



## LM-79-08 Test Report

for

### ABOVE ALL LIGHTING INC.

1501 Industrial Way N. Toms River, NJ 08755.

### WRAP

### Model: WRP12D38LED301S

### Laboratory: Leading Testing Laboratories

**NVLAP CODE: 200960-0**

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Report No.: HZ16100018h

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

Reviewed by:

Engineer: April Zou  
Dec. 27, 2016

Approved by:

Manager: Jim Zhang  
Dec. 27, 2016

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: **WRP12D38LED301S**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
134.6	4763.2	35.39	0.9963
CCT (K)	CRI	Stabilization Time (Light & Power)	
3098	82.1	60	

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Dec. 14, 2016
<b>Date of Test</b>	: Dec. 14, 2016
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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### Sample Photo



Sample view

### Equipment Under Test (EUT)

<b>Name</b>	: WRAP
<b>Model</b>	: WRP12D38LED301S
<b>Electrical Ratings</b>	: 120~277Vac, 50/60Hz, 38W
<b>Product Description</b>	: 3000K, Aluminum frame, Frosted Lens, SPCC with powder paint Manufacturer of light source: LG Innotek Co., Ltd Model of light source: LGIT 5630HE Package
<b>Manufacturer</b>	: ABOVE ALL LIGHTING INC.
<b>Address</b>	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

## TEST RESULTS

Test ambient temperature was 24.9°C.

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 30 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)	0.296	0.133
Power Factor	0.9963	0.9451
Test Power (W)	35.39	34.90
THD A%	8.62	9.74
Luminous Efficacy (lm/W)	134.6	136.3
Total Luminous Flux (lm)	4763.2	4758.4
Color Rendering Index (CRI)	82.1	
R9	3	
Correlated Color Temperature (CCT) (K)	3098	
Chromaticity (Chroma x, Chroma y)	(0.4305, 0.4026)	
Chromaticity (Chroma u, Chroma v)	(0.2471, 0.3465)	
Chromaticity (Chroma u', Chroma v')	(0.2471, 0.5198)	
Duv	0.0003	
Average Beam Angle (°)	93.7	
Center Beam Candle Power (cd)	1785	
Spacing Criteria	1.24 (0°-180°)/ 1.20 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	73.89%	
Zonal Lumens in the 60°-90°Zone	17.42%	
Zonal Lumens in the 90°-120°Zone	5.97%	
Zonal Lumens in the 120°-180°Zone	2.72%	

Special Color Rendering Indices	
R1	80
R2	91
R3	96
R4	79
R5	81
R6	89
R7	82
R8	58
R9	3
R10	80
R11	79
R12	72
R13	83
R14	98

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

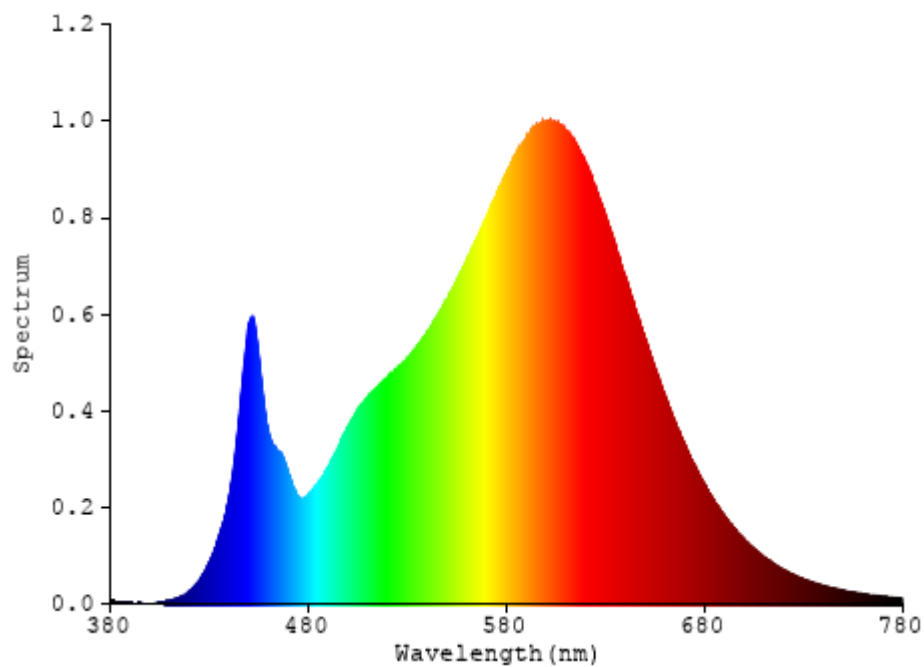


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	169.784	3.56%
10- 20	486.907	10.22%
20- 30	732.543	15.38%
30- 40	835.046	17.53%
40- 50	750.034	15.75%
50- 60	545.148	11.45%
60- 70	366.89	7.70%
70- 80	285.954	6.00%
80- 90	176.832	3.71%
90-100	102.519	2.15%
100-110	97.139	2.04%
110-120	84.73	1.78%
120-130	60.379	1.27%
130-140	36.397	0.76%
140-150	19.211	0.40%
150-160	9.649	0.20%
160-170	3.601	0.08%
170-180	0.391	0.01%
Total	4763.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3519.462	73.89%
60- 90	829.676	17.42%
0-90	4349.138	91.31%
90- 180	414.016	8.69%
0- 180	4763.2	100%

Table 3: Zonal Lumen Data

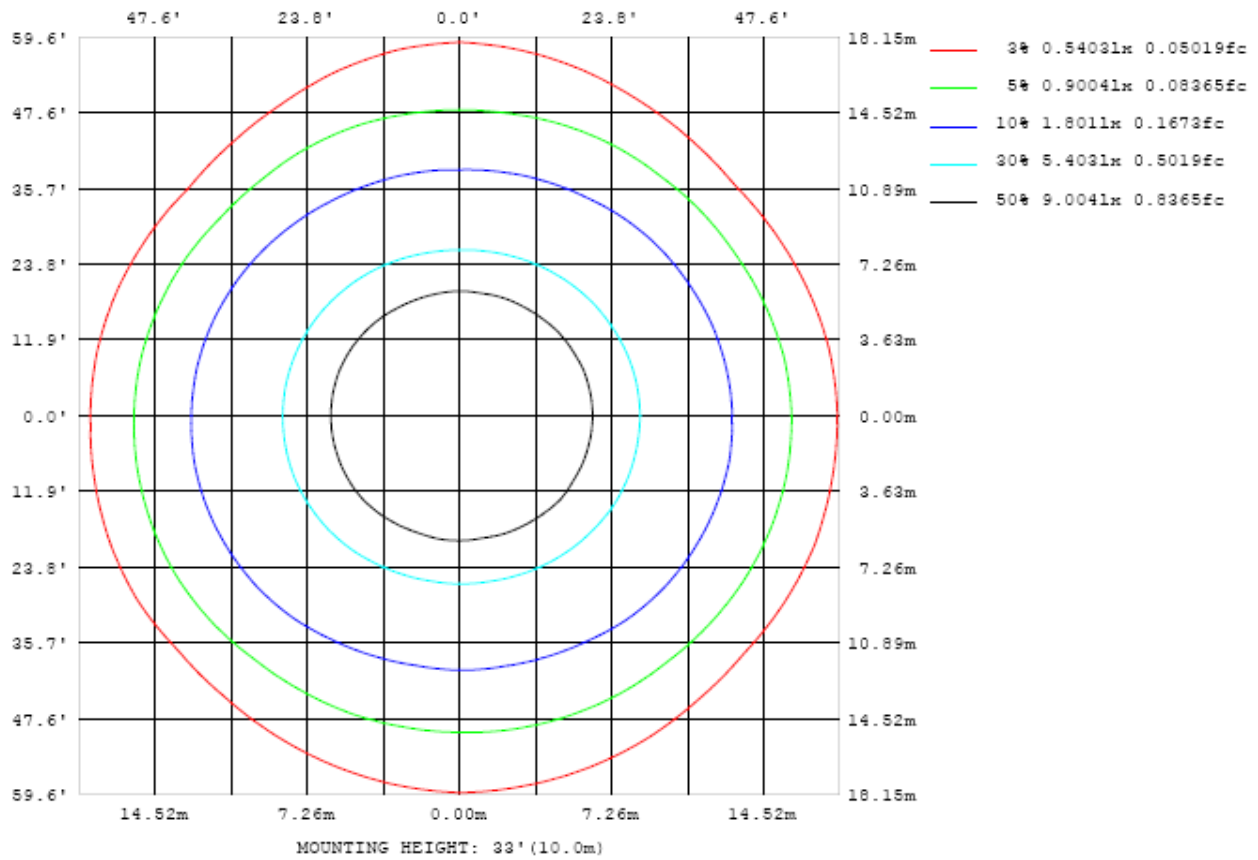


Chart 2: Illuminance Plot (Footcandles)



## Luminous Intensity Distribution Plots

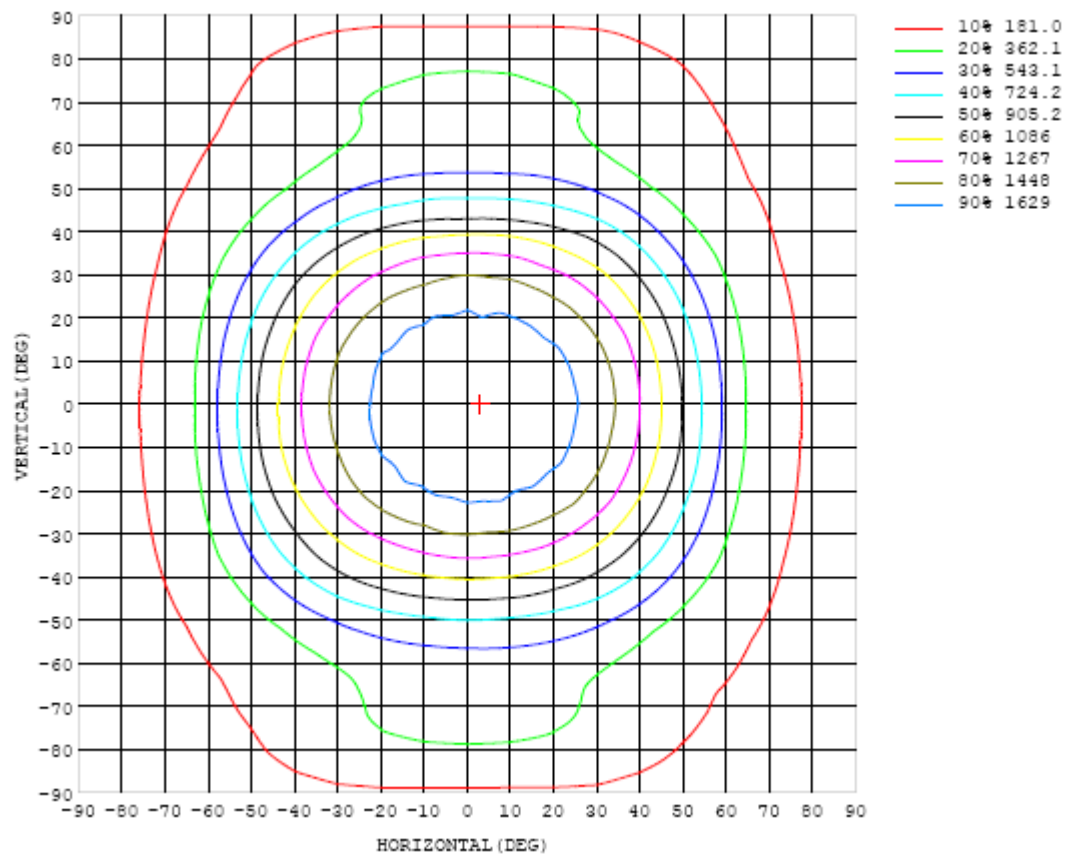


Chart 3: Isocandela Plot

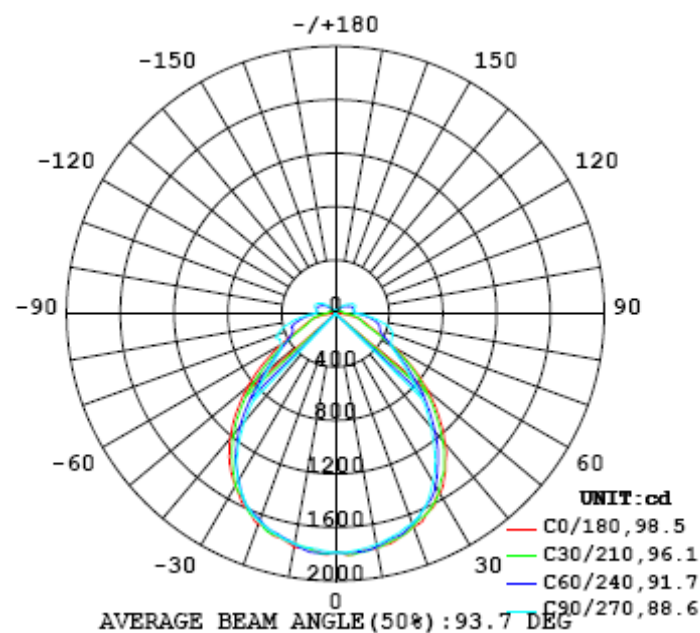


Chart 4: Polar Candela Distribution

## 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	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785
5	1797	1796	1797	1802	1805	1797	1791	1786	1780	1776	1777	1788	1792	1790	1787	1783	1776	1774	1777
10	1781	1777	1776	1776	1776	1770	1769	1772	1761	1752	1761	1769	1759	1753	1754	1765	1778	1776	1775
15	1752	1750	1750	1746	1733	1730	1729	1736	1733	1715	1721	1722	1709	1720	1715	1712	1724	1727	1727
20	1698	1698	1690	1692	1701	1679	1674	1678	1672	1670	1663	1669	1653	1662	1669	1665	1666	1668	1674
25	1636	1633	1640	1639	1614	1612	1589	1606	1580	1587	1574	1574	1583	1582	1588	1589	1583	1589	1591
30	1552	1550	1532	1538	1524	1506	1487	1473	1448	1453	1454	1438	1459	1474	1477	1493	1490	1490	1488
35	1429	1426	1420	1411	1382	1350	1331	1310	1292	1292	1287	1294	1303	1320	1343	1353	1364	1375	1372
40	1269	1266	1256	1243	1210	1181	1151	1126	1109	1109	1101	1112	1131	1155	1179	1197	1212	1218	1216
45	1090	1089	1076	1053	1026	1000	963	948	930	919	920	937	963	985	1005	1023	1042	1050	1040
50	900	904	883	865	842	816	773	741	725	726	721	734	760	800	827	838	853	859	852
55	699	705	691	679	653	627	608	594	586	579	578	581	586	607	642	650	675	667	656
60	509	511	509	494	475	474	481	482	483	481	476	472	461	452	454	477	479	473	465
65	354	356	357	334	331	361	394	431	453	463	452	416	377	345	323	324	337	326	319
70	260	261	245	236	247	291	353	413	450	455	438	395	341	283	246	233	236	243	240
75	209	198	192	199	222	276	337	382	411	422	407	374	326	264	216	189	179	185	191
80	144	150	151	167	203	253	296	322	337	340	333	318	291	246	190	148	132	132	130
85	62.2	84.2	93.7	121	161	198	228	247	251	252	246	242	225	194	152	103	82.3	77.4	58.4
90	1.51	15.4	32.3	67.0	107	143	165	168	164	163	164	167	163	143	106	62.4	30.7	14.7	0.37
95	0.56	13.9	31.3	63.8	102	130	144	143	138	137	137	142	142	130	102	60.5	29.7	12.9	0.43
100	0.72	13.5	28.0	61.1	97.5	124	139	141	138	136	137	139	136	123	97.4	58.2	27.4	11.9	0.54
105	0.85	12.8	24.6	56.4	91.1	121	140	149	150	149	148	146	138	120	91.3	53.7	23.4	11.4	0.68
110	1.08	11.9	24.2	48.3	83.7	113	138	154	160	161	158	151	136	114	83.6	46.9	23.2	10.4	0.79
115	1.28	11.6	22.7	41.5	73.9	103	128	146	156	159	154	145	127	104	73.6	41.8	22.0	9.79	0.90
120	1.38	10.3	20.6	35.5	64.4	90.3	113	131	143	146	141	130	113	90.4	63.8	36.1	20.3	9.06	1.01
125	1.44	8.87	18.8	30.0	54.5	78.8	97.9	113	124	127	122	112	97.0	78.0	54.1	30.9	18.9	8.26	1.12
130	1.48	7.60	16.9	26.1	44.8	66.7	84.2	96.7	105	107	104	96.1	83.2	65.6	44.5	26.8	17.5	7.42	1.18
135	1.50	6.60	15.8	23.8	36.4	54.2	68.6	79.7	86.6	89.1	86.1	79.2	68.1	53.3	36.4	23.9	15.8	6.57	1.12
140	1.44	5.49	14.7	22.1	30.6	43.0	55.0	63.7	68.7	70.4	68.8	63.3	54.2	42.1	30.0	21.7	14.3	5.78	1.21
145	1.36	4.49	13.2	20.3	26.6	35.1	43.2	49.7	53.8	55.1	53.5	49.1	42.0	33.7	26.0	19.6	13.1	5.14	1.46
150	1.22	3.50	11.2	18.0	23.5	29.6	34.9	39.1	41.7	42.5	41.5	38.5	33.7	28.3	22.9	17.7	11.1	4.03	1.56
155	1.23	2.84	8.75	15.4	20.4	25.2	29.1	32.1	33.9	34.2	33.3	31.4	28.2	24.5	20.3	15.6	9.46	3.20	1.53
160	1.38	2.32	5.93	11.4	16.7	20.7	24.1	26.3	27.8	28.0	27.4	26.2	23.9	20.7	17.1	12.1	7.08	2.70	1.66
165	1.53	1.80	3.53	7.16	10.7	14.3	17.7	19.5	20.7	21.1	20.7	19.9	18.2	15.4	11.6	7.54	4.09	2.04	1.72
170	1.57	1.67	2.06	3.35	5.53	7.70	9.46	10.9	11.8	12.5	12.2	11.5	10.2	8.02	5.75	3.76	2.33	1.75	1.74
175	1.42	1.52	1.65	1.77	2.01	2.38	2.86	3.45	3.89	3.85	3.83	3.46	2.85	2.36	2.11	1.89	1.81	1.74	1.71
180	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22

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	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785		
5	1780	1783	1786	1792	1798	1796	1787	1775	1767	1766	1773	1781	1789	1795	1797	1795	1797		
10	1766	1756	1749	1747	1747	1751	1763	1760	1751	1764	1775	1760	1758	1764	1769	1780	1786		
15	1725	1721	1715	1706	1706	1702	1713	1699	1706	1723	1720	1725	1724	1732	1737	1750	1757		
20	1668	1654	1654	1668	1661	1643	1659	1638	1654	1635	1667	1675	1680	1693	1686	1692	1697		
25	1586	1576	1578	1577	1560	1576	1544	1553	1575	1556	1573	1589	1594	1613	1624	1632	1631		
30	1492	1485	1487	1466	1460	1440	1431	1436	1447	1442	1458	1468	1482	1512	1517	1534	1550		
35	1372	1353	1337	1318	1308	1295	1284	1268	1268	1279	1296	1310	1342	1367	1387	1411	1424		
40	1213	1198	1177	1154	1126	1105	1083	1060	1054	1072	1097	1126	1157	1193	1214	1246	1263		
45	1034	1013	992	961	927	891	850	821	816	828	864	907	963	1000	1029	1063	1079		
50	843	817	785	750	714	685	670	661	654	667	683	707	748	790	825	858	883		
55	643	616	587	554	533	532	526	518	513	516	533	548	565	597	617	652	684		
60	459	442	418	395	404	420	445	461	467	460	449	435	424	417	443	470	497		
65	321	309	290	292	319	359	404	441	457	448	415	366	320	294	292	329	348		
70	238	227	220	237	280	338	408	435	453	444	408	349	286	239	216	227	257		
75	177	176	188	218	274	323	353	383	399	385	355	325	286	229	195	181	185		
80	126	129	153	195	245	268	290	316	323	317	301	277	245	204	166	144	139		
85	74.8	79.2	107	151	183	208	225	232	234	233	232	214	186	155	121	88.5	78.3		
90	15.3	29.8	62.9	108	140	155	156	154	154	155	160	159	145	111	68.1	32.6	16.6		
95	13.1	29.9	61.3	104	131	141	141	138	136	138	143	145	135	106	65.7	32.1	14.0		
100	12.7	27.6	57.0	99.2	129	142	143	141	140	141	146	146	132	101	60.5	29.2	14.5		
105	12.8	26.0	51.7	91.5	126	146	153	154	156	156	157	148	127	92.9	54.7	26.4	14.4		
110	12.5	24.7	46.9	82.3	118	143	157	164	166	165	159	144	118	84.6	49.2	24.2	13.6		
115	12.0	22.9	42.8	73.5	106	132	151	161	164	160	152	132	107	76.0	42.9	21.8	12.7		
120	11.4	20.9	36.6	65.1	94.5	118	136	147	151	148	136	118	95.3	66.8	35.2	19.9	11.5		
125	10.6	19.6	31.0	54.1	80.8	105	122	132	135	132	121	104	82.0	54.8	29.1	18.9	10.5		
130	9.77	18.8	27.0	44.2	65.6	86.1	103	113	115	112	101	86.0	66.7	43.8	25.2	18.2	9.46		
135	9.00	17.7	24.3	36.4	52.4	67.7	80.9	89.3	91.4	87.9	80.0	68.0	52.9	35.2	23.0	17.2	8.42		
140	7.82	16.4	22.4	30.5	41.6	52.7	62.2	68.0	69.2	66.8	61.3	53.0	42.1	29.6	21.5	15.4	7.02		
145	6.37	13.4	20.7	26.6	34.0	41.3	47.8	51.3	52.1	50.7	47.4	41.8	34.6	25.9	19.6	13.3	6.00		
150	5.17	11.1	18.3	23.9	29.0	33.9	38.1	40.5	40.9	40.4	38.2	34.8	29.5	23.2	17.4	11.2	4.79		
155	3.83	9.43	14.7	20.2	24.7	28.4	31.3	33.3	34.0	34.0	32.4	29.7	25.5	20.1	14.3	9.71	3.75		
160	1.99	6.34	11.1	15.3	19.6	23.5	26.2	28.0	28.6	28.6	27.7	25.5	21.5	16.3	12.3	8.06	3.13		
165	1.69	3.24	6.42	9.85	13.2	17.1	19.6	21.0	21.4	22.0	20.7	18.7	15.9	13.0	9.90	6.04	2.47		
170	1.86	1.77	2.67	4.66	6.64	8.43	10.6	12.7	13.2	13.2	12.9	11.9	10.2	8.04	5.66	2.96	1.42		
175	1.79	1.81	1.81	1.80	1.94	2.52	3.03	3.48	4.15	4.11	3.73	2.99	2.19	1.67	1.55	1.50	1.36		
180	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22		

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 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  $k=2$ .

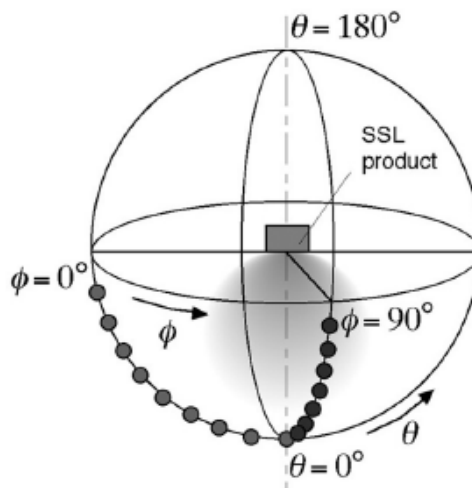
## Color Characteristics Measurements

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  $10^\circ$  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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