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DURIS® E 5
White (CCT 2700 K – 6500 K)

IES LM-80-08 Test Report

Test Documentation No.: 150241W1 – 3rd June 2015

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Document Information

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Conclusion

All tests have been performed according to the specified requirements described in IES LM-80-08. The results relate only to the listed amount of tested samples.

Confirmation

Test report prepared by	Test report approved by
Chen Kiat Pang	Joanne Ooi
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Further explanations:
Data: The Data used in this Document consider the reliability test results under the mentioned driving conditions only. For Product information on the maximum operating conditions please refer to the Product data sheet or contact your local sales partner.
Conditions: The conditions for the generation of the data are as follows:
1. The Data and curves shown in this Document are based on experiments carried out under laboratory conditions on a random sample size of LED with readouts at discrete readout times (where applicable). Thus, the Data above represent a limited number of production lots only and may differ between different assembly lots over time (including chip or package changes). Thus, the behavior of the LED in the final application may differ from the Data. The behavior of the LED at conditions or readout times deviating from those stated above may not be deduced from the Data.
2. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.
3. Possible differences in the thermal management of OSRAM OS and customer's setup may lead to a different aging behavior.
4. The lifetime projection data presented in this Document has been evaluated in accordance with the lifetime extrapolation method described and defined in IES TM-21-11. The lifetime projection is based on the Data shown in this Document. The Data had been collected and assembled according to IES LM-80-08.

Test Report

1. Number of LED light sources tested

75 randomly selected samples from mass production.

2. Description of LED light sources

Devices tested

- DURIS E 5 GW JDSRS1.EC with CCT 3000 K

3. Description of auxiliary equipment

Devices are soldered to metal-core PCB and mounted in a thermal chamber on hot-plates to maintain the desired solder-point temperature. Reliability test boards are removed from the thermal chamber to cool down to room temperature for electrical and optical characterization.
Soldering equipment: Heller 1812 MKIII,
Stress equipment: Customized thermal chambers,
Electrical characterization: Keithley 2425-C controlled by customized software,
Measurement equipment: integrating sphere/spectroradiometer: Instrument systems CAS140CT

4. Operating cycle

The devices are tested at constant solder-point temperature and constant direct current.

5. Ambient conditions including airflow, temperature and relative humidity

Boards with devices under test are operated on controlled thermal plates in an oven with controlled environmental conditions according to section 4.4 of LM-80-08. Case temperature is controlled within -2°C; ambient temperature in the oven is controlled within -5 C of case temperature; humidity is below 65 % r.H. and airflow is minimized (not forced) in the oven. The ambient temperature during lumen and chromaticity measurements is set to 25 ± 2 °C.

6. Case temperature (test point temperature)

The devices under test are operated at three constant case temperatures of 55°C, 85°C and 105 °C. The test point temperature at device is marked in the isometric view graph on page 7.

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

The devices under test are operated at constant forward current. The operating current is listed in the test data tables.

8. Initial luminous flux and forward voltage at photometric measurement current

Please refer to the test data tables on pages 9 – 11.

9. Lumen maintenance data for each individual LED light source

Please refer to the test data tables on pages 9 - 11.

10. Observation of LED light source failures including the failure conditions and time of failure

None.

11. LED light source monitoring interval

Devices were electrically and optically characterized at room temperature at 0 h, 504 h, 1000 h, 2000 h, 3000 h, 4000 h, 5000 h, 6000 h.

12. Photometric measurement uncertainty

Measurement uncertainty for luminous flux (GUM): 4.6%

13. Chromaticity shift reported over the measurement time

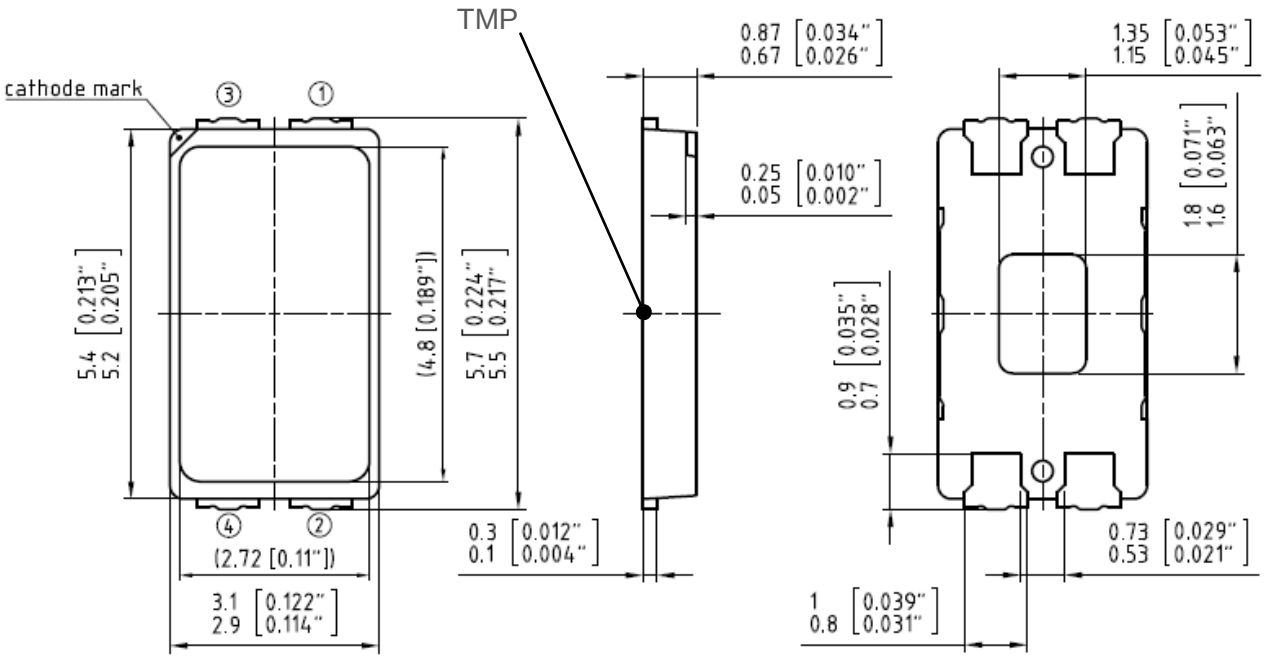
Please refer to the test data tables on pages 9 - 11.

Summary of Testing Conditions

	I	II	III
Case temperature (solder point)	T_S = 55°C	T_S = 85 C	T_S = 105 C
Device drive current	I_F = 80 mA	I_F = 80 mA	I_F = 80 mA
Number of samples	25	25	25
Test start	09.07.2014	09.07.2014	09.07.2014
Test duration	6,000 hours	6,000 hours	6,000 hours
Nr. of failures	0	0	0

Isometric View Graphs and Temperature Measurement Point (TMP)

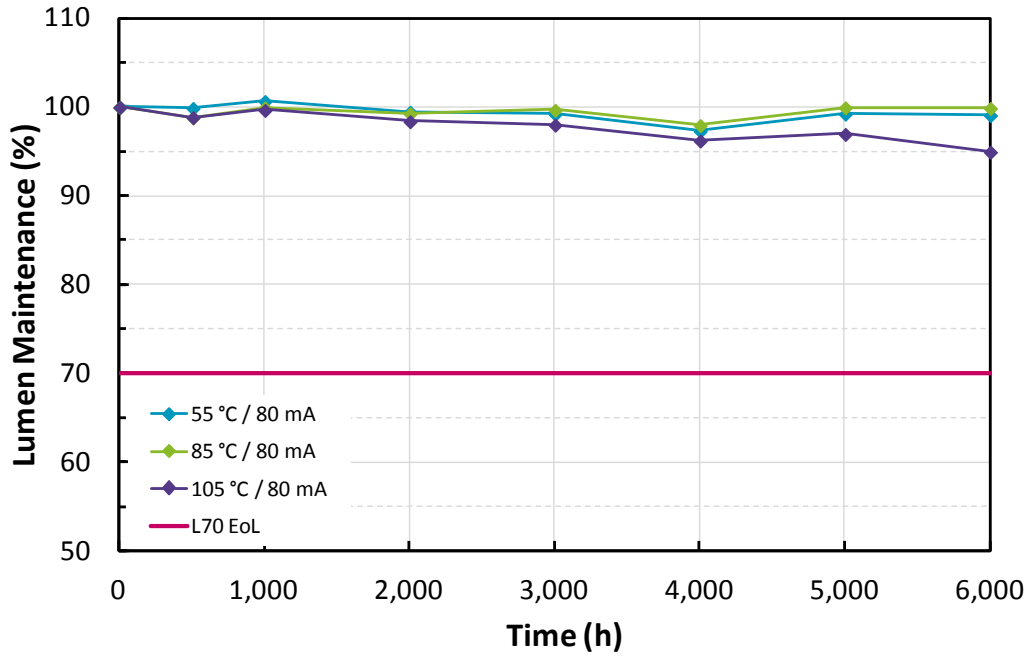
Device: GW JDSRS1.xC



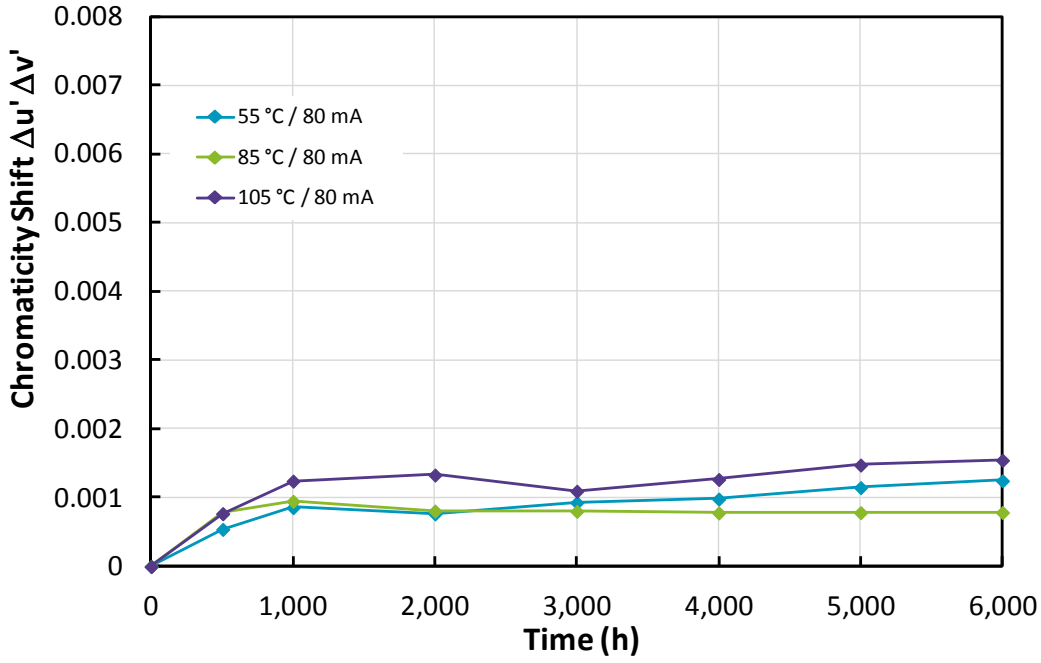
Test Results

1. Graphic charts

Lumen maintenance (I_F = 80 mA) – Normalized to 0 h



Chromaticity shift Δu' Δv' (I_F = 80 mA) – Normalized to 0 h



2. Tables

Test condition I: T_S = 55°C, I_F = 80 mA

Lumen maintenance (I_F = 80 mA) – Normalized to 0 h

	U_F [V]	Φ_V [lm]	Measurement Time of Lumen Maintenance							
	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	2.88	33.32	100.00	99.98	100.43	98.95	98.50	96.27	98.33	98.20
2	2.88	33.36	100.00	99.74	100.46	98.09	97.91	95.92	97.50	97.20
3	2.87	33.36	100.00	99.74	100.34	99.16	98.80	96.78	98.42	98.24
4	2.87	32.68	100.00	100.54	101.42	99.59	99.80	98.67	99.74	99.40
5	2.87	33.33	100.00	99.86	100.61	99.55	98.62	97.66	98.89	98.56
6	2.88	31.74	100.00	99.78	99.96	98.10	97.62	96.71	97.84	97.63
7	2.87	32.81	100.00	100.05	100.53	99.37	98.98	96.08	99.07	98.92
8	2.87	32.56	100.00	100.06	100.72	99.65	99.50	97.00	99.49	99.43
9	2.86	32.54	100.00	99.79	100.54	99.53	99.19	97.00	99.25	99.22
10	2.87	32.61	100.00	100.15	101.12	100.16	99.98	98.12	100.35	100.31
11	2.87	32.60	100.00	99.88	100.54	99.50	99.43	97.52	99.43	99.19
12	2.87	32.75	100.00	99.30	99.96	98.71	98.50	96.71	98.04	97.65
13	2.86	32.54	100.00	99.51	100.20	98.77	98.47	96.73	98.18	98.00
14	2.87	32.27	100.00	100.07	101.13	100.11	99.99	98.52	99.99	99.77
15	2.87	30.78	100.00	99.93	101.10	100.03	99.89	98.67	99.96	100.00
16	2.87	32.50	100.00	100.09	100.94	100.26	100.23	97.24	100.50	100.29
17	2.87	32.63	100.00	99.97	100.63	99.68	99.43	96.73	99.62	99.61
18	2.88	32.42	100.00	99.88	100.82	100.11	100.11	97.67	100.48	100.41
19	2.87	32.33	100.00	100.31	101.10	100.08	100.05	97.72	100.36	100.29
20	2.87	32.39	100.00	99.52	100.14	98.82	98.22	95.96	98.05	97.84
21	2.86	32.55	100.00	100.12	101.00	99.98	99.83	97.79	99.95	99.77
22	2.87	32.37	100.00	99.58	100.51	99.35	99.17	97.39	99.43	99.01
23	2.88	32.31	100.00	99.67	100.61	99.47	99.20	97.33	98.63	98.94
24	2.86	31.50	100.00	100.32	101.45	100.36	100.27	99.08	100.86	100.64
25	2.87	31.06	100.00	99.28	100.38	99.10	98.83	97.44	98.74	98.69
median	2.87	32.54	100.00	99.88	100.61	99.53	99.20	97.33	99.43	99.19
average	2.87	32.45	100.00	99.88	100.67	99.46	99.22	97.31	99.24	99.09
std. dev.	0.00	0.64	0.00	0.31	0.41	0.63	0.76	0.86	0.95	0.99
min.	2.86	30.78	100.00	99.28	99.96	98.09	97.62	95.92	97.50	97.20
max.	2.88	33.36	100.00	100.54	101.45	100.36	100.27	99.08	100.86	100.64

Chromaticity shift Δu' Δv' (I_F = 80 mA) – Normalized to 0 h

	CCT [K]	u'	v'	Measurement Time of Color Shift Δu'Δv'							
	0 h	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	3032	0.249	0.524	0.0000	0.0006	0.0010	0.0011	0.0013	0.0014	0.0017	0.0017
2	3027	0.249	0.524	0.0000	0.0007	0.0011	0.0013	0.0015	0.0015	0.0018	0.0020
3	3042	0.249	0.522	0.0000	0.0008	0.0011	0.0010	0.0012	0.0013	0.0017	0.0017
4	3083	0.248	0.520	0.0000	0.0003	0.0005	0.0006	0.0006	0.0006	0.0010	0.0010
5	3073	0.247	0.522	0.0000	0.0005	0.0009	0.0008	0.0011	0.0011	0.0013	0.0014
6	3015	0.249	0.524	0.0000	0.0006	0.0010	0.0012	0.0015	0.0015	0.0016	0.0018
7	3068	0.247	0.523	0.0000	0.0006	0.0010	0.0009	0.0012	0.0013	0.0015	0.0016
8	3062	0.248	0.523	0.0000	0.0006	0.0009	0.0008	0.0010	0.0010	0.0012	0.0013
9	3115	0.247	0.520	0.0000	0.0006	0.0010	0.0009	0.0011	0.0011	0.0013	0.0014
10	3070	0.247	0.523	0.0000	0.0004	0.0005	0.0004	0.0004	0.0005	0.0006	0.0007
11	3087	0.247	0.521	0.0000	0.0006	0.0010	0.0007	0.0008	0.0009	0.0011	0.0011
12	3048	0.248	0.524	0.0000	0.0007	0.0010	0.0010	0.0011	0.0012	0.0014	0.0016
13	3046	0.248	0.524	0.0000	0.0006	0.0010	0.0010	0.0012	0.0012	0.0015	0.0016
14	3076	0.247	0.523	0.0000	0.0004	0.0005	0.0004	0.0006	0.0006	0.0008	0.0010
15	2994	0.251	0.522	0.0000	0.0004	0.0007	0.0005	0.0006	0.0007	0.0007	0.0008
16	3063	0.248	0.523	0.0000	0.0006	0.0007	0.0005	0.0005	0.0005	0.0006	0.0006
17	3105	0.247	0.520	0.0000	0.0006	0.0009	0.0008	0.0009	0.0010	0.0011	0.0011
18	3055	0.248	0.523	0.0000	0.0002	0.0005	0.0003	0.0006	0.0005	0.0007	0.0007
19	3063	0.247	0.524	0.0000	0.0005	0.0008	0.0007	0.0008	0.0008	0.0008	0.0009
20	3055	0.248	0.522	0.0000	0.0006	0.0010	0.0010	0.0013	0.0015	0.0017	0.0018
21	3064	0.248	0.522	0.0000	0.0004	0.0007	0.0004	0.0006	0.0006	0.0008	0.0009
22	3056	0.248	0.524	0.0000	0.0007	0.0010	0.0008	0.0010	0.0009	0.0010	0.0011
23	3059	0.248	0.523	0.0000	0.0006	0.0009	0.0008	0.0010	0.0010	0.0011	0.0013
24	3079	0.247	0.522	0.0000	0.0005	0.0008	0.0004	0.0006	0.0005	0.0006	0.0007
25	3089	0.247	0.522	0.0000	0.0005	0.0009	0.0009	0.0010	0.0013	0.0013	0.0014
median	3063	0.248	0.523	0.0000	0.0006	0.0009	0.0008	0.0010	0.0010	0.0011	0.0013
average	3061	0.248	0.523	0.0000	0.0005	0.0009	0.0008	0.0009	0.0010	0.0011	0.0012
std. dev.	27	0.001	0.001	0.0000	0.0001	0.0002	0.0003	0.0003	0.0003	0.0004	0.0004
min.	2994	0.247	0.520	0.0000	0.0002	0.0005	0.0003	0.0004	0.0005	0.0006	0.0006
max.	3115	0.251	0.524	0.0000	0.0008	0.0011	0.0013	0.0015	0.0015	0.0018	0.0020

Test condition II: T_S = 85°C, I_F = 80 mA

Lumen maintenance (I_F = 80 mA) – Normalized to 0 h

	U_F [V]	Φ_V [lm]	Measurement Time of Lumen Maintenance							
	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	2.87	33.36	100.00	98.73	99.66	98.27	98.20	96.39	98.69	98.68
2	2.87	33.33	100.00	98.43	98.25	98.27	98.59	96.95	99.13	99.01
3	2.87	33.69	100.00	98.38	99.45	98.84	99.24	97.67	99.34	99.30
4	2.87	33.63	100.00	99.26	100.43	99.78	100.00	98.55	100.20	100.16
5	2.87	33.39	100.00	99.38	100.67	99.01	99.68	98.61	99.79	99.60
6	2.86	31.76	100.00	97.94	98.99	98.44	98.96	98.11	99.03	99.07
7	2.87	32.72	100.00	98.57	99.96	99.13	99.37	96.71	99.68	99.67
8	2.87	32.72	100.00	97.76	98.77	98.13	98.56	96.17	98.92	98.89
9	2.87	32.75	100.00	98.12	99.50	98.83	99.31	97.10	99.61	99.61
10	2.87	32.85	100.00	99.42	100.72	100.19	100.30	98.28	100.61	100.63
11	2.86	32.64	100.00	99.03	99.31	98.80	99.25	97.46	99.58	99.58
12	2.87	32.86	100.00	99.42	100.72	99.89	100.15	98.52	100.58	100.48
13	2.87	32.89	100.00	98.21	99.32	98.68	99.13	97.56	99.22	99.10
14	2.85	32.49	100.00	99.24	100.51	100.02	100.56	99.15	100.84	100.74
15	2.86	32.33	100.00	99.27	100.45	99.81	100.08	98.70	100.26	100.05
16	2.88	31.41	100.00	99.00	99.71	99.00	99.52	98.45	99.63	99.64
17	2.87	32.69	100.00	97.75	99.10	98.43	98.83	96.29	99.16	99.01
18	2.86	32.45	100.00	98.84	100.02	99.38	99.89	97.51	100.23	100.14
19	2.86	32.65	100.00	99.24	100.66	100.10	100.64	98.49	101.04	101.01
20	2.87	32.81	100.00	99.09	100.44	99.83	100.30	98.31	100.70	100.61
21	2.87	32.51	100.00	99.36	100.30	99.74	100.23	98.30	100.47	100.32
22	2.87	32.28	100.00	99.67	100.89	100.21	100.54	98.76	100.60	100.36
23	2.87	32.32	100.00	99.52	100.95	100.39	100.91	99.43	101.31	101.27
24	2.88	32.48	100.00	98.87	100.23	99.71	100.26	98.88	100.60	100.50
25	2.86	30.86	100.00	98.29	99.64	98.91	99.41	98.45	99.67	99.65
median	2.87	32.69	100.00	99.00	100.02	99.13	99.68	98.30	99.79	99.67
average	2.87	32.63	100.00	98.83	99.95	99.27	99.68	97.95	99.96	99.88
std. dev.	0.01	0.64	0.00	0.58	0.73	0.70	0.73	0.92	0.73	0.72
min.	2.85	30.86	100.00	97.75	98.25	98.13	98.20	96.17	98.69	98.68
max.	2.88	33.69	100.00	99.67	100.95	100.39	100.91	99.43	101.31	101.27

Chromaticity shift Δu' Δv' (I_F = 80 mA) – Normalized to 0 h

	CCT [K]	u'	v'	Measurement Time of Color Shift Δu'Δv'							
	0 h	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	3083	0.247	0.522	0.0000	0.0008	0.0010	0.0011	0.0011	0.0010	0.0011	0.0011
2	3017	0.249	0.524	0.0000	0.0010	0.0010	0.0011	0.0010	0.0009	0.0008	0.0008
3	3077	0.247	0.523	0.0000	0.0008	0.0011	0.0009	0.0009	0.0008	0.0009	0.0009
4	3106	0.247	0.520	0.0000	0.0008	0.0009	0.0007	0.0008	0.0007	0.0007	0.0007
5	3036	0.249	0.524	0.0000	0.0005	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006
6	3093	0.247	0.522	0.0000	0.0010	0.0012	0.0009	0.0009	0.0009	0.0008	0.0008
7	3053	0.248	0.522	0.0000	0.0009	0.0010	0.0008	0.0009	0.0008	0.0009	0.0009
8	3043	0.248	0.524	0.0000	0.0010	0.0012	0.0011	0.0011	0.0010	0.0009	0.0009
9	3057	0.248	0.523	0.0000	0.0008	0.0011	0.0009	0.0009	0.0008	0.0007	0.0007
10	3070	0.248	0.523	0.0000	0.0007	0.0008	0.0007	0.0006	0.0006	0.0007	0.0007
11	3033	0.249	0.523	0.0000	0.0007	0.0007	0.0010	0.0010	0.0009	0.0009	0.0009
12	3110	0.246	0.522	0.0000	0.0006	0.0008	0.0006	0.0006	0.0007	0.0006	0.0006
13	3085	0.247	0.522	0.0000	0.0008	0.0008	0.0007	0.0007	0.0007	0.0008	0.0008
14	3052	0.248	0.523	0.0000	0.0008	0.0008	0.0006	0.0006	0.0005	0.0006	0.0006
15	3044	0.248	0.523	0.0000	0.0007	0.0007	0.0006	0.0007	0.0007	0.0007	0.0006
16	3065	0.248	0.522	0.0000	0.0007	0.0010	0.0009	0.0008	0.0009	0.0008	0.0008
17	3086	0.247	0.522	0.0000	0.0010	0.0013	0.0011	0.0011	0.0010	0.0011	0.0011
18	3065	0.248	0.520	0.0000	0.0009	0.0011	0.0010	0.0010	0.0009	0.0009	0.0009
19	3054	0.248	0.523	0.0000	0.0007	0.0008	0.0006	0.0005	0.0005	0.0005	0.0005
20	3112	0.246	0.521	0.0000	0.0008	0.0010	0.0008	0.0007	0.0008	0.0008	0.0007
21	3058	0.248	0.521	0.0000	0.0007	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009
22	3040	0.249	0.522	0.0000	0.0005	0.0007	0.0006	0.0007	0.0007	0.0007	0.0009
23	3045	0.249	0.523	0.0000	0.0006	0.0008	0.0005	0.0005	0.0005	0.0006	0.0006
24	3086	0.247	0.523	0.0000	0.0007	0.0009	0.0007	0.0007	0.0006	0.0007	0.0007
25	3064	0.248	0.521	0.0000	0.0010	0.0012	0.0010	0.0010	0.0011	0.0011	0.0011
median	3064	0.248	0.522	0.0000	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
average	3065	0.248	0.522	0.0000	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
std. dev.	25	0.001	0.001	0.0000	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
min.	3017	0.246	0.520	0.0000	0.0005	0.0007	0.0005	0.0005	0.0005	0.0005	0.0005
max.	3112	0.249	0.524	0.0000	0.0010	0.0013	0.0011	0.0011	0.0011	0.0011	0.0011

Test condition III: T_S = 105°C, I_F = 80 mA

Lumen maintenance (I_F = 80 mA) – Normalized to 0 h

	U_F [V]	Φ_V [lm]	Measurement Time of Lumen Maintenance							
	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	2.86	33.33	100.00	98.08	99.15	98.15	97.82	95.80	96.90	95.20
2	2.88	32.38	100.00	98.48	99.37	97.85	97.61	95.66	96.24	94.48
3	2.86	33.58	100.00	98.23	98.94	97.60	97.09	95.47	95.94	93.93
4	2.87	33.69	100.00	99.00	99.83	98.51	97.83	96.30	96.48	94.42
5	2.86	33.53	100.00	99.20	99.95	98.60	97.88	96.70	96.56	94.31
6	2.88	32.23	100.00	98.60	99.56	98.12	97.57	96.66	96.35	94.06
7	2.87	32.87	100.00	98.51	99.17	97.95	97.87	95.41	97.17	95.36
8	2.88	32.79	100.00	98.75	99.68	98.44	98.29	95.95	97.40	95.47
9	2.86	32.53	100.00	98.69	99.50	98.22	98.19	95.92	97.17	95.35
10	2.87	32.53	100.00	97.84	98.55	97.09	96.64	94.58	95.46	93.50
11	2.86	33.03	100.00	98.82	99.56	98.20	97.84	95.76	96.70	94.60
12	2.88	32.74	100.00	99.33	100.11	98.74	98.38	96.88	97.61	95.59
13	2.86	32.35	100.00	98.66	99.34	98.03	97.37	95.66	95.87	93.74
14	2.86	32.45	100.00	98.87	99.68	98.61	98.10	96.71	96.95	94.89
15	2.86	32.33	100.00	98.66	99.34	98.06	97.46	96.02	96.09	93.92
16	2.86	31.43	100.00	99.50	100.18	98.88	98.58	97.64	97.57	95.60
17	2.87	32.72	100.00	100.18	100.90	99.65	99.43	96.70	98.58	96.68
18	2.87	32.92	100.00	98.24	98.71	97.29	97.06	94.51	96.08	94.07
19	2.87	32.92	100.00	97.82	98.86	97.72	97.51	95.24	96.51	94.64
20	2.87	29.58	100.00	101.11	102.33	101.41	101.14	98.87	100.39	98.40
21	2.87	32.62	100.00	98.94	99.90	98.80	98.53	96.63	97.79	95.73
22	2.87	32.61	100.00	97.78	98.58	97.46	97.10	95.47	96.33	94.33
23	2.86	32.83	100.00	98.33	99.20	97.92	97.54	95.95	96.59	94.36
24	2.87	32.38	100.00	99.58	100.42	99.31	98.80	97.56	98.05	95.95
25	2.87	31.03	100.00	99.95	100.77	99.16	98.42	97.36	97.20	95.27
median	2.87	32.62	100.00	98.69	99.56	98.20	97.84	95.95	96.70	94.64
average	2.87	32.54	100.00	98.85	99.66	98.39	98.00	96.22	96.96	94.95
std. dev.	0.01	0.85	0.00	0.78	0.83	0.88	0.90	0.99	1.03	1.06
min.	2.86	29.58	100.00	97.78	98.55	97.09	96.64	94.51	95.46	93.50
max.	2.88	33.69	100.00	101.11	102.33	101.41	101.14	98.87	100.39	98.40

Chromaticity shift Δu' Δv' (I_F = 80 mA) – Normalized to 0 h

	CCT [K]	u'	v'	Measurement Time of Color Shift Δu'Δv'							
	0 h	0 h	0 h	0 h	504 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
1	3077	0.247	0.523	0.0000	0.0007	0.0012	0.0013	0.0010	0.0010	0.0013	0.0013
2	3072	0.248	0.520	0.0000	0.0008	0.0013	0.0013	0.0010	0.0012	0.0015	0.0016
3	3061	0.248	0.523	0.0000	0.0009	0.0013	0.0013	0.0012	0.0012	0.0015	0.0015
4	3062	0.248	0.523	0.0000	0.0007	0.0012	0.0012	0.0010	0.0011	0.0013	0.0014
5	3077	0.247	0.523	0.0000	0.0007	0.0011	0.0012	0.0010	0.0012	0.0015	0.0017
6	3085	0.247	0.521	0.0000	0.0007	0.0012	0.0013	0.0011	0.0012	0.0016	0.0018
7	3082	0.247	0.523	0.0000	0.0007	0.0013	0.0013	0.0011	0.0013	0.0015	0.0015
8	3074	0.247	0.523	0.0000	0.0008	0.0012	0.0013	0.0011	0.0010	0.0012	0.0012
9	3094	0.247	0.521	0.0000	0.0008	0.0013	0.0015	0.0011	0.0013	0.0015	0.0016
10	3105	0.246	0.522	0.0000	0.0012	0.0016	0.0018	0.0016	0.0018	0.0021	0.0022
11	3110	0.246	0.522	0.0000	0.0007	0.0011	0.0012	0.0011	0.0013	0.0014	0.0015
12	3093	0.246	0.523	0.0000	0.0008	0.0012	0.0014	0.0012	0.0014	0.0017	0.0017
13	3078	0.248	0.520	0.0000	0.0008	0.0013	0.0014	0.0011	0.0014	0.0017	0.0017
14	3073	0.248	0.522	0.0000	0.0008	0.0013	0.0014	0.0011	0.0014	0.0017	0.0017
15	3084	0.248	0.519	0.0000	0.0007	0.0011	0.0013	0.0011	0.0014	0.0016	0.0018
16	3113	0.246	0.522	0.0000	0.0005	0.0011	0.0013	0.0010	0.0013	0.0014	0.0016
17	3095	0.247	0.522	0.0000	0.0006	0.0011	0.0011	0.0008	0.0010	0.0012	0.0012
18	3079	0.247	0.522	0.0000	0.0008	0.0012	0.0013	0.0011	0.0012	0.0014	0.0014
19	3083	0.247	0.522	0.0000	0.0008	0.0014	0.0014	0.0012	0.0013	0.0014	0.0015
20	3110	0.246	0.522	0.0000	0.0008	0.0012	0.0012	0.0009	0.0011	0.0013	0.0012
21	3099	0.246	0.523	0.0000	0.0008	0.0012	0.0013	0.0010	0.0011	0.0013	0.0013
22	3078	0.247	0.523	0.0000	0.0012	0.0015	0.0017	0.0013	0.0015	0.0016	0.0017
23	3097	0.246	0.523	0.0000	0.0009	0.0014	0.0015	0.0012	0.0013	0.0015	0.0016
24	3052	0.248	0.524	0.0000	0.0005	0.0010	0.0011	0.0009	0.0011	0.0013	0.0013
25	3093	0.247	0.521	0.0000	0.0006	0.0011	0.0013	0.0011	0.0014	0.0016	0.0017
median	3083	0.247	0.522	0.0000	0.0008	0.0012	0.0013	0.0011	0.0013	0.0015	0.0016
average	3085	0.247	0.522	0.0000	0.0008	0.0012	0.0013	0.0011	0.0013	0.0015	0.0015
std. dev.	16	0.001	0.001	0.0000	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
min.	3052	0.246	0.519	0.0000	0.0005	0.0010	0.0011	0.0008	0.0010	0.0012	0.0012
max.	3113	0.248	0.524	0.0000	0.0012	0.0016	0.0018	0.0016	0.0018	0.0021	0.0022

----- End of the accreditated section of the report -----

Appendix A:
Lumen Maintenance Projection (IES TM-21-11)

For Information Only!

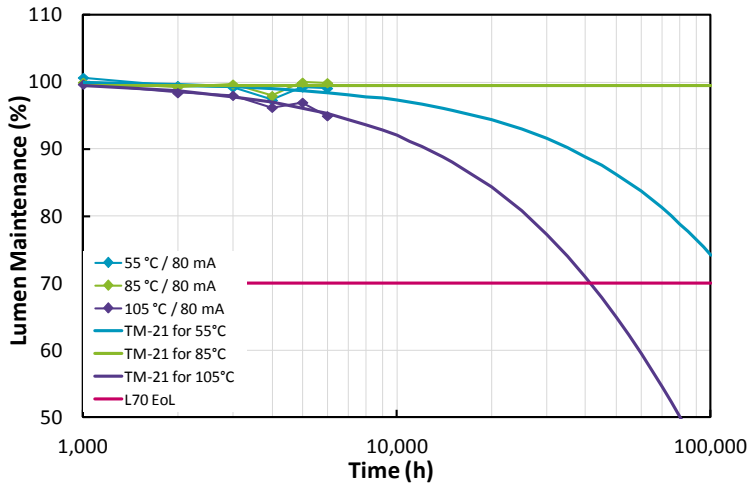
1. General Information

Description of LED light source tested	DURIS E 5 GW JDSRS1.EC
Sample size per temperature	25
LED drive current used in the test	80 mA
Test duration	6,000 hours
Test duration used for projection	1,000 hours to 6,000 hours

2. Projection Data

	I	II	III
Case temperature (solder point)	T_S = 55 °C	T_S = 85 °C	T_S = 105 °C
α	3.000E-06	-1.081E-09	8.695E-06
B	1.002E+00	9.944E-01	1.004E+00
Reported L70	>36,000 hours	>36,000 hours	>36,000 hours

3. Graphic chart



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Appendix B:
Additional Models Covered By Testing

The 9 September 2011 ENERGY STAR® *Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products* defines conditons for which a LM-80 report may be applied to cover models that have not been directly tested.

The following list of models may be covered by the test results in this report:

- DURIS E 5 GW JDSRS1.EC with CCT 2700 K – 6500 K
- DURIS E 5 GW JDSRS1.PC with CCT 4000 K – 6500 K
- DURIS E 5 GW JDSRS1.CC with CCT 2700 K – 4000 K

END OF DOCUMENT

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