

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014
- ☒ UL1598-2008

Prepared For

RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, gary@rabweb.com

Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

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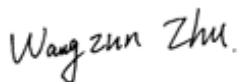
Test Date

2018/4/16

Issue Date

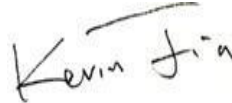
2018/4/16

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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

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1.0 Test Summary

DLC Technical Requirements v4.3

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements	Test value	Results (Fail/Pass)
Lamp Output (lm)	IES LM-79-2008	1000	1446	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥85%	100.00%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	90	92.2	P
Allowable CCTs* (K)	IES LM-79-2008	5700	2999	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	70.5	P
Power Factor	ANSI C82.77:2014	0.873	0.885	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	17.66%	P

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	HSLED13Y	A1
2	Goniophotometer Test	2018/4/16	HSLED13Y	A1
3	THD and PF Test	2018/4/16	HSLED13Y	A1

Remark(If any)

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3.0 Production Description

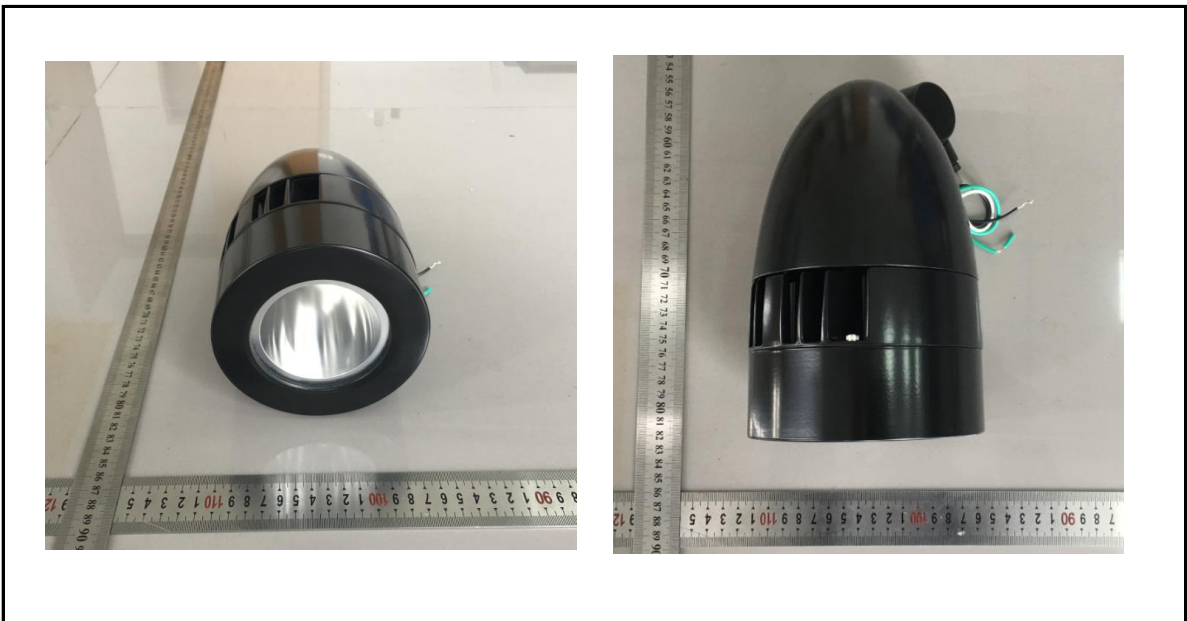
Luminaire Description:

Electrical Specification: 120V-277V,50/60HZ

Light source: SPMWH1228xxxxxxxxx

Manufacturer Of Light Source: Samsung Electronics Co., LTD.

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	HSLED13Y	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

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 sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and 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 Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.1	277.01	60	0.064	15.63	0.885

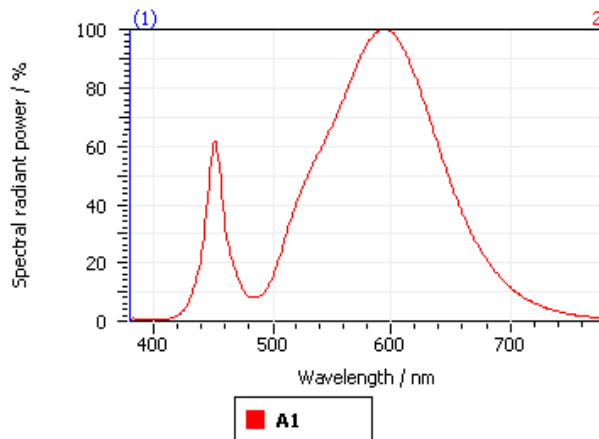
Test Result

CCT (K)	CRI (Ra)	Duv
2999	70.5	2.1E-03

4.1 Integrating Sphere Test

Spectroradiometric Parameters

Results



Spectral values

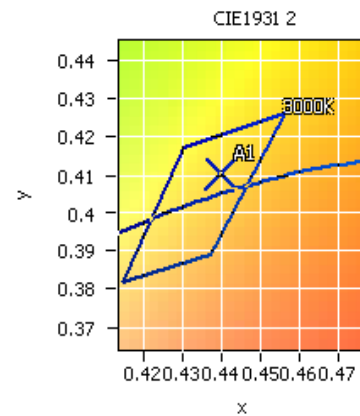
DominantWavelength	582.12 nm
Purity	0.553
PeakWavelength	593.92 nm
Width50%:	118.04 nm

Color Coordinates

Correlated Color Temperature 2999 K

x: 0.4401	u: 0.2499	u': 0.2499
y: 0.4104	v: 0.3495	v': 0.5243

ResultsCRICRI01	66.6	ResultsCRICRI09	-33.1
ResultsCRICRI02	80.2	ResultsCRICRI10	53.6
ResultsCRICRI03	91.7	ResultsCRICRI11	59.3
ResultsCRICRI04	66.3	ResultsCRICRI12	39.6
ResultsCRICRI05	65.0	ResultsCRICRI13	68.9
ResultsCRICRI06	71.5	ResultsCRICRI14	95.0
ResultsCRICRI07	78.7	ResultsCRICRI15	59.3
ResultsCRICRI08	44.2	ResultsCRICRI16	58.8
ResultsCRI	70.5		



Nominal CCT: 3000K

PlanckDistance 2.1E-003

4.0 LM-79 Measurement and Test Results

4.3 Goniophotometer Test

Model No.	HSLED13Y	Sample ID.	A1
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

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 10° horizontal intervals.

Test Conditions

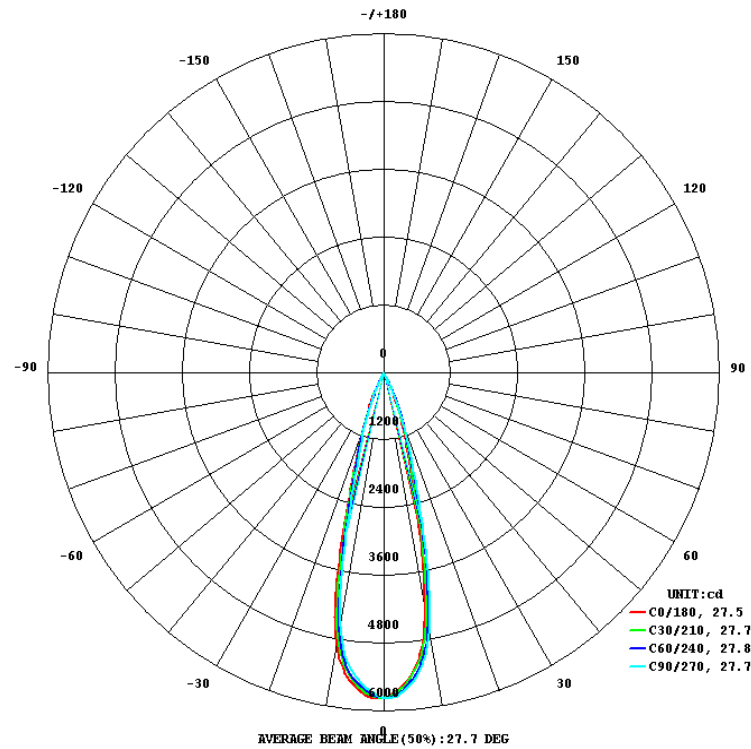
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	277.01	60	0.063	15.68	0.896	Light Down

Test Result

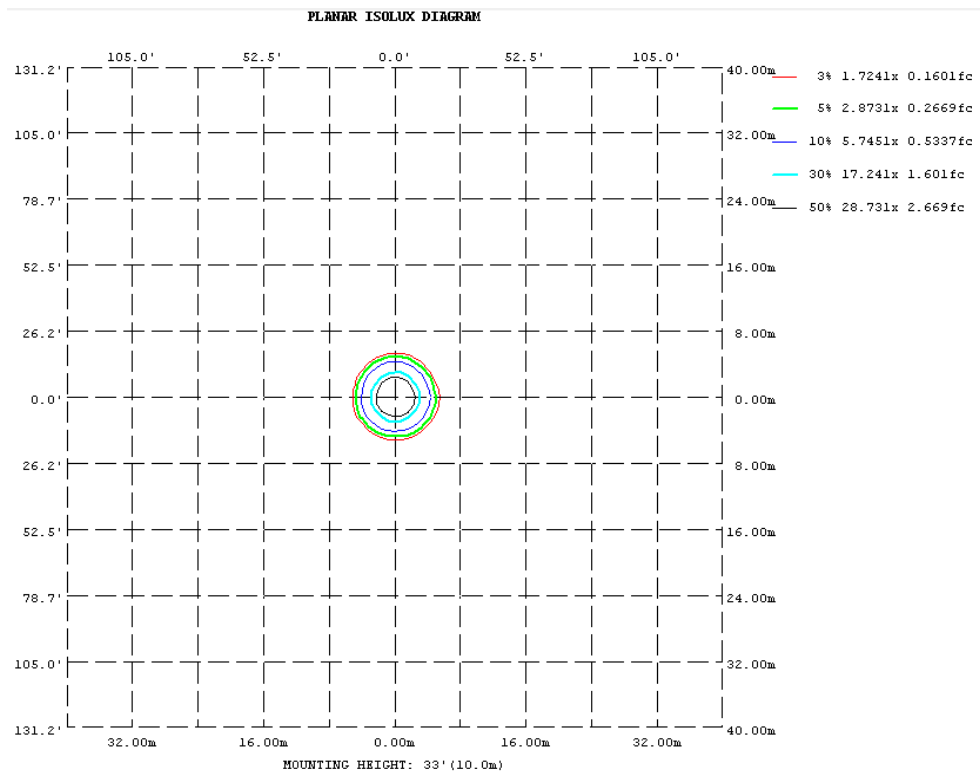
Flux(lm)	Zonal Lumen Requirement (0° - 90°)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
1446	100.00%	48.0	48.1	27.7	27.5	92.2

4.3 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.3 Goniophotometer Test

Zonal Lumen Summary

°	C0	C45	C90	C135	C180	C225	C270	C315
10	4899	4714	4558	4526	4269	4507	4704	4754
20	1266	1152	1062	1051	991.7	1116	1213	1184
30	147.3	116.8	85.49	79.14	71.95	97.11	120.5	119.5
40	12.35	11.87	10.76	10.48	10.51	11.45	11.55	11.32
50	6.350	6.312	6.076	5.922	6.008	6.245	6.176	6.016
60	4.821	4.894	4.817	4.679	4.845	4.923	4.777	4.608
70	4.024	3.933	3.823	3.737	3.688	3.892	3.961	3.842
80	1.431	1.334	1.223	1.071	0.6747	1.132	1.263	1.258
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd less than 35% Percent = 2.9 %							

4.3 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0 - 10	493.53	0 - 10	493.53	34.13%
10 - 20	679.31	0 - 20	1172.84	81.11%
20 - 30	231.77	0 - 30	1404.61	97.14%
30 - 40	22.81	0 - 40	1427.42	98.72%
40 - 50	6.31	0 - 50	1433.73	99.15%
50 - 60	4.78	0 - 60	1438.52	99.48%
60 - 70	4.29	0 - 70	1442.80	99.78%
70 - 80	2.71	0 - 80	1445.51	99.97%
80 - 90	0.46	0 - 90	1445.97	100.00%
90 - 100	0.00	0 - 100	1445.97	100.00%
100 - 110	0.00	0 - 110	1445.97	100.00%
110 - 120	0.00	0 - 120	1445.97	100.00%
120 - 130	0.00	0 - 130	1445.97	100.00%
130 - 140	0.00	0 - 140	1445.97	100.00%
140 - 150	0.00	0 - 150	1445.97	100.00%
150 - 160	0.00	0 - 160	1445.97	100.00%
160 - 170	0.00	0 - 170	1445.97	100.00%
170 - 180	0.00	0 - 180	1445.97	100.00%

4.3 Goniophotometer Test

Axial Candela

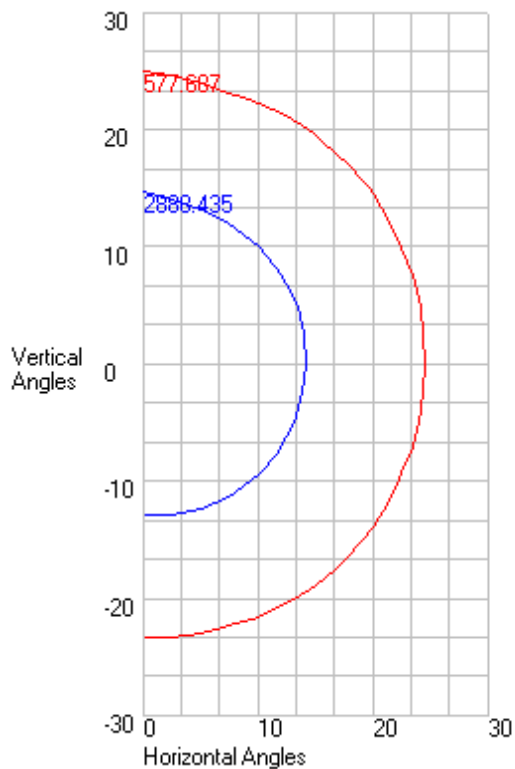
DEG.	HOR.	DEG.	VERT.
90	0	90	0
85	0.18	85	0.2
75	2.93	75	3
65	4.48	65	4.5
55	5.25	55	5.35
47.5	6.91	47.5	7.12
42.5	9.35	42.5	9.83
37.5	15.31	37.5	16.83
33	37.15	33	49.07
29	177.1	29	208.32
25.5	456.56	25.5	516.57
22.5	831.06	22.5	884.31
19.5	1295.96	19.5	1355.53
17	1824.64	17	1963.42
15	2535.23	15	2744.77
13	3451.75	13	3743.67
11	4374.29	11	4609.25
9	4957.42	9	5127.89
7	5310.04	7	5429.65
5	5534.93	5	5620.45
3	5696.92	3	5740.6
1	5768.33	1	5776.87
0	5760.952	0	5760.952
-1	5731.44	-1	5722.97
-3	5614.47	-3	5596.1
-5	5457.96	-5	5402.99
-7	5231.78	-7	5118.57
-9	4856.96	-9	4632.59
-11	4166.3	-11	3821.67
-13	3172.6	-13	2820.17
-15	2249.52	-15	2003.43
-17	1620.98	-17	1469.15
-19.5	1140.71	-19.5	1060.45
-22.5	710.12	-22.5	667.62
-25.5	383.11	-25.5	341.39
-29	130.19	-29	114.39
-33	32.63	-33	27.95
-37.5	13.84	-37.5	13.72
-42.5	8.86	-42.5	8.7
-47.5	6.7	-47.5	6.63
-55	5.26	-55	5.24
-65	4.47	-65	4.47
-75	2.67	-75	2.22
-85	0.19	-85	0
-90	0	-90	0

4.3 Goniophotometer Test

Characteristics

NEMA Type	4 H x 4 V
Maximum Candela	5776.87
Maximum Candela Angle	0 H 1 V
Horizontal Beam Angle (50%)	27.9
Vertical Beam Angle (50%)	27.6
Horizontal Field Angle (10%)	48.3
Vertical Field Angle (10%)	48.3
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	827
Beam Efficiency	N.A.
Field Lumens	1314
Field Efficiency	N.A.
Spill Lumens	132
Luminaire Lumens	1446
Total Efficiency	N.A.
Total Luminaire Watts	15.6828
Ballast Factor	1

ISOCANDELA CURVES



Axial Candela

	0	1	3	5	7	9	11	13	15	17	19.5	22.5	25.5	29	33	37.5	42.5	47.5	55	65	75	85	90
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0.2	0.195	0.184	0.173	0.163	0.152	0.141	0.115	0.1	0.105	0.11	0.115	0.118	0.118	0.107	0.095	0.081	0.065	0.041	0.013	0	0	0
75	3	2.986	2.959	2.931	2.869	2.819	2.764	2.703	2.654	2.621	2.582	2.519	2.443	2.344	2.166	1.897	1.529	1.299	0.967	0.458	0.125	0	0
65	4.5	4.49	4.469	4.44	4.412	4.381	4.348	4.312	4.284	4.257	4.223	4.175	4.124	4.039	3.931	3.783	3.565	3.289	2.683	1.456	0.407	0.004	0
55	5.35	5.332	5.296	5.24	5.187	5.128	5.065	5.008	4.966	4.92	4.858	4.781	4.704	4.624	4.53	4.425	4.312	4.164	3.764	2.7	0.867	0.02	0
47.5	7.12	7.087	7.022	6.888	6.758	6.613	6.458	6.342	6.22	6.084	5.911	5.696	5.494	5.268	5.032	4.814	4.617	4.466	4.194	3.323	1.368	0.035	0
42.5	9.83	9.761	9.623	9.324	9.041	8.732	8.442	8.235	7.971	7.651	7.296	6.902	6.482	6.05	5.615	5.221	4.889	4.637	4.37	3.622	1.692	0.053	0
37.5	16.83	16.616	15.987	15.253	14.529	13.598	12.917	12.157	11.291	10.618	9.871	8.898	8.099	7.305	6.502	5.812	5.249	4.863	4.502	3.862	1.969	0.076	0
33	49.07	47.391	42.684	37.249	31.464	27.27	24.419	21.326	18.839	16.711	14.507	12.426	10.51	8.96	7.633	6.541	5.676	5.096	4.604	4.023	2.175	0.098	0
29	208.32	202.927	183.63	158.932	129.127	101.578	77.031	59.079	43.498	33.256	24.673	18.556	14.407	11.356	9.008	7.378	6.132	5.345	4.704	4.137	2.355	0.118	0
25.5	516.57	503.811	462.302	409.866	353.966	308.396	256.491	206.692	156.301	99.738	55.273	30.99	20.504	14.487	10.612	8.206	6.581	5.583	4.788	4.225	2.508	0.133	0
22.5	884.31	866.579	806.499	732.108	660.053	589.597	508.247	418.126	325.981	238.983	151.783	62.427	31.175	18.76	12.598	9.028	7.02	5.795	4.87	4.28	2.614	0.144	0
19.5	1355.53	1330.97	1243.69	1130.56	1043.99	947.677	835.458	708.283	573.187	438.329	288.347	153.045	55.909	25.037	14.747	10.033	7.421	6.017	4.95	4.325	2.702	0.154	0
17	1963.42	1908.62	1733.80	1559.81	1443.76	1310.1	1146.25	981.99	819.923	647.046	441.879	242.972	101.87	33.839	16.99	10.797	7.779	6.189	5.009	4.356	2.76	0.161	0
15	2744.77	2653.54	2360.30	2111.07	1896.08	1648.33	1430.12	1222.55	1030.72	827.522	583.959	332.458	160.846	44.484	19.235	11.519	8.108	6.322	5.053	4.38	2.808	0.166	0
13	3743.67	3617.04	3200.62	2900.75	2567.64	2176.91	1788.73	1472.84	1230.57	1000.14	731.517	429.179	213.955	60.76	21.804	12.414	8.375	6.452	5.094	4.401	2.835	0.17	0
11	4609.25	4502.23	4123.45	3886.85	3407.66	2853.12	2303.23	1805.65	1442.55	1171.65	867.241	528.984	266.598	80.462	25.061	13.205	8.594	6.57	5.134	4.42	2.863	0.184	0
9	5127.89	5055.53	4840.45	4631.33	4237.66	3625.71	2882.89	2222.03	1694.00	1339.14	991.446	623.129	323.153	107.39	28.082	13.874	8.826	6.67	5.17	4.436	2.886	0.184	0
7	5429.65	5373.38	5248.34	5105.76	4784.37	4277.56	3496.41	2650.04	1971.88	1487.55	1101.00	706.562	372.384	135.431	30.755	14.502	9.018	6.756	5.198	4.45	2.904	0.183	0
5	5620.45	5568.34	5493.58	5351.66	5096.69	4676.54	4008.48	3033.40	2227.15	1639.02	1195.71	770.048	412.581	156.361	33.596	14.843	9.173	6.827	5.22	4.461	2.933	0.182	0
3	5740.6	5681.91	5624.09	5470.1	5227.16	4877.06	4267.71	3319.29	2421.92	1753.97	1258.98	809.294	441.946	170.085	35.777	15.132	9.337	6.901	5.243	4.473	2.932	0.181	0
1	5776.87	5763.56	5689.92	5537.72	5309.04	4965.96	4392.66	3464.88	2536.85	1824.30	1295.67	832.342	457.429	177.456	37.08	15.302	9.346	6.907	5.248	4.478	2.931	0.18	0
0	5760.95	5768.33	5696.92	5534.93	5310.04	4957.42	4374.29	3451.75	2535.23	1824.64	1295.96	831.06	456.56	177.1	37.15	15.31	9.35	6.91	5.25	4.48	2.93	0.18	0
-1	5722.97	5732.36	5670.80	5526.48	5299.06	4941.91	4346.27	3431.00	2524.21	1821.36	1293.39	828.721	455.074	176.41	37.168	15.312	9.354	6.913	5.253	4.482	2.929	0.18	0
-3	5596.1	5599.30	5542.89	5406.66	5172.47	4783.87	4123.77	3227.21	2388.86	1745.24	1251.68	798.227	435.255	167.154	36.027	15.16	9.361	6.919	5.26	4.486	2.927	0.181	0
-5	5402.99	5416.33	5332.54	5208.68	4961.10	4485.35	3802.65	2920.55	2180.14	1623.91	1182.25	751.076	402.532	152.082	33.973	14.891	9.211	6.859	5.248	4.481	2.925	0.182	0
-7	5118.57	5127.27	5036.62	4887.87	4543.48	4009.04	3279.64	2533.60	1922.91	1472.66	1078.86	680.626	358.759	130.673	31.18	14.568	9.069	6.802	5.237	4.477	2.892	0.183	0
-9	4632.59	4654.99	4550.77	4320.74	3919.63	3344.38	2702.83	2115.27	1648.72	1319.74	958.641	595.95	305.853	103.336	28.461	13.958	8.894	6.728	5.22	4.47	2.871	0.184	0
-11	3821.67	3858.51	3738.89	3524.82	3100.60	2622.82	2147.16	1726.93	1413.17	1135.77	828.262	499.965	249.088	78.565	25.387	13.308	8.68	6.636	5.197	4.461	2.844	0.185	0
-13	2820.17	2854.23	2766.65	2582.84	2308.55	1990.07	1677.94	1413.59	1177.31	951.28	685.886	401.409	195.28	60.619	22.02	12.527	8.476	6.535	5.172	4.449	2.812	0.17	0
-15	2003.43	2026.52	1977.48	1867.06	1706.80	1515.04	1347.63	1148.15	972.804	774.797	540.116	303.975	142.598	44.82	19.373	11.634	8.213	6.419	5.137	4.435	2.781	0.166	0
-17	1469.15	1481.30	1462.15	1408.69	1321.33	1201.60	1055.09	910.745	758.692	591.657	401.16	217.753	91.686	34.079	17.126	10.935	7.906	6.294	5.102	4.418	2.729	0.161	0
-19.5	1060.45	1067.06	1048.09	1002.90	941.34	858.58	755.854	637.605	512.673	389.095	252.849	131.177	54.169	25.09	14.873	10.193	7.542	6.126	5.06	4.395	2.665	0.154	0
-22.5	667.62	671.553	656.311	627.686	577.43	514.399	438.879	358.472	276.358	206.349	126.869	58.163	30.719	18.751	12.737	9.187	7.155	5.922	5	4.354	2.572	0.143	0
-25.5	341.39	344.462	336.474	317.948	288.407	249.139	209.953	170.278	125.365	81.206	50.28	30.04	20.339	14.574	10.775	8.374	6.726	5.723	4.939	4.3	2.464	0.132	0
-29	114.39	115.908	111.234	100.375	88.078	74.857	61.124	49.383	38.551	30.792	23.674	18.271	14.45	11.486	9.197	7.545	6.293	5.503	4.868	4.212	2.322	0.116	0
-33	27.95	28.194	27.949	27.102	25.689	24.171	22.223	19.884	17.929	16.172	14.453	12.446	10.631	9.162	7.852	6.725	5.855	5.277	4.789	4.085	2.147	0.095	0
-37.5	13.72	13.769	13.718	13.555	13.345	12.872	12.368	11.747	11.091	10.532	9.893	9.003	8.27	7.504	6.715	6.021	5.455	5.078	4.69	3.902	1.943	0.072	0
-42.5	8.7	8.725	8.774	8.685	8.599	8.486	8.333	8.182	7.974	7.708	7.417	7.078	6.683	6.276	5.855	5.462	5.139	4.886	4.555	3.62	1.671	0.048	0
-47.5	6.63	6.644	6.671	6.64	6.61	6.564	6.5	6.421	6.331	6.232	6.096	5.928	5.743	5.534	5.309	5.108	4.9	4.717	4.346	3.26	1.387	0.03	0
-55	5.24	5.247	5.262	5.261	5.261	5.256	5.247	5.232	5.205	5.179	5.143	5.092	5.044	4.958	4.861	4.738	4.569	4.341	3.782	2.555	0.957	0.015	0
-65	4.47	4.475	4.485	4.486	4.486	4.483	4.478	4.465	4.446	4.423	4.391	4.342	4.281	4.163	4.008	3.795	3.505	3.144	2.471	1.431	0.458	0.001	0
-75	2.22	2.228	2.245	2.261	2.239	2.23	2.215	2.194	2.177	2.146	2.11	2.055	1.991	1.896	1.764	1.61	1.41	1.19	0.847	0.427	0.105	0	0
-85	0	0	0	0	0	0	0	0	0	0.002	0.003	0.002	0	0	0.009	0.015	0.009	0.007	0.01	0.002	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90	Total
90		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
85		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
75		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
65		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
55		0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0	0.1	0	0	0	0	
47.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	
42.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
37.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
33		0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	
29		0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	
25.5		0.4	0.7	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	
22.5		0.64 *	1.22 *	1.14 *	1	0.9	0.8	0.6	0.5	0.4	0.3	0.2	0.1	0.1	0	0	0	0	0	0	0	0	0	
19.5		1.02 *	1.97 *	1.83 *	1.68 *	1.51 *	1.32 *	1.11 *	0.9	0.7	0.6	0.4	0.2	0.1	0.1	0	0	0	0	0	0	0	0	
17		1.25 *	2.41 *	2.23 *	2.03 *	1.83 *	1.61 *	1.37 *	1.13 *	0.89 *	0.8	0.6	0.3	0.1	0.1	0	0	0	0	0	0	0	0	
15		1.42 *	2.70 *	2.46 *	2.21 *	1.95 *	1.68 *	1.42 *	1.18 *	0.95 *	0.87 *	0.7	0.3	0.2	0.1	0	0	0	0	0	0	0	0	
13		1.96 *	3.70 *	3.36 *	2.98 *	2.56 *	2.14 *	1.77 *	1.45 *	1.17 *	1.09 *	0.8	0.5	0.2	0.1	0	0	0	0	0	0	0	0	
11		2.52 *	4.81 *	4.44 *	3.97 *	3.38 *	2.76 *	2.20 *	1.74 *	1.39 *	1.31 *	1.03 *	0.6	0.3	0.1	0	0	0	0	0	0	0	0	
9		2.95 *	5.71 *	5.40 *	4.95 *	4.28 *	3.49 *	2.72 *	2.09 *	1.61 *	1.52 *	1.21 *	0.7	0.3	0.1	0	0	0	0	0	0	0	0	
7		3.20 *	6.28 *	6.06 *	5.69 *	5.08 *	4.23 *	3.29 *	2.46 *	1.85 *	1.71 *	1.38 *	0.8	0.4	0.1	0.1	0	0	0	0	0	0	0	
5		3.35 *	6.62 *	6.45 *	6.15 *	5.64 *	4.85 *	3.83 *	2.83 *	2.07 *	1.88 *	1.51 *	0.9	0.5	0.2	0.1	0	0	0	0	0	0	0	
3		3.45 *	6.81 *	6.66 *	6.39 *	5.96 *	5.25 *	4.23 *	3.13 *	2.25 *	2.01 *	1.61 *	0.94 *	0.5	0.2	0.1	0	0	0	0	0	0	0	
1		3.50 *	6.92 *	6.76 *	6.50 *	6.11 *	5.46 *	4.46 *	3.32 *	2.38 *	2.10 *	1.68 *	0.98 *	0.5	0.2	0.1	0	0	0	0	0	0	0	
0		1.75 *	3.47 *	3.39 *	3.27 *	3.07 *	2.76 *	2.26 *	1.69 *	1.21 *	1.06 *	0.85 *	0.50 *	0.3	0.1	0	0	0	0	0	0	0	0	

-1	1.75 *	3.46 *	3.38 *	3.26 *	3.07 *	2.75 *	2.25 *	1.68 *	1.20 *	1.06 *	0.85 *	0.50 *	0.3	0.1	0	0	0	0	0	0	0	0	
-3	3.45 *	6.84 *	6.69 *	6.43 *	6.04 *	5.37 *	4.37 *	3.25 *	2.34 *	2.08 *	1.66 *	0.97 *	0.5	0.2	0.1	0	0	0	0	0	0	0	
-5	3.36 *	6.67 *	6.51 *	6.25 *	5.81 *	5.08 *	4.06 *	3.00 *	2.19 *	1.97 *	1.58 *	0.92 *	0.5	0.2	0.1	0	0	0	0	0	0	0	
-7	3.22 *	6.40 *	6.24 *	5.94 *	5.41 *	4.59 *	3.60 *	2.67 *	1.98 *	1.82 *	1.47 *	0.8	0.4	0.2	0.1	0	0	0	0	0	0	0	
-9	2.99 *	5.96 *	5.78 *	5.38 *	4.75 *	3.92 *	3.04 *	2.30 *	1.76 *	1.65 *	1.32 *	0.7	0.4	0.1	0.1	0	0	0	0	0	0	0	
-11	2.60 *	5.21 *	5.01 *	4.55 *	3.90 *	3.17 *	2.49 *	1.94 *	1.53 *	1.45 *	1.15 *	0.6	0.3	0.1	0	0	0	0	0	0	0	0	
-13	2.05 *	4.13 *	3.95 *	3.54 *	3.01 *	2.48 *	2.00 *	1.63 *	1.31 *	1.23 *	0.96 *	0.5	0.3	0.1	0	0	0	0	0	0	0	0	
-15	1.49 *	3.01 *	2.89 *	2.62 *	2.27 *	1.93 *	1.62 *	1.35 *	1.09 *	1.01 *	0.8	0.4	0.2	0.1	0	0	0	0	0	0	0	0	
-17	1.07 *	2.16 *	2.10 *	1.95 *	1.74 *	1.52 *	1.31 *	1.09 *	0.88 *	0.8	0.6	0.3	0.1	0.1	0	0	0	0	0	0	0	0	
-20	0.97 *	1.96 *	1.92 *	1.81 *	1.65 *	1.45 *	1.24 *	1.02 *	0.8	0.7	0.5	0.2	0.1	0.1	0	0	0	0	0	0	0	0	
-23	0.79 *	1.59 *	1.56 *	1.48 *	1.34 *	1.17 *	1	0.8	0.6	0.5	0.3	0.2	0.1	0.1	0	0	0	0	0	0	0	0	
-26	0.5	0.9	0.9	0.9	0.8	0.7	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0	0	0	0	0	0	0	0	0	
-29	0.3	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	
-33	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	
-38	0	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	
-65	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0	0.1	0	0	0	0	
-75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	52	103	99	93	84	72	58	45	34	31	24	14	7.3	3.1	1.6	1.2	0.9	1	0.9	0.4	0.1	0	723.2

5.0 THD and PF Test

Model No.	HSLED13Y	Sample ID.	A1
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Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.1	277.01	60	0.064	15.63	0.885	17.66%
25.1	120.03	60	0.123	14.63	0.991	8.71%

6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last	Calibration Due
DLF107	Integrating Sphere System	2017/12/28	2018/12/27
DLF108	Auxiliary Lamp	2017/12/28	2018/12/27
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2017/12/28	2018/12/27
DLF116	AC Power Source	2017/12/28	2018/12/27
DLF113	Power Meter	2017/12/28	2018/12/27
DLF112	Temperature Recorder	2017/12/28	2018/12/27
DLF114	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF101	Goniophotometer	2017/12/28	2018/12/27
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2017/12/28	2018/12/27
DLF104	AC Power Source	2017/12/28	2018/12/27
DLF507	DC Power Source	2017/12/28	2018/12/27
DLF102	Power Meter	2017/12/28	2018/12/27
DLF111	Temperature & Humidity Datalogger	2017/12/28	2018/12/27
DLF119	Power Meter	2017/12/28	2018/12/27
DLF031	Temperature data logger	2017/12/28	2018/12/27
DLF022	Digital power meter	2017/12/28	2018/12/27
DLF003	Temperature & Humidity Datalogger	2017/12/28	2018/12/27

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