



LM-79-08 Test Report

for

Maxlite Inc.

12 York Ave West Caldwell NJ 07006

LED Wall Pack

Model: WPL55AU50B

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15040014b/R2

This report is replaced the old report No. HZ15040014b/R1 dated Aug. 27, 2015

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

Reviewed by:

Engineer: April Zou
Sep. 09, 2015

Approve By

Manager: Jim Zhang
Sep. 09, 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: **WPL55AU50B**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
90.5	4776.7	52.77	0.9400
CCT (K)	CRI	Stabilization Time (Light & Power)	
5193	82.7	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Apr. 20, 2015

Date of Test : Apr. 22, 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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Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: LED Wall Pack
Model	: WPL55AU50B
Electrical Ratings	: 120~277Vac, 50/60Hz, 60W
Product Description	: 5000K, Outdoor Wall-Mounted Area Luminaires Manufacturer of light source: SAMSUNG Model of light source: LM561B Quantity of LED light source: 154pcs Driver model: XEL-A048B-042-C1X40-PA01
Manufacturer	: MaxLite Inc.
Address	: 12 York Ave West Caldwell, NJ 07006

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.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.468	0.194
Power Factor	0.9400	0.9602
Test Power (W)	52.77	51.59
THD A%	9.73	14.84
Luminous Efficacy (lm/W)	90.5	93.3
Total Luminous Flux (lm)	4776.7	4813.5
Color Rendering Index (CRI)	82.7	
R9	8	
Correlated Color Temperature (CCT) (K)	5193	
Chromaticity (Chroma x, Chroma y)	(0.3403, 0.3546)	
Chromaticity (Chroma u, Chroma v)	(0.2071, 0.3236)	
Chromaticity (Chroma u', Chroma v')	(0.2071, 0.4854)	
Duv	0.0034	
Average Beam Angle (°)	83.7	
Center Beam Candle Power (cd)	1838	
Spacing Criteria	0.37 (0°-180°)/ 1.16 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	69.89%	
Zonal Lumens in the 60°-90°Zone	27.20%	
Zonal Lumens in the 90°-120°Zone	2.18%	
Zonal Lumens in the 120°-180°Zone	0.73%	

Special Color Rendering Indices	
R1	81
R2	86
R3	91
R4	84
R5	82
R6	82
R7	87
R8	68
R9	8
R10	68
R11	83
R12	67
R13	82
R14	95

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

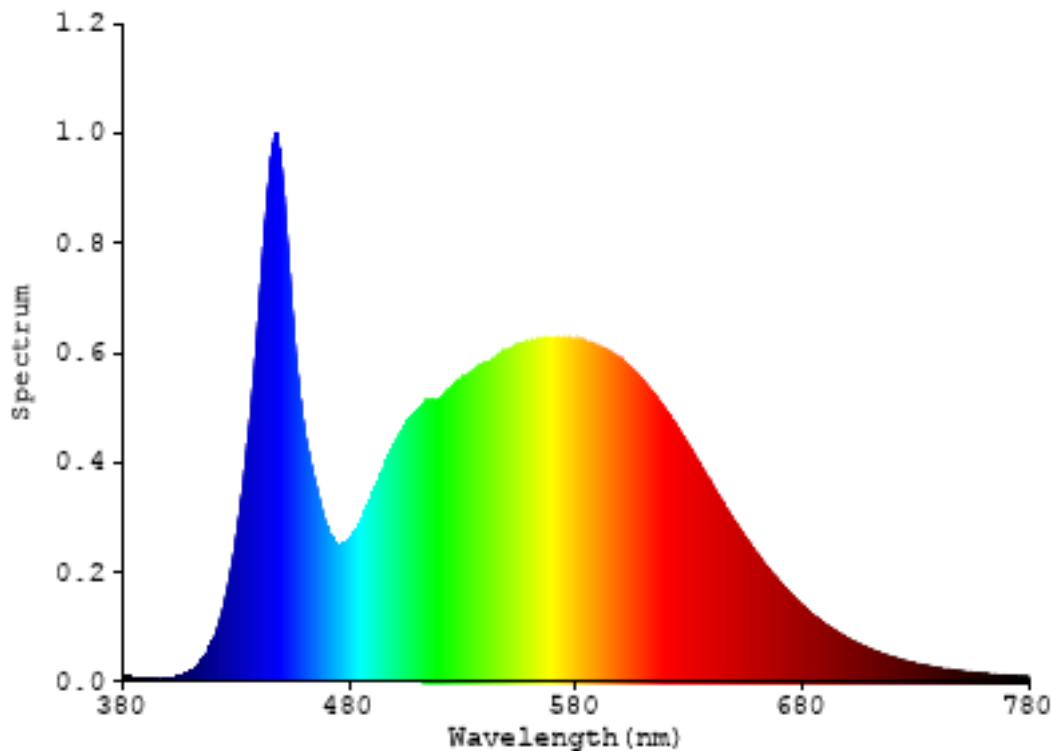


Chart 1: Spectral Power Distribution

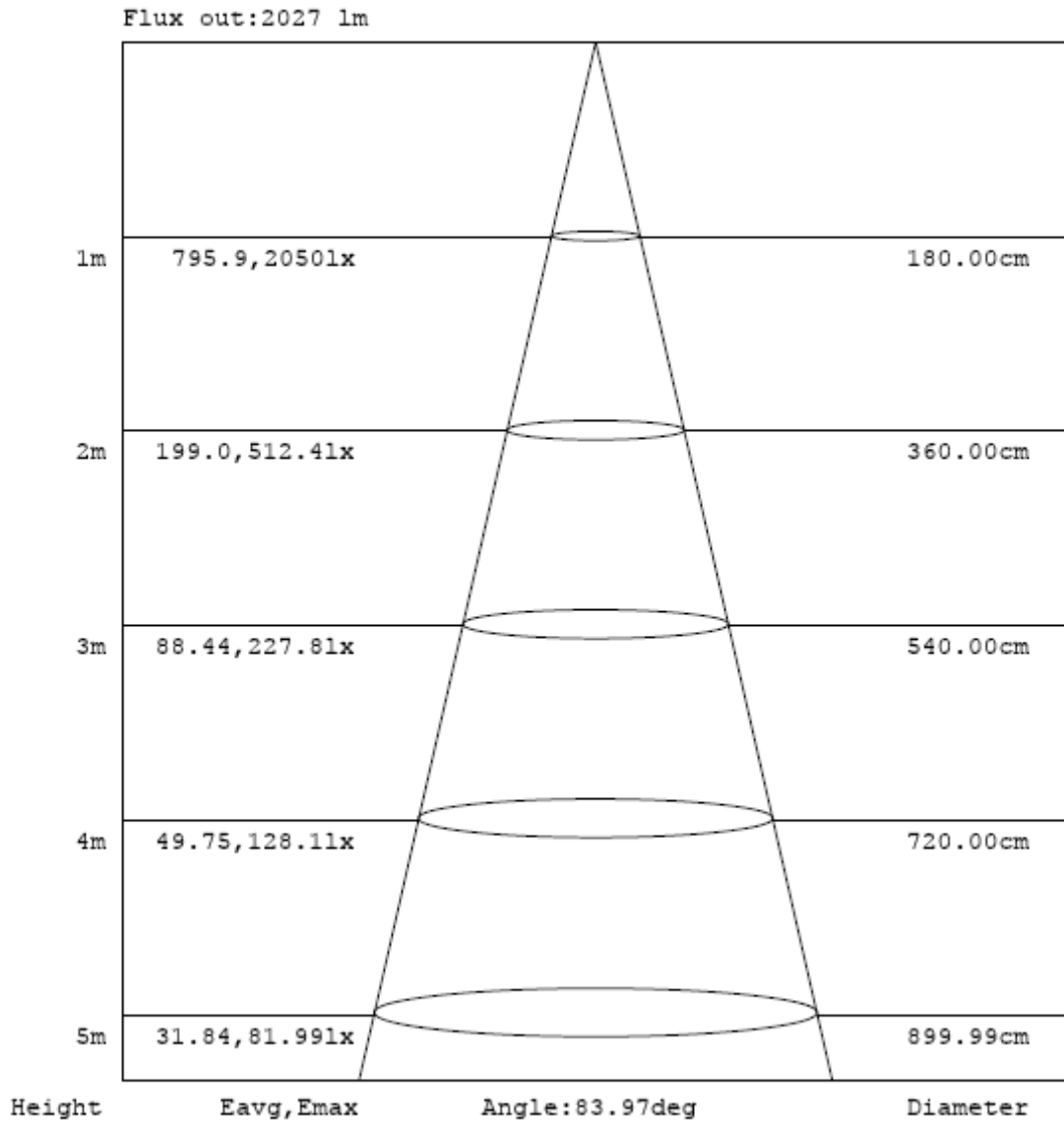
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	166.087	3.48%
10- 20	425.623	8.91%
20- 30	594.535	12.45%
30- 40	696.249	14.58%
40- 50	736.768	15.42%
50- 60	718.997	15.05%
60- 70	616.28	12.90%
70- 80	439.669	9.20%
80- 90	243.409	5.10%
90-100	51.449	1.08%
100-110	30.276	0.63%
110-120	22.628	0.47%
120-130	17.596	0.37%
130-140	10.071	0.21%
140-150	4.762	0.10%
150-160	1.811	0.04%
160-170	0.416	0.01%
170-180	0.105	0.00%
Total	4776.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3338.259	69.89%
60- 90	1299.358	27.20%
0-90	4637.617	97.09%
90- 180	139.114	2.91%
0- 180	4776.7	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

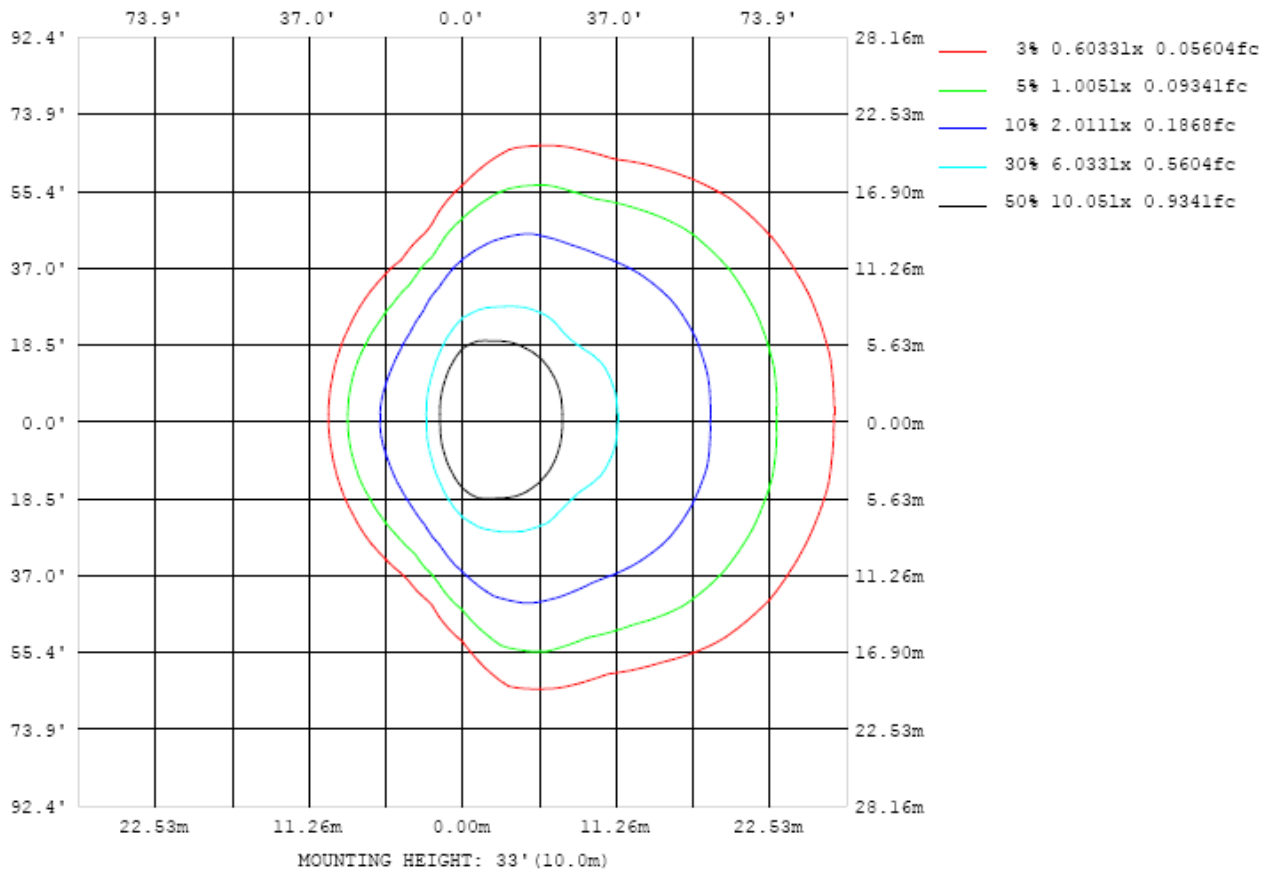


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

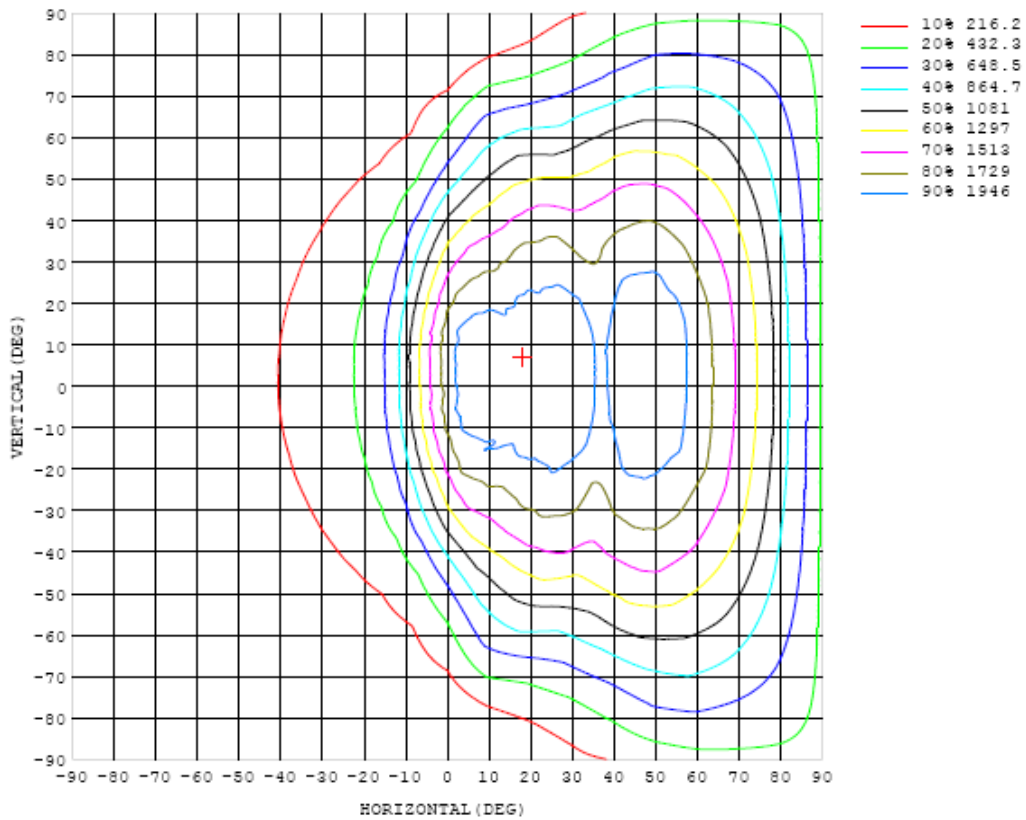


Chart 4: Isocandela Plot

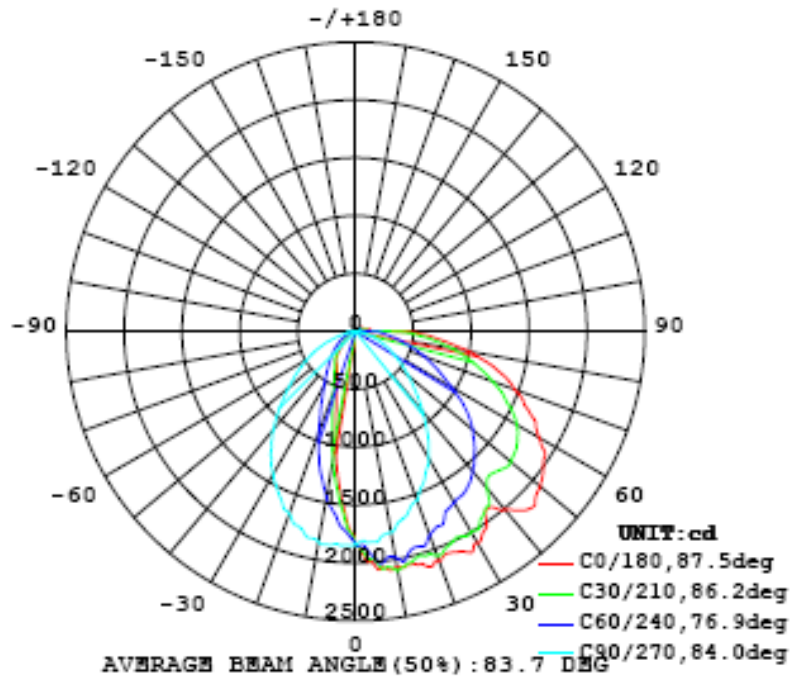


Chart 5: Polar Candela Distribution

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	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838
5	2041	2022	1992	1983	1989	1998	1969	1919	1877	1827	1753	1707	1649	1580	1521	1477	1442	1434	1434
10	2072	2039	2069	2097	2050	2019	1981	1953	1868	1763	1662	1509	1387	1268	1185	1113	1042	997	997
15	2088	2067	2079	2023	2034	1986	1938	1901	1817	1659	1490	1291	1109	959	830	744	694	655	649
20	2109	2109	2079	2059	1964	1919	1874	1835	1757	1553	1323	1068	842	694	591	542	506	485	482
25	2101	2107	2048	2000	1960	1859	1807	1717	1645	1410	1125	839	638	523	460	423	401	387	383
30	2108	2104	2100	1999	1919	1835	1707	1613	1506	1265	937	652	497	414	373	345	334	330	329
35	1965	1986	1960	1931	1869	1778	1667	1500	1364	1089	755	511	396	341	308	292	290	290	291
40	2009	1954	1817	1767	1774	1702	1575	1392	1201	899	587	396	319	280	253	242	231	225	226
45	2155	2113	1948	1715	1586	1603	1456	1268	1057	737	449	305	255	225	201	181	167	160	160
50	2085	2064	1943	1751	1519	1417	1324	1159	931	597	342	238	203	174	151	133	119	114	114
55	1981	1979	1881	1702	1474	1249	1159	1039	822	476	259	189	162	132	111	96.6	86.2	84.2	84.7
60	1832	1853	1750	1609	1383	1123	954	893	718	373	196	154	124	97.3	81.6	67.9	60.7	61.2	63.4
65	1663	1681	1573	1446	1258	984	782	709	603	280	152	125	92.2	69.9	55.6	43.9	41.6	45.8	48.2
70	1458	1457	1372	1261	1084	833	635	522	450	193	116	95.7	64.8	46.2	32.9	23.2	22.6	24.3	24.9
75	1260	1244	1166	1060	892	669	490	369	286	114	80.7	63.5	40.6	24.9	11.7	2.56	0.74	0.68	0.66
80	995	977	917	844	709	513	358	246	159	60.1	49.1	38.2	22.4	11.0	5.08	1.71	1.01	0.94	0.91
85	701	689	651	612	524	380	253	155	80.2	31.1	30.0	24.8	14.9	7.49	3.92	1.55	1.20	1.17	1.14
90	373	369	347	332	294	229	162	96.6	48.8	25.7	24.2	20.4	11.9	6.24	3.14	1.31	1.27	1.30	1.30
95	66.2	64.2	62.1	58.1	62.1	53.6	40.0	35.9	31.1	27.5	19.3	15.3	9.06	5.68	3.20	1.66	1.75	1.80	1.78
100	128	129	117	96.4	73.2	51.3	26.6	28.6	20.3	19.1	11.8	4.97	4.05	4.13	2.82	2.13	2.29	2.32	2.24
105	70.4	69.4	63.6	53.6	43.7	33.3	50.0	42.5	37.5	26.4	19.9	12.0	8.07	3.12	2.05	2.15	2.32	2.38	2.35
110	55.6	53.3	46.7	37.5	36.2	43.7	42.4	35.9	35.7	28.1	16.6	9.91	6.69	4.03	2.31	2.01	2.15	2.20	2.20
115	50.7	49.5	46.7	45.0	45.5	41.0	35.5	29.4	28.5	21.7	12.3	7.72	5.33	3.26	1.91	1.82	1.92	1.95	1.95
120	60.2	59.7	54.2	49.8	43.5	37.3	30.6	23.4	21.3	15.9	9.13	5.98	4.02	2.63	1.61	1.64	1.68	1.70	1.71
125	60.1	58.3	51.5	44.8	39.4	33.1	25.8	18.7	15.7	11.5	6.68	4.48	3.31	1.86	1.30	1.52	1.53	1.53	1.56
130	52.7	51.1	46.0	38.9	33.8	28.0	20.7	14.5	6.66	4.68	2.38	2.50	2.58	1.71	1.25	1.08	1.31	1.42	1.47
135	42.4	41.3	38.0	32.2	26.9	21.6	15.8	7.68	7.97	2.84	3.84	1.70	2.12	1.39	1.36	1.40	1.36	1.24	1.21
140	32.0	31.3	29.8	26.0	20.7	15.8	11.2	2.63	5.04	2.17	2.74	2.13	1.58	1.15	1.29	1.40	1.39	1.46	1.43
145	25.6	25.0	23.8	20.9	16.3	11.3	6.53	1.94	2.62	1.57	1.79	1.39	1.29	1.33	1.34	1.24	1.31	1.37	1.38
150	19.3	18.7	17.4	15.3	11.9	8.01	3.68	0.99	0.98	1.15	1.19	1.06	1.23	1.32	1.33	1.30	1.31	1.24	1.20
155	13.1	12.7	11.8	10.2	8.00	4.77	0.95	1.01	1.03	1.19	1.22	1.10	1.20	1.29	1.23	1.21	1.28	1.27	1.28
160	8.07	7.86	7.05	5.65	3.40	0.99	1.04	1.08	1.09	1.26	1.28	1.28	1.12	1.16	1.17	1.16	1.17	1.23	1.20
165	1.11	0.97	0.95	1.00	1.03	1.07	1.11	1.15	1.15	1.31	1.31	1.31	1.28	1.15	1.08	1.02	0.99	0.98	0.99
170	0.86	0.88	0.97	1.02	1.07	1.11	1.15	1.17	1.17	1.36	1.36	1.35	1.32	1.25	1.17	1.07	0.95	0.89	0.89
175	0.94	0.99	1.04	1.10	1.14	1.19	1.22	1.23	1.22	1.35	1.36	1.33	1.30	1.24	1.14	1.07	0.97	0.97	0.93
180	1.00	1.00	1.01	1.08	1.10	1.11	1.08	1.09	1.13	1.37	1.37	1.35	1.31	1.26	1.22	1.16	1.09	1.05	1.02

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	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838	1838		
5	1455	1472	1498	1541	1594	1667	1723	1759	1842	1871	1924	1989	1997	1989	2015	2044	2051		
10	1016	1060	1127	1218	1327	1454	1584	1719	1848	1928	2001	2066	2074	2091	2085	2059	2092		
15	663	702	776	874	1022	1207	1391	1585	1777	1918	2003	2035	2040	2071	2092	2077	2087		
20	491	514	561	632	744	935	1171	1422	1675	1827	1914	1957	1996	2035	2105	2141	2103		
25	392	412	441	482	561	706	954	1261	1561	1723	1825	1864	1934	2026	2058	2099	2091		
30	334	342	358	392	445	547	752	1086	1426	1632	1701	1787	1938	1978	2059	2131	2117		
35	294	300	308	327	366	436	590	903	1277	1495	1602	1768	1853	1949	1992	2034	2016		
40	233	244	259	275	306	355	465	726	1102	1351	1498	1692	1781	1849	1825	1886	1995		
45	166	177	196	222	251	291	364	565	927	1207	1399	1581	1701	1651	1797	2025	2142		
50	117	125	142	166	198	234	282	427	756	1051	1294	1444	1513	1638	1864	2029	2095		
55	87.0	90.2	101	122	150	185	220	317	615	916	1149	1270	1379	1600	1803	1969	2008		
60	64.0	64.9	72.3	89.3	110	141	173	234	484	792	985	1065	1264	1508	1710	1836	1868		
65	47.5	45.2	48.5	61.8	79.6	106	140	173	369	667	805	895	1126	1378	1536	1644	1691		
70	25.2	24.6	27.1	38.0	54.5	75.8	108	130	248	512	613	748	956	1190	1334	1435	1487		
75	0.67	0.72	3.47	15.4	31.2	49.7	74.1	93.8	142	353	449	585	771	985	1131	1225	1277		
80	0.92	0.97	1.94	6.35	14.3	28.0	46.1	60.3	71.2	204	303	433	604	786	906	968	1014		
85	1.13	1.14	1.67	4.67	9.29	17.9	28.8	35.2	37.0	102	191	309	446	584	649	693	718		
90	1.26	1.19	1.35	3.68	7.44	13.5	21.4	25.7	27.8	55.1	115	195	263	320	353	365	388		
95	1.78	1.68	1.56	3.47	6.41	10.6	16.8	20.7	27.3	26.8	34.8	38.8	56.3	59.9	64.9	64.6	66.0		
100	2.26	2.16	1.93	2.84	4.08	3.34	6.48	12.7	18.1	13.6	28.9	34.7	58.7	82.7	105	128	129		
105	2.34	2.20	1.95	2.00	4.57	8.82	4.56	18.1	27.7	26.2	41.7	49.9	38.1	50.3	58.9	66.9	70.1		
110	2.19	2.05	1.82	2.29	4.31	7.27	3.70	16.7	27.6	26.4	35.2	42.1	46.3	39.7	41.9	49.8	55.3		
115	1.93	1.85	1.64	1.84	3.42	5.66	2.98	13.0	21.9	22.4	30.2	36.6	43.1	49.1	47.9	48.6	51.1		
120	1.71	1.63	1.48	1.47	2.61	4.30	2.38	9.80	16.7	17.8	24.4	31.6	39.2	46.2	51.6	56.1	60.9		
125	1.52	1.48	1.34	0.98	1.98	3.37	1.87	7.42	12.4	13.7	19.4	26.8	34.5	40.8	46.3	53.4	59.4		
130	1.38	1.21	0.95	1.11	1.55	2.46	1.31	4.35	7.29	6.79	14.8	21.3	28.5	34.3	39.7	47.3	52.0		
135	1.23	1.32	1.31	1.18	1.24	1.95	2.79	3.90	5.27	7.51	9.17	15.7	21.7	27.1	33.0	38.9	41.7		
140	1.41	1.35	1.31	1.15	1.14	1.12	2.03	2.75	3.37	4.66	3.68	10.9	15.6	21.2	26.6	30.5	31.8		
145	1.33	1.29	1.16	1.28	1.28	1.19	1.19	1.56	1.83	2.19	1.55	6.50	11.4	16.4	21.1	23.8	25.1		
150	1.19	1.26	1.31	1.36	1.31	1.25	1.09	1.16	1.14	1.09	1.04	3.72	8.01	11.9	15.2	17.3	18.8		
155	1.32	1.34	1.33	1.32	1.31	1.18	1.22	1.22	1.17	1.13	1.07	0.98	4.57	7.72	9.97	11.6	12.7		
160	1.28	1.27	1.26	1.21	1.23	1.21	1.34	1.31	1.21	1.17	1.11	1.03	0.96	2.58	5.33	6.81	7.76		
165	0.98	1.00	1.01	1.01	1.07	1.26	1.29	1.29	1.23	1.20	1.17	1.11	1.03	0.95	0.90	0.86	0.92		
170	0.86	0.87	0.87	0.91	1.06	1.18	1.24	1.27	1.26	1.24	1.20	1.15	1.09	1.01	0.94	0.88	0.89		
175	0.90	0.99	0.98	0.95	1.01	1.10	1.17	1.22	1.32	1.29	1.26	1.21	1.15	1.09	1.03	0.98	0.98		
180	1.00	1.00	1.01	1.05	1.10	1.09	1.08	1.12	1.38	1.35	1.33	1.28	1.21	1.17	1.10	1.04	1.05		

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 expanded uncertainty is 1.94% with a coverage factor $k=2$.

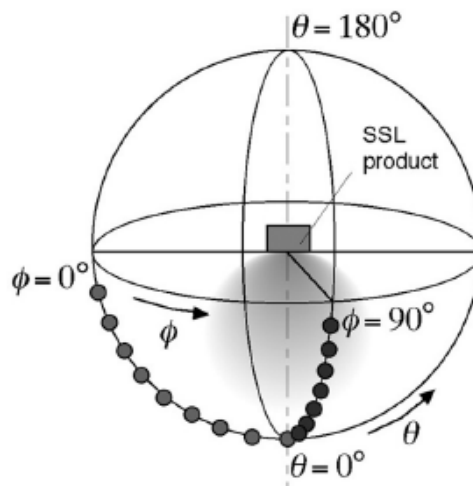
Color Characteristics Measurements

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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