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Version 1.0

Total pages 20

## Test report of

## IES LM-79-08

## Approved Method: Electrical and Photometric

## Measurements of Solid-State Lighting Products

### Applicant:

IKIO LED LIGHTING (DONGGUAN) CO LTD

### Address:

2F, Building D, XinHe Industrial Zone, NO 12, Shengfeng Road, Wangjiang District,  
Dongguan, Guangdong 523061

### For Product:

2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces

### Model No.:

IK-AT22S-0025-30K-MS, IK-AT22S-0025-50K-MS

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co.,Ltd, 1Floor, No.1 Building, Meibaohe  
Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.



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Complied by: Hunter Ou

Review by: Jason Zhou

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Project Engineer

Technical Manager

Note: The test data was only valid for the test sample(s). 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 Belling Efficiency Testing Lab Co.,Ltd. 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. Government.



# 1 General

## 1.1 Product Information

<b>Manufacturer</b>	IKIO LED LIGHTING (DONGGUAN) CO LTD
<b>Manufacturer Address</b>	2F, Building D, XinHe Industrial Zone, NO 12, Shengfeng Road, Wangjiang District, Dongguan, Guangdong 523061
<b>Brand Name</b>	IKIO
<b>Luminaire Type</b>	2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
<b>Model Number</b>	IK-AT22S-0025-30K-MS, IK-AT22S-0025-50K-MS
<b>Rated Inputs</b>	AC 120-277V, 50/60Hz
<b>Rated Power</b>	25 W
<b>Nominal CCT</b>	3000K, 5000K
<b>Dimming Capability</b>	Continuous
<b>Integral Control Sensors</b>	Yes
<b>Date of Receipt Samples</b>	2021-03-26
<b>Date of test</b>	2021-03-26 to 2021-03-29
<b>Burning Time Before Test</b>	0hour(For New Products)

## 1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- 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	2021-04-02
AC Power Source	ALL POWER	APW-110N	992257	2021-04-02
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S1510065	2021-04-08
Total Spectral Radiant Flux Standard Lamp	SENSING	12V/20W	LSD12201731	2021-04-08
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2021-04-02
Integral Sphere	SENSING	SPR-600M	N.A	2021-04-02
Digital Power Meter	YOKOGAWA	WT210	91L929742	2021-04-02
Optical Color and Electrical Measurement System	SENSING	SPR-3000	S1101108	2021-04-02
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Environment Measurer	XUYAO	HS-1	N/A	2021-04-08
Stop watch	KISLO	K610	N/A	2021-04-27
Digital Anemometer	TECMAN	TD8901	026141	2021-09-09

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co.,Ltd 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  $\pm 0.2$  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.  $4\pi$  geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is  $U=1.8\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=20\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=1.8(K=2)$ , at the 95% confidence level. The uncertainty of power meter AC current  $U=0.18\%$  of rdg, AC Voltage  $U=0.16\%$  of rdg, Power  $U=0.20\%$  ( $K=2$ ), at the 95% confidence level.



## 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.

Goniophotometer Uncertainty :The uncertainty of the luminous intensity is  $U=1.6\%$  ( $K=2$ ), at the 95% confidence level.



## 3 Test Result Summary

### 3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

#### 3.1.1 Model Number: IK-AT22S-0025-30K-MS

##### Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.02	60	0.206	24.55	0.992

##### Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
3082.87	125.6	3028

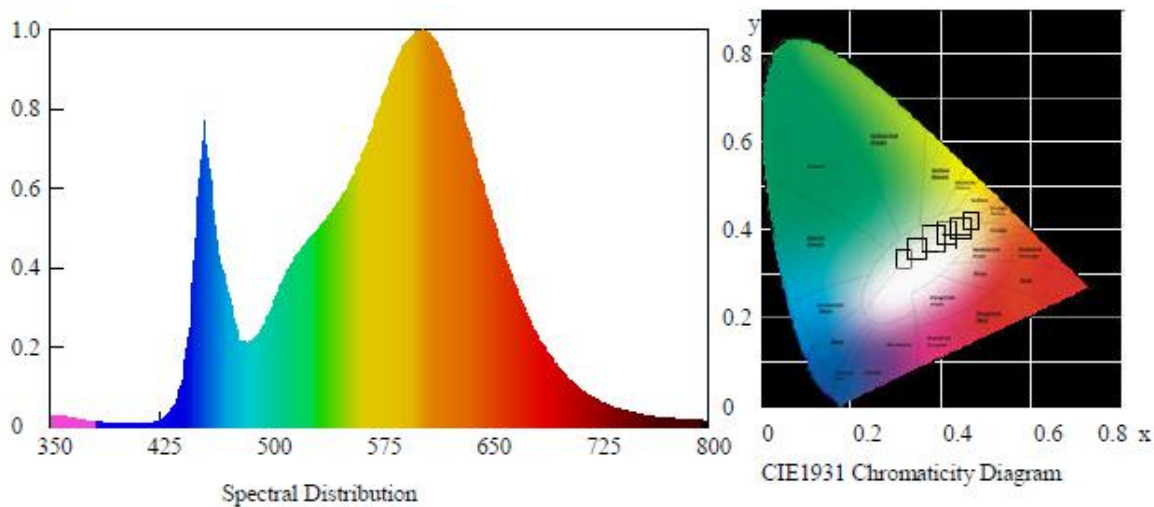
##### Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00405	0.4293	0.3915	0.2511	0.5152

##### Color Rendering

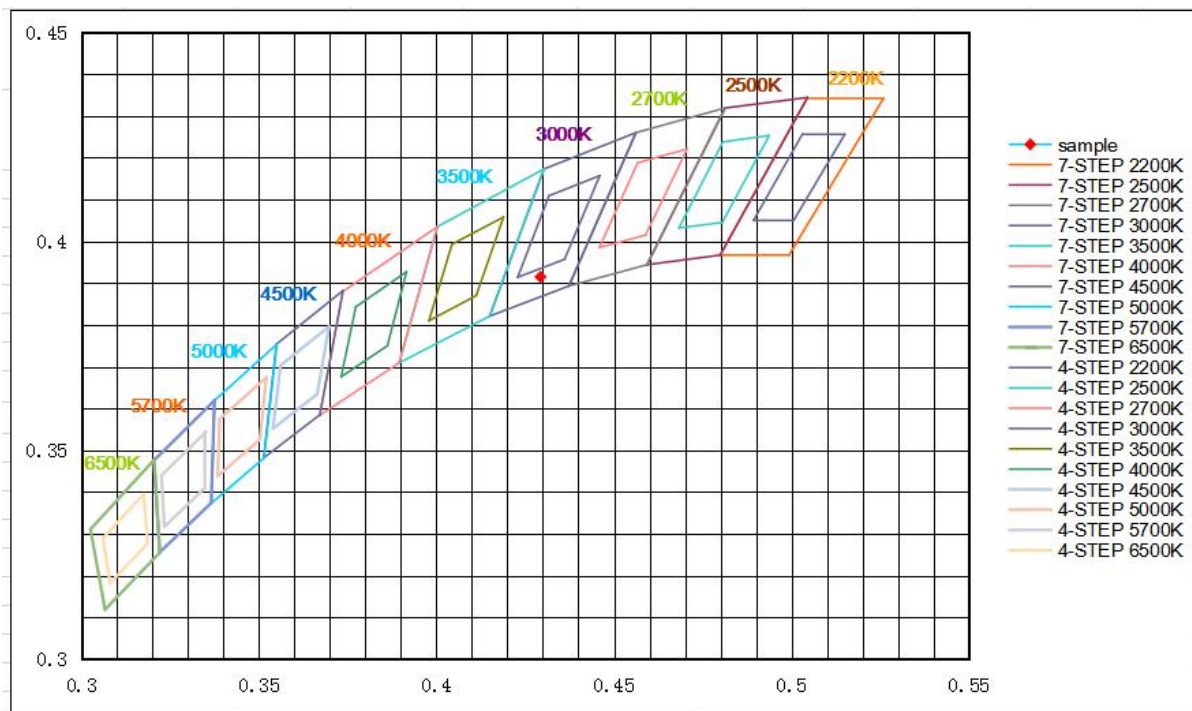
CRI	R9	Rf	Rg	Rcs,h1(%)
82.6	9	83	95	-12

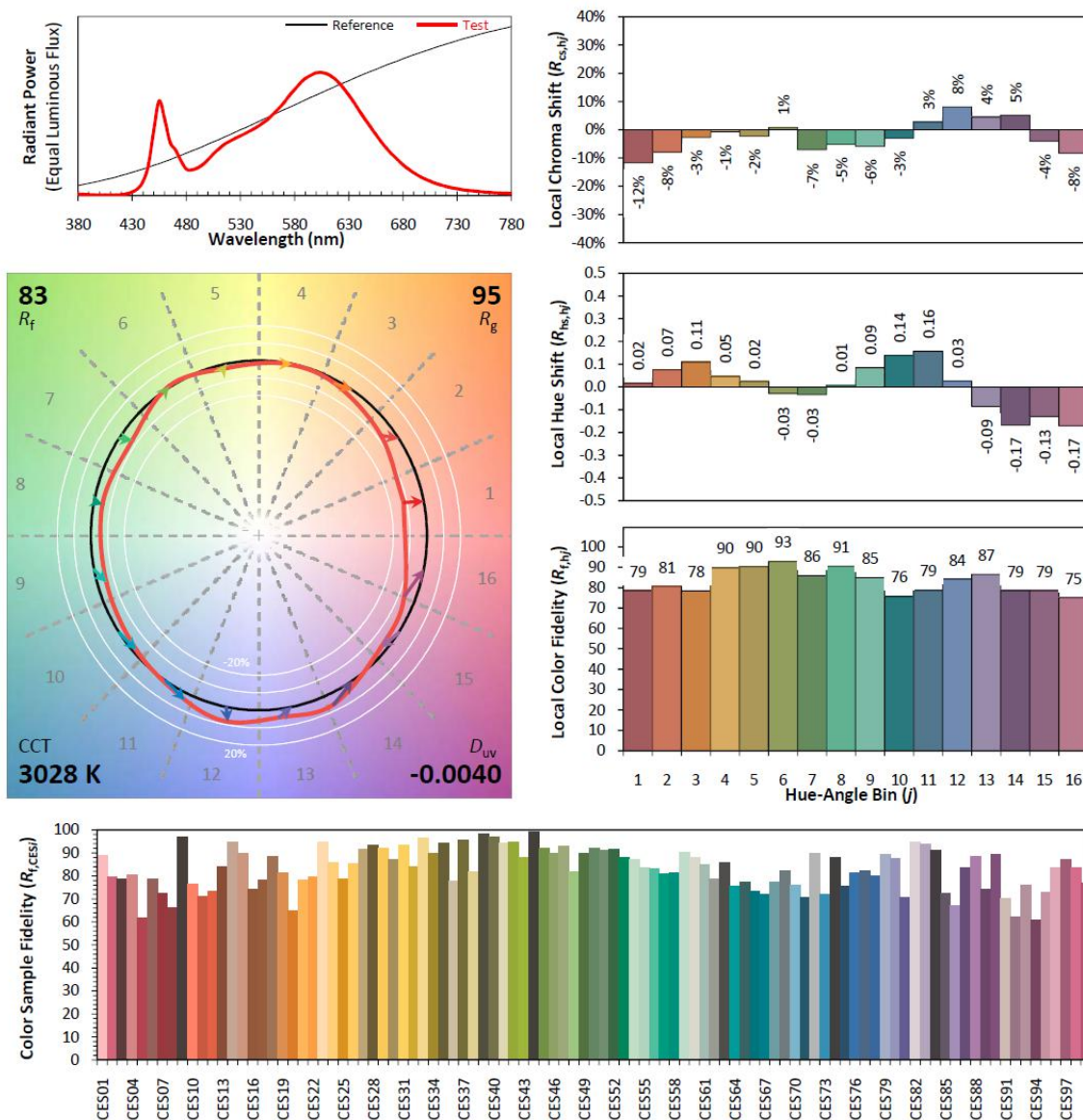
##### Spectral Distribution





### 7/4 Step Quadrangle



**ANSI/IES TM-30-18 Color Rendition Report****Source:** BL210331012-9**Manufacturer:** IKIO LED LIGHTING (DONGGUAN) CO LTD**Date:** 2021/3/31**Model:** IK-AT22S-0025-30K-MS

**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

 $x$  0.4293 $y$  0.3915 $u'$  0.2511 $v'$  0.5152

CIE 13.3-1995  
(CRI)

 $R_a$  83 $R_g$  9

ors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.





### 3.1.2 Model Number: IK-AT22S-0025-50K-MS

#### Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.01	60	0.207	24.62	0.993

#### Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
3236.16	131.4	5138

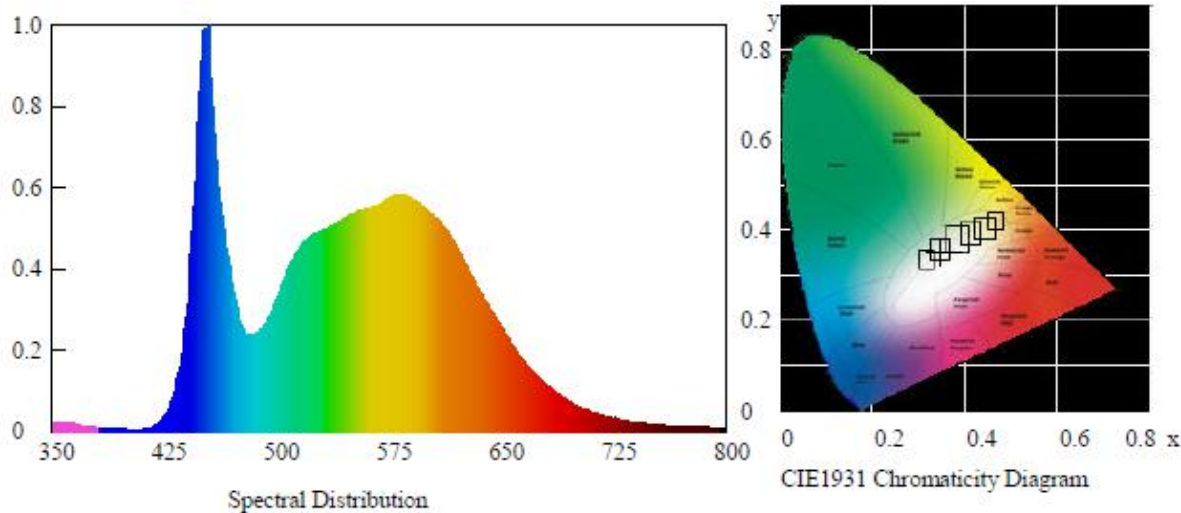
#### Chromaticity Coordinate

Duv	x	y	u'	v'
+0.00206	0.3416	0.3529	0.2086	0.4848

#### Color Rendering

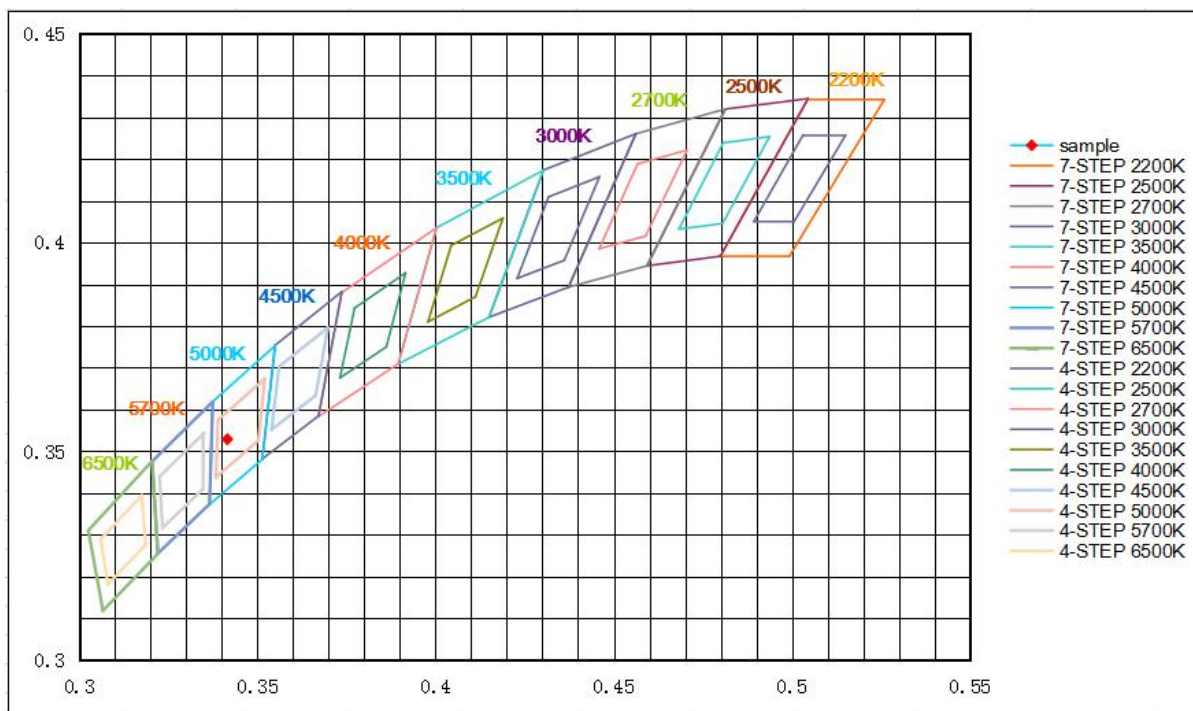
CRI	R9	Rf	Rg	Rcs,h1(%)
82.8	5	83	95	-13

#### Spectral Distribution





### 7/4 Step Quadrangle



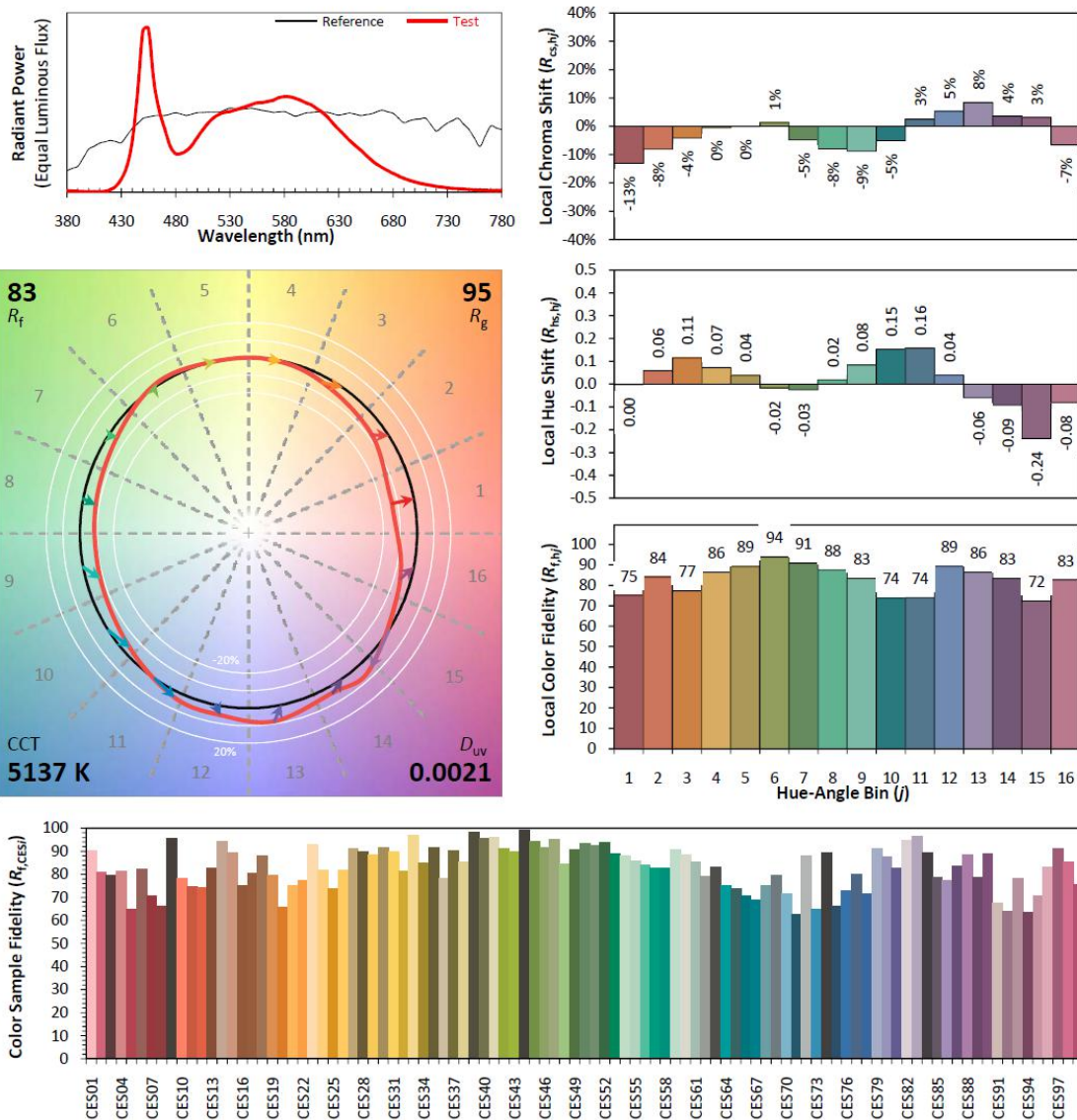
**ANSI/IES TM-30-18 Color Rendition Report**

Source: BL210331012-9

Manufacturer: IKIO LED LIGHTING (DONGGUAN) CO LTD

Date: 2021/3/31

Model: IK-AT22S-0025-50K-MS



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

 $x$  0.3416 $y$  0.3529 $u'$  0.2086 $v'$  0.4848CIE 13.3-1995  
(CRI) $R_a$  83 $R_9$  5

ors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.



### 3.2 Goniophotometer System (Total operating time for luminous intensity distribution: 1.0 hour)

#### 3.2.1 Model Number: IK-AT22S-0025-30K-MS

##### Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.08	60	0.206	24.58	0.992

##### Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	S/MH (C0/180)	S/MH (C90/270)	Zonal Lumen in 0-60°(%lm)
3093.34	125.85	1.18	1.30	75.76

**Zonal Flux Diagram**

Zonal flux distribution table

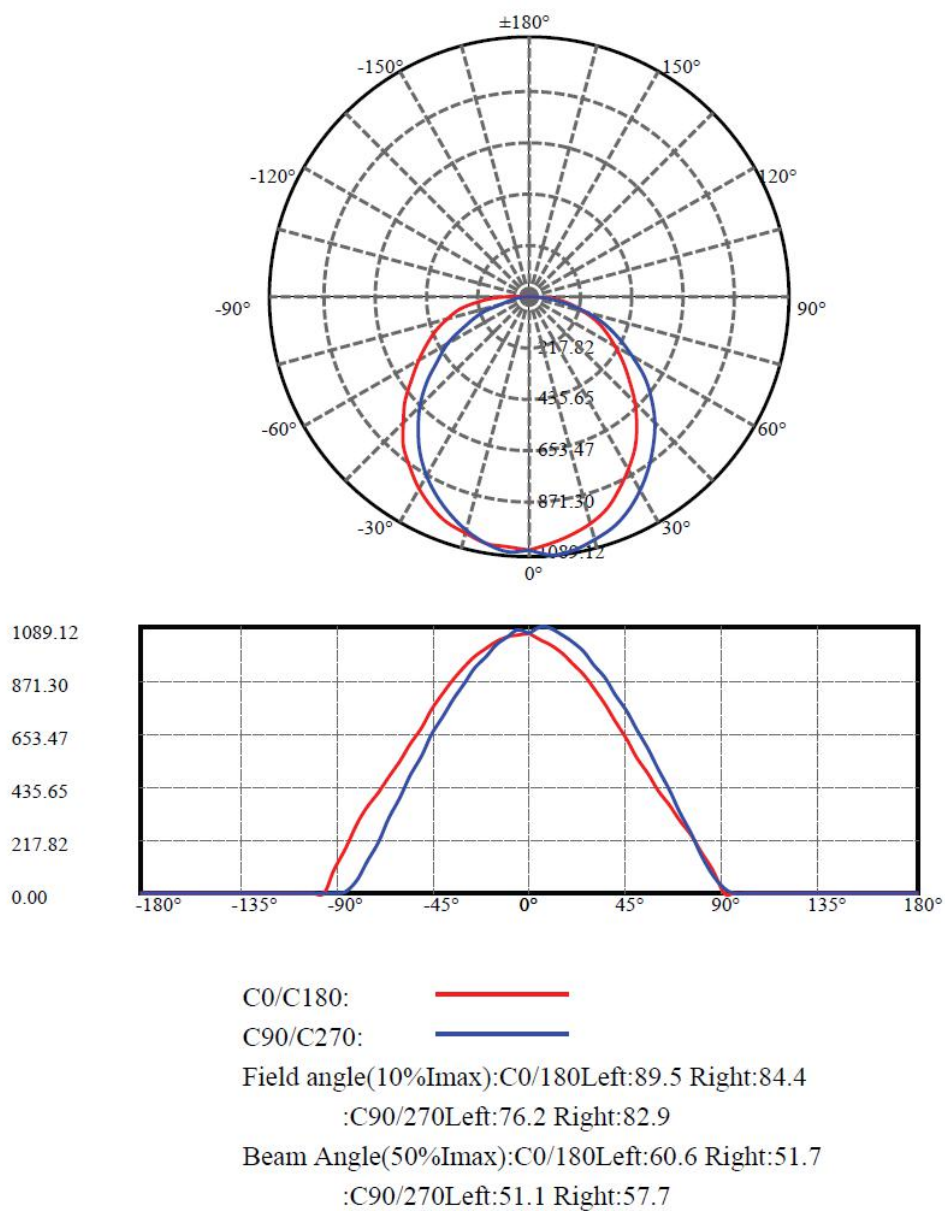
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	1062.986	0.000	0	0.00%	0.00%
5.0	1058.311	25.359	25.359	0.00%	0.82%
10.0	1042.301	75.145	100.505	0.00%	3.25%
15.0	1015.870	122.089	222.594	0.00%	7.20%
20.0	980.562	164.534	387.128	0.00%	12.51%
25.0	936.099	201.022	588.151	0.00%	19.01%
30.0	884.067	230.344	818.494	0.00%	26.46%
35.0	824.308	251.570	1070.064	0.00%	34.59%
40.0	759.032	264.168	1334.233	0.00%	43.13%
45.0	687.731	267.880	1602.112	0.00%	51.79%
50.0	612.034	262.637	1864.749	0.00%	60.28%
55.0	534.955	249.394	2114.143	0.00%	68.34%
60.0	457.789	229.470	2343.613	0.00%	75.76%
65.0	382.267	204.219	2547.832	0.00%	82.37%
70.0	308.142	174.816	2722.648	0.00%	88.02%
75.0	237.700	142.674	2865.322	0.00%	92.63%
80.0	170.416	109.200	2974.522	0.00%	96.16%
85.0	97.892	72.906	3047.428	0.00%	98.52%
90.0	28.861	34.706	3082.133	0.00%	99.64%
95.0	0.262	7.974	3090.108	0.00%	99.90%
100.0	0.189	0.123	3090.23	0.00%	99.90%
105.0	0.233	0.113	3090.343	0.00%	99.90%
110.0	0.262	0.129	3090.473	0.00%	99.91%
115.0	0.379	0.162	3090.635	0.00%	99.91%
120.0	0.393	0.188	3090.823	0.00%	99.92%
125.0	0.539	0.215	3091.038	0.00%	99.93%
130.0	0.640	0.256	3091.294	0.00%	99.93%
135.0	0.655	0.262	3091.556	0.00%	99.94%
140.0	0.888	0.286	3091.842	0.00%	99.95%
145.0	0.931	0.304	3092.145	0.00%	99.96%
150.0	1.019	0.287	3092.432	0.00%	99.97%
155.0	1.077	0.265	3092.697	0.00%	99.98%
160.0	1.077	0.226	3092.923	0.00%	99.99%
165.0	1.106	0.180	3093.103	0.00%	99.99%
170.0	1.091	0.130	3093.233	0.00%	100.00%
175.0	1.150	0.080	3093.314	0.00%	100.00%
180.0	1.246	0.029	3093.342	0.00%	100.00%





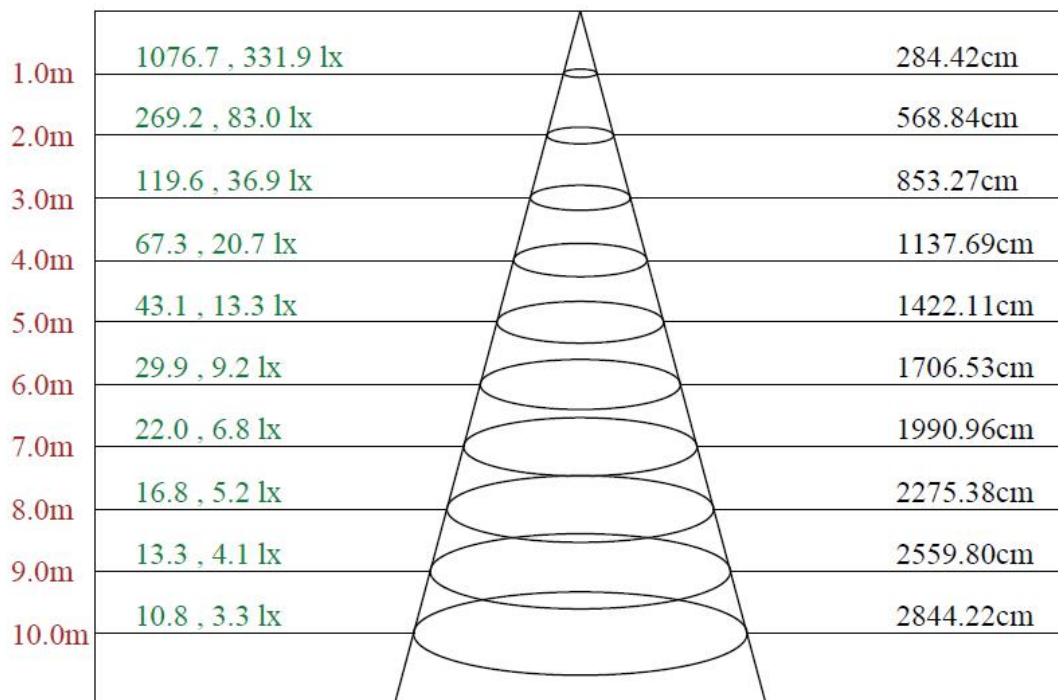
## Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]





## Lux distance Curve



Max , Ave

Beam angle of C90 plane 109.77



## UGR Glare

Illumination assessment according UGR											
Rf of Ceiling	70	70	50	50	30	70	70	50	50	30	
Rf of Wall	50	30	50	30	30	50	30	50	30	30	
Rf of Floor	20	20	20	20	20	20	20	20	20	20	
Room dimensions		Viewed crosswise					Viewed endwise				
X	Y										
2H	2H	14.96	16.61	15.32	16.94	17.26	15.39	17.05	15.75	17.37	17.69
	3H	17.05	18.56	17.44	18.91	19.26	17.36	18.87	17.75	19.22	19.57
	4H	18.01	19.43	18.41	19.79	20.16	18.17	19.59	18.56	19.95	20.32
	6H	18.89	20.23	19.30	20.60	21.00	18.84	20.17	19.25	20.54	20.94
	8H	19.26	20.55	19.67	20.93	21.33	19.08	20.37	19.50	20.75	21.16
4H	12H	19.56	20.80	19.98	21.19	21.60	19.26	20.49	19.68	20.88	21.30
	2H	15.56	16.99	15.96	17.34	17.71	15.91	17.34	16.31	17.69	18.06
	3H	17.88	19.11	18.30	19.50	19.91	18.03	19.26	18.45	19.65	20.06
	4H	19.07	20.16	19.50	20.58	21.02	18.95	20.05	19.39	20.47	20.91
	6H	20.08	21.06	20.54	21.50	21.95	19.69	20.67	20.15	21.11	21.56
8H	8H	20.55	21.47	21.02	21.92	22.39	20.01	20.93	20.48	21.38	21.85
	12H	20.95	21.81	21.43	22.25	22.76	20.27	21.13	20.75	21.57	22.08
	4H	19.38	20.30	19.86	20.75	21.22	19.28	20.20	19.75	20.65	21.12
	6H	20.58	21.36	21.07	21.82	22.33	20.11	20.89	20.60	21.36	21.86
	8H	21.22	21.90	21.73	22.41	22.91	20.54	21.23	21.05	21.74	22.23
12H	12H	21.76	22.34	22.28	22.86	23.37	20.86	21.45	21.38	21.96	22.47
	4H	19.42	20.27	19.89	20.72	21.22	19.35	20.21	19.83	20.65	21.16
	6H	20.71	21.39	21.22	21.90	22.39	20.28	20.97	20.79	21.48	21.97
	8H	21.36	21.95	21.89	22.46	22.97	20.71	21.29	21.23	21.80	22.32
Variation with the observer position at spacings:											
S = 1.0H		0.2/-0.6					0.2/-0.8				
S = 1.5H		0.6/-0.5					0.5/-0.6				
S = 2.0H		0.9/-0.8					0.5/-0.6				
Standard tables:		BKBF					BKBF				
Uncorrected UGR		5.3					5.4				

UGR calculation is based on CIE Publ. 117, S/H = 1



**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	1062.99	1038.12	1015.30	982.93	943.35	893.75	836.69	772.89	704.89
22.5	1062.99	1036.26	1014.60	983.17	944.28	896.08	842.75	781.04	712.58
45.0	1062.99	1033.47	1014.84	985.26	947.31	900.27	844.84	783.13	717.70
67.5	1062.99	1050.70	1033.23	1005.06	966.87	921.92	867.20	805.96	740.05
90.0	1062.99	1089.12	1079.11	1057.69	1025.78	985.26	934.73	876.51	811.54
112.5	1062.99	1085.16	1077.48	1057.69	1029.04	989.22	940.79	884.66	823.42
135.0	1062.99	1080.04	1073.29	1055.59	1028.81	990.62	944.51	891.65	830.17
157.5	1062.99	1071.89	1065.37	1048.37	1020.89	984.80	942.88	888.86	829.01
180.0	1062.99	1053.96	1047.21	1029.97	1004.36	969.20	925.18	872.56	817.13
202.5	1062.99	1046.97	1037.19	1017.63	988.99	951.50	905.39	853.46	794.08
225.0	1062.99	1040.69	1028.11	1005.52	973.15	933.10	885.13	828.78	766.60
247.5	1062.99	1052.56	1036.96	1010.88	977.11	932.64	882.34	825.75	757.29
270.0	1062.99	1073.75	1049.30	1014.14	970.59	918.43	861.14	792.91	723.05
292.5	1062.99	1066.53	1041.15	1005.06	961.51	907.49	846.94	778.71	708.62
315.0	1062.99	1060.48	1035.80	1000.17	955.92	904.46	843.91	777.31	705.59
337.5	1062.99	1053.26	1027.88	994.81	951.03	898.87	840.65	774.75	702.79
360.0	1062.99	1038.12	1015.30	982.93	943.35	893.75	836.69	772.89	704.89
C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	629.21	555.86	486.00	419.63	359.32	300.17	235.66	171.62	97.80
22.5	638.76	563.54	489.49	418.93	353.03	288.06	230.07	162.08	93.85
45.0	646.21	570.76	490.89	413.81	337.89	267.80	205.16	142.05	75.92
67.5	667.86	591.48	511.38	427.31	345.11	256.85	177.21	106.19	49.83
90.0	744.01	669.73	590.79	506.49	421.72	332.07	241.48	155.32	75.68
112.5	754.96	680.44	604.29	521.86	435.93	347.21	265.00	186.76	116.90
135.0	763.11	692.32	613.37	531.87	455.96	380.74	308.78	241.25	169.53
157.5	764.04	689.99	616.63	544.44	476.68	409.85	344.88	281.77	186.06
180.0	748.44	676.02	605.46	539.09	474.58	412.64	351.63	287.36	185.60
202.5	727.48	653.66	585.20	512.08	443.61	379.81	316.00	251.96	157.88
225.0	697.90	630.84	550.03	469.93	395.88	323.22	255.46	194.21	117.37
247.5	687.66	610.81	533.73	453.16	366.07	278.74	195.61	122.95	61.48
270.0	646.44	564.01	477.84	392.85	301.33	210.51	126.45	53.33	7.92
292.5	630.61	548.87	465.04	380.97	291.08	210.05	141.12	83.37	28.41
315.0	632.00	547.01	462.94	384.46	314.60	248.94	187.23	125.52	58.92
337.5	625.02	547.24	476.21	407.75	343.48	283.63	221.46	160.91	83.13
360.0	629.21	555.86	486.00	419.63	359.32	300.17	235.66	171.62	97.80
C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	0.70	0.47	0.47	0.47	0.47	0.70	0.70	0.93	0.70
22.5	0.70	0.47	0.47	0.23	0.23	0.70	0.70	0.93	0.93
45.0	0.93	0.47	0.47	0.47	0.47	0.70	0.70	0.70	0.93
67.5	0.93	0.00	0.00	0.47	0.47	0.47	0.70	0.70	0.93
90.0	17.00	0.00	0.00	0.00	0.23	0.23	0.00	0.23	0.23
112.5	48.44	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.47
135.0	90.82	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.23
157.5	110.61	0.47	0.00	0.23	0.00	0.23	0.00	0.00	0.23
180.0	97.11	0.23	0.23	0.00	0.00	0.23	0.23	0.23	0.23
202.5	65.90	0.23	0.00	0.00	0.00	0.00	0.23	0.23	0.47
225.0	24.68	0.00	0.00	0.00	0.00	0.00	0.23	0.47	0.47
247.5	1.63	0.00	0.00	0.00	0.00	0.23	0.00	0.47	0.70
270.0	0.70	0.47	0.23	0.70	0.70	0.93	0.93	0.93	1.16
292.5	0.47	0.47	0.47	0.23	0.47	0.47	0.70	0.93	0.93
315.0	0.70	0.23	0.23	0.47	0.47	0.47	0.47	0.93	0.93
337.5	0.47	0.47	0.47	0.47	0.70	0.70	0.70	0.70	0.70
360.0	0.70	0.47	0.47	0.47	0.47	0.70	0.70	0.93	0.70



C/ $\gamma$ (°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	0.93	1.16	1.16	0.93	1.16	1.40	1.16	1.40	1.16
22.5	0.93	1.16	0.93	1.16	0.93	1.40	0.93	1.16	1.16
45.0	0.93	1.16	1.16	1.16	1.16	1.40	1.16	0.93	1.16
67.5	0.70	0.93	0.93	1.16	1.16	0.93	1.16	0.93	1.40
90.0	0.47	0.70	0.70	0.93	0.93	0.93	1.16	1.16	1.16
112.5	0.23	0.70	0.70	0.70	0.93	0.70	0.93	0.70	0.93
135.0	0.47	0.47	0.70	0.70	0.93	0.70	0.93	0.93	1.16
157.5	0.47	0.70	0.70	0.70	0.93	0.93	0.93	0.70	1.16
180.0	0.47	0.70	0.47	0.93	0.70	0.93	0.93	0.93	0.93
202.5	0.23	0.47	0.47	0.70	0.93	0.93	0.93	0.93	0.93
225.0	0.47	0.70	0.93	0.93	0.93	0.93	0.93	1.16	0.93
247.5	0.23	0.70	0.70	0.93	0.93	0.93	1.16	0.93	0.70
270.0	1.16	1.40	1.63	1.63	1.63	1.63	1.86	1.63	1.86
292.5	0.93	0.93	1.40	1.40	1.63	1.16	1.16	1.16	1.40
315.0	0.93	1.16	1.16	1.16	1.16	1.16	1.16	1.63	1.16
337.5	0.93	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
360.0	0.93	1.16	1.16	0.93	1.16	1.40	1.16	1.40	1.16

C/ $\gamma$ (°)	180.0
0.0	1.25
22.5	1.25
45.0	1.25
67.5	1.25
90.0	1.25
112.5	1.25
135.0	1.25
157.5	1.25
180.0	1.25
202.5	1.25
225.0	1.25
247.5	1.25
270.0	1.25
292.5	1.25
315.0	1.25
337.5	1.25
360.0	1.25



## 4 Additional Test

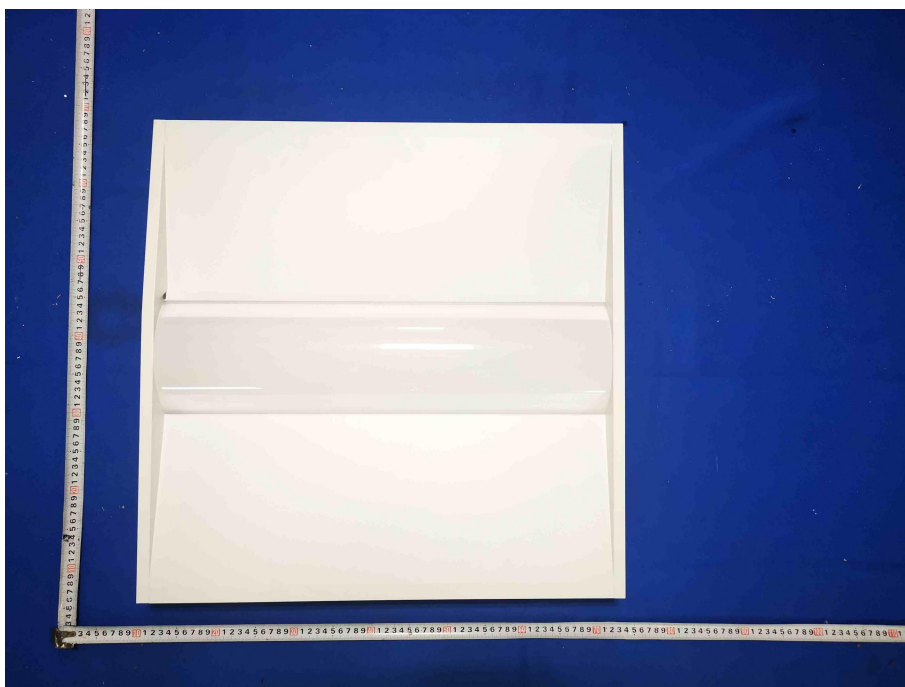
### Electrical data at 120V, 277V

Model Number	Test Item	Test Voltage (V)	Frequency(Hz)	Test Result
IK-AT22S-0025-30K-MS	Power Factor	120	60	0.993
	THD	120	60	5.5%
	Power Factor	277	60	0.936
	THD	277	60	10.7%





## Photo Document



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