



## LM-79-08 Test Report

for

**Maxlite Inc.**

12 York Ave West Caldwell NJ 07006

**LEDSlim Canopy**

**Model: CPL40AUC50B000**

**Laboratory: Leading Testing Laboratories**

**NVLAP CODE: 200960-0**

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Report No.: HZ16060026e

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

Review by:

Engineer: April Zou  
Jul. 12, 2016

Approved



Manager: Jim Zhang  
Jul. 12, 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: **CPL40AUC50B000**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
94.3	3848.3	40.80	0.9972
CCT (K)	CRI	Stabilization Time (Light & Power)	
5010	77.4	60	

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Jun. 16, 2016
<b>Date of Test</b>	: Jul. 01, 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



Figure 1- Overview of the sample

### Equipment Under Test (EUT)

<b>Name</b>	: LEDSlim Canopy
<b>Model</b>	: CPL40AUC50B000
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz, 40W
<b>Product Description</b>	: 5000K, Clear Cover, Aluminum Enclosure Manufacturer of light source: Nichia Corporation Model of LED light source: NF2L757DR Quantity of LED light source: 60pcs
<b>Manufacturer</b>	: Maxlite Inc.
<b>Address</b>	: 12 York Ave West Caldwell NJ07006

## TEST RESULTS

Test ambient temperature was 24.5°C.

Sample 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 95 minutes.

The photometric distance of Goniophotometer is 2.47m.

Luminous data was taken at 0.5°vertical intervals and 10°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.341	0.160
Power Factor	0.9972	0.9071
Test Power (W)	40.80	40.17
Off-State Power (W)	0	0
THD A%	3.02	12.78
Luminous Efficacy (lm/W)	94.3	95.7
Total Luminous Flux (lm)	3848.3	3842.6
Color Rendering Index (CRI)	77.4	
R9	-9	
Correlated Color Temperature (CCT) (K)	5010	
Chromaticity (Chroma x, Chroma y)	(0.3450, 0.3538)	
Chromaticity (Chroma u, Chroma v)	(0.2105, 0.3238)	
Chromaticity (Chroma u', Chroma v')	(0.2105, 0.4870)	
Duv	0.0011	
Average Beam Angle (°)	128.8	
Center Beam Candle Power (cd)	1063	
Spacing Criteria	1.32 (0°-180°)/ 1.34 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	68.79%	
Zonal Lumens in the 60°-90°Zone	28.34%	
Zonal Lumens in the 90°-120°Zone	2.78%	
Zonal Lumens in the 120°-180°Zone	0.09%	

Special Rendering Indices	Color
R1	75
R2	83
R3	87
R4	77
R5	75
R6	75
R7	85
R8	62
R9	-9
R10	57
R11	73
R12	49
R13	77
R14	92

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

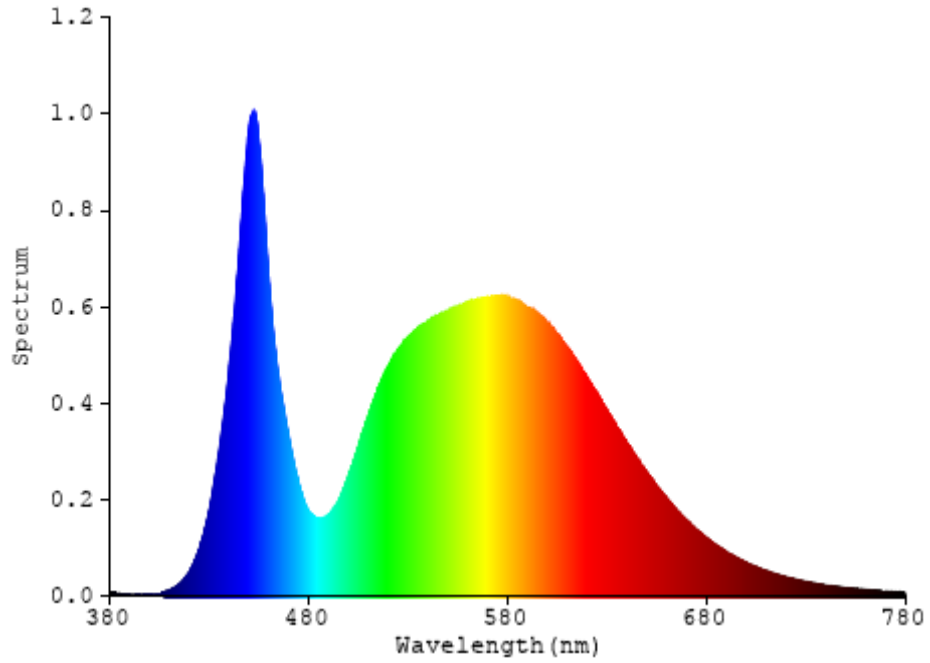


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	99.673	2.59%
10- 20	290.552	7.55%
20- 30	454.594	11.81%
30- 40	571.678	14.86%
40- 50	624.689	16.23%
50- 60	605.901	15.74%
60- 70	518.769	13.48%
70- 80	373.509	9.71%
80- 90	198.349	5.15%
90-100	82.618	2.15%
100-110	20.093	0.52%
110-120	4.411	0.11%
120-130	1.895	0.05%
130-140	0.646	0.02%
140-150	0.399	0.01%
150-160	0.295	0.01%
160-170	0.187	0.00%
170-180	0.065	0.00%
Total	3848.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2647.087	68.79%
60- 90	1090.627	28.34%
0-90	3737.714	97.13%
90- 180	110.609	2.87%
0- 180	3848.3	100%

Table 3: Zonal Lumen Data

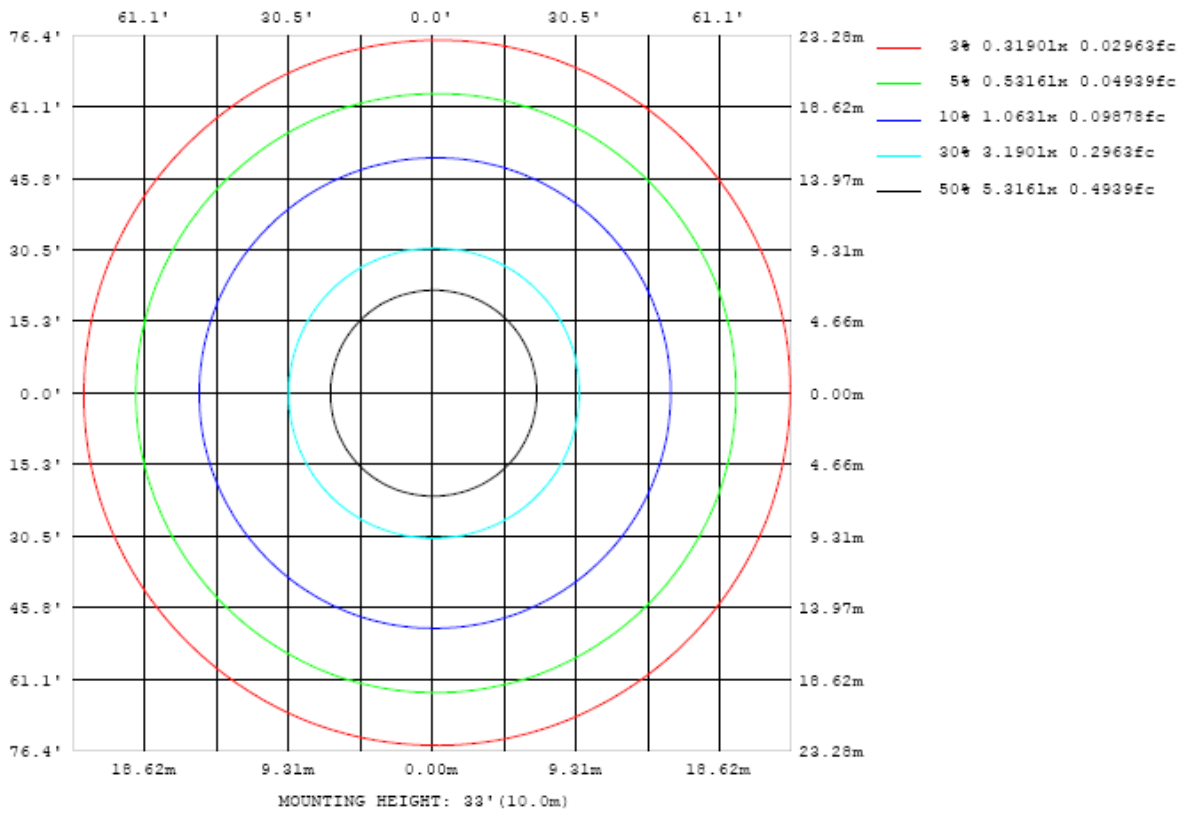


Chart 2: Illuminance Plot (Footcandles)



### Luminous Intensity Distribution Plots

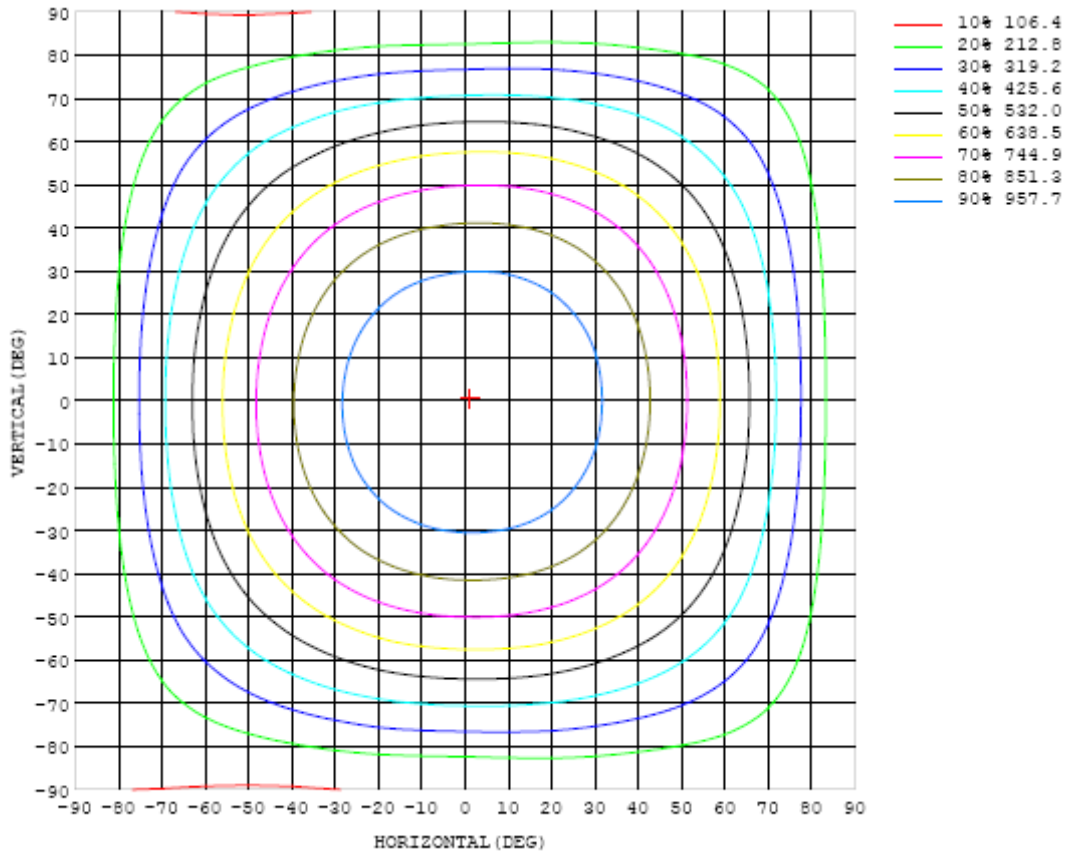


Chart 3: Isocandla Plot

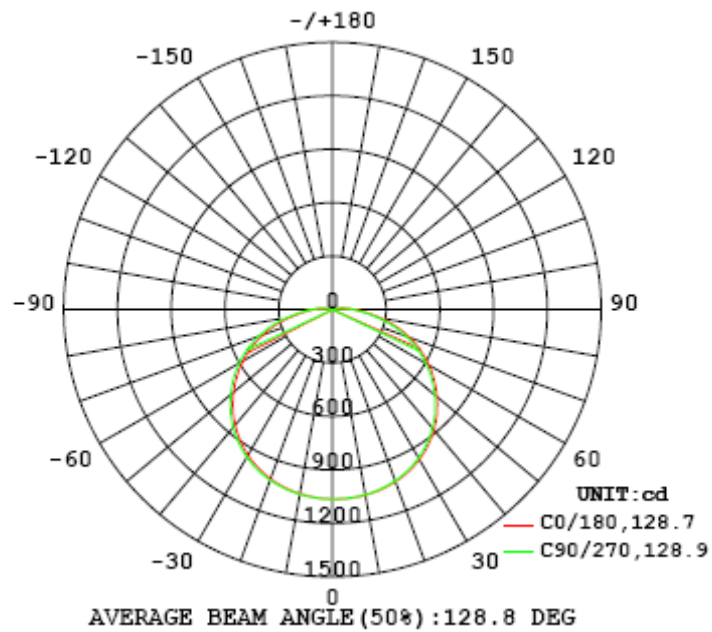


Chart 4: Polar Candela Distribution

### Luminous Intensity Data

Table--1 UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063
5	1063	1063	1063	1062	1063	1062	1062	1062	1061	1061	1061	1061	1060	1060	1059	1060	1059	1059	1059
10	1057	1057	1057	1057	1057	1057	1056	1056	1055	1054	1054	1054	1053	1052	1051	1051	1050	1050	1049
15	1045	1046	1046	1046	1045	1045	1044	1043	1043	1042	1041	1040	1039	1038	1037	1037	1035	1034	1034
20	1028	1028	1028	1028	1028	1028	1027	1025	1024	1022	1022	1020	1019	1019	1017	1016	1014	1012	1011
25	1003	1003	1004	1004	1004	1003	1002	1000	998	996	995	994	993	992	990	988	985	983	981
30	970	971	972	972	972	971	969	966	964	962	961	960	959	958	955	952	949	946	944
35	930	930	932	932	933	931	928	925	921	919	918	917	916	914	912	909	904	901	899
40	881	881	883	884	884	883	879	875	871	868	867	866	865	864	860	857	853	848	846
45	824	825	827	828	827	826	822	818	813	810	809	808	807	804	801	798	793	789	786
50	762	762	764	764	763	762	758	754	749	745	744	743	741	739	735	732	728	724	721
55	694	694	694	694	693	691	688	684	680	677	674	672	669	666	663	659	656	654	651
60	621	621	622	619	616	614	612	609	605	601	599	596	593	589	585	583	582	580	578
65	542	542	541	539	535	533	532	530	526	522	520	517	512	507	504	502	502	502	498
70	455	456	457	455	452	449	449	445	441	436	434	432	428	424	421	418	417	414	412
75	366	366	368	367	364	361	361	358	352	346	345	344	339	337	332	330	330	326	324
80	274	276	279	278	274	273	272	270	262	255	254	255	251	245	242	242	241	236	233
85	185	187	191	190	186	185	185	184	178	172	172	171	167	162	160	161	161	158	156
90	118	120	121	120	116	115	117	118	117	116	113	111	106	101	100	103	106	107	109
95	85.6	83.9	80.2	75.0	70.5	69.6	72.7	77.6	81.7	82.7	78.6	71.4	63.8	59.1	58.2	61.1	66.7	71.9	74.8
100	53.7	51.8	46.8	38.6	32.6	31.8	36.6	44.2	49.0	50.1	47.2	40.9	32.1	24.4	23.5	29.5	37.3	42.6	45.1
105	26.4	24.9	20.6	14.7	9.08	8.53	12.9	18.3	22.1	23.2	21.0	16.2	10.7	7.89	7.79	9.06	13.7	17.7	19.8
110	6.62	6.35	5.65	5.30	5.38	5.63	6.02	6.62	7.34	7.59	7.20	6.32	5.80	5.57	5.54	5.68	6.04	6.83	7.21
115	4.56	4.43	3.99	3.59	3.74	3.93	4.14	4.77	5.39	5.59	5.31	4.66	3.95	3.85	3.83	3.87	4.42	5.03	5.33
120	3.46	3.35	2.98	2.40	2.31	2.46	2.80	3.52	3.99	4.14	3.95	3.46	2.75	2.34	2.32	2.55	3.24	3.72	3.96
125	2.49	2.40	2.09	1.62	1.12	1.20	1.85	2.45	2.84	2.97	2.82	2.43	1.84	1.19	1.09	1.63	2.21	2.59	2.82
130	1.66	1.58	1.34	0.95	0.53	0.59	1.08	1.54	1.85	1.96	1.85	1.55	1.10	0.63	0.52	0.91	1.34	1.65	1.85
135	0.93	0.87	0.70	0.50	0.49	0.49	0.55	0.81	1.03	1.11	1.04	0.84	0.59	0.51	0.51	0.53	0.68	0.88	1.07
140	0.53	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.58	0.57	0.55	0.55	0.55	0.55	0.55	0.55	0.56	0.70
145	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.57	0.57	0.57	0.57	0.57	0.73
150	0.52	0.52	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.54	0.54	0.76
155	0.50	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.76
160	0.51	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	0.53	0.53	0.52	0.77
165	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.76
170	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.61	0.60	0.60	0.76
175	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.75
180	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.39

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	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063		
5	1059	1059	1059	1060	1060	1060	1060	1060	1060	1061	1061	1061	1061	1061	1063	1063	1063		
10	1049	1049	1049	1049	1050	1051	1051	1051	1052	1053	1054	1054	1055	1056	1056	1057	1056		
15	1033	1034	1034	1034	1035	1036	1037	1037	1039	1040	1042	1042	1044	1044	1045	1046	1045		
20	1011	1011	1012	1012	1014	1015	1016	1017	1018	1020	1022	1024	1025	1026	1028	1028	1028		
25	981	982	983	984	986	987	988	989	991	994	997	999	1001	1002	1004	1004	1003		
30	944	945	946	948	950	951	953	954	956	960	963	966	969	971	972	971	970		
35	899	900	903	905	907	908	909	911	914	917	922	926	930	931	932	932	931		
40	846	848	851	854	856	858	859	860	863	868	873	878	882	884	885	883	882		
45	787	789	792	794	797	799	801	802	806	811	816	822	826	828	829	828	826		
50	722	723	726	729	731	734	736	738	742	747	753	758	762	765	766	765	763		
55	652	653	655	658	661	664	667	670	674	680	685	690	693	695	697	696	695		
60	578	580	581	581	584	589	593	597	602	607	612	615	617	619	622	624	622		
65	499	501	501	502	505	508	515	519	523	530	535	536	538	540	544	544	544		
70	414	416	418	422	423	429	431	433	437	444	452	454	456	457	461	462	459		
75	327	331	331	333	335	340	344	345	348	355	364	368	369	370	374	374	370		
80	236	241	243	244	248	252	256	256	257	265	274	278	278	281	284	284	279		
85	159	162	163	163	165	170	174	174	174	181	188	190	191	192	195	196	191		
90	108	107	105	102	104	110	114	115	116	119	122	122	120	120	123	125	122		
95	72.7	67.6	62.6	60.0	61.4	66.2	72.8	79.1	83.2	83.0	80.5	76.7	73.7	73.8	77.9	82.9	85.6		
100	43.3	38.3	30.8	25.4	26.5	33.0	42.0	48.2	51.4	50.8	46.7	39.4	34.6	34.7	39.5	47.5	52.4		
105	18.6	15.0	10.4	7.52	7.52	11.6	17.4	22.4	24.8	24.2	20.6	15.1	9.67	8.97	15.2	20.9	25.3		
110	6.93	6.16	5.62	5.36	5.27	5.33	5.60	6.32	6.77	6.54	5.95	5.61	5.39	5.27	5.29	5.45	6.02		
115	5.13	4.56	3.84	3.69	3.61	3.60	4.14	4.70	4.94	4.82	4.34	3.80	3.69	3.62	3.59	4.06	4.52		
120	3.81	3.35	2.67	2.22	2.16	2.39	3.04	3.49	3.67	3.56	3.17	2.54	2.27	2.23	2.44	3.04	3.42		
125	2.69	2.33	1.77	1.12	1.01	1.57	2.10	2.46	2.60	2.51	2.19	1.68	1.13	1.10	1.68	2.17	2.49		
130	1.75	1.46	1.04	0.63	0.57	0.89	1.32	1.60	1.71	1.63	1.37	0.96	0.57	0.63	1.02	1.42	1.68		
135	1.00	0.82	0.65	0.62	0.61	0.61	0.73	0.86	0.94	0.88	0.73	0.61	0.61	0.61	0.64	0.83	1.00		
140	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68		
145	0.74	0.74	0.74	0.74	0.73	0.73	0.73	0.73	0.73	0.73	0.74	0.73	0.73	0.73	0.73	0.73	0.73		
150	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76		
155	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77		
160	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78		
165	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.78	0.78	0.78	0.78	0.78	0.78	0.78		
170	0.76	0.76	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77		
175	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.76	0.76	0.76	0.76	0.76	0.76	0.76		
180	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		

Table 5: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

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  $k=2$ .

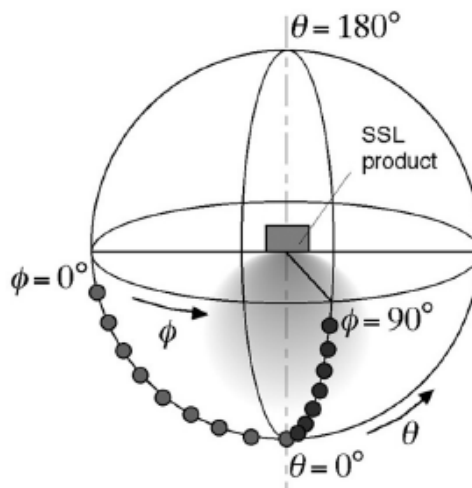
## Color Characteristics Measurements

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 \*\*\*

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.