



LM-79-08 Test Report

for

ABB Lighting, Inc.

1501 Industrial Way N. Toms River, NJ 08755.

Model T led light

Model: MT150501-VW

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ16040051b

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

Reviewed by:

Engineer: April Zou
Apr. 29, 2016

Manager: Jim Zhang
Apr. 29, 2016

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: **MT150501-VW**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
119.5	18917.0	158.34	0.9950
CCT (K)	CRI	Stabilization Time (Light & Power)	
5112	67.1	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Apr. 20, 2016

Date of Test : Apr. 27, 2016

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 Photo

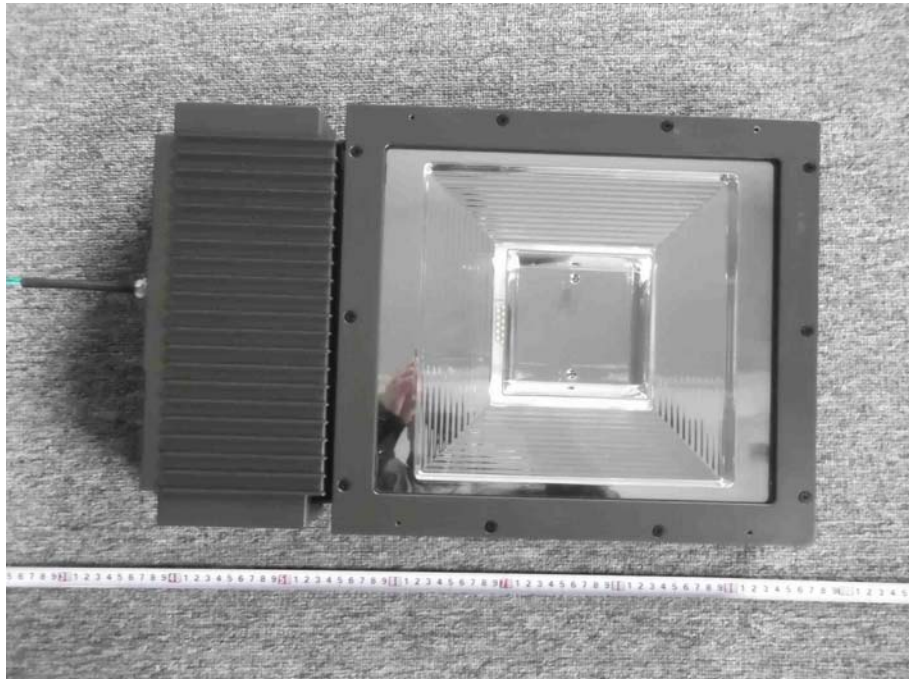


Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Model T led light
Model	: MT150501-VW
Electrical Ratings	: 100~277Vac, 50/60Hz, 150W
Product Description	: 5000K, Aluminum Enclosure, Black Coating, Silver reflector Manufacturer of light source: Samsung Model of light source: 351B Quantity of LED light source: 66pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.2°C.

Base orientation was Light down. 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 85 minutes.

The photometric distance of Goniophotometer is 30 m.

Luminous data was taken at 0.5° vertical intervals and 10.0° horizontal intervals.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	64.9
Voltage frequency (Hz)	60	60	60	R2	71
Test Current (A)	1.326	1.600	0.604	R3	75.5
Power Factor	0.9950	0.9968	0.9357	R4	68.9
Test Power (W)	158.34	159.54	156.49	R5	66
THD A%	6.29	5.87	12.75	R6	61
Luminous Efficacy (lm/W)	119.5	118.3	120.4	R7	76.1
Total Luminous Flux (lm)	18917.0	18868.0	18846.0	R8	53.6
Color Rendering Index (CRI)	67.1			R9	-42.6
R9	-42.6			R10	31.4
Correlated Color Temperature (CCT) (K)	5112			R11	66.5
Chromaticity (Chroma x, Chroma y)	(0.3426, 0.3591)			R12	37.2
Chromaticity (Chroma u, Chroma v)	(0.2069, 0.3253)			R13	64.7
Chromaticity (Chroma u', Chroma v')	(0.2069, 0.4879)			R14	86
Duv	0.0041				
Average Beam Angle (°)	153.2				
Center Beam Candle Power (cd)	2101				
Spacing Criteria	2.34 (0°-180°)/ 2.33 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	64.77%				
Zonal Lumens in the 60°-90°Zone	35.23%				
Zonal Lumens in the 90°-120°Zone	0.00%				
Zonal Lumens in the 120°-180°Zone	0.00%				

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

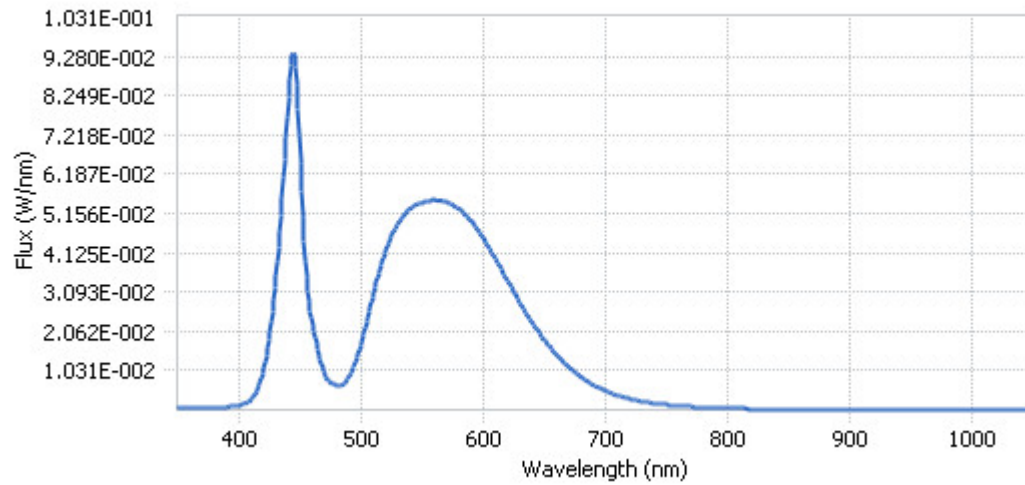


Chart 1: Spectral Power Distribution

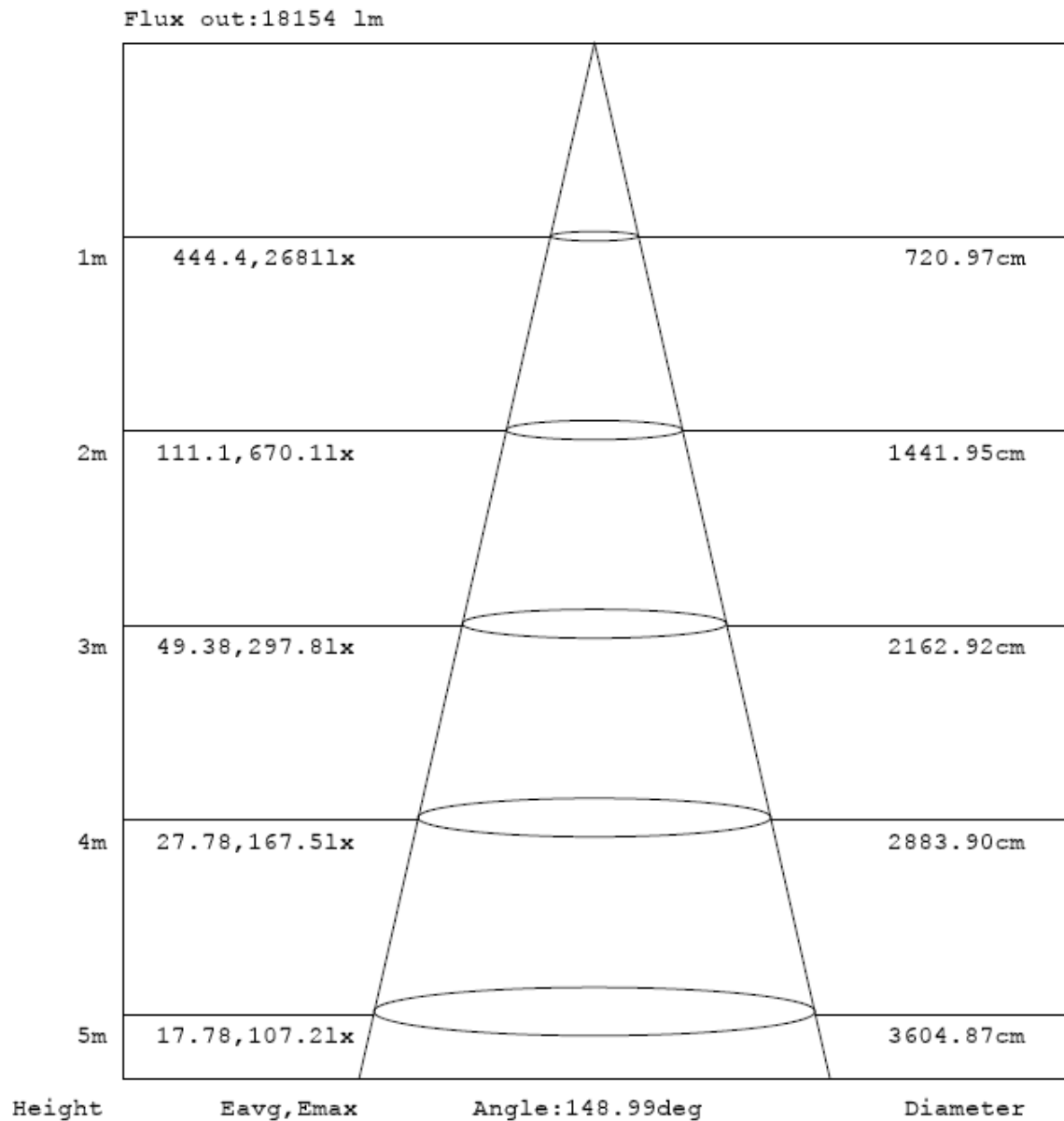
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	207.804	1.10%
10- 20	740.501	3.91%
20- 30	1417.422	7.49%
30- 40	2338.442	12.36%
40- 50	3438.534	18.18%
50- 60	4110.572	21.73%
60- 70	4504.003	23.81%
70- 80	2084.746	11.02%
80- 90	74.954	0.40%
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	18917.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	12253.275	64.77%
60- 90	6663.703	35.23%
0-90	18916.978	100.00%
90- 180	0	0.00%
0- 180	18917.0	100%

Table 3: Zonal Lumen Data

Illuminance Plots



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Chart 2: Beam Angle

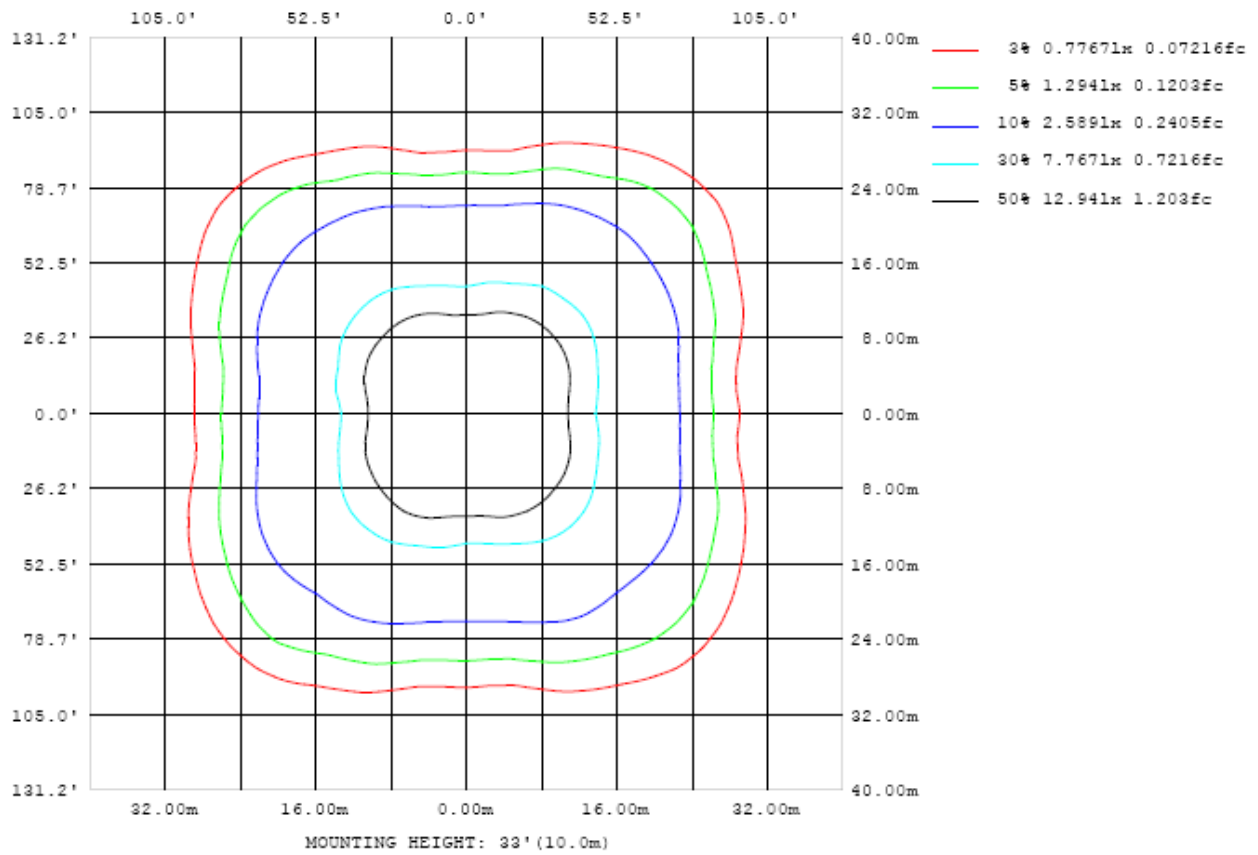


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

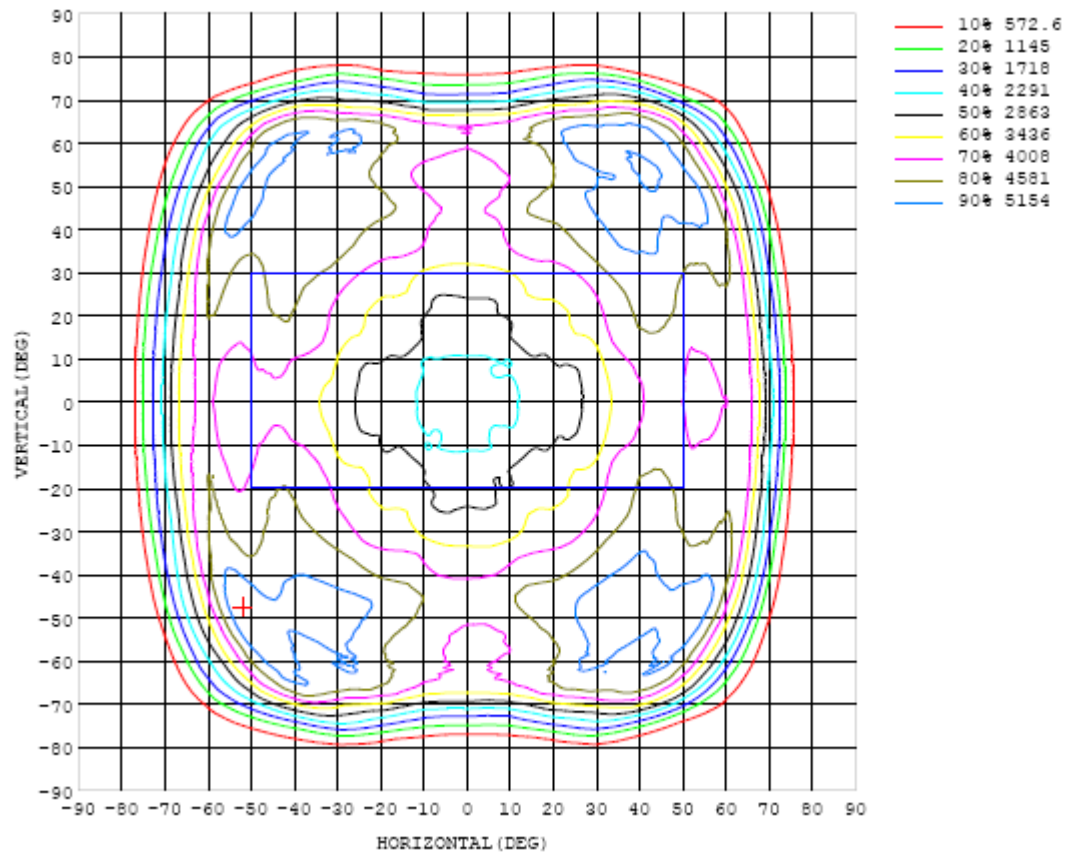


Chart 4: Isocandela Plot

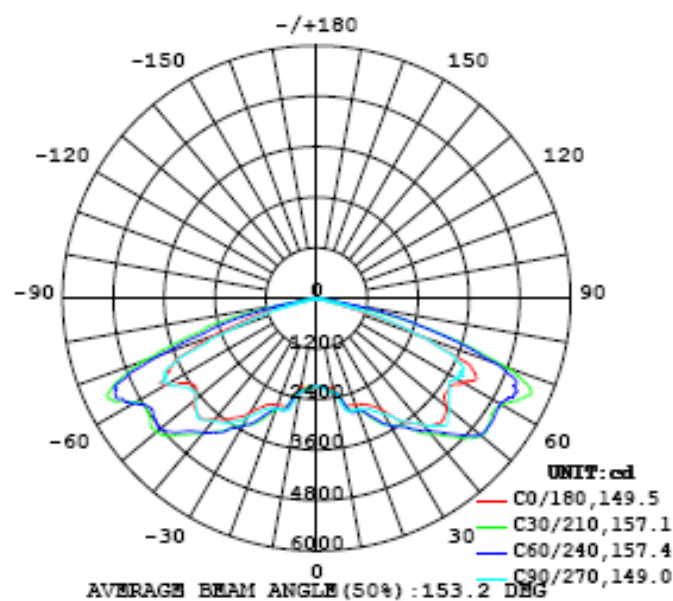


Chart 5: Polar Candela Distribution

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	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101
5	2136	2135	2133	2129	2124	2118	2111	2105	2102	2104	2111	2121	2135	2159	2182	2194	2200	2203	2200
10	2148	2152	2156	2157	2169	2219	2274	2303	2320	2330	2330	2314	2290	2259	2235	2242	2255	2257	2254
15	2632	2617	2623	2663	2694	2672	2612	2495	2391	2371	2408	2518	2638	2703	2739	2739	2732	2753	2770
20	2693	2674	2692	2770	2842	2812	2803	2960	3121	3153	3112	2975	2843	2848	2873	2819	2768	2790	2820
25	2785	2792	2808	2824	2873	3009	3160	3276	3353	3366	3328	3228	3109	3003	2919	2881	2870	2890	2908
30	3036	3056	3073	3068	3105	3295	3474	3465	3408	3395	3400	3467	3490	3318	3131	3094	3110	3138	3164
35	3585	3640	3700	3782	3838	3809	3746	3672	3612	3612	3642	3700	3748	3736	3692	3612	3544	3551	3576
40	3955	3984	4061	4228	4360	4298	4188	4140	4106	4064	4040	4058	4104	4202	4255	4120	3964	3931	3935
45	4174	4204	4303	4516	4707	4709	4663	4670	4676	4652	4619	4578	4556	4621	4653	4501	4330	4280	4277
50	4006	4068	4213	4475	4751	4944	5076	5120	5125	5143	5142	5114	5043	4913	4729	4449	4196	4099	4097
55	3789	3965	4130	4261	4425	4720	5028	5260	5423	5497	5472	5315	5073	4764	4446	4180	3974	3852	3838
60	3976	4209	4368	4404	4466	4753	5061	5227	5330	5420	5425	5273	5011	4596	4216	4115	4076	3898	3786
65	4098	4159	4314	4591	4912	5253	5479	5356	5147	5057	5035	5177	5244	4941	4544	4248	4013	3860	3800
70	2577	2571	2760	3191	3723	4246	4712	5043	5229	5210	5059	4833	4517	4089	3620	3142	2753	2599	2579
75	694	719	888	1225	1657	2140	2615	3023	3320	3453	3392	3020	2554	2204	1871	1480	1165	1077	1096
80	55.4	44.1	71.2	138	240	401	537	531	506	568	644	721	730	551	333	194	102	67.2	66.8
85	8.16	7.90	9.15	12.7	16.1	16.8	16.8	17.9	18.9	17.0	18.0	30.8	42.3	39.7	31.7	21.9	13.6	13.5	15.7
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)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101
5	2191	2180	2170	2158	2144	2129	2122	2115	2102	2092	2091	2092	2093	2093	2093	2094	2103	2111	2110
10	2243	2234	2242	2252	2254	2259	2283	2305	2306	2293	2262	2220	2167	2123	2115	2122	2133	2139	2124
15	2754	2728	2709	2683	2648	2588	2453	2343	2367	2446	2552	2653	2703	2719	2684	2644	2655	2671	2657
20	2799	2780	2811	2845	2820	2828	3001	3167	3167	3092	2955	2829	2830	2843	2757	2673	2672	2694	2695
25	2877	2843	2825	2859	3026	3208	3298	3345	3374	3354	3239	3103	3016	2943	2863	2801	2782	2787	2812
30	3149	3132	3132	3176	3349	3503	3469	3397	3399	3426	3501	3525	3344	3153	3140	3166	3134	3115	3170
35	3560	3570	3689	3801	3785	3730	3685	3649	3634	3659	3793	3908	3865	3769	3683	3599	3522	3484	3523
40	3913	3934	4102	4255	4218	4134	4092	4077	4124	4177	4176	4178	4266	4307	4142	3937	3815	3755	3785
45	4277	4330	4521	4698	4686	4634	4657	4681	4661	4625	4580	4545	4576	4561	4353	4122	3999	3952	3998
50	4170	4317	4555	4809	5017	5157	5151	5091	5060	5017	4950	4856	4734	4560	4262	3976	3815	3768	3887
55	4007	4236	4402	4587	4872	5139	5277	5336	5335	5257	5080	4836	4528	4223	4002	3826	3646	3574	3780
60	3947	4173	4276	4413	4744	5073	5230	5299	5308	5250	5119	4939	4704	4504	4485	4479	4292	4150	4286
65	3853	4011	4298	4634	4987	5238	5161	5043	5141	5315	5599	5731	5328	4786	4391	4074	3856	3754	3783
70	2616	2789	3205	3693	4101	4482	4865	5158	5273	5222	4969	4573	4044	3493	3016	2660	2546	2550	2542
75	1123	1244	1547	1936	2372	2779	3061	3243	3341	3296	2993	2610	2316	2014	1607	1267	1184	1209	1233
80	64.9	108	254	433	606	743	784	781	762	746	798	807	635	422	263	152	127	142	150
85	14.4	16.2	29.8	43.3	44.3	42.8	46.7	49.0	41.1	35.2	46.0	56.5	50.7	39.7	28.8	20.0	19.0	20.5	20.6
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 5: 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	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101
5	2105	2099	2093	2092	2094	2106	2120	2132	2141	2145	2148	2158	2169	2176	2183	2190	2195	2193	2188
10	2112	2131	2160	2188	2218	2251	2278	2289	2286	2260	2231	2216	2210	2212	2218	2225	2231	2232	2230
15	2648	2687	2716	2682	2612	2492	2390	2383	2432	2544	2662	2721	2749	2745	2733	2747	2759	2744	2733
20	2707	2760	2810	2786	2799	2998	3191	3205	3128	2953	2791	2788	2820	2785	2752	2770	2793	2772	2757
25	2842	2832	2861	3041	3228	3292	3311	3333	3321	3246	3137	2993	2870	2845	2860	2892	2922	2916	2903
30	3231	3224	3233	3360	3476	3449	3393	3386	3403	3474	3504	3351	3185	3164	3189	3213	3237	3238	3235
35	3614	3775	3912	3914	3853	3745	3651	3655	3706	3800	3879	3875	3824	3721	3623	3600	3608	3619	3662
40	3886	4095	4275	4251	4182	4191	4210	4204	4191	4176	4170	4217	4218	4028	3828	3784	3799	3813	3881
45	4124	4372	4595	4606	4573	4636	4697	4693	4651	4565	4482	4488	4460	4243	4022	3964	3974	3996	4083
50	4092	4334	4579	4783	4930	4972	4969	4976	4961	4922	4827	4619	4361	4069	3825	3732	3736	3818	3975
55	4042	4132	4238	4534	4838	5007	5102	5141	5099	4942	4717	4432	4160	4001	3888	3758	3706	3859	4064
60	4477	4526	4580	4776	4950	4931	4878	4923	4979	5025	4989	4724	4437	4336	4280	4160	4090	4184	4323
65	3966	4394	4871	5253	5466	5286	5016	4903	4891	5103	5252	5003	4627	4269	3975	3865	3862	3911	4068
70	2654	3029	3501	3955	4379	4736	4989	5116	5025	4506	3889	3503	3138	2612	2170	2069	2107	2104	2254
75	1332	1565	1884	2318	2697	2818	2809	2724	2574	2406	2171	1792	1394	1078	846	752	749	792	927
80	194	325	466	561	603	528	452	510	577	557	488	360	224	133	72.5	50.6	50.7	48.3	74.6
85	21.4	24.1	27.2	29.5	31.2	32.0	31.7	29.5	27.1	26.4	25.5	23.4	20.5	16.6	13.1	11.3	10.8	11.0	12.9
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 6: 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	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101	2101				
5	2185	2179	2166	2151	2141	2132	2122	2112	2104	2099	2104	2113	2122	2130	2135				
10	2217	2210	2232	2263	2291	2312	2316	2307	2289	2260	2216	2174	2157	2150	2146				
15	2762	2782	2748	2678	2557	2444	2394	2403	2514	2637	2681	2687	2655	2618	2615				
20	2800	2843	2812	2811	2978	3149	3191	3144	2958	2779	2793	2833	2762	2684	2669				
25	2889	2911	3042	3187	3268	3315	3334	3320	3268	3178	3023	2875	2814	2790	2778				
30	3221	3242	3389	3525	3502	3439	3408	3396	3448	3460	3286	3100	3060	3062	3048				
35	3780	3891	3913	3886	3805	3713	3646	3623	3699	3794	3847	3857	3780	3683	3625				
40	4093	4287	4282	4221	4192	4179	4203	4234	4231	4240	4336	4391	4248	4071	3987				
45	4327	4555	4568	4546	4634	4734	4795	4822	4794	4749	4749	4708	4508	4297	4199				
50	4213	4478	4722	4927	5045	5116	5171	5186	5148	5060	4916	4723	4454	4202	4063				
55	4167	4298	4585	4892	5120	5280	5346	5333	5257	5091	4765	4425	4217	4059	3912				
60	4378	4496	4878	5230	5236	5157	5190	5217	5197	5098	4813	4518	4408	4326	4171				
65	4420	4822	5193	5435	5337	5159	5110	5133	5317	5433	5204	4865	4558	4297	4151				
70	2794	3414	3816	4196	4738	5175	5242	5102	4814	4428	4014	3567	3048	2630	2493				
75	1204	1567	2016	2443	2722	2904	3020	3005	2777	2429	2005	1565	1166	854	705				
80	168	283	406	485	415	329	354	400	428	417	306	180	111	69.4	50.3				
85	18.3	23.3	23.2	21.7	21.0	20.2	18.7	17.2	16.6	16.1	16.0	15.2	12.3	9.31	8.14				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				
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				

Table 7: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

Table 8: 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 1.94% with a coverage factor k=2.

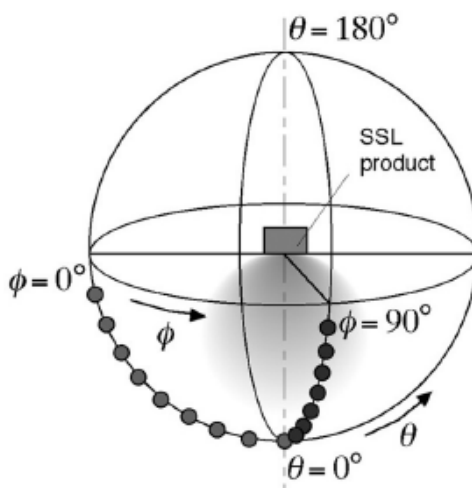
Color Characteristics Measurements

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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