SEOUL SEMICONDUCTOR

IES LM-80-08 TEST REPORT

Measuring Lumen Maintenance of LED Light Sources

Manufacturer : Seoul Semiconductor Co., Ltd.

1B-25, 727, Wonsi-dong, Danwon-gu, Ansan-city, Gyeonggi-do, Korea

Classification : LED Package

Test Sample : 5630D (STWxQ14D)

Test Date : Apr. 18, 2014 ~ Jan. 26, 2015

Report Date : Feb. 02, 2015

Report Number : I-140410-05-K-01

Revision Number : 01

Tested by		Reviewed by	
In Hoi Sim	(signature)	Jung Hee Lee	(signature)
Engineer		Technical Manager	

The above test certificate is the accredited test results by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA

SEOUL SEMICONDUCTOR CO., LTD

Accredited by KOLAS, Republic of KOREA

1. Summary

1.1 Test Results

Items	Condition 1	Condition 2	Condition 3
Required Temperature	55 ℃	85 ℃	105 ℃
Number of LED light sources tested (ea)	25	25	25
Test Duration (h)	6 000	6 000	6 000
Drive Current (mA)	150	150	150
Actual Case Temperature (℃)	54.3	84.2	105.1
Actual Ambient Temperature (℃)	52.1	82.5	101.5
Air flow velocity (m/s)	0.89	0.85	0.83
Average Initial Luminous Flux (lm)	55.409	55.998	55.800
Average Initial CCT (K)	2 677	2 673	2 679
Average Initial Volatge (V)	3.07	3.07	3.07
Average Lumen maintenance (%)	99.4	98.1	97.2
Average Chromaticity Shift	0.000 7	0.001 0	0.001 3

※ The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full.

2. General Information : IES LM-80-08 Test Report Requirement

2.1 Number of LED Light Sources tested

- 25 Packages tested at actual case temperature 54.3 ℃
- 25 Packages tested at actual case temperature 84.2 ℃
- 25 Packages tested at actual case temperature 105.1 ℃

2.2 Description of LED light Sources

- LED Package Part Number : STW8Q14D
- LED Forward Current [IF] : 150 mA
- LED Package Dimension : 5.6 mm X 3.0 mm

2.3 Description of Auxiliary equipment

- Temperature controlling chamber for LED package/array/module consists of the water cooling heat-sink plates to control the case temperature of each device and of the power supply required by LM-80 test conditions.

- Photometric measurement tester for LED package/array/module consists of the integrating sphere with temperature controlling system(TEC) and of programmable current source meter.

2.4 Operating Cycle

- Drive Current : 150 mA
- Typical Voltage : 3.07 V

  All tested LED packages are driven with a constant direct current.

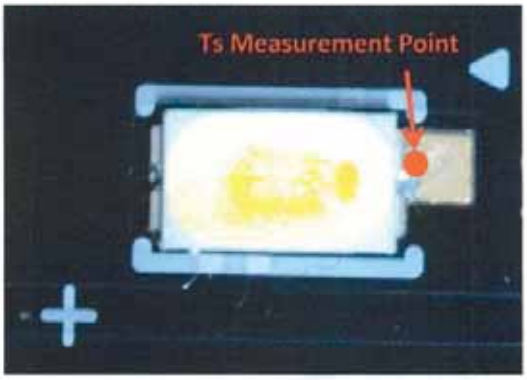
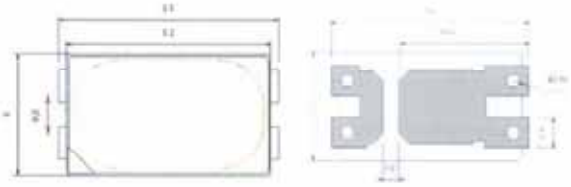
2.5 Ambient conditions including airflow, temperature and relative humidity

- Controlled ambient conditions

Ambient temperature	- 5 ℃
Air flow velocity	< 1 m/s
Relative humidity	< 65 RH

2.6 Case Temperature (Test Point temperature)

- LED temperature measurement point is shown in the picture below.

Case Temperature Measurement Point	Package Dimension
	

2.7 Drive Current of the LED light source during lifetime test

- See the Test Data No. 1, 2 and 3

2.8 Lumen maintenance data for each individual LED light source

- See the Test Data No. 1, 2 and 3

2.9 Observation of LED light source failures

- No failures

2.10 LED Light source monitoring interval

- All tested package measurement at each case temperature conditions have 1 000 h interval.
  0, 1 000, 2 000, 3 000, 4 000, 5 000, 6 000, 7 000, 8 000, 9 000 and 10 000 h

2.11 Photometric measurement uncertainty

- Seoul Semiconductor maintain a tolerance of ± 3.0 % on flux measurements for LM-80 testing

2.12 Chromaticity shift over the measurement time

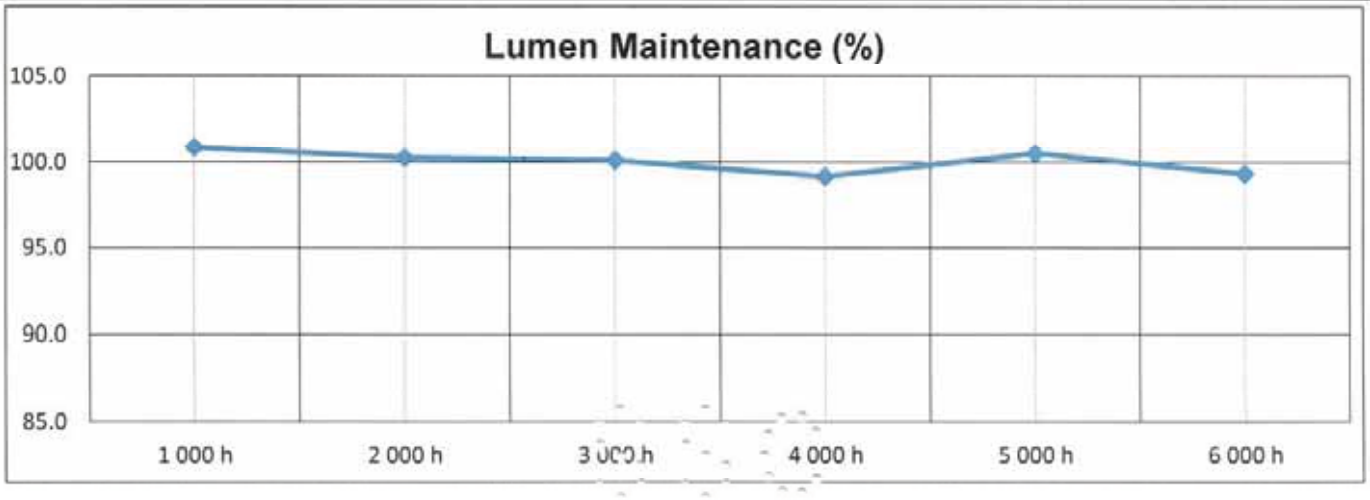
- See the Test Data No. 1, 2 and 3

3. Test Data

3.1 Condition 1 : [Ts = 55 ℃]

[LUMEN MAINTENANCE]

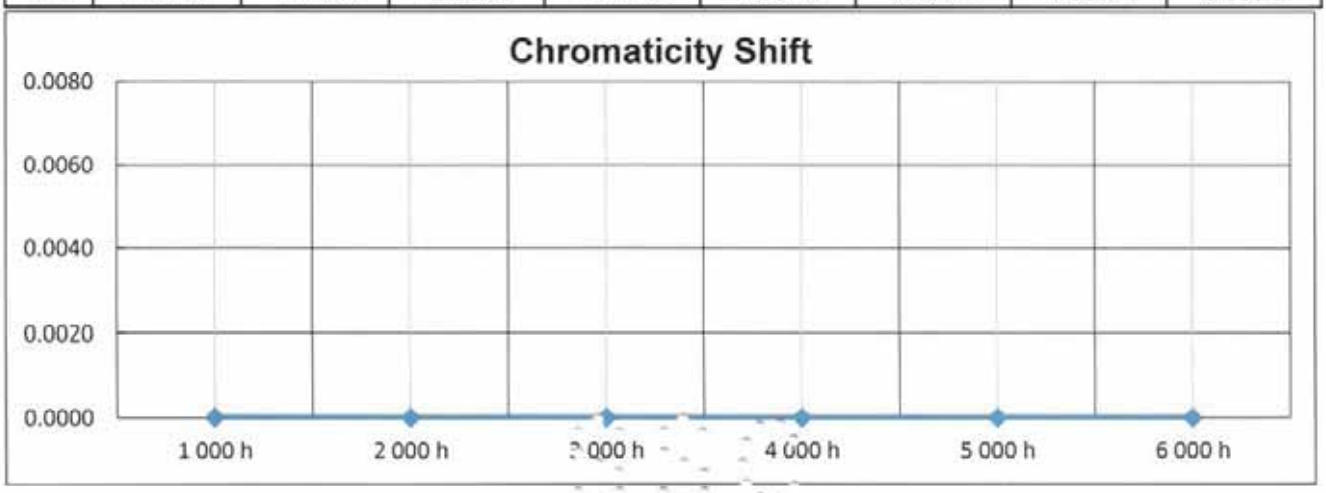
No.	Vf(V)	Flux(lm)	CCT(K)	Lumen Maintenance (%)					
	0 h			1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3.08	55.184	2 675	100.4	99.9	99.7	98.6	100.2	98.6
2	3.07	56.038	2 700	100.5	100.0	99.8	98.5	100.7	99.3
3	3.07	55.823	2 690	100.3	99.8	99.6	98.7	100.3	98.7
4	3.06	55.985	2 699	100.4	99.6	99.6	98.6	100.1	98.8
5	3.06	56.149	2 683	100.6	100.1	99.8	98.4	100.4	99.0
6	3.05	55.174	2 676	100.3	100.1	99.5	98.8	99.7	97.9
7	3.07	55.954	2 678	100.3	100.0	99.7	98.4	100.3	99.0
8	3.06	55.502	2 681	100.5	100.0	99.8	98.6	100.5	99.1
9	3.07	56.126	2 675	100.9	100.4	100.1	98.8	100.8	99.4
10	3.06	55.112	2 675	100.5	100.2	99.9	98.6	100.6	99.0
11	3.07	56.158	2 698	100.3	100.1	99.8	98.8	100.6	99.3
12	3.07	55.956	2 663	100.4	100.2	99.9	98.7	100.5	99.5
13	3.08	55.571	2 701	100.1	100.0	99.7	98.5	99.7	98.5
14	3.06	54.361	2 677	101.6	99.9	99.5	98.9	100.0	98.7
15	3.06	54.581	2 654	101.3	100.4	100.4	99.7	100.4	99.5
16	3.07	55.339	2 673	101.5	100.7	100.8	100.1	101.1	100.1
17	3.07	54.946	2 678	101.4	100.3	100.2	99.7	100.5	99.9
18	3.06	54.993	2 668	101.4	100.7	100.6	99.9	100.8	100.0
19	3.07	55.569	2 669	101.3	100.6	100.5	99.8	100.8	99.8
20	3.07	54.909	2 651	101.3	100.6	100.6	100.0	100.8	99.8
21	3.07	55.010	2 651	101.5	100.8	100.8	100.1	101.0	100.2
22	3.06	54.363	2 656	101.5	100.8	100.8	100.2	101.0	100.3
23	3.08	55.657	2 701	101.6	100.9	101.0	100.3	101.3	100.6
24	3.08	55.635	2 675	101.2	100.6	100.9	100.1	101.1	99.7
25	3.09	54.779	2 687	101.3	100.7	100.7	99.8	100.8	100.2
Max.	3.09	56.158	2 701	101.6	100.9	101.0	100.3	101.3	100.6
Ave.	3.07	55.395	2 677	100.9	100.3	100.1	99.2	100.6	99.4
Min.	3.05	54.361	2 651	100.1	99.6	99.5	98.4	99.7	97.9
Med.	3.07	55.502	2 676	100.9	100.2	99.9	98.8	100.6	99.4
Std.	0.01	0.561	15	0.5	0.3	0.5	0.7	0.4	0.7



SEOUL SEMICONDUCTOR

[CHROMATICITY SHIFT]

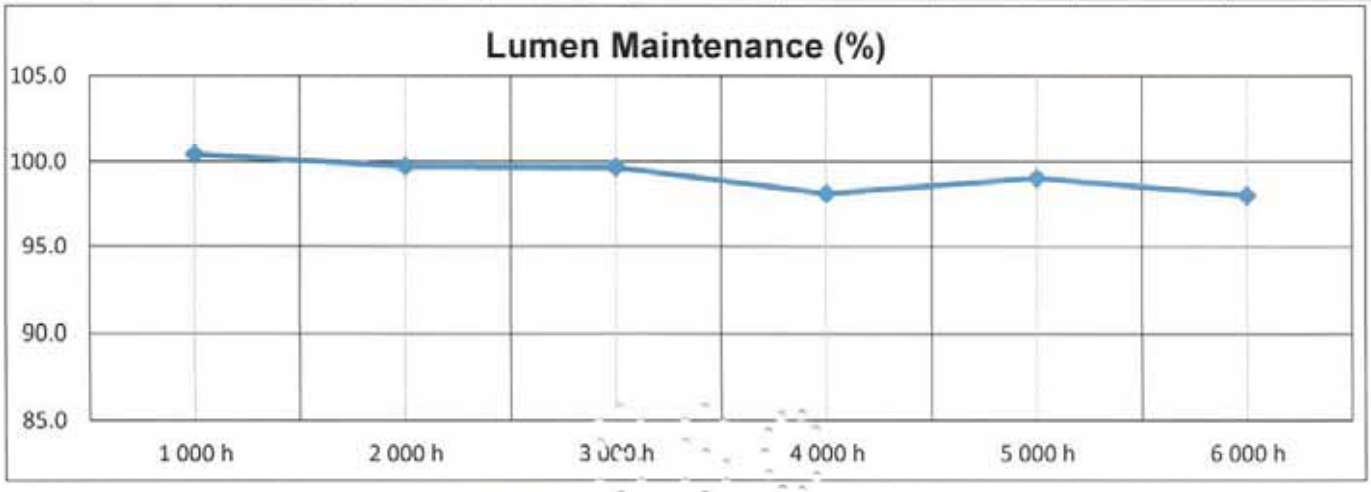
No.	u'	v'	Chromaticity Shift					
	0 h		1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	0.265 2	0.522 7	0.000 4	0.000 7	0.001 0	0.001 0	0.001 2	0.000 8
2	0.264 1	0.522 4	0.000 3	0.000 5	0.000 7	0.001 0	0.001 0	0.000 8
3	0.264 3	0.523 7	0.000 2	0.000 4	0.000 9	0.001 0	0.001 1	0.000 8
4	0.264 1	0.522 8	0.000 3	0.000 6	0.000 8	0.000 9	0.001 2	0.000 7
5	0.264 8	0.523 3	0.000 2	0.000 4	0.000 6	0.000 8	0.000 9	0.000 5
6	0.265 1	0.523 2	0.000 2	0.000 4	0.000 8	0.000 9	0.001 1	0.000 6
7	0.265 1	0.523 0	0.000 2	0.000 4	0.000 8	0.000 7	0.000 8	0.000 5
8	0.265 0	0.522 7	0.000 4	0.000 5	0.000 7	0.001 0	0.001 3	0.000 8
9	0.265 2	0.523 3	0.000 2	0.000 5	0.000 6	0.000 7	0.000 9	0.000 6
10	0.265 3	0.522 4	0.000 3	0.000 4	0.000 5	0.000 7	0.000 9	0.000 5
11	0.264 2	0.522 4	0.000 1	0.000 2	0.000 5	0.000 8	0.000 9	0.000 4
12	0.265 4	0.525 4	0.000 4	0.000 3	0.000 7	0.001 0	0.000 9	0.000 6
13	0.264 1	0.522 1	0.000 4	0.000 5	0.000 6	0.000 7	0.000 7	0.000 5
14	0.264 8	0.524 6	0.000 9	0.001 0	0.001 5	0.001 4	0.001 7	0.001 2
15	0.266 1	0.523 7	0.000 4	0.000 4	0.001 0	0.001 2	0.001 4	0.001 2
16	0.265 1	0.523 9	0.000 4	0.000 4	0.000 9	0.000 9	0.001 1	0.000 6
17	0.265 2	0.522 0	0.000 7	0.000 6	0.001 0	0.001 0	0.001 4	0.000 9
18	0.265 4	0.523 7	0.000 4	0.000 6	0.001 0	0.001 1	0.001 2	0.000 9
19	0.265 2	0.524 7	0.000 5	0.000 8	0.000 5	0.001 0	0.001 1	0.000 7
20	0.266 1	0.524 5	0.000 3	0.000 6	0.000 9	0.001 4	0.001 3	0.001 1
21	0.266 4	0.522 7	0.000 3	0.000 3	0.000 6	0.000 9	0.000 9	0.000 7
22	0.265 9	0.524 1	0.000 3	0.000 3	0.000 8	0.000 8	0.001 0	0.000 6
23	0.264 0	0.522 7	0.000 5	0.000 6	0.000 8	0.001 0	0.001 1	0.000 7
24	0.265 1	0.523 6	0.000 4	0.000 5	0.000 7	0.000 9	0.000 9	0.000 7
25	0.264 6	0.522 8	0.000 2	0.000 3	0.000 8	0.001 0	0.001 1	0.000 8
Max.	0.266 4	0.525 4	0.000 9	0.001 0	0.001 5	0.001 4	0.001 7	0.001 2
Ave.	0.265 0	0.523 3	0.000 4	0.000 5	0.000 8	0.001 0	0.001 1	0.000 7
Min.	0.264 0	0.522 0	0.000 1	0.000 2	0.000 5	0.000 7	0.000 7	0.000 4
Med.	0.265 1	0.523 2	0.000 3	0.000 5	0.000 8	0.001 0	0.001 1	0.000 7
Std.	0.000 7	0.000 9	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2



3.2 Condition 2 : [Ts = 85 ℃]

[LUMEN MAINTENANCE]

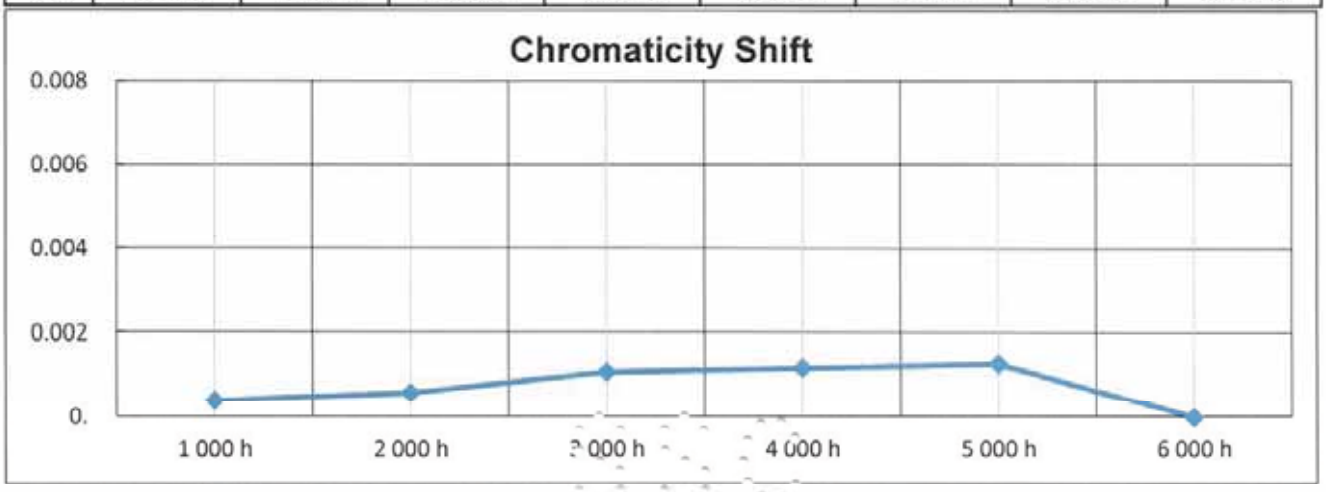
No.	Vf(V)	Flux(lm)	CCT(K)	Lumen Maintenance (%)					
	0 h			1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3.06	55.748	2 656	99.9	99.9	99.4	97.7	99.1	97.5
2	3.07	56.036	2 658	99.8	100.0	99.5	97.9	99.2	97.8
3	3.07	56.147	2 683	99.6	99.8	99.5	97.7	98.9	97.5
4	3.06	56.439	2 677	99.5	99.9	99.5	97.6	98.7	97.2
5	3.06	56.123	2 679	99.7	100.3	99.3	97.8	99.2	97.8
6	3.05	55.732	2 661	99.5	99.6	99.2	97.3	98.5	97.1
7	3.06	56.324	2 640	99.8	100.0	99.5	98.0	99.3	97.9
8	3.07	56.025	2 661	99.7	99.9	99.4	97.7	99.1	97.7
9	3.07	56.476	2 699	99.6	99.8	99.4	97.7	99.2	98.0
10	3.08	55.825	2 675	99.4	99.7	99.3	97.7	98.8	97.5
11	3.08	55.398	2 670	99.4	99.6	99.0	97.5	98.7	97.6
12	3.07	55.426	2 703	101.1	99.5	99.1	97.7	98.8	98.6
13	3.08	56.031	2 641	101.2	99.6	100.2	98.9	99.5	98.9
14	3.07	56.068	2 662	101.1	99.8	100.2	98.8	99.5	98.8
15	3.08	55.867	2 660	101.2	99.6	100.1	98.7	99.1	98.3
16	3.08	55.969	2 658	99.7	99.9	100.0	98.1	98.2	98.2
17	3.07	55.474	2 658	101.0	99.4	99.6	98.4	98.8	97.7
18	3.07	56.206	2 702	101.3	99.7	100.1	98.7	99.3	98.6
19	3.07	56.100	2 677	101.1	99.5	100.1	98.6	99.1	98.5
20	3.08	55.857	2 679	101.3	99.9	100.4	99.2	99.7	98.9
21	3.08	56.168	2 666	101.1	99.7	100.2	98.7	99.1	98.1
22	3.08	56.521	2 696	101.2	99.7	99.9	98.5	98.9	97.8
23	3.08	55.844	2 689	101.2	99.9	100.1	98.8	99.9	99.1
24	3.08	55.513	2 672	101.1	99.7	100.0	98.7	99.6	98.9
25	3.10	55.951	2 657	100.7	99.3	99.7	98.1	99.4	98.5
Max.	3.10	56.521	2 703	101.3	100.3	100.4	99.2	99.9	99.1
Ave.	3.07	55.971	2 671	100.4	99.8	99.7	98.2	99.1	98.1
Min.	3.05	55.398	2 640	99.4	99.3	99.0	97.3	98.2	97.1
Med.	3.07	56.025	2 670	100.7	99.7	99.6	98.1	99.1	98.0
Std.	0.01	0.312	17	0.8	0.2	0.4	0.5	0.4	0.6



SEOUL SEMICONDUCTOR

[CHROMATICITY SHIFT]

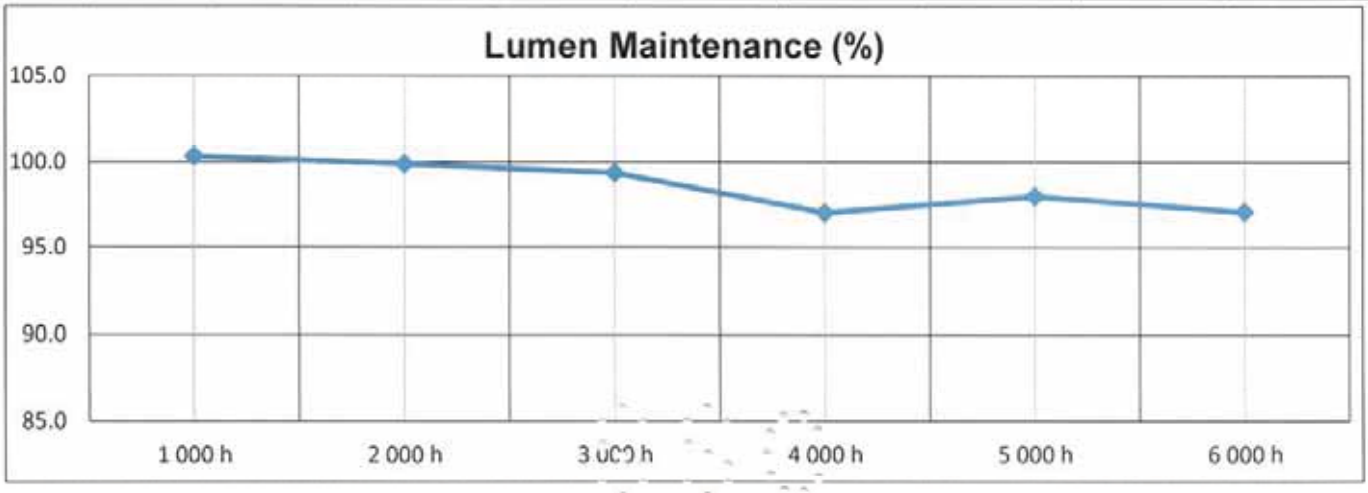
No.	u'	v'	Chromaticity Shift					
	0 h		1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	0.265 9	0.524 2	0.000 5	0.000 6	0.001 1	0.001 3	0.001 4	0.001 1
2	0.265 9	0.523 8	0.000 4	0.000 6	0.001 0	0.001 1	0.001 3	0.000 9
3	0.265 0	0.522 1	0.000 2	0.000 4	0.000 9	0.001 0	0.001 2	0.000 6
4	0.265 0	0.523 5	0.000 3	0.000 5	0.000 9	0.001 3	0.001 3	0.000 8
5	0.264 9	0.523 5	0.000 1	0.000 4	0.000 8	0.001 0	0.001 2	0.000 8
6	0.265 7	0.523 6	0.000 3	0.000 6	0.001 1	0.001 4	0.001 6	0.001 0
7	0.266 6	0.524 5	0.000 1	0.000 5	0.000 9	0.001 1	0.001 1	0.000 8
8	0.265 8	0.523 5	0.000 5	0.000 8	0.001 2	0.001 2	0.001 3	0.001 1
9	0.264 0	0.523 1	0.000 3	0.000 4	0.000 9	0.000 9	0.000 9	0.000 7
10	0.265 3	0.522 6	0.000 3	0.000 4	0.001 2	0.001 0	0.001 3	0.000 9
11	0.265 2	0.524 2	0.000 2	0.000 5	0.000 9	0.000 9	0.000 9	0.000 9
12	0.264 1	0.521 9	0.000 6	0.000 9	0.001 2	0.001 5	0.001 5	0.001 5
13	0.266 7	0.524 0	0.000 4	0.000 6	0.001 2	0.001 2	0.001 4	0.001 0
14	0.265 6	0.524 3	0.000 4	0.000 7	0.001 0	0.001 3	0.001 4	0.001 1
15	0.265 7	0.524 4	0.000 5	0.000 6	0.001 3	0.001 6	0.001 4	0.001 3
16	0.265 8	0.524 6	0.000 3	0.000 4	0.000 6	0.001 1	0.001	0.000 9
17	0.266 0	0.523 2	0.000 6	0.000 9	0.001 4	0.001 7	0.001 8	0.001 5
18	0.264 0	0.522 7	0.000 6	0.001 0	0.001 3	0.001 5	0.001 6	0.001 2
19	0.265 0	0.523 5	0.000 5	0.000 6	0.001 0	0.001 4	0.001 4	0.001 2
20	0.265 0	0.523 1	0.000 2	0.000 4	0.000 7	0.001 1	0.000 9	0.000 8
21	0.265 3	0.524 9	0.000 3	0.000 3	0.001 2	0.001 2	0.001 3	0.001 2
22	0.264 0	0.524 2	0.000 5	0.000 6	0.001 4	0.001 6	0.001 8	0.001 6
23	0.264 6	0.522 8	0.000 4	0.000 4	0.000 8	0.001 1	0.001 1	0.000 7
24	0.265 4	0.522 7	0.000 5	0.000 6	0.001 1	0.001 3	0.001 3	0.001 0
25	0.265 7	0.524 8	0.000 4	0.000 4	0.001 0	0.001 3	0.001 2	0.000 8
Max.	0.266 7	0.524 9	0.000 6	0.001 0	0.001 4	0.001 7	0.001 8	0.001 6
Ave.	0.265 3	0.523 6	0.000 4	0.000 6	0.001 1	0.001 2	0.001 3	0.001 0
Min.	0.264 0	0.521 9	0.000 1	0.000 3	0.000 6	0.000 9	0.000 9	0.000 6
Med.	0.265 3	0.523 5	0.000 4	0.000 6	0.001 0	0.001 2	0.001 3	0.001 0
Std.	0.000 7	0.000 8	0.000 6	0.001 0	0.001 4	0.001 7	0.001 8	0.001 6



3.3 Condition 3 : [Ts = 105 ℃]

[LUMEN MAINTENANCE]

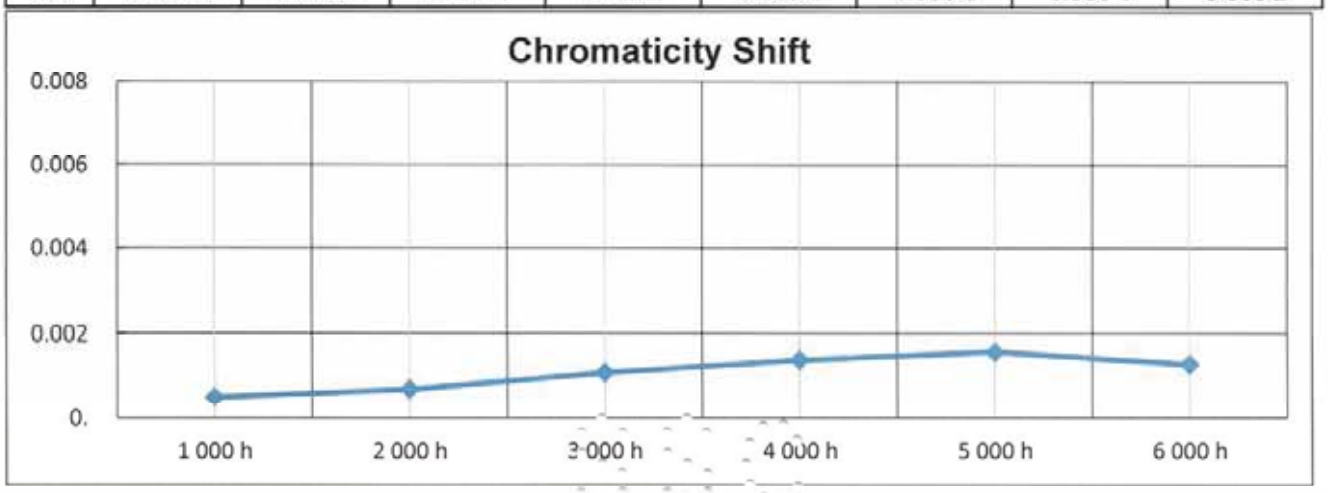
No.	Vf(V)	Flux(lm)	CCT(K)	Lumen Maintenance (%)					
	0 h			1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3.07	55.710	2 667	99.6	99.7	99.3	96.6	97.6	96.6
2	3.06	56.070	2 678	99.8	99.7	99.2	96.7	97.7	96.6
3	3.07	56.435	2 694	99.8	99.8	99.1	96.5	97.6	96.3
4	3.07	56.231	2 687	99.8	99.8	99.3	96.8	98.0	96.8
5	3.05	55.329	2 668	100.0	100.1	99.7	97.1	98.1	97.1
6	3.06	55.923	2 680	99.5	99.5	99.0	96.4	96.8	95.4
7	3.07	55.379	2 681	100.3	99.9	99.2	97.4	98.6	97.5
8	3.06	56.186	2 688	99.9	99.9	99.3	96.8	97.6	96.5
9	3.07	56.722	2 699	100.1	100.0	99.3	96.9	98.0	96.9
10	3.07	56.457	2 670	99.9	100.1	99.4	97.1	98.4	97.2
11	3.09	56.001	2 686	99.9	100.0	99.3	96.9	97.8	96.6
12	3.09	55.606	2 682	100.0	100.0	99.4	97.2	98.2	97.1
13	3.07	56.017	2 700	99.1	98.9	98.0	96.4	97.7	96.8
14	3.07	55.269	2 681	99.9	99.6	99.2	97.2	97.9	97.1
15	3.08	55.958	2 648	100.9	100.0	99.8	97.4	98.3	97.5
16	3.08	56.128	2 686	101.0	100.1	99.7	97.3	97.9	97.2
17	3.07	56.088	2 681	101.0	100.1	99.8	97.5	97.9	97.2
18	3.08	55.676	2 682	100.7	100.1	99.5	97.4	98.3	98.1
19	3.07	56.002	2 670	101.0	100.1	99.7	97.7	98.3	97.9
20	3.07	55.408	2 667	101.0	100.1	99.6	97.8	99.1	98.1
21	3.07	56.162	2 684	101.0	100.1	99.6	97.4	98.3	97.7
22	3.08	55.811	2 682	101.1	100.0	99.7	97.3	98.3	97.8
23	3.07	55.116	2 667	101.0	100.1	99.6	97.2	98.1	97.5
24	3.07	55.253	2 680	100.8	100.1	99.7	97.2	98.3	97.7
25	3.08	55.879	2 662	101.1	100.1	99.7	97.4	98.6	98.2
Max.	3.09	56.722	2 700	101.1	100.1	99.8	97.8	99.1	98.2
Ave.	3.07	55.873	2 679	100.3	99.9	99.4	97.1	98.1	97.2
Min.	3.05	55.116	2 648	99.1	98.9	98.0	96.4	96.8	95.4
Med.	3.07	55.958	2 681	100.1	100.0	99.4	97.2	98.1	97.2
Std.	0.01	0.414	12	0.6	0.3	0.4	0.4	0.4	0.6



SEOUL SEMICONDUCTOR

[CHROMATICITY SHIFT]

No.	u'	v'	Chromaticity Shift					
	0 h		1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	0.265 5	0.523 4	0.000 4	0.000 7	0.001 1	0.001 2	0.001 4	0.001 3
2	0.265 0	0.523 0	0.000 5	0.000 9	0.001 2	0.001 4	0.001 6	0.001 3
3	0.264 5	0.521 9	0.000 4	0.000 8	0.001 1	0.001 4	0.001 6	0.001 3
4	0.264 6	0.523 0	0.000 3	0.000 5	0.000 8	0.001 1	0.001 3	0.001 1
5	0.265 6	0.522 6	0.000 3	0.000 5	0.000 9	0.001 1	0.001 4	0.001 1
6	0.264 7	0.524 3	0.000 2	0.000 4	0.000 8	0.001 2	0.001 6	0.001 2
7	0.265 1	0.521 9	0.000 3	0.000 7	0.001 1	0.001 8	0.001 9	0.001 5
8	0.264 6	0.522 8	0.000 2	0.000 6	0.000 9	0.001 3	0.001 6	0.000 9
9	0.263 6	0.525 7	0.000 3	0.000 6	0.001 2	0.001 5	0.001 6	0.001 3
10	0.265 2	0.524 5	0.000 6	0.000 7	0.001 2	0.001 4	0.001 6	0.001 2
11	0.264 4	0.524 4	0.000 5	0.000 7	0.001 2	0.001 5	0.001 6	0.001 1
12	0.264 7	0.523 6	0.000 4	0.000 7	0.001 3	0.001 1	0.001 5	0.001 2
13	0.264 0	0.522 7	0.000 5	0.000 9	0.001 5	0.001 8	0.001 8	0.001 8
14	0.264 7	0.523 9	0.000 5	0.000 8	0.001 1	0.001 3	0.001 7	0.001 5
15	0.266 4	0.523 5	0.000 3	0.000 8	0.001 0	0.001 3	0.001 5	0.001 1
16	0.264 7	0.523 0	0.000 5	0.000 7	0.001 2	0.001 3	0.001 6	0.001 3
17	0.264 9	0.523 1	0.000 5	0.000 7	0.001 0	0.001 4	0.001 5	0.001 5
18	0.264 9	0.522 6	0.000 8	0.000 6	0.001 0	0.001 3	0.001 5	0.001 2
19	0.265 4	0.523 1	0.000 7	0.000 8	0.001 2	0.001 7	0.001 7	0.001 7
20	0.265 4	0.524 2	0.000 6	0.000 8	0.001 2	0.001 4	0.001 7	0.001 5
21	0.264 6	0.523 9	0.000 5	0.000 7	0.001 0	0.001 4	0.001 7	0.001 5
22	0.264 8	0.523 1	0.000 5	0.000 8	0.001 2	0.001 4	0.001 4	0.001 3
23	0.265 6	0.523 1	0.000 7	0.000 8	0.001 0	0.001 3	0.001 3	0.001 1
24	0.265 0	0.522 3	0.000 5	0.000 9	0.001 4	0.001 4	0.001 5	0.001 3
25	0.265 6	0.524 6	0.000 6	0.000 9	0.001 2	0.001 4	0.001 5	0.001 3
Max.	0.266 4	0.525 7	0.000 8	0.000 9	0.001 5	0.001 8	0.001 9	0.001 8
Ave.	0.264 9	0.523 4	0.000 5	0.000 7	0.001 1	0.001 4	0.001 6	0.001 3
Min.	0.263 6	0.521 9	0.000 2	0.000 4	0.000 8	0.001 1	0.001 3	0.000 9
Med.	0.264 9	0.523 1	0.000 5	0.000 7	0.001 1	0.001 4	0.001 6	0.001 3
Std.	0.000 6	0.000 9	0.000 1	0.000 1	0.000 2	0.000 2	0.000 1	0.000 2



4. Revision History

Revision No.	Revision Date	Contents
01	Feb. 02, 2015	First Issued