





Report No. : SLED-16-014

# LM80 Test Report

## IES LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources

### Samsung Electronics LED Business Report

Report No. : SLED-16-014  
Test Initiated Date : 2014.12.08  
Test End Date : 2016.03.23  
Report issued Date : 2016.04.12

<b>Test result reported for</b>	<b>Testing performed by</b>
SAMSUNG ELECTRONICS LED BUSINESS Lighting Marketing Group	<b>SAMSUNG ELECTRONICS LED BUSINESS</b> 1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do 17113, Korea
<b>Tested By JaeYun Song</b>	<b>Approved by DooSung Park</b>
	
<b>Test Personal Name &amp; Signatory</b>	<b>Approval Name &amp; Signatory</b>

**SAMSUNG ELECTRONICS LED BUSINESS Executive Vice President**  
**Accredited by KOLAS, Republic of KOREA**

The above testing certificate is the accredited testing items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

### ■ Test Summary ■

Life test condition			Summary of result		
Test condition	Current (mA)	Case temperature (°C)	Test duration (h)	Average lumen maintenance (%)	Maximum chromaticity shift ( $\Delta u'v'$ )
1	200	54.9 °C	10 000	96.8	0.002 3
2	200	85.1 °C	10 000	94.0	0.002 8
3	200	105.1 °C	10 000	83.4	0.007 9

#### 1. Number of LED light sources tested

- 25 Packages tested at actual case temperature 54.9 °C
- 25 Packages tested at actual case temperature 85.1 °C
- 25 Packages tested at actual case temperature 105.1 °C

#### 2. Description of LED light sources

- IF = 200 mA , CCT(Nominal) = 3 000 K
- Package Dimension : ( 5.6 × 3.0 ) mm
- Samsung Electronics LED Package : SPMWHT541M\*\*\*\*\*

#### 3. Description of auxiliary equipment

- 1) Instrument Integrating sphere ISP1000-100
- 2) Instrument CAS140-CT
- 3) Keithley 2425 Sourcemeater

#### 4. Operating time

- 10 000 h at (54.9 °C , 85.1 °C , 105.1 °C)
- Drive current : 200 mA
- Typical voltage : 3 V
- \* LED packages are driven with a constant direct current.

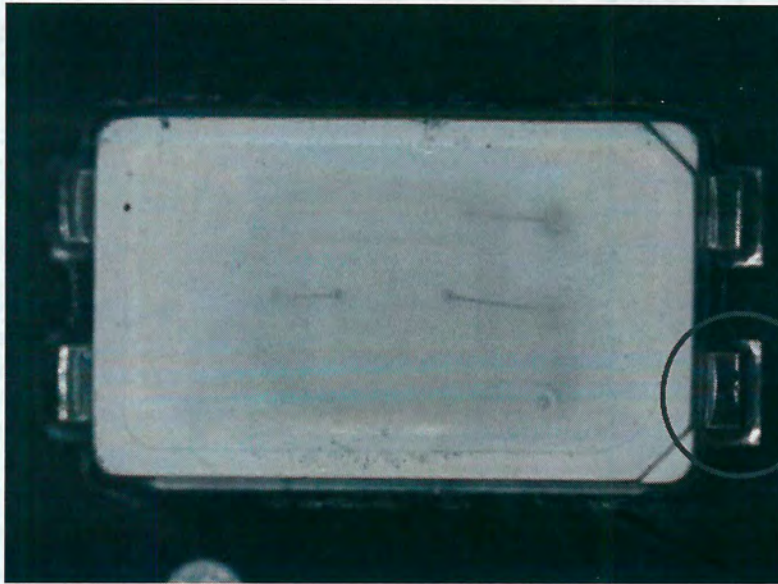
#### 5. Ambient conditions including airflow, temperature and relative humidity

The minimal airflow is maintained in chamber.

The ambient temperature around the LED packages inside chamber is controlled by air flowing and the thermocouple readings are monitored.

- Case temperature : Contorlled to -2 °C
- Surrounding air temperature : Contorlled to -5 °C
- Relative humidity : < 65 % R.H.

**6. Case temperature (Test point temperature)**



**Case Temperature Measurement Point**

**7. Drive current of the LED light source during lifetime test**

See Sub-clause 9.1, 9.2 and 9.3

**8. Initial luminous flux and forward voltage**

See the table

**9. Lumen maintenance data for each individual LED light source**

See the table



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## 9.1 Test condition 1

55 °C

Drive Current

200 mA

Measurement Current

200 mA

No.	Flux (lm)	Vf (V)	Lumen Maintenance (%)						
			0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h
1	52.3	3.065	99.3	99.1	99.0	97.9	98.0	97.3	97.2
2	52.3	3.120	99.5	99.4	99.5	98.7	98.9	98.4	97.5
3	51.4	3.036	99.3	99.2	99.2	98.6	98.9	98.3	98.4
4	53.1	3.043	99.2	99.1	99.3	98.3	98.5	97.9	98.0
5	53.2	3.040	99.2	98.9	99.3	98.5	98.6	97.6	97.6
6	52.6	3.030	99.4	99.3	99.7	98.9	99.0	98.6	98.5
7	52.4	3.020	99.5	98.6	99.0	98.4	98.5	98.1	98.0
8	51.5	3.017	99.6	99.5	99.6	98.8	99.2	98.5	98.5
9	53.2	3.037	99.4	99.2	99.7	98.9	99.1	98.6	98.6
10	53.0	3.035	99.4	99.2	99.7	99.0	99.1	98.7	98.7
11	52.8	3.068	99.2	99.2	99.6	98.6	98.9	98.4	98.4
12	52.3	3.067	99.4	99.2	99.7	97.9	98.1	97.6	97.5
13	53.1	3.037	99.2	99.1	99.3	98.5	98.7	98.2	98.1
14	53.1	3.047	99.2	99.1	99.6	98.6	98.9	98.4	98.4
15	52.6	3.036	99.5	99.4	99.9	98.9	99.1	98.8	98.8
16	53.1	3.019	99.2	99.0	99.4	98.0	98.2	97.6	97.7
17	53.2	3.031	99.3	99.0	99.3	98.4	98.6	98.1	98.2
18	52.3	3.016	99.2	99.2	99.5	98.6	98.8	98.3	98.3
19	52.9	3.040	99.6	99.5	99.9	99.1	99.3	98.8	98.8
20	52.4	3.026	99.7	99.6	100.0	98.6	98.2	97.6	97.4
21	52.7	3.042	99.2	98.7	98.8	97.7	98.0	97.4	97.5
22	52.5	3.040	99.0	99.0	99.3	98.4	98.6	98.1	98.2
23	52.4	3.039	99.2	99.1	99.0	98.2	98.3	98.0	97.9
24	52.2	3.033	99.3	99.2	99.3	98.4	98.7	98.1	98.2
25	51.3	3.027	99.2	99.1	98.8	97.8	97.9	97.4	97.6
Mean	52.6	3.04	99.3	99.2	99.4	98.5	98.6	98.1	98.1
Median	52.6	3.04	99.3	99.2	99.4	98.5	98.7	98.1	98.2
std.dev	0.6	0.02	0.2	0.2	0.3	0.4	0.4	0.5	0.5
Max	53.2	3.12	99.7	99.6	100.0	99.1	99.3	98.8	98.8
Min	51.3	3.02	99.0	98.6	98.8	97.7	97.9	97.3	97.2



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9.1 Test condition 1                    55 °C

Dirve Current                            200 mA

Measurement Current                200 mA

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	97.1	96.6	96.7	96.4					
2	97.8	96.6	96.8	96.6					
3	98.2	97.6	97.3	96.9					
4	97.8	97.3	96.8	96.6					
5	97.4	96.8	95.4	95.2					
6	98.4	98.0	97.8	97.5					
7	97.9	97.5	97.5	97.0					
8	98.3	98.1	98.3	97.9					
9	98.5	98.0	97.4	97.0					
10	98.6	98.1	96.1	96.1					
11	98.2	97.9	97.3	97.1					
12	97.5	97.1	92.2	94.3					
13	98.0	97.5	96.8	97.0					
14	98.1	97.6	97.3	96.5					
15	98.7	97.8	98.2	97.7					
16	97.7	97.3	97.0	96.4					
17	98.0	97.7	97.8	97.3					
18	98.3	97.7	97.9	97.7					
19	98.7	97.8	98.3	98.0					
20	97.4	96.9	97.3	97.1					
21	97.4	96.7	96.6	96.4					
22	98.1	97.5	97.7	97.3					
23	97.8	96.5	96.8	96.6					
24	98.2	97.6	97.6	97.5					
25	97.5	96.8	96.8	96.5					
Mean	98.0	97.4	97.0	96.8					
Median	98.0	97.5	97.3	97.0					
std.dev	0.4	0.5	1.2	0.8					
Max	98.7	98.1	98.3	98.0	0.0	0.0	0.0	0.0	0.0
Min	97.1	96.5	92.2	94.3	0.0	0.0	0.0	0.0	0.0

## 9.1 Test condition 1

55 °C

Drive Current

200 mA

Measurement Current

200 mA

No.	Cx	Cy	Chromaticity Shift ( $\Delta u'v'$ )						
	0 h		500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	0.437 9	0.413 1	0.000 1	0.000 0	0.000 5	0.000 7	0.000 6	0.000 9	0.000 8
2	0.438 7	0.412 8	0.000 2	0.000 1	0.000 2	0.000 1	0.000 3	0.000 2	0.000 6
3	0.434 7	0.410 8	0.000 0	0.000 0	0.000 2	0.000 1	0.000 1	0.000 1	0.000 2
4	0.438 3	0.413 7	0.000 2	0.000 0	0.000 3	0.000 2	0.000 3	0.000 2	0.000 2
5	0.435 5	0.412 7	0.000 1	0.000 0	0.000 1	0.000 1	0.000 1	0.000 5	0.000 4
6	0.439 0	0.412 1	0.000 1	0.000 0	0.000 1	0.000 1	0.000 2	0.000 2	0.000 3
7	0.437 8	0.413 3	0.000 1	0.000 2	0.000 2	0.000 2	0.000 1	0.000 1	0.000 3
8	0.435 0	0.410 2	0.000 1	0.000 2	0.000 2	0.000 1	0.000 2	0.000 2	0.000 3
9	0.440 8	0.414 4	0.000 1	0.000 1	0.000 1	0.000 2	0.000 2	0.000 2	0.000 3
10	0.438 2	0.413 4	0.000 1	0.000 2	0.000 2	0.000 2	0.000 3	0.000 3	0.000 4
11	0.439 8	0.414 3	0.000 1	0.000 1	0.000 1	0.000 1	0.000 2	0.000 1	0.000 3
12	0.441 6	0.415 7	0.000 1	0.000 1	0.000 1	0.000 4	0.000 4	0.000 4	0.000 4
13	0.435 2	0.411 4	0.000 0	0.000 2	0.000 1	0.000 2	0.000 2	0.000 2	0.000 3
14	0.439 2	0.414 1	0.000 2	0.000 0	0.000 2	0.000 1	0.000 2	0.000 1	0.000 3
15	0.439 3	0.412 4	0.000 0	0.000 1	0.000 2	0.000 2	0.000 2	0.000 2	0.000 4
16	0.437 9	0.412 6	0.000 2	0.000 2	0.000 2	0.000 4	0.000 4	0.000 4	0.000 4
17	0.440 1	0.414 0	0.000 0	0.000 1	0.000 0	0.000 0	0.000 1	0.000 0	0.000 3
18	0.434 4	0.410 5	0.000 2	0.000 3	0.000 3	0.000 3	0.000 3	0.000 3	0.000 5
19	0.438 7	0.413 7	0.000 0	0.000 2	0.000 2	0.000 2	0.000 3	0.000 2	0.000 4
20	0.435 9	0.410 0	0.000 1	0.000 2	0.000 2	0.000 1	0.000 6	0.000 7	0.000 7
21	0.436 2	0.412 0	0.000 1	0.000 2	0.000 8	0.000 6	0.000 6	0.000 6	0.000 6
22	0.438 7	0.414 1	0.000 2	0.000 1	0.000 1	0.000 1	0.000 1	0.000 0	0.000 2
23	0.440 4	0.413 0	0.000 1	0.000 0	0.000 2	0.000 2	0.000 3	0.000 2	0.000 3
24	0.438 4	0.414 2	0.000 1	0.000 1	0.000 2	0.000 3	0.000 2	0.000 3	0.000 4
25	0.439 9	0.412 6	0.000 2	0.000 0	0.000 3	0.000 5	0.000 5	0.000 6	0.000 4
Mean	0.438 1	0.412 8	0.000 1	0.000 1	0.000 2	0.000 2	0.000 3	0.000 3	0.000 4
Median	0.438 4	0.413 0	0.000 1	0.000 1	0.000 2	0.000 2	0.000 2	0.000 2	0.000 4
std.dev	0.002 0	0.001 4	0.000 1	0.000 1	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2
Max	0.441 6	0.415 7	0.000 2	0.000 3	0.000 8	0.000 7	0.000 6	0.000 9	0.000 8
Min	0.434 4	0.410 0	0.000 0	0.000 0	0.000 0	0.000 0	0.000 1	0.000 0	0.000 2



9.1 Test condition 1

55 °C

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Dirve Current

200 mA

Measurement Current

200 mA

No.	Chromaticity Shift ( $\Delta u'v'$ )								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	0.000 9	0.001 0	0.001 3	0.001 2					
2	0.000 6	0.000 8	0.001 1	0.001 0					
3	0.000 2	0.000 3	0.000 8	0.001 0					
4	0.000 2	0.000 2	0.000 7	0.000 6					
5	0.000 4	0.000 5	0.001 5	0.001 8					
6	0.000 3	0.000 4	0.000 4	0.000 5					
7	0.000 2	0.000 3	0.000 4	0.000 5					
8	0.000 3	0.000 4	0.000 5	0.000 6					
9	0.000 3	0.000 4	0.000 6	0.000 9					
10	0.000 5	0.000 6	0.001 1	0.000 9					
11	0.000 3	0.000 3	0.000 4	0.000 4					
12	0.000 3	0.000 4	0.003 2	0.002 3					
13	0.000 3	0.000 6	0.000 8	0.001 9					
14	0.000 2	0.000 4	0.000 7	0.000 7					
15	0.000 4	0.000 4	0.000 5	0.000 6					
16	0.000 3	0.000 4	0.000 7	0.000 6					
17	0.000 2	0.000 4	0.000 4	0.000 5					
18	0.000 5	0.000 5	0.000 5	0.000 7					
19	0.000 4	0.000 4	0.000 5	0.000 6					
20	0.000 8	0.000 7	0.000 9	0.000 7					
21	0.000 6	0.000 7	0.001 0	0.001 0					
22	0.000 2	0.000 3	0.000 4	0.000 5					
23	0.000 2	0.000 5	0.000 7	0.000 7					
24	0.000 3	0.000 3	0.000 6	0.000 5					
25	0.000 3	0.000 4	0.000 7	0.000 7					
Mean	0.000 4	0.000 5	0.000 8	0.000 9					
Median	0.000 3	0.000 4	0.000 7	0.000 7					
std.dev	0.000 2	0.000 2	0.000 6	0.000 5					
Max	0.000 9	0.001 0	0.003 2	0.002 3					
Min	0.000 2	0.000 2	0.000 4	0.000 4	0.000 0	0.000 0	0.000 0	0.000 0	0.000 0



9.1 Test condition 1      55 °C  
 Dirve Current              200 mA  
 Measurement Current      200 mA

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No.	CCT (K)							
	0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3 056	3 057	3 056	3 069	3 073	3 070	3 078	3 078
2	3 041	3 044	3 042	3 045	3 042	3 042	3 042	3 056
3	3 091	3 091	3 091	3 097	3 092	3 091	3 090	3 089
4	3 054	3 058	3 055	3 060	3 059	3 059	3 058	3 058
5	3 094	3 096	3 095	3 097	3 094	3 093	3 107	3 105
6	3 030	3 033	3 030	3 030	3 029	3 027	3 028	3 027
7	3 060	3 062	3 064	3 064	3 064	3 061	3 059	3 059
8	3 082	3 080	3 078	3 081	3 082	3 080	3 081	3 081
9	3 019	3 018	3 016	3 016	3 014	3 015	3 014	3 012
10	3 053	3 051	3 050	3 049	3 049	3 048	3 046	3 045
11	3 034	3 036	3 033	3 033	3 032	3 030	3 031	3 030
12	3 015	3 016	3 013	3 012	3 026	3 026	3 027	3 025
13	3 088	3 088	3 085	3 086	3 084	3 083	3 084	3 084
14	3 041	3 046	3 041	3 042	3 041	3 040	3 041	3 038
15	3 028	3 028	3 026	3 024	3 026	3 024	3 027	3 024
16	3 052	3 058	3 057	3 056	3 062	3 063	3 061	3 061
17	3 027	3 028	3 028	3 028	3 028	3 026	3 027	3 026
18	3 094	3 089	3 088	3 087	3 089	3 086	3 086	3 085
19	3 049	3 049	3 045	3 046	3 045	3 042	3 044	3 043
20	3 065	3 065	3 060	3 063	3 068	3 080	3 082	3 083
21	3 077	3 080	3 083	3 097	3 093	3 093	3 093	3 092
22	3 052	3 056	3 051	3 054	3 055	3 052	3 053	3 052
23	3 014	3 016	3 015	3 019	3 019	3 021	3 017	3 018
24	3 058	3 060	3 057	3 062	3 064	3 062	3 065	3 066
25	3 019	3 024	3 020	3 028	3 033	3 032	3 033	3 028
Mean	3 052	3 053	3 051	3 054	3 054	3 054	3 055	3 055
Median	3 052	3 056	3 051	3 054	3 055	3 052	3 053	3 056
std.dev	25	25	25	26	25	25	27	27
Max	3 094	3 096	3 095	3 097	3 094	3 093	3 107	3 105
Min	3 014	3 016	3 013	3 012	3 014	3 015	3 014	3 012





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**9.1 Test condition 1**      **55 °C**  
**Dirve Current**      **200 mA**  
**Measurement Current**      **200 mA**

No.	CCT (K)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	3079	3081	3089	3086					
2	3057	3062	3068	3065					
3	3089	3089	3113	3117					
4	3058	3056	3071	3066					
5	3104	3106	3133	3143					
6	3025	3025	3034	3030					
7	3058	3056	3063	3069					
8	3080	3077	3081	3082					
9	3014	3012	3033	3040					
10	3044	3042	3083	3074					
11	3028	3028	3042	3039					
12	3022	3023	3095	3073					
13	3082	3076	3108	3061					
14	3039	3041	3057	3058					
15	3022	3026	3028	3028					
16	3058	3056	3067	3062					
17	3026	3023	3029	3027					
18	3084	3084	3090	3082					
19	3042	3048	3050	3044					
20	3086	3082	3087	3080					
21	3091	3094	3102	3100					
22	3051	3048	3054	3055					
23	3016	3025	3028	3022					
24	3063	3060	3071	3064					
25	3027	3026	3036	3031					
Mean	3 054	3 054	3 068	3 064					
Median	3 057	3 056	3 068	3 064					
std.dev	27	27	29	29					
Max	3 104	3 106	3 133	3 143	00	00	00	00	00
Min	3 014	3 012	3 028	3 022	00	00	00	00	00



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9.2 Test condition 2                    85 °C

Drive Current                            200 mA

Measurement Current                200 mA

No.	Flux (lm)	Vf (V)	Lumen Maintenance (%)						
	0 h		500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	52.8	3.040	99.7	99.8	100.2	99.1	98.7	97.3	96.6
2	52.3	3.028	99.8	99.8	99.9	99.2	99.5	98.4	97.6
3	52.1	3.030	99.6	99.2	99.0	98.4	99.0	97.6	96.1
4	53.5	3.043	98.7	98.9	99.0	98.2	98.1	97.0	96.2
5	53.0	3.053	99.6	99.7	100.1	99.3	99.5	98.5	97.6
6	53.1	3.034	99.5	99.5	100.1	99.2	98.8	97.5	96.5
7	52.9	3.028	99.6	99.6	99.9	98.9	98.1	96.8	95.8
8	52.6	3.021	99.5	99.8	99.8	99.2	99.4	98.2	97.5
9	52.8	3.043	99.8	99.9	100.2	99.2	98.6	97.5	96.7
10	53.4	3.038	99.5	99.6	100.0	99.2	99.1	98.3	97.5
11	53.2	3.029	99.6	99.6	100.0	99.0	98.4	97.2	96.4
12	53.2	3.032	99.7	99.6	99.9	99.2	98.9	97.8	97.2
13	53.2	3.050	99.7	99.6	100.1	99.4	99.6	99.0	98.4
14	53.3	3.029	99.7	99.7	100.1	99.1	98.8	97.6	96.9
15	52.8	3.023	99.4	99.4	99.9	98.9	98.3	97.1	96.2
16	53.0	3.026	99.5	99.7	100.0	99.0	98.9	97.6	96.9
17	53.2	3.031	99.7	99.7	100.1	99.4	99.2	97.8	96.7
18	52.9	3.046	99.6	99.5	100.0	99.2	99.4	98.6	97.8
19	53.2	3.036	99.6	99.6	99.9	99.1	99.2	97.9	96.9
20	52.7	3.027	99.8	99.8	100.3	98.3	97.9	96.7	95.9
21	53.1	3.041	99.4	99.4	99.9	99.3	99.0	97.3	96.1
22	52.7	3.039	99.6	99.6	100.1	99.3	99.2	98.0	97.4
23	53.1	3.033	99.5	99.6	100.0	99.1	98.8	97.5	97.0
24	52.1	3.027	99.6	99.6	100.1	99.0	98.2	97.0	96.1
25	52.2	3.041	99.4	99.4	99.8	99.0	98.7	97.6	96.8
Mean	52.9	3.03	99.6	99.6	99.9	99.1	98.9	97.7	96.8
Median	53.0	3.03	99.6	99.6	100.0	99.1	98.9	97.6	96.8
std.dev	0.4	0.01	0.2	0.2	0.3	0.3	0.5	0.6	0.7
Max	53.5	3.05	99.8	99.9	100.3	99.4	99.6	99.0	98.4
Min	52.1	3.02	98.7	98.9	99.0	98.2	97.9	96.7	95.8



9.2 Test condition 2

85 °C

Report No. : SLED-16-014

Dirve Current

200 mA

Measurement Current

200 mA

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	96.4	95.9	94.8	93.9					
2	97.5	97.1	96.2	95.1					
3	95.6	94.9	93.8	92.6					
4	95.8	95.3	94.1	92.7					
5	96.5	95.9	94.8	93.4					
6	96.3	95.9	94.9	94.0					
7	95.9	95.7	94.4	93.6					
8	97.2	97.0	95.4	94.1					
9	96.8	96.5	95.6	94.8					
10	97.3	96.8	96.0	95.2					
11	96.2	95.9	94.8	94.0					
12	96.7	96.4	95.2	94.1					
13	97.7	96.9	94.6	94.3					
14	97.0	96.7	95.7	95.1					
15	96.0	94.8	94.4	93.4					
16	96.8	96.5	95.6	94.6					
17	96.2	95.3	94.3	93.6					
18	96.8	96.2	95.0	94.1					
19	96.3	95.7	94.9	93.7					
20	95.8	95.3	94.1	92.9					
21	95.7	95.2	94.1	93.0					
22	97.4	96.8	96.0	95.0					
23	96.7	96.1	94.8	94.0					
24	96.3	96.2	95.3	94.2					
25	96.7	96.2	95.8	93.9					
Mean	96.5	96.0	95.0	94.0					
Median	96.5	96.1	94.9	94.0					
std.dev	0.6	0.7	0.7	0.7					
Max	97.7	97.1	96.2	95.2	0.0	0.0	0.0	0.0	0.0
Min	95.6	94.8	93.8	92.6	0.0	0.0	0.0	0.0	0.0



9.2 Test condition 2

85 °C

Report No. : SLED-16-014

Drive Current

200 mA

Measurement Current

200 mA

No.	Cx	Cy	Chromaticity Shift ( $\Delta u'v'$ )						
			0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h
1	0.440 6	0.415 2	0.000 2	0.000 3	0.000 4	0.000 5	0.000 4	0.000 5	0.000 8
2	0.437 4	0.412 6	0.000 2	0.000 3	0.000 4	0.000 5	0.000 6	0.000 6	0.000 7
3	0.438 8	0.414 7	0.000 2	0.000 7	0.001 0	0.000 9	0.000 9	0.001 2	0.001 6
4	0.440 0	0.415 2	0.000 4	0.000 2	0.000 5	0.000 4	0.000 6	0.000 7	0.000 9
5	0.437 8	0.414 4	0.000 2	0.000 2	0.000 4	0.000 5	0.000 7	0.000 6	0.000 9
6	0.438 4	0.414 2	0.000 2	0.000 4	0.000 4	0.000 6	0.000 6	0.000 6	0.000 8
7	0.437 5	0.411 1	0.000 2	0.000 2	0.000 4	0.000 4	0.000 4	0.000 5	0.000 7
8	0.438 3	0.412 2	0.000 2	0.000 3	0.000 3	0.000 4	0.000 5	0.000 6	0.000 8
9	0.436 9	0.410 4	0.000 2	0.000 3	0.000 5	0.000 5	0.000 5	0.000 5	0.000 8
10	0.441 0	0.413 8	0.000 2	0.000 2	0.000 4	0.000 3	0.000 4	0.000 5	0.000 6
11	0.439 8	0.414 3	0.000 2	0.000 2	0.000 4	0.000 5	0.000 4	0.000 5	0.000 7
12	0.439 1	0.412 2	0.000 2	0.000 3	0.000 5	0.000 5	0.000 6	0.000 6	0.000 9
13	0.435 9	0.411 0	0.000 1	0.000 1	0.000 5	0.000 6	0.000 7	0.000 9	0.001 0
14	0.434 6	0.410 5	0.000 2	0.000 3	0.000 5	0.000 5	0.000 6	0.000 7	0.000 9
15	0.438 7	0.413 2	0.000 2	0.000 2	0.000 4	0.000 4	0.000 5	0.000 5	0.000 8
16	0.438 3	0.413 0	0.000 2	0.000 3	0.000 4	0.000 5	0.000 5	0.000 6	0.000 7
17	0.438 8	0.414 1	0.000 2	0.000 3	0.000 5	0.000 6	0.000 7	0.000 7	0.000 9
18	0.436 9	0.412 5	0.000 2	0.000 3	0.000 5	0.000 6	0.000 8	0.000 9	0.001 0
19	0.439 5	0.412 9	0.000 2	0.000 3	0.000 5	0.000 6	0.000 8	0.000 8	0.000 9
20	0.439 0	0.413 0	0.000 1	0.000 3	0.000 5	0.000 5	0.000 7	0.000 8	0.001 0
21	0.438 7	0.413 5	0.000 2	0.000 2	0.000 5	0.000 5	0.000 7	0.000 8	0.001 0
22	0.436 4	0.409 5	0.000 2	0.000 3	0.000 5	0.000 6	0.000 7	0.000 8	0.000 9
23	0.434 6	0.412 8	0.000 1	0.000 3	0.000 5	0.000 5	0.000 7	0.000 7	0.001 0
24	0.434 0	0.407 6	0.000 2	0.000 2	0.000 4	0.000 5	0.000 5	0.000 7	0.000 8
25	0.437 8	0.411 3	0.000 2	0.000 2	0.000 4	0.000 5	0.000 6	0.000 7	0.001 0
Mean	0.437 9	0.412 6	0.000 2	0.000 3	0.000 5	0.000 5	0.000 6	0.000 7	0.000 9
Median	0.438 3	0.412 9	0.000 2	0.000 3	0.000 5	0.000 5	0.000 6	0.000 7	0.000 9
std.dev	0.001 8	0.001 9	0.000 1	0.000 1	0.000 1	0.000 1	0.000 1	0.000 2	0.000 2
Max	0.441 0	0.415 2	0.000 4	0.000 7	0.001 0	0.000 9	0.000 9	0.001 2	0.001 6
Min	0.434 0	0.407 6	0.000 1	0.000 1	0.000 3	0.000 3	0.000 4	0.000 5	0.000 6





9.2 Test condition 2      85 °C  
 Drive Current            200 mA  
 Measurement Current    200 mA

Report No. : SLED-16-014

No.	CCT (K)							
	0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3 028	3 027	3 024	3 023	3 025	3 029	3 034	3 039
2	3 060	3 060	3 057	3 064	3 060	3 060	3 063	3 067
3	3 055	3 058	3 072	3 079	3 078	3 075	3 082	3 092
4	3 038	3 047	3 039	3 047	3 045	3 047	3 053	3 056
5	3 069	3 072	3 065	3 066	3 063	3 064	3 067	3 075
6	3 056	3 054	3 049	3 051	3 053	3 053	3 061	3 066
7	3 048	3 048	3 044	3 046	3 047	3 051	3 057	3 060
8	3 043	3 042	3 039	3 044	3 042	3 045	3 048	3 054
9	3 052	3 052	3 046	3 047	3 047	3 051	3 058	3 061
10	3 011	3 014	3 009	3 009	3 007	3 011	3 014	3 017
11	3 034	3 036	3 031	3 028	3 030	3 034	3 039	3 043
12	3 028	3 029	3 028	3 027	3 024	3 028	3 034	3 036
13	3 073	3 073	3 070	3 067	3 068	3 065	3 067	3 070
14	3 091	3 089	3 089	3 087	3 089	3 092	3 098	3 103
15	3 043	3 047	3 045	3 039	3 041	3 046	3 053	3 057
16	3 049	3 050	3 046	3 043	3 043	3 047	3 057	3 059
17	3 050	3 051	3 048	3 046	3 043	3 046	3 053	3 058
18	3 069	3 071	3 066	3 067	3 065	3 065	3 067	3 072
19	3 028	3 029	3 027	3 026	3 025	3 025	3 032	3 035
20	3 037	3 036	3 033	3 033	3 044	3 048	3 054	3 058
21	3 046	3 050	3 046	3 042	3 043	3 048	3 058	3 065
22	3 053	3 054	3 048	3 049	3 045	3 049	3 053	3 055
23	3 111	3 109	3 102	3 104	3 103	3 106	3 116	3 119
24	3 078	3 080	3 076	3 075	3 073	3 083	3 089	3 093
25	3 044	3 047	3 044	3 044	3 042	3 045	3 049	3 053
Mean	3 052	3 053	3 050	3 050	3 050	3 053	3 058	3 063
Median	3 049	3 050	3 046	3 046	3 045	3 048	3 057	3 059
std.dev	22	21	21	22	21	21	22	22
Max	3 111	3 109	3 102	3 104	3 103	3 106	3 116	3 119
Min	3 011	3 014	3 009	3 009	3 007	3 011	3 014	3 017



**9.2 Test condition 2**                    **85 °C**  
**Drive Current**                    **200 mA**  
**Measurement Current**            **200 mA**

Report No. : SLED-16-014

No.	CCT (K)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	3 050	3 058	3 073	3 074					
2	3 079	3 083	3 090	3 092					
3	3 103	3 113	3 125	3 125					
4	3 066	3 069	3 082	3 096					
5	3 088	3 099	3 108	3 124					
6	3 082	3 091	3 100	3 102					
7	3 070	3 075	3 093	3 088					
8	3 063	3 067	3 086	3 084					
9	3 071	3 076	3 087	3 084					
10	3 026	3 036	3 042	3 041					
11	3 051	3 060	3 069	3 072					
12	3 051	3 056	3 076	3 076					
13	3 085	3 093	3 133	3 117					
14	3 112	3 120	3 136	3 132					
15	3 067	3 094	3 093	3 102					
16	3 070	3 077	3 086	3 089					
17	3 071	3 082	3 089	3 094					
18	3 088	3 098	3 113	3 113					
19	3 048	3 059	3 077	3 086					
20	3 068	3 075	3 090	3 096					
21	3 091	3 099	3 108	3 109					
22	3 061	3 070	3 078	3 075					
23	3 132	3 135	3 154	3 154					
24	3 102	3 113	3 132	3 130					
25	3 066	3 070	3 085	3 105					
Mean	3 074	3 083	3 096	3 098					
Median	3 070	3 077	3 090	3 096					
std.dev	23	23	25	24					
Max	3 132	3 135	3 154	3 154	00	00	00	00	00
Min	3 026	3 036	3 042	3 041	00	00	00	00	00



Report No. : SLED-16-014

9.3 Test condition 3      105 °C

Drive Current              200 mA

Measurement Current      200 mA

No.	Flux (lm)	Vf (V)	Lumen Maintenance (%)						
	0 h		500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	52.2	3.039	99.9	99.8	99.0	96.5	95.1	93.2	92.2
2	52.0	3.041	100.1	99.8	99.3	96.7	95.0	93.3	91.8
3	51.3	3.035	100.0	99.8	99.5	97.5	96.3	94.1	93.0
4	52.8	3.033	100.2	100.0	99.4	96.8	95.3	93.2	92.5
5	53.0	3.034	100.4	100.2	99.5	96.9	95.9	93.7	92.1
6	52.6	3.036	100.1	99.9	99.4	97.1	95.8	94.6	93.6
7	52.6	3.021	100.1	99.8	99.4	97.2	96.0	94.0	92.8
8	52.6	3.031	100.0	99.7	99.0	96.5	95.1	93.7	92.4
9	53.1	3.035	100.1	100.0	98.7	96.2	94.6	93.2	91.9
10	53.3	3.029	100.3	100.0	98.7	96.0	94.4	92.7	91.3
11	52.9	3.024	100.1	99.9	99.0	96.5	95.2	93.0	91.8
12	52.4	3.022	100.3	100.1	99.4	97.2	95.4	94.0	92.3
13	52.8	3.048	100.2	100.0	100.1	98.5	97.6	95.4	93.7
14	52.9	3.029	100.1	100.0	99.4	96.8	95.4	93.4	92.2
15	52.4	3.020	100.2	100.0	98.8	96.3	94.4	92.5	91.4
16	52.5	3.032	100.0	100.0	99.5	96.9	95.4	93.4	92.3
17	52.7	3.048	100.2	100.0	99.7	97.4	95.9	94.1	92.8
18	52.9	3.033	100.2	100.2	99.5	96.5	94.5	93.0	91.5
19	52.6	3.045	100.0	99.8	99.3	97.1	95.3	93.2	91.6
20	52.1	3.024	100.3	100.1	99.2	96.7	95.3	93.5	91.6
21	52.0	3.022	100.3	100.1	99.4	96.8	95.3	93.3	91.6
22	52.1	3.041	100.1	100.0	98.8	96.4	94.7	93.0	91.3
23	52.7	3.042	99.9	99.7	98.9	96.5	94.8	92.9	91.2
24	52.3	3.040	100.2	100.1	99.7	97.4	95.9	93.7	92.4
25	51.3	3.043	100.0	99.8	99.3	96.2	94.4	92.6	91.4
Mean	52.5	3.03	100.1	100.0	99.3	96.8	95.3	93.5	92.1
Median	52.6	3.03	100.1	100.0	99.4	96.8	95.3	93.3	92.1
std.dev	0.5	0.01	0.1	0.1	0.3	0.5	0.7	0.7	0.7
Max	53.3	3.05	100.4	100.2	100.1	98.5	97.6	95.4	93.7
Min	51.3	3.02	99.9	99.7	98.7	96.0	94.4	92.5	91.2





**9.3 Test condition 3            105 °C**  
**Dirve Current                    200 mA**  
**Measurement Current        200 mA**

Report No. : SLED-16-014

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	90.2	87.6	83.3	84.8					
2	89.6	86.5	83.4	82.2					
3	91.2	88.3	85.8	85.6					
4	90.6	86.8	85.5	85.2					
5	89.9	86.6	83.7	82.3					
6	91.7	89.6	86.0	86.0					
7	91.4	88.4	85.8	86.1					
8	90.5	87.8	86.1	84.7					
9	90.0	87.6	84.7	83.5					
10	89.2	86.2	85.0	84.6					
11	89.7	85.6	83.2	83.4					
12	90.3	87.0	84.2	81.3					
13	91.3	88.1	84.6	84.3					
14	89.1	85.9	82.9	80.7					
15	89.3	86.4	84.3	83.1					
16	90.2	88.0	84.8	85.5					
17	90.8	87.2	85.6	85.0					
18	89.3	85.8	83.3	81.0					
19	89.7	87.6	85.6	81.7					
20	89.3	85.8	83.0	80.8					
21	89.2	86.2	82.6	83.8					
22	88.8	83.8	80.9	78.8					
23	89.1	86.6	83.7	81.7					
24	90.4	87.2	85.0	84.3					
25	89.2	86.8	83.2	84.6					
Mean	90.0	86.9	84.3	83.4					
Median	89.9	86.8	84.3	83.8					
std.dev	0.8	1.2	1.3	1.9					
Max	91.7	89.6	86.1	86.1	0.0	0.0	0.0	0.0	0.0
Min	88.8	83.8	80.9	78.8	0.0	0.0	0.0	0.0	0.0



9.3 Test condition 3      105 °C  
 Drive Current              200 mA  
 Measurement Current      200 mA

Report No. : SLED-16-014

No.	Cx	Cy	Chromaticity Shift ( $\Delta u'v'$ )						
			0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h
1	0.436 9	0.410 6	0.000 3	0.000 4	0.000 4	0.000 6	0.001 1	0.001 8	0.002 9
2	0.440 0	0.414 9	0.000 4	0.000 3	0.000 5	0.000 6	0.001 1	0.002 1	0.002 9
3	0.434 8	0.411 0	0.000 4	0.000 2	0.000 5	0.000 7	0.001 1	0.001 7	0.002 2
4	0.439 0	0.415 3	0.000 4	0.000 5	0.000 5	0.000 6	0.000 9	0.001 5	0.002 2
5	0.438 7	0.415 4	0.000 3	0.000 5	0.000 5	0.000 6	0.001 3	0.002 5	0.003 5
6	0.437 6	0.410 1	0.000 4	0.000 4	0.000 6	0.000 7	0.001 0	0.001 9	0.002 6
7	0.437 0	0.411 1	0.000 2	0.000 3	0.000 5	0.000 7	0.001 1	0.001 6	0.002 4
8	0.437 0	0.412 8	0.000 5	0.000 4	0.000 5	0.000 7	0.001 3	0.002 3	0.003 0
9	0.436 0	0.412 7	0.000 3	0.000 4	0.000 8	0.001 0	0.001 7	0.002 8	0.003 5
10	0.439 5	0.414 5	0.000 4	0.000 5	0.000 4	0.000 7	0.001 2	0.002 1	0.002 7
11	0.438 8	0.412 0	0.000 4	0.000 5	0.000 6	0.000 6	0.001 3	0.002 2	0.003 4
12	0.436 6	0.412 8	0.000 5	0.000 6	0.000 6	0.000 6	0.001 2	0.002 6	0.003 8
13	0.438 8	0.411 8	0.000 5	0.000 5	0.000 8	0.000 9	0.001 2	0.001 5	0.002 1
14	0.438 7	0.414 8	0.000 3	0.000 5	0.000 6	0.000 7	0.001 6	0.002 7	0.004 2
15	0.436 3	0.412 1	0.000 4	0.000 5	0.000 6	0.000 8	0.001 6	0.002 4	0.003 7
16	0.436 6	0.413 3	0.000 2	0.000 4	0.000 6	0.000 8	0.001 4	0.002 6	0.004 1
17	0.437 2	0.411 7	0.000 5	0.000 5	0.000 8	0.000 7	0.001 2	0.002 3	0.003 3
18	0.442 8	0.417 1	0.000 4	0.000 5	0.000 6	0.000 7	0.001 1	0.001 8	0.002 4
19	0.440 6	0.413 0	0.000 3	0.000 4	0.000 4	0.000 7	0.001 6	0.002 3	0.002 8
20	0.437 0	0.413 0	0.000 4	0.000 5	0.000 7	0.000 7	0.001 2	0.002 9	0.003 7
21	0.435 6	0.410 4	0.000 5	0.000 6	0.000 6	0.000 8	0.001 4	0.003 0	0.004 2
22	0.436 9	0.413 7	0.000 4	0.000 5	0.000 6	0.000 9	0.001 8	0.003 3	0.004 1
23	0.436 5	0.411 7	0.000 2	0.000 2	0.000 6	0.000 9	0.001 7	0.002 6	0.003 3
24	0.436 0	0.412 0	0.000 3	0.000 4	0.000 7	0.000 8	0.001 5	0.002 3	0.003 1
25	0.440 9	0.414 6	0.000 2	0.000 4	0.000 5	0.000 9	0.001 5	0.002 4	0.003 0
Mean	0.437 8	0.412 9	0.000 4	0.000 4	0.000 6	0.000 7	0.001 3	0.002 3	0.003 2
Median	0.437 0	0.412 8	0.000 4	0.000 5	0.000 6	0.000 7	0.001 3	0.002 3	0.003 1
std.dev	0.001 9	0.001 8	0.000 1	0.000 1	0.000 1	0.000 1	0.000 2	0.000 5	0.000 7
Max	0.442 8	0.417 1	0.000 5	0.000 6	0.000 8	0.001 0	0.001 8	0.003 3	0.004 2
Min	0.434 8	0.410 1	0.000 2	0.000 2	0.000 4	0.000 6	0.000 9	0.001 5	0.002 1



9.3 Test condition 3      105 °C  
 Drive Current              200 mA  
 Measurement Current      200 mA

Report No. : SLED-16-014

No.	Chromaticity Shift ( $\Delta u'v'$ )								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	0.0038	0.0046	0.0053	0.0062					
2	0.0037	0.0048	0.0058	0.0063					
3	0.0028	0.0031	0.0037	0.0038					
4	0.0029	0.0034	0.0042	0.0043					
5	0.0046	0.0058	0.0066	0.0070					
6	0.0035	0.0043	0.0059	0.0061					
7	0.0033	0.0042	0.0049	0.0055					
8	0.0039	0.0045	0.0056	0.0063					
9	0.0041	0.0047	0.0055	0.0057					
10	0.0033	0.0035	0.0041	0.0045					
11	0.0043	0.0053	0.0059	0.0069					
12	0.0052	0.0061	0.0072	0.0069					
13	0.0028	0.0037	0.0038	0.0046					
14	0.0057	0.0064	0.0075	0.0075					
15	0.0049	0.0060	0.0067	0.0072					
16	0.0054	0.0062	0.0066	0.0075					
17	0.0044	0.0059	0.0062	0.0068					
18	0.0031	0.0037	0.0044	0.0050					
19	0.0033	0.0037	0.0044	0.0044					
20	0.0047	0.0052	0.0059	0.0064					
21	0.0059	0.0065	0.0071	0.0079					
22	0.0059	0.0062	0.0068	0.0071					
23	0.0040	0.0046	0.0055	0.0060					
24	0.0039	0.0046	0.0052	0.0062					
25	0.0036	0.0044	0.0050	0.0053					
Mean	0.004 1	0.004 9	0.005 6	0.006 1					
Median	0.003 9	0.004 6	0.005 6	0.006 2					
std.dev	0.001 0	0.001 0	0.001 1	0.001 1					
Max	0.005 9	0.006 5	0.007 5	0.007 9					
Min	0.002 8	0.003 1	0.003 7	0.003 8	0.000 0	0.000 0	0.000 0	0.000 0	0.000 0

**9.3 Test condition 3**      **105 °C**  
**Dirve Current**            **200 mA**  
**Measurement Current**   **200 mA**

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No.	CCT (K)							
	0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	3 054	3 049	3 045	3 053	3 068	3 081	3 097	3 124
2	3 036	3 030	3 030	3 034	3 045	3 059	3 088	3 106
3	3 092	3 085	3 089	3 096	3 108	3 118	3 136	3 149
4	3 055	3 046	3 044	3 048	3 059	3 073	3 089	3 109
5	3 060	3 054	3 051	3 058	3 068	3 087	3 117	3 144
6	3 037	3 030	3 029	3 033	3 044	3 055	3 083	3 097
7	3 056	3 051	3 050	3 057	3 067	3 080	3 093	3 110
8	3 068	3 058	3 063	3 069	3 080	3 096	3 120	3 140
9	3 086	3 080	3 079	3 101	3 108	3 130	3 158	3 177
10	3 041	3 033	3 030	3 043	3 056	3 071	3 094	3 109
11	3 033	3 024	3 023	3 031	3 044	3 059	3 086	3 114
12	3 076	3 066	3 062	3 071	3 081	3 100	3 133	3 164
13	3 030	3 021	3 019	3 021	3 027	3 034	3 051	3 068
14	3 057	3 051	3 047	3 057	3 068	3 092	3 118	3 150
15	3 076	3 067	3 068	3 081	3 089	3 108	3 131	3 160
16	3 079	3 075	3 072	3 079	3 091	3 107	3 134	3 174
17	3 057	3 049	3 047	3 053	3 061	3 078	3 106	3 129
18	3 007	2 999	2 998	3 003	3 014	3 029	3 050	3 065
19	3 011	3 006	3 004	3 014	3 024	3 047	3 069	3 082
20	3 071	3 062	3 060	3 069	3 081	3 097	3 138	3 158
21	3 074	3 063	3 061	3 070	3 082	3 098	3 144	3 175
22	3 078	3 071	3 069	3 083	3 094	3 120	3 152	3 173
23	3 068	3 067	3 066	3 076	3 085	3 107	3 134	3 153
24	3 080	3 077	3 072	3 080	3 089	3 106	3 132	3 152
25	3 019	3 017	3 014	3 020	3 037	3 055	3 078	3 093
Mean	3 056	3 049	3 048	3 056	3 067	3 084	3 109	3 131
Median	3 057	3 051	3 050	3 057	3 068	3 087	3 117	3 140
std.dev	24	24	24	26	26	27	31	34
Max	3 092	3 085	3 089	3 101	3 108	3 130	3 158	3 177
Min	3 007	2 999	2 998	3 003	3 014	3 029	3 050	3 065



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9.3 Test condition 3

105 °C

Drive Current

200 mA

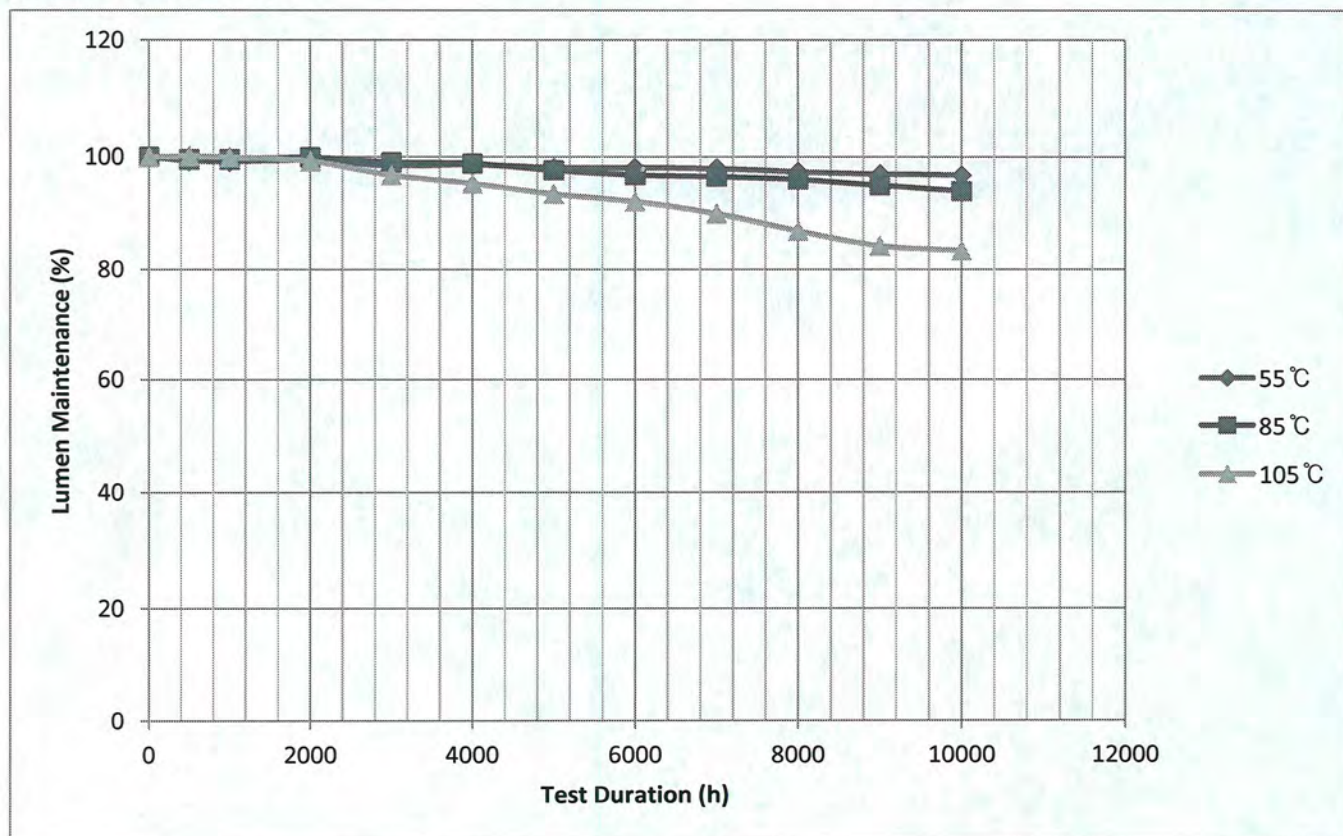
Measurement Current

200 mA

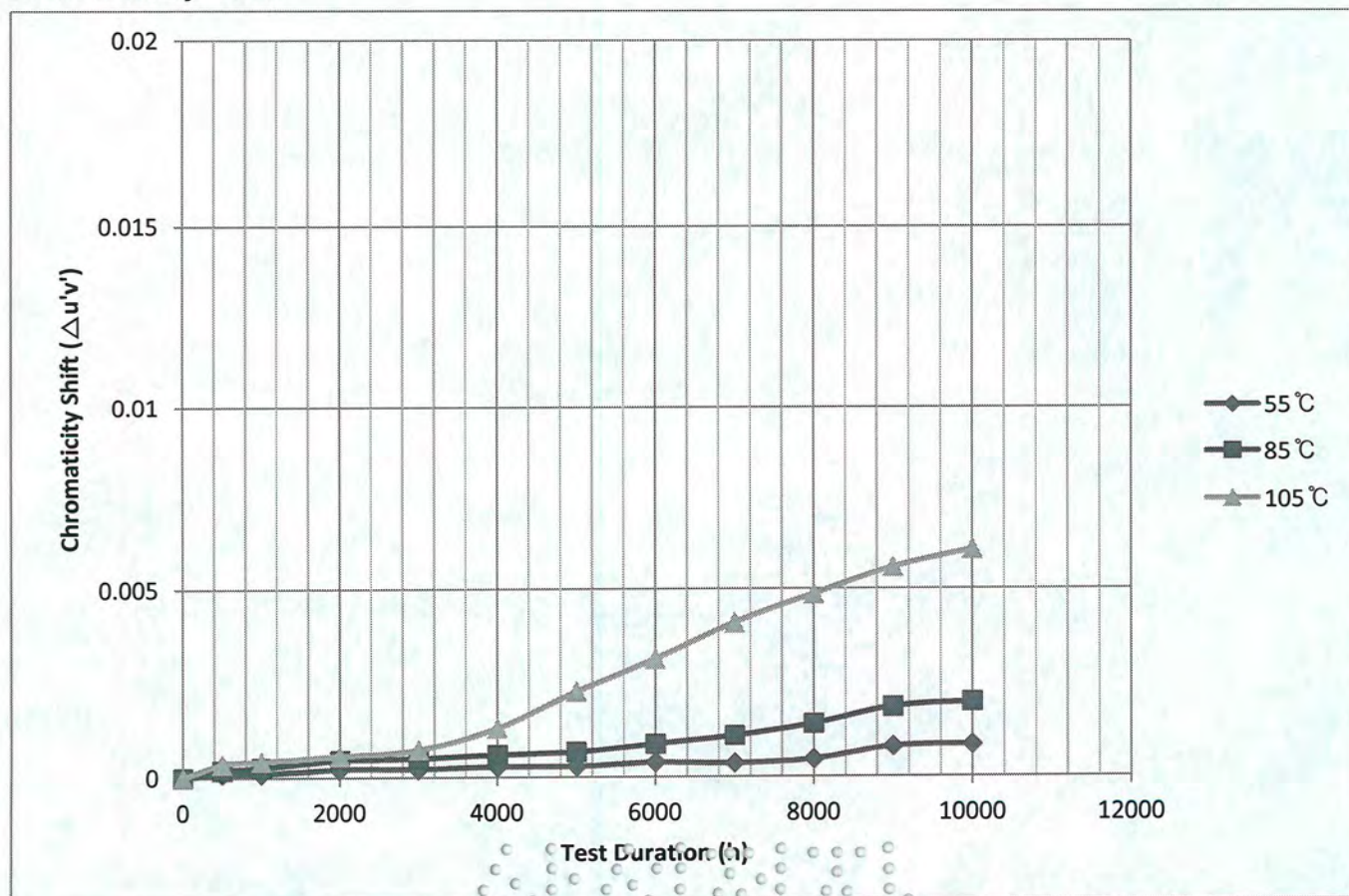
No.	CCT (K)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	3 151	3 175	3 194	3 220					
2	3 129	3 160	3 187	3 201					
3	3 166	3 176	3 188	3 194					
4	3 129	3 144	3 164	3 169					
5	3 176	3 210	3 234	3 242					
6	3 124	3 146	3 192	3 199					
7	3 137	3 165	3 185	3 203					
8	3 167	3 185	3 216	3 238					
9	3 193	3 211	3 234	3 241					
10	3 126	3 133	3 149	3 158					
11	3 140	3 171	3 187	3 214					
12	3 204	3 229	3 263	3 264					
13	3 095	3 124	3 130	3 151					
14	3 197	3 222	3 256	3 257					
15	3 196	3 229	3 250	3 267					
16	3 214	3 238	3 251	3 278					
17	3 163	3 208	3 217	3 232					
18	3 085	3 100	3 119	3 131					
19	3 095	3 107	3 123	3 122					
20	3 189	3 206	3 227	3 243					
21	3 223	3 242	3 263	3 291					
22	3 220	3 234	3 256	3 263					
23	3 175	3 191	3 214	3 230					
24	3 180	3 200	3 219	3 246					
25	3 112	3 132	3 148	3 157					
Mean	3 159	3 181	3 203	3 216					
Median	3 166	3 185	3 214	3 230					
std.dev	41	42	45	47					
Max	3 223	3 242	3 263	3 291	00	00	00	00	00
Min	3 085	3 100	3 119	3 122	00	00	00	00	00

### 9.4 Chart

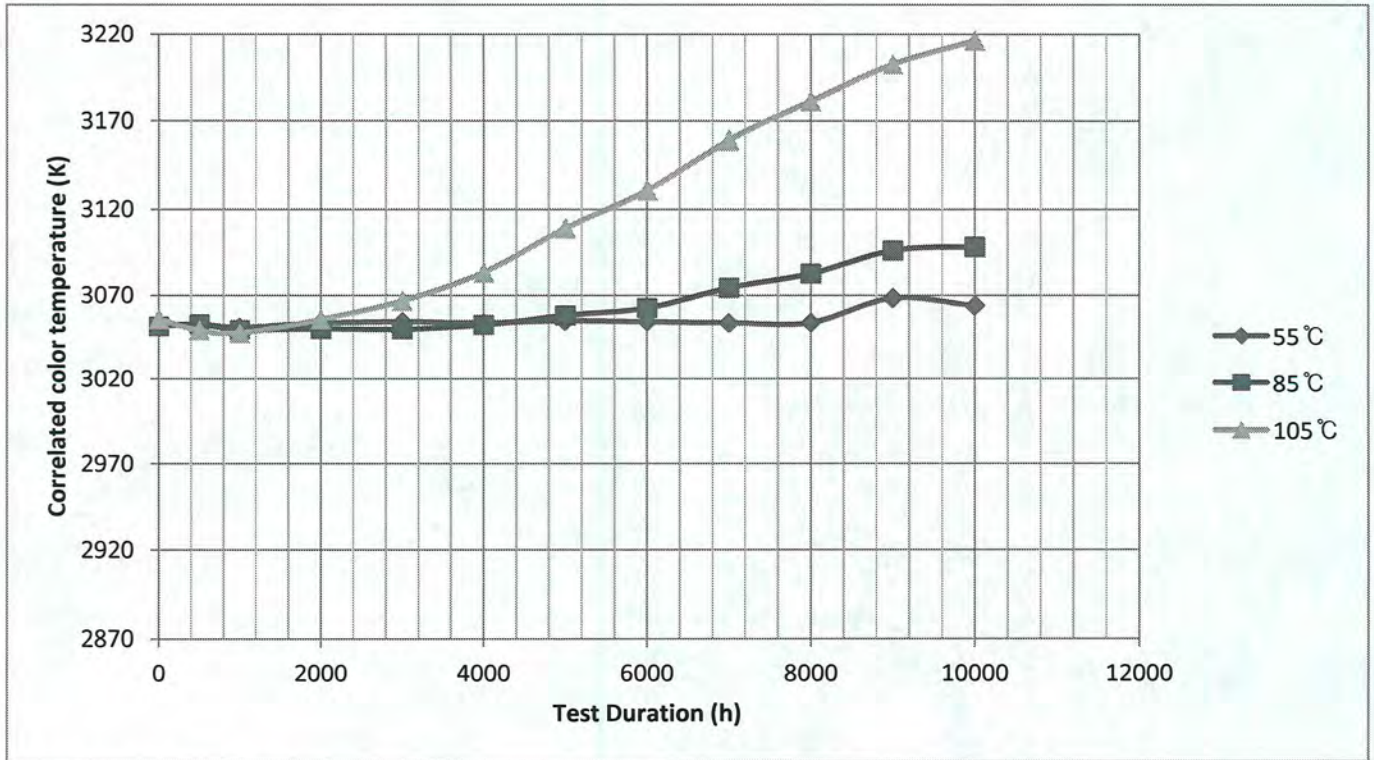
#### <Lumen Maintenance>



#### <Chromaticity Shift>



<CCT>



10. Observation of failures

No optical, Electrical or mechanical failure of any LED Package was seen during the lifetime testing.

11. LED light source monitoring interval

0 500 1 000 2 000 3 000 4 000 5 000 6 000 7 000 8 000  
9 000 10 000

12. Photometric measurement uncertainty

3.5%

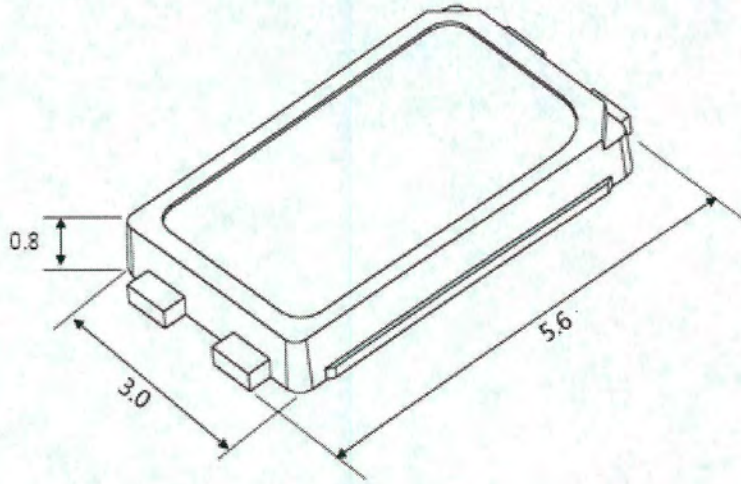
13. TM-21-11 Report : Projecting Long Term Lumen Maintenance of LED Light Source

Table 1: Report at each LM-80 Test Condition

Description of LED Light Source Tested (manufacturer, model, catalog number)		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp		Test Condition 3 - 105°C Case Temp	
Sample size	25	Sample size	25	Sample size	25	Sample size	25
Number of failures	0	Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	200	DUT drive current used in the test (mA)	200	DUT drive current used in the test (mA)	200	DUT drive current used in the test (mA)	200
Test duration (hours)	10,000	Test duration (hours)	10,000	Test duration (hours)	10,000	Test duration (hours)	10,000
Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105	Tested case temperature (°C)	105
$\alpha$	3.048E-06	$\alpha$	7.273E-06	$\alpha$	2.492E-05	$\alpha$	2.492E-05
B	0.998	B	1.014	B	1.064	B	1.064
Reported L70(10k) (hours)	>60000	Reported L70(10k) (hours)	51,000	Reported L70(10k) (hours)	17,000	Reported L70(10k) (hours)	17,000

14. Dimension of samples

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\*\*\*\*\* **END OF TEST REPORT** \*\*\*\*\*