

LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT100401-VN

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ170800061

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

Test specifications:

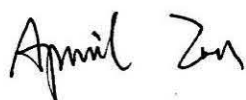
Date of Receipt : Jul. 24, 2017

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-VN

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
117.7	13813.0	117.33	0.9948
CCT (K)	CRI	Stabilization Time (Light & Power)	
3926	67.3	60	
IES Classification		Longitudinal Classification	
Type I		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	: MT100401-VN
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 24.7°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)	0.982	0.450
Power Factor	0.9948	0.9364
Test Power (W)	117.33	116.59
THD A%	6.97	11.11
Luminous Efficacy (lm/W)	117.7	118.4
Total Luminous Flux (lm)	13813.0	13810.0
Color Rendering Index (CRI)	67.3	
R9	-46	
Correlated Color Temperature (CCT) (K)	3926	
Chromaticity (Chroma x, Chroma y)	(0.3871, 0.3906)	
Chromaticity (Chroma u, Chroma v)	(0.2240, 0.3390)	
Chromaticity (Chroma u', Chroma v')	(0.2240, 0.5085)	
Duv	0.0044	
Average Beam Angle (°)	70.2	
Center Beam Candle Power (cd)	10360	
Spacing Criteria	1.05 (0°-180°)/ 1.01 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	97.89%	
Zonal Lumens in the 60°-90°Zone	2.11%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Rendering Indices	Color
R1	63
R2	74
R3	83
R4	66
R5	63
R6	63
R7	79
R8	47
R9	-46
R10	39
R11	59
R12	33
R13	64
R14	90

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

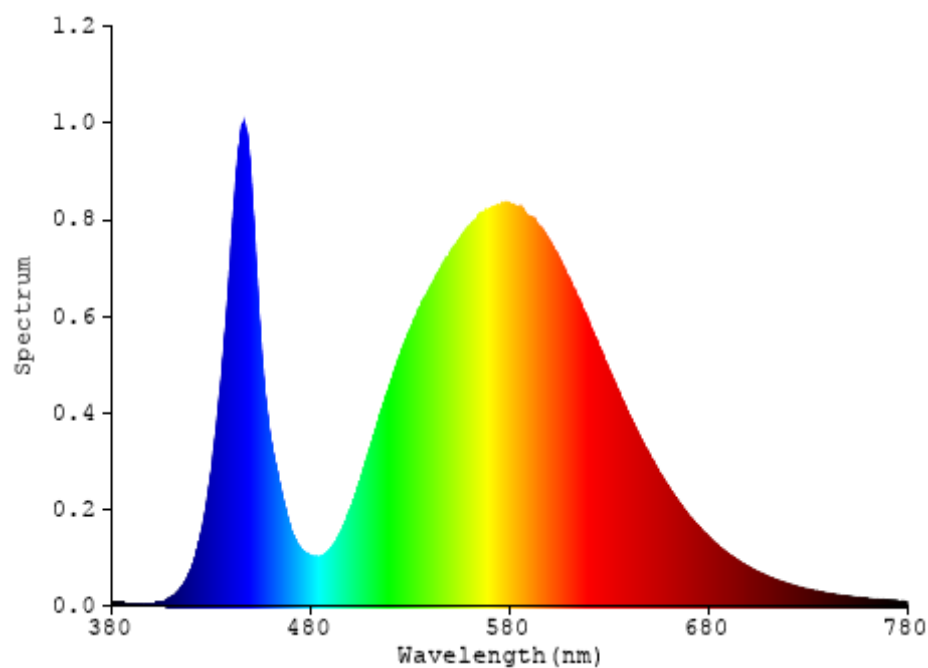


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	3353.7	24.3
FM - Front-Medium (30-60)	3104.0	22.5
FH - Front-High (60-80)	101.1	0.7
FVH - Front-Very High (80-90)	2.2	0.0
Total Forward Light	6561.0	47.5

BL - Back-Low (0-30)	3349.4	24.2
BM - Back-Medium (30-60)	3714.0	26.9
BH - Back-High (60-80)	176.1	1.3
BVH - Back-Very High (80-90)	11.9	0.1
Total Back Light	7251.4	52.5

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

BUG (Back, Up, Glare) Rating	B4-U0-G1
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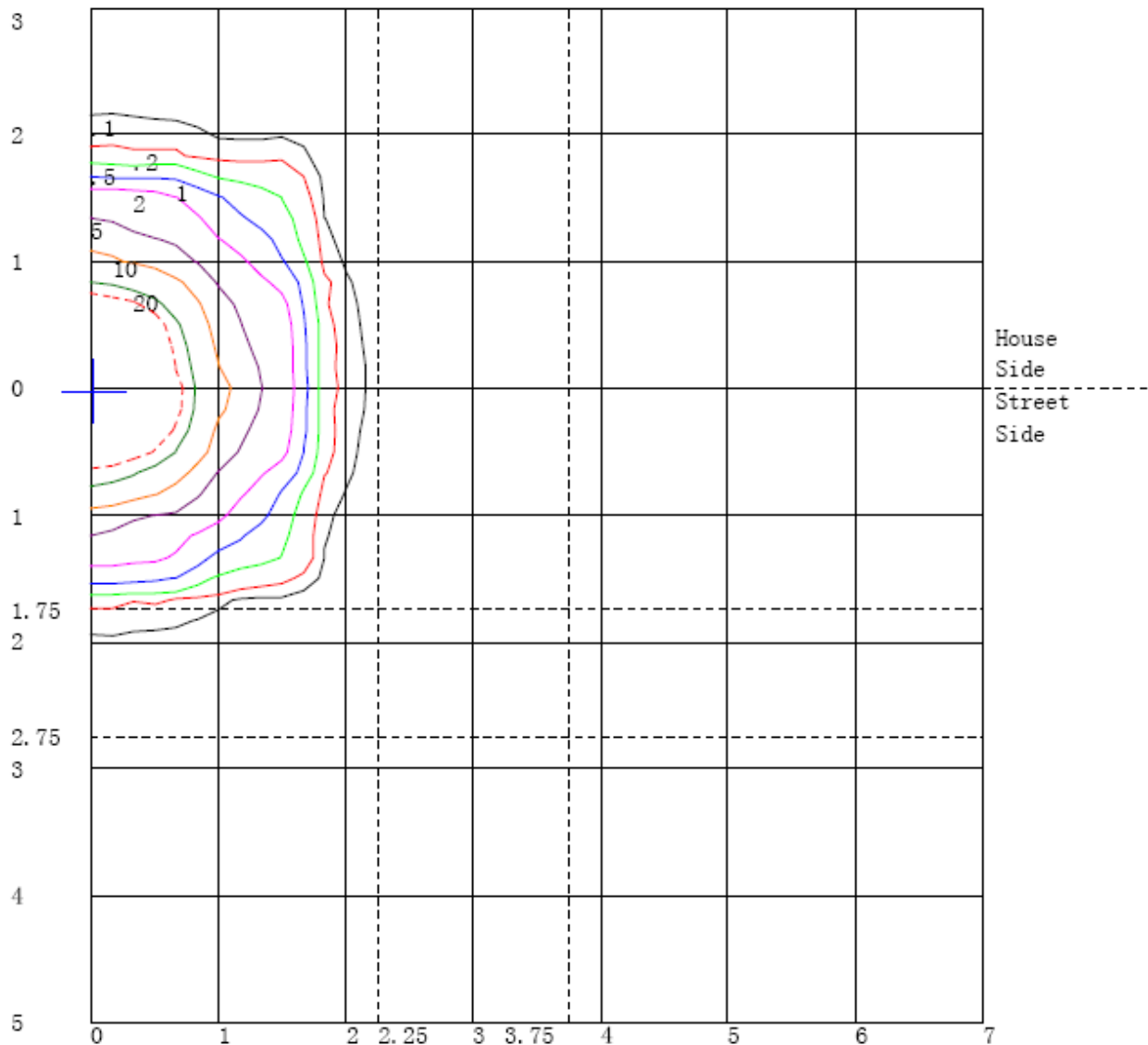
Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	7251.4	0	7251.4
Street Side	6561.0	0	6561.0

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

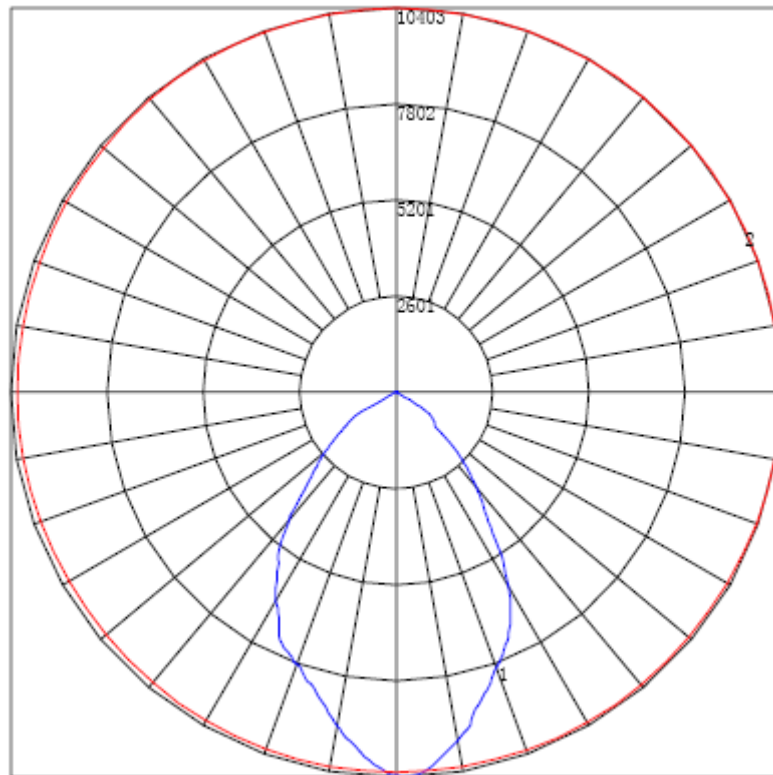


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 10402.64 Located At Horizontal Angle = 25, Vertical Angle = 2

1 - Vertical Plane Through Horizontal Angles (25 - 205) (Through Max. Cd.)

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

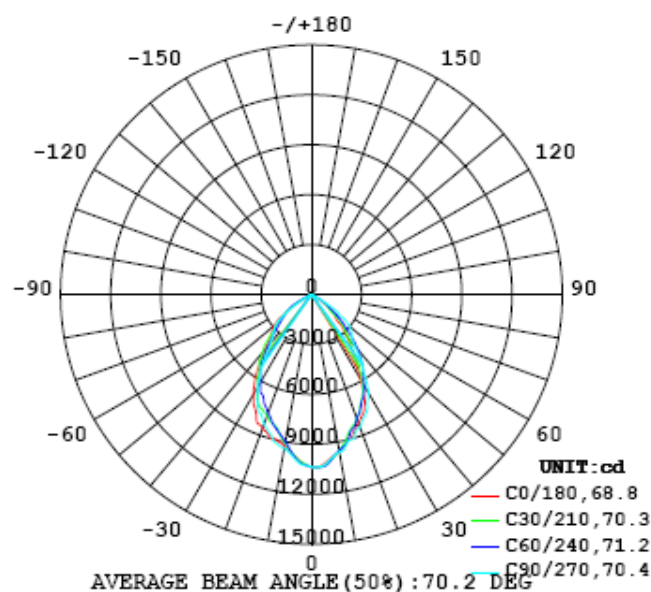


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: $\times 10\text{cd}$

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036
5	1010	1012	1013	1016	1018	1021	1022	1023	1025	1028	1030	1030	1029	1029	1026	1024	1023	1021	1020
10	957	959	959	960	958	956	953	947	944	944	946	950	954	958	962	966	967	964	962
15	894	894	892	886	878	869	860	860	869	879	878	877	878	882	884	887	898	901	902
20	823	824	817	810	799	793	791	795	787	786	791	792	794	798	814	828	841	848	848
25	749	748	738	730	728	719	706	704	707	706	716	711	710	728	744	757	768	780	779
30	595	593	587	588	597	608	613	613	615	609	615	624	633	633	647	658	675	683	681
35	436	435	432	432	430	444	468	488	503	514	516	528	540	547	545	540	532	535	536
40	341	336	326	316	326	338	342	360	369	404	427	430	430	420	411	417	406	402	404
45	207	203	202	223	231	242	266	270	281	287	292	317	307	302	304	296	320	337	340
50	169	166	155	147	140	137	144	204	199	191	185	176	209	227	217	238	265	288	296
55	106	107	107	109	115	118	104	94.7	100	110	113	115	126	147	173	177	185	193	194
60	15.6	16.0	15.0	15.2	26.1	40.2	47.7	50.4	59.3	69.4	68.9	81.0	66.5	79.2	98.5	74.5	65.8	55.0	52.2
65	6.58	7.30	7.23	7.71	9.13	8.62	9.53	9.54	9.20	28.4	41.6	17.9	13.1	12.7	13.6	13.2	12.7	13.1	13.3
70	3.50	3.97	4.24	4.28	4.29	5.00	6.76	6.72	5.39	5.20	6.31	8.37	10.2	9.08	6.69	7.34	7.50	7.20	7.05
75	1.72	1.92	2.07	1.95	1.78	2.20	2.87	3.34	3.82	4.30	4.52	4.61	5.19	4.50	3.42	3.59	4.32	4.31	3.97
80	0.81	1.01	1.17	1.11	0.93	0.86	0.98	1.24	1.79	2.11	2.30	2.34	2.25	1.99	1.89	2.61	3.63	3.39	3.00
85	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.05	0.05	0.10	0.11	0.17	0.21	0.21	0.21	0.37	0.53	0.41	0.48
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: $\times 10\text{cd}$

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036
5	1020	1019	1020	1017	1015	1015	1012	1010	1007	1003	1001	1000	997	994	991	990	988	987	986
10	959	953	947	939	930	920	913	910	910	916	922	927	932	934	935	933	930	928	925
15	896	882	867	849	844	841	842	847	843	837	840	850	862	873	886	893	895	892	883
20	838	824	803	781	766	765	769	779	769	778	793	796	794	812	835	850	856	855	844
25	769	750	732	719	707	705	713	712	704	727	737	741	761	760	767	778	786	785	777
30	674	651	639	630	626	633	640	649	659	661	644	656	655	666	670	681	692	694	684
35	525	504	499	513	538	551	566	557	564	565	558	558	561	563	559	551	562	568	558
40	391	372	374	394	407	439	459	479	479	478	481	469	449	431	422	412	423	431	422
45	321	296	284	288	307	324	350	376	385	388	379	347	332	316	302	314	330	340	330
50	275	245	231	230	229	250	259	252	266	271	260	262	249	231	235	254	281	289	277
55	190	187	188	196	197	185	178	161	156	157	170	185	185	181	176	182	186	188	186
60	55.2	66.5	78.6	116	143	120	99.0	107	99.2	92.1	102	101	124	109	55.4	45.0	48.8	27.4	28.5
65	14.0	13.4	13.7	15.5	15.0	14.4	20.7	48.9	62.0	55.4	21.9	16.0	14.8	16.3	14.0	13.3	14.0	13.0	14.5
70	8.11	8.48	8.06	8.49	9.20	10.3	10.2	8.97	8.87	11.7	11.9	12.3	9.97	8.59	8.82	8.84	9.13	8.17	9.73
75	4.77	5.17	4.70	4.96	5.77	6.74	7.22	7.57	7.69	7.72	7.66	7.39	6.65	5.97	6.94	6.34	6.22	5.72	6.42
80	3.59	3.97	3.70	3.59	4.00	4.70	5.43	5.85	6.01	5.79	5.38	5.00	4.80	5.15	6.20	6.07	5.49	5.02	5.76
85	0.56	0.77	0.68	0.90	1.13	1.44	1.70	1.91	2.26	2.72	3.17	3.90	3.90	4.38	4.70	4.99	4.66	4.77	4.83
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: $\times 10\text{cd}$

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036
5	984	984	985	988	991	992	993	995	997	998	998	997	998	1002	1003	1003	1003	1005	1009
10	923	922	919	917	907	901	896	891	890	894	899	904	911	919	928	935	940	944	945
15	872	868	856	840	821	815	814	820	823	822	830	840	853	865	878	892	897	897	896
20	832	819	796	782	770	775	779	773	753	745	761	762	768	785	801	820	828	829	822
25	770	754	750	740	738	733	716	710	703	698	682	685	707	715	728	743	755	757	749
30	675	660	653	650	641	643	647	640	640	620	612	609	607	616	620	635	644	641	637
35	547	554	562	554	547	543	550	536	532	537	526	500	480	474	478	491	505	499	501
40	412	422	427	450	454	462	459	452	447	432	398	382	359	339	352	363	380	374	370
45	309	304	324	325	343	366	368	364	346	314	303	280	266	270	284	302	320	315	294
50	252	237	230	248	253	250	256	247	230	239	228	219	220	219	231	258	276	265	240
55	180	179	182	180	182	159	154	152	156	162	175	188	181	173	173	174	176	175	167
60	31.5	57.5	103	120	101	105	91.7	102	103	97.0	109	97.7	84.1	54.1	34.4	28.4	26.7	27.2	32.1
65	13.2	14.2	15.3	14.3	17.3	20.6	56.1	58.6	40.9	28.0	16.3	13.5	13.7	12.5	12.0	11.7	10.6	11.1	10.9
70	8.88	8.28	8.44	10.1	11.9	11.0	10.6	8.46	8.74	10.2	10.3	8.37	7.36	7.19	7.59	7.31	6.32	6.37	6.40
75	6.22	5.93	5.71	6.43	6.85	7.15	7.23	7.39	6.99	6.63	5.83	4.99	4.48	4.36	4.69	4.32	3.68	3.97	3.94
80	5.86	5.24	4.73	4.48	4.62	4.86	5.21	5.41	5.20	4.49	3.71	2.96	2.71	2.85	3.26	2.92	2.28	2.65	2.99
85	5.18	4.30	3.84	3.56	2.81	2.30	1.84	1.51	1.18	0.85	0.63	0.53	0.44	0.28	0.22	0.15	0.07	0.02	0.01
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: $\times 10\text{cd}$

C (DEG) y (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036	1036				
5	1012	1014	1017	1018	1019	1019	1017	1015	1013	1012	1011	1009	1007	1009	1011				
10	944	939	935	932	928	926	926	929	937	943	948	949	949	949	953				
15	889	882	876	867	861	861	862	853	846	845	853	865	876	883	889				
20	812	799	793	793	779	771	781	784	777	776	776	782	797	808	815				
25	735	720	708	694	699	701	696	693	694	700	699	708	718	735	742				
30	633	625	615	614	607	601	597	601	604	604	596	582	577	581	589				
35	507	506	521	522	514	506	500	492	474	459	430	425	417	419	426				
40	373	377	386	409	417	406	392	361	349	334	332	314	306	315	328				
45	271	274	280	282	282	268	275	265	264	260	237	223	201	187	195				
50	222	205	206	192	160	166	177	182	178	141	133	136	141	146	159				
55	166	164	137	113	106	98.7	91.9	91.7	86.2	99.2	115	114	111	107	107				
60	51.0	69.1	55.4	58.8	64.8	61.9	63.0	52.8	43.8	41.2	38.3	22.5	14.5	14.2	16.1				
65	11.3	11.4	11.4	11.7	16.0	29.0	19.4	7.44	8.04	8.50	7.97	8.75	7.51	7.12	7.99				
70	5.96	5.68	7.81	8.96	7.49	5.83	4.97	5.12	5.84	6.17	4.82	4.41	4.33	4.32	4.59				
75	3.19	3.00	3.63	4.11	4.09	4.14	4.02	3.66	3.19	2.72	2.24	1.86	1.94	2.04	2.15				
80	2.25	1.44	1.48	1.65	1.80	1.97	1.78	1.64	1.14	0.96	0.85	0.87	1.02	1.19	1.13				
85	0.01	0.02	0.03	0.07	0.06	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02				
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 $k=2$.

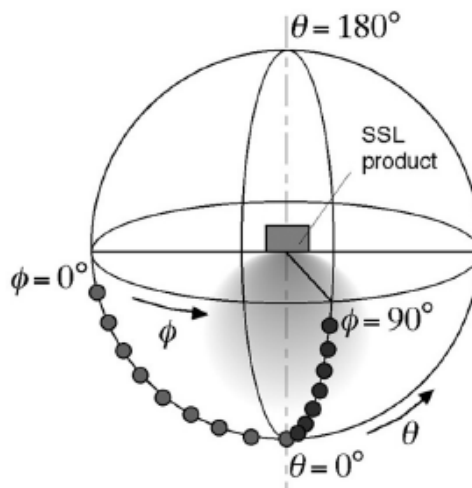
Color Characteristics Measurements

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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