LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL26301

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090i

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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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: **WL26301**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
107.0	2852.3	26.65	0.9976
CCT (K)	**CRI**	**BUG**	**Stabilization Time (Light & Power)**
2978	73.1	B1-U1-G0	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Mar. 24, 2017

Date of Test : Apr. 01, 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	: WL26301
Electrical Ratings	: 120~277Vac, 50/60Hz
Product Description	: 3000K 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)	0.223	0.107
Power Factor	0.9976	0.9106
Test Power (W)	26.65	27.04
THD A%	5.89	10.78
Luminous Efficacy (lm/W)	107.0	106.8
Total Luminous Flux (lm)	2852.3	2887.9
Color Rendering Index (CRI)	73.1	
R9	-25	
Correlated Color Temperature (CCT) (K)	2978	
Chromaticity (Chroma x, Chroma y)	(0.4396, 0.4069)	
Chromaticity (Chroma u, Chroma v)	(0.2511, 0.3486)	
Chromaticity (Chroma u', Chroma v')	(0.2511, 0.5229)	
Duv	0.0008	
Average Beam Angle (°)	74.4	
Center Beam Candle Power (cd)	956	
Spacing Criteria	0.43 (0°-180°)/ 1.24 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	87.39%	
Zonal Lumens in the 60°-90°Zone	12.53%	
Zonal Lumens in the 90°-120°Zone	0.02%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	69
R2	83
R3	95
R4	68
R5	68
R6	77
R7	79
R8	46
R9	-25
R10	62
R11	62
R12	52
R13	72
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

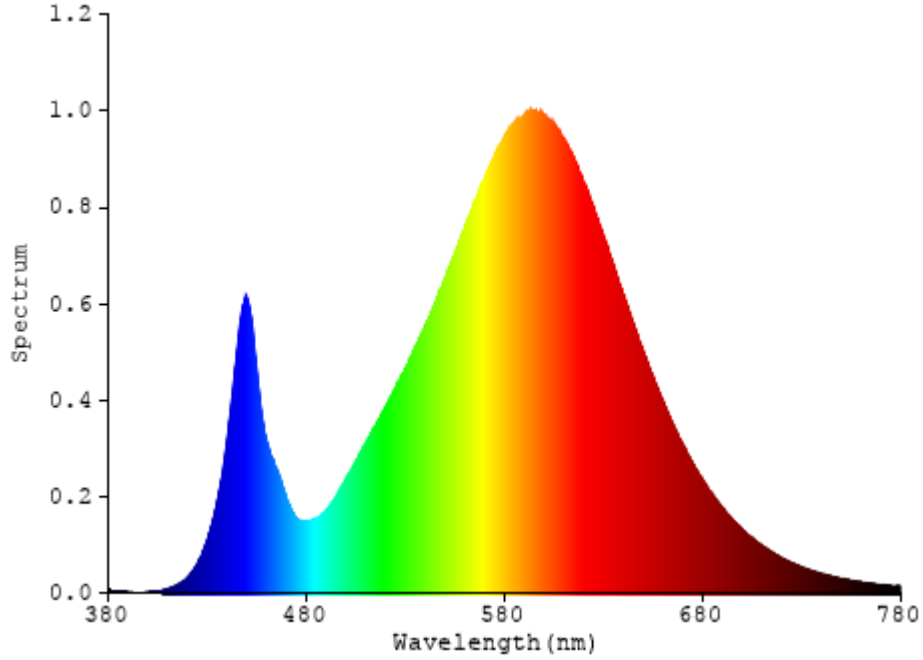


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	98.015	3.44%
10- 20	274.344	9.62%
20- 30	424.982	14.90%
30- 40	557.224	19.54%
40- 50	610.264	21.40%
50- 60	527.812	18.50%
60- 70	297.359	10.43%
70- 80	58.242	2.04%
80- 90	1.906	0.07%
90-100	0.097	0.00%
100-110	0.199	0.01%
110-120	0.268	0.01%
120-130	0.324	0.01%
130-140	0.386	0.01%
140-150	0.379	0.01%
150-160	0.293	0.01%
160-170	0.176	0.01%
170-180	0.059	0.00%
Total	2852.3	100%

γ(°)	Lumens	% Total
0- 60	2492.641	87.39%
60- 90	357.507	12.53%
0-90	2850.148	99.92%
90- 180	2.181	0.08%
0- 180	2852.3	100%

Table 3: Zonal Lumen Data

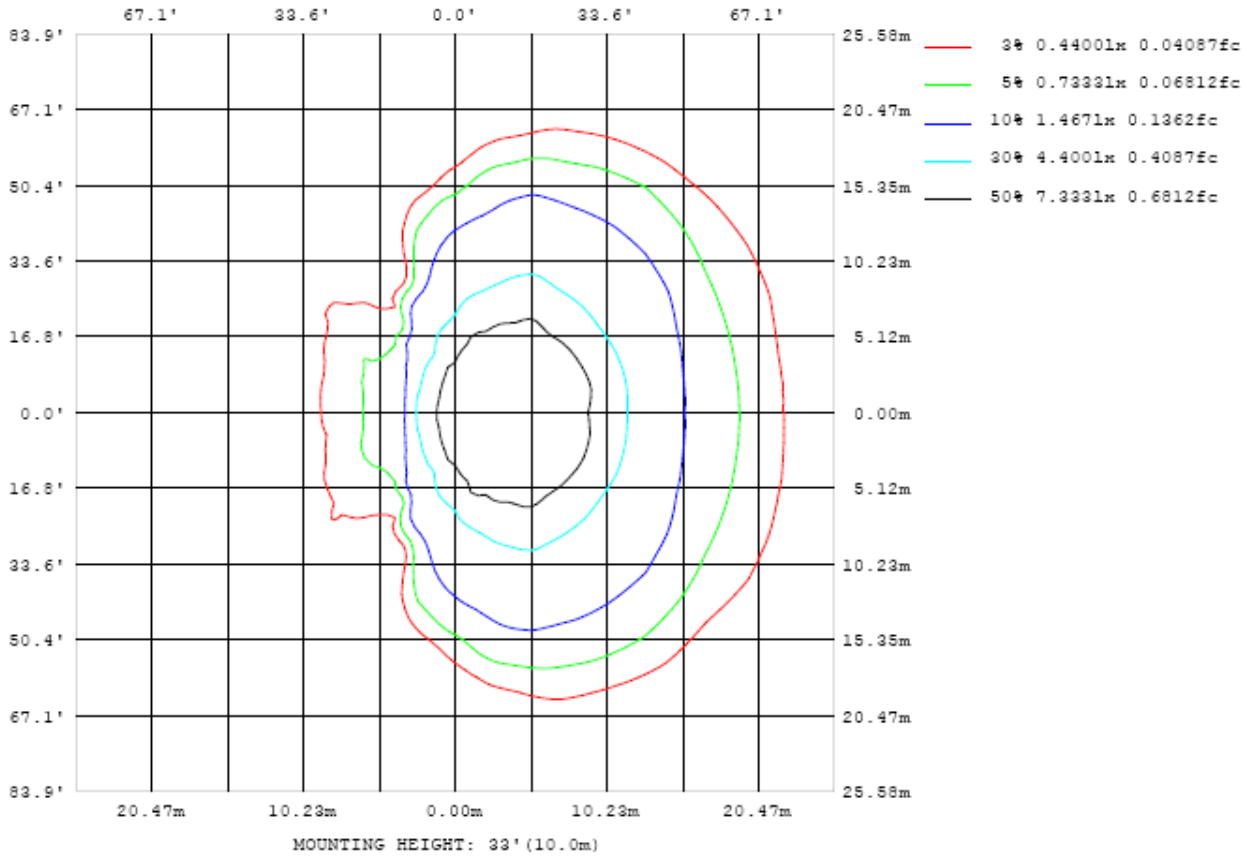


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

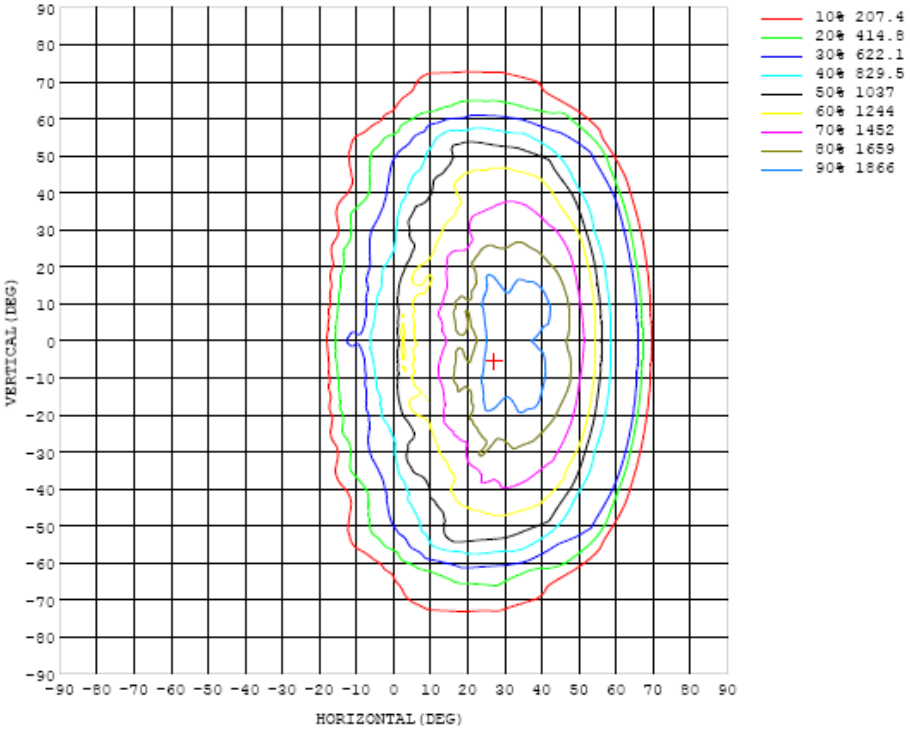


Chart 3: Isocandela Plot

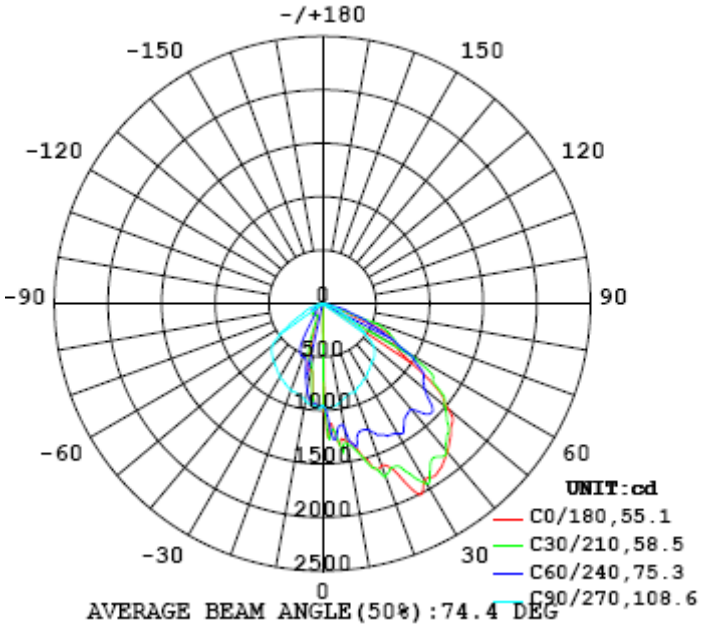


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956
5	1192	1176	1178	1182	1162	1215	1278	1151	1000	963	939	943	949	950	965	959	955	936	931
10	1308	1331	1349	1331	1332	1376	1182	1192	1104	942	914	909	836	730	628	581	590	606	636
15	1494	1541	1546	1501	1412	1299	1267	1128	1202	890	863	797	617	547	547	530	520	492	477
20	1612	1638	1701	1718	1559	1401	1257	1325	1104	882	832	640	536	520	388	205	143	132	125
25	1862	1880	1818	1677	1597	1617	1354	1178	986	839	773	521	505	279	130	120	117	115	113
30	1907	1973	1984	1942	1734	1506	1408	1149	1115	806	686	492	325	125	123	122	122	115	117
35	1898	1991	1922	1777	1755	1546	1331	1156	1079	760	572	443	112	112	124	133	130	119	118
40	1814	1978	1902	1796	1628	1574	1293	1166	927	718	457	282	86.9	111	135	140	123	112	133
45	1696	1832	1740	1668	1572	1451	1440	1128	893	685	400	97.0	73.5	113	136	127	96.7	108	85.3
50	1528	1545	1585	1493	1456	1390	1242	1080	843	624	378	89.6	91.5	102	113	61.5	24.8	22.1	15.3
55	1160	1211	1292	1254	1304	1205	1150	1093	768	482	279	99.8	93.4	78.4	35.4	18.7	17.6	21.0	13.0
60	792	802	814	917	1068	966	909	763	560	304	90.3	103	110	16.9	9.22	13.6	26.4	29.3	21.0
65	681	688	706	707	650	690	572	479	322	200	28.4	54.4	28.5	11.3	11.9	16.5	27.2	31.8	24.7
70	111	165	244	324	394	322	372	307	287	144	16.0	17.6	8.58	14.5	14.8	19.1	24.6	25.5	21.8
75	4.17	4.77	3.72	3.94	27.9	127	213	170	123	58.4	4.24	6.18	3.19	16.5	12.6	11.7	20.7	17.7	17.3
80	1.34	1.57	2.18	1.93	2.28	3.23	7.27	14.6	9.20	7.63	1.90	1.76	2.17	2.82	9.93	7.47	11.9	11.2	11.2
85	0.51	0.66	0.88	0.95	1.23	1.58	2.18	2.33	1.78	1.36	1.15	1.01	0.95	0.91	0.78	0.71	0.65	0.59	0.56
90	0.05	0.10	0.13	0.16	0.16	0.13	0.08	0.07	0.05	0.07	0.06	0.08	0.08	0.09	0.08	0.07	0.06	0.06	0.05
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.07	0.10	0.14	0.16	0.17	0.17	0.16	0.14	0.13	0.13
100	0.02	0.05	0.07	0.08	0.07	0.06	0.05	0.04	0.05	0.11	0.16	0.20	0.24	0.27	0.27	0.27	0.26	0.24	0.24
105	0.01	0.03	0.04	0.04	0.04	0.04	0.05	0.06	0.08	0.16	0.22	0.28	0.33	0.37	0.38	0.39	0.38	0.37	0.37
110	0.02	0.02	0.03	0.03	0.04	0.04	0.07	0.09	0.11	0.20	0.26	0.33	0.40	0.45	0.48	0.50	0.50	0.50	0.49
115	0.02	0.02	0.03	0.03	0.04	0.06	0.09	0.12	0.15	0.24	0.30	0.37	0.44	0.50	0.55	0.57	0.59	0.60	0.60
120	0.03	0.03	0.03	0.04	0.05	0.08	0.12	0.16	0.20	0.29	0.34	0.41	0.47	0.54	0.60	0.64	0.67	0.69	0.70
125	0.03	0.03	0.04	0.05	0.08	0.11	0.16	0.21	0.25	0.34	0.40	0.47	0.53	0.60	0.68	0.74	0.78	0.80	0.81
130	0.04	0.04	0.05	0.07	0.11	0.15	0.21	0.26	0.32	0.41	0.48	0.55	0.63	0.70	0.79	0.87	0.92	0.96	0.97
135	0.06	0.06	0.08	0.10	0.15	0.20	0.26	0.33	0.39	0.48	0.56	0.64	0.73	0.83	0.91	0.99	1.03	1.08	1.10
140	0.08	0.09	0.11	0.15	0.20	0.25	0.31	0.38	0.44	0.54	0.62	0.71	0.80	0.92	1.01	1.08	1.12	1.15	1.15
145	0.12	0.13	0.16	0.19	0.24	0.30	0.35	0.41	0.48	0.60	0.67	0.76	0.84	0.94	1.05	1.12	1.16	1.18	1.20
150	0.16	0.18	0.21	0.25	0.31	0.36	0.40	0.45	0.49	0.63	0.68	0.76	0.84	0.93	1.00	1.06	1.12	1.14	1.13
155	0.21	0.25	0.29	0.33	0.38	0.42	0.46	0.49	0.53	0.64	0.68	0.75	0.83	0.88	0.92	0.96	1.00	1.02	1.04
160	0.28	0.33	0.37	0.42	0.46	0.50	0.52	0.55	0.58	0.66	0.68	0.71	0.76	0.82	0.85	0.86	0.88	0.90	0.88
165	0.36	0.41	0.46	0.51	0.54	0.57	0.59	0.61	0.62	0.67	0.67	0.69	0.71	0.73	0.75	0.77	0.77	0.77	0.78
170	0.43	0.45	0.52	0.56	0.59	0.62	0.63	0.65	0.67	0.67	0.67	0.68	0.68	0.68	0.68	0.67	0.66	0.65	0.66
175	0.47	0.52	0.56	0.61	0.64	0.67	0.70	0.73	0.76	0.68	0.68	0.67	0.67	0.66	0.64	0.62	0.61	0.60	0.59
180	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52

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	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956	956		
5	945	946	942	927	939	934	934	942	961	996	1144	1264	1169	1146	1180	1178	1182		
10	623	592	572	610	712	823	899	905	921	1108	1124	1171	1371	1330	1316	1349	1334		
15	492	525	524	540	547	599	777	853	877	1163	1130	1226	1272	1390	1488	1532	1549		
20	128	141	194	373	515	532	619	820	865	1057	1303	1232	1337	1513	1694	1694	1664		
25	114	114	119	128	255	499	514	755	826	989	1175	1317	1551	1573	1674	1799	1867		
30	115	118	122	119	126	298	486	663	792	1072	1131	1359	1471	1746	1902	1976	1975		
35	119	128	136	121	114	110	434	541	745	1065	1113	1331	1478	1734	1741	1897	2019		
40	126	125	138	135	114	87.9	254	428	705	925	1142	1267	1575	1586	1740	1866	1955		
45	104	101	129	145	117	81.0	88.9	389	667	880	1146	1420	1432	1558	1620	1716	1793		
50	22.7	24.0	56.3	113	112	86.2	89.3	369	606	804	1026	1276	1369	1432	1465	1549	1582		
55	19.9	17.2	18.9	34.8	76.6	92.1	88.3	272	467	714	1026	1109	1193	1304	1251	1284	1222		
60	28.1	24.5	14.1	10.5	16.2	107	100	79.8	279	513	743	917	998	1065	933	807	796		
65	32.7	26.8	17.1	10.6	11.6	29.5	70.3	28.6	187	285	449	568	678	692	703	694	681		
70	25.1	26.3	18.9	14.1	15.3	9.07	18.8	16.2	132	245	295	362	313	447	409	243	178		
75	18.0	22.5	12.4	12.3	14.3	3.38	5.10	4.16	45.2	101	160	205	177	50.8	4.12	3.58	4.72		
80	11.5	10.9	7.42	8.30	2.39	2.22	1.79	1.92	7.36	9.17	14.1	20.3	3.87	2.11	1.75	1.92	1.67		
85	0.63	0.66	0.70	0.72	1.02	1.06	1.06	1.16	1.37	2.00	2.41	1.80	1.43	1.08	0.86	0.84	0.70		
90	0.06	0.06	0.07	0.08	0.09	0.09	0.09	0.09	0.04	0.05	0.04	0.07	0.10	0.10	0.10	0.07	0.06		
95	0.13	0.14	0.16	0.17	0.17	0.16	0.14	0.11	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
100	0.24	0.26	0.27	0.28	0.27	0.25	0.21	0.16	0.06	0.04	0.03	0.03	0.04	0.05	0.05	0.04	0.02		
105	0.38	0.39	0.39	0.39	0.38	0.34	0.28	0.22	0.09	0.06	0.04	0.03	0.03	0.03	0.03	0.02	0.01		
110	0.50	0.50	0.50	0.48	0.45	0.40	0.33	0.26	0.11	0.09	0.05	0.03	0.03	0.03	0.03	0.02	0.02		
115	0.60	0.59	0.57	0.55	0.50	0.44	0.37	0.30	0.14	0.11	0.07	0.04	0.03	0.03	0.03	0.02	0.02		
120	0.70	0.68	0.65	0.61	0.56	0.48	0.41	0.34	0.18	0.14	0.10	0.06	0.04	0.03	0.03	0.02	0.02		
125	0.80	0.77	0.72	0.68	0.61	0.53	0.47	0.40	0.22	0.18	0.12	0.09	0.06	0.04	0.03	0.03	0.03		
130	0.94	0.91	0.84	0.77	0.70	0.65	0.56	0.48	0.27	0.22	0.16	0.12	0.08	0.06	0.05	0.04	0.04		
135	1.07	1.02	0.95	0.89	0.85	0.77	0.67	0.58	0.33	0.27	0.21	0.16	0.11	0.09	0.07	0.06	0.05		
140	1.13	1.07	1.04	0.98	0.93	0.84	0.76	0.66	0.38	0.32	0.26	0.21	0.16	0.13	0.11	0.09	0.09		
145	1.16	1.14	1.10	1.05	0.98	0.91	0.83	0.74	0.41	0.36	0.31	0.26	0.21	0.17	0.15	0.13	0.12		
150	1.12	1.14	1.07	1.06	0.99	0.98	0.90	0.82	0.43	0.39	0.34	0.31	0.27	0.23	0.20	0.17	0.16		
155	1.05	1.03	1.01	0.97	0.98	1.00	0.90	0.85	0.44	0.42	0.39	0.36	0.32	0.28	0.26	0.24	0.22		
160	0.90	0.88	0.89	0.90	0.94	0.95	0.93	0.89	0.47	0.46	0.43	0.41	0.38	0.34	0.31	0.29	0.29		
165	0.77	0.76	0.77	0.77	0.80	0.84	0.86	0.84	0.50	0.49	0.48	0.46	0.44	0.41	0.39	0.37	0.36		
170	0.66	0.66	0.65	0.63	0.72	0.77	0.80	0.80	0.53	0.52	0.51	0.51	0.49	0.46	0.44	0.42	0.44		
175	0.57	0.63	0.64	0.62	0.69	0.75	0.76	0.79	0.60	0.59	0.58	0.56	0.54	0.52	0.50	0.49	0.49		
180	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52		

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

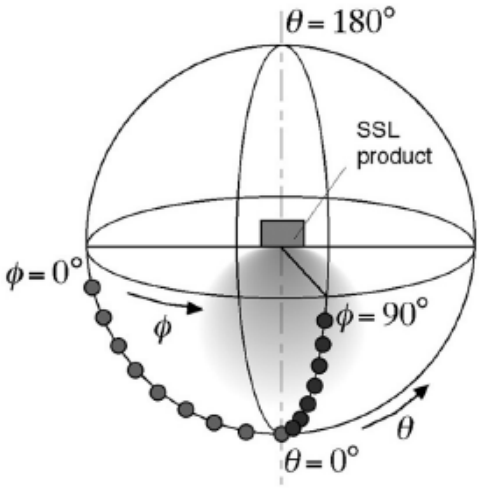
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured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