LCTECH

IESNA SUSTAINING MEMBER

Ref. No.: LCZP17030367
Version: 1.0
Date of issue: Apr. 8, 2017
Total pages: 11

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:
IKIO LED LIGHTING
8470 Allison Pointe Blvd, Suite
128 Indianapolis, IN 46250

For products:
Direct Linear Ambient Luminaires

Models No.:
IK-RL05IN-0020-30-J

Test Date:	Apr. 3, 2017
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 Fax:+86-760-22833399 E-mail:Service@lccert.com http://www.lccert.com
Template No.:	LC-RT-PL/LM79-08/01
Test Note:	

Complied by:	**Reviewed by:**
Bowen Pang	**Richard Li**
Project Engineer	**Technical Manager**
Apr. 8, 2017	**Apr. 8, 2017**

Table of Contents

1. General

1.1 Product Information

Brand Name	IKIO
Category	Indoor
General Application	Linear Ambient
Product Type	Direct Linear Ambient Luminaires
Model Number	IK-RL05IN-0020-30-J
Rated Inputs	120-277V, 50/60Hz
Rated Power	20W
Rated Light output	2400lm
Declared CCT	3000K
Power Supply	XZ-TP30B-420043
LED Package, Array or Module	Model: XUYUSMD2835, manufactured by Shenzhen XuYu Optoelectronics Co.,Ltd
Receipt Samples	1 unit
Sample Code of lab.	1703301135
Date of Receipt Samples	Mar. 30, 2017
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG 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 Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2017-02-04	2018-02-03
AC Power supply	LC-I-987	APW-110N	2017-02-04	2018-02-03
Power analyzer	LC-I-928	WT210	2017-01-19	2018-01-19
Power analyzer	LC-I-954	WT210	2017-02-04	2018-02-03
Multimeter	LC-I-972	Fluke 17B	2016-08-10	2017-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-002	24V100W	2016-10-08	2017-10-07
Luminous Flux Standard Lamp	LC-PL-I-001	110V/200W	2016-09-24	2017-09-23
Goniophotometer(with mirror)	LC-I-902	GMS2000	2016-05-07	2017-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2017-02-10	2018-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2017-02-10	2018-02-10

2. Test conducted and method

The luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25 °C ± 1°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 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	119.98V~60Hz	120.06V~60Hz
Input Current(A)	0.156	0.156
Total Power(W)	18.74	18.59
Power Factor	0.993	0.993
I-THD	5.78%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	2466.88
Luminous Length(ft)	-	4.66
Lumens per Foot(lm/ft)	-	529.37
Luminaire Efficacy(Lm/W)	-	132.70
Correlated Color Temperature (CCT)(K)	2917	-
Color Rendering Index (CRI)	82.1	-
R9	5	-
Chromaticity Coordinate (x,y)	x=0.4428 y=0.4057	-
Chromaticity Coordinate (u,v)	u=0.2536 v=0.3486	-
Chromaticity Coordinate (u',v')	u'=0.2536 v'=0.5229	-
Duv	-0.00010	-
Zone Lumens between 0-60 °	-	57.40%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	92	95	80	81	91	81	57
R9	R10	R11	R12	R13	R14	R15	-
5	82	79	72	84	98	73	-

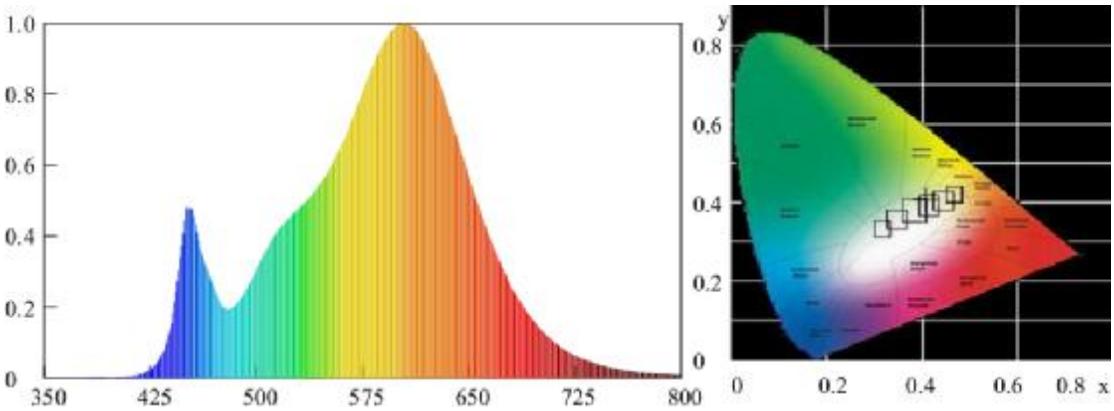
3.4 Additional test at 277V

Criteria Item	Result(Sphere)
Input Voltage & Frequency	277.04V~60Hz
Power Factor	0.920
I-THD	9.54%
Off-state Power(W)	-

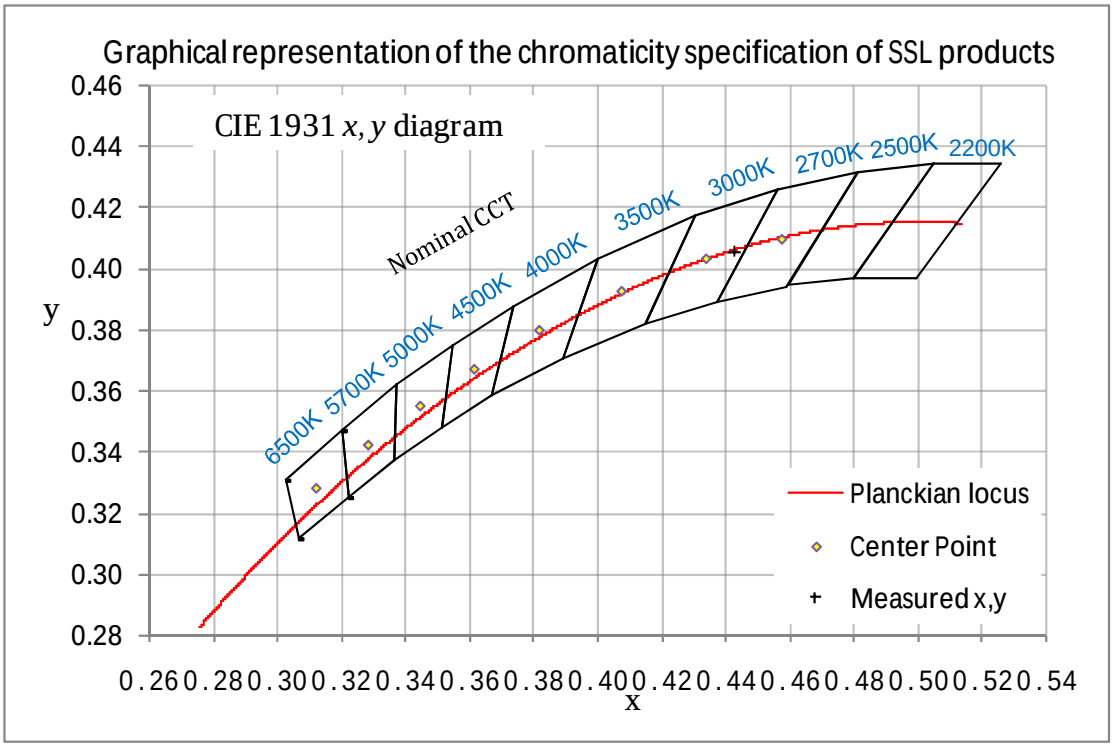
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.26	Luminous Length	1.42 m
Spacing Criteria (90-270)	1.28	Luminous Width	0.04 m
Spacing Criteria (Diagonal)	1.42	Luminous Height	0.01 m
Test Distance	29.65 m	Luminous Diameter	N/A

4.4 Zonal Lumen Summary

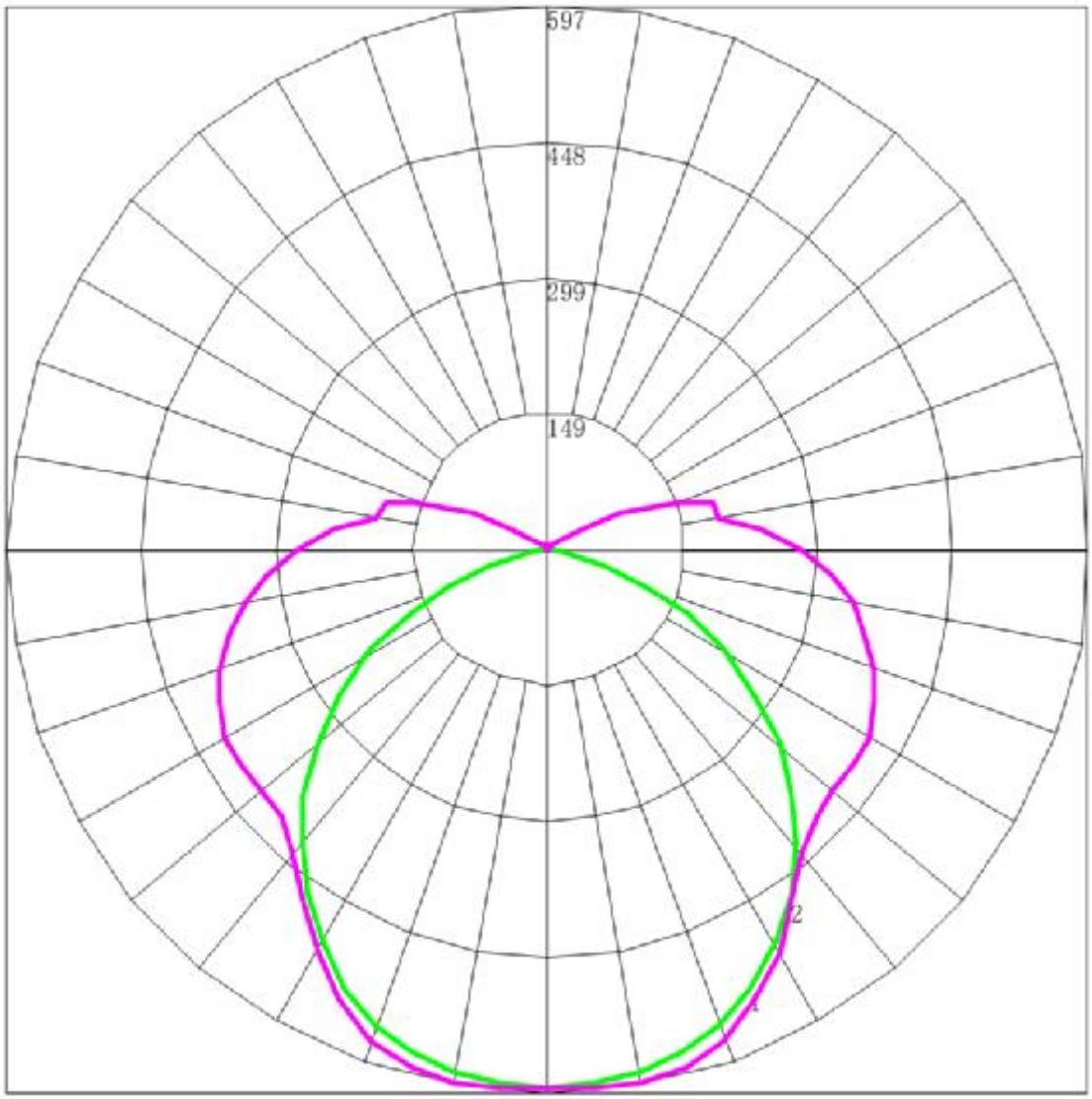
Zone	Lumens	%Lamp	%Fixt
0-20	221.33	9.00	9.00
0-30	473.41	19.20	19.20
0-40	777.29	31.50	31.50
0-60	1415.56	57.40	57.40
0-80	1976.28	80.10	80.10
0-90	2187.48	88.70	88.70
10-90	2131.00	86.40	86.40
20-40	555.95	22.50	22.50
20-50	875.92	35.50	35.50
40-70	937.95	38.00	38.00
60-80	560.72	22.70	22.70
70-80	261.05	10.60	10.60
80-90	211.20	8.60	8.60
90-110	234.92	9.50	9.50
90-120	269.56	10.90	10.90
90-130	274.57	11.10	11.10
90-150	277.70	11.30	11.30
90-180	279.40	11.30	11.30
110-180	44.48	1.80	1.80
0-180	2466.88	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	56.48
10-20	164.85
20-30	252.08
30-40	303.87
40-50	319.97
50-60	318.31
60-70	299.67
70-80	261.05
80-90	211.20
90-100	142.48
100-110	92.44
110-120	34.63
120-130	5.02
130-140	1.84
140-150	1.28
150-160	0.92
160-170	0.58
170-180	0.20

4.5 Polar Curves

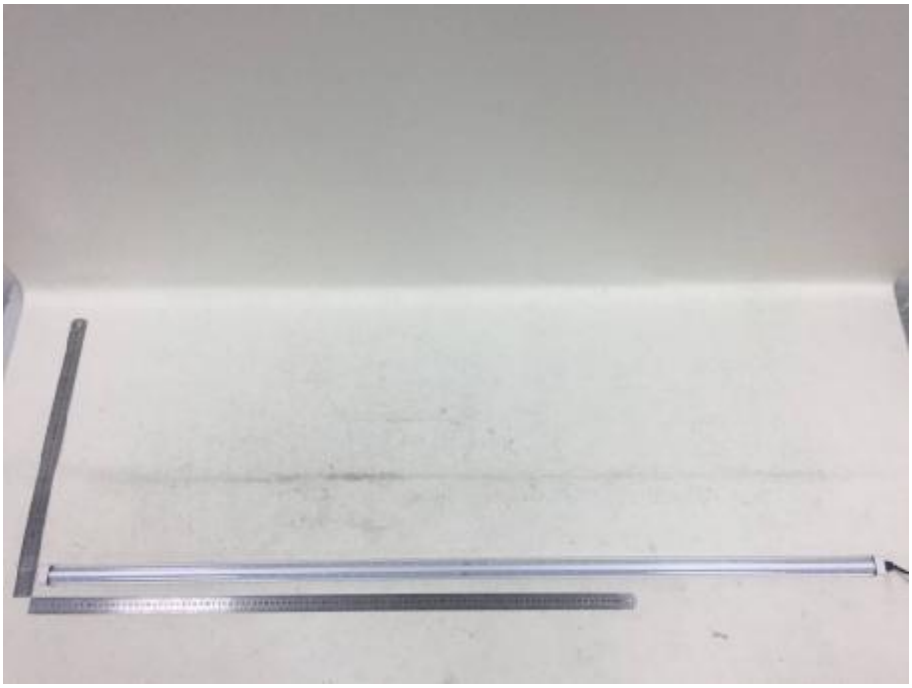


Maximum Candela = 597.039 Located At Horizontal Angle = 45, Vertical Angle = 15
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

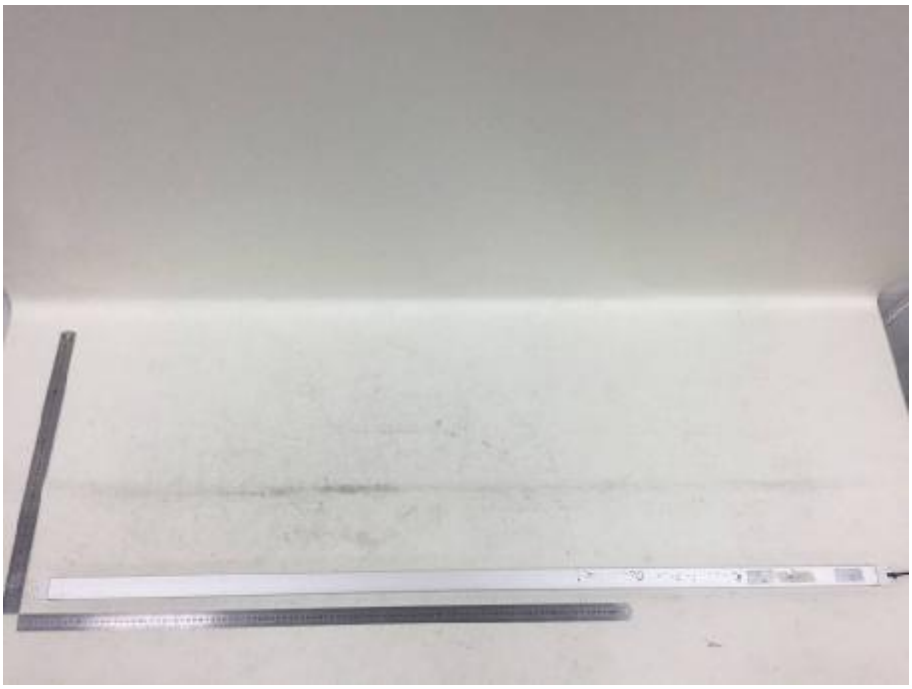
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	591.560	591.560	591.560	591.560	591.560	591.560	591.560
5	589.308	589.961	589.306	592.296	594.513	595.362	594.962
10	583.436	583.739	586.442	596.167	592.761	596.880	596.856
15	571.029	574.233	580.913	597.039	587.702	587.875	589.665
20	554.162	557.846	569.149	583.462	573.974	567.667	573.776
25	529.525	537.013	548.067	562.772	553.661	546.535	544.366
30	498.486	510.332	520.809	534.305	527.137	516.898	508.454
35	463.693	480.693	489.775	501.824	493.852	482.604	472.972
40	422.940	445.618	453.548	461.277	455.278	442.880	437.232
45	380.509	406.120	412.842	420.189	417.560	421.518	417.425
50	332.118	361.060	365.394	377.388	398.373	415.390	412.990
55	279.223	312.362	317.301	351.910	389.515	413.428	411.827
60	224.738	261.320	272.736	336.059	381.038	406.024	409.717
65	168.399	204.737	243.919	321.211	367.944	394.452	397.143
70	115.239	150.169	222.945	302.416	346.880	376.292	382.891
75	66.229	108.614	200.954	274.974	323.805	354.828	361.360
80	30.377	82.480	171.214	249.968	301.347	333.962	340.261
85	9.714	59.323	146.558	224.198	274.898	307.601	313.521
90	1.722	34.154	108.089	184.297	237.362	270.559	278.125
95	1.590	18.205	70.527	135.503	192.362	228.798	237.089
100	1.369	6.835	57.990	124.553	157.321	185.169	192.823
105	1.369	4.162	21.270	92.105	156.305	181.873	186.579
110	1.192	3.242	6.624	44.590	95.117	139.388	152.304
115	1.104	2.651	4.162	10.167	53.985	80.142	89.005
120	1.104	2.366	3.551	4.481	9.273	30.845	44.696
125	1.148	1.993	2.919	3.700	4.195	5.251	5.598
130	0.971	1.709	2.419	3.099	3.422	3.493	3.143
135	1.016	1.534	2.070	2.608	2.915	2.944	2.670
140	1.148	1.446	1.961	2.296	2.605	2.680	2.454
145	1.236	1.490	1.852	2.229	2.407	2.417	2.368
150	1.369	1.555	1.809	2.095	2.252	2.285	2.239
155	1.634	1.665	1.852	2.029	2.097	2.241	2.196
160	1.766	1.818	1.961	2.096	2.120	2.197	2.196
165	1.899	1.884	2.004	2.096	2.142	2.175	2.153
170	2.119	1.993	2.092	2.096	2.098	2.153	2.110
175	2.163	2.125	2.113	2.207	2.098	2.109	2.110
180	2.163	2.163	2.163	2.163	2.163	2.163	2.163

Appendix 1 Product Photo



Picture 1



Picture 2

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