

LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT150406-III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ17080006f

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

Test specifications:

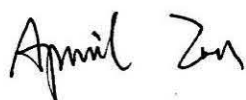
Date of Receipt : Jul. 24, 2017

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: MT150406-III

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
101.8	16279.0	159.99	0.9798
CCT (K)	CRI	Stabilization Time (Light & Power)	
4041	73.1	60	
IES Classification		Longitudinal Classification	
Type III		Short	

Table 1: Executive Data Summary

Sample Photo

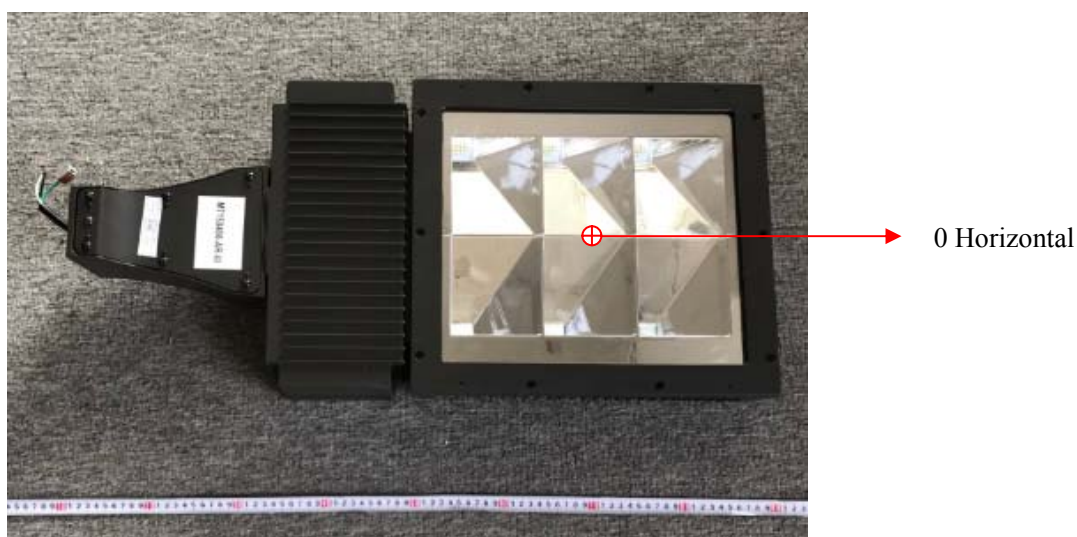


Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: MT LED Area Light
Model	: MT150406-III
Electrical Ratings	: 347~480V, 50/60Hz, 150W
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 25.1°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)	0.471	0.355
Power Factor	0.9798	0.9447
Test Power (W)	159.99	161.00
THD A%	7.60	10.64
Luminous Efficacy (lm/W)	101.8	100.8
Total Luminous Flux (lm)	16279.0	16224.0
Color Rendering Index (CRI)	73.1	
R9	-27	
Correlated Color Temperature (CCT) (K)	4041	
Chromaticity (Chroma x, Chroma y)	(0.3776, 0.3715)	
Chromaticity (Chroma u, Chroma v)	(0.2253, 0.3325)	
Chromaticity (Chroma u', Chroma v')	(0.2253, 0.4988)	
Duv	-0.0016	
Average Beam Angle (°)	98.0	
Center Beam Candle Power (cd)	4645	
Spacing Criteria	0.57 (0°-180°)/ 1.59 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	70.80%	
Zonal Lumens in the 60°-90°Zone	29.20%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Rendering Indices	Color
R1	70
R2	81
R3	88
R4	71
R5	70
R6	72
R7	81
R8	53
R9	-27
R10	54
R11	65
R12	48
R13	72
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

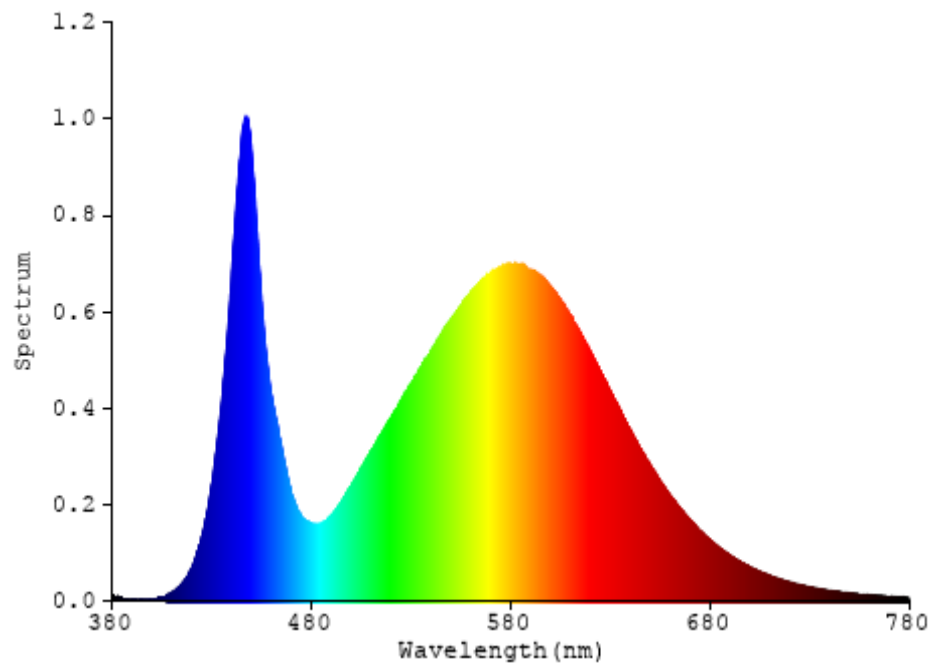


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	2286.3	14.0
FM - Front-Medium (30-60)	6736.5	41.4
FH - Front-High (60-80)	4100.5	25.2
FVH - Front-Very High (80-90)	69.0	0.4
Total Forward Light	13192.3	81.0

BL - Back-Low (0-30)	1124.2	6.9
BM - Back-Medium (30-60)	1377.4	8.5
BH - Back-High (60-80)	567.2	3.5
BVH - Back-Very High (80-90)	17.4	0.1
Total Back Light	3086.2	19.0

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-G2
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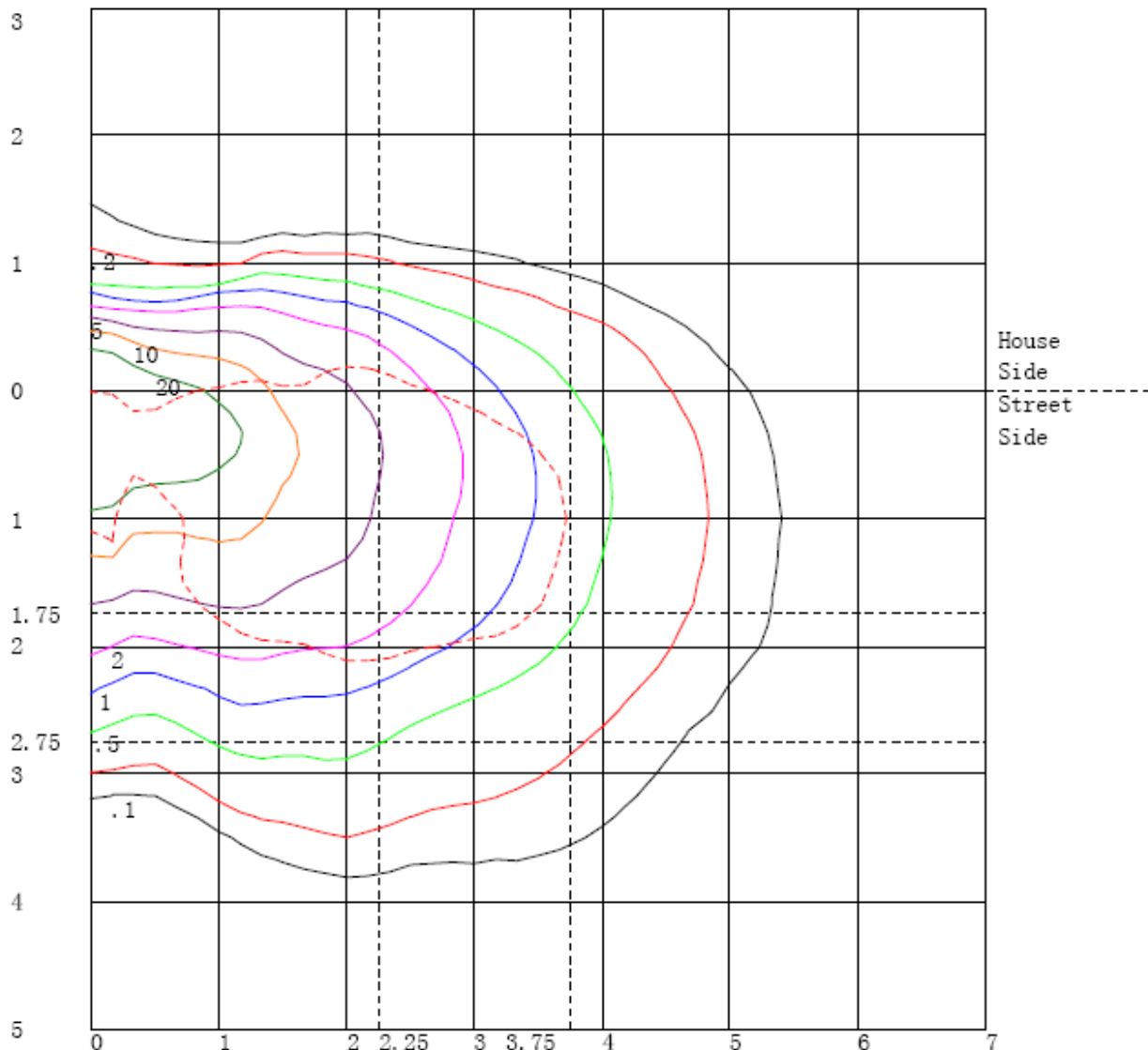
Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	3086.2	0	3086.2
Street Side	13192.3	0	13192.3

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

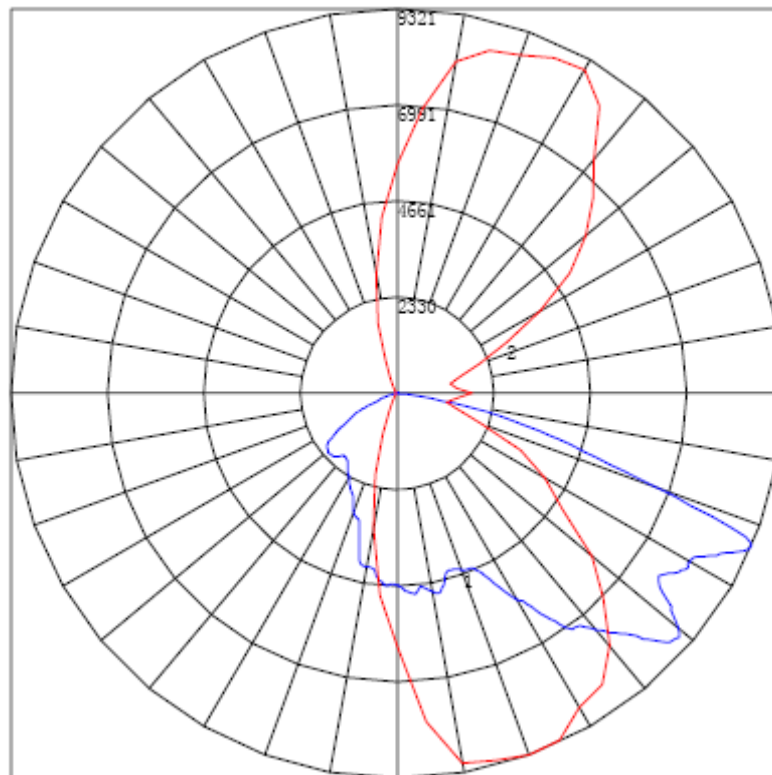


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 9321.09 Located At Horizontal Angle = 290, Vertical Angle = 66.5

1 - Vertical Plane Through Horizontal Angles (290 - 110) (Through Max. Cd.)

2 - Horizontal Cone Through Vertical Angle (66.5) (Through Max. Cd.)

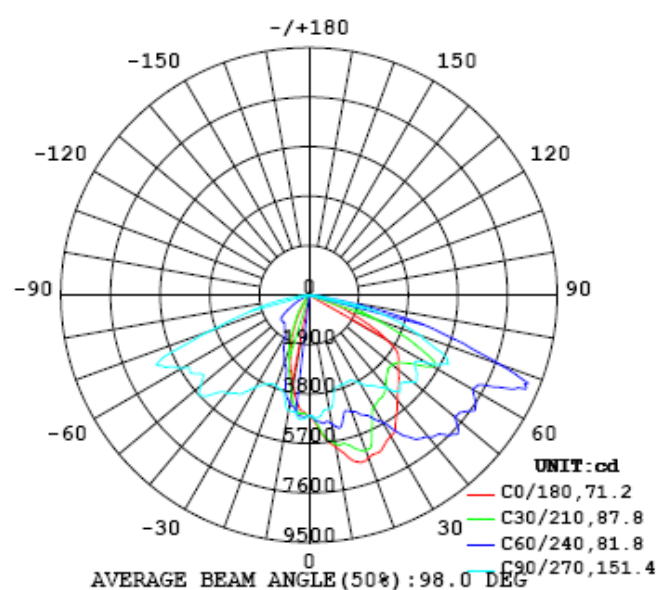


Chart 4: Polar Candela Distribution

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	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645
5	5305	5289	5273	5256	5242	5231	5239	5235	5188	5123	5046	4971	4888	4821	4772	4730	4698	4684	4684
10	5927	5922	5941	6015	6005	5900	5793	5680	5512	5355	5245	5142	5020	4886	4786	4663	4513	4437	4434
15	6597	6635	6651	6615	6396	6158	5965	5890	5759	5657	5538	5268	4996	4701	4406	4158	3968	3754	3714
20	6646	6652	6858	6703	6418	6345	6364	6213	5732	5228	4957	4862	4762	4651	4478	4256	4027	3778	3672
25	6568	6610	6643	6339	6315	6250	5680	5226	5297	5379	5372	5297	5095	4857	4710	4443	4159	3897	3647
30	6260	6362	6380	6093	6079	5430	4972	5089	5252	5426	5636	5741	5647	5447	5204	5039	4698	4321	3924
35	5809	6232	5816	5732	5296	4715	4820	4974	5217	5560	6003	6469	6643	6592	6197	5756	5291	4727	4230
40	5275	5926	5189	5153	4214	4335	4602	4877	5250	5812	6438	6806	7117	7282	6974	6403	5957	5316	4707
45	4846	5620	4744	4200	3843	3983	4244	4688	5252	5717	6341	7005	7635	8116	8153	7398	6508	5638	4894
50	4477	5094	4384	3494	3660	3907	4153	4491	5123	5800	6780	7116	7283	7753	8183	7783	6958	6042	5188
55	4181	4428	3895	3459	3867	4213	4555	5178	5758	6213	6844	7328	7731	8030	8118	7790	6899	5892	5013
60	3427	3266	2714	3030	3717	4528	5471	6118	6691	7399	7606	7444	7258	7415	7616	7709	6984	6129	5184
65	2146	1797	1588	1842	2482	3391	4476	5791	6779	6869	7262	8049	8550	8885	9006	8964	8431	7183	5854
70	1027	847	847	1158	1689	2327	2721	3163	4147	5615	6832	7417	7745	7430	6905	6983	6754	5861	4557
75	48.8	44.4	81.3	266	735	1171	1764	2125	2292	2563	3057	3971	4797	5019	4956	4881	4612	3918	3008
80	6.42	6.73	8.28	23.4	97.7	122	177	354	581	773	1110	1265	1369	1532	1802	1611	1452	1277	957
85	0.20	0.20	0.23	0.24	0.25	0.33	1.36	1.21	5.22	8.12	45.0	60.2	82.2	70.4	36.0	14.8	81.7	53.9	47.5
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	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645
5	4675	4642	4601	4568	4549	4535	4535	4543	4559	4562	4535	4468	4400	4359	4336	4320	4317	4343	4346
10	4416	4318	4260	4266	4245	4125	3993	3916	3865	3840	3798	3727	3670	3668	3597	3523	3513	3520	3521
15	3655	3573	3620	3516	3485	3456	3331	3287	3161	3017	2924	2846	2863	2877	2853	2809	2746	2752	2773
20	3489	3466	3206	3073	2747	2566	2368	2247	2237	2262	2247	2177	2082	2021	2099	2105	2019	2020	2092
25	3409	3235	3006	2625	2330	2139	1970	1780	1638	1517	1458	1473	1438	1325	1292	1314	1278	1277	1366
30	3618	3205	2725	2328	2011	1753	1537	1377	1217	1056	930	808	760	684	612	644	643	618	675
35	3871	3234	2582	2104	1762	1480	1236	1007	794	626	496	384	303	246	203	193	223	232	247
40	4078	3225	2554	1991	1618	1280	991	725	484	308	187	128	118	112	107	108	112	109	108
45	4219	3503	2702	2174	1661	1205	785	460	238	144	115	96.7	87.5	79.2	73.8	71.5	72.7	74.9	75.2
50	4560	3710	2829	2188	1613	1026	575	271	142	95.1	75.3	62.9	54.7	51.6	52.1	53.2	56.1	60.0	56.8
55	4325	3479	2717	2002	1322	774	347	156	83.4	64.1	52.4	44.1	40.1	39.5	42.0	43.9	50.2	54.6	51.6
60	4320	3099	2149	1386	845	449	229	110	65.5	52.2	43.3	38.7	35.3	34.2	36.2	41.7	47.5	53.4	50.2
65	4665	3135	1990	1039	488	239	113	66.9	50.8	47.4	43.4	39.4	34.1	31.2	31.2	34.2	42.4	44.4	38.8
70	3317	2095	1079	474	241	120	65.0	49.6	43.7	39.2	35.8	33.3	30.9	28.9	28.2	27.8	30.7	30.2	29.7
75	2164	1152	517	252	99.9	50.6	49.4	44.0	38.4	35.5	33.8	33.3	32.8	31.6	31.3	29.4	28.2	28.0	27.1
80	673	231	112	68.4	45.8	43.3	38.6	35.5	33.5	32.1	31.0	29.3	28.8	28.7	30.4	28.4	26.5	25.9	25.9
85	35.8	21.7	12.4	13.6	15.8	18.4	21.2	21.6	22.8	22.5	22.2	22.6	23.0	22.7	25.6	24.3	22.3	23.1	22.5
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	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645
5	4369	4407	4463	4517	4558	4569	4582	4593	4605	4628	4653	4668	4688	4722	4745	4751	4753	4766	4798
10	3585	3669	3715	3802	3854	3863	3876	3948	4021	4097	4226	4317	4354	4392	4427	4482	4501	4557	4633
15	2878	2945	2986	2910	2974	3036	3155	3304	3310	3334	3451	3508	3569	3652	3713	3767	3818	3944	4066
20	2162	2192	2118	2177	2257	2258	2233	2253	2391	2528	2753	2882	3168	3345	3534	3614	3716	3901	4151
25	1418	1339	1403	1476	1503	1543	1642	1748	1861	2024	2315	2542	2805	3183	3419	3642	3785	4031	4468
30	681	704	782	853	923	1012	1127	1298	1496	1653	1842	2197	2542	2887	3395	3804	4091	4450	4971
35	287	311	340	372	440	552	755	915	1093	1372	1619	1839	2312	2927	3603	4240	4646	5330	5846
40	109	125	130	130	179	269	391	570	907	1137	1453	1880	2301	2963	3709	4482	4902	5688	6354
45	78.7	84.5	84.9	93.4	104	129	175	373	592	989	1409	1934	2535	3291	4089	4909	5455	6219	7126
50	57.2	58.9	60.7	62.5	66.8	76.7	113	190	386	810	1401	2086	2773	3403	4221	4888	5400	6278	7501
55	49.6	47.9	48.4	45.0	47.1	52.4	64.2	94.4	215	487	1004	1542	2155	2928	3859	4643	5254	6078	7262
60	39.6	38.9	38.5	36.9	39.4	45.4	51.8	61.6	105	267	607	1135	1789	2616	3712	4839	5624	6564	7603
65	32.7	31.5	32.4	34.7	37.5	44.6	46.4	47.3	60.8	114	253	602	1245	2279	3566	5211	6385	7973	9155
70	29.1	28.6	29.2	31.0	34.4	36.5	39.8	41.8	45.0	53.5	105	257	524	1091	1988	3054	4037	5380	5962
75	26.6	27.1	28.7	31.6	33.6	33.7	35.6	38.5	42.2	45.2	48.3	93.9	181	328	795	1575	2185	2836	3272
80	26.2	26.7	28.3	29.5	31.1	33.2	33.4	34.3	35.4	41.1	42.1	36.1	50.8	83.6	236	613	948	1194	1297
85	22.3	23.4	25.7	27.0	24.8	23.8	23.0	22.0	19.5	18.6	15.7	11.7	9.92	8.07	6.19	4.81	3.53	0.98	0.79
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	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645	4645				
5	4838	4885	4938	4994	5040	5087	5130	5176	5224	5279	5328	5345	5345	5342	5328				
10	4749	4874	5043	5185	5270	5341	5423	5524	5678	5870	5965	5994	6020	6038	5993				
15	4330	4537	4735	5005	5254	5551	5788	5910	5982	6081	6182	6472	6616	6657	6668				
20	4384	4554	4677	4936	5065	5227	5466	5737	6146	6422	6446	6456	6705	6834	6802				
25	4606	4786	5104	5310	5457	5507	5513	5459	5477	5855	6364	6495	6451	6763	6748				
30	5313	5783	6050	6051	6065	5997	5801	5520	5312	5170	5431	6153	6189	6397	6628				
35	6464	6817	6936	6960	6824	6373	5850	5464	5155	4946	4837	5274	5838	5911	6449				
40	7103	7491	7698	7651	7315	6710	5984	5416	4963	4684	4454	4334	5158	5327	6060				
45	7902	8436	8354	7805	7370	6598	6012	5267	4744	4308	4069	3946	4226	4863	5648				
50	8250	8845	8679	8295	7754	7075	6203	5323	4598	4138	3918	3749	3593	4421	5034				
55	7749	7701	7618	7606	7672	7793	7268	6216	5409	4612	4247	3915	3516	3860	4410				
60	8185	8166	8128	7932	7673	7249	7234	7508	6874	5756	4609	3808	3132	2782	3225				
65	9109	9072	9025	8559	8248	8056	7380	6576	5643	5022	3705	2512	1806	1519	1760				
70	6340	6689	7302	7952	7753	6795	5530	4261	3429	2770	2242	1867	960	664	772				
75	3430	3557	3707	3390	2852	2570	2323	2077	1887	1499	1115	643	332	64.3	34.7				
80	1360	1396	1097	1006	860	569	432	334	232	186	112	69.5	22.4	7.07	7.08				
85	0.70	17.3	16.7	30.8	16.7	1.96	0.58	0.28	0.26	0.23	0.22	0.21	0.21	0.21	0.21				
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 $k=2$.

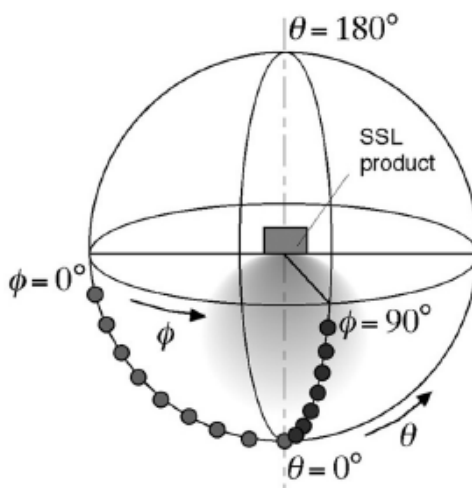
Color Characteristics Measurements

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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