



Report No. : SLED-17-002-R02

# 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-17-002-R02

Test Initiated Date : 2016.05.06

Test End Date : 2017.08.31

Report issued Date : 2018.06.11

Test result reported for	Testing performed by
SAMSUNG ELECTRONICS LED BUSINESS Lighting Marketing Group Tel) +82-31-8021-3231	<b>SAMSUNG ELECTRONICS LED BUSINESS</b> 1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do 17113, Korea
Tested By KyungYeup Kwak	Approved by SeungYoon Choi
	
Test Personal Name & Signatory	Approval Name & Signatory

**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	1 620	85.2	10 000	98.7	0.001 9
2	1 620	105.1	10 000	97.9	0.002 1

### 1. Number of LED light sources tested

- 20 Packages tested at actual case temperature 85.2 °C
- 20 Packages tested at actual case temperature 105.1 °C

### 2. Description of LED light sources

- IF = 1 620 mA (Current-per-die = 90mA), CCT(Nominal) = 3 000 K
- Package Dimension : ( 28.0 × 28.0 ) mm
- Samsung Electronics LED COB Package : LCxxxC Series, LCxxxD Series
- SPHWH\*HDNA\*\*\*\*\* (LC003D), SPHWH\*HDNB\*\*\*\*\* (LC006D, LC006DP),  
SPHWH\*HDNC\*\*\*\*\* (LC010C, LC009D), SPHWH\*HDND\*\*\*\*\* (LC013D, LC013DP),  
SPHWH\*HDNE\*\*\*\*\* (LC016D, LC016DP), SPHWH\*HDNF\*\*\*\*\* (LC020C, LC019D, LC021DP1),  
SPHWH\*HDNG\*\*\*\*\* (LC026D, LC026DP, LC028DP1),  
SPHWH\*HDNH\*\*\*\*\* (LC030C, LC033D, LC037DP1), SPHWH\*HDNK\*\*\*\*\* (LC040C, LC040D),  
SPHWH\*HDNL\*\*\*\*\* (LC060D), SPHWH\*HDNM\*\*\*\*\* (LC080D)

### 3. Description of auxiliary equipment

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

### 4. Operating time

- 10 000 h at ( 85.2 °C, 105.1 °C)
- Drive current : 1 620 mA
- Typical voltage : 52 V
- \* LED packages are driven with a constant direct current.

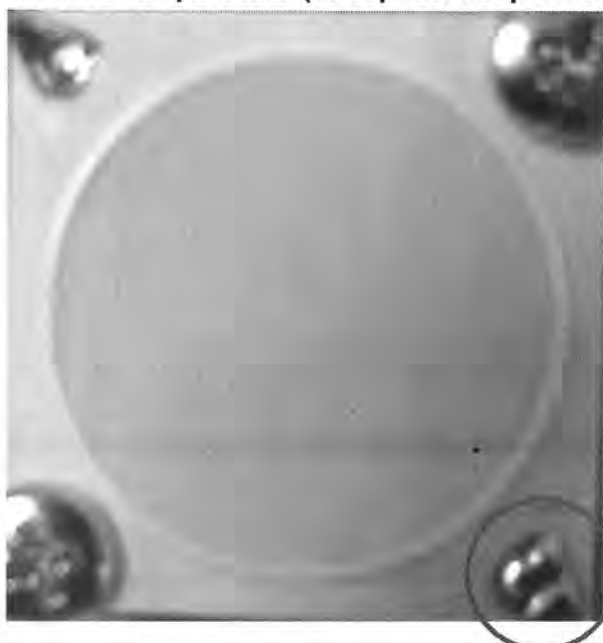
## 5. Ambient conditions including airflow, temperature and relative humidity

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 : Controlled to  $-2^{\circ}\text{C}$
- Surrounding air temperature : Controlled to  $-5^{\circ}\text{C}$
- 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 and 9.2

## 8. Initial luminous flux and forward voltage

See the table

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

See the table

1 620 mA

**1 620 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	11 563	51.69	100.4	100.2	99.9	99.8	99.5	99.2	99.1
2	11 780	51.83	100.6	99.9	99.6	99.4	99.1	99.1	99.4
3	11 491	51.76	100.5	100.2	99.7	99.4	99.1	99.0	99.0
4	11 442	52.07	99.8	99.5	99.4	99.2	99.0	98.4	98.7
5	11 924	52.16	100.4	100.1	99.8	99.6	99.3	98.9	98.9
6	11 720	52.07	100.5	99.5	99.7	99.5	99.3	99.3	99.4
7	11 701	52.06	100.5	100.3	99.9	99.8	99.7	99.8	100.0
8	11 695	52.11	100.7	100.6	99.8	99.7	99.6	99.5	99.7
9	11 645	51.69	100.7	100.5	100.2	100.3	100.3	100.4	100.3
10	11 876	52.14	100.1	100.0	99.7	99.2	99.3	99.3	99.2
11	11 737	51.88	100.7	100.4	100.1	99.9	99.9	99.7	99.8
12	11 658	52.07	100.5	100.4	99.8	100.0	99.8	100.0	99.0
13	11 953	52.14	100.6	100.4	100.3	100.0	100.1	100.2	100.3
14	11 793	51.82	100.5	100.3	100.0	100.0	100.1	100.0	100.2
15	11 586	51.64	100.5	100.3	100.0	100.1	99.9	100.0	100.3
16	11 723	52.12	100.6	100.3	100.0	100.0	99.9	100.0	100.0
17	11 755	52.14	100.3	99.9	99.4	99.4	99.3	99.0	99.0
18	11 606	51.65	100.4	99.8	99.6	99.2	99.0	99.0	99.2
19	11 916	52.12	100.5	100.2	99.7	99.2	99.2	99.2	99.2
20	11 833	52.12	100.5	98.9	98.7	98.3	98.5	98.1	98.1
Mean	11 720	51.96	100.5	100.1	99.8	99.6	99.5	99.4	99.4
Median	11 722	52.07	100.5	100.2	99.8	99.7	99.4	99.3	99.3
std.dev	141.1	0.19	0.2	0.4	0.4	0.4	0.5	0.6	0.6
Max	11 953	52.16	100.7	100.6	100.3	100.3	100.3	100.4	100.3
Min	11 442	51.64	99.8	98.9	98.7	98.3	98.5	98.1	98.1



1 620 mA

SAMSUNG ELECTRONICS LED BUSINESS  
1, Samsung-ro, Giheung-gu, Yongin-si,  
Gyeonggi-do 17113, Korea

1 620 mA

1 620 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	0.435 8	0.396 9	0.000 3	0.000 3	0.000 3	0.000 4	0.000 3	0.000 7	0.000 8
2	0.436 0	0.402 0	0.000 1	0.000 1	0.000 4	0.000 4	0.000 3	0.000 4	0.000 5
3	0.436 9	0.400 4	0.000 1	0.000 2	0.000 4	0.000 6	0.000 6	0.000 9	0.001 0
4	0.438 3	0.401 2	0.000 2	0.000 3	0.000 3	0.000 3	0.000 3	0.000 7	0.000 7
5	0.437 7	0.402 9	0.000 2	0.000 3	0.000 4	0.000 7	0.000 7	0.001 2	0.001 3
6	0.441 0	0.403 2	0.000 1	0.000 6	0.000 8	0.000 9	0.000 8	0.001 0	0.001 1
7	0.440 7	0.402 7	0.000 1	0.000 1	0.000 3	0.000 2	0.000 1	0.000 3	0.000 1
8	0.437 4	0.402 5	0.000 0	0.000 1	0.000 2	0.000 2	0.000 3	0.000 5	0.000 7
9	0.434 7	0.396 9	0.000 1	0.000 1	0.000 1	0.000 1	0.000 1	0.000 4	0.000 0
10	0.437 8	0.400 8	0.000 2	0.000 3	0.000 5	0.000 6	0.000 7	0.000 8	0.000 8
11	0.437 1	0.403 2	0.000 2	0.000 2	0.000 4	0.000 6	0.000 4	0.000 5	0.000 7
12	0.433 2	0.395 0	0.000 3	0.000 2	0.000 4	0.000 5	0.000 3	0.000 5	0.000 8
13	0.435 2	0.402 1	0.000 0	0.000 1	0.000 1	0.000 3	0.000 1	0.000 3	0.000 2
14	0.439 4	0.402 2	0.000 1	0.000 2	0.000 4	0.000 4	0.000 3	0.000 4	0.000 4
15	0.435 2	0.396 3	0.000 1	0.000 2	0.000 2	0.000 1	0.000 2	0.000 4	0.000 3
16	0.438 2	0.402 3	0.000 2	0.000 2	0.000 2	0.000 3	0.000 2	0.000 4	0.000 3
17	0.443 0	0.405 6	0.000 2	0.000 2	0.000 7	0.000 8	0.000 8	0.001 0	0.001 1
18	0.434 8	0.397 8	0.000 1	0.000 3	0.000 2	0.000 4	0.000 3	0.000 5	0.000 4
19	0.441 5	0.404 8	0.000 3	0.000 2	0.000 2	0.000 4	0.000 5	0.000 6	0.000 5
20	0.439 3	0.402 9	0.000 3	0.000 5	0.000 6	0.000 6	0.000 4	0.000 8	0.000 9
Mean	0.437 7	0.401 1	0.000 2	0.000 2	0.000 4	0.000 4	0.000 4	0.000 6	0.000 6
Median	0.437 6	0.402 2	0.000 1	0.000 2	0.000 3	0.000 4	0.000 3	0.000 5	0.000 7
std.dev	0.002 6	0.002 9	0.000 1	0.000 1	0.000 2	0.000 2	0.000 2	0.000 3	0.000 4
Max	0.443 0	0.405 6	0.000 3	0.000 6	0.000 8	0.000 9	0.000 8	0.001 2	0.001 3
Min	0.433 2	0.395 0	0.000 0	0.000 1	0.000 1	0.000 1	0.000 1	0.000 3	0.000 0

**1 620 mA**

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1 620 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	2 960	2 965	2 968	2 966	2 969	2 968	2 977	2 979
2	2 999	2 998	3 002	3 009	3 009	3 007	3 010	3 011
3	2 970	2 972	2 973	2 981	2 984	2 984	2 992	2 995
4	2 953	2 958	2 959	2 960	2 960	2 958	2 971	2 969
5	2 977	2 976	2 983	2 986	2 993	2 993	3 006	3 010
6	2 924	2 927	2 939	2 943	2 945	2 943	2 948	2 951
7	2 926	2 927	2 929	2 932	2 930	2 928	2 932	2 929
8	2 978	2 979	2 979	2 982	2 984	2 986	2 991	2 996
9	2 978	2 976	2 978	2 980	2 980	2 979	2 983	2 979
10	2 959	2 962	2 965	2 970	2 975	2 976	2 979	2 980
11	2 991	2 995	2 996	3 000	3 005	3 001	3 004	3 007
12	2 988	2 994	2 994	2 999	3 001	2 995	2 997	3 010
13	3 014	3 015	3 017	3 016	3 022	3 017	3 018	3 017
14	2 944	2 946	2 949	2 954	2 954	2 952	2 954	2 953
15	2 966	2 969	2 972	2 972	2 969	2 969	2 975	2 973
16	2 964	2 968	2 970	2 969	2 970	2 970	2 972	2 972
17	2 913	2 918	2 917	2 928	2 932	2 932	2 938	2 939
18	2 985	2 983	2 992	2 990	2 995	2 992	2 997	2 995
19	2 931	2 932	2 933	2 936	2 941	2 942	2 942	2 942
20	2 951	2 945	2 962	2 964	2 964	2 962	2 971	2 971
Mean	2 964	2 965	2 969	2 972	2 974	2 973	2 978	2 979
Median	2 965	2 969	2 971	2 971	2 973	2 973	2 978	2 979
std.dev	27	26	26	25	26	25	25	26
Max	3 014	3 015	3 017	3 016	3 022	3 017	3 018	3 017
Min	2 913	2 918	2 917	2 928	2 930	2 928	2 932	2 929



1 620 mA

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1 620 mA

**1 620 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	10 231	50.47	100.2	100.1	99.6	99.2	98.9	98.8	98.7
2	10 309	50.80	100.4	100.1	99.8	99.4	99.1	99.1	99.1
3	10 392	50.80	100.5	100.2	99.6	99.3	98.9	98.6	98.2
4	10 299	50.83	100.1	99.8	99.1	98.5	98.6	98.6	98.6
5	10 158	50.38	100.5	100.1	99.8	99.4	99.3	99.2	99.1
6	10 469	50.90	100.4	100.2	100.1	99.9	99.8	99.8	99.8
7	10 618	50.92	100.3	100.0	99.8	99.5	99.0	98.9	98.5
8	10 233	50.47	100.1	100.1	99.7	99.7	99.4	99.1	98.7
9	10 250	50.54	100.4	100.1	99.9	99.6	99.8	99.8	99.9
10	10 459	50.94	100.2	100.1	99.6	99.6	99.7	99.6	99.5
11	10 319	50.45	100.3	100.1	99.8	99.3	98.9	98.7	98.2
12	10 543	50.76	100.2	100.0	99.7	99.4	99.6	99.6	99.4
13	10 340	50.65	100.1	99.8	99.6	99.3	99.5	99.4	99.3
14	10 363	50.77	100.3	100.0	99.7	99.5	99.6	99.6	99.8
15	10 373	50.63	100.3	100.1	99.7	99.4	99.6	99.7	99.7
16	10 413	50.61	100.4	100.2	100.0	99.7	99.1	98.3	98.2
17	10 501	50.85	100.3	100.0	99.3	99.2	99.2	99.1	99.0
18	10 422	50.75	100.4	100.1	99.8	99.4	98.9	98.9	98.7
19	10 354	50.62	100.4	100.0	99.9	99.8	99.8	99.9	99.9
20	10 547	50.78	100.1	99.7	99.6	99.3	99.3	99.4	99.3
Mean	10 380	50.69	100.3	100.0	99.7	99.4	99.3	99.2	99.1
Median	10 368	50.75	100.3	100.1	99.7	99.4	99.3	99.2	99.1
std.dev	119.4	0.17	0.1	0.1	0.2	0.3	0.4	0.5	0.6
Max	10 618	50.94	100.5	100.2	100.1	99.9	99.8	99.9	99.9
Min	10 158	50.38	100.1	99.7	99.1	98.5	98.6	98.3	98.2

1 620 mA

**1 620 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	98.4	98.1	97.8	97.2					
2	98.7	98.5	98.1	97.6					
3	97.9	97.8	97.6	97.3					
4	98.3	98.1	97.8	97.4					
5	98.9	98.7	98.3	97.9					
6	99.5	99.2	99.1	98.7					
7	98.1	97.8	97.7	97.3					
8	98.0	97.6	97.3	97.1					
9	99.6	99.5	99.2	98.9					
10	99.1	98.9	98.5	98.3					
11	97.9	97.7	97.4	96.9					
12	99.3	99.2	98.9	98.4					
13	99.2	99.1	98.9	98.4					
14	99.4	99.3	98.9	98.7					
15	99.4	99.0	98.7	98.1					
16	98.0	97.9	97.7	97.5					
17	98.9	98.7	98.4	97.8					
18	97.9	97.7	97.5	97.0					
19	99.5	99.5	99.2	98.7					
20	99.0	98.9	98.5	98.1					
Mean	98.8	98.6	98.3	97.9					
Median	98.9	98.7	98.4	97.8					
std.dev	0.6	0.6	0.6	0.6					
Max	99.6	99.5	99.2	98.9					
Min	97.9	97.6	97.3	96.9					



1 620 mA

1 620 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	0.440 5	0.401 8	0.000 3	0.000 3	0.000 4	0.000 9	0.000 9	0.001 1	0.001 2
2	0.442 2	0.403 2	0.000 1	0.000 1	0.000 3	0.000 6	0.000 5	0.000 5	0.000 6
3	0.431 9	0.394 7	0.000 1	0.000 1	0.000 4	0.000 6	0.000 6	0.000 7	0.001 2
4	0.438 5	0.405 6	0.000 1	0.000 3	0.000 7	0.001 1	0.000 9	0.000 9	0.001 1
5	0.438 0	0.399 2	0.000 0	0.000 2	0.000 2	0.000 7	0.000 6	0.000 6	0.001 0
6	0.443 4	0.407 1	0.000 1	0.000 2	0.000 2	0.000 7	0.000 4	0.000 5	0.000 6
7	0.441 7	0.404 4	0.000 2	0.000 2	0.000 5	0.000 7	0.000 7	0.000 7	0.001 0
8	0.437 6	0.401 1	0.000 2	0.000 1	0.000 3	0.000 4	0.000 3	0.000 4	0.000 8
9	0.440 4	0.399 4	0.000 2	0.000 5	0.000 5	0.000 9	0.000 6	0.000 7	0.000 7
10	0.439 5	0.405 0	0.000 3	0.000 3	0.000 4	0.000 8	0.000 6	0.000 6	0.000 8
11	0.433 1	0.394 2	0.000 2	0.000 3	0.000 5	0.000 8	0.000 7	0.000 9	0.001 0
12	0.436 9	0.403 1	0.000 3	0.000 5	0.000 6	0.000 8	0.000 7	0.000 7	0.000 9
13	0.439 9	0.401 3	0.000 1	0.000 2	0.000 4	0.000 7	0.000 6	0.000 7	0.000 9
14	0.442 4	0.405 9	0.000 2	0.000 3	0.000 5	0.000 7	0.000 5	0.000 5	0.000 6
15	0.435 1	0.397 5	0.000 2	0.000 3	0.000 6	0.000 9	0.000 7	0.000 5	0.000 9
16	0.435 4	0.401 2	0.000 3	0.000 3	0.000 5	0.000 8	0.000 8	0.001 4	0.001 4
17	0.443 3	0.406 2	0.000 2	0.000 3	0.000 5	0.000 8	0.000 6	0.000 9	0.000 9
18	0.439 7	0.404 9	0.000 1	0.000 3	0.000 3	0.000 6	0.000 7	0.000 7	0.000 9
19	0.443 0	0.405 0	0.000 1	0.000 3	0.000 3	0.000 3	0.000 4	0.000 6	0.000 6
20	0.437 4	0.400 7	0.000 3	0.000 4	0.000 4	0.000 8	0.000 5	0.000 5	0.000 8
Mean	0.439 0	0.402 1	0.000 2	0.000 3	0.000 4	0.000 7	0.000 6	0.000 7	0.000 9
Median	0.439 6	0.402 4	0.000 2	0.000 3	0.000 4	0.000 7	0.000 6	0.000 7	0.000 9
std.dev	0.003 3	0.003 7	0.000 1	0.000 1	0.000 1	0.000 2	0.000 2	0.000 2	0.000 2
Max	0.443 4	0.407 1	0.000 3	0.000 5	0.000 7	0.001 1	0.000 9	0.001 4	0.001 4
Min	0.431 9	0.394 2	0.000 0	0.000 1	0.000 2	0.000 3	0.000 3	0.000 4	0.000 6

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1 620 mA

1 620 mA

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	2 922	2 928	2 931	2 932	2 943	2 944	2 949	2 952
2	2 906	2 910	2 910	2 914	2 922	2 918	2 919	2 921
3	3 008	3 010	3 011	3 018	3 024	3 024	3 027	3 037
4	2 985	2 988	2 991	3 001	3 013	3 007	3 007	3 012
5	2 942	2 943	2 946	2 948	2 959	2 957	2 958	2 968
6	2 918	2 919	2 922	2 923	2 935	2 929	2 929	2 933
7	2 924	2 927	2 929	2 935	2 940	2 939	2 942	2 948
8	2 964	2 966	2 966	2 970	2 974	2 971	2 974	2 982
9	2 904	2 910	2 916	2 916	2 928	2 919	2 922	2 921
10	2 964	2 971	2 971	2 975	2 984	2 978	2 979	2 983
11	2 983	2 987	2 990	2 994	3 005	3 001	3 006	3 008
12	2 993	2 999	3 005	3 007	3 014	3 010	3 010	3 016
13	2 928	2 931	2 934	2 939	2 946	2 942	2 943	2 950
14	2 925	2 929	2 933	2 937	2 943	2 938	2 937	2 940
15	2 976	2 982	2 985	2 990	2 997	2 994	2 989	2 999
16	3 002	3 008	3 010	3 016	3 022	3 023	3 039	3 037
17	2 912	2 915	2 919	2 923	2 930	2 926	2 933	2 933
18	2 961	2 962	2 967	2 968	2 976	2 978	2 979	2 982
19	2 908	2 911	2 915	2 916	2 915	2 917	2 922	2 922
20	2 964	2 971	2 974	2 974	2 984	2 977	2 977	2 985
Mean	2 950	2 953	2 956	2 960	2 968	2 965	2 967	2 971
Median	2 951	2 953	2 956	2 958	2 967	2 964	2 966	2 975
std.dev	34	35	35	36	36	36	37	38
Max	3 008	3 010	3 011	3 018	3 024	3 024	3 039	3 037
Min	2 904	2 910	2 910	2 914	2 915	2 917	2 919	2 921



**1 620 mA**

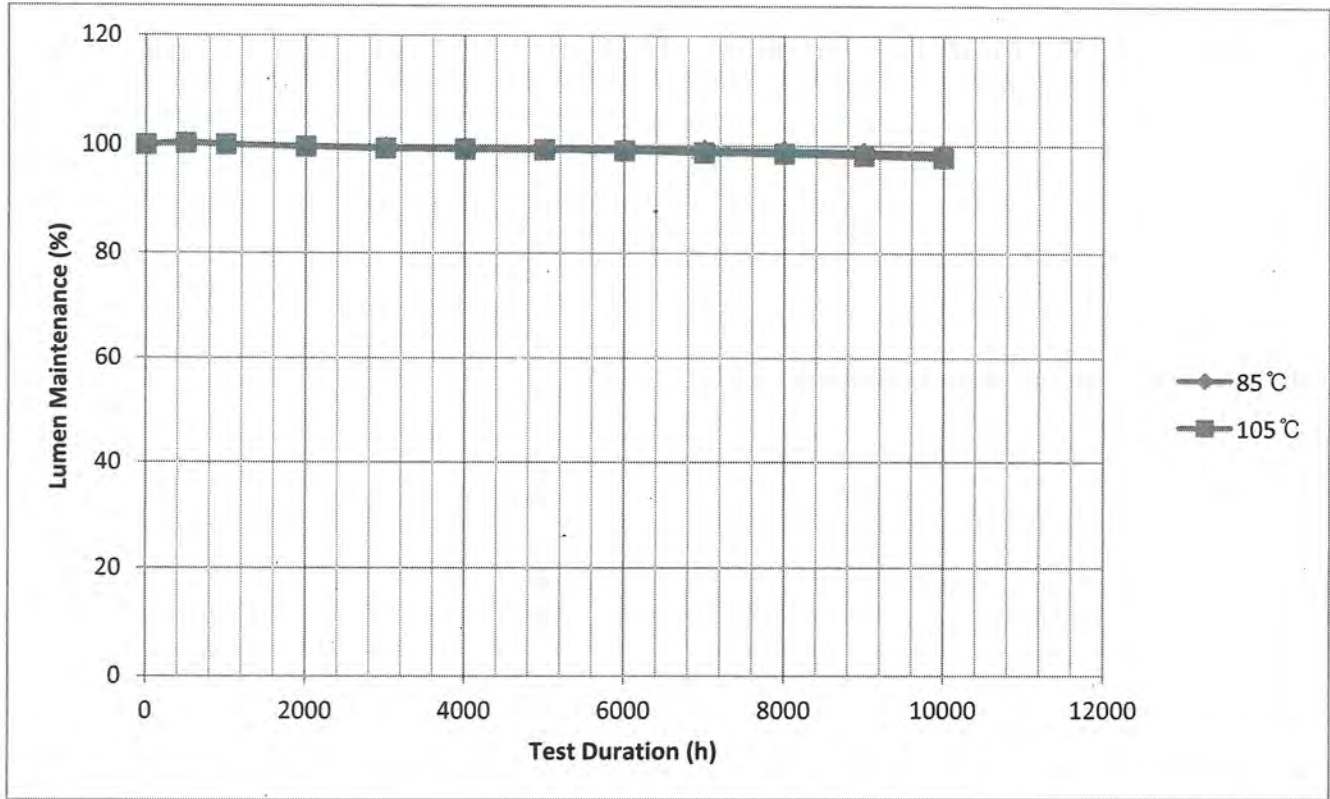
1 620 mA

[illegible]

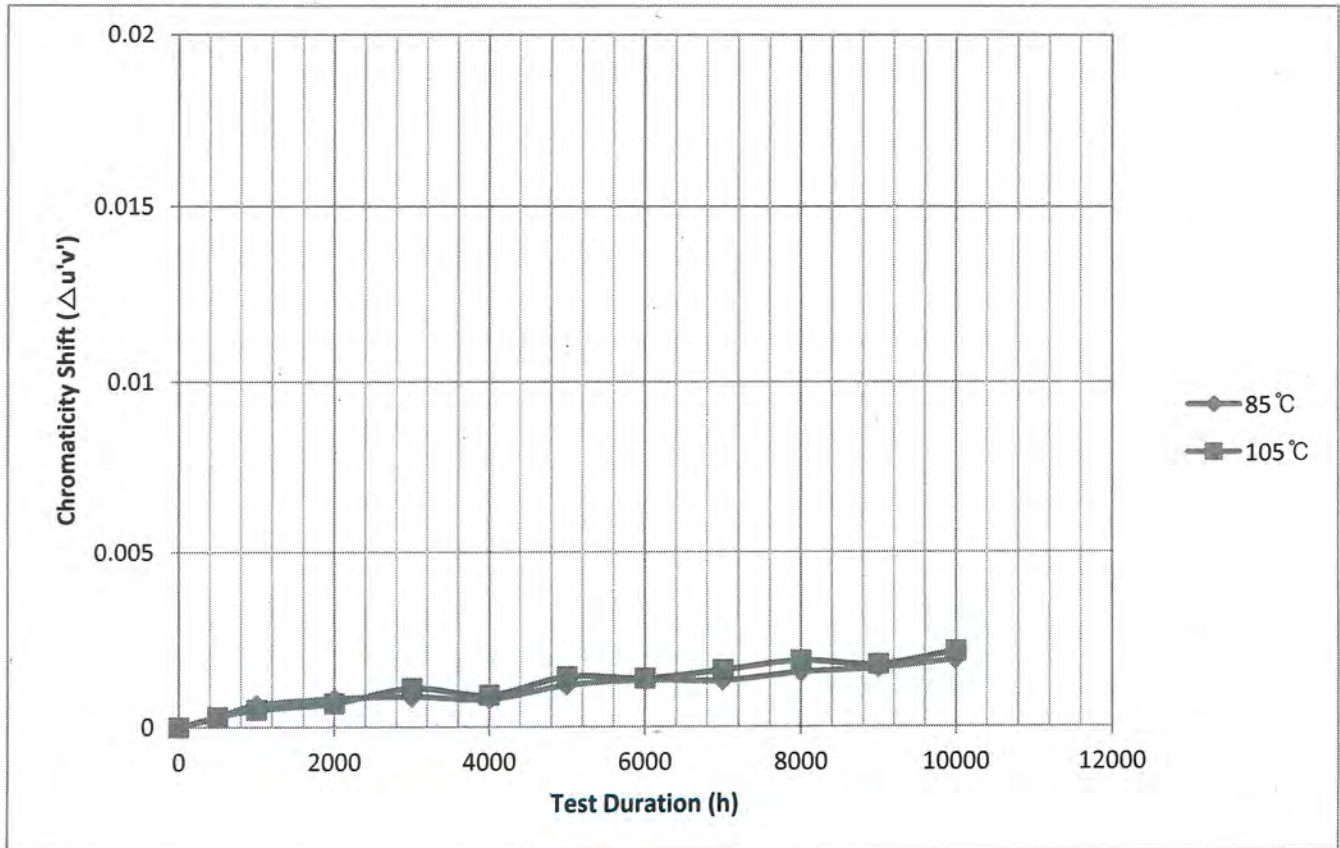
### 9.3 Chart

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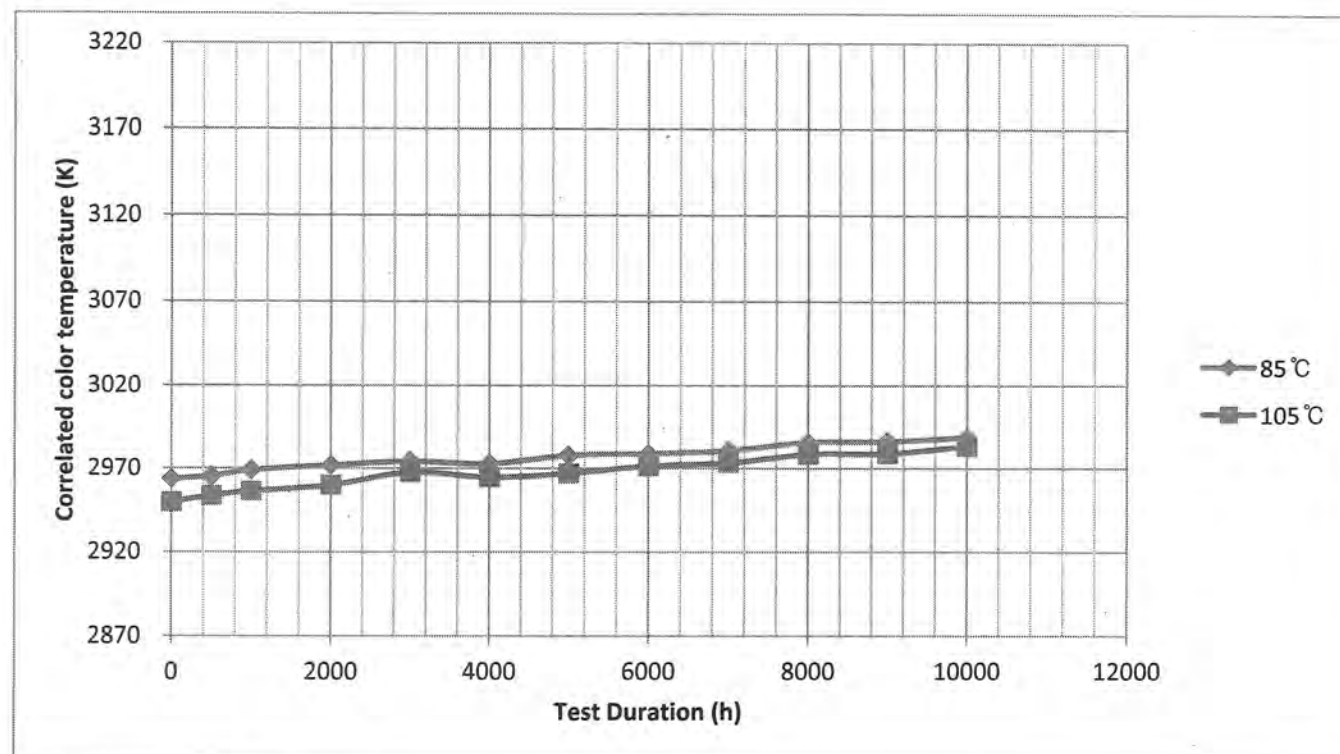
#### <Lumen Maintenance>



#### <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

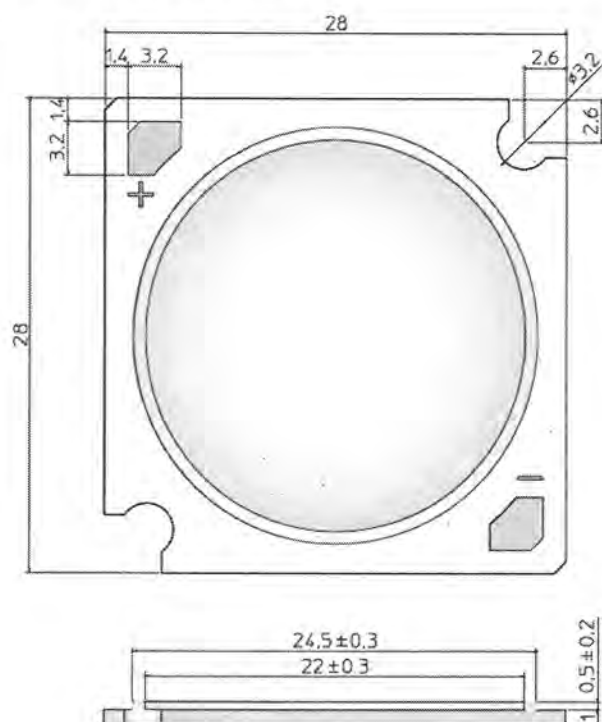
Table 1: Report at each LM-80 Test Condition

Description of LED Light Source Tested (manufacturer, model, catalog number)					
Test Condition 1 - 85°C Case Temp		Test Condition 2 - 105°C Case Temp			
Sample size	20	Sample size	20	Sample size	-
Number of failures	0	Number of failures	0	Number of failures	-
DUT drive current used in the test (mA)	1620	DUT drive current used in the test (mA)	1620	DUT drive current used in the test (mA)	-
Test duration (hours)	10,000	Test duration (hours)	10,000	Test duration (hours)	-
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)	-
Tested case temperature (°C)	85	Tested case temperature (°C)	105	Tested case temperature (°C)	-
$\alpha$	1.557E-06	$\alpha$	2.637E-06	$\alpha$	-
B	1.003	B	1.006	B	-
Reported L70(10k) (hours)	>60000	Reported L70(10k) (hours)	>60000	Reported L70(10k) (hours)	-



## 14. Dimension of samples

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## 15. Applicable product series

Product name	Size	Chip		LM80 Condition	
	Outer [mm]	Array	Distance (Chip to Chip) [mm]	If [mA]	Power Density [W/mm <sup>2</sup> ]
LC010C	13.5 X 13.5	12s X 2p	0.30	380	0.080
LC020C	19 X 19	12s X 4p	0.30	920	0.097
LC030C		12s X 6p	0.37	1050	0.108
LC040C		12s X 7p	0.30	1050	0.106
LC003D	13.5 X 13.5	12s X 1p	1.13	230	0.051
LC006D LC006DP		12s X 2p	0.59	460	0.101
LC009D		12s X 3p	0.48	510	0.108
LC013D LC013DP		12s X 4p	0.35	520	0.108
LC016D LC016DP	19 X 19	12s X 5p	0.59	1000	0.107
LC019D		12s X 6p	0.37	1030	0.108
LC026D LC026DP		12s X 8p	0.44	1080	0.110
LC033D		12s X 10p	0.33	1080	0.108
LC021DP1	23.85X23.85	12s X 6p	0.55	1380	0.099
LC028DP1		12s X 8p	0.46	1440	0.104
LC037DP1		12s X 10p	0.64	1440	0.103
LC040D	28 X 28	12s X 12p	0.68	2160	0.105
LC060D		18s X 12p	0.50	1560	0.109
LC080D		18s X 18p	0.30	1620	0.110

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

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