

# EDISON OPTO Laboratory Test Report

## IES LM-80-08

### MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCE

Report Number	Q140401
Test Sample	2T03X3WW23000001
Rating	DC 30mA 0.3W
Normal CCT	2,700 K
Test Date	April 18, 2014 to January 12, 2014
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=1.601%(K=1.97) at 95% confidence level.
7. Chromaticity(x,y) uncertainty=0.000018 (K=2) at 95% confidence level.

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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 <sup>2</sup>
2T03X3WW23000001	5000K/5700K/6500K	0.3	0.031
2T03X3WW23000001	4000K	0.3	0.031
2T03X3WW23000001	2700K/3000K/3500K	0.3	0.031
2T03X3WW11000001	5000K/5700K/6500K	0.3	0.031
2T03X3WW11000001	4000K	0.3	0.031
2T03X3WW11000001	2700K/3000K/3500K	0.3	0.031

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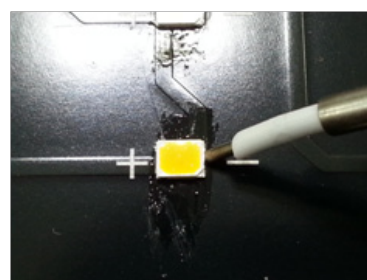
## 1. Test Summary

Case temperature (Ts)	83°C ≤ Ts	103°C ≤ Ts
Ambient conditions (T <sub>A</sub> )	80°C ≤ T <sub>A</sub> R.H. < 65 % Minimized airflow	100°C ≤ T <sub>A</sub> R.H. < 65 % Minimized airflow
Sample Size	22	22
Drive current of the LED	30mA	30mA
Initial flux (lm) / V <sub>f</sub> (V)	30.00 / 9.28	29.86 / 9.31
Lumen maintenance at 6,000 hrs	97.28% Page 5	95.92% 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<sub>s</sub> is the temperature on the substrate; the ambient temperature T<sub>A</sub> is the temperature of the air at a distance of 50 mm above substrate.

Ts Measurement Point



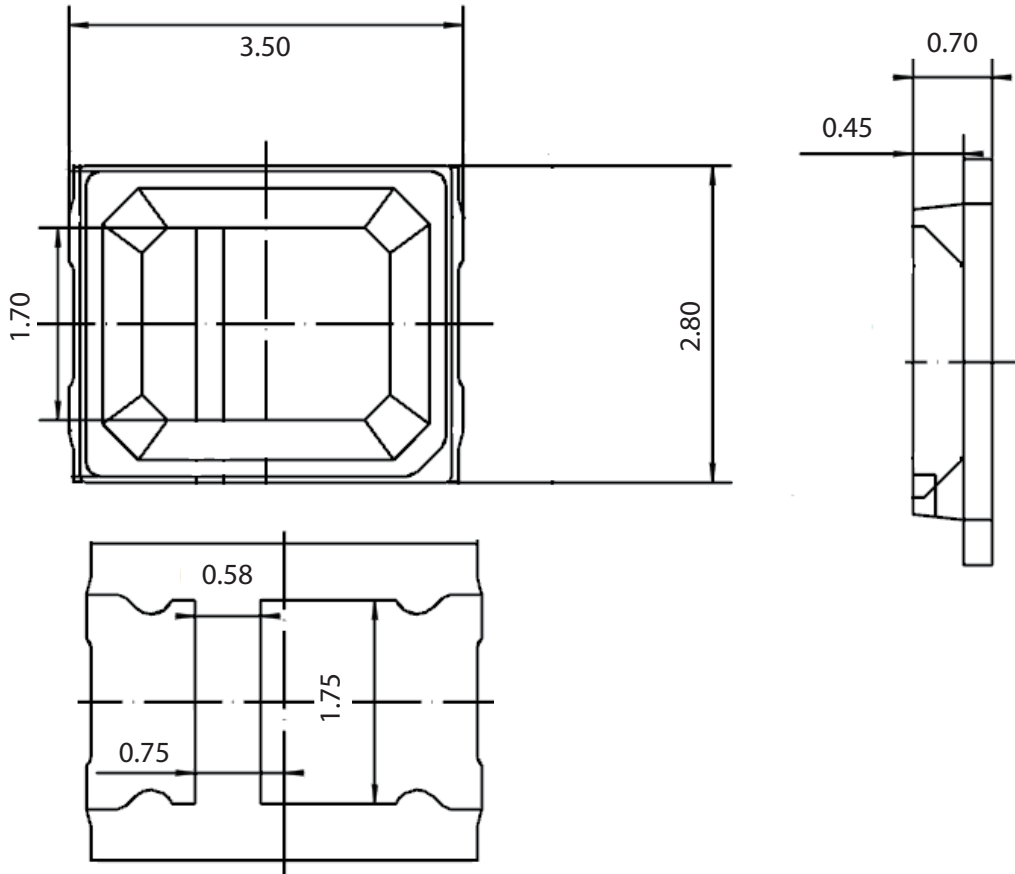
## 3. Description of test equipment

Equipment	Model No. / Serial No.	Cal. Laboratory	Report No.	Effective Date
Integrating sphere	ISP250 45392012	Standard Light Source L7386A	14-11-BAC-498- 01L	01.12.2015
DC power source	KEITHLEY 2425 1347276	SGS Taiwan Ltd.	ECAC1606814	16.06.2015
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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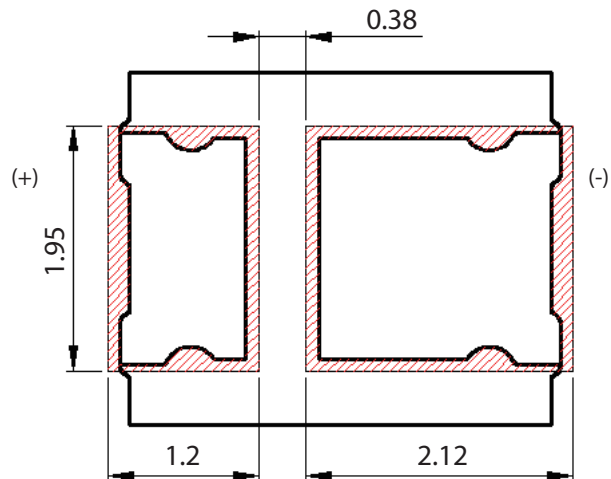
## Emitter Type Dimension



## Circuit



## Solder Pad



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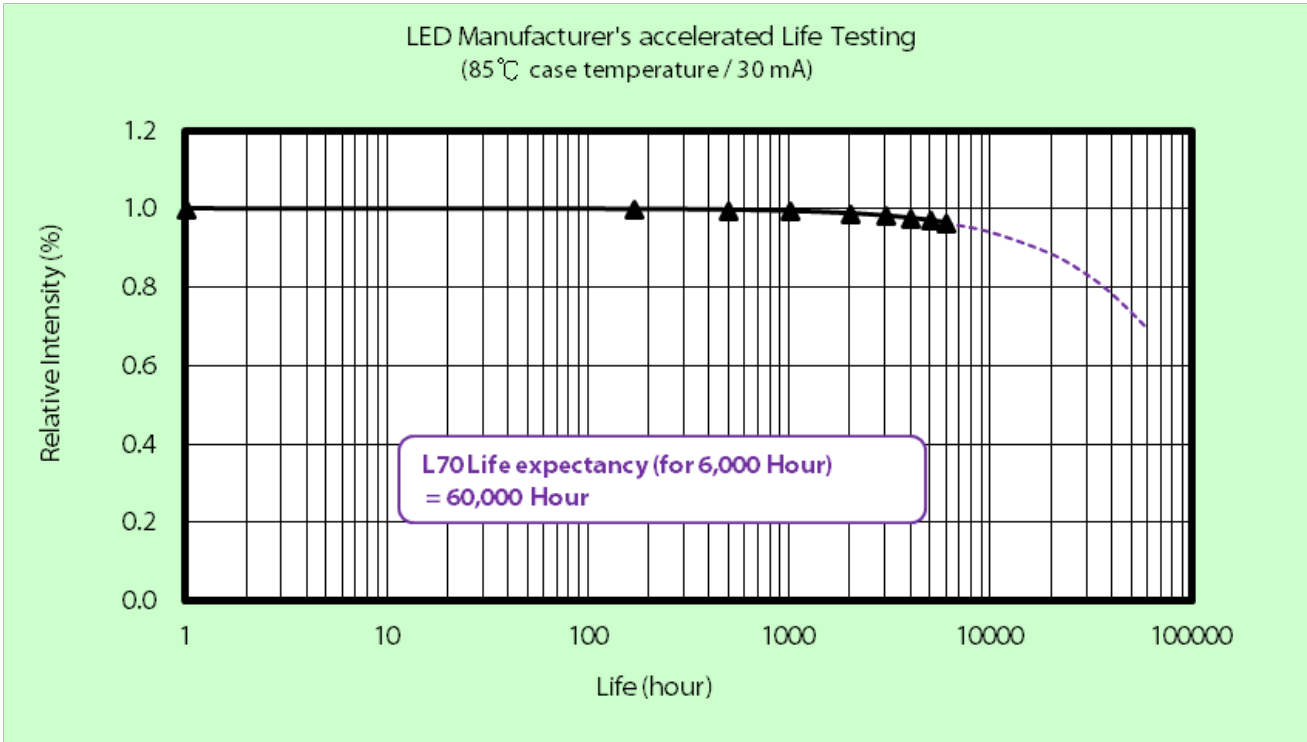
## 4. Test Results

### 4.1 Lumen and Color Maintenance data (85 °C)

#### ■ Lumen Maintenance data (85 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	29.72	1.000	0.995	0.987	0.982	0.975	0.966	0.964
2	30.55	1.000	0.998	0.991	0.988	0.983	0.972	0.967
3	29.80	1.000	0.999	0.993	0.989	0.985	0.975	0.974
4	29.05	1.000	1.012	1.006	1.003	0.998	0.985	0.977
5	29.26	1.000	0.997	0.989	0.987	0.984	0.982	0.983
6	29.93	1.000	1.006	1.000	0.998	0.993	0.983	0.980
7	30.06	1.000	1.002	0.996	0.991	0.983	0.972	0.967
8	30.92	1.000	1.003	0.991	0.997	0.993	0.983	0.980
9	29.47	1.000	1.003	0.995	0.990	0.987	0.979	0.980
10	30.04	1.000	1.003	0.997	0.993	0.987	0.975	0.968
11	29.74	1.000	1.005	0.998	0.993	0.979	0.971	0.975
12	30.00	1.000	1.000	0.993	0.985	0.983	0.973	0.972
13	29.38	1.000	0.997	0.990	0.980	0.972	0.955	0.950
14	30.24	1.000	0.999	0.992	0.985	0.978	0.966	0.965
15	30.27	1.000	1.001	0.993	0.990	0.983	0.967	0.965
16	29.88	1.000	0.998	0.991	0.985	0.980	0.970	0.962
17	30.24	1.000	1.005	0.998	0.993	0.989	0.979	0.979
18	30.56	1.000	1.006	0.999	0.995	0.989	0.977	0.974
19	30.04	1.000	1.005	1.000	0.995	0.990	0.978	0.975
20	30.04	1.000	1.000	0.997	0.997	0.993	0.985	0.986
21	30.37	1.000	0.997	0.992	0.991	0.985	0.979	0.979
22	30.44	1.000	1.001	0.996	0.994	0.990	0.979	0.981
AVG	30.00	1.000	1.001	0.995	0.991	0.985	0.975	0.973
MIN	29.05	1.000	0.995	0.987	0.980	0.972	0.955	0.950
MAX	30.92	1.000	1.012	1.006	1.003	0.998	0.985	0.986

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Test Condition 1 - 85°C Case Temp	
Sample size	22
Number of failures	0
DUT drive current used in the test (mA)	30
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	85
$\alpha$	6.027E-06
B	1.008
Calculated L70(6k) (hours)	60,000
Reported L70(6k) (hours)	>36000

# EDISON OPTO Laboratory Test Report

■ Color Maintenance data (85 °C)

$\Delta u'v'$

No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	2681.71	0	0.0010	0.0011	0.0015	0.0017	0.0020	0.0022
2	2662.65	0	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017
3	2631.65	0	0.0010	0.0011	0.0013	0.0016	0.0018	0.0021
4	2713.05	0	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013
5	2699.55	0	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020
6	2676.44	0	0.0005	0.0006	0.0007	0.0008	0.0010	0.0013
7	2685.39	0	0.0007	0.0008	0.0010	0.0012	0.0013	0.0016
8	2701.90	0	0.0008	0.0011	0.0009	0.0011	0.0014	0.0016
9	2691.93	0	0.0008	0.0009	0.0012	0.0015	0.0017	0.0018
10	2685.65	0	0.0007	0.0008	0.0010	0.0011	0.0012	0.0015
11	2742.89	0	0.0006	0.0008	0.0010	0.0011	0.0014	0.0016
12	2713.50	0	0.0010	0.0012	0.0014	0.0017	0.0018	0.0019
13	2700.36	0	0.0011	0.0012	0.0014	0.0017	0.0018	0.0020
14	2672.01	0	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
15	2741.95	0	0.0007	0.0009	0.0012	0.0014	0.0017	0.0021
16	2697.21	0	0.0009	0.0011	0.0013	0.0014	0.0017	0.0018
17	2675.38	0	0.0008	0.0009	0.0011	0.0013	0.0016	0.0017
18	2729.22	0	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017
19	2668.75	0	0.0009	0.0010	0.0013	0.0014	0.0014	0.0017
20	2711.51	0	0.0007	0.0007	0.0010	0.0012	0.0014	0.0016
21	2691.12	0	0.0009	0.0011	0.0012	0.0013	0.0015	0.0016
22	2761.00	0	0.0008	0.0008	0.0010	0.0012	0.0013	0.0015
AVG	2697.04	0	0.0008	0.0010	0.0012	0.0013	0.0015	0.0017
MIN	2631.65	0	0.0004	0.0006	0.0007	0.0008	0.0010	0.0013
MAX	2761.00	0	0.0011	0.0012	0.0015	0.0017	0.0020	0.0022

## EDISON OPTO Laboratory Test Report

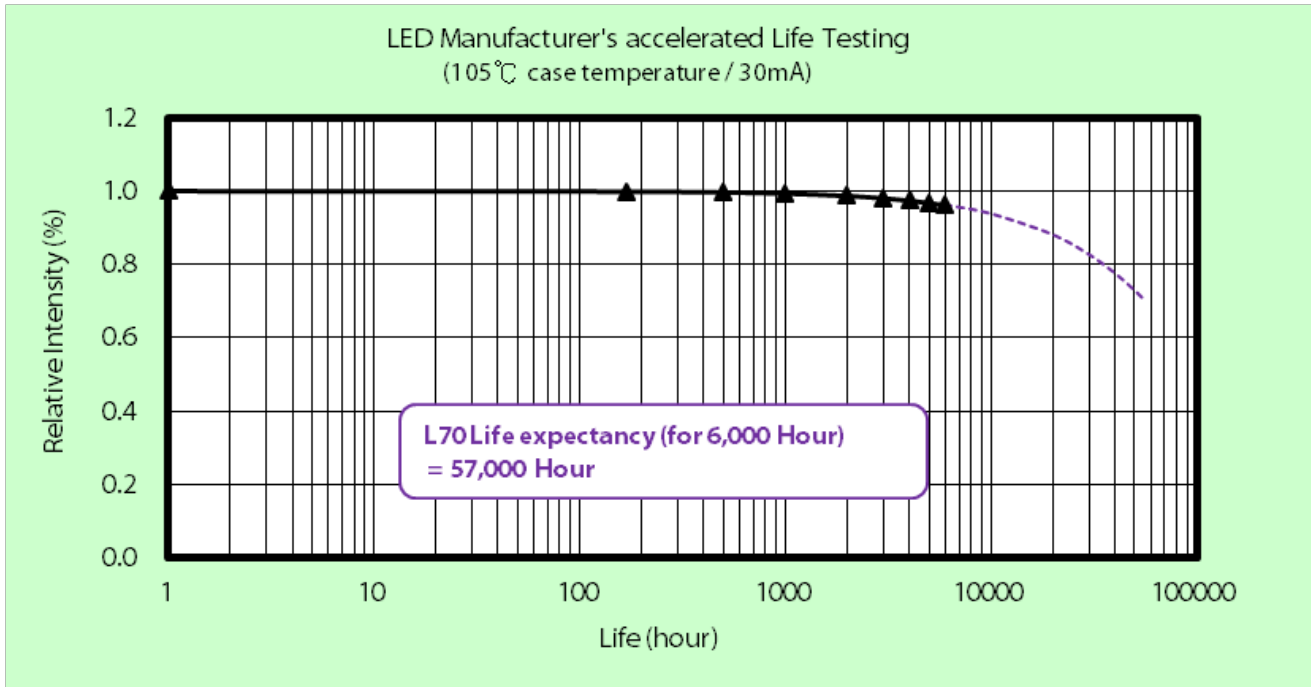
### 4.2 Lumen and Color Maintenance data (105 °C)

#### ■ Lumen Maintenance data (105 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	29.83	1.000	0.992	0.986	0.982	0.975	0.970	0.959
2	29.83	1.000	0.991	0.985	0.981	0.973	0.970	0.959
3	29.67	1.000	0.991	0.985	0.982	0.972	0.967	0.957
4	29.80	1.000	0.991	0.986	0.982	0.973	0.969	0.958
5	29.82	1.000	0.992	0.986	0.982	0.974	0.969	0.958
6	30.50	1.000	0.991	0.985	0.982	0.973	0.968	0.957
7	30.09	1.000	0.991	0.985	0.981	0.974	0.969	0.959
8	30.15	1.000	0.991	0.985	0.982	0.973	0.969	0.959
9	29.94	1.000	0.991	0.985	0.982	0.973	0.970	0.960
10	29.88	1.000	0.991	0.985	0.982	0.973	0.970	0.961
11	29.76	1.000	0.991	0.985	0.982	0.973	0.970	0.958
12	28.99	1.000	0.991	0.985	0.982	0.974	0.970	0.961
13	29.68	1.000	0.990	0.984	0.981	0.972	0.968	0.957
14	29.59	1.000	0.991	0.985	0.982	0.975	0.971	0.962
15	29.48	1.000	0.991	0.985	0.982	0.973	0.970	0.960
16	30.67	1.000	0.991	0.985	0.981	0.974	0.968	0.959
17	30.71	1.000	0.991	0.985	0.982	0.973	0.968	0.958
18	29.13	1.000	0.990	0.985	0.981	0.973	0.970	0.960
19	29.71	1.000	0.990	0.985	0.981	0.975	0.971	0.961
20	29.70	1.000	0.991	0.985	0.982	0.976	0.971	0.961
21	30.35	1.000	0.991	0.985	0.982	0.973	0.969	0.959
22	29.74	1.000	0.991	0.985	0.982	0.974	0.968	0.958
AVG	29.86	1.000	0.991	0.985	0.982	0.974	0.969	0.959
MIN	28.99	1.000	0.990	0.984	0.981	0.972	0.967	0.957
MAX	30.71	1.000	0.992	0.986	0.982	0.976	0.971	0.962



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Test Condition 2 - 105°C Case Temp	
Sample size	22
Number of failures	0
DUT drive current used in the test (mA)	30
Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	105
$\alpha$	6.282E-06
B	0.998
Calculated L70(6k) (hours)	57,000
Reported L70(6k) (hours)	>36000

# EDISON OPTO Laboratory Test Report

■ Color Maintenance data (105 °C)

$\Delta u'v'$

No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h
1	2674.99	0	0.0008	0.0010	0.0013	0.0015	0.0017	0.0021
2	2751.24	0	0.0009	0.0011	0.0011	0.0014	0.0016	0.0019
3	2670.57	0	0.0007	0.0009	0.0012	0.0014	0.0016	0.0020
4	2668.74	0	0.0007	0.0009	0.0010	0.0012	0.0015	0.0018
5	2716.15	0	0.0009	0.0013	0.0014	0.0015	0.0018	0.0021
6	2684.93	0	0.0007	0.0011	0.0013	0.0016	0.0018	0.0021
7	2667.85	0	0.0009	0.0009	0.0013	0.0014	0.0017	0.0021
8	2681.18	0	0.0007	0.0009	0.0012	0.0014	0.0016	0.0020
9	2692.76	0	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019
10	2663.31	0	0.0007	0.0012	0.0012	0.0014	0.0016	0.0019
11	2721.19	0	0.0009	0.0010	0.0011	0.0013	0.0016	0.0020
12	2635.80	0	0.0007	0.0010	0.0011	0.0012	0.0015	0.0018
13	2713.32	0	0.0008	0.0009	0.0013	0.0013	0.0017	0.0020
14	2724.35	0	0.0007	0.0009	0.0012	0.0013	0.0017	0.0019
15	2732.16	0	0.0010	0.0010	0.0018	0.0021	0.0023	0.0026
16	2728.18	0	0.0007	0.0009	0.0010	0.0013	0.0016	0.0019
17	2728.91	0	0.0007	0.0011	0.0013	0.0014	0.0017	0.0020
18	2669.05	0	0.0007	0.0009	0.0013	0.0015	0.0017	0.0021
19	2683.67	0	0.0007	0.0010	0.0012	0.0013	0.0016	0.0020
20	2721.75	0	0.0009	0.0009	0.0014	0.0016	0.0019	0.0022
21	2687.51	0	0.0007	0.0012	0.0017	0.0018	0.0021	0.0024
22	2705.06	0	0.0008	0.0010	0.0014	0.0016	0.0018	0.0022
AVG	2696.48	0	0.0008	0.0010	0.0013	0.0015	0.0017	0.0020
MIN	2635.80	0	0.0007	0.0009	0.0010	0.0012	0.0015	0.0018
MAX	2751.24	0	0.0010	0.0013	0.0018	0.0021	0.0023	0.0026



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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](http://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](http://www.edison-opto.com)

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[www.edison-opto.com](http://www.edison-opto.com)

For general assistance please contact:  
[service@edison-opto.com.tw](mailto:service@edison-opto.com.tw)

For technical assistance please contact:  
[LED.Detective@edison-opto.com.tw](mailto:LED.Detective@edison-opto.com.tw)

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