

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF1804109**

## Report Number

**DLF20180416001-15a**

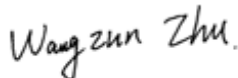
## Test Date

**2018/4/16**

## Issue Date

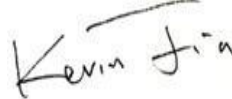
**2018/4/16**

## Prepared By



Wangzun Zhu

## Approved By



Kevin Jia

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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	3167	P
Zonal Lumen Requirement (0°-90°)	IES LM-79-2008	≥85%	100.00%	P
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	110	114.3	P
Allowable CCTs* (K)	IES LM-79-2008	5700	3075	P
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	65	69.9	P
Power Factor	ANSI C82.77:2014	0.873	0.935	P
Total Harmonic Distortion (A%)	ANSI C82.77:2014	25.00%	9.32%	P

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/4/16	HBLED26Y/480	O1
2	Goniophotometer Test	2018/4/16	HBLED26Y/480	O1
3	THD and PF Test	2018/4/16	HBLED26Y/480	O1

### Remark(If any)

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- 2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

### 3.0 Production Description

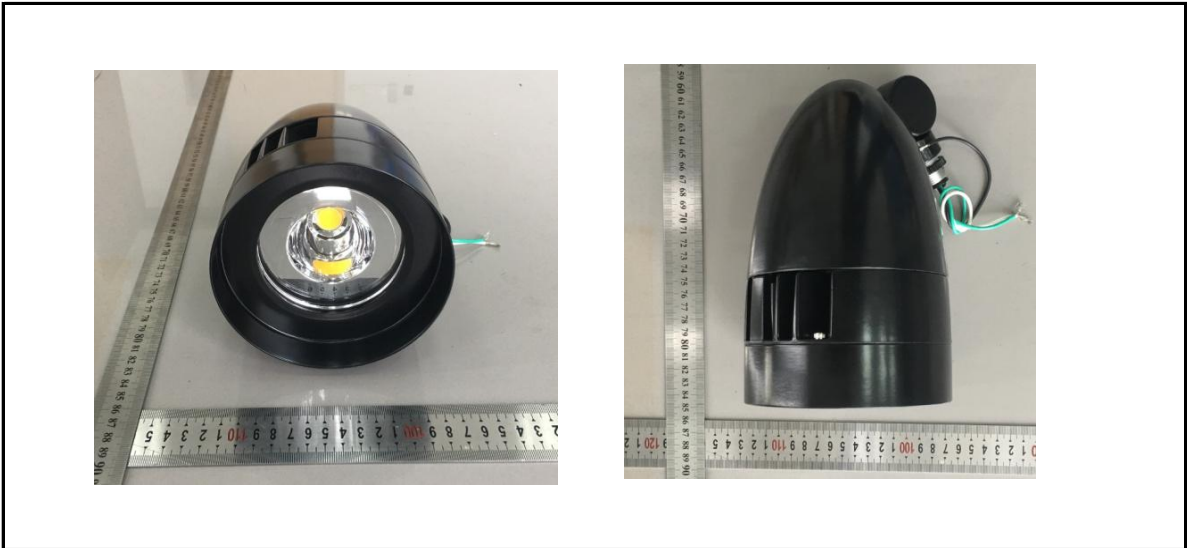
**Luminaire Description:**

**Electrical Specification:** 347V-480V,50/60HZ

**Light source:** LL725F1212-XXC

**Manufacturer Of Light Source:** Lustrous International Technology Company

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	HBLED26Y/480	Sample ID.	O1
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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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	480.01	60	0.062	27.77	0.935

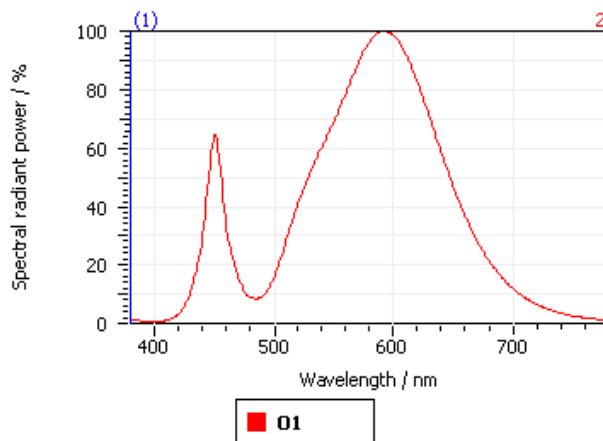
#### Test Result

CCT (K)	CRI (Ra)	Duv
3075	69.9	1.2E-03

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

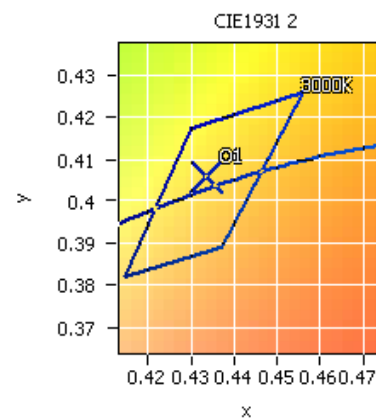
DominantWavelength	582.08 nm
Purity	0.519
PeakWavelength	592.24 nm
Width50%:	118.69 nm

#### Color Coordinates

Correlated Color Temperature 3075 K

x: 0.4334 u: 0.2475 u': 0.2475  
y: 0.4059 v: 0.3477 v': 0.5216

ResultsCRICRI01	66.1	ResultsCRICRI09	-35.1
ResultsCRICRI02	80.0	ResultsCRICRI10	52.9
ResultsCRICRI03	91.3	ResultsCRICRI11	57.8
ResultsCRICRI04	65.0	ResultsCRICRI12	40.3
ResultsCRICRI05	64.1	ResultsCRICRI13	68.5
ResultsCRICRI06	70.7	ResultsCRICRI14	94.9
ResultsCRICRI07	78.2	ResultsCRICRI15	58.8
ResultsCRICRI08	43.6	ResultsCRICRI16	58.6
ResultsCRI	69.9		



Nominal CCT: 3000K

PlanckDistance 1.2E-003

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	HBLED26Y/480	Sample ID.	O1
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  $\pm 0.2$  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  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

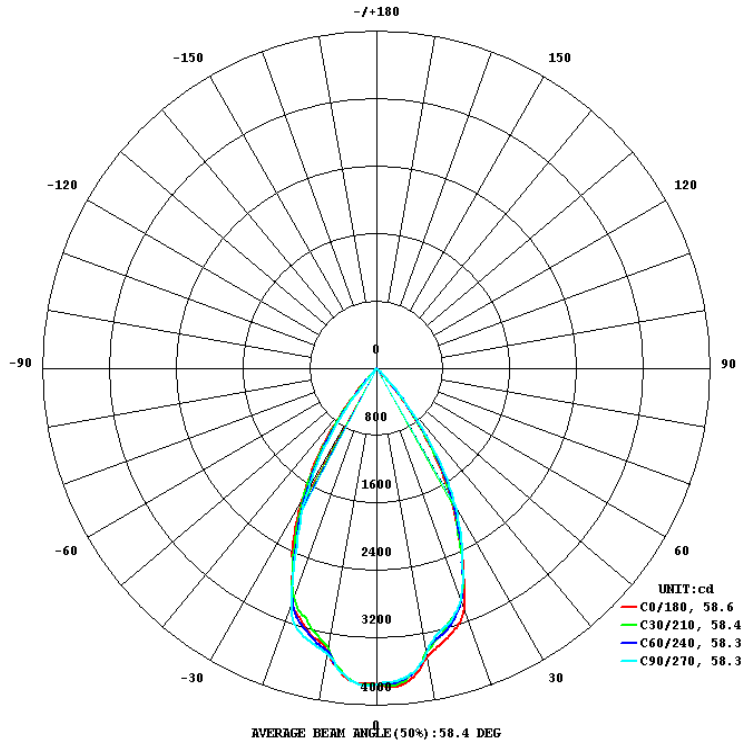
Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.1	480.08	60	0.062	27.71	0.931	Light Down

#### Test Result

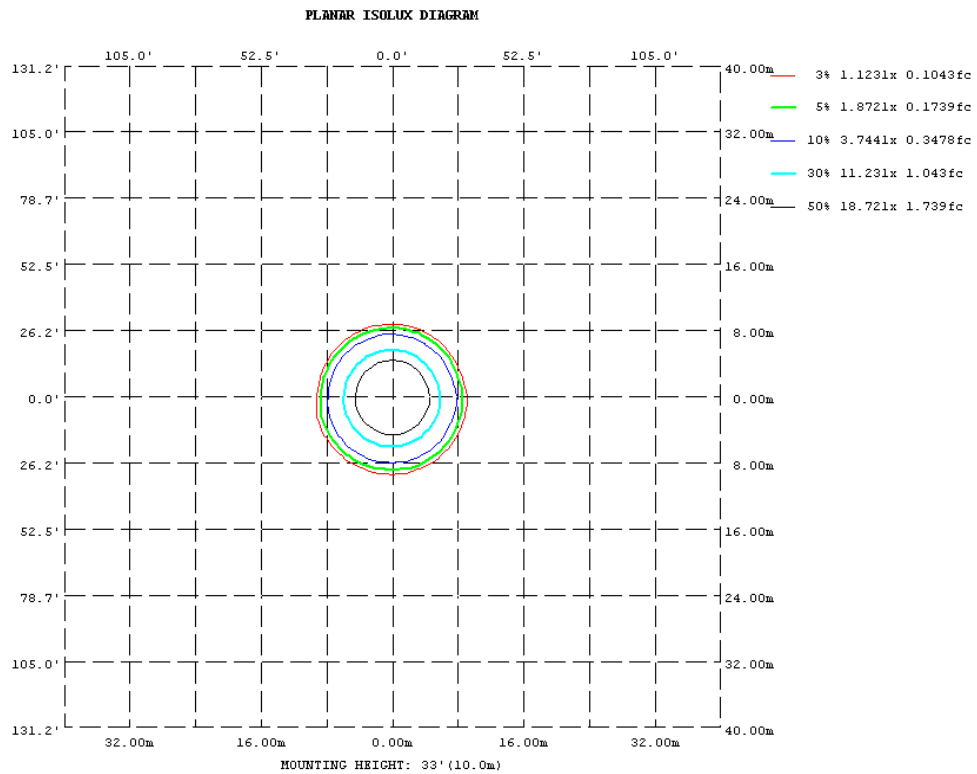
Flux(lm)	Zonal Lumen Requirement ( $0^{\circ}$ - $90^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
3167	100.00%	82.1	82.4	58.3	58.6	114.3

### 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	3479	3441	3452	3446	3411	3404	3442	3461
20	3056	2946	2942	2954	2954	2922	3000	3009
30	1786	1826	1894	1930	1799	1737	1652	1622
40	491.2	556.0	599.3	653.0	540.8	457.7	369.0	353.0
50	11.15	12.94	12.93	17.65	14.16	11.86	8.806	9.714
60	1.287	1.308	1.416	1.460	1.349	1.595	1.638	1.349
70	0.6806	0.7515	0.4132	0.8096	0.7986	0.7978	0.2333	0.6041
80	0.0343	0.0484	0.1733	0.0558	0.0341	0.0354	0.0745	0.0314
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 = 3.5 %							



### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0 - 10	344.35	0 - 10	344.35	10.87%
10 - 20	903.61	0 - 20	1247.95	39.40%
20 - 30	1081.05	0 - 30	2329.01	73.54%
30 - 40	697.30	0 - 40	3026.31	95.56%
40 - 50	133.57	0 - 50	3159.88	99.77%
50 - 60	5.71	0 - 60	3165.58	99.95%
60 - 70	1.17	0 - 70	3166.75	99.99%
70 - 80	0.26	0 - 80	3167.01	100.00%
80 - 90	0.04	0 - 90	3167.05	100.00%
90 - 100	0.00	0 - 100	3167.05	100.00%
100 - 110	0.00	0 - 110	3167.05	100.00%
110 - 120	0.00	0 - 120	3167.05	100.00%
120 - 130	0.00	0 - 130	3167.05	100.00%
130 - 140	0.00	0 - 140	3167.05	100.00%
140 - 150	0.00	0 - 150	3167.05	100.00%
150 - 160	0.00	0 - 160	3167.05	100.00%
160 - 170	0.00	0 - 170	3167.05	100.00%
170 - 180	0.00	0 - 180	3167.05	100.00%

### 4.3 Goniophotometer Test

#### Axial Candela

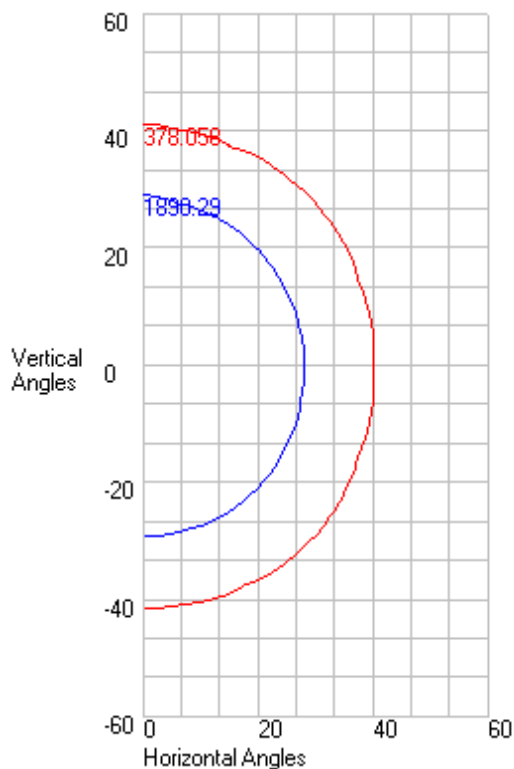
DEG.	HOR.	DEG.	VERT.
90	0	90	0.01
85	0.06	85	0.01
75	0.11	75	0.11
65	1.03	65	1.3
55	2.81	55	3.8
47.5	18.99	47.5	22.81
42.5	149.54	42.5	227.22
37.5	657.29	37.5	790.55
33	1254.99	33	1399.69
29	1780.51	29	1919.85
25.5	2199.07	25.5	2337.38
22.5	2615.54	22.5	2768.13
19.5	3059.95	19.5	3099.87
17	3241.69	17	3234.33
15	3309.17	15	3302.42
13	3360.5	13	3368.11
11	3411.71	11	3431.4
9	3485.11	9	3562.13
7	3616.22	7	3681.41
5	3708.25	5	3755.58
3	3759.94	3	3780.58
1	3762.33	1	3762.83
0	3749.001	0	3749.001
-1	3733.79	-1	3745.06
-3	3723.54	-3	3751.31
-5	3692.29	-5	3713.64
-7	3629.73	-7	3625.1
-9	3516.36	-9	3505.31
-11	3348.15	-11	3352.34
-13	3236.83	-13	3291.8
-15	3173.56	-15	3222.19
-17	3106.79	-17	3122.9
-19.5	2973.08	-19.5	2999.04
-22.5	2719.45	-22.5	2656.16
-25.5	2401.73	-25.5	2343.94
-29	2008.62	-29	1935.92
-33	1524.31	-33	1422.73
-37.5	906.81	-37.5	843.95
-42.5	343	-42.5	273.96
-47.5	54.34	-47.5	26.78
-55	4.21	-55	3.45
-65	1.07	-65	1.43
-75	0.23	-75	0.15
-85	0.13	-85	0.01
-90	0.01	-90	0

### 4.3 Goniophotometer Test

#### Characteristics

NEMA Type	5 H x 5 V
Maximum Candela	3780.58
Maximum Candela Angle	0 H 3 V
Horizontal Beam Angle (50%)	57.7
Vertical Beam Angle (50%)	58.6
Horizontal Field Angle (10%)	82.4
Vertical Field Angle (10%)	82.7
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	2249
Beam Efficiency	N.A.
Field Lumens	3076
Field Efficiency	N.A.
Spill Lumens	91
Luminaire Lumens	3167
Total Efficiency	N.A.
Total Luminaire Watts	27.7052
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	0.01	0.009	0.008	0.007	0.005	0.004	0.003	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.012	0.015	0.013	0.012	0.017	0.024	0.01	0	0
75	0.11	0.107	0.1	0.093	0.08	0.071	0.062	0.055	0.05	0.05	0.05	0.05	0.05	0.042	0.04	0.04	0.039	0.032	0.027	0.038	0.041	0.01	0
65	1.3	1.293	1.28	1.262	1.239	1.21	1.172	1.101	1.036	0.999	0.968	0.916	0.814	0.774	0.71	0.31	0.163	0.115	0.059	0.049	0.051	0.039	0
55	3.8	3.667	3.402	2.963	2.566	2.16	1.836	1.663	1.605	1.55	1.488	1.419	1.369	1.311	1.319	1.419	1.28	0.874	0.174	0.072	0.054	0.053	0
47.5	22.81	22.325	21.357	19.359	17.608	15.792	14.007	12.58	10.987	9.67	8.381	7.086	5.617	4.096	1.995	1.579	1.379	1.399	0.752	0.095	0.063	0.055	0
42.5	227.22	220.767	207.88	176.342	145.978	110.417	78.59	62.085	45.91	33.116	26.525	19.262	15.006	9.935	6.505	3.541	1.646	1.416	1.034	0.12	0.066	0.055	0
37.5	790.55	777.829	740.286	693.034	641.039	566.135	508.532	445.123	376.237	304.372	230.647	132.059	58.271	28.403	15.886	8.011	3.331	1.574	1.331	0.193	0.078	0.056	0
33	1399.69	1382.87	1331.78	1269.00	1195.06	1127.89	1058.16	965.091	871.599	771.078	625.574	446.644	281.181	136.728	34.827	15.292	5.999	1.892	1.393	0.236	0.08	0.056	0
29	1919.85	1901.44	1846.63	1778.50	1697.40	1626.85	1542.81	1448.51	1333.86	1213.37	1044.89	836.65	593.888	355.627	138.499	29.164	8.644	3.717	1.451	0.262	0.09	0.057	0
25.5	2337.38	2317.68	2257.93	2188.48	2115.11	2042.57	1951.86	1846.64	1726.04	1593.95	1401.20	1157.89	902.904	595.766	284.969	63.187	14.516	4.851	1.525	0.3	0.091	0.057	0
22.5	2768.13	2746.37	2674.70	2583.81	2488.91	2386.56	2268.02	2162.43	2039.83	1894.79	1694.88	1431.64	1152.67	829.406	441.493	138.51	20.647	6.616	1.6	0.36	0.092	0.058	0
19.5	3099.87	3089.77	3047.96	2984.50	2916.06	2816.22	2671.59	2513.24	2336.77	2166.34	1964.04	1691.16	1389.61	1022.78	612.135	227.407	28.557	7.483	1.688	0.64	0.094	0.058	0
17	3234.33	3231.95	3215.11	3190.20	3162.29	3099.06	2986.57	2832.03	2632.99	2420.96	2161.29	1881.09	1576.11	1186.78	747.255	299.146	40.893	8.428	1.771	0.788	0.096	0.059	0
15	3302.42	3301.39	3291.63	3284.32	3268.64	3230.67	3161.35	3037.39	2873.45	2632.09	2330.95	2020.45	1706.77	1310.16	847.297	364.585	61.416	9.565	1.847	0.88	0.097	0.059	0
13	3368.11	3364.87	3347.89	3345.44	3342.96	3296.85	3242.50	3169.32	3035.15	2833.27	2506.78	2139.56	1824.45	1428.24	941.184	426.88	82.773	11.308	1.927	0.917	0.099	0.059	0
11	3431.4	3426.20	3405.93	3400.57	3380.76	3339.51	3282.15	3231.10	3144.23	2986.23	2666.41	2256.35	1925.27	1520.89	1038.86	484.014	98.732	13.376	2.035	0.951	0.102	0.059	0
9	3562.13	3529.50	3472.99	3464.80	3419.43	3333.97	3314.94	3260.76	3199.87	3084.34	2814.22	2379.76	2013.57	1601.52	1107.26	537.148	118.114	15.133	2.15	0.975	0.104	0.059	0
7	3681.41	3658.29	3608.61	3534.16	3464.19	3399.16	3341.04	3281.39	3237.21	3152.22	2919.65	2481.20	2081.16	1669.23	1156.80	588.465	133.791	16.555	2.36	0.994	0.106	0.06	0
5	3755.58	3724.90	3688.81	3641.77	3513.18	3426.03	3368.75	3300.50	3256.50	3195.19	2992.00	2551.47	2133.79	1720.88	1202.37	617.748	144.083	17.648	2.538	1.01	0.108	0.06	0
3	3780.58	3758.03	3737.39	3677.28	3576.38	3458.09	3395.82	3321.91	3276.33	3220.91	3034.75	2593.97	2172.94	1756.84	1234.07	642.087	153.312	18.759	2.732	1.026	0.109	0.06	0
1	3762.83	3765.86	3754.94	3706.4	3613.82	3480.96	3411.37	3351.63	3299.98	3238.48	3059.77	2616.90	2197.09	1778.62	1253.4	656.396	150.799	18.913	2.784	1.029	0.11	0.06	0
0	3749.00	3762.33	3759.94	3708.25	3616.22	3485.11	3411.71	3360.5	3309.17	3241.69	3059.95	2615.54	2199.07	1780.51	1254.99	657.29	149.54	18.99	2.81	1.03	0.11	0.06	0
-1	3745.06	3757.93	3756.25	3706.68	3617.49	3484.07	3405.84	3350.11	3299.29	3232.66	3055.79	2615.46	2200.18	1783.21	1257.33	659.593	152.165	19.088	2.819	1.033	0.109	0.06	0
-3	3751.31	3750.37	3729.66	3678.73	3588.84	3445.01	3377.72	3320.87	3271.35	3203.01	3023.18	2591.81	2182.12	1771.19	1245.86	651.641	157.405	19.285	2.837	1.039	0.108	0.06	0
-5	3713.64	3712.56	3673.31	3618.14	3523.91	3401.73	3351.18	3293.96	3236.86	3164.47	2974.04	2553.68	2148.85	1746.47	1221.98	633.557	151.156	18.525	2.693	1.032	0.107	0.059	0
-7	3625.1	3622.29	3578.05	3516.96	3410.25	3351.86	3311.66	3254.36	3193.89	3110.03	2893.15	2492.14	2105.82	1707.03	1184.16	610.388	144.012	17.784	2.55	1.026	0.104	0.059	0
-9	3505.31	3501.68	3429.35	3362.28	3323.72	3285.23	3246.67	3190.49	3140.26	3033.35	2785.68	2410.76	2051.11	1651.10	1142.24	563.982	131.524	16.717	2.347	1.015	0.102	0.059	0
-11	3352.34	3350.27	3329.00	3291.21	3247.49	3213.26	3169.72	3125.65	3058.52	2927.45	2649.65	2303.99	1980.49	1577.25	1081.14	514.55	113.341	15.318	2.262	1.002	0.1	0.059	0
-13	3291.8	3285.11	3259.81	3221.64	3162.11	3120.92	3091.74	3039.83	2951.81	2795.38	2528.34	2185.62	1891.66	1493.80	997.206	458.572	93.789	13.575	2.178	0.976	0.097	0.059	0
-15	3222.19	3213.77	3181.83	3135.55	3082.38	3048.83	3012.12	2936.38	2825.74	2628.97	2395.79	2083.89	1783.81	1388.00	908.93	398.799	75.494	11.5	2.12	0.945	0.095	0.058	0
-17	3122.9	3114.64	3088.04	3055.76	3018.46	2960.86	2891.89	2789.46	2636.59	2479.86	2224.21	1968.05	1666.42	1275.77	813.331	335.07	52.207	9.775	2.065	0.874	0.094	0.058	0
-19.5	2999.04	2991.53	2957.62	2909.51	2849.66	2775.52	2672.95	2555.52	2425.85	2239.60	2048.41	1791.57	1499.07	1118.48	682.003	261.476	33.494	8.505	2.003	0.77	0.093	0.058	0
-22.5	2656.16	2654.61	2627.66	2587.95	2542.72	2477.71	2379.52	2243.61	2123.39	1995.08	1809.30	1562.17	1267.92	925.183	513.71	172.243	25.072	7.596	1.92	0.617	0.091	0.057	0
-25.5	2343.94	2340.33	2312.09	2265.25	2204.64	2138.97	2056.3	1956.32	1843.48	1718.35	1541.36	1286.57	1017.52	694.256	344.538	90.14	17.923	5.58	1.816	0.391	0.087	0.057	0
-29	1935.92	1931.10	1902.95	1862.25	1809.55	1748.89	1676.08	1594.84	1476.96	1349.63	1176.27	962.903	712.266	448.827	187.876	35.048	10.225	4.262	1.722	0.285	0.085	0.056	0
-33	1422.73	1421.07	1402.25	1371.41	1327.01	1277.60	1206.31	1108.57	1010.74	905.24	753.068	563.901	373.116	199.246	56.263	18.887	7.053	2.373	1.641	0.241	0.079	0.055	0
-37.5	843.95	841.582	823.488	795.202	762.419	710.405	650.648	580.137	501.588	418.884	324.832	208.378	114.826	37.177	19.427	8.371	3.875	1.896	1.546	0.213	0.076	0.054	0
-42.5	273.96	272.236	268.794	247.277	228.394	207.093	180.144	153.302	118.182	75.749	38.679	27.3	19.578	12.553	7.402	3.903	1.994	1.629	1.32	0.14	0.066	0.053	0
-47.5	26.78	26.648	26.384	24.886	23.578	22.107	20.473	18.364	16.02	13.484	10.094	8.55	6.118	4.595	2.344	1.899	1.604	1.552	0.918	0.099	0.057	0.053	0
-55	3.45	3.451	3.452	3.221	2.926	2.461	2.176	1.986	1.919	1.858	1.785	1.692	1.613	1.528	1.487	1.52	1.545	1.059	0.218	0.072	0.046	0.05	0
-65	1.43	1.428	1.423	1.425	1.424	1.423	1.421	1.402	1.386	1.353	1.292	1.121	1.066	0.951	0.872	0.731	0.215	0.146	0.06	0.047	0.042	0.039	0
-75	0.15	0.147	0.142	0.136	0.119	0.107	0.094	0.081	0.07	0.067	0.062	0.06	0.06	0.052	0.05	0.047	0.04	0.04	0.03	0.028	0.031	0.01	0
-85	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.011	0.011	0.01	0.01	0.012	0.015	0.013	0.012	0.017	0.023	0.01	0	0
-90	0	0.001	0.002	0.003	0.005	0.006	0.007	0.009	0.01	0.01	0.01	0.01	0.01	0.01	0.008	0.005	0.002	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	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
47.5		0.2	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	
42.5		0.77 *	1.52 *	1.45 *	1.36 *	1.2	1.1	1	0.8	0.7	0.7	0.6	0.4	0.2	0.1	0.1	0	0	0	0	0	0	0	
37.5		1.50 *	2.94 *	2.85 *	2.72 *	2.57 *	2.39 *	2.19 *	1.96 *	1.73 *	1.81 *	1.7	1.1	0.8	0.4	0.2	0.1	0	0	0	0	0	0	
33		2.02 *	3.98 *	3.87 *	3.73 *	3.57 *	3.39 *	3.18 *	2.93 *	2.65 *	2.90 *	2.84 *	2.12 *	1.6	1	0.4	0.1	0	0	0	0	0	0	
29		2.26 *	4.48 *	4.37 *	4.23 *	4.08 *	3.91 *	3.70 *	3.46 *	3.19 *	3.57 *	3.63 *	2.86 *	2.39 *	1.6	0.8	0.2	0	0	0	0	0	0	
25.5		2.33 *	4.60 *	4.49 *	4.36 *	4.20 *	4.02 *	3.81 *	3.58 *	3.33 *	3.78 *	3.92 *	3.20 *	2.80 *	2.04 *	1.1	0.3	0.1	0	0	0	0	0	
22.5		2.68 *	5.29 *	5.18 *	5.04 *	4.87 *	4.66 *	4.41 *	4.13 *	3.85 *	4.38 *	4.60 *	3.84 *	3.48 *	2.65 *	1.5	0.6	0.1	0	0	0	0	0	
19.5		2.41 *	4.78 *	4.71 *	4.62 *	4.50 *	4.33 *	4.12 *	3.87 *	3.60 *	4.09 *	4.32 *	3.65 *	3.36 *	2.66 *	1.64 *	0.7	0.1	0	0	0	0	0	
17		1.99 *	3.95 *	3.91 *	3.86 *	3.78 *	3.69 *	3.55 *	3.36 *	3.13 *	3.55 *	3.74 *	3.18 *	2.98 *	2.41 *	1.53 *	0.6	0.1	0	0	0	0	0	
15		2.03 *	4.04 *	4.00 *	3.95 *	3.88 *	3.80 *	3.69 *	3.54 *	3.33 *	3.79 *	3.98 *	3.39 *	3.20 *	2.63 *	1.72 *	0.8	0.2	0	0	0	0	0	
13		2.07 *	4.12 *	4.08 *	4.03 *	3.96 *	3.88 *	3.78 *	3.66 *	3.48 *	4.00 *	4.20 *	3.57 *	3.40 *	2.84 *	1.90 *	0.9	0.2	0	0	0	0	0	
11		2.13 *	4.22 *	4.16 *	4.10 *	4.02 *	3.94 *	3.85 *	3.74 *	3.59 *	4.18 *	4.41 *	3.73 *	3.56 *	3.02 *	2.06 *	1	0.2	0	0	0	0	0	
9		2.20 *	4.36 *	4.28 *	4.19 *	4.08 *	3.98 *	3.89 *	3.79 *	3.66 *	4.30 *	4.57 *	3.88 *	3.70 *	3.16 *	2.19 *	1	0.3	0.1	0	0	0	0	
7		2.26 *	4.48 *	4.40 *	4.29 *	4.16 *	4.03 *	3.92 *	3.82 *	3.71 *	4.39 *	4.71 *	4.00 *	3.82 *	3.27 *	2.28 *	1.1	0.3	0.1	0	0	0	0	
5		2.29 *	4.54 *	4.48 *	4.37 *	4.23 *	4.08 *	3.95 *	3.84 *	3.73 *	4.44 *	4.79 *	4.08 *	3.90 *	3.35 *	2.36 *	1.16 *	0.3	0.1	0	0	0	0	
3		2.29 *	4.57 *	4.51 *	4.42 *	4.28 *	4.11 *	3.97 *	3.86 *	3.75 *	4.47 *	4.84 *	4.13 *	3.95 *	3.41 *	2.41 *	1.19 *	0.3	0.1	0	0	0	0	
1		1.14 *	2.28 *	2.26 *	2.22 *	2.15 *	2.06 *	1.99 *	1.93 *	1.88 *	2.24 *	2.43 *	2.07 *	1.99 *	1.71 *	1.21 *	0.60 *	0.2	0	0	0	0	0	
0																								

-1	1.14 *	2.28 *	2.26 *	2.22 *	2.15 *	2.06 *	1.99 *	1.93 *	1.88 *	2.24 *	2.42 *	2.07 *	1.99 *	1.72 *	1.22 *	0.60 *	0.2	0	0	0	0	0	
-3	2.28 *	4.55 *	4.50 *	4.42 *	4.27 *	4.10 *	3.95 *	3.84 *	3.73 *	4.45 *	4.83 *	4.13 *	3.96 *	3.42 *	2.42 *	1.20 *	0.3	0.1	0	0	0	0	
-5	2.27 *	4.52 *	4.46 *	4.37 *	4.22 *	4.05 *	3.92 *	3.81 *	3.70 *	4.41 *	4.77 *	4.09 *	3.92 *	3.38 *	2.39 *	1.18 *	0.3	0.1	0	0	0	0	
-7	2.24 *	4.45 *	4.38 *	4.27 *	4.13 *	3.99 *	3.88 *	3.77 *	3.66 *	4.34 *	4.69 *	4.02 *	3.86 *	3.31 *	2.33 *	1.14 *	0.3	0.1	0	0	0	0	
-9	2.17 *	4.32 *	4.25 *	4.15 *	4.03 *	3.92 *	3.82 *	3.72 *	3.61 *	4.26 *	4.57 *	3.92 *	3.77 *	3.22 *	2.24 *	1.1	0.3	0.1	0	0	0	0	
-11	2.09 *	4.17 *	4.11 *	4.03 *	3.94 *	3.85 *	3.76 *	3.66 *	3.54 *	4.14 *	4.42 *	3.79 *	3.64 *	3.10 *	2.13 *	1	0.2	0.1	0	0	0	0	
-13	2.02 *	4.04 *	4.00 *	3.93 *	3.86 *	3.78 *	3.69 *	3.59 *	3.44 *	3.99 *	4.25 *	3.65 *	3.49 *	2.94 *	1.99 *	0.9	0.2	0	0	0	0	0	
-15	1.98 *	3.95 *	3.91 *	3.85 *	3.78 *	3.70 *	3.61 *	3.49 *	3.31 *	3.82 *	4.06 *	3.49 *	3.31 *	2.76 *	1.82 *	0.8	0.2	0	0	0	0	0	
-17	1.93 *	3.85 *	3.81 *	3.76 *	3.69 *	3.60 *	3.50 *	3.35 *	3.15 *	3.62 *	3.85 *	3.30 *	3.11 *	2.54 *	1.64 *	0.7	0.2	0	0	0	0	0	
-20	2.33 *	4.65 *	4.61 *	4.54 *	4.44 *	4.30 *	4.13 *	3.92 *	3.67 *	4.22 *	4.48 *	3.82 *	3.57 *	2.86 *	1.78 *	0.7	0.2	0	0	0	0	0	
-23	2.59 *	5.16 *	5.13 *	5.04 *	4.91 *	4.73 *	4.51 *	4.27 *	4.00 *	4.58 *	4.86 *	4.09 *	3.74 *	2.91 *	1.72 *	0.7	0.1	0	0	0	0	0	
-26	2.29 *	4.58 *	4.54 *	4.47 *	4.34 *	4.18 *	3.98 *	3.77 *	3.52 *	4.02 *	4.21 *	3.48 *	3.09 *	2.29 *	1.3	0.4	0.1	0	0	0	0	0	
-29	2.28 *	4.56 *	4.52 *	4.45 *	4.32 *	4.15 *	3.95 *	3.71 *	3.44 *	3.89 *	3.99 *	3.21 *	2.73 *	1.89 *	0.9	0.3	0.1	0	0	0	0	0	
-33	2.05 *	4.10 *	4.06 *	3.99 *	3.88 *	3.72 *	3.50 *	3.25 *	2.97 *	3.28 *	3.27 *	2.50 *	1.99 *	1.3	0.6	0.2	0	0	0	0	0	0	
-38	1.56 *	3.12 *	3.09 *	3.03 *	2.93 *	2.78 *	2.57 *	2.33 *	2.07 *	2.22 *	2.09 *	1.5	1.1	0.6	0.2	0.1	0	0	0	0	0	0	
-43	0.85 *	1.72 *	1.70 *	1.65 *	1.58 *	1.47 *	1.33 *	1.2	1	1	0.9	0.6	0.4	0.2	0.1	0	0	0	0	0	0	0	
-48	0.2	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0	0	0	0	0	0	0	0	0	
-55	0	0.1	0.1	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	0	
-65	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	
-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	65	129	127	125	121	117	112	106	100	115	121	101	93	75	48	21	5	1.1	0.2	0	0	0	1583

## 5.0 THD and PF Test

Model No.	HBLED26Y/480	Sample ID.	O1
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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	480.01	60	0.062	27.77	0.935	4.66%
25.1	347.00	60	0.080	27.65	0.995	9.32%

## 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\*\*\*\*\*