



# TEST REPORT

According to ANSI/IES LM-80-15

For

## Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

**Model: HL-A2219W1H2-D01-9D2AB2**

<b>Report Type:</b> 6000 Hours Test Report		<b>Product Type:</b> LED Package	
<b>Reviewed By:</b>	Pote Wang	<i>Pote Wang</i>	
<b>Report Number:</b>	SZ2230926-57032E-EE-6000		
<b>Test Date:</b>	2023-09-28 to 2024-06-28		
<b>Report Date:</b>	2024-07-09		
<b>Approved by:</b>	Blake Zhang / EE Engineer	<i>Blake Zhang</i>	
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## 1 - General Information

### 1.1 Description of LED Light Sources<sup>#</sup>

#### Sample Size:

50 PCS test samples were in good condition and received on 2023-09-26. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-A2219W1H2-D01-9D2AB2
Part Type:	LED Package
Drive Level:	DC 60mA
Nominal CCT:	2700K
Power:	0.2W
Average Current Density per LED die:	775.002mA/mm <sup>2</sup>
Average Power Density per LED die:	2.5833W/mm <sup>2</sup>
CRI:	90
Die Spacing:	/

#### Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

#### Family products covered by this report:

According to *ENERGY STAR<sup>®</sup> Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR<sup>®</sup> Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Series Name	Model Name	CRI(typ.)	Total Input Current (mA)	Power (W)	CCT (K)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm <sup>2</sup> )	Power Density per PCB (W/mm <sup>2</sup> )	Die Spacing (mm)
Test model	HL-A2219W1H2-D01-9D2AB2	90	60	0.2	2700	1	60	775.002	0.0478	/
Multiple model	HL-A2219W*H2-D01-*D2AB2	80-90	60	0.2	2700-6500	1	60	775.002	0.0478	/
Multiple model	HL-A-2219****W-S1-06L-HR*-***	80-90	60	0.2	2700-6500	1	60	775.002	0.0478	/
Multiple model	HL-A-2219****W-S1-06L-HR*(R9)-***	80-90	60	0.2	2700-6500	1	60	775.002	0.0478	/

Note1: The model name begins with "HL", such as "HL-A2219W\*H2-D01-\*D2AB2", "\*" is described in detail as follows:

1. The first "\*" is the number from 1 to 9 which stands for the CCT(K).
2. The second "\*" is the number 8 or 9 which stands for the different CRI style.

Note2: The model name begins with "HL", such as "HL-A-2219\*\*\*\*W-S1-06L-HR\*-\*\*\*", "\*\*\*\*" is described in detail as follows:

1. The first "\*\*\*\*" is the letter or number, which stands for the brightness level.
2. The second "\*" is the number 3 or 4 or 5 which stands for the different CRI style.
3. The third "\*\*\*\*" is the letter, which stands for the customer code or None.

### 1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR<sup>®</sup> Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

### 1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2023-09-02	2024-09-01
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2023-09-02	2024-09-01
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2023-09-02	2024-09-01
Standard Light Source	EVERFINE	D062	M133799CM1381112	2023-05-12	2025-05-11
Multilayer aging machine	BACL	B2-270	20013	2023-10-16	2024-10-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	2023-09-02	2024-09-01

### 1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  during photometric and electrical measurement test.

### 1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case ( $TMP_{LED}$ ) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing,  $TMP_{LED}$  of the coldest LEDs were maintained at a temperature that was greater than or equal to  $2^{\circ}C$  below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}C$  below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within  $\pm 3\%$  of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%.

### 1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate  $u'v'$ .  $2\pi$  measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is  $U=1.59\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21K$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of the temperature is  $U=0.8671^{\circ}C$  ( $K=2$ ), at the 95% confidence level.

### 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).



## 1.8 Sample Set

### Data Set 1: 55°C, 60mA

Part Number: HL-A2219W1H2-D01-9D2AB2

Number of Units: 25

Case Temperature: >53°C

Ambient Temperature: >50°C

Life Test Drive Current: 60mA

Measurement Current: 60mA

### Data Set 2: 105°C, 60mA

Part Number: HL-A2219W1H2-D01-9D2AB2

Number of Units: 25

Case Temperature: >103°C

Ambient Temperature: >100°C

Life Test Drive Current: 60mA

Measurement Current: 60mA

## 2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	$\alpha$	$\beta$	Reported TM-21 L <sub>70</sub> Lifetime
1	25	0	1000hrs	6000hrs	2.020E-06	1.003	>36000 hours
2	25	0	1000hrs	6000hrs	2.608E-06	1.003	>36000 hours

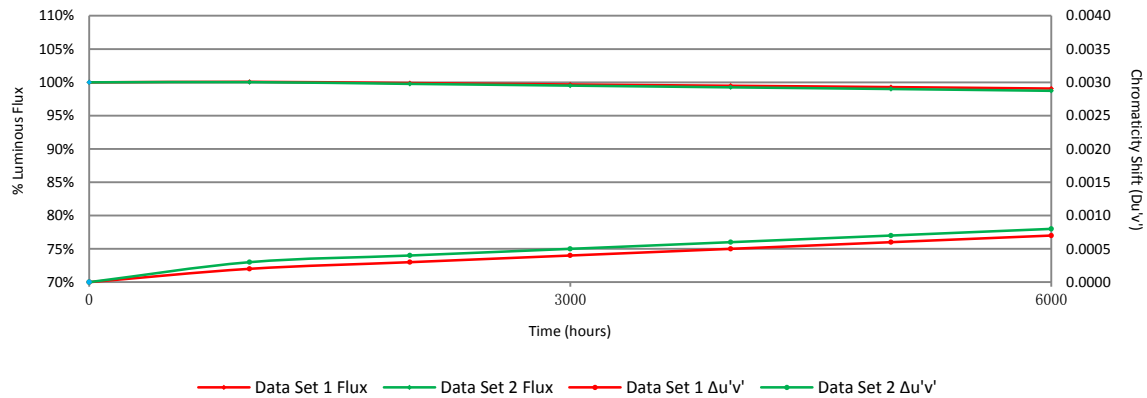
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	100.08%	99.89%	99.68%	99.49%	99.29%	99.07%
2	100.03%	99.77%	99.51%	99.25%	99.00%	98.73%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
2	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008

Average Lumen Maintenance and Chromaticity Shift VS. Time



### 3 - Test Data

#### 3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	20.67	100.19	100.05	99.81	99.71	99.37	99.08
2	21.41	100.14	99.86	99.67	99.49	99.16	98.88
3	21.40	100.14	100.00	99.86	99.77	99.63	99.35
4	21.03	100.10	99.90	99.76	99.57	99.43	99.24
5	20.99	100.19	100.05	99.81	99.57	99.33	99.00
6	21.01	100.29	100.14	99.81	99.62	99.33	99.05
7	21.62	100.23	100.09	99.95	99.81	99.63	99.54
8	22.01	100.23	100.05	99.82	99.64	99.50	99.36
9	21.52	100.19	99.95	99.77	99.63	99.40	99.21
10	20.92	100.10	99.86	99.57	99.28	99.09	99.00
11	21.83	100.09	99.91	99.73	99.59	99.40	99.18
12	20.55	99.95	99.76	99.56	99.37	99.12	98.93
13	21.42	100.05	99.77	99.53	99.39	99.11	99.02
14	21.57	99.86	99.72	99.54	99.21	99.07	98.79
15	20.84	100.19	99.95	99.76	99.42	99.28	99.04
16	21.29	100.14	99.91	99.72	99.58	99.39	99.25
17	21.25	100.19	99.91	99.67	99.44	99.20	98.92
18	21.80	99.91	99.77	99.54	99.36	99.17	98.94
19	20.60	99.95	99.76	99.56	99.42	99.17	98.93
20	21.75	100.05	99.82	99.63	99.45	99.26	98.94
21	21.34	100.09	99.91	99.77	99.53	99.44	99.11
22	21.02	100.05	99.71	99.48	99.24	99.10	98.95
23	21.41	99.86	99.72	99.53	99.30	99.11	98.93
24	21.63	99.95	99.82	99.58	99.40	99.21	98.98
25	21.73	99.95	99.82	99.68	99.49	99.26	99.08
Avg.	21.30	100.08	99.89	99.68	99.49	99.29	99.07
Med.	21.40	100.10	99.90	99.68	99.49	99.26	99.02
st dev	0.41	0.12	0.12	0.13	0.16	0.16	0.18
Min.	20.55	99.86	99.71	99.48	99.21	99.07	98.79
Max.	22.01	100.29	100.14	99.95	99.81	99.63	99.54

**3.2 Data Set 1, 55°C, 60mA (Forward Voltage)**

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	3.004	3.029	3.031	3.028	3.027	3.028	3.029
2	3.015	3.028	3.024	3.023	3.022	3.022	3.023
3	3.037	3.041	3.040	3.037	3.035	3.035	3.037
4	2.997	3.011	3.009	3.009	3.007	3.006	3.007
5	3.025	3.035	3.033	3.034	3.033	3.032	3.034
6	3.007	3.026	3.023	3.022	3.022	3.026	3.023
7	3.045	3.040	3.038	3.034	3.034	3.032	3.034
8	3.045	3.040	3.037	3.032	3.032	3.032	3.034
9	3.021	3.042	3.041	3.035	3.037	3.037	3.036
10	3.017	3.037	3.038	3.034	3.032	3.033	3.035
11	3.017	3.032	3.033	3.032	3.029	3.028	3.029
12	3.008	3.016	3.019	3.015	3.012	3.015	3.015
13	3.011	3.029	3.027	3.028	3.027	3.025	3.026
14	3.014	3.029	3.028	3.028	3.026	3.025	3.030
15	3.011	3.030	3.031	3.028	3.024	3.025	3.026
16	3.006	3.020	3.019	3.022	3.017	3.016	3.016
17	2.997	3.014	3.017	3.013	3.012	3.010	3.012
18	2.994	3.013	3.010	3.009	3.007	3.007	3.009
19	3.004	3.022	3.019	3.020	3.017	3.016	3.017
20	3.029	3.034	3.031	3.032	3.030	3.029	3.030
21	3.016	3.029	3.026	3.025	3.029	3.023	3.024
22	3.031	3.034	3.036	3.033	3.029	3.029	3.029
23	3.006	3.020	3.022	3.020	3.017	3.016	3.017
24	3.010	3.026	3.029	3.026	3.024	3.023	3.025
25	3.018	3.033	3.038	3.034	3.031	3.030	3.032
Avg.	3.015	3.028	3.028	3.026	3.024	3.024	3.025
Med.	3.014	3.029	3.029	3.028	3.027	3.025	3.026
st dev	0.014	0.009	0.009	0.008	0.009	0.009	0.009
Min.	2.994	3.011	3.009	3.009	3.007	3.006	3.007
Max.	3.045	3.042	3.041	3.037	3.037	3.037	3.037



### 3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )					
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs
1	0.2608	0.5273	2735	0.0002	0.0002	0.0001	0.0002	0.0003	0.0004
2	0.2613	0.5322	2705	0.0002	0.0004	0.0006	0.0007	0.0008	0.0010
3	0.2608	0.5287	2729	0.0003	0.0004	0.0005	0.0004	0.0005	0.0007
4	0.2570	0.5290	2809	0.0003	0.0003	0.0004	0.0005	0.0006	0.0007
5	0.2617	0.5309	2701	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008
6	0.2623	0.5279	2703	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009
7	0.2607	0.5309	2724	0.0001	0.0003	0.0005	0.0006	0.0008	0.0008
8	0.2566	0.5298	2814	0.0002	0.0003	0.0005	0.0006	0.0007	0.0009
9	0.2589	0.5302	2763	0.0001	0.0001	0.0004	0.0005	0.0006	0.0008
10	0.2615	0.5308	2706	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007
11	0.2564	0.5303	2817	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008
12	0.2593	0.5288	2761	0.0001	0.0002	0.0002	0.0004	0.0004	0.0007
13	0.2627	0.5314	2680	0.0001	0.0003	0.0004	0.0004	0.0006	0.0007
14	0.2582	0.5293	2783	0.0001	0.0002	0.0002	0.0004	0.0005	0.0007
15	0.2664	0.5314	2607	0.0001	0.0002	0.0004	0.0005	0.0006	0.0007
16	0.2587	0.5288	2773	0.0002	0.0003	0.0004	0.0004	0.0006	0.0007
17	0.2617	0.5309	2703	0.0001	0.0002	0.0002	0.0003	0.0004	0.0004
18	0.2552	0.5302	2843	0.0004	0.0004	0.0004	0.0005	0.0005	0.0007
19	0.2632	0.5286	2680	0.0001	0.0003	0.0004	0.0004	0.0005	0.0004
20	0.2589	0.5311	2760	0.0001	0.0003	0.0004	0.0006	0.0008	0.0008
21	0.2612	0.5304	2715	0.0001	0.0002	0.0004	0.0005	0.0006	0.0007
22	0.2629	0.5302	2680	0.0001	0.0002	0.0002	0.0004	0.0006	0.0006
23	0.2596	0.5307	2747	0.0002	0.0001	0.0003	0.0004	0.0006	0.0007
24	0.2596	0.5304	2747	0.0003	0.0003	0.0002	0.0005	0.0006	0.0007
25	0.2587	0.5298	2769	0.0002	0.0003	0.0004	0.0003	0.0004	0.0006
Avg.	0.2602	0.5300	2738	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
Med.	0.2607	0.5302	2735	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
st dev	0.0025	0.0012	53	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2552	0.5273	2607	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004
Max.	0.2664	0.5322	2843	0.0004	0.0004	0.0006	0.0007	0.0008	0.0010

**3.4 Data Set 2, 105°C, 60mA (Lumen Maintenance)**

No.	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	21.25	100.05	99.86	99.62	99.44	99.20	98.87
27	21.29	100.14	99.81	99.44	99.15	99.06	98.78
28	21.22	100.09	99.81	99.58	99.39	99.10	98.77
29	21.18	99.86	99.62	99.34	99.15	99.01	98.87
30	21.01	100.14	99.81	99.48	99.14	98.86	98.52
31	21.21	100.05	99.86	99.62	99.43	99.15	98.92
32	21.32	99.86	99.58	99.39	99.16	98.92	98.73
33	20.95	99.86	99.67	99.43	99.24	98.90	98.52
34	21.39	100.05	99.81	99.44	99.30	98.97	98.69
35	21.30	100.14	99.81	99.48	99.15	98.87	98.64
36	20.69	100.05	99.86	99.57	99.28	99.08	98.74
37	20.92	100.05	99.71	99.43	99.04	98.80	98.57
38	21.13	99.91	99.53	99.20	98.91	98.63	98.44
39	21.19	99.91	99.76	99.58	99.15	98.91	98.63
40	21.50	100.19	99.81	99.58	99.26	98.93	98.70
41	20.98	100.10	99.90	99.71	99.48	99.19	98.95
42	20.87	100.14	99.90	99.66	99.43	99.14	98.90
43	21.14	100.05	99.67	99.43	99.15	98.91	98.63
44	21.20	99.86	99.53	99.25	99.01	98.82	98.58
45	21.47	99.95	99.58	99.30	99.07	98.74	98.51
46	21.26	99.86	99.62	99.39	99.06	98.82	98.54
47	20.99	100.19	99.81	99.52	99.29	99.09	98.86
48	21.03	100.14	99.95	99.81	99.48	99.19	99.05
49	20.93	100.05	99.90	99.76	99.62	99.28	98.95
50	20.83	100.10	99.95	99.66	99.42	99.28	98.94
Avg.	21.13	100.03	99.77	99.51	99.25	99.00	98.73
Med.	21.18	100.05	99.81	99.48	99.24	98.97	98.73
st dev	0.20	0.11	0.13	0.16	0.18	0.17	0.17
Min.	20.69	99.86	99.53	99.20	98.91	98.63	98.44
Max.	21.50	100.19	99.95	99.81	99.62	99.28	99.05

**3.5 Data Set 2, 105°C, 60mA (Forward Voltage)**

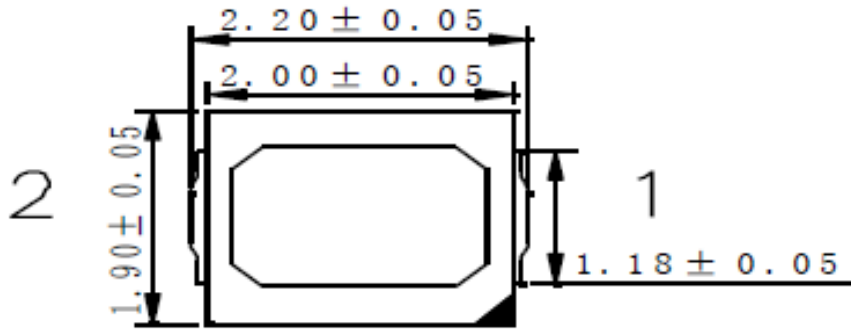
No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	3.031	3.037	3.038	3.035	3.032	3.035	3.032
27	3.019	3.028	3.021	3.018	3.016	3.019	3.016
28	3.000	3.022	3.023	3.022	3.026	3.022	3.019
29	3.010	3.035	3.031	3.031	3.032	3.029	3.032
30	3.028	3.040	3.035	3.034	3.035	3.033	3.036
31	3.025	3.050	3.041	3.037	3.037	3.036	3.038
32	3.024	3.031	3.030	3.026	3.026	3.026	3.028
33	3.015	3.034	3.029	3.031	3.030	3.031	3.029
34	3.016	3.032	3.032	3.027	3.028	3.027	3.028
35	3.014	3.025	3.019	3.021	3.022	3.018	3.020
36	2.986	3.004	2.999	3.000	3.000	2.997	2.998
37	3.010	3.026	3.022	3.020	3.022	3.019	3.020
38	3.012	3.035	3.025	3.025	3.025	3.024	3.027
39	3.005	3.035	3.020	3.020	3.022	3.020	3.023
40	3.018	3.037	3.032	3.030	3.032	3.030	3.032
41	3.007	3.026	3.020	3.021	3.020	3.018	3.021
42	3.016	3.041	3.033	3.034	3.035	3.035	3.035
43	3.010	3.035	3.025	3.026	3.026	3.025	3.026
44	3.044	3.027	3.022	3.022	3.022	3.021	3.022
45	3.028	3.037	3.029	3.031	3.031	3.032	3.030
46	3.019	3.038	3.033	3.033	3.034	3.032	3.032
47	2.995	3.007	3.003	3.003	3.001	3.004	3.004
48	3.007	3.031	3.025	3.022	3.021	3.022	3.024
49	3.017	3.038	3.033	3.034	3.031	3.032	3.034
50	3.011	3.024	3.020	3.025	3.021	3.022	3.026
Avg.	3.015	3.031	3.026	3.025	3.025	3.024	3.025
Med.	3.015	3.034	3.025	3.026	3.026	3.025	3.027
st dev	0.012	0.010	0.010	0.009	0.009	0.009	0.009
Min.	2.986	3.004	2.999	3.000	3.000	2.997	2.998
Max.	3.044	3.050	3.041	3.037	3.037	3.036	3.038

**3.6 Data Set 2, 105°C, 60mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2647	0.5312	2642	0.0003	0.0004	0.0006	0.0007	0.0007	0.0007
27	0.2606	0.5299	2728	0.0004	0.0004	0.0006	0.0007	0.0009	0.0009
28	0.2602	0.5301	2737	0.0003	0.0004	0.0005	0.0007	0.0007	0.0009
29	0.2626	0.5308	2685	0.0002	0.0004	0.0004	0.0006	0.0007	0.0008
30	0.2659	0.5330	2612	0.0002	0.0004	0.0004	0.0005	0.0005	0.0006
31	0.2649	0.5344	2626	0.0002	0.0004	0.0004	0.0004	0.0005	0.0006
32	0.2568	0.5282	2818	0.0001	0.0004	0.0005	0.0006	0.0006	0.0008
33	0.2585	0.5285	2780	0.0002	0.0004	0.0005	0.0005	0.0006	0.0008
34	0.2625	0.5314	2684	0.0002	0.0003	0.0004	0.0004	0.0005	0.0007
35	0.2621	0.5303	2696	0.0003	0.0005	0.0005	0.0005	0.0007	0.0008
36	0.2630	0.5303	2679	0.0003	0.0004	0.0005	0.0005	0.0006	0.0009
37	0.2612	0.5290	2721	0.0003	0.0004	0.0004	0.0006	0.0007	0.0009
38	0.2624	0.5296	2692	0.0002	0.0005	0.0006	0.0006	0.0007	0.0008
39	0.2593	0.5297	2757	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
40	0.2590	0.5293	2765	0.0004	0.0004	0.0005	0.0005	0.0007	0.0009
41	0.2604	0.5287	2738	0.0002	0.0004	0.0005	0.0006	0.0006	0.0008
42	0.2618	0.5273	2714	0.0002	0.0004	0.0005	0.0006	0.0006	0.0007
43	0.2602	0.5279	2747	0.0003	0.0004	0.0004	0.0006	0.0006	0.0008
44	0.2588	0.5307	2763	0.0004	0.0004	0.0006	0.0007	0.0009	0.0009
45	0.2592	0.5312	2752	0.0003	0.0004	0.0005	0.0006	0.0010	0.0010
46	0.2630	0.5295	2681	0.0004	0.0005	0.0005	0.0007	0.0009	0.0011
47	0.2582	0.5276	2791	0.0004	0.0004	0.0005	0.0006	0.0009	0.0011
48	0.2615	0.5298	2711	0.0003	0.0005	0.0006	0.0007	0.0009	0.0010
49	0.2603	0.5270	2747	0.0002	0.0004	0.0006	0.0006	0.0009	0.0010
50	0.2579	0.5285	2792	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011
Avg.	0.2610	0.5298	2722	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
Med.	0.2606	0.5297	2728	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
st dev	0.0023	0.0017	52	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2568	0.5270	2612	0.0001	0.0003	0.0004	0.0004	0.0005	0.0006
Max.	0.2659	0.5344	2818	0.0004	0.0005	0.0006	0.0007	0.0010	0.0011

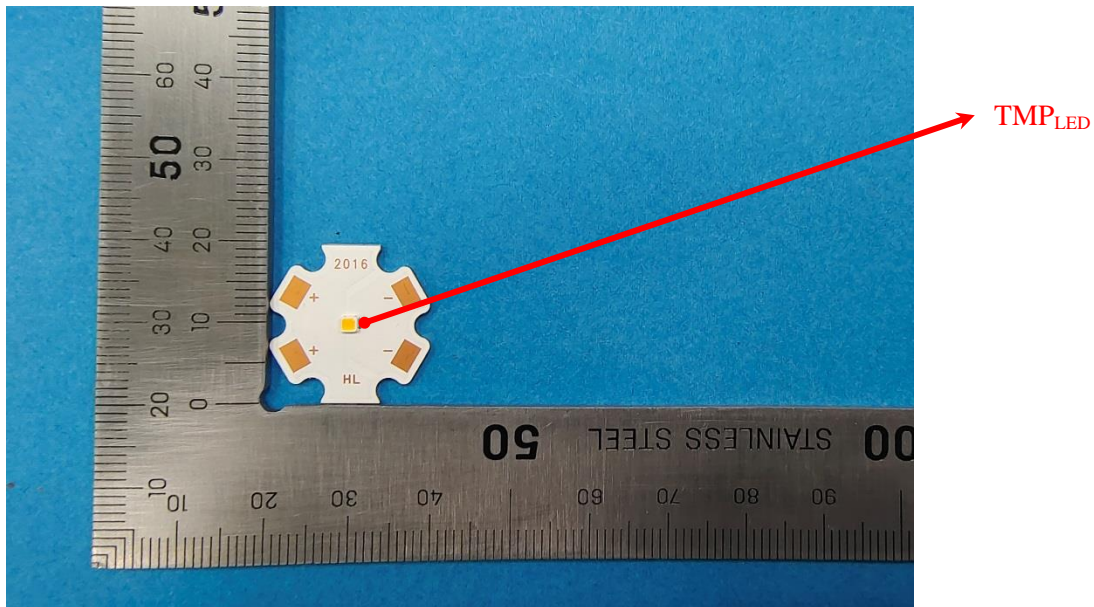
#### 4 - DUT Photo

##### 4.1 Mechanical Dimensions



All dimensions are in millimeter

##### 4.2 DUT Photo



## Directions

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1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor  $K=2$  with the 95% confidence interval.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*