Testing Lab.

Shenzhen LCS Compliance Testing Laboratory Ltd.

TESTING
NVLAP LAB CODE 600112-0

REPORT NO.:LCS180831034BS

TEST REPORT of IES LM-79-08

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

Client.....	:	Shenzhen Sinoco Lighting Technologies Co.,Ltd.
Address.....	:	G building,Shasi High-Tec Industrial park,Shajing Town,Baoan District, Shenzhen, Guangdong,China
Brand Name.....	:	Sinoco
Testing laboratory.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address.....	:	B Area, 2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, China
Product description ...	:	LED street light
Models.....	:	ST-52-90W
Rating.....	:	AC100-240V, 50/60Hz, 90W
Date of Test.....	:	September 03, 2018
Date of Issue.....	:	September 05, 2018

Test by:	**Check by:**	**Approved by:**
James	Ian Luo	
James Zhang/ Project Engineer	Ian Luo/ Director	Jesse Liu/ Manager

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1. Test Method

Test Item.....:	Integrating Sphere Test
Ambient Condition .....:	25.1℃
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):	1h
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.....:	ST-52-90W
Rated Inputs.....:	AC100-240V, 50/60Hz
Rated Power.....:	90W
Declared CCT.....:	4000K
Manufacturer.....:	Shenzhen Sinoco Lighting Technologies Co.,Ltd.
Address.....:	G building,Shasi High-Tec Industrial park,Shajing Town,Baoan District,Shenzhen, Guangdong,China
LED Manufacturer.....:	N/A
LED Model.....:	N/A
Forward current of the LED chip.....:	N/A
Date of Receipt Samples.....:	September 03, 2018
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	2018/08/14	2019/08/13
EVERFINE	Digital Power Meter	SLCS-S-103	PF2010	2018/08/14	2019/08/13
EVERFINE	AC Testing Power Source	SLCS-S-115	DPS1060	2018/08/14	2019/08/13
EVERFINE	Total Spectral Radiant Flux Standard Lamp	SLCS-S-143	D908S	2018/08/22	2019/08/21
SENSING	2 Meter Integrating Sphere	SLCS-S-038	SPR-3000	2018/08/14	2019/08/13
YOKOGAWA	Digital Power Meter	SLCS-S-058	WT310	2018/08/14	2019/08/13
ALL POWER ELECTRONIC	AC Testing Power Source	SLCS-S-111	APW-105N	2018/08/14	2019/08/13
SENSING	Standard Lamp	SLCS-S-118	S11010017	2018/08/22	2019/08/21

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4. Integrating Sphere Test Results：

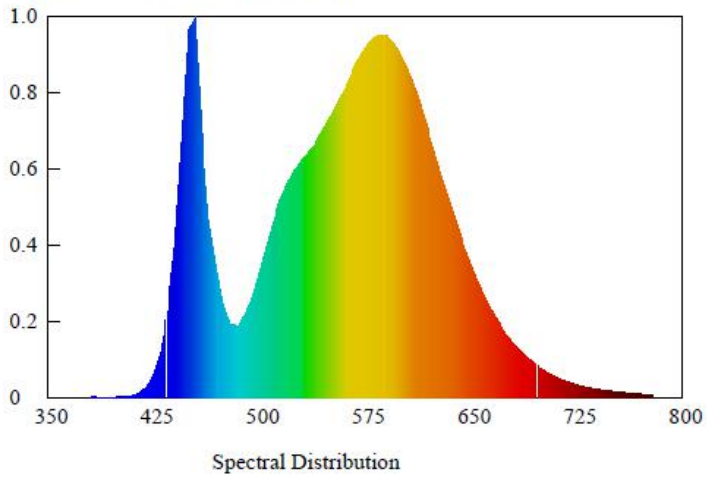
4.1 Test Data

Test type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
Input	220.0	50.00	0.424	0.971	90.56

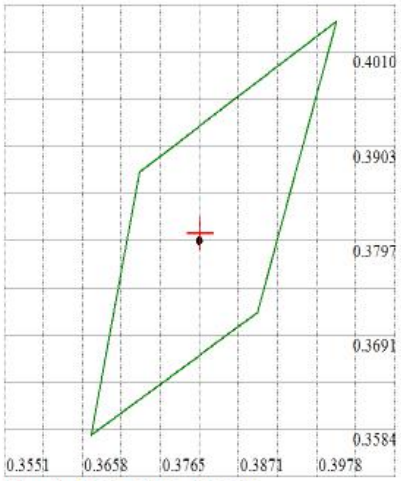
Test type	CCT (K)	CRI	Luminous flux (lm)	Luminous efficacy(lm/W)
Output	3988	74.8	11645.12	128.59

4.2 Spectrum

Spectroradiometric Parameters



Spectral Distribution



Nominal CCT:LED_4000K
x0=0.3818 y0=0.3797

Chromaticity Coordinates: x=0.3819 y=0.3805 u'=0.2246 v'=0.5034

Correlated Color Temperature: 3988 K	Dominant Wavelength: 577.0 nm(E)
Colour Fidelity Index: Rf=74	Gamut Index: Rg=91
Luminous Flux: 11645.12 lm	Purity: 0.2882
Chromaticity Difference: 0.001Duv	Peak Wavelength: 455.0 nm
Color Ratio: Kr=38.2% Kg=53.7% Kb=8.2%	
Bandwidth: 18.8nm	Radiant Flux: 32.864 W
Photosynthetically Active Radiation(PAR): 32.41W	Photosynthetic Photon Flux(PPF):152.02μmol/s

Rendering Index: Ra=74.8

R1=71	R2=83	R3=93	R4=72	R5=71	R6=76	R7=81	R8=50
R9=-30	R10=61	R11=68	R12=48	R13=75	R14=96	R15=64	Re=65

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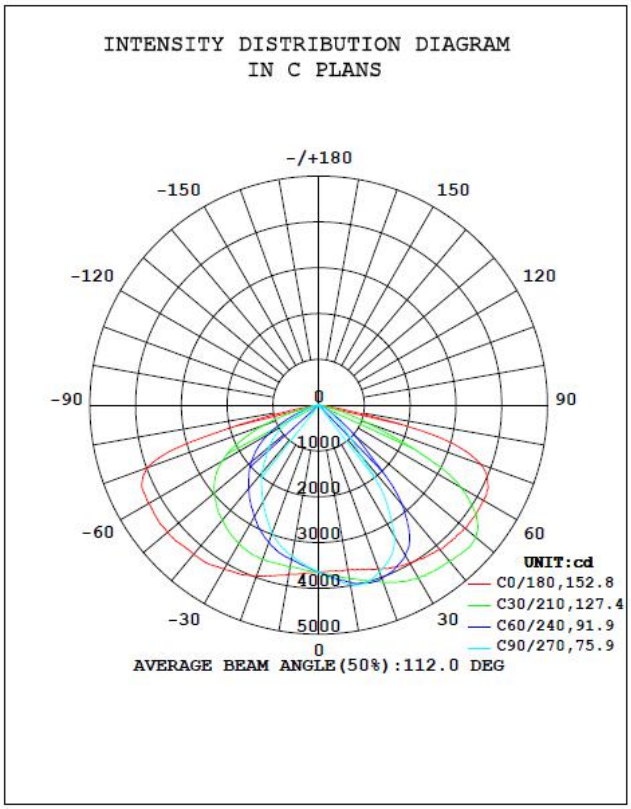
5. Goniophotometer Test results

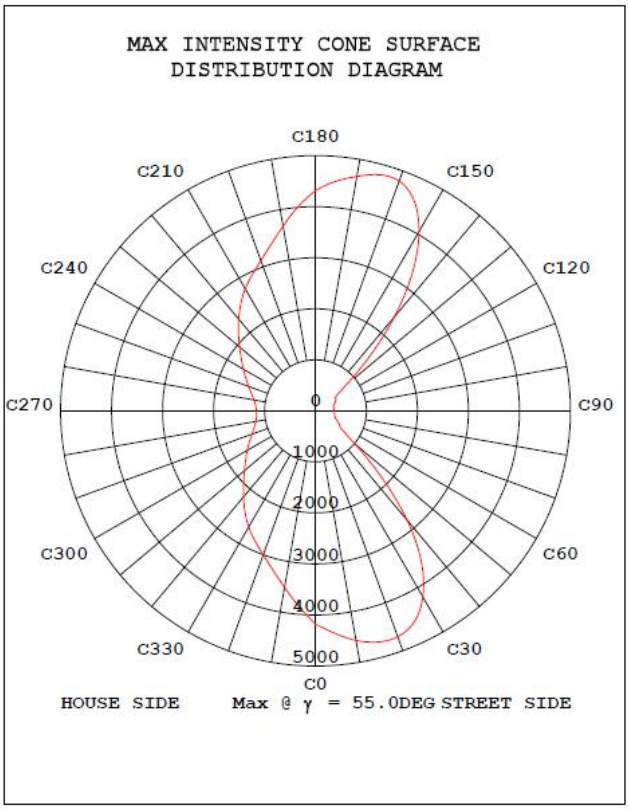
5.1 Test Data

Test type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power Factor	Power (W)
Input	220.0	50.00	0.424	0.9702	90.53

Test type	Total Flux (lm)	Luminous efficacy(lm/W)	Imax (cd)	Spacing Criteria (0~180°)	Spacing Criteria (90~270°)
Output	11638.4	128.57	4793	-	-

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	3649	3887	3973	3942	3748	3506	3352	3436	0- 10	350.7	350.7	3.01,3.01
20	3794	4108	3870	4180	3972	3377	2970	3254	10- 20	1051	1402	12,12
30	3970	4135	3303	4190	4136	3154	2432	2992	20- 30	1683	3084	26.5,26.5
40	4107	3935	1466	3845	4247	2840	1926	2669	30- 40	2107	5191	44.6,44.6
50	4169	2781	608.2	2517	4313	2432	1416	2266	40- 50	2188	7378	63.4,63.4
60	4158	962.7	236.2	613.4	4292	1754	824.2	1683	50- 60	2029	9408	80.8,80.8
70	3766	157.5	82.60	136.4	3977	700.7	321.7	695.9	60- 70	1540	10948	94.1,94.1
80	548.2	20.11	2.025	11.28	384.5	108.2	118.6	122.0	70- 80	631.4	11579	99.5,99.5
90	2.457	0.4350	0	0.1092	2.813	0.1087	0.0701	0.1121	80- 90	37.52	11617	99.8,99.8
100	2.597	0.2900	0	0.1456	4.622	0.2211	0	0.1821	90-100	0.8684	11618	99.8,99.8
110	3.823	0.9053	0.0725	0.9800	6.795	1.637	0.1458	1.168	100-110	1.594	11619	99.8,99.8
120	4.252	1.596	0.8703	1.738	6.925	3.665	0.6527	3.062	110-120	2.496	11622	99.9,99.9
130	5.915	3.259	2.321	2.946	5.699	4.316	1.377	4.043	120-130	3.036	11625	99.9,99.9
140	7.498	4.891	4.131	4.500	5.699	4.895	3.484	5.208	130-140	3.390	11628	99.9,99.9
150	8.223	6.994	6.165	6.113	6.350	6.848	5.600	7.245	140-150	3.703	11632	99.9,99.9
160	8.295	7.860	7.399	7.024	7.504	7.933	8.050	7.970	150-160	3.388	11635	100,100
170	8.869	9.018	8.616	8.332	8.151	8.805	9.063	8.916	160-170	2.319	11638	100,100
180	9.594	9.455	9.283	8.698	9.305	9.383	8.993	8.916	170-180	0.8588	11638	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

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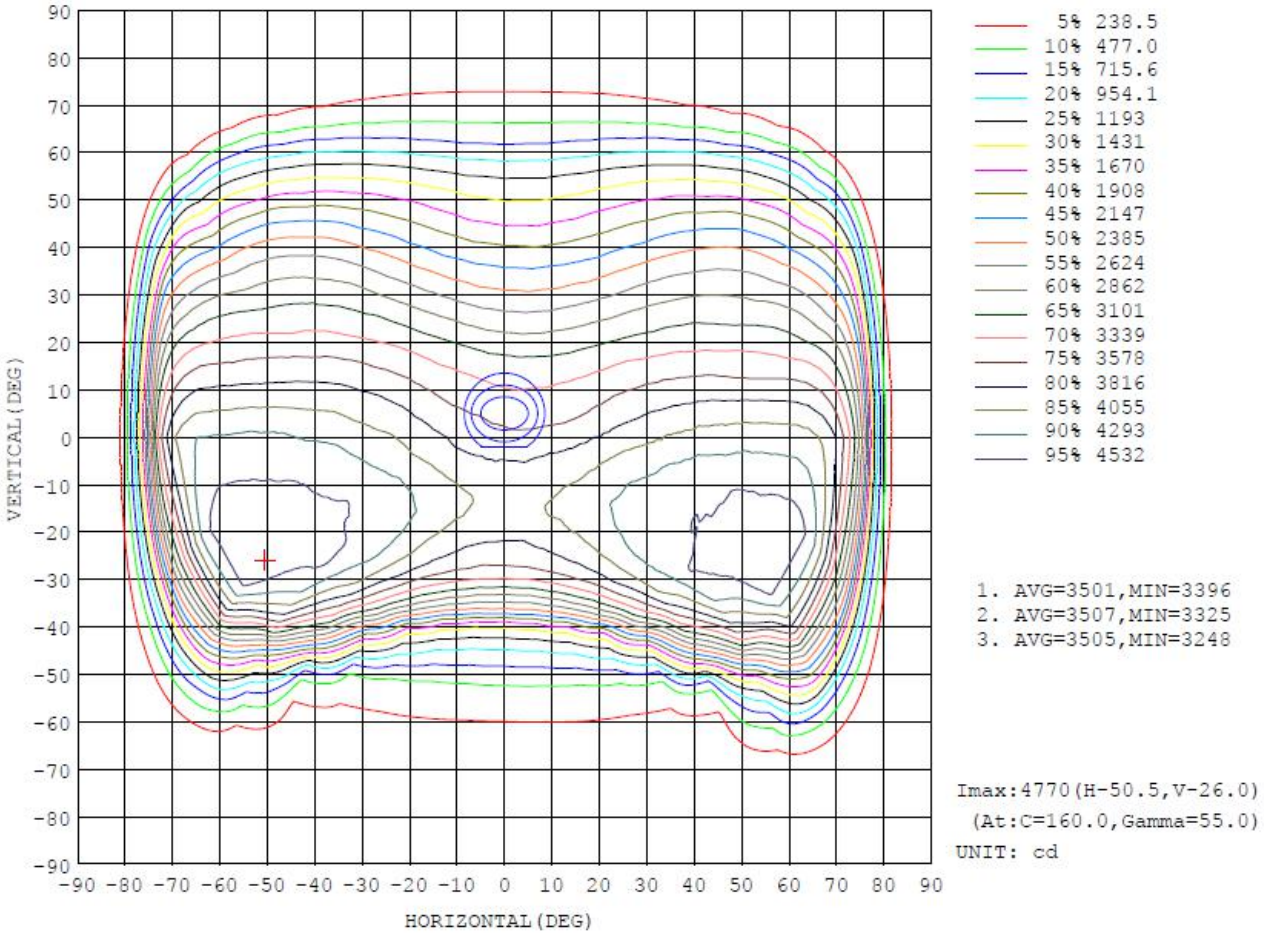
5.4 Isocandela Diagram



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5.5 Luminous Distribution Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646	3646
5	3632	3669	3718	3735	3745	3771	3786	3797	3812	3817	3831	3808	3818	3797	3784	3767	3738	3727	3689
10	3649	3752	3811	3836	3869	3906	3923	3942	3956	3973	3982	3980	3979	3951	3933	3910	3863	3821	3748
15	3707	3836	3901	3962	4006	4031	4016	4001	4006	4013	4025	4045	4077	4106	4079	4066	4017	3941	3853
20	3794	3975	4046	4117	4120	4097	4027	3941	3890	3870	3894	3969	4058	4150	4209	4227	4191	4088	3972
25	3910	4110	4206	4250	4210	4077	3938	3805	3717	3682	3707	3805	3953	4135	4288	4376	4335	4221	4067
30	3970	4205	4350	4367	4236	4034	3783	3563	3371	3303	3364	3532	3769	4062	4317	4460	4471	4335	4136
35	4047	4335	4455	4420	4260	3927	3460	2986	2670	2573	2645	2935	3376	3894	4302	4514	4547	4438	4223
40	4107	4422	4495	4443	4228	3640	2837	2091	1596	1466	1531	1929	2706	3491	4198	4550	4593	4506	4247
45	4142	4491	4538	4502	4031	3091	1734	1192	992	934	957	1118	1545	2857	3890	4562	4650	4572	4278
50	4169	4547	4628	4480	3556	2002	1034	742	641	608	615	688	930	1697	3336	4426	4736	4621	4313
55	4180	4568	4709	4209	2797	993	543	418	379	365	360	381	465	757	2410	4058	4793	4662	4313
60	4158	4633	4655	3594	1566	357	284	264	246	236	239	252	268	300	926	3192	4619	4710	4292
65	4077	4538	4234	2368	407	215	190	175	160	151	154	167	180	199	292	1663	3857	4443	4264
70	3766	3794	3185	1131	183	132	113	99.6	88.4	82.6	84.8	93.4	104	118	154	689	2275	3296	3977
75	2747	2332	1612	446	90.4	63.5	49.3	38.1	32.6	29.7	30.6	33.3	41.7	52.2	68.8	193	774	1454	2309
80	548	474	313	97.0	25.6	14.6	7.79	3.77	2.54	2.03	2.08	2.48	4.26	8.00	14.6	34.8	137	235	385
85	27.8	23.8	15.5	5.11	1.99	0.52	0.29	0.15	0.22	0.22	0.07	0.22	0.15	0.29	0.45	1.94	4.81	9.64	16.9
90	2.46	2.62	2.11	1.24	0.58	0.29	0.07	0.07	0.07	0.00	0.07	0.07	0.07	0.07	0.15	0.44	1.02	2.05	2.81
95	2.45	2.33	1.75	0.87	0.43	0.14	0.07	0.07	0.07	0.00	0.00	0.07	0.07	0.07	0.15	0.29	0.80	1.90	3.47
100	2.60	2.39	1.75	0.94	0.43	0.14	0.07	0.07	0.07	0.00	0.00	0.07	0.07	0.15	0.15	0.29	1.31	2.12	4.62
105	3.53	2.76	2.25	1.23	0.51	0.14	0.07	0.07	0.07	0.00	0.00	0.07	0.07	0.15	0.44	1.17	1.68	2.92	5.77
110	3.82	3.64	2.47	1.59	1.30	0.51	0.22	0.07	0.07	0.07	0.00	0.07	0.21	0.51	1.45	1.68	2.63	3.73	6.80
115	3.89	3.63	2.69	2.17	1.38	1.23	0.93	0.43	0.36	0.36	0.29	0.36	0.79	1.30	1.60	2.34	3.36	4.53	7.14
120	4.25	3.71	2.84	2.39	1.67	1.52	1.23	1.23	1.09	0.87	0.79	1.16	1.37	1.59	1.88	2.34	3.58	4.68	6.92
125	4.97	4.49	3.71	3.18	2.46	2.46	2.24	2.01	1.59	1.66	1.52	1.67	1.88	2.33	2.55	3.50	4.09	5.12	5.91
130	5.91	5.09	4.65	3.91	3.55	2.97	2.67	2.67	2.32	2.32	2.47	2.39	2.55	2.55	3.34	3.94	4.68	6.00	5.70
135	6.20	5.89	4.87	4.63	4.13	3.77	3.61	3.62	3.33	3.19	2.97	3.47	3.56	3.49	3.79	4.60	5.04	6.07	5.55
140	7.50	6.90	6.18	5.94	5.21	4.57	4.62	4.48	4.33	4.13	3.92	4.06	4.58	4.49	4.50	5.40	6.28	6.95	5.70
145	8.15	7.56	6.91	6.65	6.08	5.80	5.93	5.86	5.72	5.00	4.79	5.23	5.30	5.45	5.24	5.99	6.43	7.39	5.77
150	8.22	8.14	7.49	7.16	7.03	6.96	6.94	6.65	6.29	6.16	6.02	6.10	6.04	6.11	6.11	6.13	6.94	7.39	6.35
155	8.22	8.21	8.22	8.03	7.46	7.32	7.01	7.02	7.09	7.03	6.53	6.67	6.61	6.77	6.99	7.07	7.09	7.39	6.93
160	8.30	8.28	8.29	8.25	7.75	7.97	7.81	7.80	7.38	7.40	7.18	7.12	6.98	7.06	6.99	7.01	7.09	7.39	7.50
165	8.58	8.65	8.37	8.33	8.18	8.27	8.53	8.39	8.10	8.27	8.27	7.41	8.07	7.28	7.42	7.95	8.04	8.42	7.65
170	8.87	9.22	9.23	8.83	8.90	9.13	9.11	8.96	8.53	8.62	8.57	8.27	8.44	8.29	8.37	8.39	8.40	8.56	8.15
175	9.59	9.52	9.31	9.34	9.42	9.50	9.25	9.25	8.98	9.28	9.36	8.85	9.09	8.66	8.81	8.69	9.06	9.00	9.31
180	9.59	9.52	9.39	9.34	9.41	9.50	9.25	9.25	8.97	9.28	9.29	8.79	9.17	8.66	8.73	8.76	8.99	9.00	9.31

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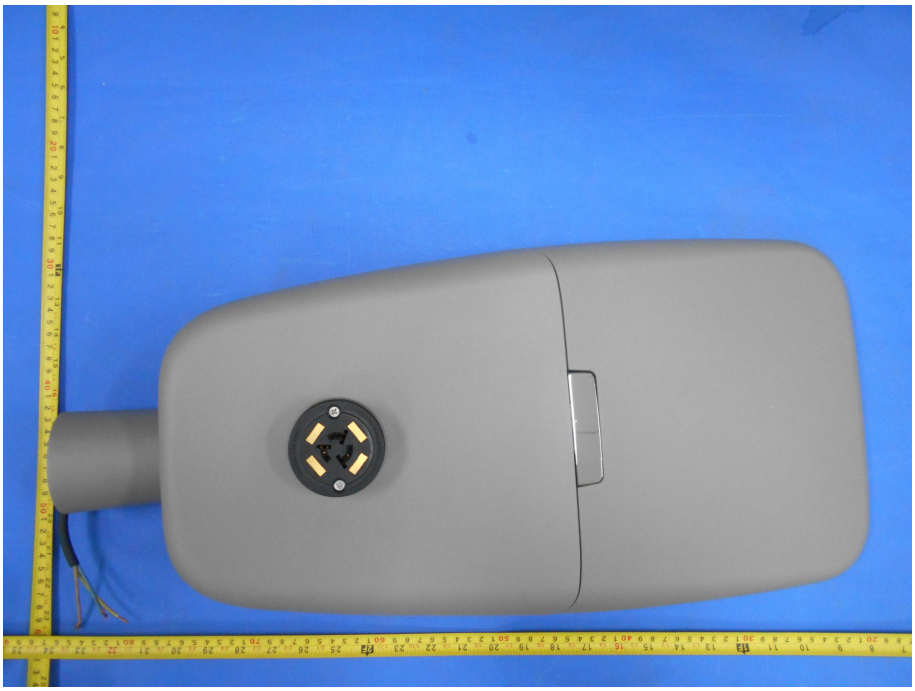
6. Photo of sample:



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

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