

LM-79-08 Test Report

For

ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City,
Guangdong Prov., China

Inseparable SSL Luminaire

Model Name(s):

565741##

Representative (Tested) Model:

56574141

Model Difference: Where ## denotes color temperature 41 ~ 50 identifies 4000K.

Prepare by:

Derek Lai

Engineer: Derek Lai

Date: 2019-09-24

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan

Issue Date: 2019-10-10

Revised Date: N/A

- Note:
1. The results contained in this report pertain only to the tested samples.
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 3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	Commercial Electric
Model Number:	565741##(##=41-50)
Product Type:	Indoor/Outdoor, inseparable SSL Luminaire
Rating Input:	120Vac, 60Hz, 32W
Declared CCT:	4000 K
Declared Light Output:	3600 lm
LED Manufacturer:	Samsung Electronics Co., LTD.
LED Model:	SPMWHX228FD5WAW0XX
LED Quantity:	156 pcs

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2019-09-14
Quantity of Receipt Samples:	1 pcs
Sample Number:	190914004-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_ntc@163.com

Report Information:

Issued Date of Test Report:	2019-10-10
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR19090166
Remark (If applicable):	N/A

Test Specification:	
Date of Test	2019-09-18
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry

Test Methods:
<p>1. Photometric and Electrical Measurements – Light Distribution Method:</p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizontal intervals.</p>
<p>2. Photometric and Electrical Measurements – Integrating Sphere Method:</p> <p>Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. 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 require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.</p>

Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.7	40.3	Face Down	90	10

Electrical Data:

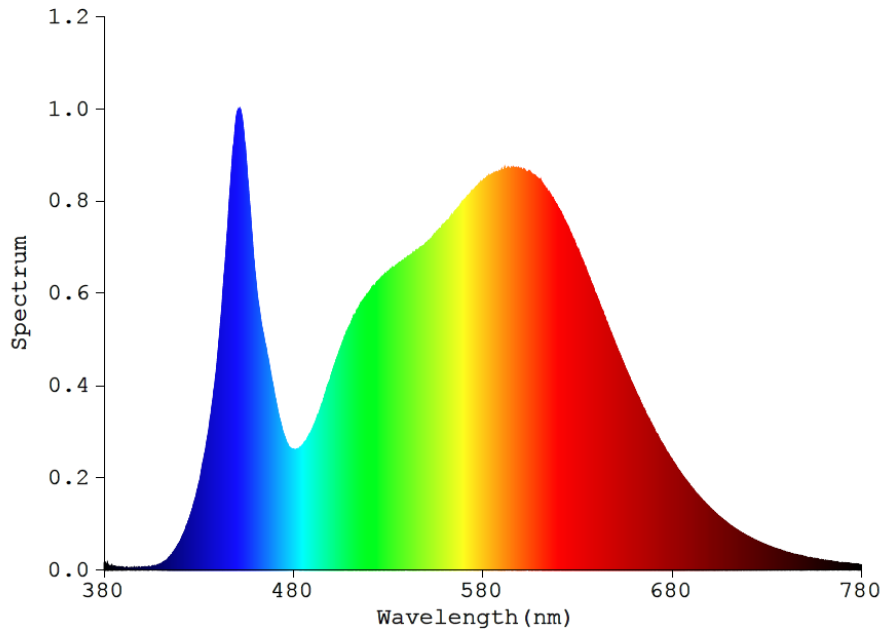
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.2748	31.70	0.9611

Color Data:

Parameter	Result
CCT(K)	4048
Ra	85.2
R9	22
Chromaticity, x	0.3774
Chromaticity, y	0.3719
Chromaticity, u'	0.2250
Chromaticity, v'	0.4990
Duv	-0.00137

Special Color Rendering			
R1	84	R9	22
R2	90	R10	77
R3	94	R11	84
R4	85	R12	65
R5	84	R13	86
R6	86	R14	97
R7	88	R15	79
R8	70	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.7	40.3	Face Down	90	25

Electrical Data:

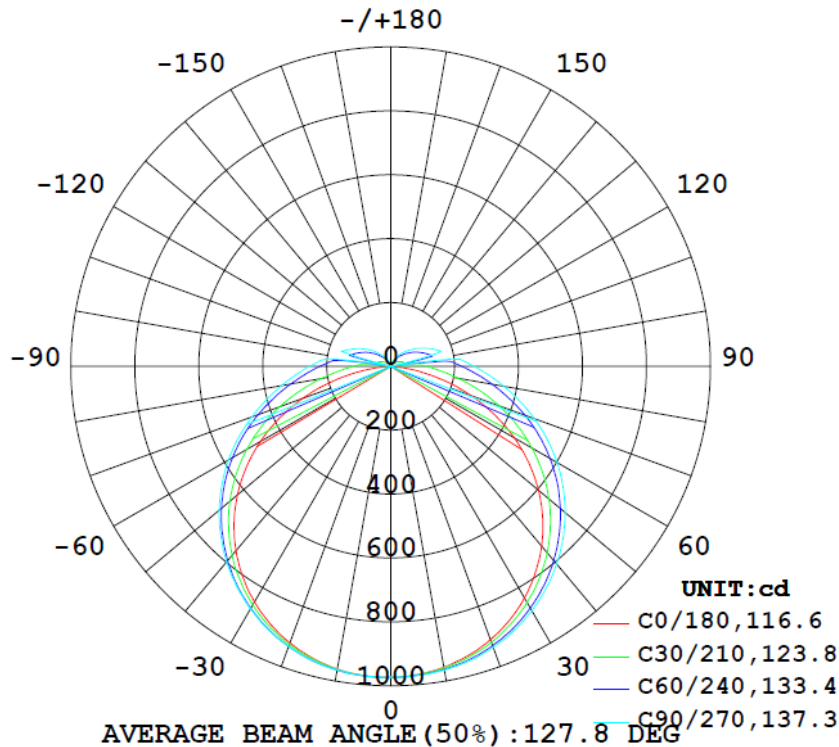
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.2748	31.70	0.9611

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	3736.5
Luminous Efficacy (lm/w)	117.87
Zonal Lumens Distribution (0-60°)	64.0%
Beam Angle (°)	127.8

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM

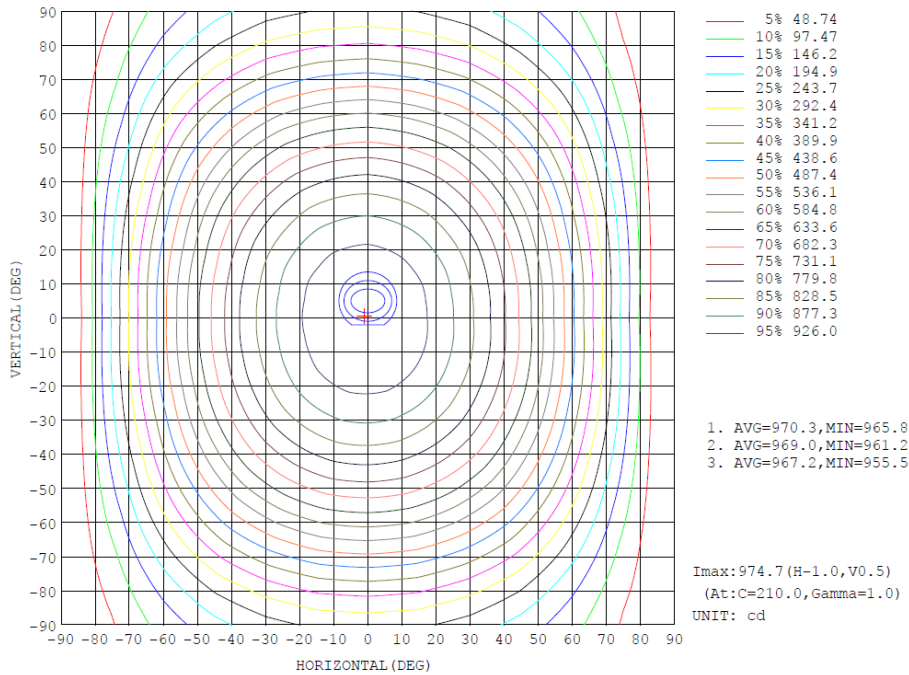


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	956.2	961.4	965.5	964.8	961.8	964.2	965.2	960.9	0- 10	92.41	92.41	2.47,2.47
20	910.6	925.9	936.5	931.9	921.5	929.4	932.9	923.0	10- 20	267.8	360.2	9.64,9.64
30	836.3	865.3	883.0	873.4	851.7	868.7	877.1	859.0	20- 30	414.6	774.8	20.7,20.7
40	734.3	779.9	807.1	789.7	753.2	782.4	798.4	770.3	30- 40	515.8	1291	34.5,34.5
50	603.3	673.1	711.8	683.5	626.0	674.5	700.3	660.1	40- 50	559.6	1850	49.5,49.5
60	446.0	548.4	600.4	558.7	471.2	547.9	585.7	531.7	50- 60	540.5	2391	64,64
70	267.9	411.6	478.2	421.0	293.4	409.1	462.0	392.8	60- 70	462.0	2853	76.3,76.3
80	89.83	277.8	359.1	284.7	109.7	275.7	346.6	260.8	70- 80	340.7	3193	85.5,85.5
90	0.1037	176.8	261.6	180.0	0.3696	178.2	254.3	166.8	80- 90	217.6	3411	91.3,91.3
100	0.4483	13.53	0.5211	3.561	0.6374	0.9825	53.02	29.82	90-100	111.5	3522	94.3,94.3
110	0.4147	82.10	152.5	83.22	0.5782	82.55	149.7	77.66	100-110	59.92	3582	95.9,95.9
120	0.4807	62.06	115.1	62.98	0.5876	61.20	111.4	57.16	110-120	67.54	3650	97.7,97.7
130	0.5899	43.84	82.41	44.42	0.7112	40.39	78.37	38.07	120-130	44.12	3694	98.9,98.9
140	0.6396	28.33	54.67	28.83	0.7761	25.17	48.98	22.22	130-140	25.65	3720	99.5,99.5
150	0.6673	16.10	31.74	16.55	0.9074	12.98	26.70	11.58	140-150	12.17	3732	99.9,99.9
160	0.7612	5.752	8.112	5.535	1.024	4.064	3.628	3.190	150-160	3.975	3736	100,100
170	0.8418	1.177	2.402	1.188	1.044	1.105	1.375	1.007	160-170	0.5940	3736	100,100
180	0.9721	0.9670	0.9488	0.9125	0.9725	0.9697	0.9535	0.9145	170-180	0.0971	3737	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 19.0 %										UNIT:lm	

Isocandela Diagram:



Luminous Distribution Intensity Data:

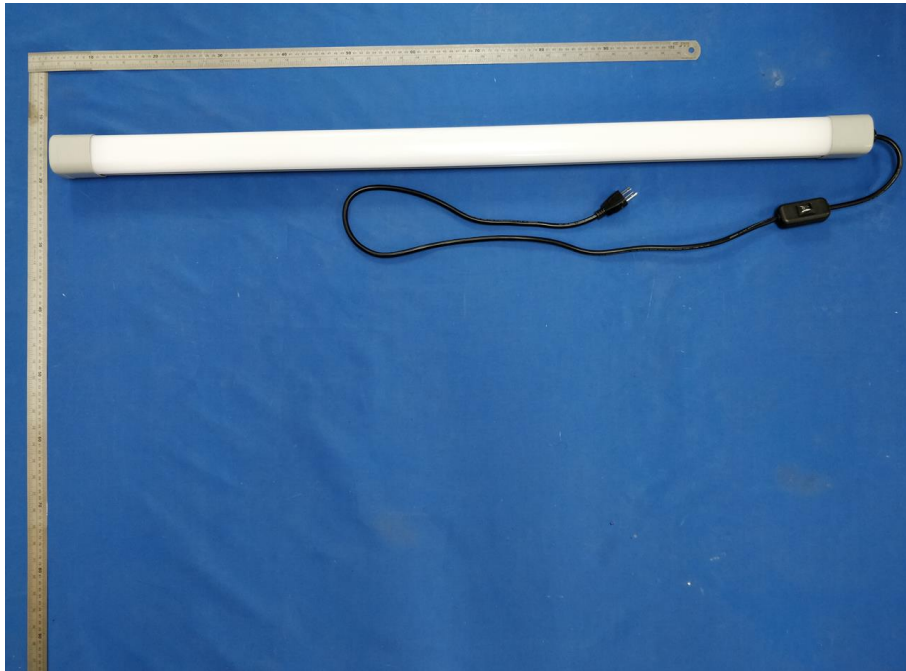
Table--1 UNIT: cd

C (DEG) \ Y (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	
0	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974	974
5	968	969	970	970	971	972	971	972	972	972	971	971	971	971	971	972	972	972	972	972
10	956	958	959	961	963	965	965	966	966	965	962	962	962	961	963	964	966	965	965	965
15	937	940	943	947	950	953	954	955	953	951	947	946	945	945	948	951	953	952	952	952
20	911	915	919	926	931	936	936	937	935	932	926	923	922	922	927	929	933	933	933	933
25	877	883	890	899	905	911	912	913	910	906	898	893	890	891	899	902	907	908	908	908
30	836	844	853	865	873	881	883	883	879	873	863	855	852	854	863	869	875	876	877	877
35	789	799	810	826	836	845	847	848	842	834	822	811	806	809	820	828	838	839	840	840
40	734	747	761	780	793	804	807	806	800	790	773	761	753	758	773	782	794	797	798	798
45	672	688	707	729	745	758	762	761	752	739	719	703	693	700	717	731	744	750	752	752
50	603	623	646	673	692	707	712	710	700	684	659	638	626	635	657	675	691	697	700	700
55	528	551	580	613	636	653	658	656	643	623	594	567	551	563	591	613	633	641	645	645
60	446	474	510	548	575	595	600	598	582	559	524	490	471	486	520	548	572	582	586	586
65	359	393	436	481	511	534	540	537	519	491	450	408	384	404	446	479	507	520	525	525
70	268	308	360	412	446	471	478	474	453	421	373	323	293	319	369	409	441	456	462	462
75	176	224	285	343	382	409	417	412	388	351	297	237	199	233	293	340	377	395	402	402
80	89.8	144	214	278	321	351	359	353	326	285	224	155	110	153	222	276	318	339	347	347
85	21.8	79.9	155	222	268	298	307	300	272	227	162	86.9	35.3	87.8	161	221	266	289	297	297
90	0.10	42.9	113	177	223	253	262	254	226	180	117	45.1	0.37	47.2	118	178	223	246	254	254
95	0.30	12.2	44.7	128	188	208	225	210	190	136	44.6	13.1	0.38	15.7	53.4	146	188	213	221	221
100	0.45	8.37	38.5	13.5	25.3	0.70	0.52	0.70	0.50	3.56	39.0	10.4	0.64	10.1	39.2	0.98	0.88	1.73	53.0	53.0
105	0.42	8.19	42.4	90.3	132	102	101	88.3	133	92.3	45.0	8.87	0.61	8.38	43.3	90.5	134	99.0	36.5	36.5
110	0.41	8.85	41.0	82.1	118	145	153	145	119	83.2	41.8	8.48	0.58	8.69	41.3	82.5	119	143	150	150
115	0.44	7.80	36.7	72.3	104	126	133	127	105	73.2	37.0	7.57	0.57	7.45	36.6	72.0	103	124	130	130
120	0.48	6.65	31.2	62.1	89.4	109	115	109	90.3	63.0	32.1	6.51	0.59	6.08	30.1	61.2	88.4	106	111	111
125	0.56	2.89	26.0	52.5	76.0	92.8	98.1	93.1	76.7	53.2	27.3	5.51	0.66	2.62	24.5	51.0	74.4	89.5	94.2	94.2
130	0.59	3.49	21.4	43.8	63.4	77.8	82.4	78.1	63.9	44.4	22.6	1.52	0.71	2.06	19.8	40.4	61.3	74.2	78.4	78.4
135	0.63	3.67	17.4	35.7	52.1	63.9	67.7	64.0	52.6	36.3	18.2	2.79	0.75	2.55	15.6	32.6	47.6	60.2	63.6	63.6
140	0.64	2.68	13.8	28.3	41.7	51.5	54.7	51.7	42.2	28.8	14.3	2.81	0.78	1.90	11.8	25.2	38.1	46.2	49.0	49.0
145	0.65	1.92	0.65	21.8	32.2	40.1	42.6	40.3	32.7	22.2	5.94	1.99	0.83	1.31	0.89	18.5	28.8	35.4	37.8	37.8
150	0.67	1.32	5.22	16.1	23.9	29.8	31.7	30.0	24.3	16.5	0.69	1.40	0.91	1.05	3.62	13.0	20.3	24.8	26.7	26.7
155	0.71	0.99	4.21	0.67	16.5	21.0	22.3	21.2	16.9	0.70	4.53	1.03	0.95	1.00	2.99	1.00	13.7	17.0	18.5	18.5
160	0.76	0.85	2.37	5.75	0.67	2.12	8.11	4.16	0.73	5.53	2.63	0.85	1.02	1.02	1.64	4.06	1.06	1.20	3.63	3.63
165	0.79	0.81	1.29	2.80	4.67	6.24	5.80	6.23	5.01	3.03	1.33	0.80	1.04	1.05	1.15	1.84	3.09	3.92	4.13	4.13
170	0.84	0.84	0.88	1.18	1.67	2.21	2.40	2.29	1.79	1.19	0.88	0.82	1.04	1.06	1.06	1.11	1.24	1.35	1.38	1.38
175	0.91	0.92	0.91	0.88	0.82	0.83	0.86	0.85	0.85	0.85	0.86	0.89	1.03	1.04	1.04	1.02	1.01	0.95	0.93	0.93
180	0.97	0.99	0.98	0.97	0.94	0.94	0.95	0.90	0.90	0.91	0.92	0.96	0.97	0.99	0.98	0.97	0.94	0.95	0.95	0.95

Table--2 UNIT: cd

C (DEG) \ Y (DEG)	285	300	315	330	345															
0	974	974	974	974	974															
5	971	971	970	969	969															
10	964	963	961	959	957															
15	950	948	945	943	939															
20	930	928	923	919	914															
25	904	901	894	888	881															
30	872	868	859	851	842															
35	834	829	817	807	796															
40	792	784	770	757	743															
45	743	735	718	701	683															
50	691	680	660	639	616															
55	635	622	598	572	544															
60	575	560	532	500	466															
65	513	495	463	425	383															
70	450	429	393	349	298															
75	389	365	324	273	213															
80	333	307	261	202	134															
85	284	256	208	145	72.7															
90	242	214	167	106	37.9															
95	209	182	109	20.7	10.7															
100	1.47	0.90	29.8	37.4	9.25															
105	104	129	87.1	42.4	7.45															
110	140	114	77.7	38.0	6.91															
115	121	99.1	67.5	32.8	5.59															
120	104	84.7	57.2	27.9	4.53															
125	87.5	71.3	47.5	23.0	1.18															
130	72.5	58.6	38.1	16.9	0.98															
135	58.7	45.8	30.6	13.9	1.87															
140	45.3	36.6	22.2	10.5	1.36															
145	34.7	27.4	16.9	0.87	1.02															
150	23.6	19.3	11.6	1.80	0.90															
155	16.6	12.7	0.98	2.21	0.96															
160	1.24	1.04	3.19	1.35	1.00															
165	3.72	2.60	1.53	1.07	1.01															
170	1.26	1.11	1.01	0.99	1.00															
175	0.93	0.88	0.95	0.98	1.00															
180	0.90	0.91	0.91	0.92	0.96															

Photo of Sample:



Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2018-11-16	2019-11-15
NTC-F01-006	2.0 meter Integrating Sphere	2018-11-16	2019-11-15
NTC-F01-012	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-013	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-031	Digital Power Meter	2019-08-22	2020-08-21
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

*****End of Report*****