

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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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 v5.1

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		39017
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	154.3
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		252.8
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%		4.40%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9		0.961
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	5015
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		81
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		-1
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		82
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		97
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	85%		99.89%
Input Voltage (V) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		480
Input Current (A) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.549

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/11/4	FFLEDL @ 230W / 5000K/480	F1
2	Goniophotometer Test	2021/11/4	FFLEDL @ 230W / 5000K/480	F1
3	THD and PF Test	2021/11/4	FFLEDL @ 230W / 5000K/480	F1

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: FFLEDL @ 230W / 5000K/480

Electrical Specification: 480V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	FFLEDL @ 230W / 5000K/480	Sample ID.	F1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
479.95	60	0.549	253.3	0.961

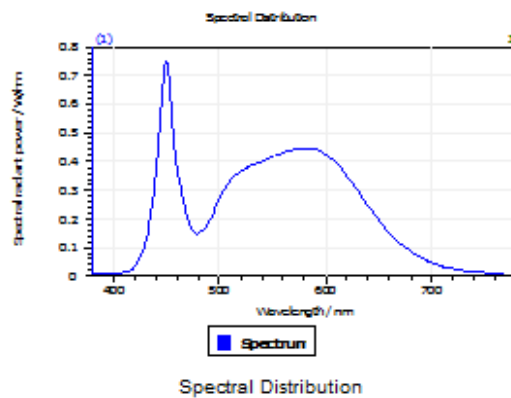
Test Result

CCT (K)	CRI	R9	Duv
5015	81	-1	0.0029

Rf	Rg	IES Rcs,h1
82	97	-13%

4.1 Integrating Sphere Test

Results



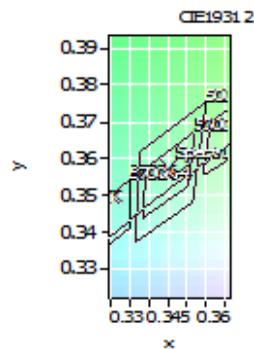
Spectral values

DominantWavelength 569.85 nm
Purity 0.109
PeakWavelength 449.80 nm
Radiant Power 86.26 W
Width50%:

Color Coordinates

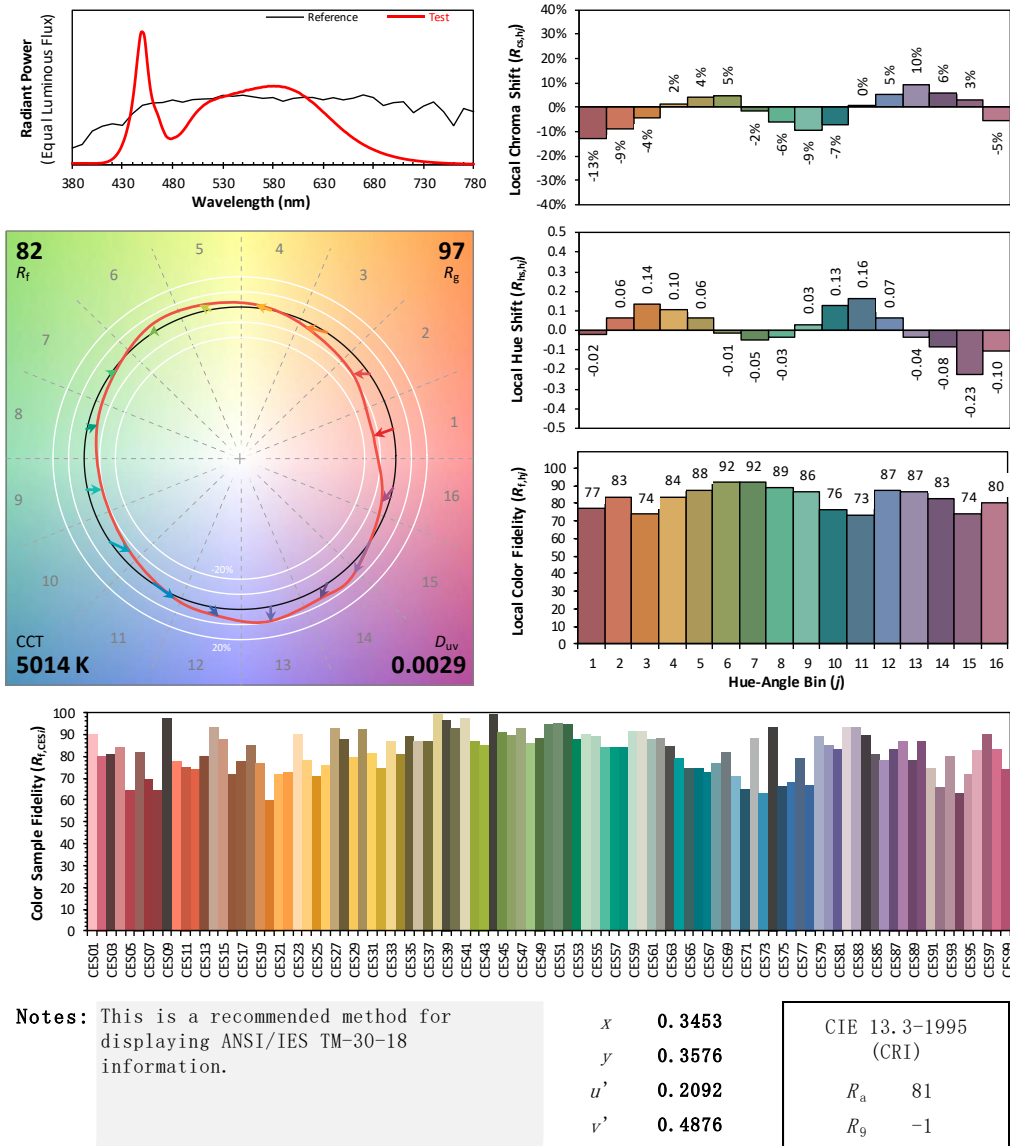
Correlated Color Temperat 5015 K
x: 0.3453 u: 0.2092 u': 0.2092
y: 0.3576 v: 0.3251 v': 0.4876
CRI01 78.9 CRI09 -1.0
CRI02 85.7 CRI10 66.7
CRI03 91.0 CRI11 81.1
CRI04 81.6 CRI12 60.2
CRI05 80.2 CRI13 80.4
CRI06 80.9 CRI14 95.2
CRI07 85.6 CRI15 72.5
CRI08 64.7 CRI16 71.9

ResultsCRI 81.1



PlanckDistance 2.9E-003

4.1 Integrating Sphere Test



Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	FFLEDL @ 230W / 5000K/480	Sample ID.	F1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

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

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

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 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

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	479.99	60	0.549	252.8	0.959

Test Result

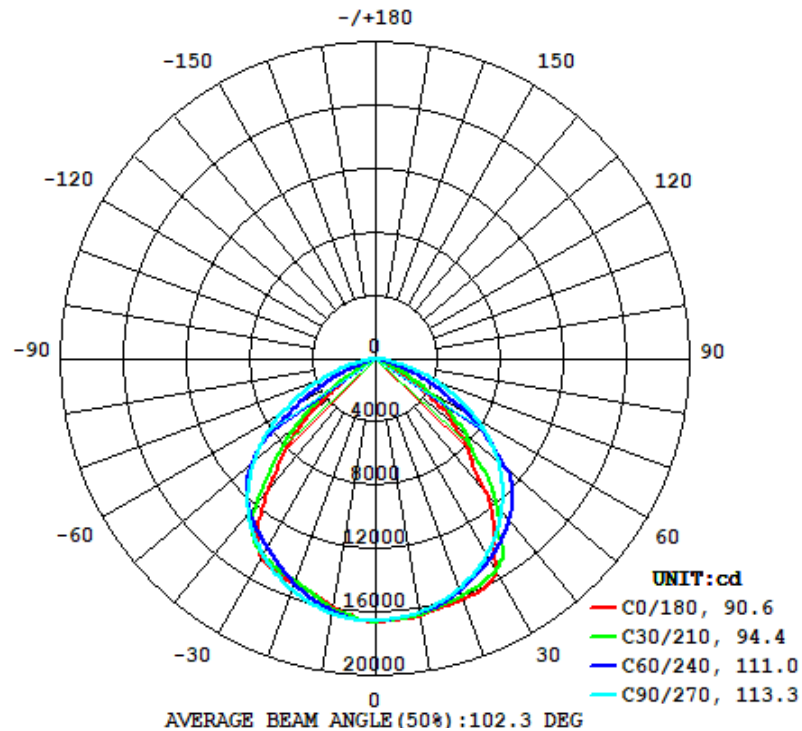
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
39017	118.9	153.3	90.6	113.3	154.3

Zonal Lumen Requirement (0°-90°)

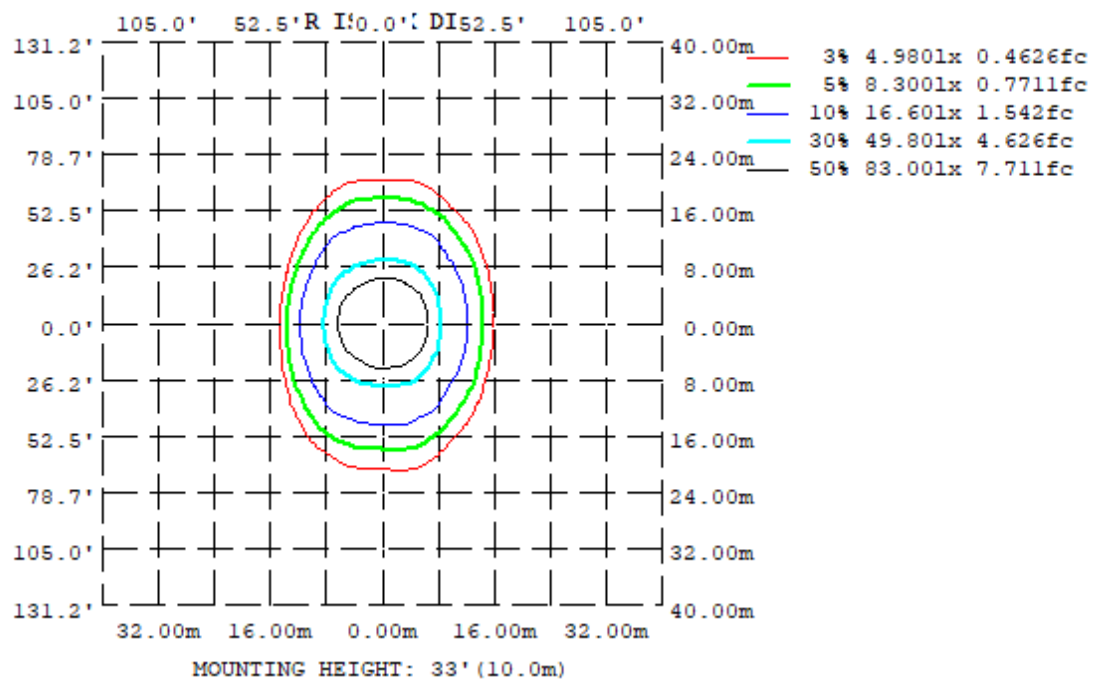
99.89%

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1645	1635	1622	1598	1593	1607	1631	1637
20	1616	1571	1544	1486	1510	1495	1555	1570
30	1543	1499	1425	1392	1450	1404	1432	1495
40	1099	1319	1255	1267	1056	1268	1259	1335
50	664.5	899.7	1030	901.2	577.9	827.8	1013	927.3
60	202.7	487.1	734.7	445.1	98.62	355.5	702.0	486.2
70	7.780	69.75	400.9	49.89	19.28	31.20	357.6	75.65
80	0.3377	0.6096	94.41	12.45	2.962	7.764	66.73	0.4546
90	0.2832	0.3388	0.2668	0.7864	0.2560	0.3369	0.2666	0.2689
100	0.1206	0.2509	0.3291	0.4361	0.6259	0.3922	0.3466	0.1732
110	0.2571	0.3926	0.6289	0.4869	0.2908	0.4097	0.5412	0.3255
120	0.4619	0.5469	0.7343	0.6734	0.4423	0.5292	0.6550	0.4539
130	0.7332	0.7197	0.9700	0.8899	0.7496	0.7242	0.8703	0.6743
140	0.9526	0.9421	1.123	1.107	1.117	1.041	1.067	0.9654
150	1.133	1.153	1.202	1.284	1.297	1.231	1.223	1.209
160	1.262	1.235	1.339	1.333	1.446	1.309	1.264	1.303
170	1.325	1.260	1.277	1.285	1.239	1.289	1.159	1.176
180	1.459	1.375	1.277	1.431	1.404	1.399	1.308	1.340
DEG	LUMINOUS INTENSITY: *10cd							

	Zonal (lm)		Total (lm)	Percent
0-10	1563.06	0 - 10	1563.06	4.01%
10-20	4478.08	0 - 20	6041.15	15.48%
20-30	6946.55	0 - 30	12987.70	33.29%
30-40	8448.51	0 - 40	21436.21	54.94%
40-50	8032.27	0 - 50	29468.48	75.53%
50-60	5909.03	0 - 60	35377.52	90.67%
60-70	2797.90	0 - 70	38175.42	97.84%
70-80	745.09	0 - 80	38920.51	99.75%
80-90	52.62	0 - 90	38973.13	99.89%
90-100	4.92	0 - 100	38978.05	99.90%
100-110	3.64	0 - 110	38981.69	99.91%
110-120	4.74	0 - 120	38986.43	99.92%
120-130	5.99	0 - 130	38992.41	99.94%
130-140	7.12	0 - 140	38999.53	99.95%
140-150	7.12	0 - 150	39006.65	99.97%
150-160	5.92	0 - 160	39012.57	99.99%
160-170	3.66	0 - 170	39016.24	100.00%
170-180	1.23	0 - 180	39017.47	100.00%

4.2 Goniophotometer Test

Axial Candela

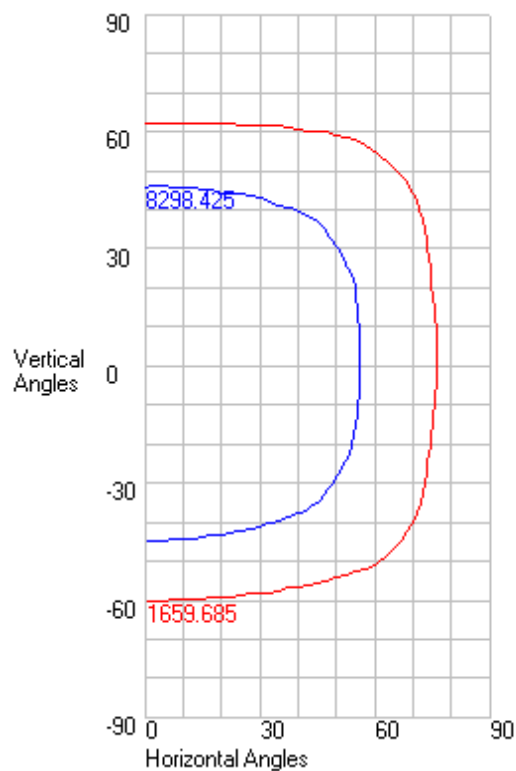
DEG.	HOR.	DEG.	VERT.
90	2.672	90	2.832
85	54.17	85	3.39
75	1921.87	75	9.29
65	5293.98	65	438.84
55	8651.24	55	4424.3
47.5	10804.895	47.5	7774.88
42.5	12041.415	42.5	9290.755
37.5	13097.235	37.5	12234.765
33	13849.51	33	13894.2
29	14464.23	29	15657.83
25.5	14942.205	25.5	15997.315
22.5	15299.47	22.5	16104.1
19.5	15597.185	19.5	16167.035
17	15820.86	17	16219.76
15	15985.7	15	16248.76
13	16124.13	13	16284.91
11	16255.01	11	16395.811
9	16363.11	9	16498.24
7	16452.189	7	16522.961
5	16504.891	5	16534.35
3	16533.811	3	16550.15
1	16536.51	1	16593.02
0	16537.029	0	16537.029
-1	16514.109	-1	16596.85
-3	16474.189	-3	16524.57
-5	16426.9	-5	16351.98
-7	16357.49	-7	16184.47
-9	16268.16	-9	16035.93
-11	16157.92	-11	15798.32
-13	16026.69	-13	15569.26
-15	15880.91	-15	15395.27
-17	15722.27	-17	15240.83
-19.5	15490.2	-19.5	15119.195
-22.5	15181.815	-22.5	15033.16
-25.5	14837.15	-25.5	14872.63
-29	14380.57	-29	14619.6
-33	13778.07	-33	13811.04
-37.5	13012.905	-37.5	11883.805
-42.5	12028.455	-42.5	9306.985
-47.5	10911.685	-47.5	7016.16
-55	8909.48	-55	3007.17
-65	5713.27	-65	296.18
-75	2376.07	-75	107.33
-85	76.25	-85	26.45
-90	2.674	-90	2.56

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	16596.85
Maximum Candela Angle	0 H -1 V
Horizontal Beam Angle (50%)	113
Vertical Beam Angle (50%)	90.5
Horizontal Field Angle (10%)	154.5
Vertical Field Angle (10%)	121.9
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	30491
Beam Efficiency	N.A.
Field Lumens	38284
Field Efficiency	N.A.
Spill Lumens	733
Luminaire Lumens	39017
Total Efficiency	N.A.
Total Luminaire Watts	252.843
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	2.832	2.821	2.798	2.776	2.753	2.73	2.708	2.685	2.662	2.657	2.65	2.642	2.634	2.625	2.636	2.656	2.68	2.716	2.791	2.654	2.28	2.54	2.67
85	3.39	3.384	3.372	3.36	3.348	3.336	3.324	3.307	3.293	3.283	3.27	3.254	3.238	3.219	3.213	3.215	3.213	3.184	3.116	2.807	2.268	2.59	2.67
75	9.29	9.908	11.145	12.381	12.756	13.216	13.327	13.027	12.698	13.393	13.932	14.806	14.882	12.717	16.332	17.303	15.347	16.491	20.998	21.026	4.756	2.719	2.67
65	438.84	449.47	470.724	473.919	477.595	475.203	466.66	451.897	468.042	491.257	499.708	472.748	447.937	456.95	520.926	484.407	355.18	517.659	329.177	313.117	58.065	2.915	2.671
55	4424.3 *	4473.856 *	4572.909 *	4589.635 *	4595.551 *	4557.063 *	4467.853 *	4379.984 *	4427.135 *	4473.713 *	4489.529 *	4414.454 *	4054.41 *	3913.588 *	3817.377 *	3673.209 *	3059.081 *	2728.627 *	2173.319 *	1089.598	303.927	3.188	2.671
47.5	7774.88 *	7795.908 *	7816.238 *	7817.32 *	7810.733 *	7782.349 *	7722.99 *	7628.48 *	7486.811 *	7345.974 *	7298.118 *	7265.713 *	6974.925 *	6582.508 *	6381.35 *	6134.481 *	5515.516 *	4683.138 *	3768.287 *	2100.445 *	582.356	10.565	2.671
42.5	9290.755 *	9327.594 *	9374.615 *	9374.136 *	9312.306 *	9247.581 *	9250.823 *	9401.978 *	9384.102 *	9269.151 *	8892.357 *	8743.018 *	8790.732 *	8726.011 *	7965.112 *	7489.243 *	7193.154 *	6302.85 *	4719.424 *	2850.765 *	799.784	16.913	2.671
37.5	12234.765 *	12262.092 *	12288.676 *	12278.055 *	12252.449 *	12144.551 *	12089.271 *	12018.739 *	11924.745 *	11769.419 *	11570.181 *	11317.777 *	11000.643 *	10611.919 *	10196.785 *	9577.149 *	8545.965 *	7678.994 *	5623.102 *	3659.383 *	997.386	23.739	2.671
33	13894.2 *	13903.465 *	13888.127 *	13845.166 *	13770.004 *	13756.179 *	13786.048 *	13742.063 *	13582.923 *	13313.067 *	13167.578 *	13035.469 *	12788.916 *	12075.916 *	11561.365 *	10973.495 *	10201.013 *	8610.744 *	6578.683 *	4182.196 *	1180.424	28.87	2.672
29	15657.83 *	15644.611 *	15590.406 *	15522.995 *	15446.801 *	15331.296 *	15201.569 *	15021.309 *	14936.069 *	14788.057 *	14438.539 *	14075.109 *	13912.749 *	13308.732 *	12408.658 *	11903.218 *	10977.028 *	9255.73 *	7263.976 *	4494.103 *	1333.623	33.743	2.672
25.5	15997.315 *	15974.227 *	15922.198 *	15862.068 *	15784.027 *	15681.676 *	15570.747 *	15452.359 *	15305.07 *	15128.148 *	14892.776 *	14592.852 *	14224.883 *	13730.101 *	13057.921 *	12404.562 *	11280.356 *	9808.084 *	7730.824 *	4725.983 *	1460.811	37.648	2.672
22.5	16104.1 *	16081.74 *	16034.212 *	15983.013 *	15904.263 *	15805.912 *	15702.19 *	15583.289 *	15435.02 *	15272.069 *	15045.676 *	14744.336 *	14363.352 *	13885.134 *	13313.547 *	12551.718 *	11497.183 *	10139.148 *	8091.75 *	4901.12 *	1557.154	40.712	2.672
19.5	16167.035 *	16144.306 *	16095.319 *	16041.378 *	15968.952 *	15883.836 *	15783.735 *	15656.4 *	15513.671 *	15359.528 *	15137.533 *	14830.519 *	14464.899 *	13970.073 *	13445.041 *	12684.674 *	11608.445 *	10324.012 *	8263.832 *	5023.776 *	1643.118	43.502	2.672
17	16219.76 *	16196.573 *	16144.712 *	16087.592 *	16022.807 *	15943.81 *	15838.776 *	15714.884 *	15574.443 *	15419.056 *	15205.622 *	14892.121 *	14522.318 *	14067.288 *	13537.473 *	12769.902 *	11700.329 *	10420.334 *	8385.521 *	5113.075 *	1707.212 *	45.609	2.672
15	16248.76 *	16224.996 *	16173.37 *	16124.006 *	16066.571 *	15992.929 *	15886.983 *	15756.973 *	15630.828 *	15485.922 *	15261.672 *	14936.871 *	14595.722 *	14161.211 *	13604.919 *	12831 *	11747.34 *	10519.739 *	8467.497 *	5175.269 *	1752.508 *	47.146	2.672
13	16284.91 *	16264.722 *	16213.002 *	16179.027 *	16124.602 *	16058.62 *	15958.439 *	15821.6 *	15702.721 *	15560.497 *	15324.749 *	15001.629 *	14681.271 *	14241.694 *	13669.02 *	12878.834 *	11832.373 *	10606.851 *	8543.247 *	5230.09 *	1792.46 *	48.549	2.672
11	16395.811 *	16373.868 *	16310.334 *	16292.85 *	16237.825 *	16165.896 *	16060.835 *	15930.615 *	15799.519 *	15640.684 *	15400.608 *	15086.423 *	14756.293 *	14307.025 *	13720.573 *	12936.998 *	11893.819 *	10681.322 *	8593.796 *	5272.795 *	1827.056 *	52.116	2.672
9	16498.24 *	16468.41 *	16410.623 *	16391.737 *	16331.946 *	16266.989 *	16142.362 *	16017.626 *	15887.259 *	15714.205 *	15468.157 *	15161.669 *	14823.447 *	14365.705 *	13781.23 *	13006.607 *	11958.03 *	10741.091 *	8637.217 *	5303.421 *	1856.294 *	52.486	2.672
7	16522.961 *	16478.967 *	16436.88 *	16416.824 *	16369.062 *	16286.053 *	16178.64 *	16057.713 *	15913.66 *	15741.73 *	15507.928 *	15212.16 *	14871.565 *	14416.485 *	13817.986 *	13069.16 *	12006.385 *	10784.646 *	8666.384 *	5322.023 *	1880.176 *	52.858	2.672
5	16534.35 *	16456.2 *	16433.254 *	16421.566 *	16370.557 *	16286.512 *	16201.338 *	16070.92 *	15919.913 *	15746.891 *	15534.143 *	15256.915 *	14911.174 *	14450.837 *	13848.106 *	13091.609 *	12037.584 *	10811.136 *	8680.93 *	5328.694 *	1915.166 *	53.232	2.672
3	16550.15 *	16443.145 *	16465.948 *	16448.354 *	16398.353 *	16319.111 *	16209.523 *	16086.061 *	15945.056 *	15784.503 *	15571.74 *	15284.925 *	14936.612 *	14469.152 *	13861.029 *	13107.116 *	12052.031 *	10821.17 *	8697.921 *	5336.466 *	1917.844 *	53.607	2.672
1	16593.02 *	16503.011 *	16515.192 *	16496.061 *	16441.479 *	16354.37 *	16247.369 *	16119.254 *	15980.115 *	15816.079 *	15592.89 *	15298.947 *	14944.911 *	14472.631 *	13859.282 *	13104.989 *	12049.315 *	10814.524 *	8666.813 *	5308.15 *	1920.527 *	54.17	2.672
0	16537.029 *	16536.51 *	16533.811 *	16504.891 *	16452.189 *	16363.11 *	16255.01 *	16124.13 *	15985.7 *	15820.86 *	15597.185 *	15299.47 *	14942.205 *	14464.23 *	13849.51 *	13097.235 *	12041.415 *	10804.895 *	8651.24 *	5293.98 *	1921.87 *	54.17	2.672
-1	16596.85 *	16564.918 *	16542.546 *	16509.929 *	16451.084 *	16357.727 *	16241.329 *	16103.463 *	15956.25 *	15785.22 *	15556.034 *	15258.263 *	14903.667 *	14427.841 *	13813.064 *	13056.345 *	12010.298 *	10786.476 *	8654.633 *	5302.795 *	1913.234 *	53.988	2.672
-3	16524.57 *	16518.354 *	16491.363 *	16451.365 *	16376.732 *	16293.018 *	16184.562 *	16033.867 *	15869.468 *	15689.682 *	15459.423 *	15161.975 *	14812.004 *	14333.942 *	13722.281 *	12961.353 *	11935.343 *	10737.461 *	8661.412 *	5320.41 *	1895.976 *	53.625	2.672
-5	16351.98 *	16360.474 *	16330.438 *	16297.612 *	16232.719 *	16137.121 *	16041.324 *	15910.848 *	15752.334 *	15573.762 *	15341.742 *	15049.385 *	14700.63 *	14223.194 *	13616.71 *	12849.231 *	11844.301 *	10673.067 *	8621.15 *	5301.372 *	1878.754 *	53.262	2.672
-7	16184.47 *	16175.148 *	16175.204 *	16144.336 *	16080.939 *	15994.98 *	15883.194 *	15759.005 *	15606.602 *	15430.328 *	15193.455 *	14909.33 *	14570.659 *	14093.091 *	13493.724 *	12731.113 *	11738.277 *	10594.362 *	8584.19 *	5283.042 *	1828.816 *	52.9	2.672
-9	16035.93 *	16043.464 *	16020.335 *	15986.547 *	15919.873 *	15832.768 *	15709.38 *	15579.518 *	15435.853 *	15256.219 *	15018.551 *	14741.458 *	14415.565 *	13946.247 *	13364.523 *	12576.708 *	11616.482 *	10501.351 *	8534.086 *	5252.062 *	1790.004 *	52.54	2.672
-11	15798.32 *	15810.161 *	15786.254 *	15765.812 *	15690.038 *	15607.745 *	15485.837 *	15366.657 *	15232.316 *	15058.431 *	14821.48 *	14557.024 *	14243.872 *	13802.452 *	13213.961 *	12418.278 *	11480.9 *	10395.475 *	8471.595 *	5208.142 *	1745.646 *	52.182	2.672
-13	15569.26 *	15577.353 *	15560.076 *	15525.391 *	15462.29 *	15388.879 *	15279.28 *	15145.679 *	15027.689 *	14875.48 *	14646.367 *	14357.122 *	14062.468 *	13658.511 *	13107.102 *	12310.046 *	11350.212 *	10279.009 *	8403.852 *	5151.042 *	1695.703 *	48.702	2.672
-15	15395.27 *	15399.288 *	15382.933 *	15347.592 *	15286.704 *	15203.596 *	15106.008 *	14980.574 *	14852.039 *	14706.773 *	14507.586 *	14206.171 *	13873.869 *	13518.519 *	13002.067 *	12242.176 *	11215.254 *	10152.661 *	8312.149 *	5080.55 *	1640.139	47.35	2.672
-17	15240.83 *	15242.793 *	15230.231 *	15198.684 *	15139.085 *	15055.295 *	14963.503 *	14854.051 *	14709.513 *	14558.868 *	14383.579 *	14109.139 *	13745.559 *	13383.447 *	12894.202 *	12161.144 *	11153.217 *	10016.867 *	8216.085 *	4997.249 *	1578.934	45.875	2.672
-19.5	15119.195 *	15115.137 *	15100.61 *	15076.873 *	15016.634 *	14939.074 *	14847.948 *	14740.116 *	14606.25 *	14448.62 *	14262.463 *	13989.83 *	13664.244 *	13247.842 *	12761.347 *	12051.152 *	11056.602 *	9899.259 *	8078.478 *	4873.592 *	1494.487	43.864	2.672
-22.5	15033.16 *	15026.689 *	15009.19 *	14987.026 *	14926.569 *	14843.01 *	14753.099 *	14639.326 *	14497.775 *	14341.627 *	14139.167 *	13864.799 *	13550.571 *	13161.621 *	12613.4 *	11910.22 *	10925.329 *	9696.294 *	7889.324 *	4701.92 *	1385.181	41.22	2.673
-25.5	14872.63 *	14867.593 *	14850.158 *	14822.392 *	14772.456 *	14683.463 *	14583.164 *	14471.639 *	14345.988 *	14193.361 *	13983.73 *	13716.543 *	13420.96 *	12976.641 *	12373.615 *	11718.313 *	10694.751 *	9404.447 *	7483.884 *	4468.625 *	1267.043	38.337	2.673
-29	14619.6 *	14615.684 *	14591.444 *	14555.57 *	14507.396 *	14413.404 *	14300.554 *	14182.033 *	14069.246 *	13915.936 *	13657.674 *	13410.213 *	13140.694 *	12633.859 *	11933.082 *	11241.838 *	10328.853 *	8908.051 *	6951.157 *	4161.143 *	1114.963	34.694	2.673
-33	13811.04 *	13826.02 *	13817.716 *	13780.054 *	13709.485 *	13634.538 *	13507.596 *	13387.022 *	13259.511 *	13117.67 *	12867.828 *	12500.105 *	12180.105 *	11830.926 *	10973.515 *	10255.677 *	9582.77 *	8103.692 *	6241.918 *	3757.81 *	934.098	30.19	2.673
-37.5	11883.805 *	11907.122 *	11919.682 *	11886.64 *	11834.672 *	11679.328 *	11615.352 *	11513.083 *	11366.266 *	11212.535 *	10966.605 *	10707.861 *	10430.835 *	10038.146 *	9390.044 *	8775.219 *	8079.444 *	6969.409 *	5319.73 *	3122.646 *	722.803	25.514	2.673
-42.5	9306.985 *	9320.489 *	9320.56 *	9285.967 *	9218.346 *	9120.18 *	9036.489 *	9028.484 *	8895.29 *	87													

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	0	0
85	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0	0	0	0
75	0.7	1.4	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.8	2.1	2	2.2	2.6	2.8	2.6	2.4	3.2	2.8	1.1	0.1	0	0	0
65	7.45 *	15.11 *	15.25 *	15.20 *	15.06 *	14.76 *	14.37 *	14.20 *	14.25 *	17.73 *	20.59 *	19.14 *	20.71 *	22.47 *	23.35 *	21.77 *	17.77 *	20	15	4.9	0.6	0	0	0
55	13.97 *	28.10 *	28.16 *	28.05 *	27.81 *	27.36 *	26.77 *	26.25 *	25.84 *	31.76 *	37.08 *	34.99 *	37.84 *	40.29 *	41.50 *	39.75 *	32.18 *	35.66 *	26.25 *	8.3	1	0	0	0
47.5	13.01 *	26.08 *	26.05 *	25.91 *	25.65 *	25.36 *	25.13 *	24.81 *	24.25 *	29.40 *	34.10 *	32.89 *	36.52 *	38.35 *	38.77 *	38.19 *	31.81 *	35.03 *	26.04 *	8.6	1	0	0	0
42.5	16.41 *	32.87 *	32.82 *	32.62 *	32.26 *	31.89 *	31.68 *	31.34 *	30.70 *	37.17 *	42.91 *	41.31 *	45.99 *	48.47 *	48.67 *	47.48 *	39.94 *	43.91 *	32.79 *	11.19 *	1.4	0	0	0
37.5	17.92 *	35.83 *	35.72 *	35.49 *	35.18 *	34.85 *	34.45 *	33.86 *	33.10 *	40.33 *	46.92 *	44.88 *	49.16 *	52.00 *	52.91 *	51.10 *	42.33 *	46.35 *	34.97 *	12.15 *	1.5	0	0	0
33	18.00 *	35.95 *	35.78 *	35.53 *	35.21 *	34.85 *	34.35 *	33.76 *	33.07 *	40.19 *	46.58 *	44.77 *	49.15 *	51.44 *	52.48 *	51.27 *	42.03 *	45.95 *	35.02 *	12.14 *	1.5	0	0	0
29	16.87 *	33.65 *	33.48 *	33.25 *	32.92 *	32.49 *	31.98 *	31.45 *	30.87 *	37.50 *	43.29 *	41.55 *	45.79 *	47.96 *	48.83 *	47.71 *	39.16 *	43.22 *	33.15 *	11.50 *	1.5	0	0	0
25.5	14.66 *	29.24 *	29.11 *	28.91 *	28.64 *	28.29 *	27.90 *	27.43 *	26.90 *	32.78 *	37.99 *	36.35 *	40.06 *	42.36 *	43.18 *	41.98 *	34.72 *	38.90 *	29.96 *	10.42 *	1.4	0	0	0
22.5	14.74 *	29.40 *	29.27 *	29.07 *	28.80 *	28.47 *	28.07 *	27.61 *	27.08 *	33.02 *	38.29 *	36.64 *	40.40 *	42.89 *	43.75 *	42.47 *	35.44 *	40.10 *	30.96 *	10.84 *	1.4	0	0	0
19.5	12.32 *	24.59 *	24.47 *	24.31 *	24.09 *	23.82 *	23.49 *	23.10 *	22.66 *	27.64 *	32.05 *	30.67 *	33.85 *	35.98 *	36.72 *	35.66 *	29.90 *	33.98 *	26.28 *	9.30 *	1.3	0	0	0
17	9.88 *	19.72 *	19.63 *	19.50 *	19.33 *	19.11 *	18.84 *	18.54 *	18.19 *	22.19 *	25.72 *	24.62 *	27.21 *	28.94 *	29.52 *	28.66 *	24.09 *	27.47 *	21.29 *	7.59 *	1	0	0	0
15	9.90 *	19.76 *	19.67 *	19.55 *	19.38 *	19.17 *	18.90 *	18.59 *	18.26 *	22.27 *	25.79 *	24.71 *	27.35 *	29.07 *	29.62 *	28.77 *	24.24 *	27.68 *	21.49 *	7.70 *	1.1	0	0	0
13	9.95 *	19.85 *	19.76 *	19.64 *	19.47 *	19.26 *	18.99 *	18.68 *	18.34 *	22.36 *	25.90 *	24.83 *	27.47 *	29.18 *	29.71 *	28.89 *	24.38 *	27.86 *	21.65 *	7.79 *	1.1	0	0	0
11	10.01 *	19.97 *	19.88 *	19.76 *	19.59 *	19.37 *	19.09 *	18.78 *	18.43 *	22.46 *	26.02 *	24.94 *	27.58 *	29.29 *	29.83 *	29.01 *	24.50 *	28.00 *	21.75 *	7.86 *	1.1	0	0	0
9	10.05 *	20.05 *	19.96 *	19.84 *	19.67 *	19.44 *	19.17 *	18.85 *	18.49 *	22.53 *	26.12 *	25.03 *	27.67 *	29.39 *	29.95 *	29.15 *	24.60 *	28.09 *	21.83 *	7.92 *	1.1	0	0	0
7	10.06 *	20.05 *	19.97 *	19.86 *	19.68 *	19.46 *	19.20 *	18.88 *	18.51 *	22.57 *	26.19 *	25.10 *	27.74 *	29.46 *	30.04 *	29.23 *	24.66 *	28.15 *	21.86 *	7.96 *	1.2	0	0	0
5	10.06 *	20.06 *	19.98 *	19.86 *	19.69 *	19.47 *	19.20 *	18.88 *	18.53 *	22.60 *	26.23 *	25.14 *	27.78 *	29.50 *	30.08 *	29.28 *	24.69 *	28.17 *	21.88 *	7.99 *	1.2	0	0	0
3	10.07 *	20.08 *	20.01 *	19.89 *	19.72 *	19.49 *	19.22 *	18.90 *	18.55 *	22.64 *	26.26 *	25.16 *	27.80 *	29.51 *	30.09 *	29.29 *	24.68 *	28.15 *	21.83 *	7.99 *	1.2	0	0	0
1	5.04 *	10.05 *	10.02 *	9.96 *	9.87 *	9.75 *	9.62 *	9.46 *	9.28 *	11.32 *	13.13 *	12.58 *	13.89 *	14.75 *	15.04 *	14.64 *	12.33 *	14.04 *	10.88 *	3.98 *	0.6	0	0	0
0	5.04 *	10.05 *	10.02 *	9.96 *	9.87 *	9.75 *	9.61 *	9.45 *	9.28 *	11.31 *	13.12 *	12.56 *	13.87 *	14.73 *	15.02 *	14.61 *	12.31 *	14.02 *	10.87 *	3.98 *	0.6	0	0	0

-1	10.07	20.07	20.00	19.87	19.69	19.47	19.19	18.86	18.49	22.54	26.13	25.02	27.64	29.33	29.91	29.10	24.53	27.99	21.75	7.97	1.2	0	0
-3	10.00	19.93	19.86	19.74	19.56	19.35	19.07	18.75	18.38	22.40	25.97	24.86	27.46	29.15	29.71	28.91	24.38	27.88	21.71	7.95	1.2	0	0
-5	9.90	19.75	19.67	19.56	19.39	19.17	18.90	18.59	18.23	22.22	25.76	24.67	27.25	28.92	29.48	28.68	24.21	27.71	21.61	7.91	1.1	0	0
-7	9.81	19.56	19.47	19.36	19.20	18.98	18.71	18.40	18.05	22.00	25.49	24.43	27.01	28.67	29.20	28.40	24.00	27.51	21.50	7.84	1.1	0	0
-9	9.69	19.32	19.23	19.12	18.96	18.74	18.48	18.18	17.83	21.73	25.19	24.15	26.71	28.38	28.89	28.08	23.75	27.27	21.35	7.77	1.1	0	0
-11	9.55	19.04	18.95	18.84	18.68	18.47	18.21	17.92	17.60	21.45	24.86	23.84	26.40	28.08	28.59	27.77	23.48	27.00	21.18	7.68	1.1	0	0
-13	9.43	18.80	18.70	18.58	18.43	18.23	17.97	17.69	17.37	21.19	24.56	23.54	26.08	27.79	28.34	27.51	23.20	26.69	20.96	7.58	1.1	0	0
-15	9.33	18.60	18.51	18.38	18.22	18.02	17.78	17.49	17.17	20.97	24.33	23.29	25.77	27.49	28.10	27.29	22.95	26.35	20.69	7.45	1	0	0
-17	11.55	23.04	22.93	22.77	22.57	22.32	22.02	21.67	21.26	25.95	30.14	28.86	31.89	33.98	34.78	33.82	28.40	32.50	25.43	9.10	1.2	0	0
-20	13.77	27.46	27.32	27.13	26.88	26.57	26.21	25.79	25.30	30.86	35.83	34.33	37.91	40.31	41.22	40.12	33.65	38.33	29.83	10.56	1.4	0	0
-23	13.66	27.24	27.10	26.91	26.65	26.34	25.98	25.55	25.06	30.57	35.45	33.96	37.52	39.80	40.60	39.51	33.02	37.29	28.80	10.10	1.3	0	0
-26	15.71	31.34	31.17	30.94	30.64	30.26	29.83	29.35	28.80	35.09	40.66	38.99	43.05	45.47	46.18	44.92	37.40	41.62	31.87	11.12	1.4	0	0
-29	17.32	34.56	34.38	34.12	33.79	33.36	32.86	32.31	31.71	38.60	44.63	42.71	47.22	49.69	50.00	48.72	40.54	44.41	33.76	11.72	1.4	0	0
-33	17.62	35.23	35.10	34.86	34.47	34.02	33.55	33.00	32.36	39.38	45.46	43.43	48.05	50.53	50.60	49.25	41.13	44.83	33.78	11.61	1.4	0	0
-38	16.15	32.34	32.25	32.02	31.63	31.19	30.86	30.42	29.80	36.22	41.91	40.16	44.37	46.66	46.98	45.73	38.22	41.84	31.19	10.51	1.2	0	0
-43	12.45	24.92	24.87	24.69	24.39	24.02	23.73	23.42	22.96	27.93	32.28	30.91	34.12	35.91	36.30	35.23	29.29	32.23	23.89	7.9	0.9	0	0
-48	11.48	23.09	23.10	22.93	22.65	22.24	21.85	21.58	21.27	25.95	29.89	28.34	31.27	33.26	33.61	32.21	26.90	29.97	23	7.7	0.9	0	0
-55	5.1	10.25	10.31	10	10	9.9	9.7	9.6	9.6	12	14	13	14	15	16	15	13	15	12	4.7	0.6	0	0
-65	0.6	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.5	1.8	1.7	2	2.3	2.5	2.5	2.6	3.5	3.3	1.4	0.2	0	0
-75	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	1	0.8	0.3	0.1	0	0
-85	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0
Total	450	898	895	889	881	870	858	845	829	1011	1171	1120	1237	1311	1334	1295	1084	1220	937	330	43.6	0.18	19508

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDL @ 230W / 5000K/480	Sample ID.	F1
Temperature (°C)	25.4	Humidity (%RH)	54.0

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

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
479.95	60	0.549	253.3	0.961	4.40%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

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