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-A-3014H416W-S1-08HL-HR6

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	SZ2220725-33705E-EE-10000
Test Date:	2022-07-29 to 2023-10-20
Report Date:	2023-10-31
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - General Information

1.1 Description of LED Light Sources#

Sample Size:

50 PCS test samples were in good condition and received on 2022-07-25. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-A-3014H416W-S1-08HL-HR6
Part Type:	LED Package
Drive Level:	DC 30mA
Nominal CCT:	2700K
Power:	0.102W
Average Current Density per LED die:	387.5mA/mm^2
Average Power Density per LED die:	1.318W/mm^2
CRI:	95
Die Spacing:	N/A

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® 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® Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model Type	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^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
Test model	HL-A-3014H416W-S1-08HL-HR6	95	30	0.102	2700	1	30	387.5	0.0476	/
Multiple model	HL-A-3014H***W-S1-08**-HR*-***	>90	30	0.102	2700-6500	1	30	387.5	0.0476	/
	HL-A-3014H***W-S1-08**-HR*(R9)-***	>90	30	0.102	2700-6500	1	30	387.5	0.0476	/
	HL-A-3014D***W-S1-08**-HR*-***	>90	30	0.102	2700-6500	1	30	387.5	0.0476	/
	HL-A-3014D***W-S1-08**-HR*(R9)-***	>90	30	0.102	2700-6500	1	30	387.5	0.0476	/

Note: The model name begins with "HL", such as “HL-A-3014H***W-S1-08**-HR*-***”, " *" is described in detail as follows:

1. The first “***” is the number from 1 to 999 which stands for the brightness level.
2. The second “**” is the letter HL or None which stands for the bonding wire style.
3. The third “*” is the number 5 or 6 which stands for the CRI style
4. The fourth “***” is the letter which stands for the customer code.

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® 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
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2022-11-18	2023-11-17
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2022-11-18	2023-11-17
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D062	1011093	2023-05-12	2025-05-11
Multilayer aging machine	BACL	B2-270	20015	2022-11-18	2023-11-17
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-60-03	N/A	2022-11-18	2023-11-17

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 ±3% of the specified value of the manufacturer during maintenance test, and was within ±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°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°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 ±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°C ± 2°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'. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°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°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, 30mA

Part Number:	HL-A-3014H416W-S1-08HL-HR6
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	30mA
Measurement Current:	30mA

Data Set 2: 85°C, 30mA

Part Number:	HL-A-3014H416W-S1-08HL-HR6
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	30mA
Measurement Current:	30mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime
1	25	0	1000hrs	10000hrs	1.994E-06	1.004	>60000 hours
2	25	0	1000hrs	10000hrs	2.376E-06	1.005	>60000 hours

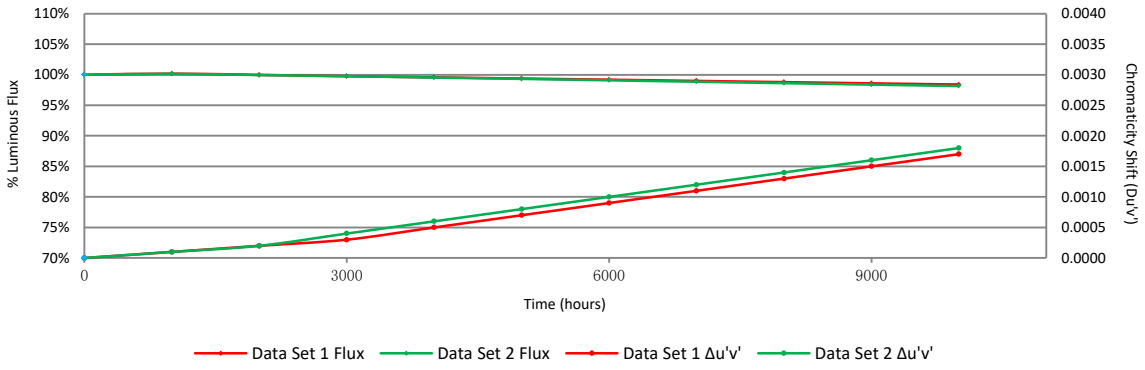
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.18%	99.97%	99.76%	99.57%	99.38%	99.19%	98.99%	98.79%	98.59%	98.40%
2	100.14%	99.95%	99.76%	99.54%	99.32%	99.09%	98.85%	98.62%	98.38%	98.15%

Average Chromaticity Shift

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.0001	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017
2	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018

Average Lumen Maintenance and Chromaticity Shift VS. Time



**: The items tested by Bay Area Compliance Laboratories Corp. (Shenzhen) and covered by NVLAP accreditation, the reference report No. is SZ2220725-33705E-EE-6000 (test Date: 2022-07-29 to 2023-04-05).

Bay Area Compliance Laboratories Corp. (Shenzhen) is EPA-Recognized Laboratories and the ORG ID: 1105318

3 - Test Data

3.1 Data Set 1, 55°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	9.732	100.21	99.90	99.75	99.57	99.47	99.28	99.14	99.04	98.87	98.58
2	9.767	100.22	100.02	99.92	99.75	99.62	99.51	99.17	98.95	98.85	98.75
3	9.676	100.27	100.19	99.87	99.76	99.67	99.51	99.39	99.15	98.88	98.72
4	9.840	100.32	100.11	99.91	99.66	99.40	99.24	99.15	98.99	98.89	98.67
5	9.794	100.30	100.13	99.99	99.71	99.58	99.39	99.06	98.81	98.51	98.14
6	9.484	100.27	99.98	99.79	99.53	99.33	99.19	99.07	98.83	98.65	98.51
7	9.425	100.33	100.07	99.78	99.55	99.30	99.01	98.82	98.65	98.48	98.33
8	9.716	100.19	99.86	99.77	99.61	99.41	99.10	98.84	98.62	98.27	98.02
9	9.733	100.15	99.82	99.65	99.55	99.29	98.97	98.86	98.55	98.38	98.20
10	9.692	100.03	99.87	99.75	99.58	99.47	99.37	99.16	98.94	98.72	98.41
11	9.538	100.04	99.85	99.67	99.49	99.36	99.27	99.06	98.89	98.63	98.35
12	9.560	100.20	100.02	99.80	99.54	99.30	99.18	98.94	98.76	98.49	98.41
13	9.754	100.21	100.03	99.85	99.57	99.29	99.10	99.00	98.70	98.54	98.38
14	9.826	100.20	99.84	99.65	99.39	99.11	98.84	98.61	98.42	98.28	98.13
15	9.742	100.32	100.10	99.76	99.52	99.27	99.16	98.88	98.52	98.36	98.08
16	9.568	100.11	100.03	99.81	99.70	99.60	99.39	99.10	98.80	98.51	98.41
17	9.521	100.36	100.20	99.89	99.66	99.47	99.34	99.17	99.09	98.81	98.68
18	9.746	100.19	100.01	99.87	99.70	99.44	99.20	99.07	98.95	98.84	98.69
19	9.738	100.11	99.95	99.66	99.47	99.31	99.08	98.78	98.58	98.47	98.31
20	9.571	100.06	99.98	99.79	99.50	99.31	99.13	98.84	98.59	98.27	98.15
21	9.739	100.02	99.75	99.57	99.41	99.25	99.02	98.93	98.72	98.42	98.27
22	9.841	100.02	99.85	99.49	99.26	99.12	98.96	98.80	98.63	98.52	98.25
23	9.776	100.05	99.91	99.54	99.48	99.21	99.02	98.83	98.70	98.60	98.43
24	9.433	100.11	99.85	99.73	99.62	99.37	99.12	98.95	98.74	98.59	98.36
25	9.613	100.10	99.92	99.80	99.62	99.52	99.30	99.19	99.13	98.95	98.76
Avg.	9.673	100.18	99.97	99.76	99.57	99.38	99.19	98.99	98.79	98.59	98.40
Med.	9.732	100.19	99.98	99.78	99.57	99.36	99.18	99.00	98.76	98.54	98.38
st dev	0.126	0.11	0.12	0.12	0.12	0.15	0.17	0.18	0.20	0.21	0.22
Min.	9.425	100.02	99.75	99.49	99.26	99.11	98.84	98.61	98.42	98.27	98.02
Max.	9.841	100.36	100.20	99.99	99.76	99.67	99.51	99.39	99.15	98.95	98.76

3.2 Data Set 1, 55°C, 30mA (Forward Voltage)

No.	Forward Voltage (V)										
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	2.913	2.919	2.915	2.916	2.919	2.906	2.914	2.909	2.907	2.903	2.916
2	2.919	2.915	2.922	2.918	2.900	2.923	2.900	2.909	2.908	2.908	2.901
3	2.916	2.934	2.919	2.917	2.907	2.914	2.916	2.906	2.902	2.905	2.913
4	2.913	2.911	2.914	2.901	2.916	2.906	2.914	2.912	2.906	2.908	2.916
5	2.909	2.919	2.909	2.902	2.927	2.908	2.912	2.904	2.900	2.917	2.908
6	2.904	2.913	2.905	2.902	2.900	2.929	2.902	2.916	2.903	2.925	2.904
7	2.906	2.924	2.907	2.916	2.913	2.925	2.913	2.926	2.918	2.919	2.909
8	2.909	2.916	2.909	2.908	2.906	2.919	2.911	2.901	2.909	2.900	2.900
9	2.906	2.917	2.907	2.904	2.900	2.918	2.910	2.904	2.900	2.903	2.906
10	2.910	2.914	2.912	2.916	2.918	2.919	2.912	2.916	2.916	2.917	2.920
11	2.905	2.909	2.906	2.904	2.917	2.909	2.919	2.906	2.917	2.900	2.923
12	2.919	2.918	2.921	2.905	2.908	2.903	2.919	2.917	2.910	2.901	2.901
13	2.906	2.921	2.909	2.915	2.900	2.900	2.918	2.909	2.907	2.901	2.910
14	2.912	2.922	2.915	2.911	2.901	2.918	2.905	2.903	2.907	2.903	2.916
15	2.922	2.925	2.926	2.903	2.908	2.922	2.902	2.905	2.905	2.920	2.912
16	2.907	2.911	2.911	2.910	2.902	2.904	2.907	2.915	2.905	2.911	2.903
17	2.903	2.905	2.905	2.912	2.906	2.917	2.906	2.917	2.903	2.906	2.905
18	2.909	2.912	2.912	2.906	2.900	2.901	2.914	2.904	2.903	2.900	2.905
19	2.915	2.921	2.921	2.906	2.904	2.908	2.914	2.905	2.900	2.916	2.912
20	2.910	2.913	2.914	2.913	2.909	2.910	2.911	2.909	2.904	2.905	2.918
21	2.911	2.919	2.912	2.906	2.906	2.917	2.907	2.916	2.926	2.914	2.912
22	2.911	2.916	2.912	2.918	2.909	2.901	2.914	2.903	2.911	2.913	2.909
23	2.909	2.911	2.911	2.901	2.908	2.902	2.902	2.923	2.908	2.902	2.916
24	2.918	2.918	2.923	2.906	2.928	2.911	2.911	2.909	2.900	2.909	2.919
25	2.915	2.913	2.919	2.904	2.928	2.914	2.909	2.915	2.919	2.902	2.913
Avg.	2.911	2.917	2.913	2.909	2.910	2.912	2.910	2.910	2.908	2.908	2.911
Med.	2.910	2.916	2.912	2.906	2.908	2.911	2.911	2.909	2.907	2.906	2.912
st dev	0.005	0.006	0.006	0.006	0.009	0.008	0.005	0.007	0.007	0.007	0.006
Min.	2.903	2.905	2.905	2.901	2.900	2.900	2.900	2.901	2.900	2.900	2.900
Max.	2.922	2.934	2.926	2.918	2.928	2.929	2.919	2.926	2.926	2.925	2.923

3.3 Data Set 1, 55°C, 30mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	**0hr(Initial)			**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2591	0.5334	2745	0.0001	0.0002	0.0004	0.0005	0.0007	0.0009	0.0010	0.0013	0.0017	0.0019
2	0.2567	0.5292	2816	0.0001	0.0002	0.0004	0.0005	0.0008	0.0009	0.0011	0.0014	0.0016	0.0018
3	0.2585	0.5309	2768	0.0001	0.0002	0.0003	0.0005	0.0007	0.0008	0.0010	0.0014	0.0017	0.0019
4	0.2586	0.5332	2757	0.0002	0.0003	0.0003	0.0005	0.0006	0.0009	0.0010	0.0013	0.0016	0.0019
5	0.2577	0.5326	2778	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019
6	0.2586	0.5310	2765	0.0001	0.0002	0.0002	0.0002	0.0004	0.0008	0.0009	0.0012	0.0013	0.0015
7	0.2594	0.5315	2747	0.0001	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0014	0.0015	0.0016
8	0.2610	0.5332	2708	0.0001	0.0002	0.0003	0.0007	0.0007	0.0010	0.0011	0.0015	0.0015	0.0016
9	0.2591	0.5325	2750	0.0002	0.0003	0.0004	0.0005	0.0006	0.0009	0.0010	0.0013	0.0015	0.0016
10	0.2592	0.5314	2752	0.0001	0.0002	0.0003	0.0004	0.0005	0.0009	0.0010	0.0013	0.0014	0.0016
11	0.2620	0.5319	2693	0.0001	0.0002	0.0002	0.0004	0.0006	0.0009	0.0011	0.0011	0.0014	0.0016
12	0.2608	0.5315	2718	0.0001	0.0002	0.0002	0.0004	0.0006	0.0009	0.0011	0.0011	0.0014	0.0015
13	0.2572	0.5295	2803	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0012	0.0011	0.0014	0.0016
14	0.2573	0.5322	2789	0.0001	0.0002	0.0004	0.0004	0.0007	0.0008	0.0011	0.0011	0.0013	0.0015
15	0.2574	0.5305	2794	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010	0.0011	0.0015	0.0017
16	0.2603	0.5302	2734	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0009	0.0010	0.0014	0.0016
17	0.2566	0.5301	2813	0.0001	0.0002	0.0002	0.0004	0.0005	0.0005	0.0007	0.0009	0.0011	0.0013
18	0.2581	0.5329	2768	0.0001	0.0002	0.0002	0.0004	0.0005	0.0006	0.0009	0.0010	0.0012	0.0014
19	0.2596	0.5311	2745	0.0001	0.0002	0.0002	0.0004	0.0007	0.0009	0.0009	0.0011	0.0012	0.0015
20	0.2605	0.5329	2719	0.0001	0.0002	0.0003	0.0004	0.0008	0.0009	0.0009	0.0009	0.0011	0.0014
21	0.2594	0.5316	2746	0.0001	0.0002	0.0004	0.0004	0.0008	0.0011	0.0012	0.0012	0.0016	0.0018
22	0.2585	0.5313	2767	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0014	0.0013	0.0016	0.0019
23	0.2581	0.5311	2776	0.0001	0.0002	0.0002	0.0004	0.0009	0.0012	0.0013	0.0014	0.0015	0.0018
24	0.2616	0.5312	2704	0.0001	0.0002	0.0002	0.0004	0.0009	0.0011	0.0016	0.0015	0.0014	0.0017
25	0.2587	0.5331	2755	0.0001	0.0002	0.0002	0.0007	0.0009	0.0012	0.0013	0.0016	0.0017	0.0018
Avg.	0.2590	0.5316	2756	0.0001	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017
Med.	0.2587	0.5315	2755	0.0001	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0016
st dev	0.0015	0.0012	33	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2566	0.5292	2693	0.0001	0.0002	0.0002	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013
Max.	0.2620	0.5334	2816	0.0002	0.0003	0.0004	0.0007	0.0009	0.0012	0.0016	0.0016	0.0017	0.0019

3.4 Data Set 2, 85°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	9.525	100.25	100.08	99.93	99.64	99.41	99.20	99.04	98.79	98.65	98.36
27	9.764	100.18	99.97	99.76	99.59	99.37	99.18	99.02	98.62	98.32	98.13
28	9.743	100.10	99.78	99.60	99.24	99.07	98.80	98.49	98.33	98.15	97.99
29	9.729	99.95	99.87	99.72	99.48	99.23	98.94	98.73	98.57	98.28	97.96
30	9.678	100.25	99.98	99.60	99.26	99.06	98.82	98.65	98.46	98.19	98.02
31	9.686	100.27	100.03	99.86	99.74	99.64	99.45	99.18	98.80	98.61	98.40
32	9.724	100.10	99.77	99.59	99.30	99.16	98.97	98.78	98.56	98.28	98.16
33	9.605	99.96	99.86	99.74	99.70	99.43	99.30	99.16	98.83	98.52	98.38
34	9.558	99.96	99.90	99.82	99.67	99.48	99.15	98.89	98.62	98.33	98.01
35	9.705	100.33	100.06	99.79	99.42	99.17	98.90	98.72	98.52	98.29	98.01
36	9.535	100.21	100.02	99.66	99.42	99.26	99.02	98.83	98.67	98.36	98.06
37	9.792	100.12	100.06	99.87	99.72	99.41	99.26	98.98	98.83	98.49	98.33
38	9.795	100.29	100.02	99.64	99.51	99.13	98.89	98.70	98.53	98.25	98.03
39	9.611	100.24	100.03	99.76	99.40	99.02	98.92	98.66	98.41	98.22	97.89
40	9.636	100.22	99.91	99.64	99.46	99.28	99.06	98.84	98.66	98.46	98.19
41	9.503	100.29	99.98	99.74	99.64	99.40	99.06	98.91	98.63	98.30	98.15
42	9.899	100.17	99.87	99.75	99.40	99.28	99.02	98.81	98.66	98.43	98.15
43	9.690	100.10	99.92	99.81	99.68	99.57	99.25	98.89	98.68	98.34	98.15
44	9.669	100.09	100.01	99.74	99.56	99.31	99.14	98.90	98.74	98.52	98.29
45	9.570	100.07	100.03	99.94	99.79	99.54	99.40	99.26	99.00	98.69	98.60
46	9.611	99.89	99.76	99.69	99.57	99.51	99.21	99.04	98.71	98.46	98.22
47	9.693	100.11	100.04	99.88	99.63	99.38	99.08	98.73	98.38	98.14	97.91
48	9.753	100.02	99.97	99.76	99.59	99.26	99.11	98.74	98.64	98.53	98.44
49	9.511	99.93	99.98	99.86	99.50	99.23	98.90	98.61	98.35	98.25	97.97
50	9.599	100.27	99.96	99.77	99.60	99.39	99.08	98.72	98.54	98.33	98.01
Avg.	9.663	100.14	99.95	99.76	99.54	99.32	99.09	98.85	98.62	98.38	98.15
Med.	9.678	100.12	99.98	99.76	99.57	99.31	99.08	98.83	98.63	98.33	98.15
st dev	0.101	0.13	0.09	0.10	0.15	0.16	0.17	0.19	0.16	0.15	0.19
Min.	9.503	99.89	99.76	99.59	99.24	99.02	98.80	98.49	98.33	98.14	97.89
Max.	9.899	100.33	100.08	99.94	99.79	99.64	99.45	99.26	99.00	98.69	98.60

3.5 Data Set 2, 85°C, 30mA (Forward Voltage)

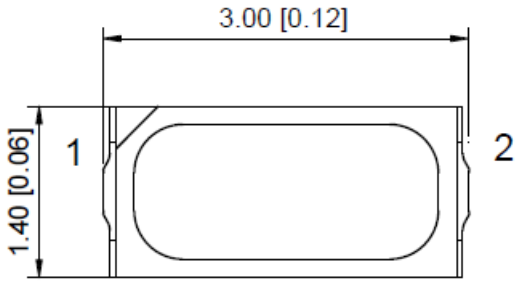
No.	Forward Voltage (V)										
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	2.910	2.919	2.913	2.902	2.914	2.919	2.903	2.919	2.937	2.914	2.904
27	2.916	2.929	2.921	2.916	2.917	2.917	2.912	2.913	2.911	2.917	2.910
28	2.915	2.915	2.919	2.931	2.915	2.919	2.936	2.915	2.914	2.918	2.903
29	2.912	2.928	2.917	2.918	2.914	2.911	2.928	2.912	2.911	2.910	2.914
30	2.905	2.915	2.908	2.917	2.910	2.905	2.917	2.911	2.936	2.916	2.903
31	2.907	2.919	2.912	2.901	2.916	2.917	2.912	2.908	2.912	2.916	2.907
32	2.919	2.924	2.924	2.915	2.920	2.930	2.914	2.913	2.910	2.915	2.903
33	2.913	2.917	2.916	2.910	2.915	2.913	2.916	2.917	2.922	2.916	2.922
34	2.906	2.910	2.910	2.911	2.909	2.904	2.904	2.900	2.939	2.919	2.939
35	2.934	2.940	2.939	2.927	2.910	2.902	2.914	2.917	2.936	2.911	2.912
36	2.912	2.923	2.916	2.919	2.921	2.914	2.912	2.916	2.930	2.918	2.901
37	2.933	2.938	2.937	2.929	2.906	2.927	2.900	2.926	2.938	2.918	2.916
38	2.933	2.936	2.937	2.914	2.919	2.921	2.918	2.926	2.921	2.911	2.914
39	2.910	2.914	2.914	2.907	2.908	2.914	2.918	2.901	2.917	2.910	2.907
40	2.916	2.920	2.920	2.926	2.918	2.921	2.919	2.925	2.919	2.912	2.927
41	2.913	2.917	2.919	2.932	2.904	2.911	2.918	2.912	2.921	2.910	2.914
42	2.922	2.921	2.921	2.910	2.912	2.913	2.917	2.900	2.919	2.916	2.905
43	2.920	2.919	2.920	2.917	2.901	2.918	2.907	2.915	2.901	2.915	2.903
44	2.909	2.912	2.910	2.918	2.913	2.910	2.931	2.918	2.901	2.906	2.908
45	2.922	2.924	2.924	2.922	2.926	2.925	2.919	2.921	2.922	2.921	2.923
46	2.922	2.923	2.923	2.924	2.922	2.915	2.926	2.922	2.928	2.928	2.924
47	2.916	2.917	2.919	2.906	2.919	2.919	2.937	2.902	2.923	2.900	2.905
48	2.919	2.917	2.919	2.916	2.907	2.912	2.917	2.922	2.935	2.909	2.912
49	2.912	2.912	2.913	2.919	2.906	2.930	2.914	2.907	2.901	2.905	2.917
50	2.918	2.919	2.921	2.930	2.908	2.928	2.919	2.915	2.906	2.919	2.935
Avg.	2.917	2.921	2.920	2.917	2.913	2.917	2.917	2.914	2.920	2.914	2.913
Med.	2.916	2.919	2.919	2.917	2.914	2.917	2.917	2.915	2.921	2.915	2.912
st dev	0.008	0.008	0.008	0.009	0.006	0.008	0.009	0.008	0.012	0.006	0.010
Min.	2.905	2.910	2.908	2.901	2.901	2.902	2.900	2.900	2.901	2.900	2.901
Max.	2.934	2.940	2.939	2.932	2.926	2.930	2.937	2.926	2.939	2.928	2.939

3.6 Data Set 2, 85°C, 30mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	**0hr(Initial)			**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	0.2603	0.5322	2726	0.0001	0.0002	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019
27	0.2592	0.5331	2744	0.0001	0.0002	0.0007	0.0006	0.0006	0.0009	0.0013	0.0014	0.0016	0.0017
28	0.2598	0.5335	2731	0.0002	0.0003	0.0004	0.0007	0.0007	0.0008	0.0014	0.0015	0.0017	0.0019
29	0.2595	0.5329	2739	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0019
30	0.2610	0.5328	2709	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019
31	0.2611	0.5331	2706	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0014	0.0016
32	0.2601	0.5325	2728	0.0001	0.0002	0.0003	0.0005	0.0008	0.0009	0.0010	0.0011	0.0014	0.0015
33	0.2589	0.5328	2751	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0009	0.0010	0.0013	0.0014
34	0.2599	0.5323	2734	0.0001	0.0002	0.0004	0.0006	0.0008	0.0009	0.0012	0.0012	0.0014	0.0015
35	0.2593	0.5335	2741	0.0001	0.0002	0.0003	0.0003	0.0005	0.0008	0.0009	0.0010	0.0013	0.0014
36	0.2593	0.5302	2755	0.0001	0.0002	0.0004	0.0004	0.0006	0.0009	0.0009	0.0011	0.0014	0.0015
37	0.2562	0.5315	2816	0.0001	0.0002	0.0002	0.0002	0.0005	0.0008	0.0009	0.0010	0.0014	0.0017
38	0.2586	0.5321	2762	0.0001	0.0002	0.0003	0.0003	0.0003	0.0008	0.0010	0.0012	0.0015	0.0019
39	0.2598	0.5314	2740	0.0001	0.0002	0.0003	0.0003	0.0003	0.0007	0.0010	0.0012	0.0014	0.0019
40	0.2581	0.5317	2774	0.0001	0.0002	0.0005	0.0006	0.0009	0.0009	0.0009	0.0012	0.0014	0.0018
41	0.2587	0.5309	2765	0.0001	0.0002	0.0004	0.0006	0.0007	0.0010	0.0010	0.0011	0.0014	0.0018
42	0.2577	0.5331	2777	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011	0.0011	0.0013	0.0015	0.0017
43	0.2583	0.5321	2767	0.0002	0.0003	0.0005	0.0006	0.0007	0.0010	0.0012	0.0016	0.0017	0.0018
44	0.2589	0.5319	2756	0.0001	0.0002	0.0004	0.0005	0.0008	0.0011	0.0012	0.0017	0.0020	0.0021
45	0.2623	0.5315	2688	0.0001	0.0002	0.0004	0.0004	0.0008	0.0011	0.0013	0.0017	0.0018	0.0021
46	0.2617	0.5321	2697	0.0001	0.0002	0.0004	0.0007	0.0010	0.0014	0.0015	0.0016	0.0019	0.0021
47	0.2590	0.5331	2750	0.0001	0.0002	0.0004	0.0008	0.0010	0.0012	0.0016	0.0018	0.0020	0.0022
48	0.2579	0.5331	2771	0.0001	0.0002	0.0003	0.0008	0.0011	0.0012	0.0016	0.0017	0.0020	0.0021
49	0.2613	0.5321	2705	0.0001	0.0002	0.0004	0.0008	0.0012	0.0012	0.0013	0.0016	0.0018	0.0018
50	0.2618	0.5323	2696	0.0002	0.0003	0.0005	0.0009	0.0014	0.0016	0.0017	0.0019	0.0021	0.0021
Avg.	0.2595	0.5323	2741	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018
Med.	0.2593	0.5323	2741	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018
st dev	0.0014	0.0008	30	0.0000	0.0000	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002
Min.	0.2562	0.5302	2688	0.0001	0.0002	0.0002	0.0002	0.0003	0.0007	0.0009	0.0010	0.0013	0.0014
Max.	0.2623	0.5335	2816	0.0002	0.0003	0.0007	0.0009	0.0014	0.0016	0.0017	0.0019	0.0021	0.0022

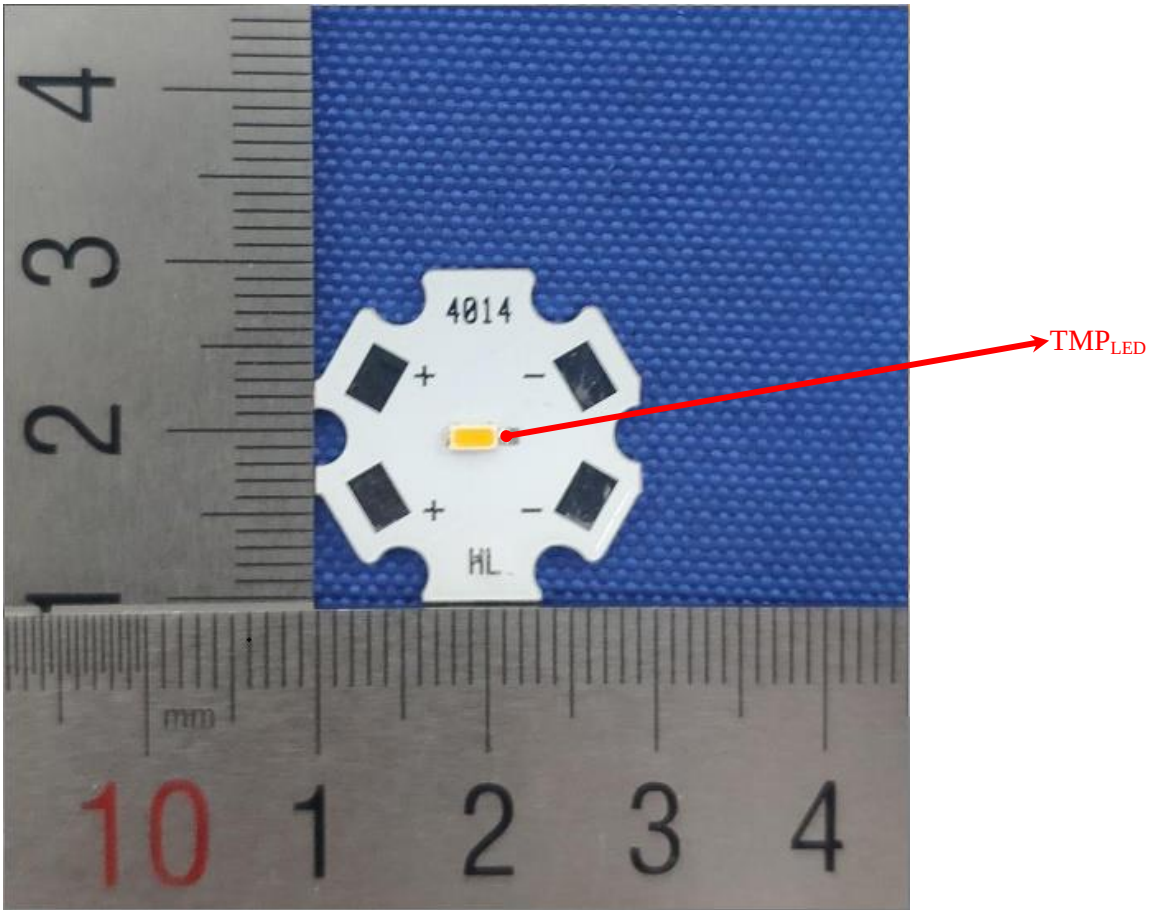
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



Directions

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**********