

LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT100401-VM

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ17080006i

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

Test specifications:

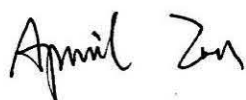
Date of Receipt : Jul. 24, 2017

Date of Test : Jul. 25, 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

Reviewed by:



Engineer: April Zou

Jul. 25, 2017

Approved by



Manager: Jim Zhang

Jul. 25, 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: MT100401-VM

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
114.1	13747.0	120.49	0.9948
CCT (K)	CRI	Stabilization Time (Light & Power)	
3929	72.3	60	
IES Classification		Longitudinal Classification	
Type VS		Very Short	

Table 1: Executive Data Summary

Sample Photo

0 Horizontal



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: MT LED Area Light
Model	: MT100401-VM
Electrical Ratings	: 120~277V, 50/60Hz, 100W
Product Description	: 4000K 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

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TEST RESULTS

Test ambient temperature was 24.9°C.

Sample 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.

Goniophotometer Method

The photometric distance is 2.47m.

Luminous data was taken at 0.5°vertical intervals and 5°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	1.009	0.460
Power Factor	0.9948	0.9386
Test Power (W)	120.49	119.55
THD A%	6.56	10.85
Luminous Efficacy (lm/W)	114.1	115.0
Total Luminous Flux (lm)	13747.0	13754.0
Color Rendering Index (CRI)	72.3	
R9	-31	
Correlated Color Temperature (CCT) (K)	3929	
Chromaticity (Chroma x, Chroma y)	(0.3841, 0.3804)	
Chromaticity (Chroma u, Chroma v)	(0.2261, 0.3358)	
Chromaticity (Chroma u', Chroma v')	(0.2261, 0.5037)	
Duv	0.0006	
Average Beam Angle (°)	103.6	
Center Beam Candle Power (cd)	5528	
Spacing Criteria	1.36 (0°-180°)/ 1.36 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	95.20%	
Zonal Lumens in the 60°-90°Zone	4.80%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Rendering Indices	Color
R1	68
R2	80
R3	89
R4	70
R5	69
R6	71
R7	81
R8	51
R9	-31
R10	52
R11	64
R12	47
R13	70
R14	93

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

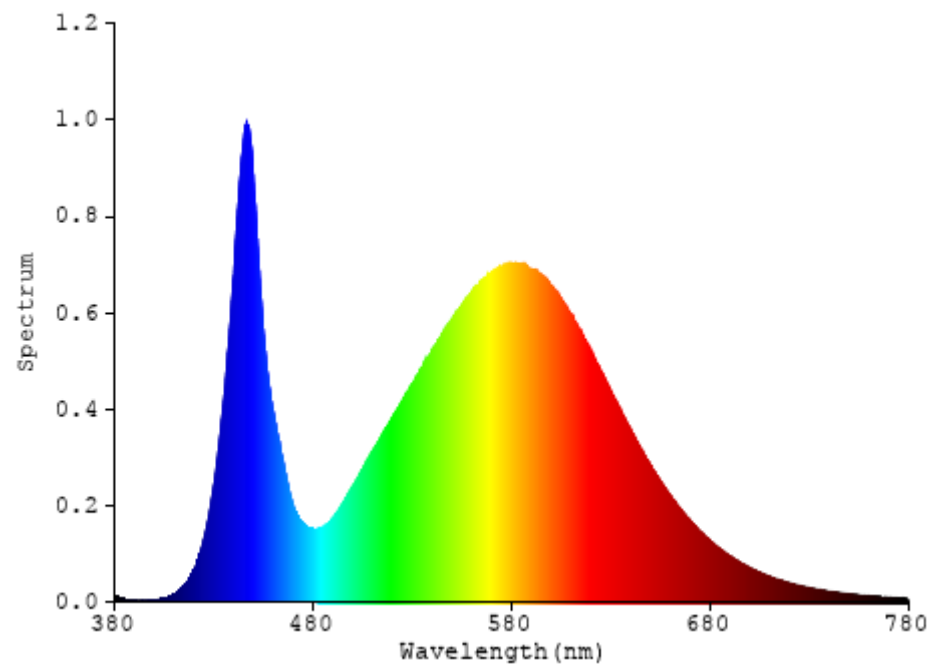


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	2396.5	17.4
FM - Front-Medium (30-60)	3975.4	28.9
FH - Front-High (60-80)	260.9	1.9
FVH - Front-Very High (80-90)	3.9	0.0
Total Forward Light	6636.7	48.2

BL - Back-Low (0-30)	2412.0	17.5
BM - Back-Medium (30-60)	4303.8	31.3
BH - Back-High (60-80)	377.8	2.7
BVH - Back-Very High (80-90)	17.0	0.1
Total Back Light	7110.6	51.6

UL - Uplight-Low (90-100)	0	0
UH - Uplight-High (100-180)	0	0
Total Up Light	0	0

BUG (Back, Up, Glare) Rating	B3-U0-G1
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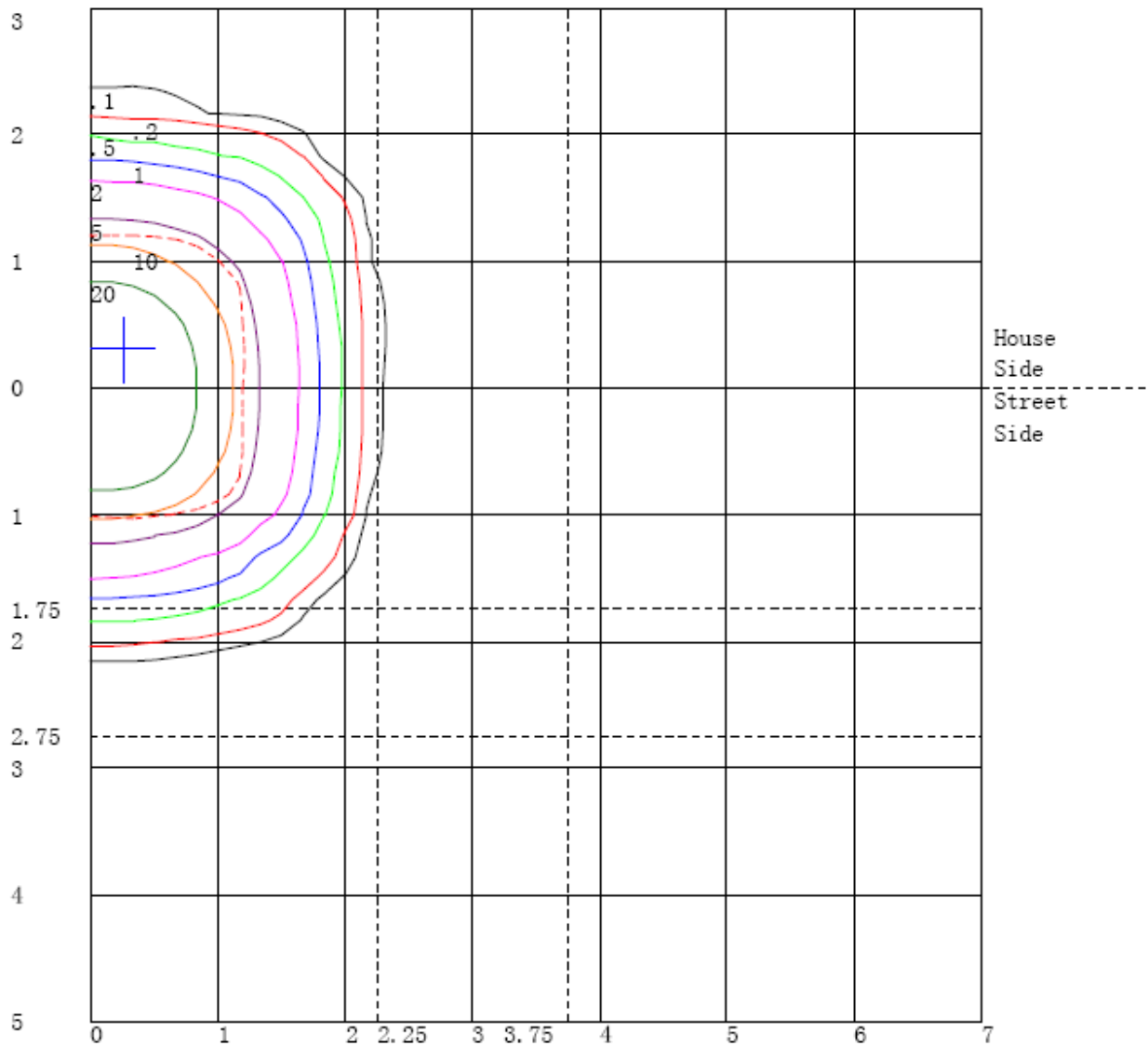
Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	7110.6	0	7110.6
Street Side	6636.7	0	6636.7

Table 4: Flux Distribution Table

Note: The Flux in this table might be a little different from the total flux in Table 2 due to software calculation deviation.

Isoilluminance Plots of Horizontal Illuminance



Distance In Units Of Mounting Height

Values Based On 10 Foot Mounting Height

1/2 Maximum Candela Trace Shown As Dashed Curve

(+) = Maximum Candela Point

Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

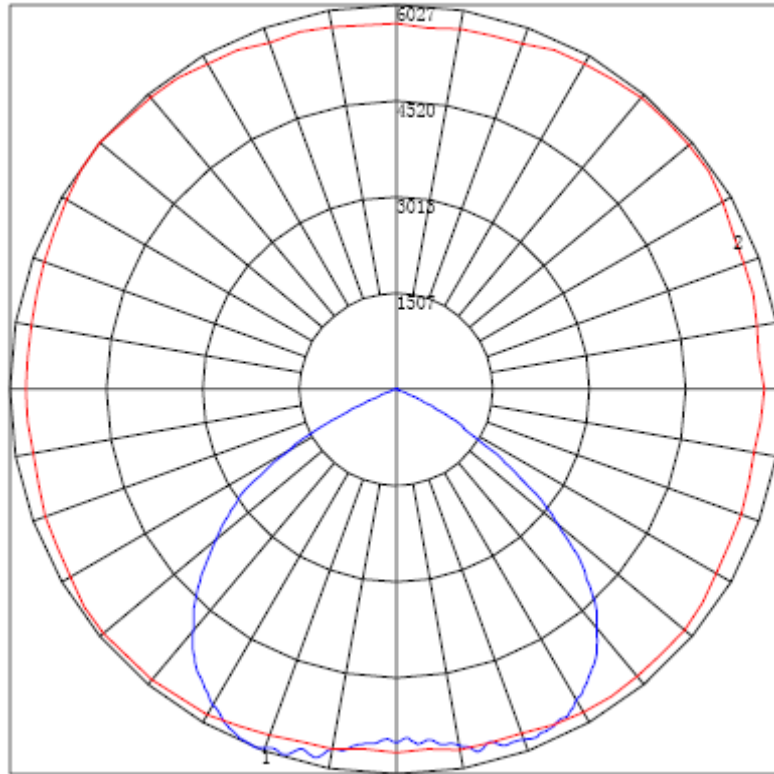


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 6026.68 Located At Horizontal Angle = 140, Vertical Angle = 21.5

1 - Vertical Plane Through Horizontal Angles (140 - 320) (Through Max. Cd.)

2 - Horizontal Cone Through Vertical Angle (21.5) (Through Max. Cd.)

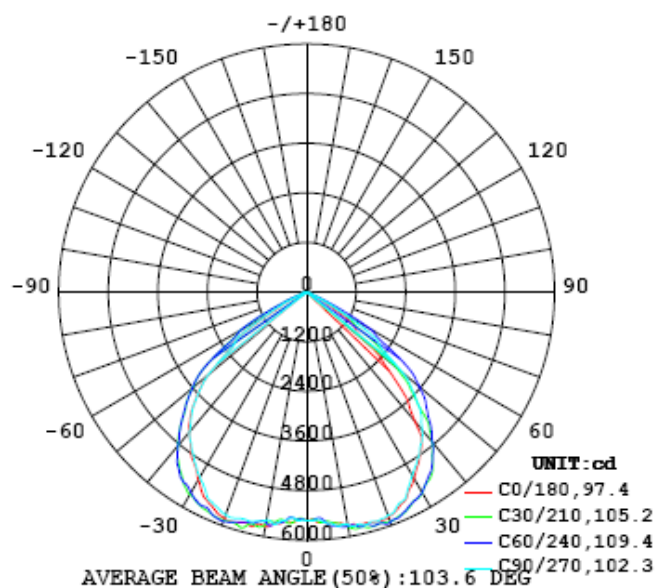


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528
5	5613	5614	5609	5602	5591	5571	5557	5562	5587	5613	5624	5622	5608	5586	5572	5579	5593	5605	5612
10	5754	5761	5745	5722	5723	5736	5746	5736	5740	5731	5758	5756	5748	5746	5735	5700	5667	5688	5707
15	5762	5749	5720	5795	5841	5871	5887	5874	5840	5919	5915	5840	5824	5841	5847	5833	5782	5728	5786
20	5787	5745	5763	5791	5828	5851	5904	5924	5956	5950	5912	5954	5917	5840	5816	5788	5756	5690	5746
25	5585	5561	5569	5619	5651	5707	5790	5861	5897	5912	5882	5823	5770	5687	5632	5585	5567	5521	5556
30	5198	5242	5331	5415	5465	5507	5595	5677	5664	5670	5645	5640	5593	5493	5416	5312	5259	5147	5116
35	4789	4814	4874	4945	5051	5165	5308	5355	5334	5352	5316	5297	5261	5181	5043	4971	4858	4830	4771
40	4075	4156	4271	4464	4580	4646	4715	4839	4909	4957	4922	4836	4743	4679	4578	4562	4438	4417	4348
45	3099	3153	3276	3498	3616	3671	3792	4113	4227	4295	4318	4259	4144	4079	4099	4040	3916	3853	3800
50	1956	2055	2168	2301	2414	2536	2853	3115	3262	3498	3549	3583	3567	3488	3375	3271	3152	3058	3029
55	1382	1379	1392	1409	1408	1405	1538	1982	2201	2534	2706	2884	2635	2331	2171	2134	2122	2124	2124
60	596	623	638	670	743	863	1039	1190	1222	1300	1474	1658	1765	1586	1370	1150	1059	1013	994
65	123	127	132	141	191	296	382	392	497	532	521	561	550	505	415	341	270	220	206
70	64.0	67.2	78.4	83.9	83.4	81.0	78.6	70.4	59.5	52.0	59.6	72.4	93.4	110	118	124	118	103	97.4
75	37.8	39.0	45.0	53.7	59.7	62.5	60.1	48.2	36.3	32.8	36.8	50.3	70.0	88.0	97.1	93.7	83.0	68.8	67.4
80	14.4	14.5	15.6	18.3	22.6	25.6	25.1	21.6	18.8	15.5	18.2	26.4	31.1	39.1	40.7	40.2	38.9	37.6	39.3
85	0.33	0.31	0.31	0.31	0.27	0.27	0.23	0.24	0.24	0.40	0.55	0.47	0.44	1.41	3.02	2.68	1.87	1.91	2.37
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

Table 5: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528
5	5600	5575	5565	5577	5595	5617	5623	5616	5601	5576	5562	5564	5575	5576	5567	5560	5556	5545	5544
10	5673	5677	5728	5752	5725	5701	5733	5785	5750	5716	5744	5785	5797	5756	5753	5770	5766	5752	5744
15	5754	5829	5841	5829	5855	5835	5885	5959	5892	5835	5904	5968	5889	5844	5796	5752	5767	5769	5747
20	5743	5794	5803	5792	5904	5920	5951	5971	5976	5979	5990	5936	5887	5899	5873	5848	5834	5825	5821
25	5579	5554	5565	5663	5696	5772	5871	5948	5972	5942	5922	5860	5751	5693	5669	5606	5592	5620	5612
30	5181	5229	5348	5407	5487	5628	5683	5680	5693	5715	5687	5644	5595	5495	5434	5355	5261	5239	5220
35	4857	4876	5019	5096	5220	5292	5331	5349	5419	5404	5379	5332	5254	5177	5049	4961	4889	4862	4865
40	4408	4472	4561	4627	4698	4764	4878	4958	4927	4926	4922	4849	4755	4683	4594	4553	4456	4424	4447
45	3842	3941	4031	4116	4135	4174	4251	4336	4389	4362	4275	4245	4202	4146	4087	4009	3906	3882	3933
50	3067	3164	3288	3403	3509	3566	3627	3645	3684	3675	3634	3574	3526	3442	3299	3165	3071	3076	3131
55	2128	2134	2149	2186	2376	2673	2994	3001	2999	3013	2897	2567	2373	2218	2171	2158	2145	2147	2159
60	1028	1072	1178	1420	1623	1840	1892	2024	2061	2005	1894	1738	1541	1286	1139	1019	947	973	1028
65	223	280	372	436	529	645	789	947	979	839	699	601	552	388	246	209	206	206	215
70	107	125	142	144	139	133	116	125	98.7	111	122	137	144	151	155	145	129	122	133
75	72.7	89.1	110	120	121	117	91.2	76.0	70.1	77.6	99.2	122	132	135	127	112	98.1	93.1	97.8
80	42.3	46.5	56.5	66.5	67.4	68.9	61.5	56.8	53.2	63.1	73.1	84.4	96.7	95.1	88.3	80.7	77.2	77.6	78.8
85	3.29	4.28	4.33	6.78	6.80	8.83	12.0	15.9	20.5	27.6	36.5	44.7	52.8	54.9	55.2	54.0	53.9	55.8	57.1
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

Table 6: Luminous Intensity Data

Table--3

UNIT: cd

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528
5	5537	5558	5582	5593	5594	5571	5550	5537	5529	5526	5522	5506	5495	5491	5499	5520	5531	5519	5501
10	5777	5766	5716	5700	5687	5648	5641	5717	5744	5682	5658	5666	5655	5613	5577	5582	5601	5568	5567
15	5756	5711	5795	5846	5892	5818	5762	5820	5862	5783	5754	5763	5748	5754	5709	5679	5698	5666	5733
20	5801	5810	5870	5878	5876	5903	5905	5939	5919	5866	5899	5797	5783	5766	5780	5722	5730	5707	5795
25	5610	5654	5688	5720	5807	5890	5951	5975	5928	5837	5740	5744	5612	5595	5596	5530	5557	5554	5595
30	5306	5417	5497	5593	5647	5701	5746	5717	5748	5744	5599	5507	5463	5281	5250	5194	5176	5228	5279
35	4944	5046	5129	5216	5315	5385	5429	5406	5388	5378	5363	5239	5139	5041	4870	4800	4791	4832	4871
40	4520	4602	4687	4764	4844	4933	4938	4971	5003	4931	4848	4762	4664	4579	4472	4443	4417	4425	4466
45	4014	4090	4158	4192	4210	4312	4378	4436	4368	4326	4232	4184	4170	4102	3990	3910	3869	3889	3955
50	3216	3332	3439	3537	3608	3675	3686	3712	3707	3660	3608	3564	3475	3340	3225	3121	3094	3124	3211
55	2176	2183	2271	2465	2698	2983	3027	3035	3062	2987	2727	2447	2230	2175	2159	2137	2123	2122	2138
60	1114	1233	1389	1618	1832	1909	2114	2172	2031	1913	1847	1672	1464	1314	1195	1125	1096	1108	1170
65	253	381	530	610	641	844	981	1047	1079	915	725	648	567	492	447	405	389	406	436
70	152	160	151	147	134	204	244	158	235	234	151	140	147	152	141	122	114	119	133
75	113	131	137	133	123	99.2	79.1	71.6	78.8	97.5	119	127	127	118	97.9	80.9	75.0	78.2	93.7
80	83.0	91.4	98.9	97.6	87.6	76.3	65.8	56.9	64.6	71.1	79.7	87.6	85.0	72.6	61.5	55.5	52.4	50.6	54.9
85	58.1	58.8	58.1	54.4	46.3	36.9	30.4	25.6	23.1	21.7	19.2	17.9	16.4	12.7	10.8	8.65	7.28	6.32	7.01
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

Table 7: Luminous Intensity Data

Table--4

UNIT: cd

C (DEG) y (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528	5528				
5	5484	5481	5501	5528	5539	5533	5521	5519	5536	5564	5594	5594	5590	5583	5597				
10	5631	5654	5649	5693	5720	5706	5693	5666	5629	5618	5622	5645	5708	5742	5742				
15	5774	5766	5766	5734	5734	5819	5784	5715	5805	5826	5753	5721	5683	5721	5750				
20	5782	5753	5791	5839	5824	5879	5869	5842	5834	5766	5798	5777	5724	5716	5756				
25	5583	5618	5700	5758	5782	5847	5862	5821	5755	5707	5606	5588	5555	5495	5535				
30	5306	5395	5489	5535	5597	5638	5638	5626	5627	5543	5453	5370	5316	5250	5183				
35	5015	5129	5193	5289	5303	5305	5342	5333	5300	5236	5093	5017	4918	4818	4766				
40	4566	4601	4685	4758	4833	4919	4955	4866	4811	4687	4568	4465	4331	4220	4109				
45	4042	4090	4138	4154	4252	4336	4338	4208	4050	3870	3682	3568	3431	3250	3165				
50	3317	3418	3509	3572	3615	3592	3516	3282	3132	2830	2596	2409	2265	2150	2062				
55	2158	2211	2418	2671	2904	2715	2593	2271	2055	1737	1476	1406	1410	1401	1387				
60	1296	1443	1646	1767	1631	1588	1403	1216	1201	1115	929	791	702	625	581				
65	454	530	611	607	588	608	625	528	448	396	378	289	254	201	137				
70	132	120	116	99.7	89.7	83.4	58.3	80.4	77.0	84.3	87.6	89.1	90.7	83.1	71.5				
75	104	106	93.7	75.9	52.7	39.4	34.0	40.3	52.5	65.8	68.2	64.3	56.9	46.7	39.5				
80	58.9	60.6	54.8	40.9	32.1	24.2	19.1	23.1	24.3	28.6	30.9	27.9	22.7	19.8	17.5				
85	6.80	7.47	5.69	4.24	2.72	2.13	1.59	1.45	1.37	0.55	0.41	0.36	0.35	0.36	0.36				
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				

Table 8: 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 9: 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 $k=2$.

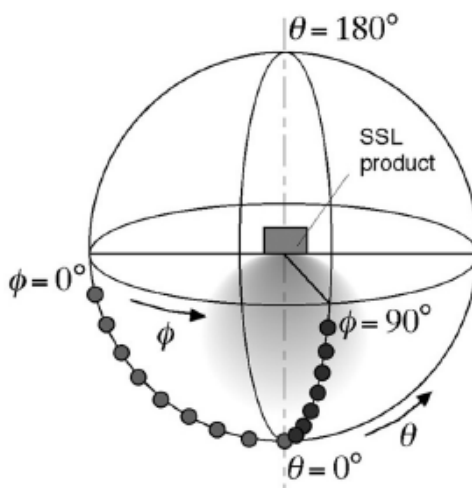
Color Characteristics Measurements

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 ***

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