

IES LM-79-08

MEASUREMENT AND TEST REPORT For

MESTER LED LIMITED

3rd F, Building A, Sunshine Industrial Park, Hezhou, Xixiang, Bao' an District, Shenzhen China.

Test Model: PL09G2435KBQH

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ150825501-10
Test Date:	2015-08-25 to 2015-08-27
Report Date:	2015-09-02
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2015-08-25 and used for testing. Sample No.: RSZ150825501-S01 Model: PL09G2435KBQH

Model Tested: PL09G2435KBQH
 Manufacturer: MESTER LED LIMITED
 Brand Name: MESTER
 Product Designation: Plugin light
 Burning Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277V AC 60Hz
 Rated Power: 9W
 Nominal CCT: 3500K
 Nominal Lumen Output: 910 lm

2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integrating Sphere	SENSING	SPR-600	S09008	1.5 meter	2015-03-24	2016-03-24
Spectral photometer	SENSING	SPR3000	90902027	380nm~800nm	2015-03-24	2016-03-24
Power Meter	YOKOGAWA	WT-210	91J926132	15/30/60/150/300/600 V	2015-03-05	2016-03-05
AC Power Supply	ALL Power	APW-105N	970613	0V-300V 50-400Hz	2015-03-05	2016-03-05
Standard Light Source	EVERFINE	D204	LSD090808	N/A	2015-08-05	2016-08-05
Thermal Meter	SENSING	N/A	N/A	25°C,45°C,55°C	2015-03-05	2016-03-05
DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~60V	2015-03-05	2016-03-05
AC Power Supply	EVERFINE	VPS1030 PWM	1012017	0-150V, 0-300V	2015-03-05	2016-03-05
DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2015-03-05	2016-03-05
Power Meter	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2015-03-05	2016-03-05
Goniophotometer	EVERFINE	GO-R5000	YG108492N10120001	1600mm,3000W/10A	2015-03-20	2016-03-20
Thermal Meter	Victor	VC230	EE091	0~40°C0~90%	2013-04-01	2016-03-31
Standard Light Source	EVERFINE	D908	1012003	N/A	2015-05-15	2016-05-14

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=32\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.1$ ($K=2$), at the 95% confidence level.

The uncertainty of power meter AC current $U=0.19\%$ of rdg, AC Voltage $U=0.15\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the luminous intensity is $U=2.82\%$ ($K=2$), at the 95% confidence level.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.00	60.0	0.0904	10.07	0.928

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
911.397	3.198	90.506	3462	1.88E-03

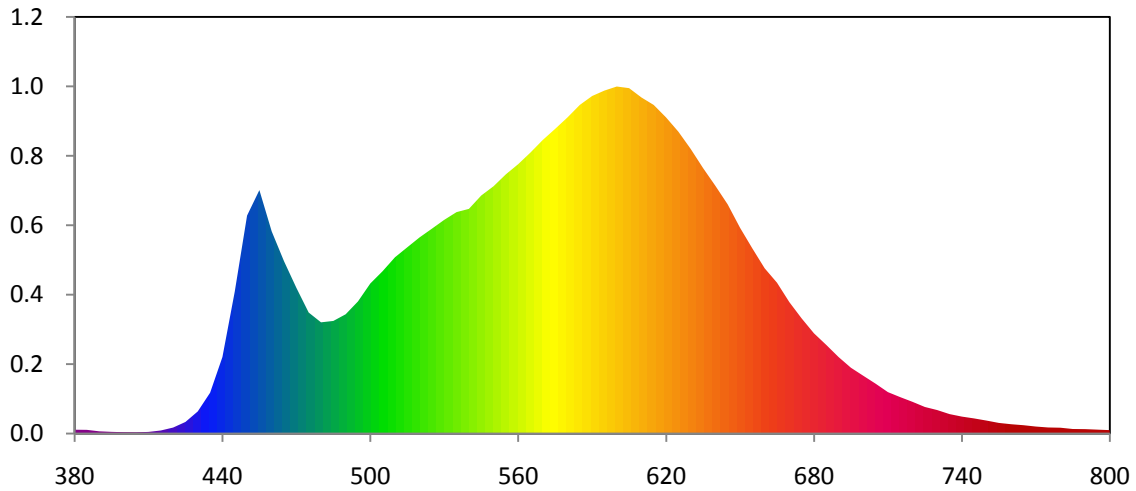
Chromaticity Coordinate

x	y	u	v	u'	v'
0.4095	0.3971	0.2358	0.3430	0.2358	0.5145

Color Rendering Index

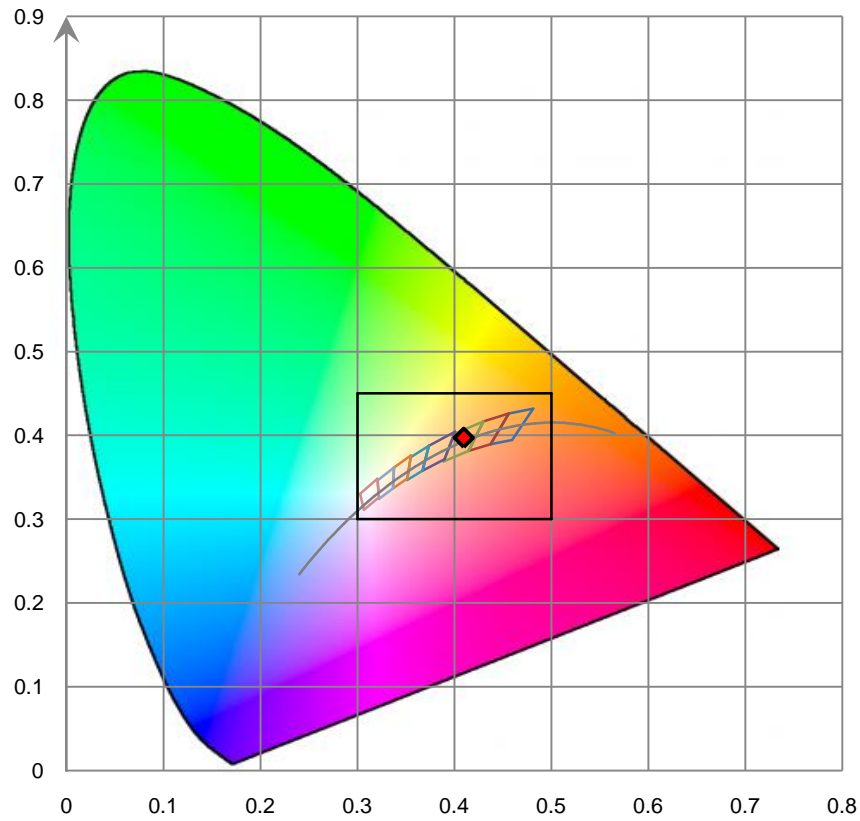
Ra			
85.0			
R1	R2	R3	R4
84	93	97	82
R5	R6	R7	R8
83	90	85	65
R9	R10	R11	R12
18	83	82	68
R13	R14	R15	
87	99	77	

Relative Spectral Power Distribution

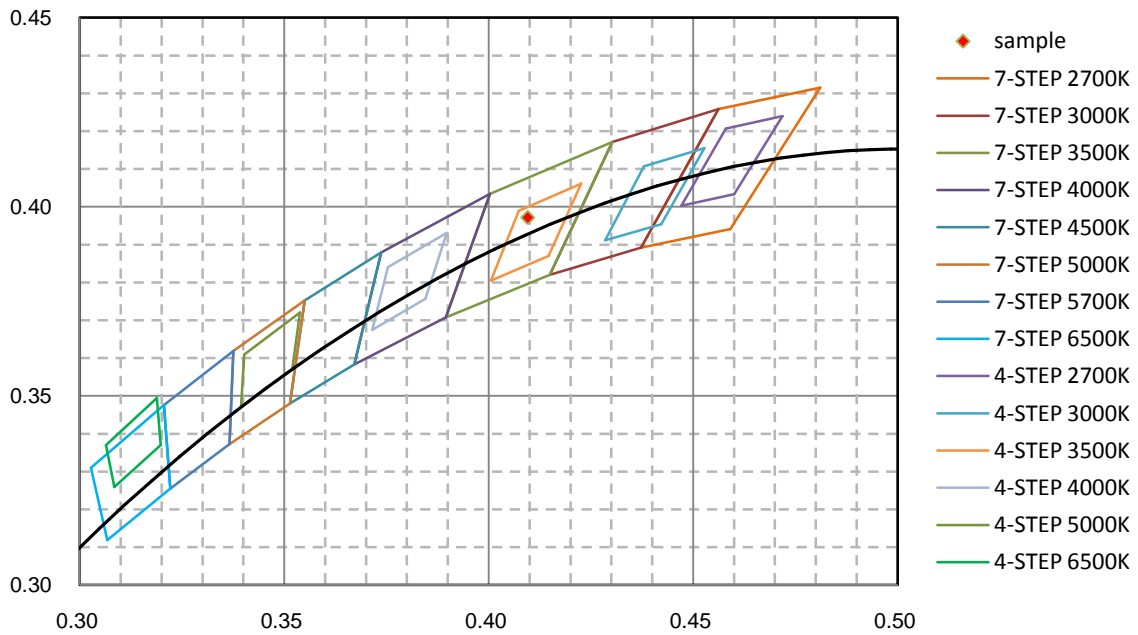


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	9.287E-04	465	4.155E-02	550	5.963E-02	635	6.402E-02	720	7.650E-03
385	8.971E-04	470	3.514E-02	555	6.250E-02	640	5.974E-02	725	6.416E-03
390	5.407E-04	475	2.918E-02	560	6.495E-02	645	5.526E-02	730	5.665E-03
395	4.129E-04	480	2.682E-02	565	6.777E-02	650	4.964E-02	735	4.699E-03
400	3.304E-04	485	2.716E-02	570	7.080E-02	655	4.464E-02	740	4.090E-03
405	3.007E-04	490	2.876E-02	575	7.346E-02	660	3.984E-02	745	3.647E-03
410	4.024E-04	495	3.186E-02	580	7.622E-02	665	3.638E-02	750	3.134E-03
415	7.452E-04	500	3.618E-02	585	7.924E-02	670	3.170E-02	755	2.565E-03
420	1.453E-03	505	3.915E-02	590	8.138E-02	675	2.777E-02	760	2.256E-03
425	2.797E-03	510	4.250E-02	595	8.269E-02	680	2.418E-02	765	2.016E-03
430	5.339E-03	515	4.491E-02	600	8.367E-02	685	2.137E-02	770	1.691E-03
435	9.848E-03	520	4.731E-02	605	8.328E-02	690	1.844E-02	775	1.469E-03
440	1.845E-02	525	4.940E-02	610	8.103E-02	695	1.587E-02	780	1.411E-03
445	3.422E-02	530	5.152E-02	615	7.922E-02	700	1.394E-02	785	1.104E-03
450	5.256E-02	535	5.339E-02	620	7.622E-02	705	1.203E-02	790	1.071E-03
455	5.870E-02	540	5.417E-02	625	7.278E-02	710	9.995E-03	795	9.456E-04
460	4.874E-02	545	5.739E-02	630	6.861E-02	715	8.785E-03	800	8.341E-04

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Downward**

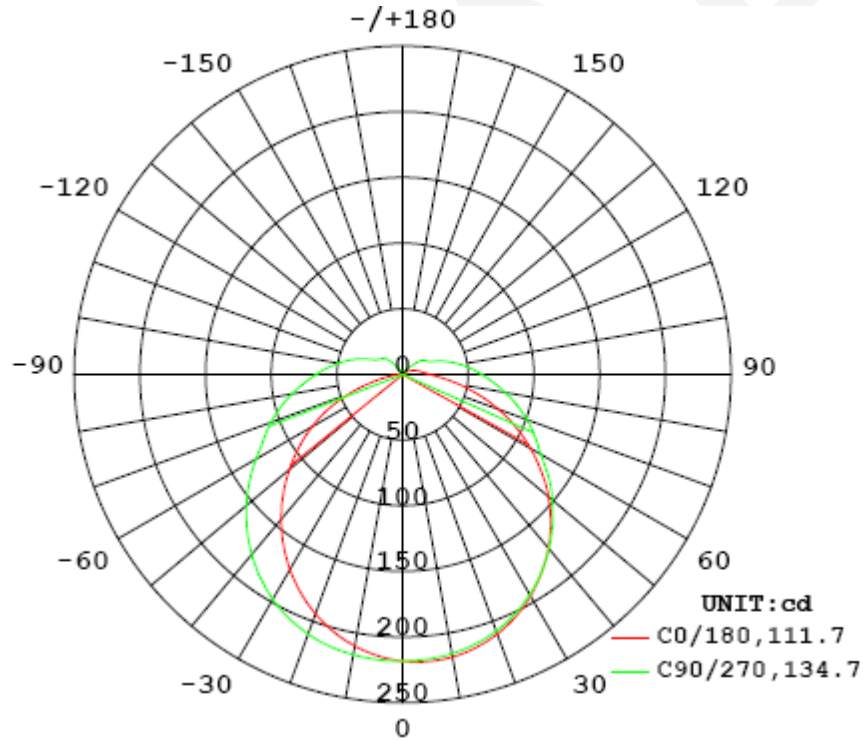
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60.0	0.0886	10.07	0.9469

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I _{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
913.372	90.70	238.1	1.32	1.32

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I _{max}):	11.7	120.5	134.7	124.9	98.0
Field Angle (10% I _{max}):	165.6	206.3	239.4	218.8	207.5

Luminous Intensity (cd) Distribution Data

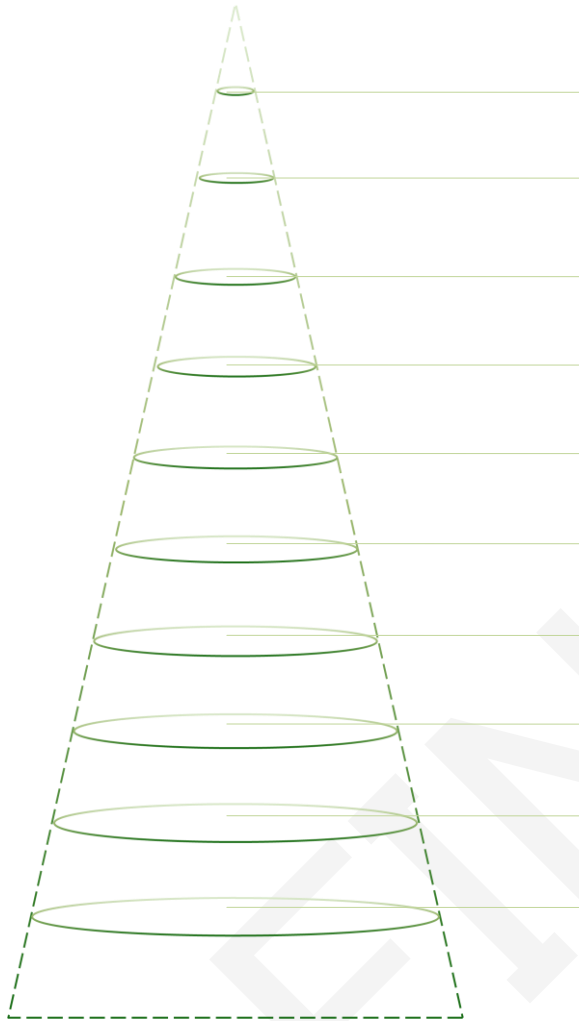
C y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	237	237	237	237	237	237	237	237
5.0°	233	234	234	235	236	237	238	238
10.0°	228	228	230	233	235	237	237	237
15.0°	220	221	224	229	232	235	235	235
20.0°	210	212	217	223	228	231	232	230
25.0°	199	201	208	216	222	226	226	224
30.0°	186	189	197	207	214	219	219	216
35.0°	172	175	185	196	205	209	210	206
40.0°	156	160	172	184	194	199	199	194
45.0°	139	144	157	171	182	187	186	181
50.0°	122	127	142	157	168	174	173	166
55.0°	104	110	126	142	154	160	158	151
60.0°	86	93	110	127	140	145	143	134
65.0°	68	75	94	112	127	131	127	117
70.0°	48	57	79	101	116	120	112	100
75.0°	28	40	67	90	104	108	100	83
80.0°	14	27	56	80	93	96	88	69
85.0°	6	17	46	69	82	84	76	56
90.0°	1	10	37	60	72	73	64	46
95.0°	1	7	30	51	63	63	55	37
100.0°	1	5	24	44	54	53	45	29
105.0°	1	5	19	36	46	45	36	22
110.0°	0	4	15	29	38	36	28	19
115.0°	0	3	14	23	30	29	23	16
120.0°	0	2	13	21	25	24	20	13
125.0°	0	1	10	19	23	22	18	10
130.0°	0	1	6	17	20	20	15	7
135.0°	0	0	4	13	17	16	10	6
140.0°	0	0	2	7	12	11	7	4
145.0°	0	0	2	4	7	6	5	3
150.0°	0	0	1	3	4	4	3	2
155.0°	0	0	1	2	2	2	2	1
160.0°	0	0	0	1	1	1	1	1
165.0°	0	0	0	0	1	1	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	237	237	237	237	237	237	237	237
5.0°	238	238	237	237	236	235	234	233
10.0°	237	236	236	235	234	232	230	228
15.0°	233	233	233	232	231	228	224	221
20.0°	228	228	228	228	226	222	217	212
25.0°	221	220	221	221	219	214	208	202
30.0°	211	211	212	213	210	205	197	190
35.0°	200	200	202	202	200	194	185	176
40.0°	187	187	190	191	188	181	172	162
45.0°	173	173	176	178	175	168	158	146
50.0°	157	158	162	164	161	154	142	129
55.0°	140	140	146	149	147	139	126	113
60.0°	122	123	129	133	132	124	111	96
65.0°	103	105	113	119	120	112	96	80
70.0°	84	87	97	108	109	101	85	64
75.0°	65	69	84	96	98	90	74	50
80.0°	47	53	72	84	86	80	63	39
85.0°	32	40	60	72	75	70	54	30
90.0°	23	30	50	63	65	61	45	22
95.0°	18	23	41	53	57	53	38	17
100.0°	15	19	33	44	48	45	31	12
105.0°	12	16	25	35	40	37	24	10
110.0°	10	13	20	27	32	29	19	9
115.0°	8	10	17	22	25	23	17	6
120.0°	6	7	14	20	23	21	16	4
125.0°	4	5	10	18	20	19	11	3
130.0°	3	4	8	12	16	14	6	2
135.0°	3	3	6	8	9	8	4	1
140.0°	2	2	4	5	6	5	3	1
145.0°	2	2	3	4	4	3	2	0
150.0°	1	1	1	2	2	2	1	0
155.0°	1	1	1	1	1	1	1	0
160.0°	1	1	0	0	1	1	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Average Area Illumination Figure

Angle: 98.00°. Flux out: 425.3 lm.



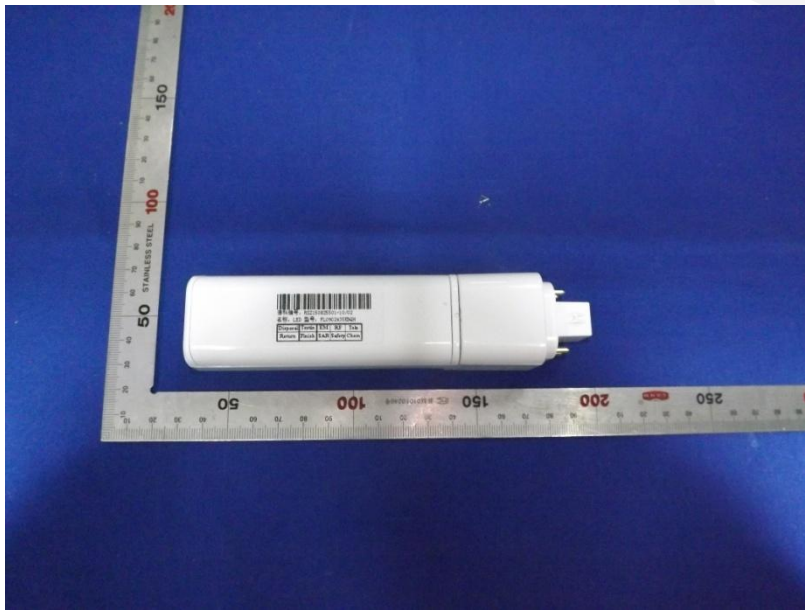
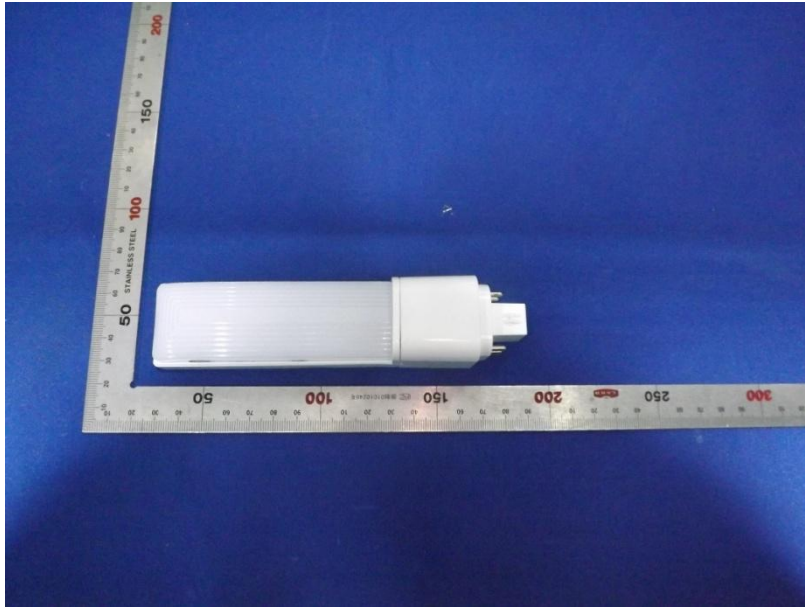
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	115.0	409.2	949.1
1.0	230.1	102.3	237.3
1.5	345.1	45.5	105.5
2.0	460.1	25.6	59.3
2.5	575.2	16.4	38.0
3.0	690.2	11.4	26.4
3.5	805.3	8.4	19.4
4.0	920.3	6.4	14.8
4.5	1035.3	5.1	11.7
5.0	1150.4	4.1	9.5

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	5.6	0.62
5-10	16.8	1.84
10-15	27.4	3.00
15-20	37.3	4.08
20-25	46.0	5.04
25-30	53.3	5.84
30-35	59.0	6.46
35-40	62.9	6.88
40-45	64.9	7.11
45-50	65.0	7.11
50-55	63.3	6.94
55-60	59.9	6.56
60-65	55.4	6.06
65-70	50.1	5.48
70-75	44.3	4.85
75-80	38.3	4.19
80-85	32.4	3.55
85-90	27.1	2.97
90-95	22.7	2.48
95-100	18.8	2.06
100-105	15.2	1.67
105-110	12.1	1.32
110-115	9.4	1.02
115-120	7.5	0.82
120-125	6.1	0.67
125-130	4.7	0.51
130-135	3.3	0.36
135-140	2.1	0.23
140-145	1.2	0.13
145-150	0.7	0.08
150-155	0.4	0.04
155-160	0.2	0.02
160-165	0.1	0.00
165-170	0.0	0.01
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	5.6	0.62
0-10	22.4	2.46
0-15	49.9	5.46
0-20	87.2	9.54
0-25	133.2	14.58
0-30	186.5	20.42
0-35	245.5	26.88
0-40	308.4	33.76
0-45	373.3	40.87
0-50	438.3	47.98
0-55	501.6	54.92
0-60	561.5	61.48
0-65	616.9	67.54
0-70	666.9	73.02
0-75	711.2	77.87
0-80	749.5	82.06
0-85	781.9	85.61
0-90	809.1	88.58
0-95	831.8	91.06
0-100	850.5	93.12
0-105	865.7	94.79
0-110	877.8	96.11
0-115	887.2	97.13
0-120	894.7	97.95
0-125	900.8	98.62
0-130	905.5	99.13
0-135	908.7	99.49
0-140	910.8	99.72
0-145	912.0	99.85
0-150	912.7	99.93
0-155	913.1	99.97
0-160	913.2	99.99
0-165	913.3	99.99
0-170	913.3	100.00
0-175	913.4	100.00
0-180	913.4	100.00

6. Product Photo



*****END OF REPORT*****