
5	1276	1301	1328	1307	1200	1096	1061	1019	998	995	996	991	988	975	956	901	880	864	954
10	1416	1443	1469	1381	1296	1226	1259	1041	979	960	947	853	728	644	616	636	662	667	674
15	1474	1515	1528	1473	1411	1355	1147	1171	952	931	871	679	591	581	554	484	386	310	416
20	1728	1755	1775	1638	1462	1316	1342	1136	958	906	763	581	564	414	185	136	129	127	132
25	1835	1822	1808	1749	1648	1492	1293	1177	939	878	648	559	380	139	136	132	123	122	126
30	2144	2167	2079	1774	1742	1577	1285	1255	970	845	551	492	139	134	132	140	128	127	129
35	2097	2148	1989	1907	1720	1472	1336	1124	992	800	506	243	126	132	143	141	133	122	131
40	2082	2120	2003	1813	1724	1542	1353	1071	935	747	463	105	114	139	148	145	122	103	107
45	1943	1962	1892	1754	1646	1590	1271	1111	884	691	412	93.5	109	141	140	106	62.4	39.0	53.8
50	1773	1742	1682	1629	1577	1449	1411	1092	820	613	250	105	117	119	64.4	34.5	30.4	26.9	24.2
55	1426	1417	1411	1429	1408	1351	1207	1011	768	502	113	110	114	46.8	25.6	25.5	33.6	34.2	29.5
60	853	881	1050	1186	1193	1114	1063	885	595	320	91.6	123	53.1	19.0	21.2	29.0	34.4	33.5	32.8
65	727	742	763	785	928	852	788	656	364	169	45.1	73.4	19.7	20.1	25.1	30.2	32.4	31.9	32.5
70	29.0	43.1	221	445	618	547	444	337	227	89.2	29.8	17.9	16.3	22.6	22.6	27.3	25.3	23.6	25.0
75	8.25	9.92	12.5	19.0	72.7	256	255	205	140	39.7	13.9	7.29	17.9	18.6	16.0	18.4	16.7	14.2	14.8
80	1.18	1.68	2.34	4.05	7.32	12.7	50.5	67.0	31.7	8.54	4.00	4.75	6.83	9.08	5.74	4.47	3.55	3.44	2.91
85	0.11	0.12	0.12	0.13	0.13	0.44	2.29	5.06	4.55	2.34	1.70	1.67	2.05	2.20	2.92	3.11	3.01	2.92	2.21
90	0.02	0.03	0.03	0.03	0.04	0.05	0.09	0.11	0.06	0.08	0.17	0.08	0.11	0.14	0.13	0.10	0.09	0.06	0.05
95	0.01	0.02	0.02	0.01	0.02	0.02	0.04	0.06	0.06	0.07	0.11	0.10	0.10	0.10	0.09	0.08	0.08	0.07	0.13
100	0.01	0.01	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.12	0.19	0.32	0.35	0.23	0.16	0.15	0.15	0.14	0.26
105	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.09	0.13	0.16	0.20	0.28	0.35	0.30	0.27	0.25	0.23	0.21	0.41
110	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.12	0.16	0.20	0.24	0.29	0.33	0.34	0.32	0.31	0.30	0.29	0.52
115	0.02	0.02	0.02	0.03	0.05	0.07	0.09	0.15	0.19	0.26	0.30	0.35	0.37	0.41	0.39	0.39	0.39	0.39	0.61
120	0.02	0.03	0.03	0.04	0.05	0.09	0.12	0.17	0.23	0.30	0.34	0.40	0.44	0.48	0.52	0.50	0.49	0.49	0.74
125	0.03	0.04	0.04	0.05	0.07	0.11	0.16	0.19	0.28	0.36	0.41	0.48	0.52	0.56	0.58	0.62	0.61	0.62	0.85
130	0.04	0.05	0.06	0.08	0.09	0.14	0.20	0.25	0.32	0.41	0.50	0.57	0.63	0.67	0.70	0.75	0.75	0.75	0.98
135	0.06	0.07	0.09	0.11	0.13	0.17	0.23	0.32	0.36	0.47	0.58	0.64	0.71	0.79	0.86	0.88	0.89	0.89	1.12
140	0.09	0.10	0.12	0.15	0.17	0.22	0.27	0.35	0.40	0.50	0.60	0.70	0.80	0.89	0.93	0.96	0.99	0.98	1.22
145	0.12	0.14	0.17	0.19	0.21	0.25	0.31	0.38	0.46	0.54	0.65	0.76	0.83	0.90	0.95	0.97	1.00	0.99	1.26
150	0.17	0.19	0.24	0.25	0.26	0.28	0.32	0.41	0.45	0.53	0.63	0.72	0.78	0.86	0.91	0.92	0.93	0.92	1.24
155	0.23	0.27	0.30	0.35	0.32	0.31	0.36	0.42	0.45	0.51	0.60	0.69	0.74	0.82	0.86	0.88	0.85	0.85	1.18
160	0.31	0.35	0.38	0.42	0.41	0.38	0.38	0.42	0.48	0.48	0.62	0.70	0.75	0.80	0.84	0.82	0.81	0.79	1.08
165	0.39	0.44	0.47	0.50	0.51	0.46	0.45	0.49	0.50	0.54	0.65	0.74	0.76	0.80	0.81	0.78	0.77	0.74	0.91
170	0.49	0.52	0.55	0.58	0.57	0.48	0.48	0.50	0.57	0.59	0.63	0.73	0.76	0.77	0.78	0.77	0.76	0.73	0.77
175	0.56	0.61	0.63	0.65	0.68	0.62	0.62	0.63	0.65	0.63	0.71	0.79	0.82	0.84	0.85	0.84	0.82	0.79	0.71
180	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64

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	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031	1031		
5	966	969	957	957	978	993	997	992	994	1005	1019	1047	1071	1137	1224	1286	1284		
10	648	627	606	633	731	849	943	957	958	989	1079	1244	1198	1317	1447	1474	1449		
15	459	523	562	588	596	649	834	921	935	981	1141	1305	1334	1392	1461	1466	1471		
20	135	139	187	388	561	581	700	895	932	1157	1279	1312	1348	1486	1650	1733	1740		
25	127	135	131	137	300	553	584	855	906	1073	1282	1363	1569	1665	1735	1800	1788		
30	133	139	136	139	134	394	534	799	873	1101	1221	1441	1646	1710	1901	2119	2112		
35	135	141	144	133	125	143	495	715	840	1112	1220	1460	1562	1845	1915	2016	2064		
40	126	147	151	143	116	101	416	623	814	1032	1271	1428	1714	1717	1902	2049	2078		
45	66.6	94.7	125	156	118	86.6	224	535	788	980	1257	1552	1579	1705	1780	1907	1928		
50	28.0	30.9	51.4	110	124	103	108	440	746	967	1227	1413	1540	1578	1610	1700	1740		
55	32.4	24.0	23.8	25.7	85.9	114	110	345	661	920	1210	1282	1365	1429	1398	1415	1393		
60	35.0	31.2	23.7	15.8	21.9	127	104	189	488	776	981	1074	1137	1188	1107	883	866		
65	34.7	32.0	25.6	19.2	16.5	29.7	53.5	116	276	546	697	812	886	778	775	750	726		
70	26.3	28.1	20.5	21.2	20.2	11.4	20.9	39.4	166	277	371	445	538	344	141	27.2	24.5		
75	15.5	18.5	14.5	16.2	18.4	6.75	8.79	10.5	96.4	175	216	202	41.3	13.9	10.1	8.26	7.50		
80	3.00	2.74	2.75	3.67	5.10	3.67	3.18	3.90	11.5	25.4	60.4	8.62	5.12	2.75	1.56	1.45	1.03		
85	2.25	2.00	1.77	1.54	1.40	1.22	1.14	1.44	1.81	2.33	1.31	0.14	0.09	0.10	0.11	0.10	0.11		
90	0.05	0.07	0.09	0.10	0.12	0.11	0.09	0.06	0.04	0.02	0.02	0.01	0.01	0.02	0.03	0.03	0.03		
95	0.14	0.17	0.19	0.21	0.22	0.20	0.16	0.11	0.07	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
100	0.27	0.30	0.32	0.33	0.41	0.40	0.31	0.20	0.12	0.07	0.04	0.03	0.03	0.02	0.02	0.02	0.02		
105	0.42	0.44	0.46	0.48	0.47	0.43	0.35	0.26	0.18	0.11	0.06	0.04	0.04	0.03	0.02	0.02	0.02		
110	0.53	0.55	0.56	0.55	0.53	0.48	0.40	0.32	0.23	0.15	0.08	0.05	0.04	0.04	0.03	0.03	0.02		
115	0.62	0.62	0.61	0.60	0.57	0.52	0.44	0.35	0.26	0.19	0.12	0.06	0.05	0.05	0.04	0.04	0.03		
120	0.73	0.71	0.69	0.66	0.62	0.54	0.47	0.38	0.30	0.22	0.14	0.09	0.07	0.06	0.06	0.04	0.04		
125	0.83	0.80	0.77	0.74	0.67	0.60	0.52	0.42	0.34	0.26	0.19	0.12	0.09	0.06	0.06	0.06	0.05		
130	0.97	0.94	0.90	0.85	0.78	0.70	0.60	0.51	0.41	0.32	0.31	0.18	0.12	0.10	0.09	0.07	0.06		
135	1.12	1.09	1.06	1.00	0.92	0.82	0.71	0.62	0.50	0.40	0.30	0.30	0.19	0.15	0.13	0.11	0.09		
140	1.24	1.21	1.17	1.14	1.05	0.94	0.81	0.70	0.60	0.56	0.44	0.35	0.27	0.22	0.17	0.14	0.12		
145	1.28	1.27	1.24	1.20	1.13	1.02	0.90	0.76	0.79	0.56	0.50	0.43	0.36	0.30	0.24	0.20	0.19		
150	1.25	1.27	1.24	1.21	1.14	1.03	0.94	0.81	0.68	0.63	0.57	0.51	0.45	0.39	0.35	0.29	0.26		
155	1.20	1.21	1.23	1.19	1.10	1.01	0.92	0.83	0.72	0.69	0.61	0.55	0.51	0.50	0.47	0.39	0.35		
160	1.10	1.11	1.13	1.13	1.06	0.99	0.92	0.84	0.74	0.69	0.67	0.60	0.59	0.61	0.58	0.53	0.48		
165	0.93	0.97	0.99	1.00	0.99	0.95	0.90	0.82	0.76	0.68	0.68	0.66	0.65	0.70	0.68	0.66	0.60		
170	0.78	0.83	0.86	0.89	0.90	0.87	0.85	0.79	0.73	0.72	0.73	0.71	0.70	0.76	0.79	0.76	0.71		
175	0.71	0.76	0.78	0.82	0.81	0.81	0.78	0.73	0.69	0.69	0.75	0.74	0.74	0.81	0.84	0.81	0.79		
180	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 27, 2016	Jul. 26, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 27, 2016	Jul. 26, 2017
AC Power Supply	PCR 500L	HZTE001-08	Jul. 27, 2016	Jul. 26, 2017
DC Power Supply	WY12010	HZTE004-03	Jul. 27, 2016	Jul. 26, 2017
Temperature Meter	TES1310	HZTE017-01	Jul. 27, 2016	Jul. 26, 2017
Standard Source	D908	HZTE012-01	Jul. 27, 2016	Jul. 26, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 27, 2016	Jul. 26, 2017

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

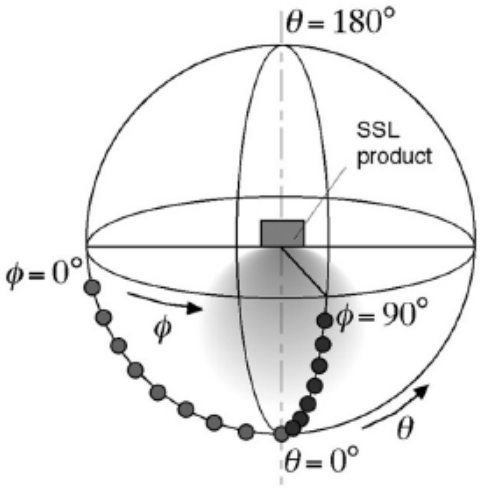
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured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

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