

EDISON OPTO Laboratory Test Report

IES LM-80-08

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCE

Report Number	Q130905
Test Sample	2T10X2NW27000001
Rating	DC 60mA 0.2W
Normal CCT	2,700 K
Test Date	August 8,2013 to December 24,2013
Test Address	9F, NO.800, Chung-Cheng Rd., Chung-Ho Dist., New Taipei City 235, Taiwan
Test Standard	IES LM-80-08 Approved Method : Measuring Lumen Maintenance of Led Lighting Sources
Temp. Measure point	See page 3
Description of test equipment	See page 3
Test Engineer	Amos Huang <i>Amos Huang</i>
Review By	Kenny Yen <i>Kenny yen</i>

Notes:

1. The test center executes the test operations with prudent manners. All the test results are detail stated in the report. All test service meet under the regulations of ISO/IEC 17025.
2. The report is only responsible to the assigned test. It shall not be any of the bases of Compliance judgments.
3. There are 11 pages in the test report (include the cover page). It is invalid when being used separately.
4. The test report is forbidden to reproduce in separate pages. The complete report copy is unrestricted.
5. The recorded contents in this report shall not be used as advertising, publications or merchandising purposes without written permissions by the test center.
6. Lumen maintenance(lm) uncertainty=6.2%; Chromaticity(x,y) uncertainty=0.0002.

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According to section 3 item 7 and section 4 item 5 of ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products, the test report also applies to the following products:

Part Number	Normal CCT	Watt	W/mm ²
2T10X2NW27000001	4250	0.2	0.03
2T10X2NW27000002	4250	0.2	0.03
2T10X2CW27000001	5700	0.2	0.03
2T10X2CW27000002	5700	0.2	0.03
2T10X2WW26000001	3000	0.2	0.03
2T10X2WW26000002	3000	0.2	0.03
2T10X2NW26000001	4250	0.2	0.03
2T10X2NW26000002	4250	0.2	0.03
2T10X2CW26000001	5700	0.2	0.03
2T10X2CW26000001	5700	0.2	0.03

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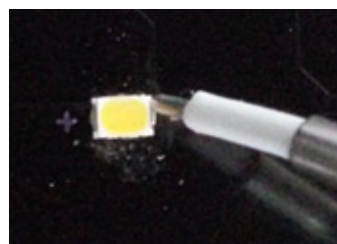
1. Test Summary

Case temperature (Ts)	53°C ≤ Ts	83°C ≤ Ts
Ambient conditions (T _A)	50°C ≤ T _A R.H. < 65 % Minimized airflow	80°C ≤ T _A R.H. < 65 % Minimized airflow
Sample Size	24	24
Drive current of the LED	60mA	60mA
Initial flux (lm) / V _f (V)	20.4 / 3.01	20.52 / 3.00
Lumen maintenance at 6000 hrs	99.63 % Page 5	97.97% Page 8
LED failure	0	0
Monitoring interval (hrs)	0,1000,2000,3000,4000,5000,6000	
Chromaticity shift	Page 7	Page 10

2. Case and ambient temperature

The case temperature T_s is the temperature on the substrate; the ambient temperature T_A is the temperature of the air at a distance of 50 mm above substrate.

Ts Measurement Point



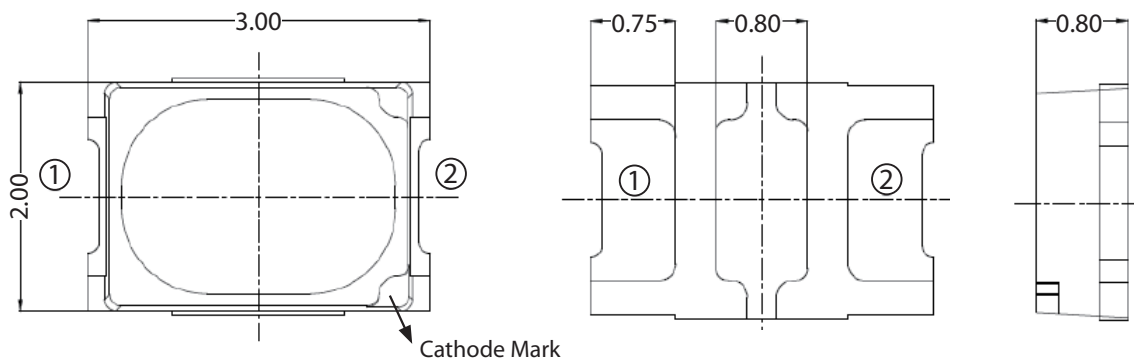
3. Description of test equipment

Equipment	Model No. / Serial No.	Cal. Laboratory	Report No.	Effective Date
Integrating sphere	ISP250 45392012	Deutscher Akkreditierungs Rat DAT-PL-293/09-00	CAL-141-12-058	02.08.2014
DC power source	KEITHLEY 2400 4000282	Tai Yi TAF-1625	T3306141201	17.06.2014
Temperature controlled test	VEKTREX/ SpikeSafe 200 1080030009	SGS Taiwan Ltd.	ECAC0780614A	27.03.2015
	VEKTREX/ ITCS 428		ECAC0780214A	
	VEKTREX/ ITCS 429		ECAC0780314A	
	VEKTREX/ ITCS 430		ECAC0780414A	
	VEKTREX/ ITCS 454		ECAC0780514A	

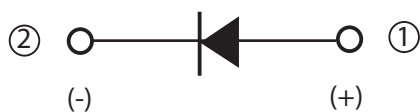
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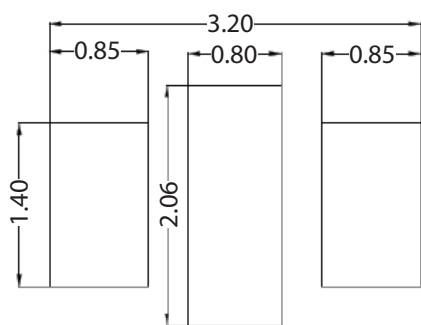
Package Dimensions and Polarity



Circuit



Solder Pad



Notes:

1. All dimensions are measured in mm.
2. Tolerance : ± 0.20 mm

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4. Test Results

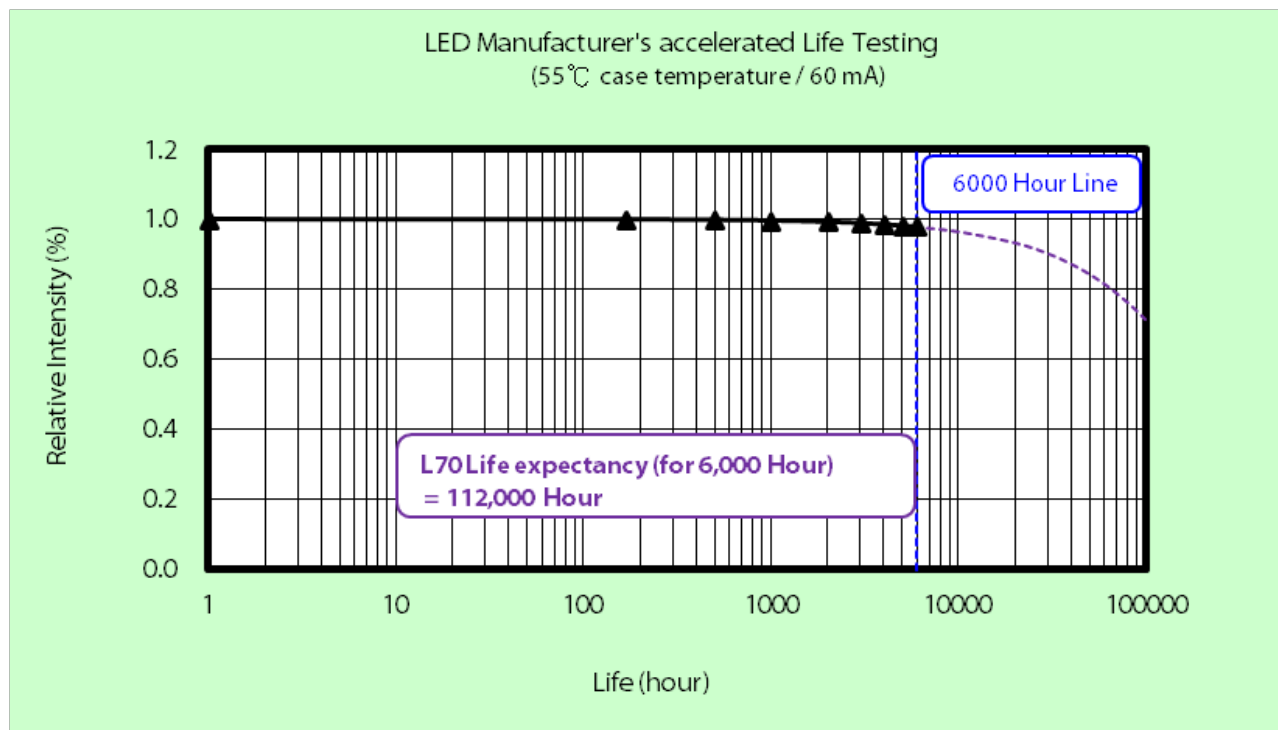
4.1 Lumen and Color Maintenance data (55 °C)

■ Lumen Maintenance data (55 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	20.09	1	1.014	1.018	1.010	1.009	1.006	1.000
2	20.50	1	1.013	1.015	1.008	1.007	1.004	0.998
3	20.61	1	1.010	1.013	1.006	1.005	1.001	0.994
4	20.34	1	1.018	1.024	1.018	1.019	1.017	1.011
5	20.40	1	1.004	1.006	0.999	0.995	0.992	0.985
6	20.70	1	1.011	1.014	1.008	1.005	1.002	0.996
7	20.44	1	1.010	1.012	1.006	1.004	1.001	0.994
8	20.92	1	1.009	1.014	1.009	1.007	1.004	0.996
9	20.47	1	1.015	1.019	1.013	1.011	1.008	1.001
10	20.22	1	1.016	1.019	1.012	1.010	1.008	1.000
11	20.26	1	1.018	1.021	1.015	1.015	1.011	1.005
12	20.30	1	1.020	1.026	1.020	1.019	1.017	1.010
13	20.19	1	1.011	1.015	1.009	1.005	1.003	0.994
14	19.89	1	1.017	1.020	1.010	1.009	1.006	1.000
15	20.89	1	1.009	1.012	1.004	1.002	0.999	0.992
16	20.51	1	0.995	0.990	0.980	0.975	0.970	0.961
17	20.51	1	1.008	1.012	1.007	1.003	1.001	0.994
18	20.47	1	1.006	1.005	0.998	0.993	0.989	0.981
19	20.44	1	1.011	1.015	1.009	1.007	1.005	1.000
20	20.33	1	1.009	1.007	1.001	0.997	0.994	0.987
21	20.20	1	1.018	1.022	1.018	1.014	1.012	1.006
22	20.24	1	1.020	1.022	1.016	1.012	1.009	1.004
23	20.30	1	1.021	1.026	1.020	1.018	1.014	1.007
24	20.40	1	1.013	1.017	1.013	1.009	1.007	1.000
AVG	20.40	1	1.012	1.015	1.009	1.006	1.003	0.996
MIN	19.89	1	0.995	0.990	0.980	0.975	0.970	0.961
MAX	20.92	1	1.021	1.026	1.020	1.019	1.017	1.011

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Test Condition 1 - 55°C Case Temp	
Sample size	24
Number of failures	0
DUT drive current used in the test (mA)	60
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000-6,000
Tested case temperature (°C)	55
α	3.344E-06
B	1.019
Calculated L70(6k) (hours)	112,000
Reported L70(6k) (hours)	>36000



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■ Color Maintenance data (55 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	3004.85	0	0.0008	0.0009	0.0010	0.0011	0.0009	0.0011
2	3039.56	0	0.0011	0.0012	0.0012	0.0013	0.0011	0.0013
3	3018.81	0	0.0010	0.0011	0.0011	0.0013	0.0011	0.0013
4	2997.05	0	0.0010	0.0010	0.0010	0.0012	0.0011	0.0011
5	3017.22	0	0.0010	0.0012	0.0012	0.0014	0.0012	0.0015
6	3043.06	0	0.0009	0.0011	0.0011	0.0012	0.0011	0.0012
7	3066.80	0	0.0012	0.0013	0.0013	0.0015	0.0013	0.0015
8	3028.05	0	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009
9	3006.25	0	0.0009	0.0010	0.0011	0.0012	0.0011	0.0012
10	3063.71	0	0.0007	0.0009	0.0010	0.0010	0.0010	0.0011
11	3048.66	0	0.0009	0.0010	0.0011	0.0012	0.0011	0.0012
12	3000.95	0	0.0010	0.0011	0.0011	0.0012	0.0011	0.0012
13	3037.03	0	0.0009	0.0009	0.0010	0.0011	0.0010	0.0010
14	3014.36	0	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011
15	3012.07	0	0.0010	0.0011	0.0011	0.0012	0.0010	0.0012
16	3034.55	0	0.0013	0.0018	0.0019	0.0022	0.0020	0.0024
17	3013.75	0	0.0009	0.0010	0.0010	0.0012	0.0010	0.0011
18	3002.34	0	0.0010	0.0012	0.0013	0.0015	0.0013	0.0016
19	3029.74	0	0.0010	0.0010	0.0011	0.0011	0.0010	0.0011
20	3020.12	0	0.0009	0.0012	0.0012	0.0015	0.0012	0.0015
21	3013.64	0	0.0011	0.0012	0.0013	0.0013	0.0012	0.0013
22	3064.27	0	0.0011	0.0013	0.0014	0.0015	0.0014	0.0015
23	3036.57	0	0.0012	0.0015	0.0015	0.0017	0.0014	0.0016
24	3040.33	0	0.0011	0.0011	0.0012	0.0013	0.0012	0.0013
AVG	3027.24	0	0.0010	0.0011	0.0012	0.0013	0.0012	0.0013
MIN	2997.05	0	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009
MAX	3066.80	0	0.0013	0.0018	0.0019	0.0022	0.0020	0.0024

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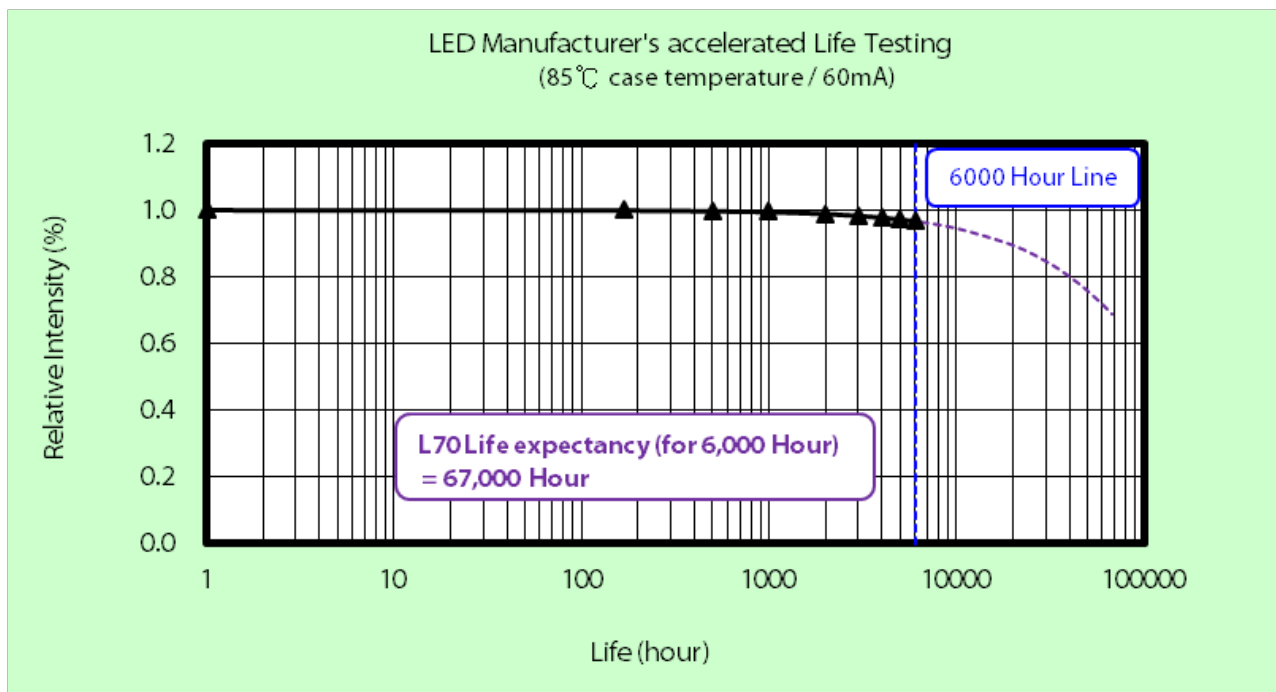
4.3 Lumen and Color Maintenance data (85 °C)

■ Lumen Maintenance data (85 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	20.67	1	1.005	1.003	0.995	0.989	0.987	0.973
2	20.35	1	1.006	1.009	1.002	0.994	0.988	0.974
3	20.60	1	1.008	1.008	1.000	0.995	0.990	0.977
4	20.60	1	1.001	1.004	0.999	0.997	0.992	0.982
5	20.77	1	0.995	0.999	0.991	0.986	0.981	0.969
6	20.45	1	0.996	0.995	0.988	0.982	0.978	0.965
7	20.65	1	1.000	1.005	0.998	0.992	0.988	0.975
8	20.60	1	1.006	1.011	1.004	1.000	0.996	0.982
9	20.43	1	1.000	1.004	0.996	0.991	0.987	0.975
10	20.31	1	0.999	1.004	0.996	0.990	0.986	0.974
11	20.45	1	1.010	1.014	1.009	1.003	0.998	0.984
12	20.46	1	1.006	1.008	0.999	0.993	0.987	0.973
13	20.39	1	1.013	1.019	1.011	1.004	0.998	0.985
14	20.69	1	1.003	1.004	0.997	0.990	0.985	0.972
15	20.61	1	0.998	1.007	1.000	0.993	0.988	0.974
16	20.50	1	0.995	0.998	0.991	0.982	0.973	0.959
17	20.47	1	0.995	1.000	0.993	0.986	0.981	0.970
18	20.20	1	1.023	1.030	1.023	1.017	1.011	1.000
19	20.40	1	1.021	1.026	1.019	1.010	1.005	0.991
20	20.77	1	1.000	1.001	1.000	0.992	0.986	0.975
21	20.38	1	1.036	1.043	1.041	1.034	1.030	1.018
22	20.83	1	1.013	1.020	1.015	1.009	1.003	0.990
23	20.45	1	1.011	1.016	1.010	1.003	0.998	0.984
24	20.53	1	1.015	1.022	1.016	1.010	1.006	0.994
AVG	20.52	1	1.006	1.010	1.004	0.997	0.993	0.980
MIN	20.20	1	0.995	0.995	0.988	0.982	0.973	0.959
MAX	20.83	1	1.036	1.043	1.041	1.034	1.030	1.018

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Test Condition 2 - 85°C Case Temp	
Sample size	24
Number of failures	0
DUT drive current used in the test (mA)	60
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	85
α	5.553E-06
B	1.018
Calculated L70(6k) (hours)	67,000
Reported L70(6k) (hours)	>36000



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■ Color Maintenance data (85 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	3041.38	0	0.0016	0.0018	0.0020	0.0021	0.0021	0.0021
2	3014.66	0	0.0005	0.0005	0.0005	0.0007	0.0005	0.0007
3	3019.35	0	0.0019	0.0020	0.0019	0.0021	0.0017	0.0020
4	3027.16	0	0.0021	0.0021	0.0021	0.0024	0.0020	0.0022
5	3019.39	0	0.0028	0.0027	0.0025	0.0027	0.0024	0.0027
6	3013.14	0	0.0018	0.0019	0.0020	0.0023	0.0019	0.0022
7	3049.98	0	0.0021	0.0021	0.0023	0.0021	0.0024	0.0021
8	3035.39	0	0.0019	0.0021	0.0023	0.0022	0.0024	0.0021
9	3007.55	0	0.0021	0.0022	0.0023	0.0025	0.0023	0.0024
10	3042.83	0	0.0034	0.0036	0.0039	0.0038	0.0039	0.0038
11	2997.68	0	0.0020	0.0021	0.0021	0.0023	0.0020	0.0022
12	2999.98	0	0.0016	0.0018	0.0019	0.0021	0.0018	0.0020
13	3018.64	0	0.0010	0.0011	0.0012	0.0013	0.0011	0.0012
14	3009.31	0	0.0025	0.0026	0.0025	0.0028	0.0024	0.0028
15	3008.57	0	0.0051	0.0050	0.0049	0.0052	0.0048	0.0052
16	3004.58	0	0.0020	0.0019	0.0018	0.0021	0.0020	0.0024
17	3016.50	0	0.0015	0.0017	0.0018	0.0020	0.0018	0.0019
18	2997.50	0	0.0008	0.0009	0.0009	0.0010	0.0009	0.0010
19	3000.75	0	0.0020	0.0018	0.0017	0.0021	0.0017	0.0020
20	3006.78	0	0.0003	0.0002	0.0002	0.0003	0.0002	0.0003
21	3000.71	0	0.0026	0.0026	0.0027	0.0028	0.0027	0.0028
22	3046.85	0	0.0002	0.0004	0.0007	0.0006	0.0008	0.0005
23	3025.45	0	0.0012	0.0014	0.0015	0.0017	0.0014	0.0016
24	3032.93	0	0.0010	0.0012	0.0014	0.0013	0.0015	0.0013
AVG	3018.21	0	0.0018	0.0019	0.0020	0.0021	0.0020	0.0021
MIN	2997.50	0	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003
MAX	3049.98	0	0.0051	0.0050	0.0049	0.0052	0.0048	0.0052

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5. EPA Recognized Certification Laboratory Information

EPA Recognized Certification Bodies (CBs) and Laboratories List Results

Notes:

1. Only accredited laboratories are listed on this page. Laboratories that are EPA-recognized through enrolling in a Certification Body's WMTL or SMTL program are not listed here.
2. EPA encourages manufacturers to contact laboratories directly to ensure they have the capability and availability to test the particular products for which certification is sought, as some product types may require special testing equipment or capabilities. Manufacturers must also confirm with an EPA-recognized certification body (CB) that the laboratory is acceptable under the CB's program for that product type.
3. Windows, Doors, and Skylights partners are advised to contact the National Fenestration Rating Council(www.nfrc.org [EXIT ↗](#)) for a complete list of EPA-recognized laboratories for these products.
4. [Lighting \(CFLs, ILLs, Luminaires, and Decorative Light Strings\) Labs](#) and [CBs](#) are listed separately.
5. Please note, EPA recognizes the Association of Home Appliance Manufacturers (AHAM) only for administering verification testing.

Organization ID	Organization Name	Type of Recognized Body	If Lab is it 1st Party?	Programs	Organization Address	City	State	Country
1114690	Edison Opto Corporation - OPTO Testing Laboratory	Accredited Laboratory	Y	Luminaires	4F, NO.800, Chung-Cheng Rd., Chung-Ho Dist.,	New Taipei City	-	TW

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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