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Test report of

## IES LM-79-08

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

Rendered to:

NVCETi Lighting Co.,Ltd

Block 2-2, No. 1, Zhongzhu Road South, Technical Innovation Coast, High-Tech Zone, Zhuhai City, Guangdong Prov., China.

For products:

Direct Linear Ambient Luminaires

Models No.:

54583XXX

(Where the first X denotes installation type and could be 1, 2, 3. 1 which refers pendant mounting, 2 which refers surface mounting and 3 which refers pendant mounting with emergency power supply, the last XX denotes CCT and 61-70 which refers 5000K)

**Test Date:** Apr. 26, 2017 to May. 11, 2017

**Test Item:** Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.

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**Template No.:** LC-RT-PL/LM79-08/01

**Test Note:** 545832XX was selected for test.

**Complied by:**

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May. 11, 2017

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## 1. General

### 1.1 Product Information

Brand Name	ETI
Product Type	Direct Linear Ambient Luminaires
Model Number	54583XXX
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	33W
Rated Light output	4900lm
Declared CCT	5000K
Power Supply	LED driver
LED Package, Array or Module	2835S Series, EVERLIGHT ELECTRONICS CO., LTD
Dimming Information	Non-dimmable
Receipt Samples	1 unit
Sample Code of lab.	170422136
Date of Receipt Samples	Apr. 22, 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ; 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 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 both sphere-spectroradiometer system and 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.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these 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	119.90 V~60Hz	120.05 V~60Hz
Input Current(A)	0.279	0.279
Total Power(W)	32.72	32.78
Power Factor	0.979	0.979
I-THD	16.77 %	-
Off-state Power(W)	-	-

#### 3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	4933.80
Luminaire Efficacy(Lm/W)	-	150.51
Correlated Color Temperature (CCT)(K)	5028	-
Color Rendering Index (CRI)	82.8	-
R9	1	-
Chromaticity Coordinate (x,y)	x = 0.3449 y = 0.3573	-
Chromaticity Coordinate (u,v)	u = 0.2091 v = 0.3249	-
Chromaticity Coordinate (u',v')	u' = 0.2091 v' = 0.4874	-
Duv	0.0030	-
Zone Lumens between 0-60 °	-	57.54%

#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	90	95	80	82	86	85	64
R9	R10	R11	R12	R13	R14	R15	-
1	76	79	61	84	98	75	-

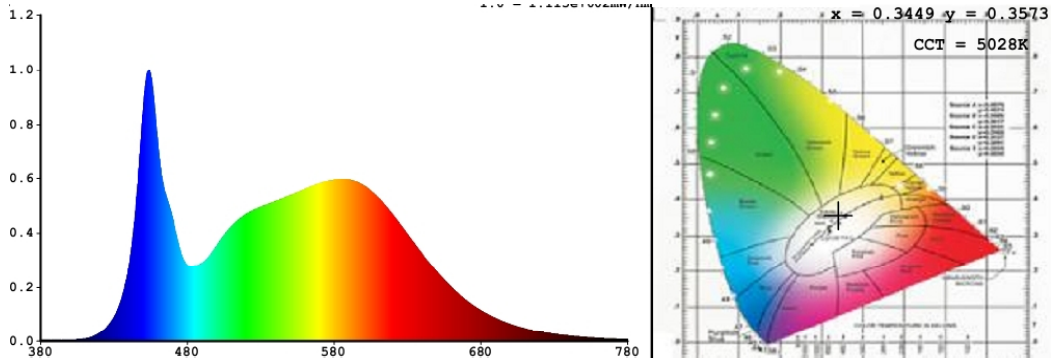
#### 3.4 Electrical data on 277V

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00 V~50Hz	-
Power Factor	0.915	-
I-THD	18.83 %	-
Off-state Power(W)	-	-

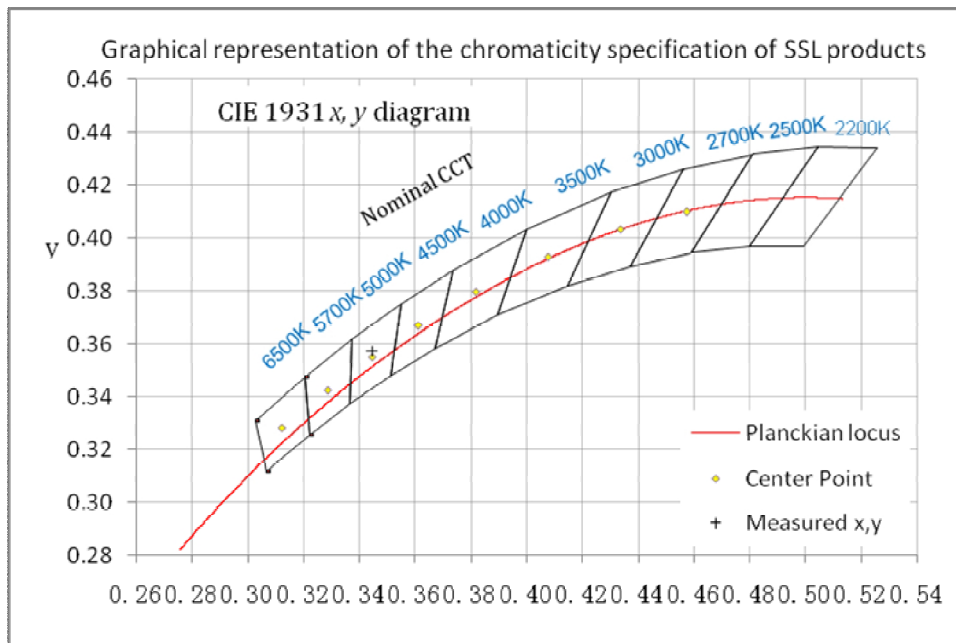
Note: N.A.

## 4. Test Data

### 4.1 Spectral Distribution



### 4.2 ANSI Chromaticity Quadrangles Diagram





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4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.26	Luminous Length	1.21 m
Spacing Criteria (90-270)	1.42	Luminous Width	0.05 m
Spacing Criteria (Diagonal)	1.48	Luminous Height	0.02 m
Test Distance	29.65 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	423.16	8.60	8.60
0-30	913.18	18.50	18.50
0-40	1524.87	30.90	30.90
0-60	2838.98	57.50	57.50
0-80	3810.71	77.20	77.20
0-90	4079.94	82.70	82.70
10-90	3971.79	80.50	80.50
20-40	1101.7	22.30	22.30
20-50	1768.03	35.80	35.80
40-70	1871.93	37.90	37.90
60-80	971.73	19.70	19.70
70-80	413.92	8.40	8.40
80-90	269.23	5.50	5.50
90-110	395.15	8.00	8.00
90-120	551.50	11.20	11.20
90-130	673.93	13.70	13.70
90-150	815.62	16.50	16.50
90-180	853.86	17.30	17.30
110-180	458.71	9.30	9.30
0-180	4933.8	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

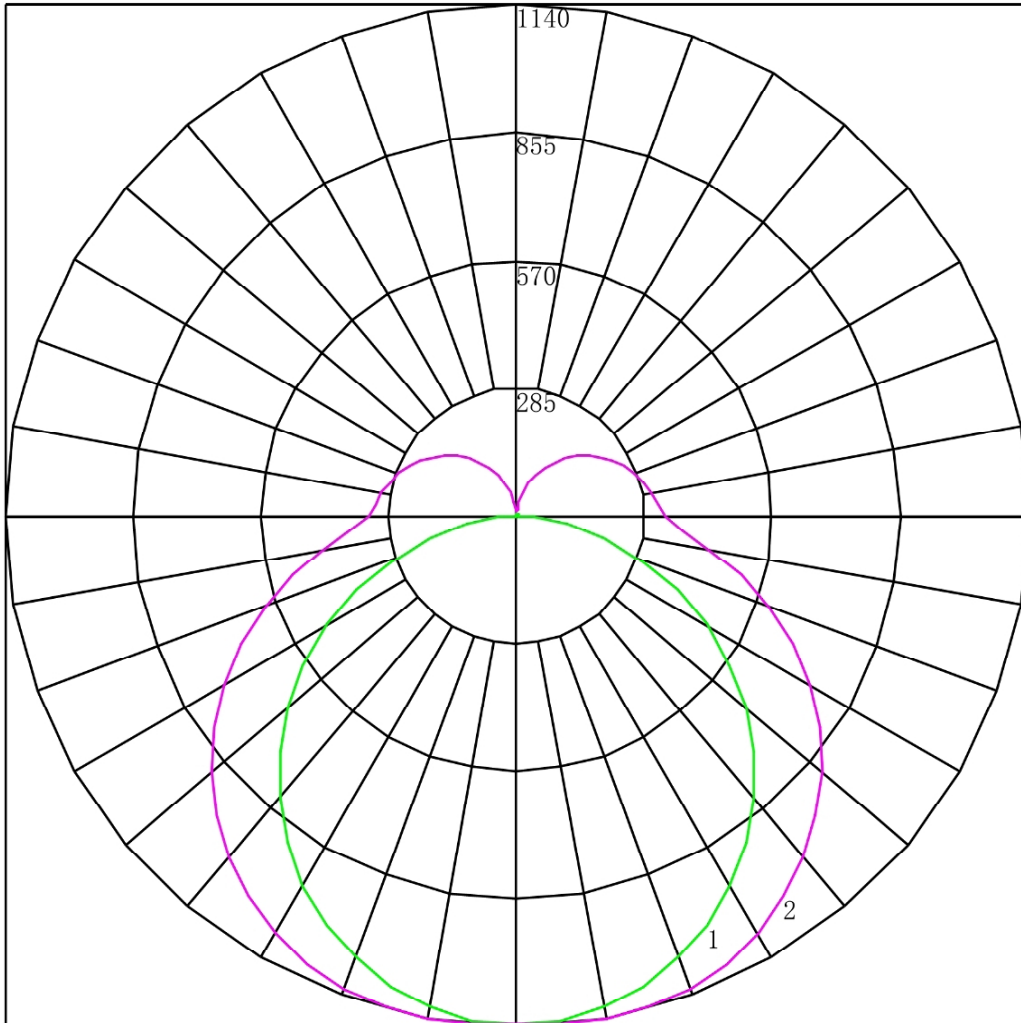
Zone	Lumens
0-10	108.15
10-20	315.01
20-30	490.02
30-40	611.68
40-50	666.32
50-60	647.80
60-70	557.81
70-80	413.92
80-90	269.23
90-100	209.27
100-110	185.87
110-120	156.35
120-130	122.44
130-140	87.16
140-150	54.52
150-160	27.49
160-170	9.42
170-180	1.32





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4.5 Polar Curves



Maximum Candela = 1140.226 Located At Horizontal Angle = 90, Vertical Angle = 10  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)



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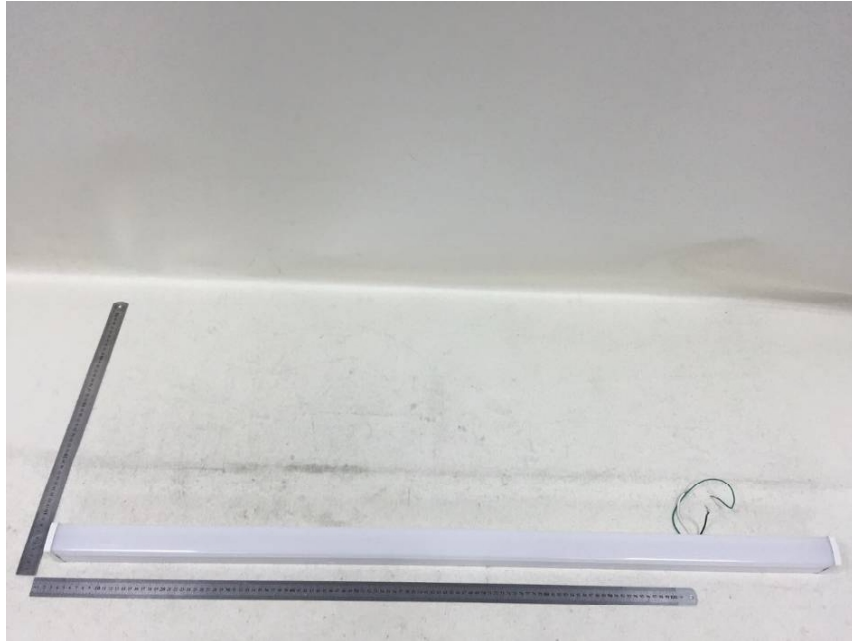
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
<b>0</b>	1137.010	1137.010	1137.010	1137.010	1137.010	1137.010	1137.010
<b>5</b>	1131.777	1131.903	1133.475	1135.207	1137.519	1138.748	1138.053
<b>10</b>	1114.389	1117.422	1122.570	1129.323	1135.748	1139.715	1140.226
<b>15</b>	1088.175	1092.550	1104.395	1116.834	1127.458	1134.161	1136.141
<b>20</b>	1052.868	1060.448	1077.063	1096.288	1112.275	1122.941	1125.280
<b>25</b>	1007.891	1018.198	1041.625	1068.503	1087.504	1100.921	1104.686
<b>30</b>	953.955	969.183	997.791	1032.167	1056.013	1072.460	1076.271
<b>35</b>	890.837	911.877	945.499	987.728	1015.357	1035.244	1038.690
<b>40</b>	823.727	848.403	888.738	936.648	968.265	991.129	995.503
<b>45</b>	747.170	779.047	823.942	876.531	914.219	939.405	944.627
<b>50</b>	666.975	703.126	754.673	811.906	852.889	881.765	887.537
<b>55</b>	581.280	623.136	678.229	740.555	786.471	817.278	824.452
<b>60</b>	489.065	534.789	597.350	664.722	712.768	746.855	754.328
<b>65</b>	396.406	443.812	512.256	582.553	634.913	670.382	678.426
<b>70</b>	301.396	349.562	424.292	498.804	553.524	590.541	598.527
<b>75</b>	202.838	257.523	336.402	413.017	469.861	508.503	516.629
<b>80</b>	112.885	169.707	251.190	330.654	389.530	428.694	438.512
<b>85</b>	38.323	97.632	183.105	261.879	322.820	362.839	372.863
<b>90</b>	5.145	63.121	147.300	224.708	284.110	323.142	332.935
<b>95</b>	3.770	57.925	138.499	212.771	269.101	306.386	316.251
<b>100</b>	3.637	55.184	132.721	204.395	259.512	295.760	305.520
<b>105</b>	3.548	52.420	126.547	195.802	248.473	283.596	293.355
<b>110</b>	3.593	49.457	119.891	186.151	236.140	269.673	279.495
<b>115</b>	3.460	46.384	113.060	175.290	222.710	254.194	263.854
<b>120</b>	3.548	43.377	105.658	163.944	208.468	237.570	247.257
<b>125</b>	3.593	40.172	97.427	151.919	193.193	220.092	228.923
<b>130</b>	3.460	36.833	88.692	138.707	176.557	201.406	209.502
<b>135</b>	3.371	33.230	79.365	124.483	159.352	181.357	188.821
<b>140</b>	3.504	29.626	70.039	110.345	141.488	161.176	167.315
<b>145</b>	3.548	25.027	60.800	95.769	122.921	140.425	145.678
<b>150</b>	3.770	19.412	49.897	80.379	103.762	118.621	123.433
<b>155</b>	4.125	15.852	39.170	63.694	84.165	96.640	100.884
<b>160</b>	4.835	13.597	29.734	46.766	64.326	74.507	78.074
<b>165</b>	5.544	11.740	20.663	33.065	42.974	52.943	55.525
<b>170</b>	6.077	9.883	14.708	20.224	24.183	30.347	33.411
<b>175</b>	6.387	7.981	10.113	12.025	13.473	13.108	15.163
<b>180</b>	6.503	6.503	6.503	6.503	6.503	6.503	6.503

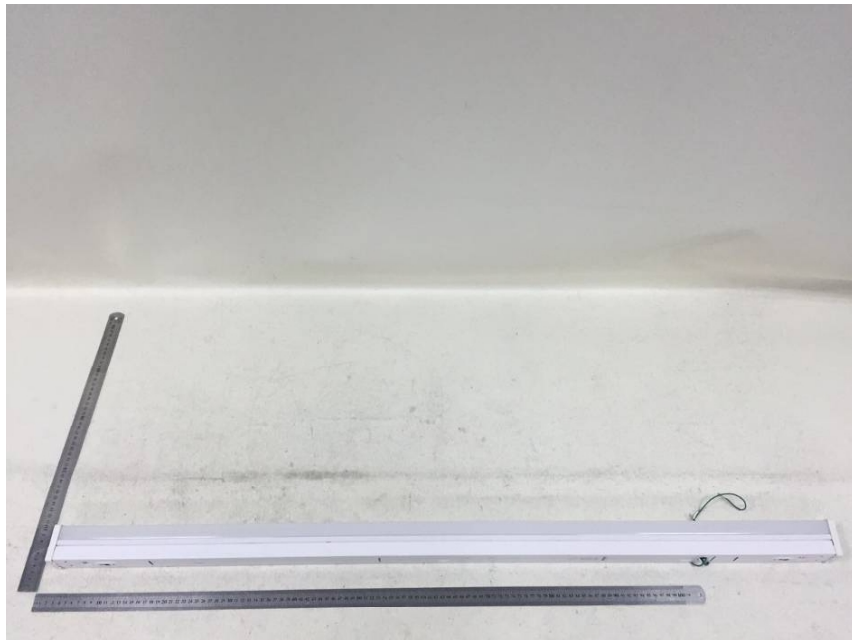


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**Appendix 1 Product Photo**



Picture 1



Picture 2

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