LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP17120238
Version: 1.0
Date of Issue: Jul. 19, 2019
Total pages: 11

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

For products:

LED Wrap Lights

Models No.:

WR10-2405-25-840

Test Date:	May. 13, 2019
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd**
	2/F., Building II, 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
Test Sites:	1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China
Template No.:	LC-RT-PL-001 Rev.1.1
Test Note:	

Complied by:	**Reviewed by:**
Fish Tan	**Lin Qiu**
Project Engineer	**Technical Manager**
Jul. 19, 2019	**Jul. 19, 2019**

Table of Contents

1. General 3
1.1 Product Information 3
1.2 Standards or methods 4
1.3 Equipment list 4
2. Test conducted and method 5
2.1 Ambient Condition 5
2.2 Power Supply Characteristics 5
2.3 Seasoning and Stabilization 5
2.4 Electrical Instrumentation 5
2.5 Color Measurement Method 5
2.6 Total Luminous Flux Measurement Method 5
2.7 Luminous Intensity Distribution Measurement Method 5
2.8 Spatial Non-uniformity of Chromaticity 5
3. Test Result Summary 6
3.1 Electrical data 6
3.2 Photometric data 6
3.3 Color Rendering Details 6
4. Test Data 7
4.1 Spectral Distribution 7
4.2 ANSI Chromaticity Quadrangles Diagram 7
4.3 Goniometry Test Data 8
4.4 Zonal Lumen Summary 8
4.5 Polar Curves 9
4.6 Candela Tabulation 10
Appendix A Product Photo 11

1. General

1.1 Product Information

Brand Name	LedKey Lighting
Product Type	LED Wrap Lights
Model Number	WR10-2405-25-840
Rated Inputs	120-277VAC, 60Hz
Rated Power	25W
Rated Light output	2100lm
Declared CCT	3000K
Power Supply	LED Driver
LED Package, Array or Module	HL-AS-2835DW-3C-S1-08-PCT-HR3(R9), Hongli Zhihui Group Co.,Ltd.
Receipt Samples	1 unit
Sample Code of lab.	190510106005
Date of Receipt Samples	May. 10, 2019
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-987	APW-120N	2019-01-08	2020-01-07
AC Power supply	LC-I-989	APW-120N	2019-01-08	2020-01-07
Power analyzer	LC-I-928	WT210	2019-01-02	2020-01-01
Power analyzer	LC-I-954	WT210	2019-03-12	2020-03-11
Multimeter	LC-I-972	Fluke 17B	2018-08-01	2019-07-31
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2018-11-21	2019-11-20
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2018-11-21	2019-11-20
Goniophotometer(with mirror)	LC-I-902	GMS2000	2019-05-06	2020-05-05
Wireless temperature transmitter	LC-I-978	DWRF-B	2019-01-07	2020-01-06
Wireless temperature transmitter	LC-I-979	DWRF-B	2019-01-07	2020-01-06

Note:

* Bandwidth of spectroradiometer is 1 nm.

** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

*** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The lamp/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	120.00 V~60Hz	119.96 V~60Hz
Input Current(A)	0.205	0.205
Total Power(W)	24.50	24.43
Power Factor	0.997	0.995
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	2162.33
Luminaire Efficacy(lm/W)	-	88.51
Correlated Color Temperature (CCT)(K)	4156	-
Color Rendering Index (CRI)	84.4	-
R9	25	-
Chromaticity Coordinate (x,y)	x = 0.3745 y = 0.3758	-
Chromaticity Coordinate (u,v)	u = 0.2216 v = 0.3335	-
Chromaticity Coordinate (u',v')	u' = 0.2216 v' = 0.5003	-
Duv	0.0013	-
Zone Lumens between 0-60 °	-	81.40%
Beam Angle(50%Imax)	-	C0/180=89.6° C90/270=97.1°

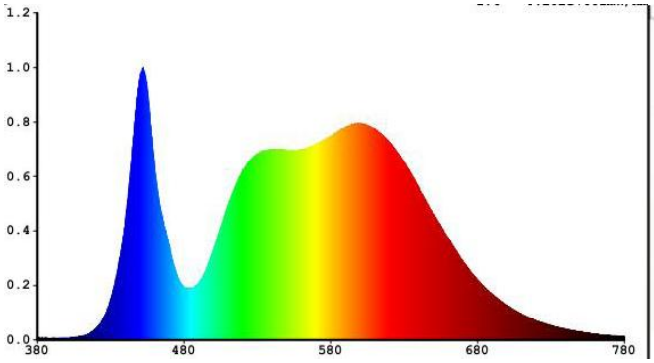
3.3 Color Rendering Details

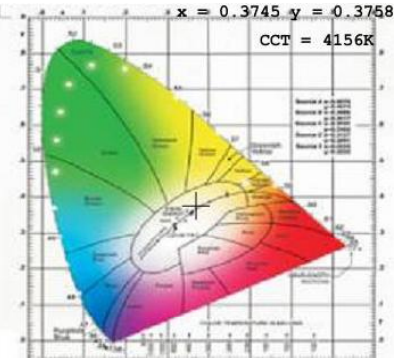
R1	R2	R3	R4	R5	R6	R7	R8
84	88	89	86	83	83	90	73
R9	R10	R11	R12	R13	R14	R15	-
25	69	84	56	85	94	80	-

Note: N/A

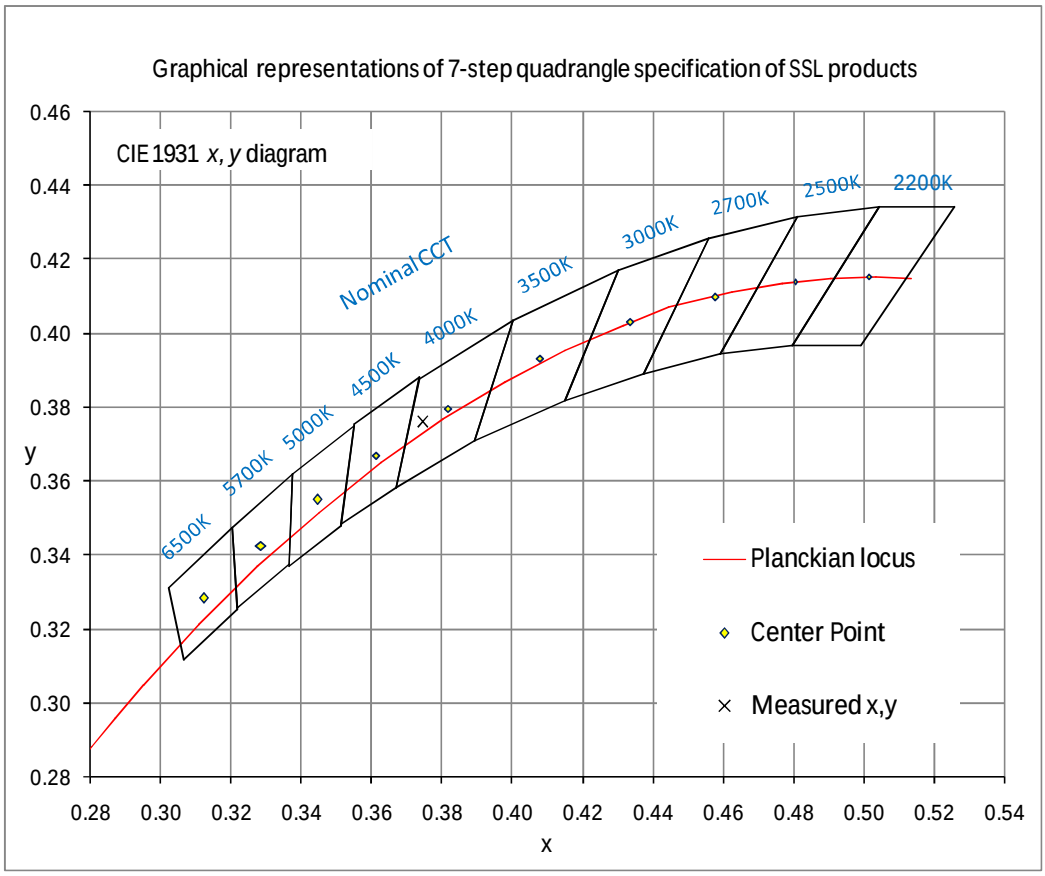
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.18	Luminous Length	0.58 m
Spacing Criteria (90-270)	1.12	Luminous Width	0.12 m
Spacing Criteria (Diagonal)	1.24	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

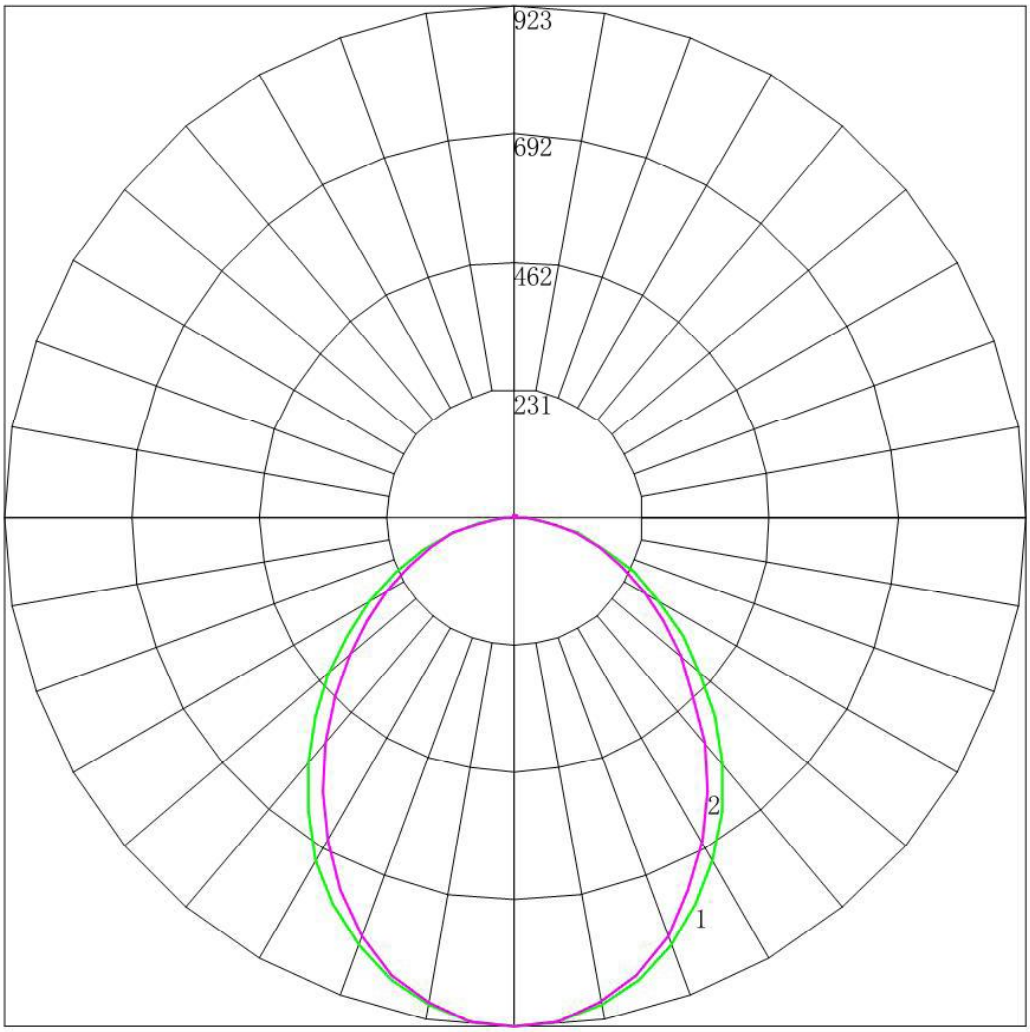
Zone	Lumens	%Lamp	%Fixt
0-20	329.28	15.20	15.20
0-30	679.25	31.40	31.40
0-40	1072.26	49.60	49.60
0-60	1760.03	81.40	81.40
0-80	2107.95	97.50	97.50
0-90	2148.5	99.40	99.40
10-90	2061.73	95.30	95.30
20-40	742.98	34.40	34.40
20-50	1117.99	51.70	51.70
40-70	911.38	42.10	42.10
60-80	347.92	16.10	16.10
70-80	124.30	5.70	5.70
80-90	40.56	1.90	1.90
90-110	6.82	0.30	0.30
90-120	8.40	0.40	0.40
90-130	9.81	0.50	0.50
90-150	12.02	0.60	0.60
90-180	13.83	0.60	0.60
110-180	7.01	0.30	0.30
0-180	2162.34	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	86.77
10-20	242.51
20-30	349.97
30-40	393.01
40-50	375.01
50-60	312.75
60-70	223.62
70-80	124.30
80-90	40.56
90-100	5.38
100-110	1.44
110-120	1.58
120-130	1.41
130-140	1.19
140-150	1.02
150-160	0.88
160-170	0.68
170-180	0.25

4.5 Polar Curves

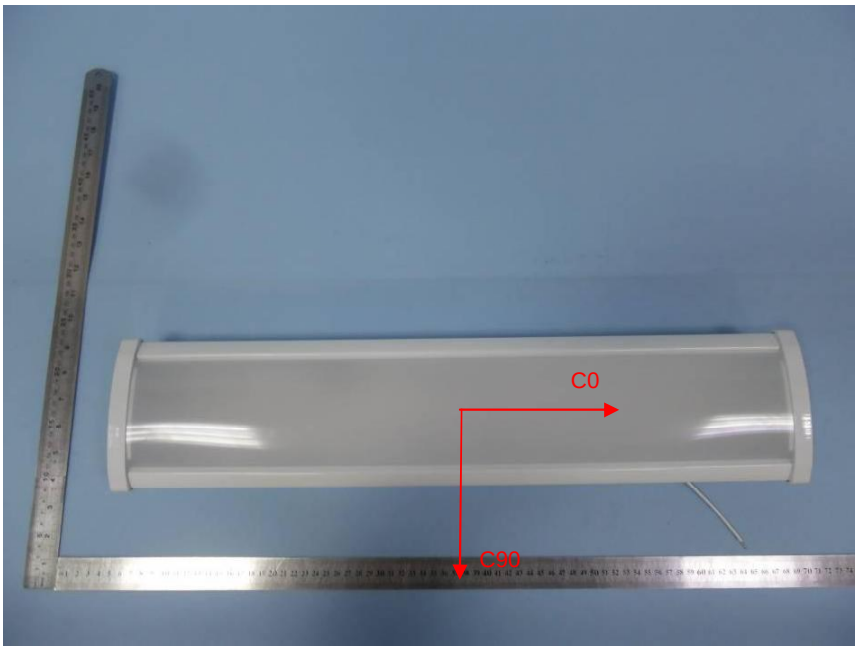


Maximum Candela = 923.238 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

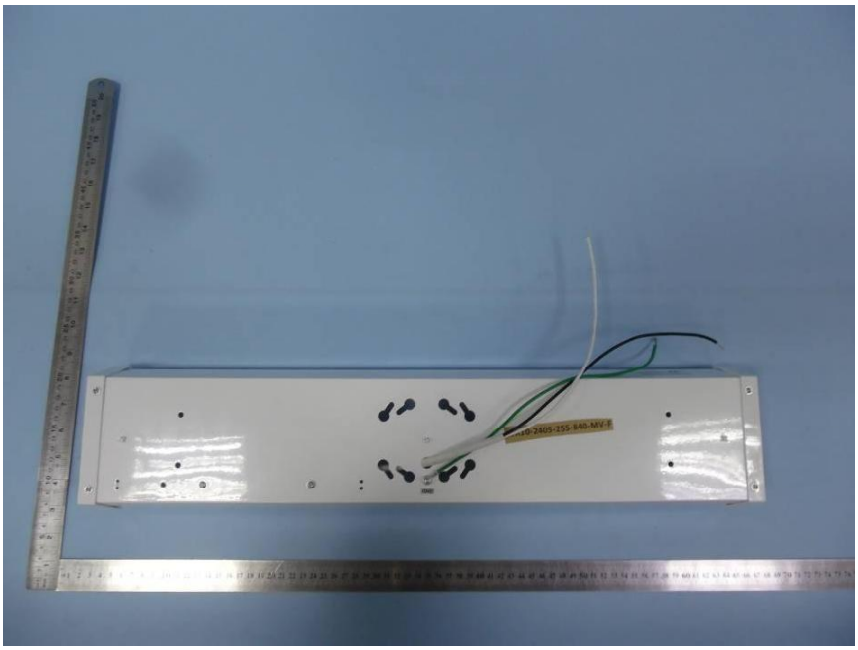
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	923.238	923.238	923.238	923.238	923.238	923.238	923.238
5	917.395	916.194	916.157	915.696	915.514	915.211	917.243
10	898.280	896.166	896.202	894.836	894.030	893.257	892.796
15	867.523	866.972	864.567	860.156	858.178	857.266	857.229
20	827.028	825.586	820.283	817.210	812.034	807.277	808.014
25	776.160	773.225	767.536	760.899	754.562	747.717	745.593
30	717.047	712.579	707.491	697.499	688.037	681.473	676.014
35	652.726	647.734	639.552	628.407	617.031	608.188	605.092
40	582.335	578.508	569.042	558.594	546.633	533.829	532.358
45	512.804	506.934	496.479	485.823	473.420	463.632	458.509
50	440.239	435.631	426.126	415.308	403.404	395.084	390.703
55	371.116	368.460	358.571	348.568	338.862	331.147	327.436
60	302.265	299.731	292.209	285.846	276.931	270.091	267.239
65	238.170	235.178	230.492	225.897	219.032	214.354	212.240
70	174.528	174.081	171.821	168.728	165.321	163.025	161.739
75	116.458	115.828	116.735	116.143	117.195	115.516	115.455
80	62.555	64.191	67.174	71.665	73.866	75.074	75.443
85	21.063	23.346	29.540	35.448	39.365	42.098	42.590
90	1.676	3.635	7.465	12.373	16.102	19.093	19.473
95	0.725	0.858	1.421	2.936	4.977	6.461	6.803
100	0.951	0.926	1.173	1.197	1.464	1.856	1.912
105	1.223	1.061	1.353	1.468	1.396	1.319	1.290
110	1.132	1.152	1.331	1.716	1.712	1.654	1.645
115	1.223	1.287	1.331	1.603	1.937	1.923	1.956
120	1.223	1.355	1.398	1.423	1.824	2.146	2.178
125	1.314	1.400	1.466	1.536	1.531	1.766	1.778
130	1.268	1.603	1.556	1.536	1.599	1.610	1.600
135	1.178	1.603	1.489	1.490	1.531	1.610	1.644
140	1.178	1.829	1.353	1.558	1.621	1.654	1.600
145	1.359	1.693	1.466	1.671	1.666	1.722	1.689
150	1.449	1.603	1.646	1.603	1.802	1.766	1.777
155	1.721	1.987	2.052	1.806	1.779	1.878	1.911
160	1.857	2.642	2.097	2.507	2.117	2.079	2.044
165	2.129	2.326	2.525	2.348	2.500	2.616	2.311
170	2.355	2.393	2.706	2.890	2.477	2.437	2.400
175	2.582	2.551	2.525	2.574	2.950	2.974	2.711
180	2.629	2.629	2.629	2.629	2.629	2.629	2.629

Appendix A Product Photo



Picture 1



Picture 2

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