



Shenzhen Belling Efficiency Testing Lab



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Total pages 14

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric

Measurements of Solid-State Lighting Products

Applicant:

IKIO LED LIGHTING

Address:

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

For Product:

Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

Model No.:

IK-SBSL-L120-0300-DN-30-ML / IK-SBSL-L120-0300-DN-57-ML

Test laboratory: Shenzhen Belling Efficiency Testing Lab., 1/F., Building 1, 1F, No.1 building, Meibaohe industrial park, Dalang street, Shenzhen, Guangdong Prov.518101, China.

Complied by: Zac Kuang

Review by: Jason Zhou

Project Engineer

Technical Manager

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Shenzhen Belling Efficiency Testing Lab. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



1 General

1.1 Product Information

Manufacturer	IKIO LED LIGHTING
Manufacturer Address	8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250
Brand Name	IKIO
Luminaire Type	Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
Model Number	IK-SBSL-L120-0300-DN-30-ML / IK-SBSL-L120-0300-DN-57-ML
Rated Inputs	AC 100-277V 50/60Hz
Rated Power	300 W
Nominal CCT	3000K / 5700K
Date of Receipt Samples	2017-06-19

1.2 Standards or methods

- ANSI C78.377-2015: Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits-Related Power Quality Requirements for Lighting Equipment
- CIE Publication No.13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products



1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	N.A	2017-09-21
AC Power Source	ALL POWER	APW-110N	992257	2017-08-27
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100234	2017-09-15
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2017-08-29
Integral Sphere	SENSING	SPR-600M	N.A	2017-08-27
Digital Power Meter	YOKOGAWA	WT210	91L929742	2017-08-29
Optical Color and Electrical Measurement System	SENSING	SPR-3000	N.A	2017-08-27
Temperature/humidity/clock	VICTOR	VC230	57636	2017-09-13
Digital Anemometer	TECMAN	TD8901	026141	2017-09-13

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).



2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 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. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards. 4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

2.5 Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

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 method according to IESNA LM-79-08 following chapter.



3 Test Result Summary

3.1 Integrating Sphere System

3.1.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-SBSL-L120-0300-DN-30-ML	119.97	60	2.530	302.9	0.998
IK-SBSL-L120-0300-DN-57-ML	119.94	60	2.535	303.6	0.999

3.1.2 Additional Test

Test Item	Model	Test Voltage (V)	Frequency (Hz)	Test Result
Power factor	IK-SBSL-L120-0300-DN-30-ML	120	60	0.998
		277	60	0.929
	IK-SBSL-L120-0300-DN-57-ML	120	60	0.999
		277	60	0.936
Total harmonic distortion	IK-SBSL-L120-0300-DN-30-ML	120	60	11.4%
		277	60	14.6%
	IK-SBSL-L120-0300-DN-57-ML	120	60	12.2%
		277	60	15.3%
Off state power (W)	IK-SBSL-L120-0300-DN-30-ML	120	60	0
	IK-SBSL-L120-0300-DN-30-ML	277	60	0

3.1.3 Photometric data

Model Number	Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)	CRI	R9
IK-SBSL-L120-0300-DN-30-ML	33516.188	110.651	2970	83.4	12
IK-SBSL-L120-0300-DN-57-ML	36465.700	120.111	5548	84.8	17

3.1.4 Chromaticity Coordinate

Model Number	Duv	x	y	u'	v'
IK-SBSL-L120-0300-DN-30-ML	-0.0007	0.4380	0.4026	0.2519	0.5210
IK-SBSL-L120-0300-DN-57-ML	0.0023	0.3314	0.3447	0.2048	0.4792



3.2 Goniophotometer System

3.2.1 Electrical data

Model Number	Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
IK-SBSL-L120-0300-DN-30-ML	120.19	60	2.5245	303.00	0.9985

3.2.2 Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)	Zonal Lumen in 80-90°(%lm)
33400.72	110.23	99.833	0.709



4 Test Data

IK-SBSL-L120-0300-DN-30-ML

Test Condition

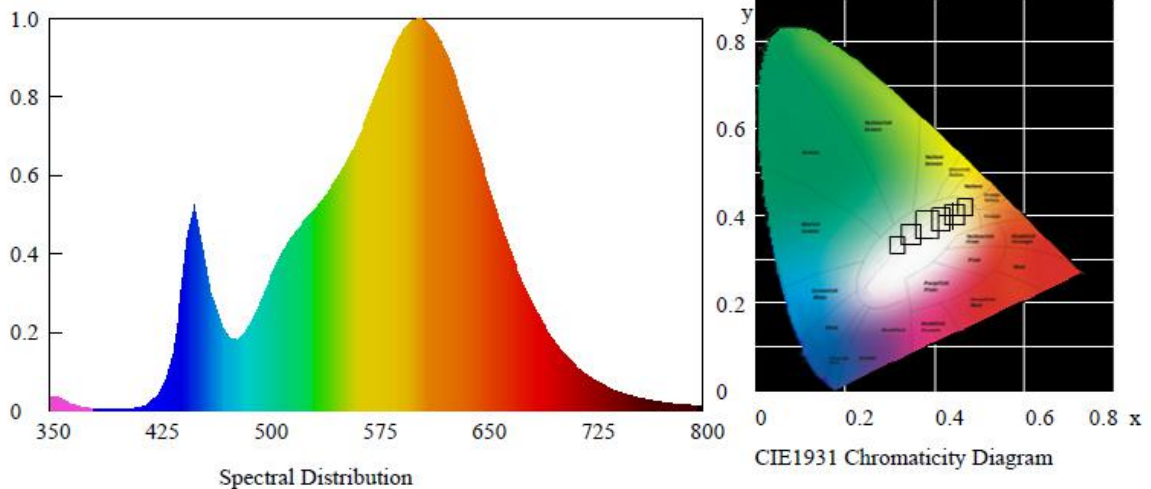
Temperature: 25°C

RH: 58%

Spectrum Range: 350-800 nm

Scan Step: 5 nm

Spectroradiometric Parameters



Chromaticity Coordinates: $x=0.4380$ $y=0.4026$ $u'=0.2519$ $v'=0.5210$

Correlated Color Temperature: 2970 K

Dominant Wavelength: 582.0 nm(E)

Luminous Flux: 33516.188 lm

Purity: 0.5240

Chromaticity Difference: -0.0007Duv

Peak Wavelength: 876.3 nm

Color Ratio: $K_r=45.2\%$ $K_g=47.5\%$ $K_b=7.3\%$

Bandwidth: 0nm

Radiant Flux: 100.151 W

Rendering Index: $R_a=83.4$

$R_1=82$ $R_2=91$ $R_3=97$ $R_4=82$ $R_5=82$ $R_6=89$ $R_7=83$ $R_8=61$

$R_9=12$ $R_{10}=80$ $R_{11}=82$ $R_{12}=73$ $R_{13}=85$ $R_{14}=99$ $R_{15}=75$

Electric Parameters

Voltage: 119.97 V

Current: 2.53 A

Power Factor: 0.998

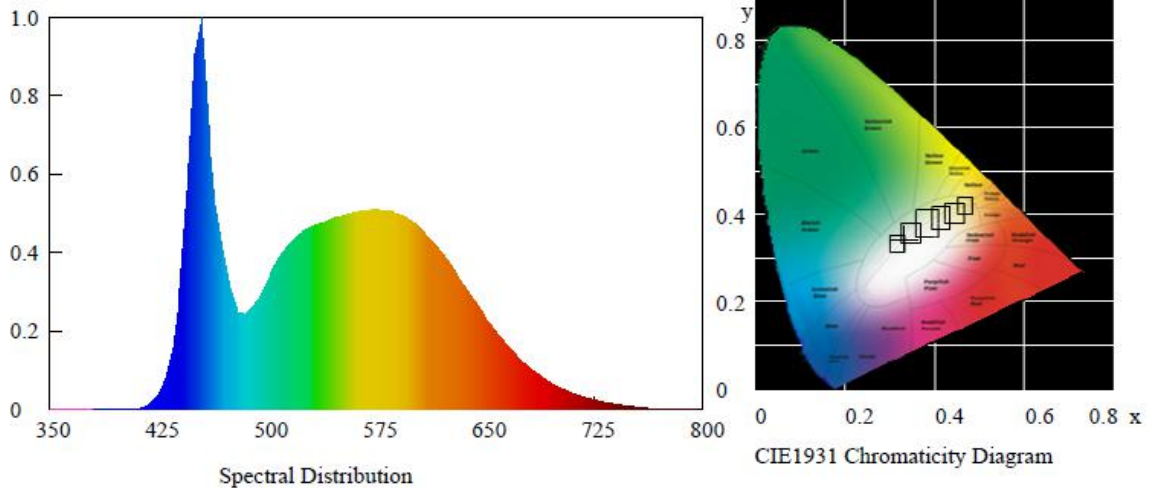
Power: 302.9 W

Luminous Efficacy: 110.651 lm/W

**IK-SBSL-L120-0300-DN-57-ML****Test Condition**

Temperature: 25°C
Spectrum Range: 350-800 nm

RH: 58%
Scan Step: 5 nm

Spectroradiometric Parameters

Chromaticity Coordinates: $x=0.3314$ $y=0.3447$ $u'=0.2048$ $v'=0.4792$

Correlated Color Temperature: 5548 K

Dominant Wavelength: 545.0 nm(E)

Luminous Flux: 36465.700 lm

Purity: 0.0291

Chromaticity Difference: 0.0023Duv

Peak Wavelength: 448.2 nm

Color Ratio: $K_r=32.5\%$ $K_g=55.4\%$ $K_b=12.2\%$

Bandwidth: 335.2nm

Radiant Flux: 117.266 W

Rendering Index: $R_a=84.8$

$R_1=84$ $R_2=91$ $R_3=93$ $R_4=83$ $R_5=83$ $R_6=85$ $R_7=88$ $R_8=71$

$R_9=17$ $R_{10}=76$ $R_{11}=82$ $R_{12}=59$ $R_{13}=86$ $R_{14}=96$ $R_{15}=79$

Electric Parameters

Voltage: 119.94 V

Current: 2.535 A

Power Factor: 0.999

Power: 303.6 W

Luminous Efficacy: 120.111 lm/W

**Zonal Flux Diagram**

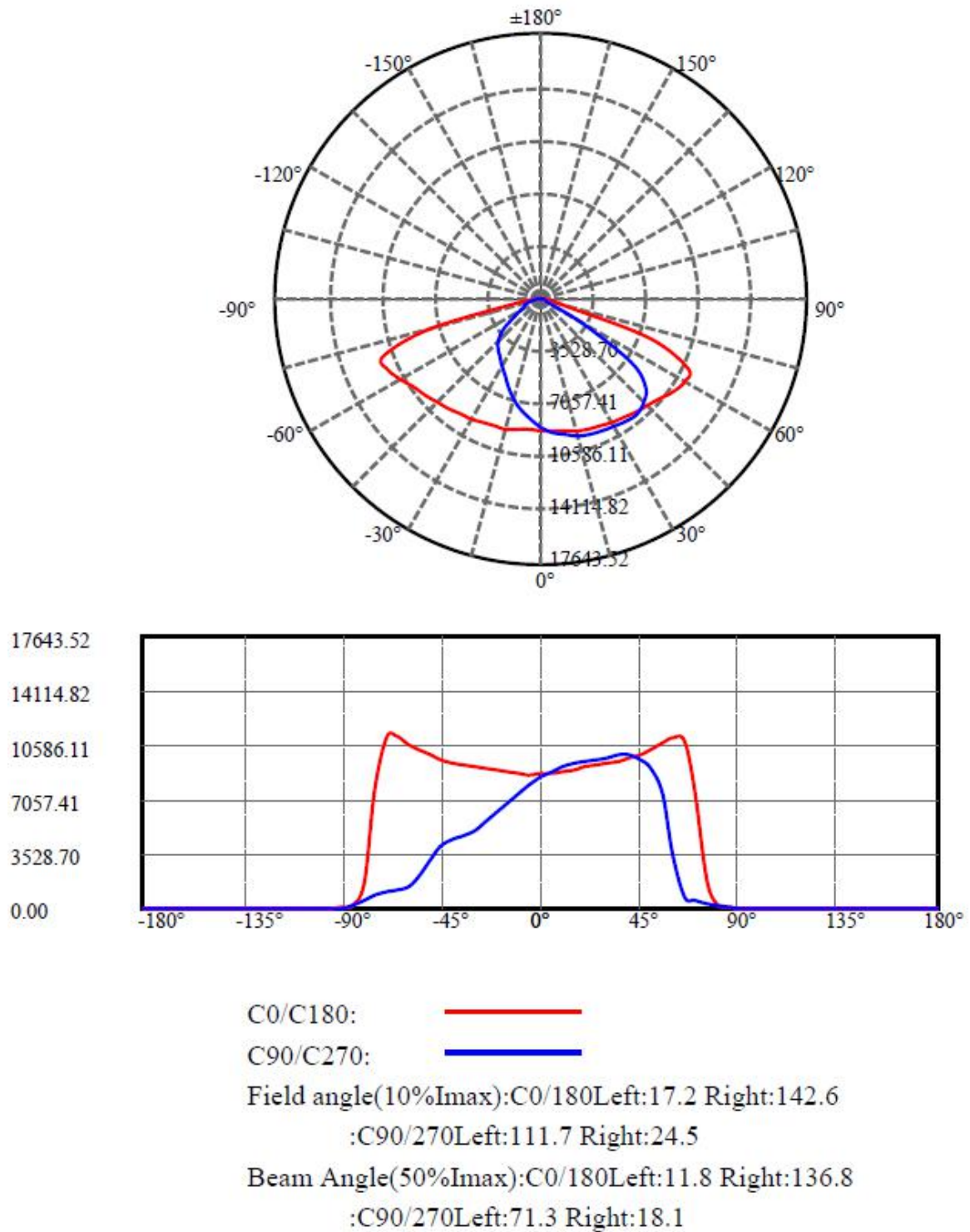
Zonal flux distribution table

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	8516.350	.000	.000	.000%	.000%
5.0	8506.931	203.509	203.509	.609%	.609%
10.0	8478.775	607.632	811.141	1.819%	2.429%
15.0	8443.403	1003.812	1814.953	3.005%	5.434%
20.0	8386.068	1386.985	3201.938	4.153%	9.586%
25.0	8322.426	1752.413	4954.351	5.247%	14.833%
30.0	8286.651	2101.893	7056.243	6.293%	21.126%
35.0	8303.214	2442.974	9499.217	7.314%	28.440%
40.0	8364.796	2780.931	12280.150	8.326%	36.766%
45.0	8387.609	3101.844	15381.990	9.287%	46.053%
50.0	8342.315	3380.526	18762.520	10.121%	56.174%
55.0	8020.170	3557.749	22320.270	10.652%	66.826%
60.0	7395.095	3563.195	25883.460	10.668%	77.494%
65.0	5620.145	3164.029	29047.490	9.473%	86.967%
70.0	3499.779	2309.223	31356.710	6.914%	93.880%
75.0	1338.611	1264.677	32621.390	3.786%	97.667%
80.0	481.013	486.881	33108.270	1.458%	99.124%
85.0	179.104	179.370	33287.640	.537%	99.661%
90.0	30.215	57.313	33344.950	.172%	99.833%
95.0	4.378	9.472	33354.430	.028%	99.861%
100.0	4.537	2.422	33356.850	.007%	99.869%
105.0	5.228	2.613	33359.460	.008%	99.876%
110.0	6.222	2.993	33362.450	.009%	99.885%
115.0	7.331	3.432	33365.880	.010%	99.896%
120.0	8.324	3.806	33369.690	.011%	99.907%
125.0	9.289	4.071	33373.760	.012%	99.919%
130.0	9.894	4.171	33377.930	.012%	99.932%
135.0	10.240	4.068	33382.000	.012%	99.944%
140.0	10.269	3.797	33385.800	.011%	99.955%
145.0	10.326	3.436	33389.230	.010%	99.966%
150.0	10.326	3.041	33392.280	.009%	99.975%
155.0	10.297	2.610	33394.890	.008%	99.983%
160.0	10.096	2.139	33397.030	.006%	99.989%
165.0	9.750	1.636	33398.660	.005%	99.994%
170.0	9.549	1.145	33399.810	.003%	99.997%
175.0	9.621	.686	33400.500	.002%	99.999%
180.0	9.736	.231	33400.730	.001%	100.000%



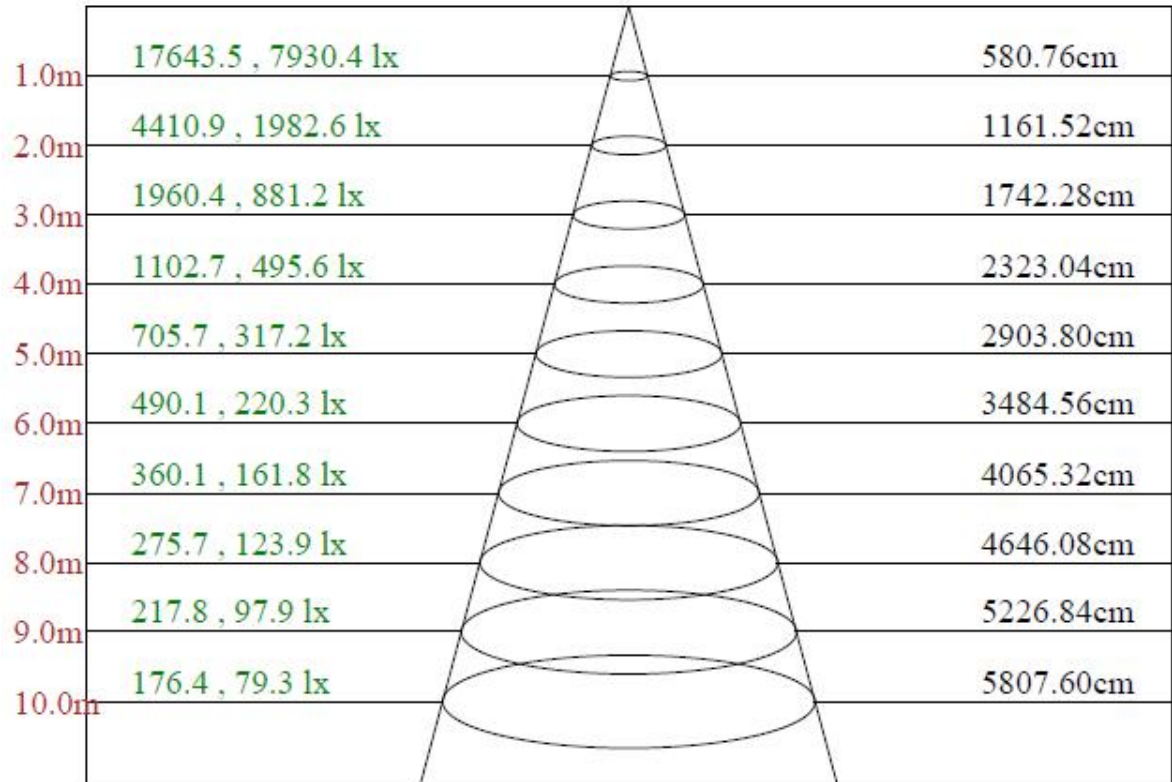
Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





Lux distance Curve



Max , Ave

Beam angle of C22.5plane140.77



**Luminous Intensity Distribution Data**

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	8733.62	8814.96	8874.18	9026.96	9169.37	9263.15	9409.71	9576.77	9794.76
22.5	8641.91	8874.18	9157.15	9420.08	9690.84	9971.96	10259.31	10642.29	11149.47
45.0	8590.98	8906.67	9200.01	9524.00	9786.69	10049.39	10365.08	10768.57	11178.04
67.5	8521.62	8884.32	9195.87	9436.21	9631.84	9876.33	10116.67	10332.59	10466.93
90.0	8511.48	8880.17	9155.08	9391.50	9556.49	9682.77	9790.84	9923.11	9986.25
112.5	8436.13	8790.54	9057.38	9295.64	9476.99	9676.78	9878.41	10073.81	10212.30
135.0	8381.06	8694.91	8994.24	9226.51	9546.35	9817.11	10077.96	10513.94	10915.12
157.5	8314.00	8511.48	8761.96	9047.24	9289.65	9546.35	9839.69	10218.53	10774.56
180.0	8733.62	8694.91	8733.62	8925.11	9010.60	9096.09	9202.09	9301.87	9462.71
202.5	8641.91	8456.41	8317.92	8185.65	8036.79	7871.80	7694.60	7507.26	7342.27
225.0	8590.98	8258.93	7900.38	7548.04	7168.98	6775.87	6399.11	6064.98	5773.71
247.5	8521.62	8093.94	7601.04	7046.85	6490.82	5957.14	5496.73	5089.33	4828.48
270.0	8511.48	8030.80	7444.12	6837.16	6217.76	5594.44	5085.18	4728.70	4451.72
292.5	8436.13	8014.44	7533.76	6969.43	6397.03	5826.71	5337.74	4965.13	4716.49
315.0	8381.06	8059.37	7725.25	7327.98	6939.01	6556.03	6195.41	5857.36	5604.58
337.5	8314.00	8144.86	8008.45	7886.09	7767.88	7596.90	7437.90	7287.19	7179.35
360.0	8733.62	8814.96	8874.18	9026.96	9169.37	9263.15	9409.71	9576.77	9794.76

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	9957.68	10306.09	10719.72	11094.40	10797.14	7686.53	1993.70	304.40	143.33
22.5	11770.72	12846.38	14422.99	16488.36	17643.52	12055.99	2074.35	392.20	137.11
45.0	11719.79	12347.26	12616.17	11418.39	7297.33	1129.58	420.31	258.78	93.33
67.5	10440.66	9986.25	8837.31	5830.86	1055.61	527.92	385.97	243.11	125.13
90.0	9688.99	9065.67	7470.62	3502.34	713.42	515.25	376.30	220.99	82.73
112.5	10222.67	9737.84	8393.27	9493.35	1031.42	529.30	377.22	235.50	106.00
135.0	11410.09	11921.42	12013.13	10615.79	6246.33	960.21	421.69	244.72	77.20
157.5	11298.10	12408.32	14227.36	16423.38	17612.87	11251.32	1583.53	372.61	117.52
180.0	9664.34	9927.26	10261.38	10676.85	11194.18	11092.33	7719.03	1777.10	267.76
202.5	7154.93	6987.86	6751.44	6350.26	5115.83	2710.12	1017.36	457.41	239.42
225.0	5537.52	5229.89	4547.35	3076.73	1520.39	998.93	764.81	504.65	199.09
247.5	4486.29	3806.05	2565.40	1463.48	1165.99	1039.71	807.44	548.43	256.70
270.0	4009.75	3215.22	2041.86	1445.04	1227.05	1080.50	835.78	515.71	225.36
292.5	4372.23	3695.91	2463.55	1457.26	1196.64	1076.35	831.17	571.01	269.38
315.0	5425.30	5117.90	4317.15	2838.47	1461.40	1017.36	810.20	548.66	247.72
337.5	7042.71	6877.72	6674.01	6146.55	4643.21	2325.06	998.93	500.96	277.90
360.0	9957.68	10306.09	10719.72	11094.40	10797.14	7686.53	1993.70	304.40	143.33

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	5.07	5.07	5.30	5.76	5.99	7.14	8.30	8.99	8.76
22.5	5.99	5.30	4.38	4.15	4.61	5.53	5.99	6.91	7.14
45.0	5.30	4.15	3.00	3.23	3.69	4.15	4.84	5.30	5.76
67.5	4.15	2.77	2.77	2.77	3.00	3.69	4.15	4.61	5.07
90.0	2.77	2.30	2.54	2.77	3.00	3.69	4.15	4.84	5.53
112.5	2.30	2.30	2.54	2.77	3.46	4.15	5.07	5.76	6.91
135.0	3.46	2.54	3.00	3.92	5.07	6.22	7.37	8.30	8.53
157.5	5.76	5.53	5.53	7.37	9.22	10.83	11.29	11.75	11.29
180.0	137.34	6.68	6.91	6.68	7.14	7.60	8.53	9.22	10.14
202.5	49.08	6.22	7.14	8.99	10.37	11.29	11.98	12.90	13.37
225.0	36.18	4.38	5.76	8.07	10.83	13.14	14.29	14.52	14.52
247.5	29.50	3.00	3.92	5.07	7.14	9.68	11.75	13.14	13.60
270.0	38.02	3.00	3.23	4.15	4.84	6.45	8.30	10.14	11.52
292.5	42.63	3.46	3.46	4.15	5.30	6.22	7.60	8.99	10.60
315.0	50.47	5.76	5.53	5.76	6.91	7.60	8.53	10.37	11.52
337.5	65.44	7.60	7.60	8.07	8.99	9.91	11.06	12.90	14.06
360.0	5.07	5.07	5.30	5.76	5.99	7.14	8.30	8.99	8.76

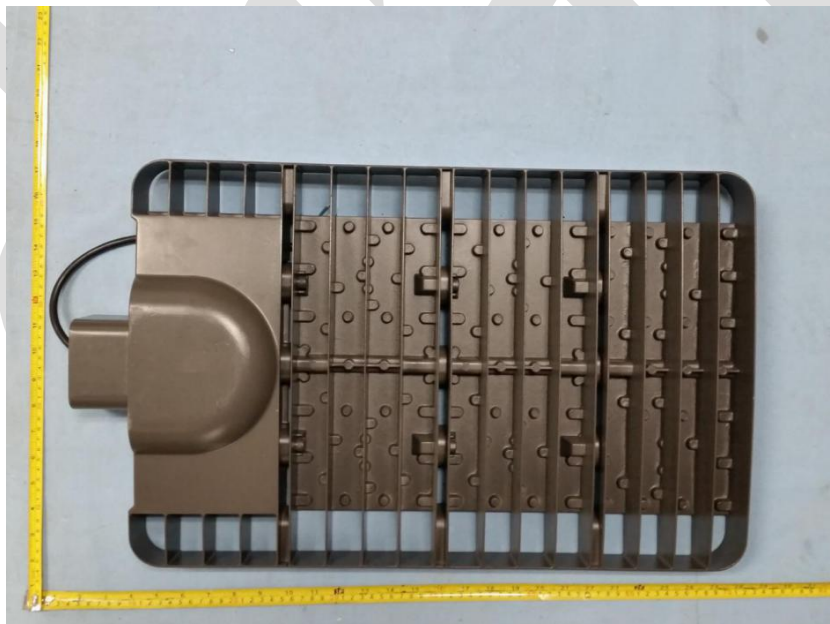
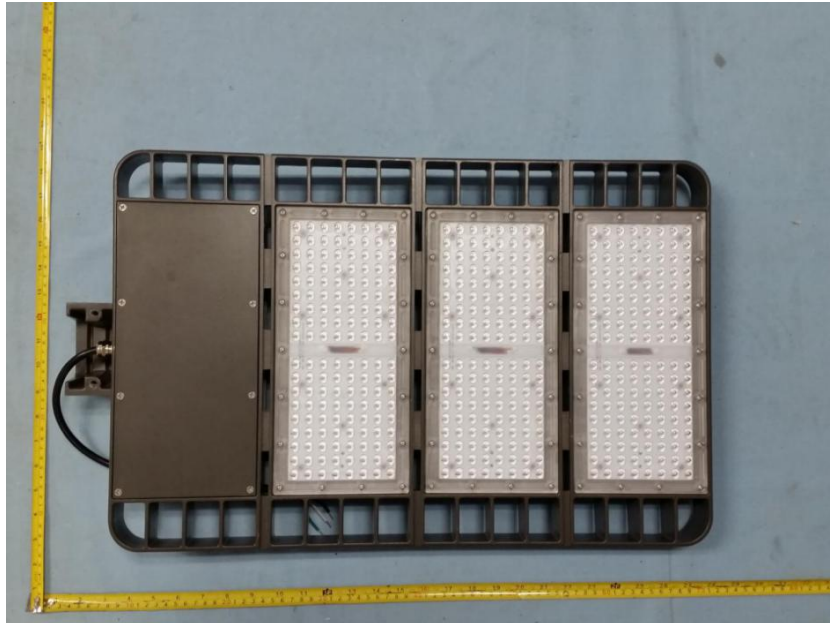


C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	8.76	8.30	8.07	8.07	7.60	7.60	7.37	7.37	7.84
22.5	7.84	8.30	8.07	8.30	8.53	8.53	8.53	8.76	9.22
45.0	6.68	6.91	7.60	7.60	8.07	8.30	8.53	8.53	9.22
67.5	5.99	6.45	7.14	7.60	8.07	8.53	8.76	8.99	9.45
90.0	5.99	6.91	7.60	7.84	8.53	9.22	9.22	9.22	9.91
112.5	7.37	7.60	8.30	8.99	9.22	9.45	9.45	9.91	10.14
135.0	8.99	9.22	9.45	9.91	9.91	9.68	9.68	9.68	10.37
157.5	11.06	11.06	11.06	11.06	10.37	10.37	9.68	9.68	10.37
180.0	10.37	9.68	9.68	9.45	9.45	9.22	8.99	8.53	8.30
202.5	12.90	12.21	11.75	11.06	11.06	10.37	9.45	8.99	8.76
225.0	13.83	13.14	12.90	12.21	11.98	11.06	10.37	9.45	9.22
247.5	13.60	13.37	12.90	12.67	12.21	11.75	11.06	10.37	9.68
270.0	12.44	12.90	12.90	12.90	12.90	12.21	11.29	10.83	10.14
292.5	11.52	12.21	12.44	12.90	12.44	12.21	11.52	11.06	10.60
315.0	12.67	12.90	12.67	12.44	12.44	11.75	11.06	10.83	10.60
337.5	13.83	13.14	12.67	12.21	11.98	11.29	11.06	10.60	10.14
360.0	8.76	8.30	8.07	8.07	7.60	7.60	7.37	7.37	7.84
C/γ(°)	180.0								
0.0	7.60								
22.5	9.22								
45.0	9.22								
67.5	9.91								
90.0	10.14								
112.5	10.60								
135.0	10.60								
157.5	10.60								
180.0	7.60								
202.5	9.22								
225.0	9.22								
247.5	9.91								
270.0	10.14								
292.5	10.60								
315.0	10.60								
337.5	10.60								
360.0	7.60								





Photo Document



****End of test report****