



## Photometric Test Report

### Relevant Standards

- IES LM-79-2008
- ANSI C82.77-10-2014

### Prepared For

## GREEN INOVA LIGHTING TECHNOLOGY (SHENZHEN) LTD

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### Catalog Number

5SB(a)(b)(c)(d)(e)(f)(g)(h)(j)

### Project Number

4788254856

### Report Number

4788254856-13a

### Test Date

12/11/2017 — 12/12/2017

### Issue Date

12/13/2017

### Revision Date

N/A

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The results contained in this report pertain only to the tested sample.

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## 1.0 Test Summary

DLC Technical Requirements v4.2- issued 2017-04-28

Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Minimum Light Output (lm)	IES LM-79-2008	$\geq 10000, \leq 30000$	16725	Pass
Minimum Lamp Output (lm)	IES LM-79-2008	N/A	N/A	N/A
Spacing Criteria (0-180°)	IES LM-79-2008	N/A	N/A	N/A
Spacing Criteria (90-270°)	IES LM-79-2008	N/A	N/A	N/A
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	$\geq 99\%$	99.70%	Pass
Zonal Lumen Requirement (80°-90°)	IES LM-79-2008	$\leq 10\%$	1.60%	Pass
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	$\geq 120$	120.12	Pass
Minimum Lamp Efficacy (lm/ft)	IES LM-79-2008	N/A	N/A	N/A
Allowable CCTs* (K)	IES LM-79-2008 ANSI C78.377-2015	$\leq 5700$	5138	Pass
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	$\geq 65$	76.3	Pass
Power Factor	ANSI C82.77-10-2014	$\geq 0.9$	0.9184	Pass
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	$\leq 20\%$	12.56%	Pass
Minimum Luminaire Warranty (years)	N/A	5	5	Pass

\* The standards are NOT covered by the NVLAP scope of test laboratory UL Verification Services (Guangzhou) Co., Ltd.



## 2.0 Test List

Test Item	Test	Test Date	Model Number	Tests Conducted By
1	Integrating Sphere Test for the Lower CCT	12/12/2017	5SB140H40B2DIV	Howie Wang
2	Integrating Sphere Test for the Higher CCT	12/12/2017	5SB140H50B2DIV	Howie Wang
3	Goniophotometer Test	12/11/2017	5SB140H40B2DIV	Howie Wang
4	THD and PF Test	12/11/2017	5SB140H40B2DIV	Howie Wang

### **Remark** (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.



### 3.0 Production Description

**Luminaire Description:** Outdoor-High Output, Outdoor Pole/Arm-Mounted Area and Roadway Luminaires

**Model Number:** 5SB140H40B2DIV

**Rated Input and CCT:** 347-480 Vac, 50/60 Hz, 140W, 4000K

**Driver Model Number :** HVG-150-36B

**LED Package:** SAW7C22B-xx

**Family Model and Variation:** 5SB(a)(b)(c)(d)(e)(f)(g)(h)(j)

where (a) may be any number, represent products wattage; (b) may be L and H, L represent input voltage is 100-277V, H represent input voltage is 347-480V, (c) represents color temperature, may be 40, 45 and 50; (d) represents case color, may be B, W and BK, instead of bronze, white and black; (e) represents the employing driver manufacture, may be 1 and 2, 1 for E-DRIVER CO LTD, 2 for MEAN WELL ENTERPRISED CO LTD; (f) represents provided with photocell, can be P for provided with photocell or blank for no photocell; (g) represents the dimmable, can be D for dimmable or Blank for non-dimmable; (h) represents motion Sensor, can be M for provided with Motion Sensor or blank for no motion sensor; (j) represent a variety of aisle lens, may be T, I, IV and V, T represent Type II lens, I represent Type III lens, IV represent Type IV lens, V represent Type V lens.

#### Photos of Luminaire Characteristics





## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test for the Lower CCT

<b>Model No.</b>	5SB140H40B2DIV	<b>Sample ID.</b>	1278277-S001
<b>Operate time (Min.)</b>	50	<b>Stabilization time (Min.)</b>	45

#### Test Method

1. The sample was tested according to the IES LM-79-2008.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The reference standard lamp is rated current 2.6A omni-directional Incandescent lamp and was calibrated by china seprei laboratory.

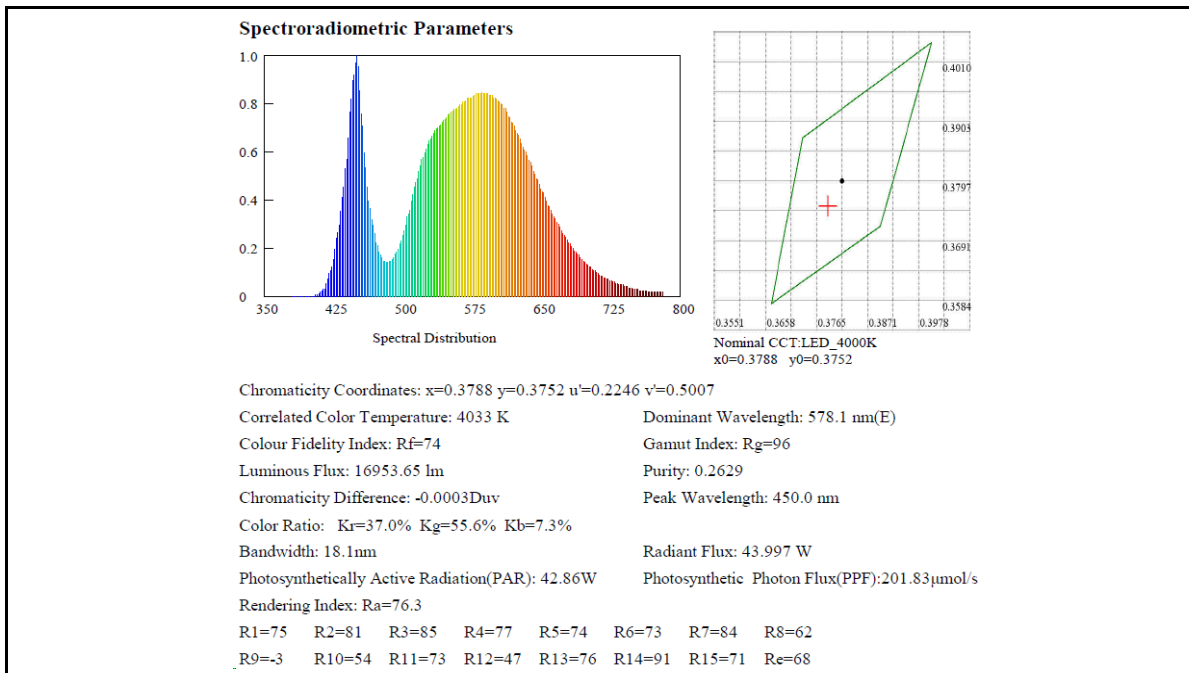
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using  $4\pi$  geometry. The self-absorption factor is applied in the final test result. 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.

#### Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.1	346.97	60	0.412	139.17	0.9750

#### Test Results

CCT (K)	CRI (Ra)	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)	Luminous Efficacy (lm/ft)
4033	76.3	-0.0003	16953.65	121.82	N/A





## 4.0 LM-79 Measurement and Test Results

### 4.2 Integrating Sphere Test for the higher CCT

<b>Model No.</b>	5SB140H50B2DIV	<b>Sample ID.</b>	1293883 -S001
<b>Opreate time (Min.)</b>	50	<b>Stabilization time (Min.)</b>	45

#### Test Method

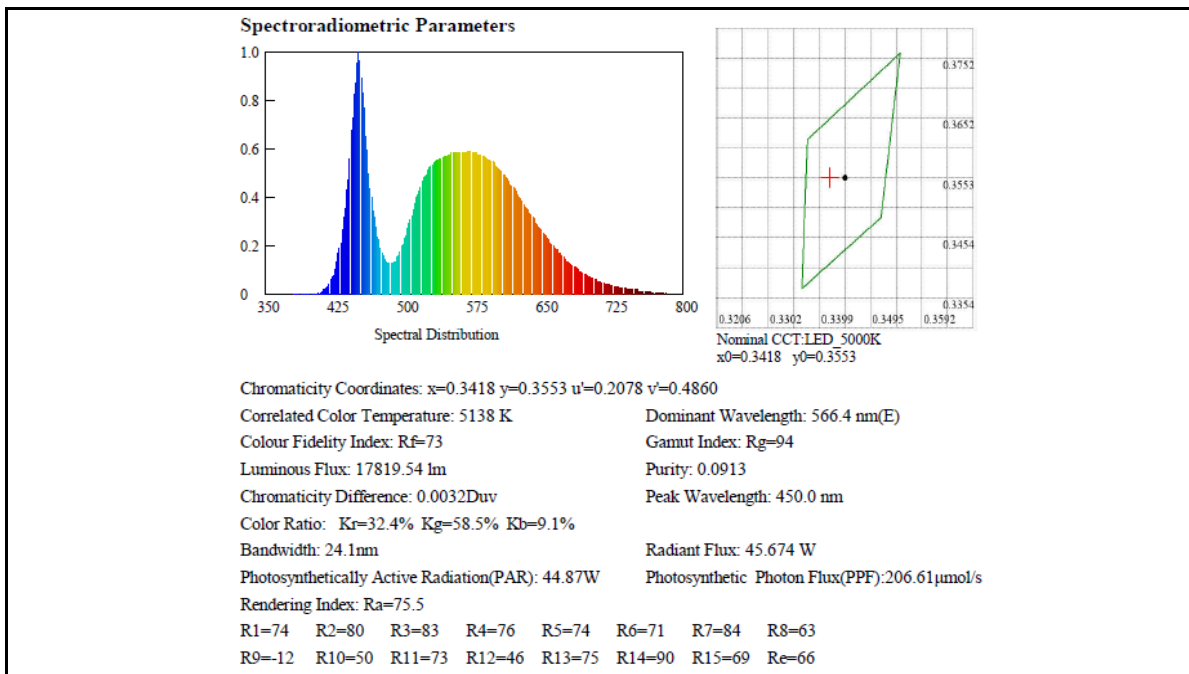
- The sample was tested according to the IES LM-79-2008.
- Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° C. The reference standard lamp is rated current 2.6A omni-directional Incandescent lamp and was calibrated by china seprei laboratory.
- The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. 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.

#### Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.1	346.91	60	0.415	140.59	0.9770

#### Test Results

CCT (K)	CRI (Ra)	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)	Luminous Efficacy (lm/ft)
5138	75.5	0.0032	17819.54	126.75	N/A





### 5.0 LM-79 Measurement and Test Results

<b>Model No.</b>	5SB140H40B2DIV	<b>Sample ID.</b>	1278277-S001
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	45

#### Test Method

- 1.The sample was tested according to the IES LM-79-2008.
- 2.Photometric paramters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample.The reference standard lamp is rated current 3.865A omni-directional Incandescent lamp and was calibrated by china seprei laboratory.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 22.5° horizontal intervals..Photometric distance was more than five times of the largest dimension of the test SSL product.

#### Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	347.02	60	0.4106	139.24	0.9772	Face Down

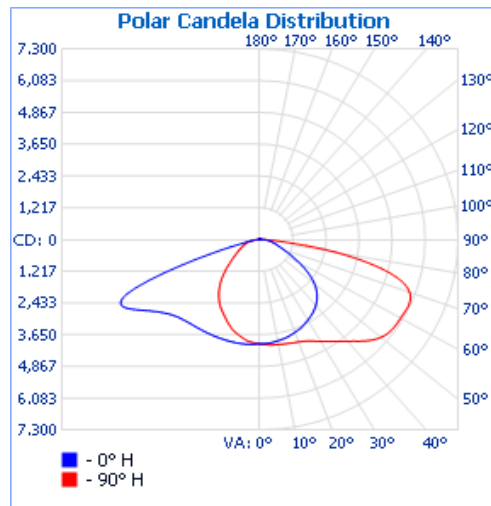
#### Test Result

Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)
	Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
16725	99.5	155.5	52.5	125.4	120.12
<b>Zonal Lumen Requirement (0°-90°)</b>	<b>Zonal Lumen Requirement (80°-90°)</b>				
99.70%	1.60%				

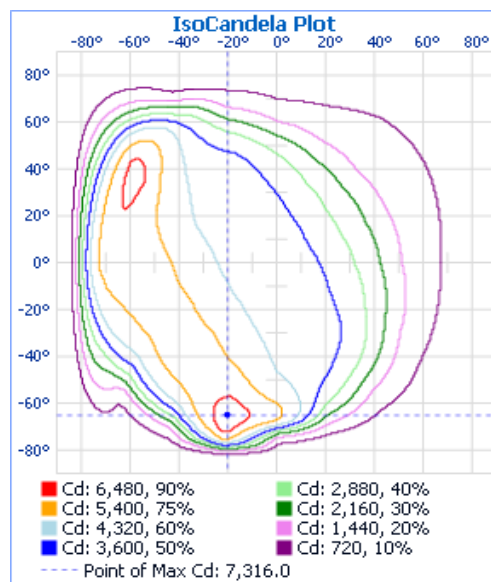


## 5.2 Goniophotometer Test (Cont'd)

### Light Distribution Curve



### IsoCandela Plot







## 5.2 Goniophotometer Test (Cont'd)

### Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,292.4	19.7%
0-40	5,684.5	34%
0-60	11,698.9	69.9%
60-90	4,981.6	29.8%
70-100	1,971.8	11.8%
90-120	19.2	0.1%
0-90	16,680.6	99.7%
90-180	44.5	0.3%
0-180	16,725.0	100%

### Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	96.7	0.6%	90-95	3.6	0%
5-10	288.3	1.7%	95-100	2.8	0%
10-15	472.9	2.8%	100-105	3.0	0%
15-20	648.7	3.9%	105-110	3.2	0%
20-25	813.5	4.9%	110-115	3.3	0%
25-30	972.4	5.8%	115-120	3.3	0%
30-35	1,125.0	6.7%	120-125	3.4	0%
35-40	1,267.2	7.6%	125-130	3.4	0%
40-45	1,393.0	8.3%	130-135	3.3	0%
45-50	1,489.9	8.9%	135-140	3.0	0%
50-55	1,549.8	9.3%	140-145	2.7	0%
55-60	1,581.7	9.5%	145-150	2.3	0%
60-65	1,574.3	9.4%	150-155	2.0	0%
65-70	1,441.9	8.6%	155-160	1.7	0%
70-75	1,077.4	6.4%	160-165	1.4	0%
75-80	612.1	3.7%	165-170	1.1	0%
80-85	225.4	1.3%	170-175	0.7	0%
85-90	50.6	0.3%	175-180	0.3	0%



## 5.2 Goniophotometer Test (Cont'd)

### Intensity Data(cd)

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	4040	4042	4048	4049	4049	4042	4042	4041	4042	4041	4041	4037	4033	4027	4030	4033	4037
1	4040	4040	4046	4048	4048	4040	4041	4042	4040	4039	4039	4035	4032	4025	4027	4030	4034
2	4035	4042	4054	4057	4059	4055	4055	4054	4047	4047	4037	4028	4021	4014	4019	4025	4032
3	4034	4050	4068	4077	4079	4074	4074	4070	4062	4055	4039	4022	4009	3996	4000	4011	4030
4	4026	4055	4075	4087	4088	4085	4083	4080	4071	4057	4037	4013	3993	3977	3982	4000	4026
5	4024	4054	4081	4094	4098	4094	4095	4086	4074	4059	4035	4004	3980	3958	3963	3987	4023
6	4015	4055	4084	4098	4105	4101	4100	4092	4077	4060	4033	3995	3965	3943	3945	3981	4016
7	4006	4051	4086	4101	4110	4107	4105	4097	4082	4060	4029	3986	3948	3923	3926	3966	4010
8	3995	4050	4089	4105	4113	4110	4109	4102	4086	4062	4024	3970	3920	3894	3907	3942	4002
9	3984	4051	4090	4106	4116	4117	4116	4106	4088	4062	4016	3949	3884	3854	3874	3920	3988
10	3974	4049	4093	4113	4123	4125	4123	4110	4091	4063	4006	3927	3851	3810	3832	3887	3976
11	3965	4044	4096	4117	4130	4132	4131	4116	4094	4062	3998	3906	3818	3769	3790	3861	3964
12	3952	4044	4097	4120	4138	4142	4138	4121	4094	4062	3991	3885	3783	3725	3748	3837	3950
13	3942	4042	4098	4123	4144	4150	4147	4126	4096	4062	3984	3863	3748	3681	3703	3810	3935
14	3926	4039	4100	4127	4154	4164	4158	4127	4098	4060	3974	3843	3717	3640	3661	3783	3923
15	3910	4037	4100	4131	4163	4174	4170	4136	4098	4059	3967	3821	3682	3600	3618	3758	3910
16	3895	4032	4099	4132	4172	4187	4180	4141	4099	4058	3960	3799	3648	3559	3575	3728	3898
17	3876	4032	4098	4133	4184	4202	4193	4146	4098	4056	3953	3776	3604	3515	3536	3694	3882
18	3860	4028	4097	4136	4196	4219	4208	4153	4099	4053	3942	3747	3554	3466	3493	3654	3866
19	3840	4026	4096	4141	4205	4237	4227	4164	4098	4052	3931	3715	3502	3406	3453	3615	3845
20	3822	4021	4096	4142	4218	4262	4249	4178	4100	4049	3920	3680	3448	3345	3406	3570	3823
25	3717	3992	4084	4166	4335	4468	4438	4259	4106	4038	3856	3504	3197	3057	3116	3360	3709
30	3585	3969	4075	4219	4552	4755	4704	4388	4114	4028	3794	3328	2965	2812	2856	3151	3594
35	3440	3940	4069	4297	4824	5109	5050	4590	4136	4014	3709	3107	2670	2507	2604	2891	3436
40	3254	3879	4057	4400	5140	5573	5526	4881	4179	3979	3571	2835	2324	2127	2236	2603	3241
45	3000	3770	4051	4594	5549	5904	5924	5255	4273	3910	3356	2486	1916	1717	1786	2255	2999
50	2631	3565	4050	4927	5882	5913	6044	5673	4475	3774	3013	2040	1510	1378	1398	1841	2660
55	2110	3196	4064	5488	6029	5674	5906	6124	4845	3532	2482	1547	1185	1154	1141	1406	2198
60	1512	2630	4083	6287	6054	5211	5598	6638	5418	3135	1813	1120	951	1000	973	1072	1625
65	1030	1897	3924	6871	6090	4313	4867	7139	5715	2405	1191	807	778	857	840	846	1088
70	728	1208	3082	6163	5916	3082	3612	7285	3822	1385	724	599	636	651	715	679	748
75	528	726	1439	3928	4984	1161	1747	6169	1142	575	451	440	501	504	513	533	532
80	382	412	418	1623	2879	435	628	1953	358	214	272	262	332	369	360	392	380
85	201	201	151	429	542	166	221	166	102	61	78	119	152	211	201	224	204
90	45	28	24	25	10	4	5	6	3	3	4	7	6	8	16	52	52
95	6	4	4	4	4	3	4	4	3	3	5	9	8	6	6	8	6
100	8	4	3	3	3	2	3	3	3	4	6	10	10	7	8	10	8
105	8	5	3	3	2	2	2	2	3	4	7	11	10	8	9	11	8
110	9	6	4	3	3	3	2	3	3	5	8	12	11	9	11	11	9
115	9	6	4	3	3	3	3	3	4	5	8	12	11	10	11	11	9
120	9	6	5	4	3	3	3	4	4	6	8	12	12	10	12	12	9
125	10	7	5	4	4	3	3	4	5	6	9	13	13	11	12	13	10
130	10	7	5	5	4	4	4	4	6	7	10	13	13	11	13	13	10
135	10	8	6	5	4	4	4	5	6	7	10	12	12	12	12	13	11
140	10	8	7	6	5	5	5	5	6	8	9	11	11	12	12	12	10
145	10	8	7	6	6	6	6	6	7	8	9	10	10	10	10	10	9
150	9	8	7	7	6	6	6	6	7	8	8	9	9	10	10	9	9
155	8	8	7	7	7	6	6	7	7	8	8	8	8	9	9	9	8
160	9	8	8	8	7	7	7	7	8	8	8	8	8	9	10	9	9
165	9	9	9	9	8	8	8	8	8	9	9	9	10	10	10	9	9
170	10	10	10	10	10	10	9	10	10	10	10	10	10	10	10	10	10
175	11	11	11	11	11	10	10	10	10	10	10	10	10	11	11	11	11
180	11	11	12	12	11	11	11	11	10	10	11	11	10	11	11	11	11



## 6.0 THD and PF Test

### Test Method

1. The samples were tested according to the ANSI C82.77-2002.
2. The ambient temperature condition was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

### Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD
25.1	346.95	60	0.4107	139.24	0.9972	7.04%
25.1	480	60	0.3186	140.44	0.9184	12.56%



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