



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT100406-VM

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ17080006b

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:

April Zou

Engineer: April Zou

Jul. 25, 2017

Approved by



Jim Zhang

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: MT100406-VM

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
114.1	13619.0	119.37	0.9616
CCT (K)	CRI	Stabilization Time (Light & Power)	
3925	72.2	60	
IES Classification		Longitudinal Classification	
Type VS		Very Short	

Table 1: Executive Data Summary

Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: MT LED Area Light
Model	: MT100406-VM
Electrical Ratings	: 347~480V, 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 24.4°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)	347.0	480.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.358	0.282
Power Factor	0.9616	0.8943
Test Power (W)	119.37	121.04
THD A%	9.52	13.75
Luminous Efficacy (lm/W)	114.1	112.6
Total Luminous Flux (lm)	13619.0	13630.0
Color Rendering Index (CRI)	72.2	
R9	-31	
Correlated Color Temperature (CCT) (K)	3925	
Chromaticity (Chroma x, Chroma y)	(0.3844, 0.3808)	
Chromaticity (Chroma u, Chroma v)	(0.2261, 0.3359)	
Chromaticity (Chroma u', Chroma v')	(0.2261, 0.5039)	
Duv	0.0007	
Average Beam Angle (°)	103.5	
Center Beam Candle Power (cd)	5459	
Spacing Criteria	1.37 (0°-180°)/ 1.34 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	95.25%	
Zonal Lumens in the 60°-90°Zone	4.75%	
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	68
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

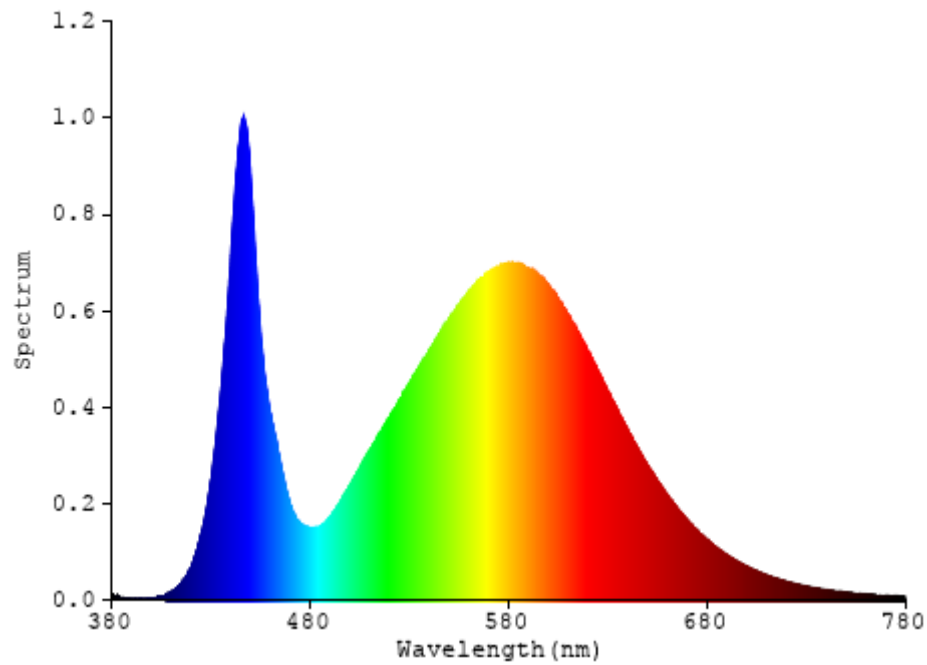


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	2373.9	17.4
FM - Front-Medium (30-60)	3921.6	28.8
FH - Front-High (60-80)	257.1	1.9
FVH - Front-Very High (80-90)	3.4	0.0
Total Forward Light	6556.0	48.1

BL - Back-Low (0-30)	2395.5	17.6
BM - Back-Medium (30-60)	4281.5	31.4
BH - Back-High (60-80)	372.4	2.7
BVH - Back-Very High (80-90)	13.2	0.1
Total Back Light	7062.6	51.8

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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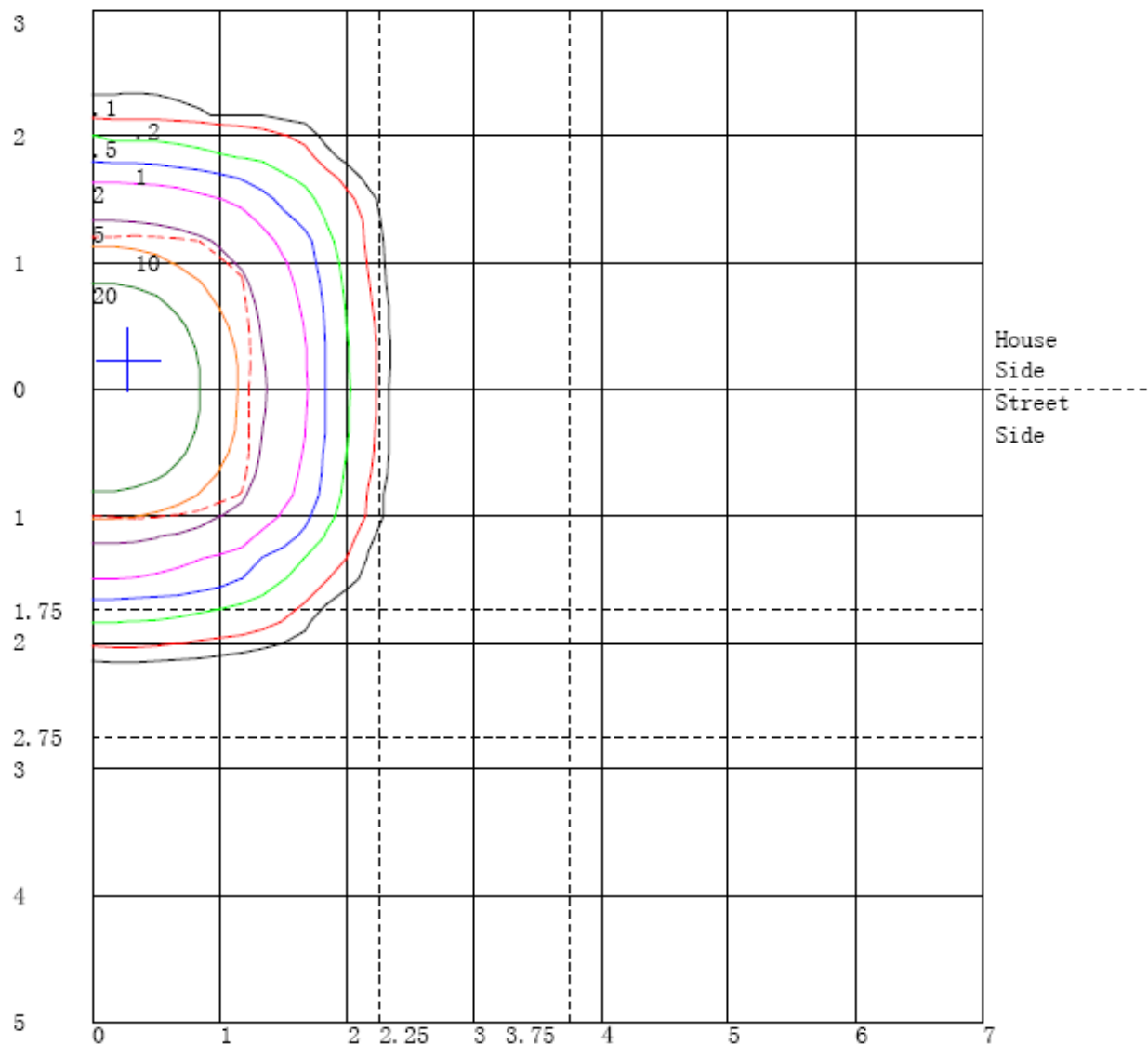
Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	7062.6	0	7062.6
Street Side	6556.0	0	6556.0

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

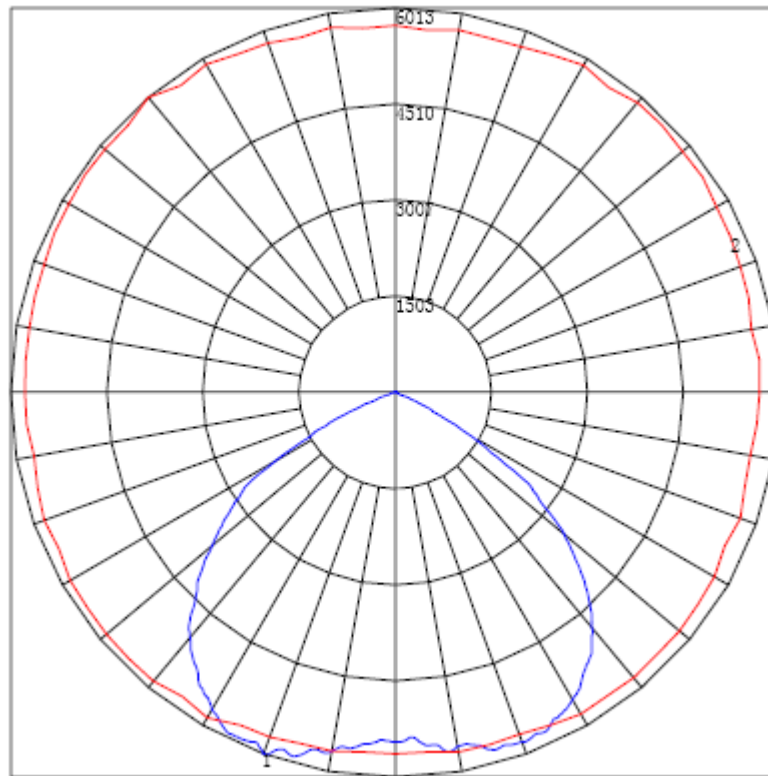


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 6013.12 Located At Horizontal Angle = 130, Vertical Angle = 20

1 - Vertical Plane Through Horizontal Angles (130 - 310) (Through Max. Cd.)

2 - Horizontal Cone Through Vertical Angle (20) (Through Max. Cd.)

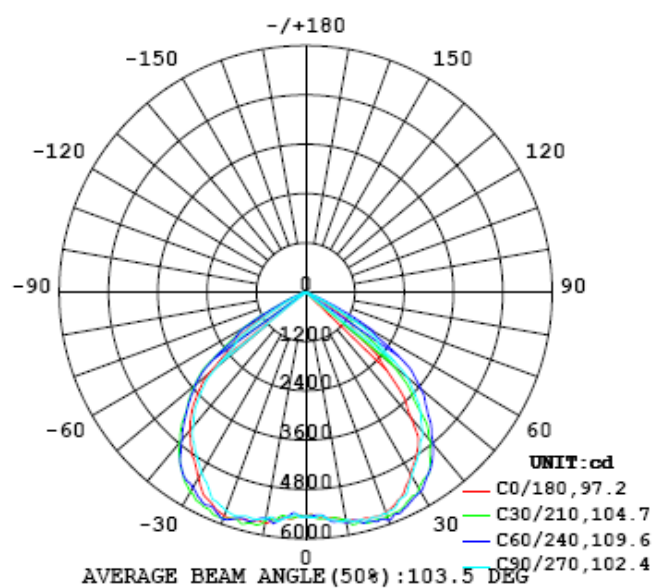


Chart 4: Polar Candela Distribution

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	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459
5	5537	5547	5556	5555	5548	5542	5525	5516	5508	5506	5510	5506	5495	5472	5453	5459	5478	5499	5508
10	5683	5702	5706	5685	5657	5643	5637	5667	5669	5657	5656	5682	5695	5692	5703	5660	5601	5612	5633
15	5687	5709	5684	5665	5756	5784	5820	5809	5778	5795	5851	5814	5777	5720	5756	5770	5755	5702	5755
20	5704	5727	5664	5731	5751	5793	5806	5871	5864	5901	5910	5820	5900	5821	5753	5734	5751	5687	5733
25	5504	5517	5507	5530	5584	5632	5719	5815	5810	5879	5870	5822	5775	5711	5621	5559	5539	5515	5524
30	5112	5145	5240	5331	5397	5450	5511	5640	5610	5690	5647	5601	5596	5512	5434	5334	5294	5194	5160
35	4731	4734	4813	4867	4994	5101	5257	5342	5306	5353	5304	5327	5279	5210	5129	5023	4895	4856	4798
40	4002	4041	4184	4355	4534	4618	4711	4817	4897	4969	4927	4893	4823	4738	4642	4609	4508	4486	4415
45	3003	3059	3210	3377	3587	3671	3752	4069	4227	4320	4363	4357	4213	4140	4144	4122	4027	3986	3918
50	1901	1953	2071	2281	2422	2504	2797	3057	3273	3501	3628	3656	3660	3597	3501	3406	3323	3262	3237
55	1365	1364	1381	1403	1405	1408	1542	2034	2193	2553	2724	3002	2868	2586	2351	2227	2177	2159	2158
60	578	614	627	678	771	907	1081	1210	1230	1471	1652	1701	1877	1771	1634	1502	1340	1231	1200
65	118	123	130	146	230	338	395	453	583	631	594	684	668	616	526	480	447	408	398
70	60.4	64.8	75.4	80.8	81.5	79.2	78.3	72.9	68.1	64.5	69.2	80.6	91.1	108	117	128	128	113	106
75	35.4	36.5	41.9	52.1	58.7	61.4	60.8	51.6	36.6	31.3	36.0	49.4	70.0	91.0	99.8	97.4	85.6	71.0	68.3
80	12.9	13.3	15.2	17.6	23.7	28.3	26.7	22.4	20.9	16.8	20.1	27.3	36.4	51.4	53.0	51.5	48.5	46.5	47.2
85	0.17	0.18	0.22	0.23	0.22	0.31	0.55	0.66	0.76	0.85	1.46	2.43	3.14	5.45	5.50	4.96	5.77	5.74	6.46
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	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459
5	5498	5476	5451	5460	5477	5500	5502	5513	5532	5548	5554	5549	5536	5530	5519	5511	5505	5500	5507
10	5600	5598	5664	5715	5712	5683	5668	5699	5687	5669	5688	5702	5688	5713	5736	5730	5719	5703	5728
15	5712	5775	5804	5734	5787	5780	5844	5882	5811	5796	5885	5902	5868	5795	5719	5739	5743	5712	5726
20	5711	5788	5741	5808	5833	5913	5854	6013	5913	5923	5926	5886	5887	5853	5842	5806	5806	5797	5785
25	5547	5557	5601	5666	5690	5867	5854	5934	5938	5942	5900	5826	5698	5686	5624	5577	5588	5588	5584
30	5208	5247	5343	5446	5569	5637	5684	5720	5733	5709	5668	5632	5572	5472	5439	5316	5228	5214	5195
35	4874	4917	5086	5174	5213	5329	5373	5382	5424	5415	5408	5337	5249	5150	5004	4949	4850	4837	4826
40	4476	4532	4592	4652	4759	4842	4955	4994	4992	4981	4942	4873	4784	4671	4579	4537	4400	4386	4401
45	3956	4055	4124	4174	4209	4245	4356	4389	4441	4438	4340	4286	4238	4167	4086	3980	3885	3859	3898
50	3265	3328	3417	3528	3624	3668	3706	3740	3791	3749	3690	3622	3572	3466	3326	3174	3078	3071	3096
55	2162	2186	2240	2379	2617	2929	3087	3098	3055	3082	3028	2649	2468	2245	2171	2143	2125	2126	2125
60	1239	1360	1537	1650	1825	1931	1952	2232	2311	2142	1920	1829	1625	1383	1190	1075	976	984	1009
65	411	446	488	550	628	792	953	1122	1064	1017	809	632	574	492	294	207	196	193	199
70	114	132	145	138	130	125	172	168	108	177	117	127	132	140	145	135	117	111	121
75	72.4	88.9	111	119	117	108	83.6	66.8	59.6	66.5	88.9	108	120	123	116	98.8	84.3	80.0	84.0
80	50.0	54.4	65.0	74.5	74.2	66.1	58.2	49.7	43.8	52.3	61.4	71.4	83.3	81.6	74.1	68.1	63.6	63.1	63.4
85	7.47	5.82	7.59	10.0	12.2	13.5	14.4	15.9	17.2	21.6	26.3	34.1	38.8	41.5	41.7	40.4	39.1	40.7	41.3
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	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459
5	5532	5533	5520	5499	5485	5487	5507	5528	5530	5524	5504	5477	5458	5455	5469	5495	5502	5486	5471
10	5720	5671	5676	5687	5641	5610	5657	5715	5659	5586	5587	5620	5625	5592	5562	5580	5589	5566	5563
15	5671	5717	5764	5856	5842	5737	5748	5809	5838	5753	5728	5724	5691	5702	5664	5625	5642	5598	5678
20	5744	5795	5850	5803	5876	5887	5886	5883	5898	5815	5876	5737	5745	5692	5701	5639	5656	5639	5715
25	5569	5648	5630	5701	5781	5857	5909	5915	5838	5753	5719	5678	5563	5541	5526	5444	5462	5468	5506
30	5306	5388	5473	5550	5625	5651	5662	5647	5686	5620	5492	5435	5371	5207	5167	5089	5073	5136	5173
35	4941	4991	5091	5175	5274	5309	5367	5320	5311	5272	5261	5128	5025	4918	4756	4719	4696	4736	4767
40	4513	4565	4644	4699	4776	4848	4852	4885	4900	4812	4683	4637	4535	4469	4344	4298	4264	4280	4327
45	3985	4043	4101	4120	4113	4233	4283	4317	4257	4172	4100	4058	4036	3960	3838	3750	3701	3730	3786
50	3158	3275	3383	3463	3526	3587	3586	3599	3589	3541	3507	3409	3282	3120	2950	2838	2813	2836	2933
55	2140	2136	2188	2389	2579	2874	2938	2952	2931	2781	2512	2191	2102	2088	2076	2060	2043	2046	2058
60	1078	1167	1313	1516	1757	1848	2039	1992	1889	1843	1682	1441	1229	1072	1021	968	942	956	998
65	218	318	473	574	598	746	868	941	887	770	621	526	429	359	260	208	191	198	251
70	138	147	138	133	125	109	160	90.0	180	118	124	131	136	139	126	108	101	107	122
75	100	116	123	119	108	85.7	66.2	60.8	68.1	87.1	107	115	115	107	89.9	75.0	68.9	70.7	86.3
80	67.0	75.1	82.9	81.2	71.4	61.6	53.1	44.6	50.8	57.2	60.8	63.4	59.5	50.9	42.8	39.3	37.3	35.5	37.9
85	42.0	41.9	41.7	38.6	29.0	23.5	18.4	12.3	10.7	7.67	5.91	4.81	3.76	2.97	2.53	1.98	1.32	0.21	0.16
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	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459	5459				
5	5459	5466	5490	5522	5541	5540	5524	5498	5479	5472	5495	5528	5564	5575	5560				
10	5625	5625	5598	5618	5627	5628	5666	5677	5625	5582	5623	5634	5621	5683	5711				
15	5689	5726	5697	5722	5710	5779	5743	5717	5722	5763	5760	5680	5658	5628	5693				
20	5709	5687	5743	5806	5787	5814	5800	5814	5784	5768	5696	5748	5665	5648	5687				
25	5510	5556	5590	5684	5668	5746	5813	5758	5706	5671	5579	5505	5517	5456	5452				
30	5208	5306	5393	5434	5518	5548	5567	5539	5584	5478	5407	5346	5261	5219	5113				
35	4846	4968	5048	5186	5232	5216	5226	5265	5206	5155	5019	4952	4860	4787	4705				
40	4435	4488	4554	4640	4727	4800	4853	4756	4707	4583	4488	4419	4230	4142	4037				
45	3879	3986	4010	4037	4106	4184	4209	4112	3905	3670	3593	3454	3325	3171	3047				
50	3086	3240	3344	3446	3472	3458	3231	3178	2946	2649	2445	2353	2190	2038	1955				
55	2079	2104	2175	2438	2567	2609	2276	2095	1839	1572	1376	1374	1384	1378	1368				
60	1050	1210	1394	1505	1464	1401	1136	1180	1166	1036	866	739	659	595	557				
65	337	382	488	448	453	494	531	461	389	383	329	265	224	178	125				
70	123	116	104	90.1	69.5	56.0	47.4	58.5	69.9	77.4	82.4	84.9	85.7	79.1	68.2				
75	97.6	95.8	84.5	69.4	48.2	35.0	29.8	35.1	45.4	58.9	60.7	57.7	51.7	44.1	36.9				
80	38.4	43.2	40.1	32.0	25.5	17.6	14.0	18.1	19.0	22.4	24.8	22.5	18.5	16.5	15.8				
85	0.17	0.27	0.61	1.10	0.57	0.49	0.32	0.26	0.19	0.15	0.15	0.16	0.16	0.17	0.17				
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 expended uncertainty is 2.3% with a coverage factor k=2.

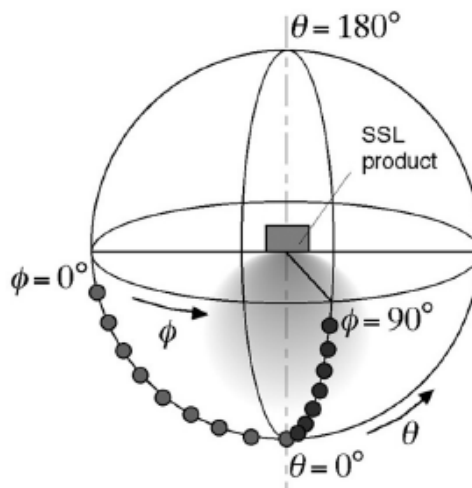
Color Characteristics Measurements

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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