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Test report of

IES LM-79-08

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

Rendered to:

Foshan Ledkey Lighting Co, LTD.
Building 1, No.5 Nanda Road, Danzao, Nanhai, Foshan, Guangdong, China

For products:

Ceiling Fixture

Models No.:

WR02-2405-25-940

Test Date:	Jan. 4, 2018 to Jan. 5, 2018
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:**
Fish Tan	**Richard Li**
Project Engineer	**Technical Manager**
Jan. 15, 2018	**Jan. 15, 2018**

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1. General

1.1 Product Information

Brand Name	LedKey
Product Type	Ceiling Fixture
Model Number	WR02-2405-25-940
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	25W
Rated Light output	2100lm
Declared CCT	4000K
Power Supply	LED Driver
LED Package, Array or Module	BXEN-27E-11M-3A
Dimming Information	Non-dimmable
Receipt Samples	1 unit
Sample Code of lab.	180102101001
Date of Receipt Samples	Jan. 2, 2018
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	2017-08-08	2018-08-07
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-011	D204C	2019-09-07	2018-09-06
Luminous Flux Standard Lamp	LC-PL-I-003	24V100W	2017-10-08	2018-10-07
Goniophotometer(with mirror)	LC-I-902	GMS2000	2017-05-06	2018-05-05
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 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	120.00 V~60Hz	120.00 V~60Hz
Input Current(A)	0.207	0.208
Total Power(W)	24.34	24.43
Power Factor	0.978	0.978
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	2147.81
Luminaire Efficacy(Lm/W)	-	87.92
Correlated Color Temperature (CCT)(K)	4014	-
Color Rendering Index (CRI)	97.8	-
R9	94	-
Chromaticity Coordinate (x,y)	x = 0.3806 y = 0.3791	-
Chromaticity Coordinate (u,v)	u = 0.2243 v = 0.3351	-
Chromaticity Coordinate (u',v')	u' = 0.2243 v' = 0.5026	-
Duv	0.0011	-
Zone Lumens between 0-60 °	-	68.45%

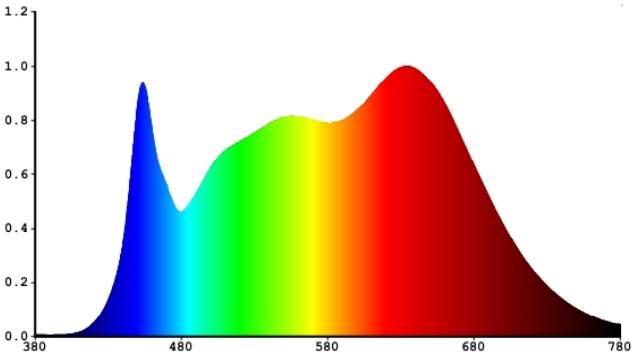
3.3 Color Rendering Details

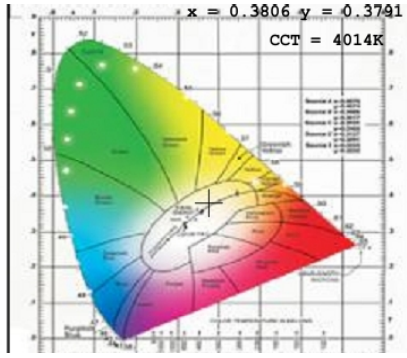
R1	R2	R3	R4	R5	R6	R7	R8
98	100	97	98	98	98	98	97
R9	R10	R11	R12	R13	R14	R15	-
94	99	98	79	98	98	96	-

Note: N.A.

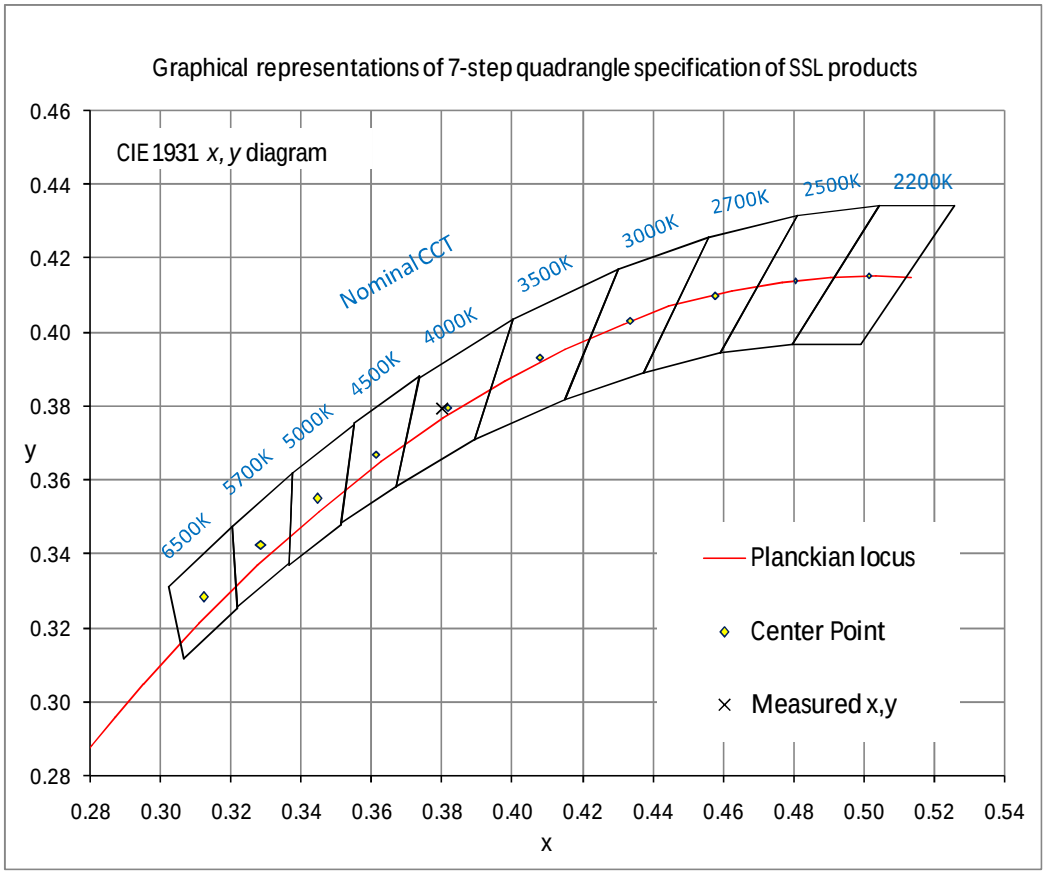
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.06	Luminous Length	0.59 m
Spacing Criteria (90-270)	1.06	Luminous Width	0.13 m
Spacing Criteria (Diagonal)	1.16	Luminous Height	0.04 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

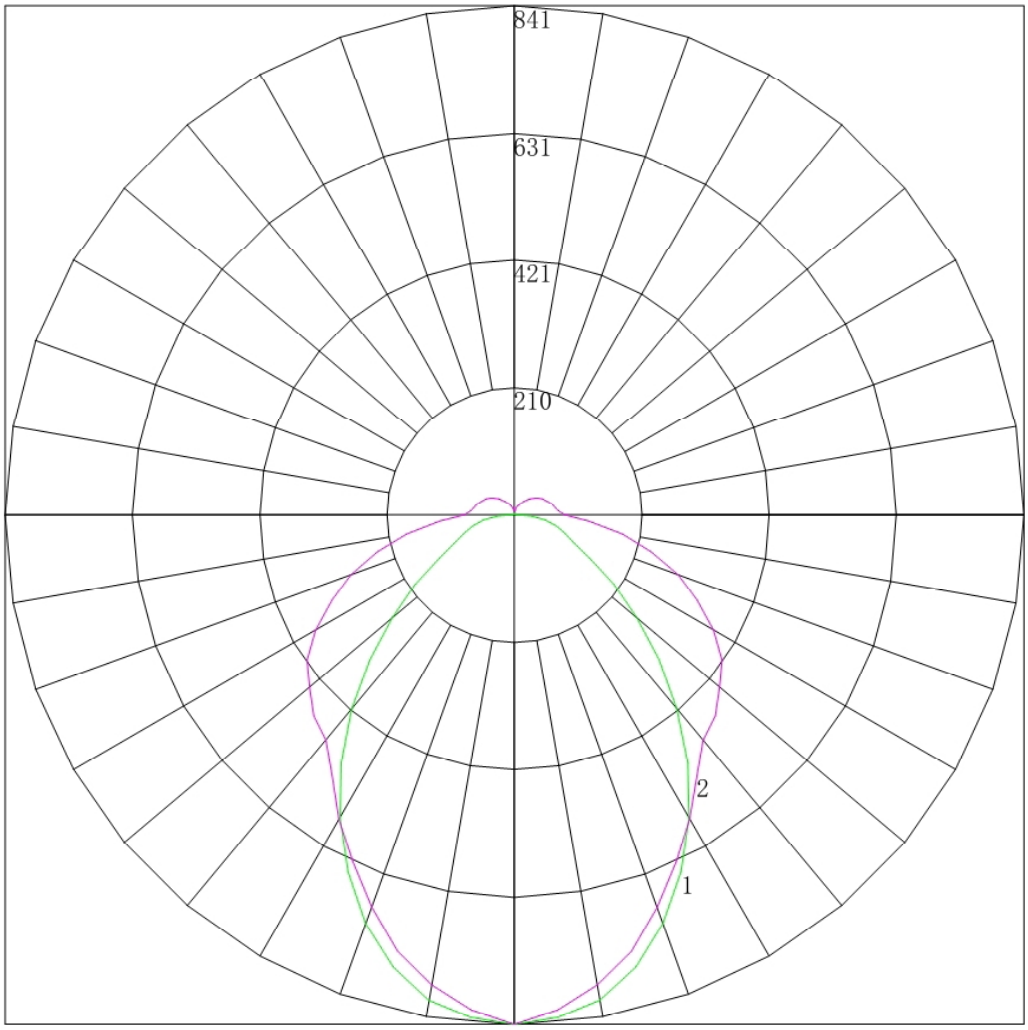
Zone	Lumens	%Lamp	%Fixt
0-20	290.14	13.50	13.50
0-30	585.49	27.30	27.30
0-40	905.18	42.10	42.10
0-60	1470.24	68.50	68.50
0-80	1853.01	86.30	86.30
0-90	1953.13	90.90	90.90
10-90	1875.3	87.30	87.30
20-40	615.04	28.60	28.60
20-50	916.47	42.70	42.70
40-70	781.52	36.40	36.40
60-80	382.77	17.80	17.80
70-80	166.31	7.70	7.70
80-90	100.12	4.70	4.70
90-110	99.64	4.60	4.60
90-120	133.70	6.20	6.20
90-130	158.90	7.40	7.40
90-150	186.28	8.70	8.70
90-180	194.68	9.10	9.10
110-180	95.04	4.40	4.40
0-180	2147.81	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	77.83
10-20	212.31
20-30	295.35
30-40	319.69
40-50	301.43
50-60	263.63
60-70	216.46
70-80	166.31
80-90	100.12
90-100	56.18
100-110	43.46
110-120	34.06
120-130	25.20
130-140	17.11
140-150	10.27
150-160	5.58
160-170	2.36
170-180	0.46

4.5 Polar Curves

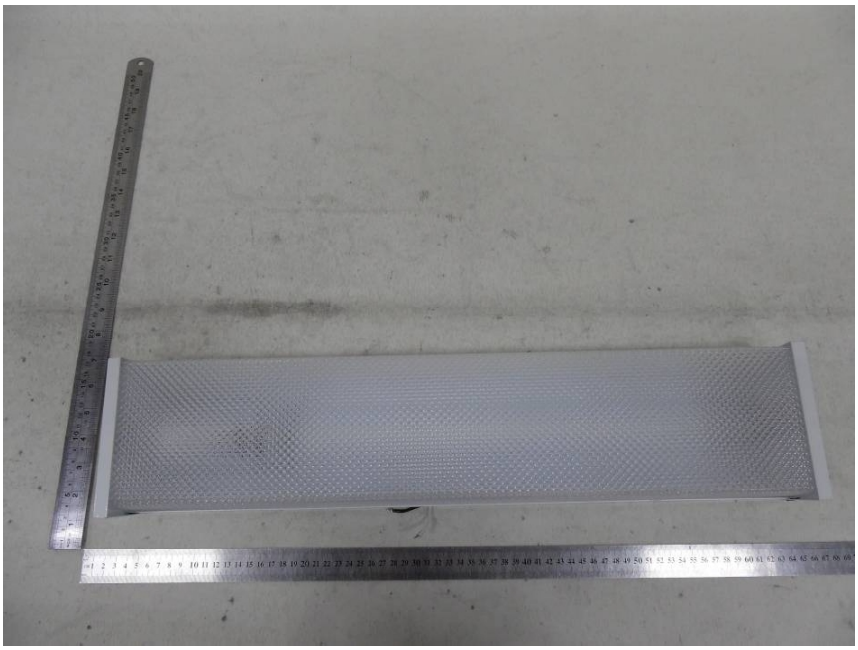


Maximum Candela = 841.312 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

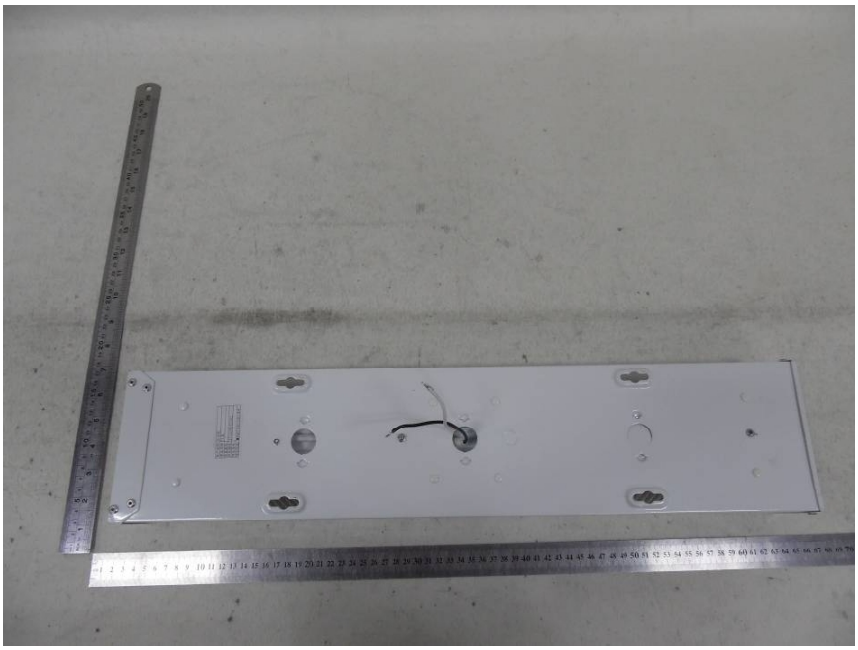
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	841.312	841.312	841.312	841.312	841.312	841.312	841.312
5	832.410	829.097	825.287	822.404	821.344	820.131	820.184
10	813.269	804.222	800.802	790.593	788.286	785.712	788.070
15	773.206	768.908	760.968	753.444	748.792	744.672	745.836
20	717.564	715.382	711.777	702.503	697.988	690.842	689.078
25	650.348	653.194	652.570	641.997	631.207	628.843	632.315
30	576.455	585.898	583.348	570.811	569.749	576.988	579.512
35	499.001	510.606	505.449	500.072	515.392	520.942	524.951
40	417.985	427.763	423.099	439.342	454.156	473.724	484.908
45	337.860	346.697	350.324	376.833	408.005	451.209	468.619
50	262.632	272.738	283.558	320.551	374.281	423.845	441.764
55	199.867	209.440	227.699	275.614	344.326	396.924	418.439
60	144.225	156.802	182.077	239.132	311.491	363.163	379.713
65	108.169	122.599	149.804	209.323	275.991	323.007	332.630
70	88.583	103.276	128.659	183.741	244.045	277.115	287.307
75	71.667	86.619	108.404	162.386	208.105	229.463	234.067
80	51.191	67.296	88.815	133.245	170.612	180.486	181.271
85	27.599	43.087	65.667	102.548	128.459	127.093	123.637
90	4.006	22.876	45.191	75.631	88.967	86.051	83.162
95	2.226	19.323	39.625	61.396	71.884	72.372	72.164
100	1.781	17.324	34.727	51.608	63.009	67.958	68.203
105	1.781	15.769	30.497	44.935	57.462	63.323	65.123
110	2.226	13.770	26.712	40.485	52.803	59.573	60.722
115	2.226	11.993	23.596	36.481	48.809	55.380	56.761
120	2.226	10.439	20.924	32.922	43.706	50.747	53.240
125	2.226	9.106	18.476	29.363	39.269	46.334	49.279
130	2.226	7.996	16.472	25.581	35.276	41.699	43.559
135	2.226	7.107	14.692	22.467	30.839	36.847	37.838
140	2.226	6.441	13.578	19.575	26.401	31.110	32.997
145	2.226	5.552	12.465	17.128	21.742	25.593	26.396
150	2.226	4.886	10.239	15.349	18.858	20.960	21.557
155	2.671	4.664	9.126	13.569	16.418	17.651	18.477
160	3.561	4.664	7.346	11.123	13.756	15.003	15.397
165	3.561	4.442	6.233	8.676	10.427	11.914	11.876
170	3.116	3.776	4.674	6.228	7.100	7.721	7.917
175	3.561	3.776	3.784	4.226	4.437	4.633	4.839
180	3.993	3.993	3.993	3.993	3.993	3.993	3.993

Appendix 1 Product Photo



Picture 1



Picture 2

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