



LM-79-08 Test Report

for

DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO., LTD

Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

LED WALL PACKS LIGHT

Model: TLWMK203YYZZ

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17060045g

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

Review by:

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Jul. 05, 2017

Approved by

Manager: Jim Zhang
Jul. 05, 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: **TLWMK203YYZZ**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
113.5	2235.3	19.70	0.9894
CCT (K)	CRI	Stabilization Time (Light & Power)	
3052	74.2	60	
IES Classification		B-U-G	
Type VS		B1-U0-G1	

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:

Date of Receipt	: Jun. 22, 2017
Date of Test	: Jun. 30, 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 Photos



Overview of the sample

Equipment Under Test (EUT)

Name	: LED WALL PACKS LIGHT
Model	: TLWMK203YYZZ
Electrical Ratings	: 100-277V, 50/60Hz
Product Description	: 3000K
Manufacturer	: DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO., LTD
Address	: Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

TEST RESULTS

Test ambient temperature was 24.7°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 95 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)	0.166	0.079
Power Factor	0.9894	0.9065
Test Power (W)	19.70	19.78
THD A%	13.53	13.67
Luminous Efficacy (lm/W)	113.5	110.0
Total Luminous Flux (lm)	2235.3	2176.7
0°-90° Luminous Efficacy (lm/W)	113.5	
0°-90° Luminous Flux (lm)	2235.3	
Color Rendering Index (CRI)	74.2	
R9	-20	
Correlated Color Temperature (CCT) (K)	3052	
Chromaticity (Chroma x, Chroma y)	(0.4303, 0.3964)	
Chromaticity (Chroma u, Chroma v)	(0.2496, 0.3449)	
Chromaticity (Chroma u', Chroma v')	(0.2496, 0.5173)	
Duv	-0.0022	
Average Beam Angle (°)	101.6	
Center Beam Candle Power (cd)	890	
Spacing Criteria	1.21(0°-180°)/ 1.20 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	83.44%	
Zonal Lumens in the 60°-90°Zone	16.56%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Color Rendering Indices	
R1	71
R2	86
R3	94
R4	68
R5	70
R6	79
R7	78
R8	47
R9	-20
R10	66
R11	61
R12	55
R13	74
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

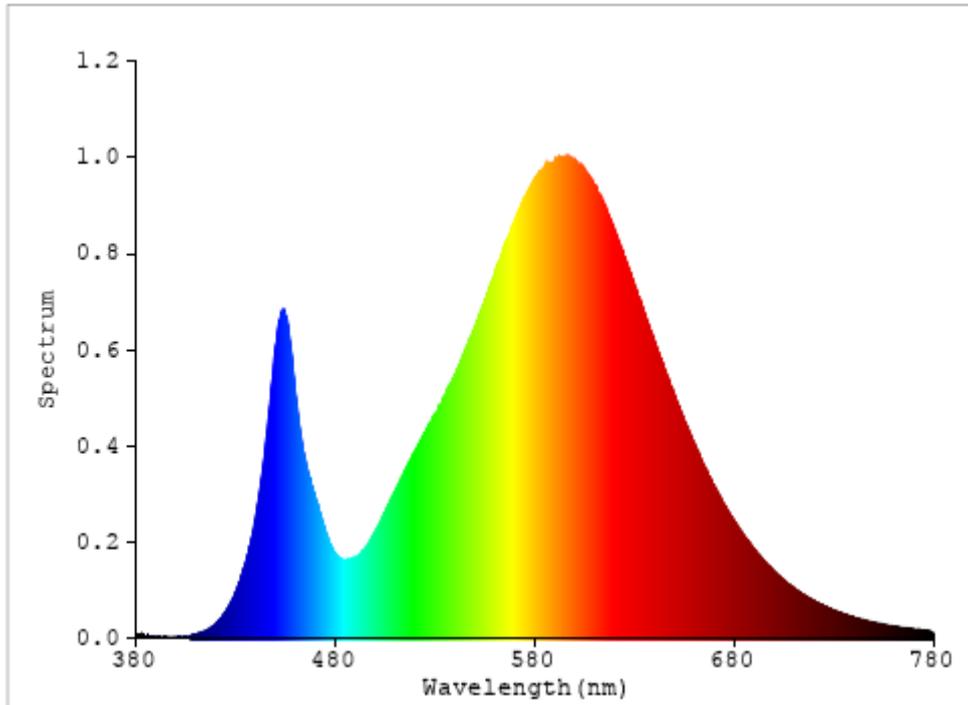


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	84.262	3.77%
10- 20	241.076	10.79%
20- 30	361.818	16.19%
30- 40	422.047	18.88%
40- 50	411.889	18.43%
50- 60	344.003	15.39%
60- 70	232.985	10.42%
70- 80	111.275	4.98%
80- 90	25.927	1.16%
90-100	0	0.00%
100-110	0	0.00%
110-120	0	0.00%
120-130	0	0.00%
130-140	0	0.00%
140-150	0	0.00%
150-160	0	0.00%
160-170	0	0.00%
170-180	0	0.00%
Total	2235.3	100%
	84.262	3.77%
$\gamma(^{\circ})$	Lumens	% Total
0- 60	1865.095	83.44%
60- 90	370.187	16.56%
0-90	2235.282	100.00%
90- 180	0	0.00%
0- 180	2235.3	100%

Table 3: Zonal Lumen Data

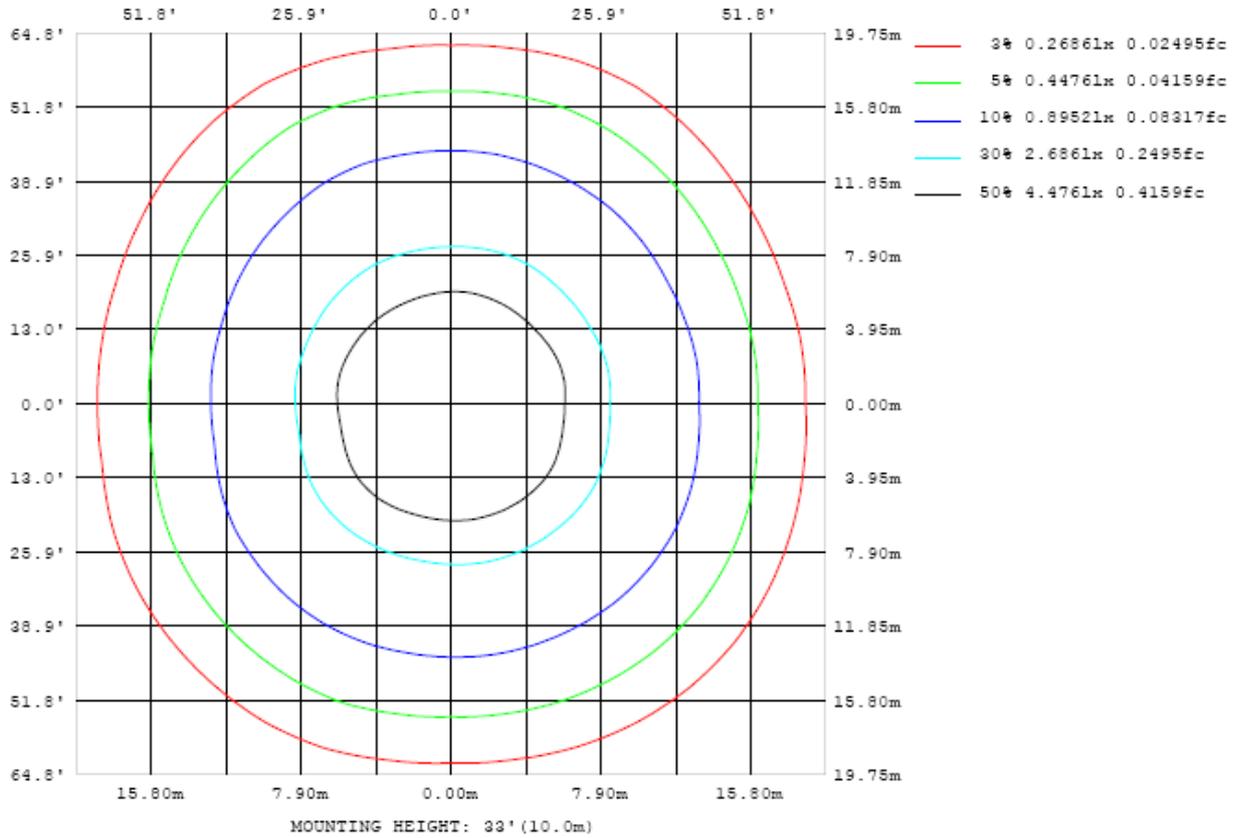


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

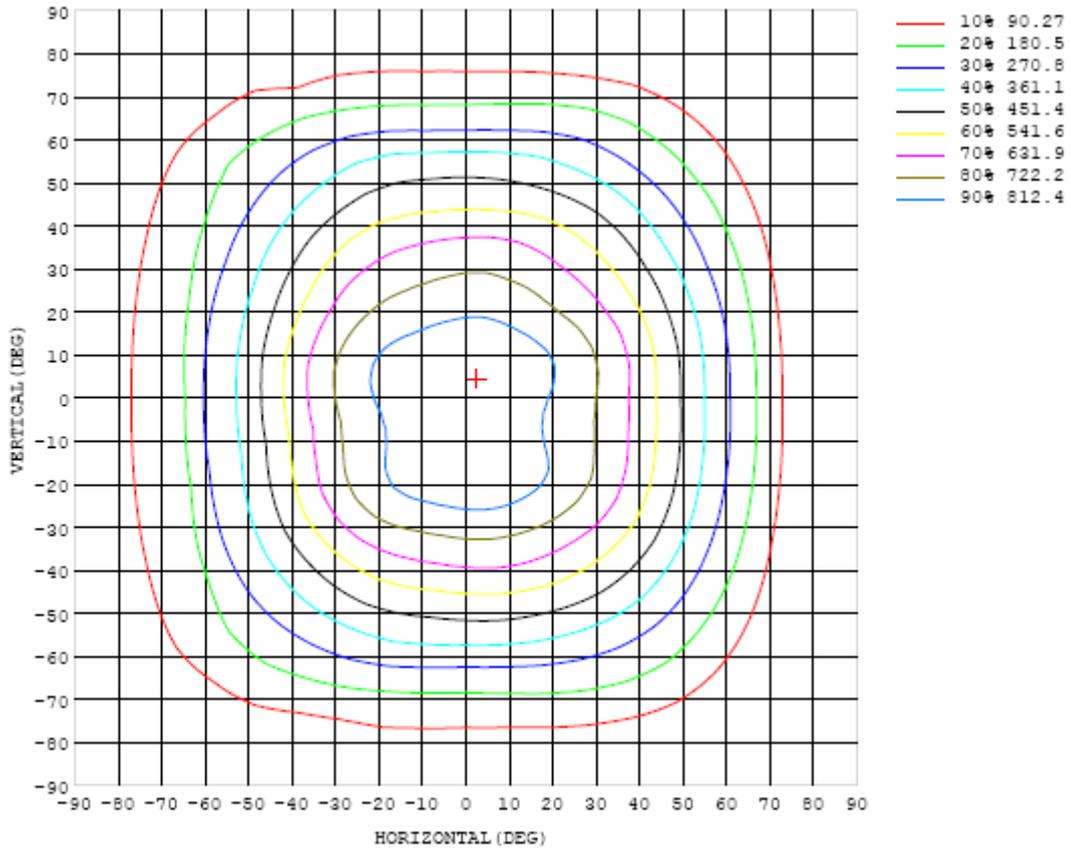


Chart 3: Isocandela Plot

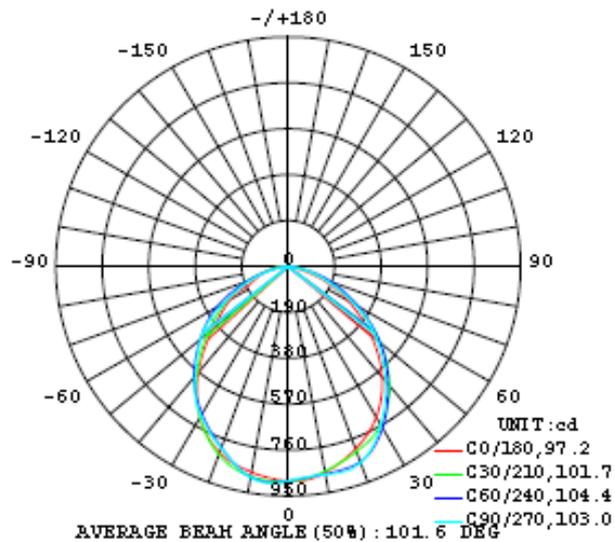


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890
5	888	884	882	881	880	879	878	877	877	876	875	874	873	872	872	873	874	877	880
10	867	862	860	861	864	869	873	876	877	876	873	869	865	860	856	855	856	859	866
15	839	833	834	839	848	860	871	879	882	880	877	870	862	851	842	838	837	839	848
20	805	800	804	817	835	851	863	869	869	866	862	859	854	845	831	818	811	811	821
25	767	765	774	793	813	825	828	828	826	821	817	818	823	823	809	790	774	769	779
30	721	722	737	759	773	775	773	769	765	758	754	757	769	775	769	749	725	712	723
35	664	669	689	710	716	712	706	702	698	691	685	687	699	709	706	690	662	644	652
40	597	607	628	646	648	640	637	635	631	621	616	619	626	632	629	616	587	565	572
45	522	535	558	572	573	569	567	562	556	547	542	549	553	550	545	535	509	483	487
50	442	455	477	492	494	495	491	485	481	474	470	476	479	471	462	453	428	401	403
55	360	374	394	407	414	416	412	409	406	401	401	405	402	397	386	375	356	333	333
60	283	294	311	324	334	336	333	328	319	313	320	332	330	324	317	307	294	276	275
65	209	220	233	247	257	260	256	247	235	229	236	248	255	254	251	246	228	182	174
70	133	144	160	174	188	191	187	178	165	160	164	170	179	184	190	182	144	137	135
75	61.6	71.5	88.4	106	120	125	123	116	108	106	109	111	113	107	119	110	107	103	102
80	19.5	24.2	35.1	48.8	56.2	57.3	57.5	56.8	54.4	57.4	61.5	66.2	56.6	64.7	68.7	74.1	77.3	72.6	72.1
85	1.79	2.26	4.39	7.70	10.0	12.0	14.7	17.6	19.9	21.3	22.4	26.4	30.2	34.2	39.6	44.5	46.4	42.7	42.2
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890	890		
5	883	887	891	894	896	898	900	901	902	902	902	903	901	900	898	895	891		
10	873	879	884	887	888	887	886	887	888	889	890	892	891	890	887	882	875		
15	858	864	864	859	852	848	845	845	848	852	854	856	858	861	863	858	849		
20	831	834	830	818	806	799	798	798	802	805	806	806	811	819	826	826	817		
25	789	790	782	769	760	754	754	755	760	763	762	760	760	766	779	786	780		
30	734	732	723	716	712	706	704	708	714	718	714	712	709	711	725	735	733		
35	664	661	656	659	658	657	656	657	663	668	665	658	655	655	663	675	675		
40	582	579	583	592	598	601	597	592	593	600	606	604	596	594	595	606	608		
45	497	496	505	520	530	536	533	527	527	529	536	540	534	528	523	529	532		
50	411	416	430	446	459	471	473	468	468	467	466	466	464	456	446	446	448		
55	338	343	360	376	390	407	412	401	399	401	400	393	389	379	366	364	365		
60	278	282	296	310	324	338	332	315	310	316	326	323	313	301	291	284	286		
65	195	225	237	249	258	257	245	230	226	231	244	251	241	229	217	211	211		
70	136	149	184	186	186	178	169	160	158	164	174	182	178	163	150	140	135		
75	102	105	111	116	103	116	110	103	100.0	102	107	111	109	98.2	83.8	69.9	63.1		
80	71.8	74.8	71.9	68.8	58.6	53.0	58.5	47.9	44.8	45.9	42.5	42.8	41.5	43.3	33.5	24.1	20.6		
85	41.6	43.6	41.4	35.0	28.1	23.6	18.9	16.0	15.5	12.9	10.2	7.71	6.45	4.90	3.32	1.99	1.86		
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 26, 2016	Jul. 25, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 26, 2016	Jul. 25, 2017
AC Power Supply	DPS1060	HZTE001-06	Dec. 25, 2016	Dec. 24, 2017
DC Power Supply	WY12010	HZTE004-03	Dec. 25, 2016	Dec. 24, 2017
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2016	Aug. 07, 2017
Standard Source	D908	HZTE012-01	Jul. 28, 2016	Jul. 27, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 28, 2016	Jul. 27, 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 2.3% with a coverage factor $k=2$.

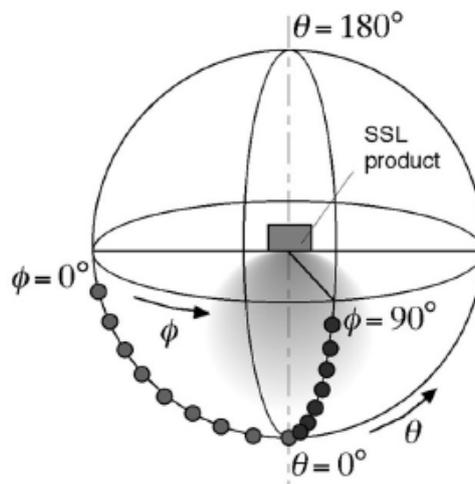
Color Characteristics Measurements

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 ***

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.