Report No.: LCS200106026BS

TEST REPORT of IES LM-79-08

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

Client.....	:	Shenzhen Penel Optoelectronics Technology Co.,Ltd
Address.....	:	The 1st Building ,Xi'en Industrial District, No.227, Xiangshan Avenue, Yanluo Street, Bao'an District, Shenzhen, China
Brand Name.....	:	penel Expert of Outdoor lighting & Industrial lighting
Testing laboratory.....	:	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Address.....	:	B Area, 2F, Building B, Zhongyu Green Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, Guangdong Prov .518000 China
Product description ..	:	LED STREET LIGHT
Models.....	:	STL-52W-NS08
Rating.....	:	AC100-240V, 50/60Hz, 52W, 4000K
Date of Test.....	:	January 10, 2020
Date of Issue.....	:	January 13, 2020

Test by:	**Check by:**	**Approved by:**
William Lian	Ian Luo	
William Lian/ Project Engineer	Ian Luo/ Director	Jesse Liu/ Manager

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Table of Contents

1. Test Method.....3
2. Product Information.....4
3. Test equipment list:.....4
4. Integrating Sphere Test Results：.....5
4.1 Test Data.....5
4.2 Spectrum.....5
5. Goniophotometer Test results.....6
5.1 Test Data.....6
5.2 Luminous Intensity Distribution Diagram and C0 Plane Isolux Diagram (Unit : lx).....6
5.3 Zonal Flux Diagram.....7
5.4 Isocandela Diagram.....8
5.5 Luminous Distribution Intensity Data.....9
6. Photo of sample:.....10

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1. Test Method

Test Item.....:	Integrating Sphere Test
Ambient Condition .....:	25.1℃
Number of hours operated prior to Measurement .....(h):	0h
Stabilization time .....(h):	0.5h
Orientation(burning position) of SSL product during test .....:	down
Test Method .....:	The sample was tested according to the IES LM-79-2008. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.
Test Item.....:	Goniophotometer Test
Ambient Condition.....:	25.1℃
Total operated time of the product for measurements including stabilization..... (h):	2.5h
Correction factors applied.....:	Intensity distribution
Orientation(burning position) of SSL product during test .....:	down
Test Method.....:	The sample was tested according to the IES LM-79-2008. Photometric paramters were measured using a type C goniophotometer and software. The sample reference plane was located at the center of the sample goniometer at a test distance of 26m from the detectors. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, Luminous efficacy, zonal flux were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

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2. Product Information

Product description.....:	LED STREET LIGHT
Model Number.....:	STL-52W-NS08
Rated Inputs.....:	AC100-240V, 50/60Hz
Rated Power.....:	52W
Declared CCT.....:	4000K
LED Manufacturer.....:	N/A
LED Model.....:	N/A
LED Package, Array or Module.....:	N/A
Forward current of the LED chip.....:	N/A
Date of Receipt Samples.....:	January 10, 2020
Quantity of Receipt Samples.....:	1 unit

3. Test equipment list:

Manufacturer	Description	Equipment ID	Model	Calibration Date	Calibration Due Date
EVERFINE	Full-field Speed Goniophotometer	SLCS-S-112	GO-R5000	2019/07/01	2020/07/01
EVERFINE	Digital Power Meter	SLCS-S-103	PF2010	2019/07/01	2020/07/01
EVERFINE	AC Testing Power Source	SLCS-S-115	DPS1060	2019/07/01	2020/07/01
EVERFINE	Total Spectral Radiant Flux Standard Lamp	SLCS-S-143	D908S	2019/07/08	2020/07/08
SENSING	2 Meter Integrating Sphere	SLCS-S-038	SPR-3000	2019/07/01	2020/07/01
YOKOGAWA	Digital Power Meter	SLCS-S-058	WT310	2019/07/01	2020/07/01
ALL POWER ELECTRONIC	AC Testing Power Source	SLCS-S-111	APW-105N	2019/07/01	2020/07/01
SENSING	Standard Lamp	SLCS-S-118	S11010017	2019/07/08	2020/07/08

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4. Integrating Sphere Test Results：

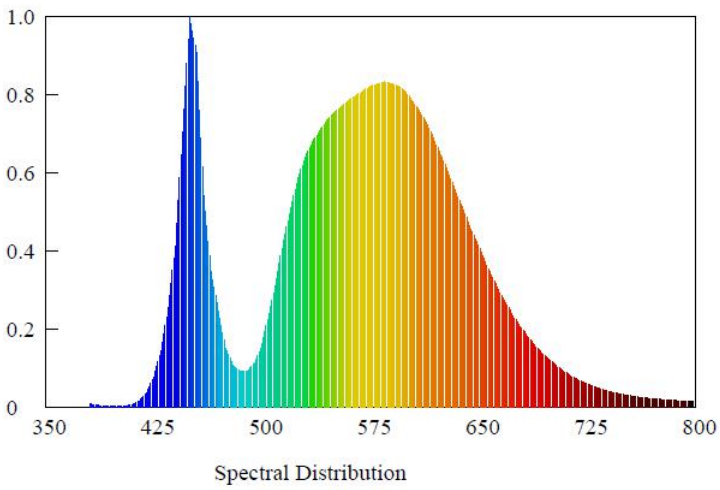
4.1 Test Data

Test type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
Input	230.0	50.0	0.236	0.975	52.9

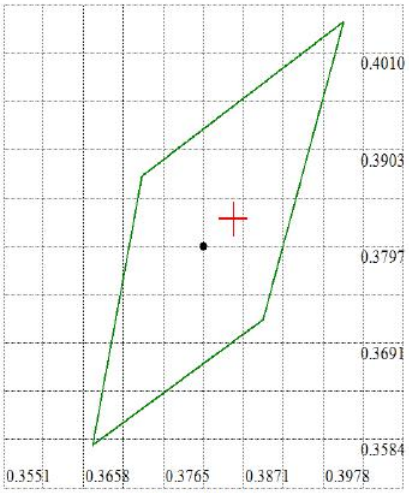
Test type	CCT (K)	CRI	Duv	Luminous flux (lm)	Luminous efficacy(lm/W)
Output	3903	73.2	+0.00122	7813.33	147.7

4.2 Spectrum

Spectroradiometric Parameters



Spectral Distribution



Nominal CCT:LED_4000K
x0=0.3818 y0=0.3797

Chromaticity Coordinates: x=0.3858 y=0.3827 u'=0.2262 v'=0.5049

Correlated Color Temperature: 3903 K	Dominant Wavelength: 577.0 nm(E)
Colour Fidelity Index: Rf=71	Gamut Index: Rg=95
Luminous Flux: 7813.33 lm	Purity: 0.3067
Chromaticity Difference: +0.00122Duv	Peak Wavelength: 450.0 nm
Color Ratio: Kr=37.3% Kg=56.6% Kb=6.2%	
Bandwidth: 22.4nm	Radiant Flux: 22.478 W
Photosynthetically Active Radiation(PAR): 21.82W	Photosynthetic Photon Flux(PPF):103.24μmol/s

Rendering Index: Ra=73.2

R1=72	R2=79	R3=83	R4=72	R5=69	R6=68	R7=84	R8=58
R9=-13	R10=48	R11=66	R12=35	R13=73	R14=90	R15=68	Re=64

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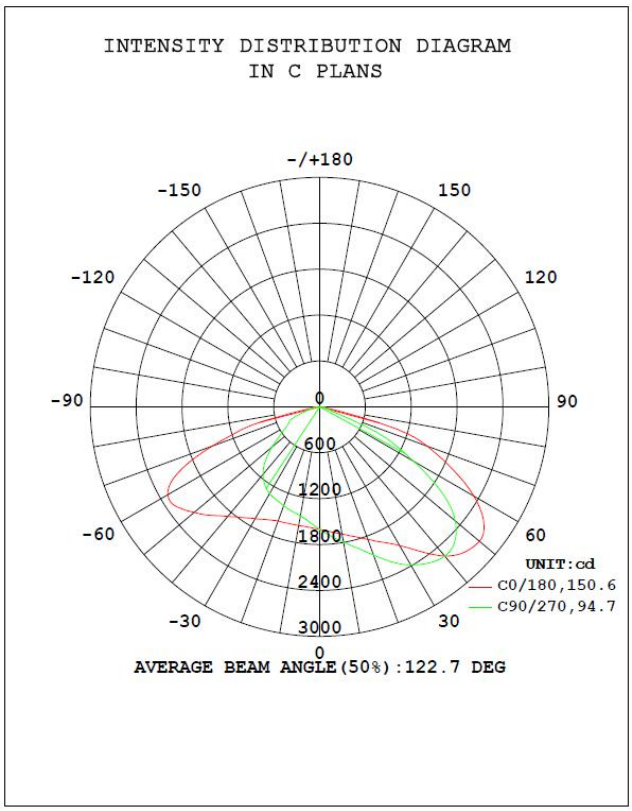
5. Goniophotometer Test results

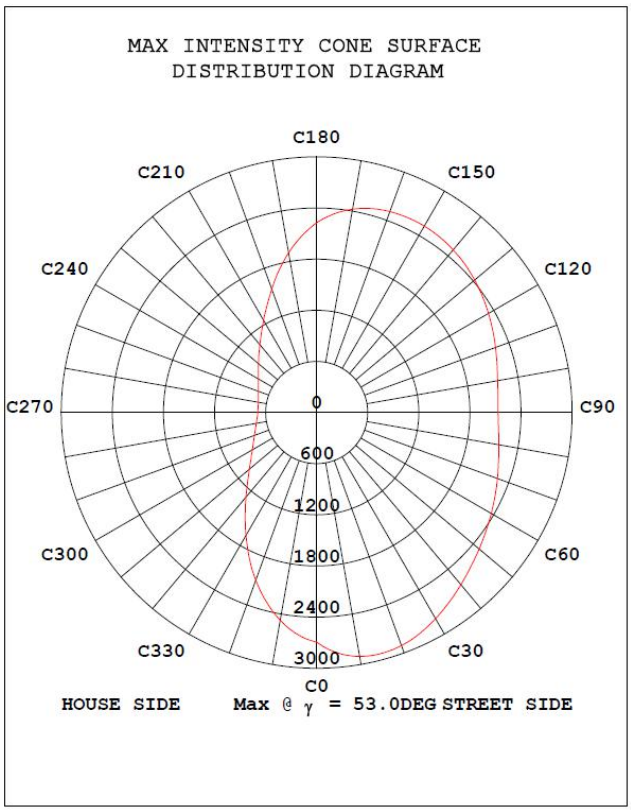
5.1 Test Data

Test type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
Input	230.1	50.01	0.2356	0.9746	52.83

Test type	Total Flux (lm)	Luminous efficacy(lm/W)	ZL (0~90°)	ZL (80~90°)
Output	7801.58	147.66	99.8%	1.0%

5.2 Luminous Intensity Distribution Diagram and C0 Plane Isolux Diagram (Unit : lx)





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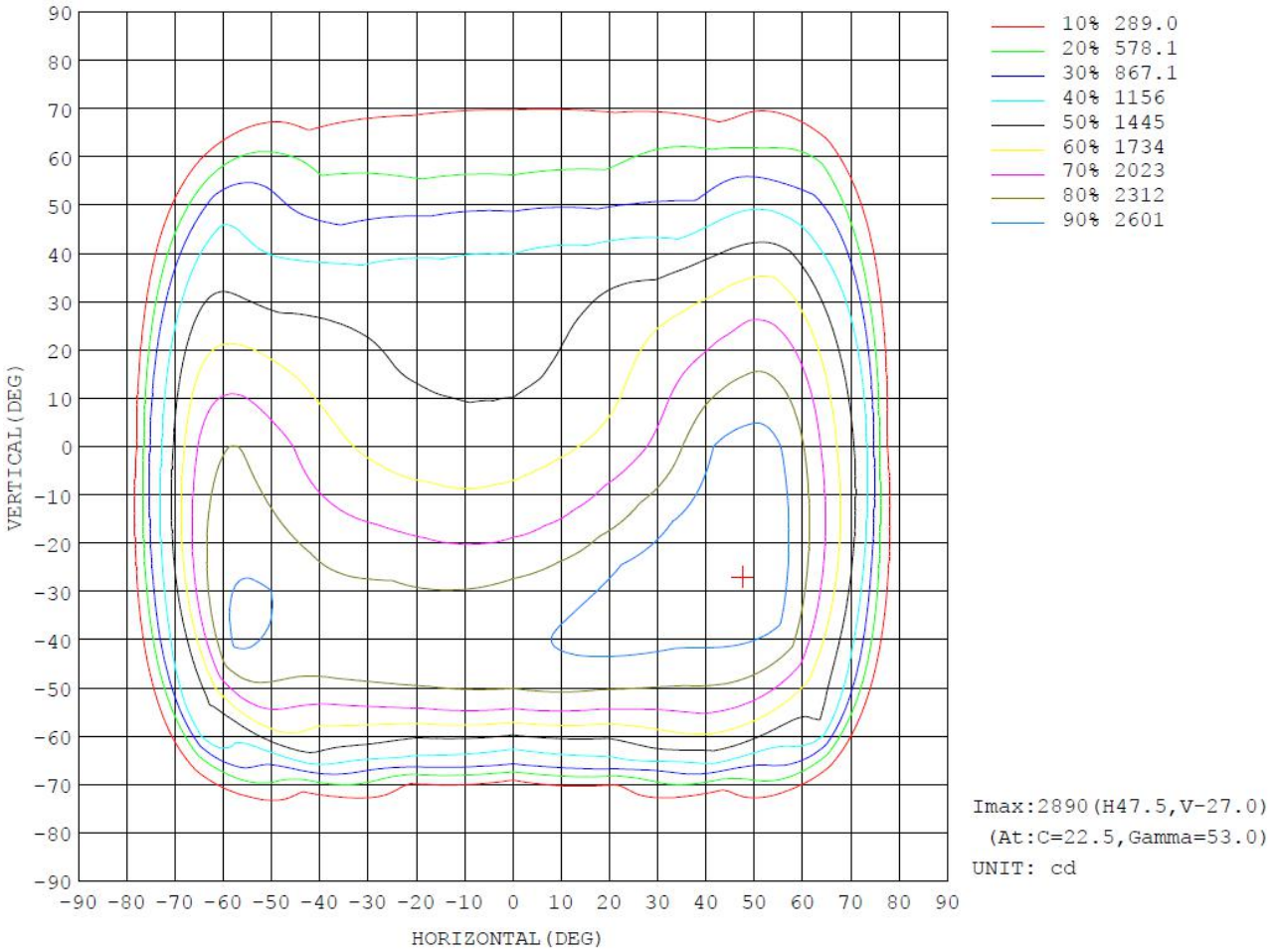
5.3 Zonal Flux Diagram

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	1688	1801	1795	1709	1575	1467	1446	1530	0- 10	154.0	154.0	1.97,1.97
20	1844	2087	2061	1870	1589	1404	1375	1540	10- 20	474.4	628.5	8.06,8.06
30	2093	2499	2385	2144	1687	1376	1308	1589	20- 30	835.9	1464	18.8,18.8
40	2545	2752	2548	2394	1868	1307	1153	1539	30- 40	1229	2693	34.5,34.5
50	2732	2647	2318	2491	2145	1073	812.6	1266	40- 50	1538	4231	54.2,54.2
60	2330	2259	1419	2183	2293	703.6	489.3	872.4	50- 60	1602	5833	74.8,74.8
70	1497	1470	198.8	1507	1492	397.3	277.3	518.3	60- 70	1312	7145	91.6,91.6
80	118.7	135.6	87.84	162.6	149.4	127.4	92.63	137.3	70- 80	561.3	7706	98.8,98.8
90	3.975	11.63	4.284	3.650	2.378	1.171	0.5816	4.578	80- 90	80.53	7786	99.8,99.8
100	1.377	0.5866	0.2211	0.4403	2.030	1.617	0.3689	1.764	90-100	1.406	7788	99.8,99.8
110	1.450	0.5133	0.2211	0.4403	3.264	2.789	1.625	3.156	100-110	1.484	7789	99.8,99.8
120	1.522	0.4399	0.2211	0.4403	3.552	3.666	2.952	4.036	110-120	2.016	7791	99.9,99.9
130	2.609	1.463	1.400	1.395	3.548	3.373	3.980	3.889	120-130	2.221	7793	99.9,99.9
140	3.550	2.419	2.358	2.348	3.334	3.300	4.422	3.965	130-140	2.324	7796	99.9,99.9
150	3.624	3.593	3.607	3.520	3.768	4.183	4.790	4.477	140-150	2.275	7798	100,100
160	3.697	3.666	3.830	3.743	4.132	4.399	4.790	4.697	150-160	1.876	7800	100,100
170	3.914	4.325	4.490	3.963	4.350	4.619	4.790	4.697	160-170	1.190	7801	100,100
180	4.639	4.693	4.716	4.256	4.712	4.619	4.716	4.621	170-180	0.4290	7802	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

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5.4 Isocandela Diagram



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5.5 Luminous Distribution Intensity Data

Table--1 UNIT: cd

C (DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601	1601			
5	1637	1669	1694	1701	1694	1679	1651	1619	1580	1549	1525	1511	1512	1526	1559	1600			
10	1688	1759	1801	1810	1795	1762	1709	1653	1575	1517	1467	1446	1446	1473	1530	1612			
15	1754	1871	1927	1939	1911	1851	1775	1696	1578	1491	1430	1406	1409	1447	1524	1635			
20	1844	2005	2087	2103	2061	1972	1870	1754	1589	1481	1404	1364	1375	1430	1540	1682			
25	1953	2169	2286	2287	2236	2127	1998	1833	1627	1483	1385	1325	1341	1416	1567	1757			
30	2093	2368	2499	2458	2385	2271	2144	1934	1687	1497	1376	1295	1308	1394	1589	1850			
35	2307	2562	2665	2580	2491	2391	2275	2028	1766	1528	1362	1260	1250	1349	1589	1939			
40	2545	2701	2752	2641	2548	2470	2394	2136	1868	1550	1307	1178	1153	1263	1539	1994			
45	2684	2799	2741	2614	2498	2479	2476	2272	2007	1544	1217	1047	1007	1119	1426	2015			
50	2732	2870	2647	2452	2318	2388	2491	2428	2145	1505	1073	864	813	927	1266	2002			
55	2621	2880	2487	2145	1958	2132	2414	2575	2278	1421	886	664	618	718	1063	1960			
60	2330	2757	2259	1676	1419	1670	2183	2699	2293	1318	704	512	489	563	872	1805			
65	1914	2448	1943	1229	955	1218	1812	2695	2050	1248	568	436	428	472	727	1509			
70	1497	1904	1470	519	199	461	1507	2189	1492	1141	397	290	277	313	518	1114			
75	809	1500	520	156	133	146	539	1428	916	607	187	164	149	181	213	758			
80	119	367	136	133	87.8	89.5	163	424	149	162	127	109	92.6	131	137	212			
85	46.0	72.6	113	58.7	35.7	44.2	105	118	61.3	118	58.8	51.0	50.5	75.7	74.9	95.3			
90	3.98	11.5	11.6	4.85	4.28	2.78	3.65	3.88	2.38	2.19	1.17	0.80	0.58	0.95	4.58	8.44			
95	1.45	1.76	1.03	0.51	0.37	0.29	0.74	1.68	1.81	1.83	0.88	0.37	0.22	0.44	1.03	2.20			
100	1.38	1.32	0.59	0.37	0.22	0.22	0.44	1.10	2.03	2.26	1.62	0.66	0.37	0.66	1.76	2.71			
105	1.38	1.17	0.51	0.29	0.22	0.22	0.44	1.02	2.54	3.00	2.20	1.18	0.74	1.25	2.43	3.23			
110	1.45	1.17	0.51	0.29	0.22	0.22	0.44	1.46	3.26	3.66	2.79	1.99	1.63	1.98	3.16	4.32			
115	1.52	1.17	0.44	0.29	0.22	0.22	0.44	1.39	3.62	3.87	3.30	2.72	2.36	2.72	4.04	4.61			
120	1.52	1.31	0.44	0.29	0.22	0.22	0.44	1.61	3.55	3.87	3.67	3.24	2.95	3.30	4.04	4.46			
125	2.39	1.39	1.17	1.09	0.73	0.58	1.25	2.41	3.55	3.72	3.52	3.31	3.76	3.45	3.89	4.02			
130	2.61	1.68	1.46	1.32	1.40	1.39	1.40	2.71	3.55	3.50	3.37	3.68	3.98	3.75	3.89	3.80			
135	2.75	2.41	1.90	1.98	1.69	1.61	1.76	3.29	3.33	3.50	3.23	4.12	4.27	4.11	3.89	3.80			
140	3.55	2.63	2.42	2.64	2.36	2.35	2.35	3.80	3.33	3.50	3.30	4.26	4.42	4.48	3.96	3.73			
145	3.55	2.92	2.79	3.52	2.87	2.78	2.72	3.80	3.41	3.58	3.81	4.63	4.65	4.63	4.26	3.88			
150	3.62	3.58	3.59	3.68	3.61	3.45	3.52	3.80	3.77	3.80	4.18	4.70	4.79	4.77	4.48	4.17			
155	3.70	3.65	3.59	3.89	3.76	3.67	3.67	3.80	3.92	4.02	4.40	4.70	4.79	4.77	4.48	4.24			
160	3.70	3.65	3.67	4.04	3.83	3.74	3.74	3.80	4.13	4.16	4.40	4.70	4.79	4.77	4.70	4.24			
165	3.77	3.65	3.81	4.19	3.98	3.74	3.74	3.95	4.20	4.23	4.47	4.92	4.79	4.70	4.70	4.24			
170	3.91	3.87	4.32	4.56	4.49	4.11	3.96	4.02	4.35	4.46	4.62	4.85	4.79	4.70	4.70	4.24			
175	4.49	4.45	4.76	4.71	4.79	4.18	4.25	4.46	4.78	4.67	4.62	4.78	4.79	4.70	4.70	4.24			
180	4.64	4.60	4.69	4.70	4.72	4.48	4.26	4.39	4.71	4.67	4.62	4.70	4.72	4.70	4.62	4.24			

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6. Photo of sample:





----- End of test report -----

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