

TEST REPORT

IES LM-79-08

For

AOK LED Light Company Limited

Building 1, St George's Science and Technology Industrial Park, Shajin Street, Shenzhen,
Guangdong Province, China Zip 518104

Report No.: SZANL180619001-01

Product Description: LED Street Light

Electrical Rating: 100-277 VAC, 50/60 Hz, 55 W

Model No.: AOK-55WiM(3000K), AOK-55WiM(4000K)
AOK-55WiM(5000K), AOK-55WiM(5700K)

Model Difference: All construction and rating are the same except for CCT.

Test Date: 2018-06-22 to 2018-06-23

Report Date: 2018-06-25

Test Standard: LM-79-08

Test Laboratory: Shenzhen Anbotek Compliance Laboratory Limited

Tested by

Reviewed by Lab Director

Meteor Liu / *Meteor Liu*

Tom Chen / *Tom Chen*

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Anbotek Compliance Laboratory Limited. 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.



General Information

Applicant:	AOK LED Light Company Limited
Applicant Address:	Building 1, St George's Science and Technology Industrial Park, Shajin Street, Shenzhen, Guangdong Province, China Zip 518104
Manufacturer:	AOK LED Light Company Limited
Manufacturer Address:	Building 1, St George's Science and Technology Industrial Park, Shajin Street, Shenzhen, Guangdong Province, China Zip 518104
Brand Name:	 Quality, Honesty, Service and Innovation
Tested Model:	AOK-55WiM(3000K), AOK-55WiM(4000K), AOK-55WiM(5000K), AOK-55WiM(5700K)

Summary of Result

Test Item	Test Result	
	Luminous Flux (lm)	Luminous Efficacy (lm/W)
Integrating Sphere Test AOK-55WiM(3000K)	6128.10	109.96
Goniophotometer Test AOK-55WiM(3000K)	6195.51	110.71
Electrical Test	Power Factor	THDi
	0.9985	5.12%

1 Test Condition

1.1 Air Temperature

The ambient temperature in which measurements are being taken shall be maintained at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the SSL product and at the same height as the SSL product. The temperature sensor shall be shielded from direct optical radiation from the SSL product and optical radiation from any other source. If measurements are performed at other than this recommended temperature, this is a non-standard condition and shall be noted in the test report.

1.2 Thermal Conditions for Mounting SSL Products

The method of mounting can be the primary path for heat flow away from the device and can affect measurement results significantly. The SSL product under test shall be mounted to the measuring instrument so that heat conduction through supporting objects causes negligible cooling effects. If the SSL product under test is provided with a support structure that is designated to be used as a component of the luminaire thermal management system, the product shall be tested with the support structure attached. Any such support structure included in the measurement shall be reported.

1.3 Air Movement

The incidence of air movements on the surface of a SSL product under test may substantially affect electrical and photometric values. Air flow around the SSL product being tested should be such that normal convective air flow induced by device under test is not affected.

1.4 Waveshape of AC Power Supply

The AC power supply, while operating the SSL product, shall have a sinusoidal voltage waveshape at the prescribed frequency (typically 50/60 Hz or 50 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

1.5 Voltage Regulation

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

1.6 Seasoning

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning.

1.7 Stabilization

Before measurements are taken, the SSL product under test shall be operated long enough to reach stabilization and temperature equilibrium. The time required for stabilization depends on the type of SSL products under test. The stabilization time typically ranges from 30 min to 2 or more hours for large SSL products.

1.8 Operating Orientation

The SSL product under test shall be evaluated in the operating orientation recommended by the manufacturer for an intended use of the SSL product. Stabilization and photometric measurements of SSL products shall be done in such operating orientation.

2 Test Method

2.1 Integrating Sphere Measurement

The integrating sphere system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The system is calibrated by standard lamp before measurement weekly. The standard lamp has been calibrated regularly and traced to the National Primary Standard.

The 4π geometry was used to measure total luminous, luminous efficacy, chromaticity coordinates, correlated color temperature, and color rendering index, the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm. The product was operated in its intended orientation and was recorded in the report.

2.2 Goniophotometer Measurement

The goniophotometer system is calibrated by standard lamp before measurement weekly. The standard lamp has been calibrated regularly and traced to National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous efficacy, luminous intensity distribution, and color angular uniformity, which were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. The product was operated in its intended orientation and was recorded in the report.

2.3 Electrical Measurement

According to ANSI C82.77-2002, the measurement was made using a digital power meter and power supply, the SSL product under test was operated at rated voltage and stabilized enough before measurement. The total harmonic distortion of current and power factor can be calculated from the digital power meter. The digital power meter was calibrated regularly and traced to National Primary Standards.

3 Test Result

3.1 Integrating Sphere Test at 25°C for AOK-55WiM(3000K)

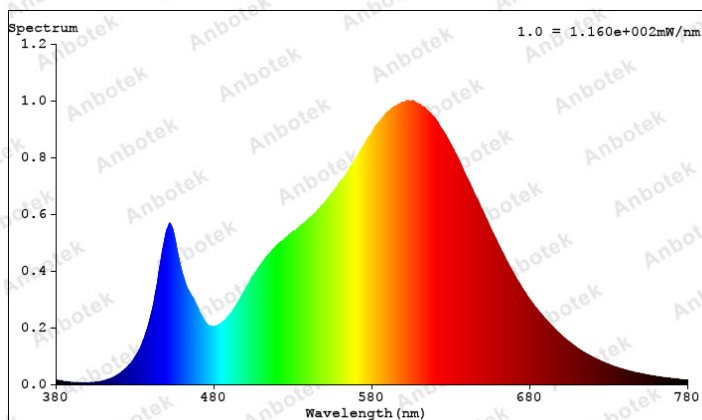
Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
230.05	50	0.2430	0.9983	55.73

Luminous Flux (lm)	Radiant Flux (W)	CCT (K)	Duv	Luminous Efficacy (lm/W)
6128.10	18.04	3088	0.0002	109.96

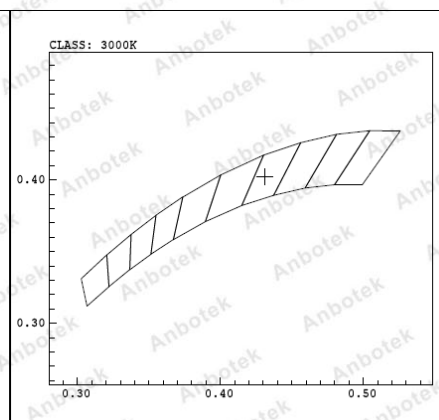
Ra	x	y	u'	v'
83.6	0.4310	0.4023	0.2475	0.5198

R1	R2	R3	R4	R5
82	91	97	82	82
R6	R7	R8	R9	R10
89	84	62	13	79
R11	R12	R13	R14	R15
81	71	84	99	75

Spectral Distribution & Chromaticity Diagram



Spectral Distribution



CIE1931 Chromaticity Diagram

3.2 Integrating Sphere Test at 25°C for AOK-55WiM(4000K)

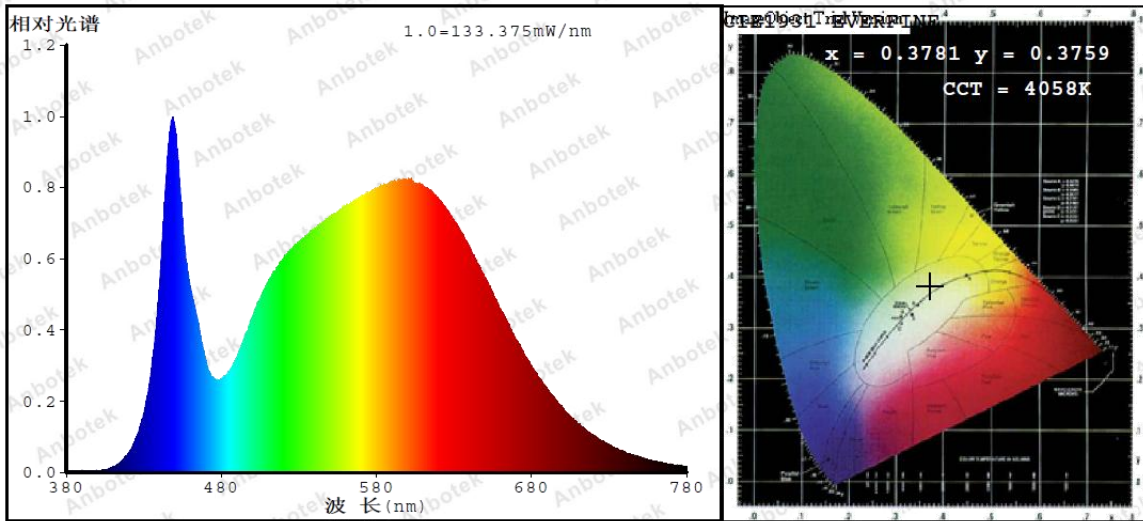
Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
230.05	50	0.2447	0.9985	56.21

Luminous Flux (lm)	Radiant Flux (W)	CCT (K)	Duv	Luminous Efficacy (lm/W)
6733.00	21.66	4058	0.0003	119.79

Ra	x	y	u'	v'
86.6	0.3781	0.3759	0.2239	0.5008

R1	R2	R3	R4	R5
86	90	93	87	86
R6	R7	R8	R9	R10
86	90	76	35	76
R11	R12	R13	R14	R15
86	66	87	96	82

Spectral Distribution & Chromaticity Diagram



3.3 Integrating Sphere Test at 25°C for AOK-55WiM(5000K)

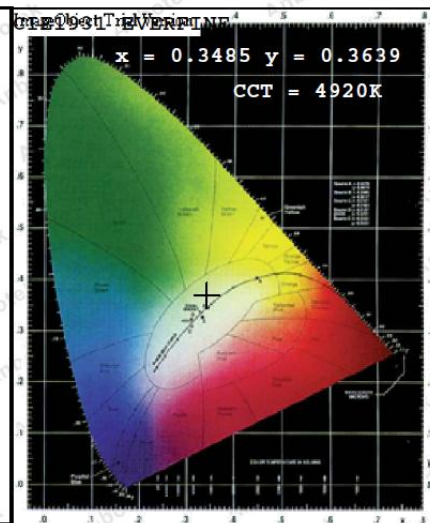
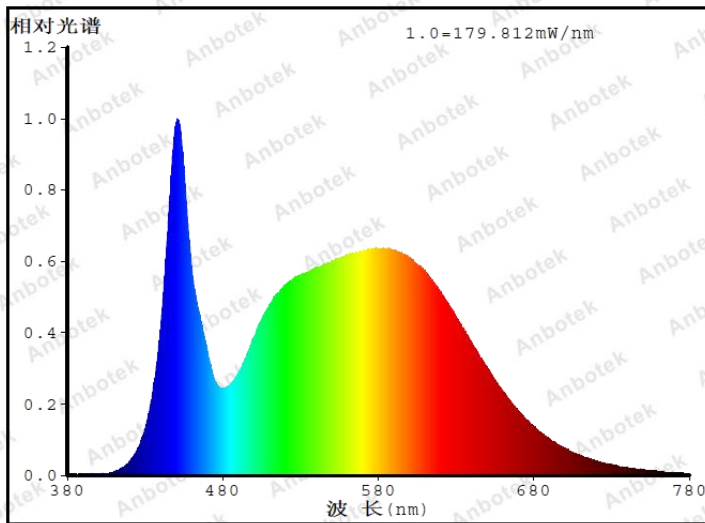
Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
230.03	50	0.2449	0.9988	56.27

Luminous Flux (lm)	Radiant Flux (W)	CCT (K)	Duv	Luminous Efficacy (lm/W)
7290.00	22.36	4920	0.0047	129.55

Ra	x	y	u'	v'
82.4	0.3485	0.3639	0.2090	0.4910

R1	R2	R3	R4	R5
80	87	93	81	80
R6	R7	R8	R9	R10
82	88	67	6	70
R11	R12	R13	R14	R15
80	56	82	96	74

Spectral Distribution & Chromaticity Diagram



3.4 Integrating Sphere Test at 25°C for AOK-55WiM(5700K)

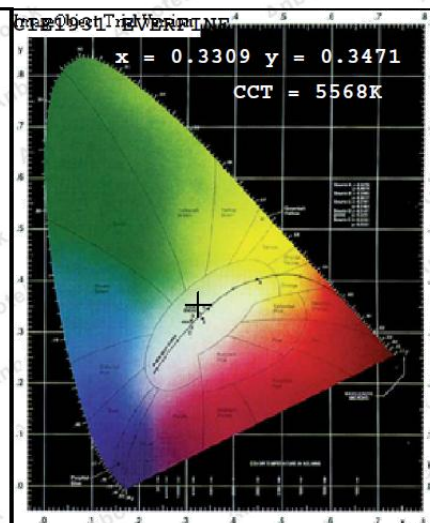
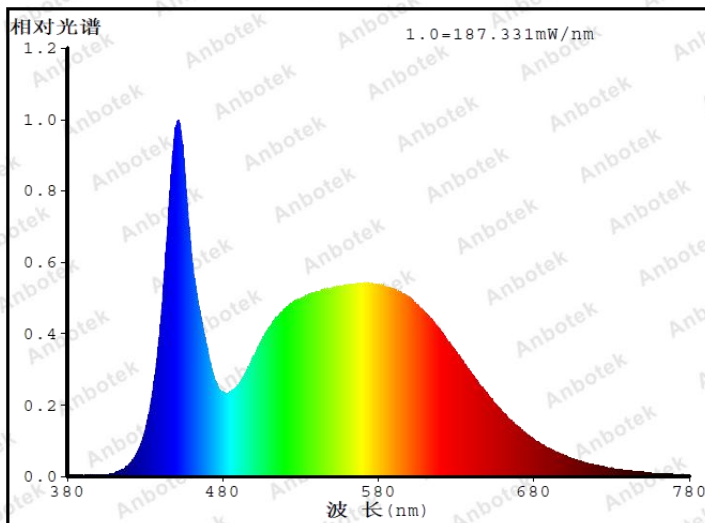
Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
230.00	50	0.2450	0.9987	56.28

Luminous Flux (lm)	Radiant Flux (W)	CCT (K)	Duv	Luminous Efficacy (lm/W)
6537.00	20.48	5568	0.0037	116.15

Ra	x	y	u'	v'
82.3	0.3309	0.3471	0.2035	0.4803

R1	R2	R3	R4	R5
80	87	91	82	81
R6	R7	R8	R9	R10
82	87	68	5	69
R11	R12	R13	R14	R15
81	58	82	95	75

Spectral Distribution & Chromaticity Diagram



3.5 Goniophotometer Test at 25°C for AOK-55WiM(3000K)

Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
230.00	50	0.2440	0.9984	55.96

Luminous Flux (lm)	Maximum Intensity (cd)	Field Angle (10%)	Beam Angle (50%)	Luminous Efficacy (lm/W)
6195.51	3468	163.50	144.90	110.71

Luminous Intensity Distribution



Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt	Zone	Lumens
0-20	618.77	10.00	10.00	0-10	146.30
0-30	1478.09	23.90	23.90	10-20	472.47
0-40	2656.35	42.90	42.90	20-30	859.32
0-60	4983.75	80.40	80.40	30-40	1178.26
0-80	5994.76	96.80	96.80	40-50	1234.23
0-90	6070.87	98.00	98.00	50-60	1093.18
10-90	5924.56	95.60	95.60	60-70	791.53
20-40	2037.58	32.90	32.90	70-80	219.48
20-50	3271.81	52.80	52.80	80-90	76.11
40-70	3118.93	50.30	50.30	90-100	25.20
60-80	1011.01	16.30	16.30	100-110	19.21
70-80	219.48	3.50	3.50	110-120	18.95
80-90	76.11	1.20	1.20	120-130	17.30
90-110	44.42	0.70	0.70	130-140	14.42
90-120	63.37	1.00	1.00	140-150	12.62
90-130	80.67	1.30	1.30	150-160	8.98
90-150	107.72	1.70	1.70	160-170	5.97
90-180	124.64	2.00	2.00	170-180	1.98
110-180	80.23	1.30	1.30		
0-180	6195.51	100.00	100.00		

Total Luminaire Efficiency = 100.00%

**IES "BUG" RATING (BACK LIGHT, UPLIGHT, GLARE)
PER IES TM-15-11**

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	984.2	15.9	15.9
FM - Front-Medium (30-60)	2426.7	39.2	39.2
FH - Front-High (60-80)	548.4	8.9	8.9
FVH - Front-Very High (80-90)	38.4	0.6	0.6
BL - Back-Low (0-30)	493.9	8.0	8.0
BM - Back-Medium (30-60)	1078.9	17.4	17.4
BH - Back-High (60-80)	462.6	7.5	7.5
BVH - Back-Very High (80-90)	37.7	0.6	0.6
UL - Uplight-Low (90-100)	25.2	0.4	0.4
UH - Uplight-High (100-180)	99.4	1.6	1.6

Total 6195.4 100.1 100.0

BUG Rating B2-U3-G1

Luminous Intensity (cd) Distribution Data

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506
1	1568	1568	1527	1537	1516	1476	1476	1485	1465	1485	1476	1476	1516	1537	1527	1568	1568
2	1568	1600	1547	1547	1516	1486	1446	1454	1444	1454	1446	1486	1516	1547	1547	1600	1568
3	1630	1610	1577	1547	1537	1466	1425	1423	1403	1423	1425	1466	1537	1547	1577	1610	1630
4	1651	1652	1597	1577	1527	1455	1395	1413	1403	1413	1395	1455	1527	1577	1597	1652	1651
5	1692	1693	1638	1567	1537	1445	1385	1371	1362	1371	1385	1445	1537	1567	1638	1693	1692
10	1960	1922	1789	1669	1537	1394	1294	1278	1238	1278	1294	1394	1537	1669	1789	1922	1960
15	2476	2358	2032	1761	1547	1333	1233	1163	1114	1163	1233	1333	1547	1761	2032	2358	2476
20	2971	2877	2477	1862	1547	1293	1132	1018	929	1018	1132	1293	1547	1862	2477	2877	2971
25	3239	3261	2861	2005	1577	1282	1051	842	763	842	1051	1282	1577	2005	2861	3261	3239
30	3177	3376	3225	2208	1638	1272	950	717	619	717	950	1272	1638	2208	3225	3376	3177
35	2703	3127	3458	2463	1730	1293	869	613	578	613	869	1293	1730	2463	3458	3127	2703
40	1898	2441	3397	2738	1862	1333	768	561	516	561	768	1333	1862	2738	3397	2441	1898
45	1052	1496	2973	3023	2005	1364	687	488	454	488	687	1364	2005	3023	2973	1496	1052
50	495	737	2103	3277	2208	1415	586	405	392	405	586	1415	2208	3277	2103	737	495
55	310	343	1072	3318	2381	1455	495	343	330	343	495	1455	2381	3318	1072	343	310
60	248	249	486	2951	2442	1466	364	291	289	291	364	1466	2442	2951	486	249	248
65	248	229	243	2005	2188	1262	263	239	227	239	263	1262	2188	2005	243	229	248
70	165	208	162	662	1282	580	192	197	165	197	192	580	1282	662	162	208	165
75	124	135	132	153	407	193	142	125	124	125	142	193	407	153	132	135	124
80	82	83	91	112	193	122	101	93	82	93	101	122	193	112	91	83	82
85	62	62	61	81	112	92	61	52	62	52	61	92	112	81	61	62	62
90	41	21	30	41	61	30	30	21	21	21	30	30	61	41	30	21	41
95	21	10	10	30	30	20	20	21	21	21	20	20	30	30	10	10	21
100	21	10	20	10	20	10	20	21	21	21	20	10	20	10	20	10	21
105	21	21	30	20	20	20	20	21	21	21	20	20	20	20	30	21	21
110	21	21	20	20	10	20	20	21	21	21	20	20	10	20	20	21	21
115	21	21	10	10	20	20	30	21	21	21	30	20	20	10	10	21	21
120	21	10	20	20	20	20	20	10	21	10	20	20	20	20	20	10	21
125	21	21	30	20	20	20	30	21	21	21	30	20	20	20	30	21	21
130	21	10	20	20	20	30	20	21	21	21	20	30	20	20	10	21	21
135	21	21	20	20	10	20	20	21	21	21	20	20	10	20	20	21	21
140	0	10	20	10	20	20	20	21	21	21	20	20	20	10	20	10	0
145	21	10	20	20	20	30	20	21	21	21	20	30	20	20	20	10	21
150	21	10	20	20	20	20	20	21	21	21	20	20	20	20	20	10	21
155	21	21	0	20	10	20	10	21	21	21	10	20	10	20	0	21	21
160	21	21	20	20	20	20	20	21	21	21	20	20	20	20	20	21	21
165	21	21	20	20	10	20	20	21	21	21	20	20	10	20	20	21	21
170	21	21	20	30	20	20	20	21	21	21	20	20	20	30	20	21	21
175	21	10	10	20	20	30	20	21	21	21	20	30	20	20	10	10	21
180	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

3.6 Electrical Test for AOK-55WIM(3000K)

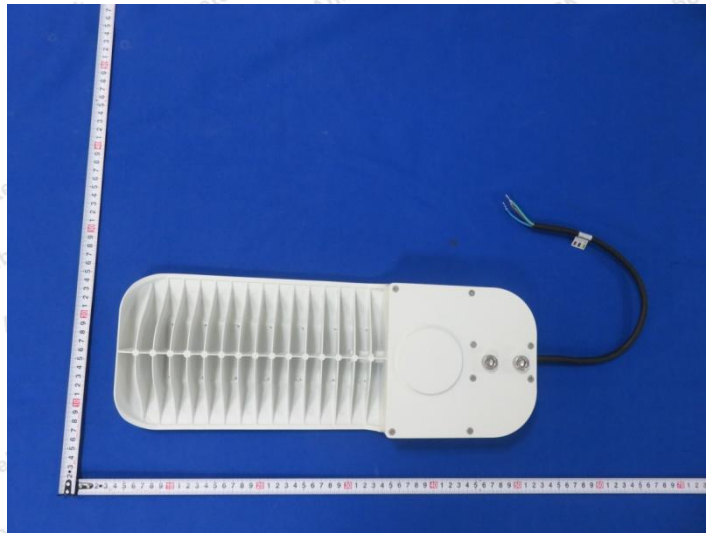
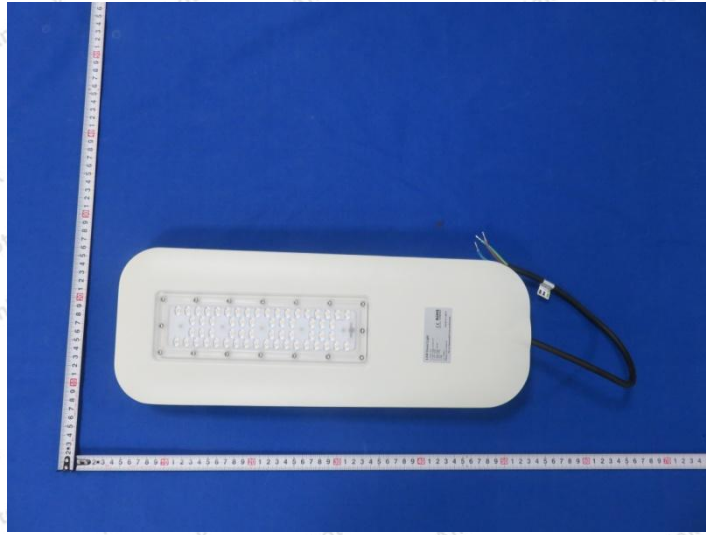
Input Voltage (V)	Frequency (Hz)	Current (A)	Power Factor	THDi
230.10	50	0.2430	0.9985	5.12%

4 Test Equipment

Equipment Name	Manufacturer	Model No	Reference No	Calibration Due Date
Integrating Sphere (1.5m)	SENSING	SPR-600M	SE-451	Before Use
Integrating Sphere (2.0m)	EVERFINE	YF-1000	SE-599	Before Use
Standard Lamp	EVERFINE	D062	SE-606	2019-06-05
Digital Power Meter	YOKOGAWA	WT210	SE-074	2019-06-05
Goniophotometer System	SENSING	GMS-3000	SE-450	Before Use
Standard Lamp	SENSING	110V/100W	SE-465	2019-06-05
Digital Power Meter	YOKOGAWA	WT310	SE-381	2019-06-05
AC Power Source	HUAYANG	HY9010	SE-114	Before Use
DC Power Source	EVERFINE	WY605	SE-605	2019-06-05
Temperature Sensor	WALVICO	HG126D	SE-616	2019-06-05

Statement of Traceability: Shenzhen Anbotek Compliance Laboratory Limited attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

Attachment A – Product Photo



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