LEKOLED TECHNOLOGY CORPORATION

TEST REPORT

Prepared For:	LEKOLED TECHNOLOGY CORPORATION 3rd Floor, First Building WeiQun Industrial Park,BaiHua Community, GuangMing District, Shenzhen, Guangdong, China
Product Name:	SMD LED
Model Number:	3528 SMD
Prepared By:	Shenzhen BST Technology Co., Ltd. Building No.23-24, Zhiheng industrial park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China.
Test Date:	May. 29, 2017-Feb. 13, 2018
Date of Report:	Feb. 26, 2018
Report No.:	BST18021047090003SR-2

TEST REPORT

LUMEN MAINTENANCE TESTING ACCORDING TO THE IESNA LM-80-08 TEST STANDARD

Testing laboratory.....	: Shenzhen BST Technology Co., Ltd.
Address.....	: Building No.23-24, Zhiheng industrial park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China.
Testing location.....	: Shenzhen BST Technology Co., Ltd.
Applicant.....	: LEKOLED Technology Corporation
Address.....	: 3rd Floor,First Building WeiQun Industrial Park,BaiHua Community,GuangMing District, Shenzhen, Guangdong, China
Standard	: IES LM-80-08
Non-standard test method.....	: N.A.
Type of test object.....	: SMD LED
Trademark.....	: LKL
Model/type reference.....	: 3528 SMD
Rating.....	: 2.8-2.9V—,20mA , CCT:3000K
Manufacturer.....	: LEKOLED Technology Corporation.
Address.....	: 3rd Floor,First Building WeiQun Industrial Park, BaiHua Community,GuangMing District, Shenzhen, Guangdong, China

Name and address of the testing laboratory: **Shenzhen BST Technoloav Co., Ltd. Buildina No.23-24, Zhihena industrial park, Guankouer Road, Nantou, Nanshan District, Shenzhen,GuangDong,China**

Prepared by : Tracy Yang

Engineer

Reviewer: Owen

Supervisor

Approved & Authorized Signer:

Possible test case verdicts : Test case does not apply to the test object. :N(.A.) Test object does meet the requirement..... :P(ass)
Test object does not meet the requirement : F(ail)
General remarks:

Throughout this report a point is used as the decimal separator. The test results presented in this report relate only to the object tested.

Test Results Summary:

Summary	I	II	III
Condition	Ts=55°C T_A=54.5°C R.H <65% I_F=20mA	Ts=85°C T_A=84.4°C R.H <65% I_F=20mA	Ts=104.9°C T_A=103.7°C R.H <65% I_F=20mA
Duration(hour)	6000	6000	6000
Interval(hour)	0,1000,2000,3000,4000, 5000, 6000	0,1000,2000,3000,4000, 5000,6000	0,1000,2000,3000,4000, 5000,6000
Sample number	20	20	20
Average Lumen Maintenance at 6000 hour	97.02%	96.58%	95.85%
Average Chromaticity Shift △u'v' at 6000 hour	0.0026	0.0029	0.0031
Failure	None	None	None
α	7.069E-06	7.596E-06	9.206E-06
β	1.012	1.011	1.014
Calculated L70(6k) (hours)	52,000	48,000	40,000
Reported TM-21 L70 Lifetime:	>36,000	>36,000	>36,000

Equipments Used for Testing:

Equipment	Model	Equipment No.
DC Power Supply	IT6122	BSTNX001
Power meter	WT210	BSTNX001
Spectroradiometer	SPEC300	BN067
0.3m Integrating Sphere	—	BSTNX002

Test Data:

Operating Condition: 55℃/20mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)					
	0hr(In	itial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.82	9.84	100.02	99.87	99.28	98.27	97.84	96.33
2	2.87	9.62	100.17	99.88	99.33	98.73	98.18	97.29
3	2.85	9.59	101.06	99.87	99.16	98.90	98.57	97.56
4	2.83	9.68	100.70	99.87	99.08	97.78	97.36	96.65
5	2.88	9.83	101.11	100.16	99.12	98.77	97.26	96.02
6	2.89	9.36	101.08	99.95	98.88	97.90	97.39	96.42
7	2.80	9.71	99.98	98.75	97.80	97.18	96.72	95.67
8	2.88	9.46	101.04	99.92	99.12	98.48	98.04	97.85
9	2.86	9.67	100.03	99.66	98.32	97.92	97.23	96.83
10	2.81	9.50	100.04	99.76	99.13	98.39	98.06	97.29
11	2.84	9.72	101.28	99.67	99.26	98.80	97.87	97.56
12	2.82	9.60	100.00	99.88	99.18	98.40	97.87	96.36
13	2.83	9.63	100.53	99.75	99.25	98.98	98.14	97.69
14	2.85	9.49	100.00	99.65	98.78	98.19	98.95	97.56
15	2.80	9.36	100.21	99.58	99.11	97.99	97.51	97.62
16	2.81	9.87	101.03	99.65	99.25	98.84	97.98	96.82
17	2.82	9.55	102.70	100.06	99.39	98.45	97.92	97.20
18	2.84	9.71	101.19	99.48	98.75	98.34	98.00	97.63
19	2.89	9.66	101.02	99.77	98.87	97.50	97.15	96.73
20	2.87	9.47	100.04	99.58	98.96	99.33	99.28	97.28
Avg.	2.84	9.62	100.66	99.74	99.00	98.36	97.87	97.02
Median	2.84	9.63	100.62	99.77	99.12	98.40	97.90	97.24
δ	0.029	0.143	0.676	0.280	0.367	0.521	0.598	0.608
Min.	2.80	9.36	99.98	98.75	97.80	97.18	96.72	95.67
Max.	2.89	9.87	102.70	100.16	99.39	99.33	99.28	97.85

Operating Condition: 55℃/20mA

No.	CCT(K)	Chromaticity Shift △u'v'					
	Oh(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2918	0.0010	0.0011	0.0012	0.0017	0.0017	0.0021
2	2931	0.0011	0.0012	0.0015	0.0021	0.0023	0.0023
3	3076	0.0010	0.0012	0.0021	0.0023	0.0017	0.0021
4	2823	0.0009	0.0012	0.0026	0.0029	0.0032	0.0032
5	2947	0.0012	0.0016	0.0015	0.0020	0.0027	0.0030
6	3032	0.0010	0.0009	0.0015	0.0020	0.0022	0.0023
7	3087	0.0010	0.0012	0.0013	0.0020	0.0022	0.0022
8	3072	0.0007	0.0012	0.0011	0.0017	0.0021	0.0022
9	2950	0.0008	0.0011	0.0011	0.0017	0.0020	0.0022
10	2941	0.0009	0.0014	0.0012	0.0019	0.0024	0.0026
11	2970	0.0010	0.0012	0.0013	0.0019	0.0022	0.0026
12	2980	0.0009	0.0013	0.0014	0.0019	0.0021	0.0024
13	3037	0.0012	0.0012	0.0030	0.0034	0.0037	0.0040
14	2987	0.0010	0.0015	0.0017	0.0021	0.0022	0.0025
15	3053	0.0006	0.0010	0.0015	0.0018	0.0023	0.0027
16	2965	0.0010	0.0011	0.0014	0.0021	0.0025	0.0027
17	3052	0.0009	0.0012	0.0015	0.0020	0.0027	0.0030
18	2993	0.0008	0.0016	0.0011	0.0015	0.0020	0.0021
19	2979	0.0010	0.0013	0.0015	0.0021	0.0026	0.0029
20	2986	0.0013	0.0011	0.0016	0.0023	0.0025	0.0028
Average	2989	0.0010	0.0012	0.0016	0.0021	0.0024	0.0026
Median	2983	0.0010	0.0012	0.0015	0.0020	0.0023	0.0026
δ	62.84	0.0002	0.0002	0.0005	0.0004	0.0005	0.0005
Min.	2823	0.0006	0.0009	0.0011	0.0015	0.0017	0.0021
Max.	3087	0.0013	0.0016	0.0030	0.0034	0.0037	0.0040

Operating Condition: 85℃/20mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.88	9.45	100.26	99.79	99.08	98.95	97.87	96.23
2	2.80	9.64	100.10	99.87	98.90	98.33	97.92	96.58
3	2.80	9.60	100.20	99.97	99.59	98.11	97.48	96.82
4	2.89	9.97	100.23	99.73	98.60	97.84	96.83	95.95
5	2.84	9.52	99.95	99.30	98.55	97.39	97.03	96.84
6	2.85	9.66	99.95	99.74	99.46	99.01	98.31	97.82
7	2.80	9.48	100.35	99.97	99.28	98.79	97.84	96.53
8	2.88	9.45	101.03	99.88	99.33	98.73	98.18	97.29
9	2.87	9.66	100.40	99.87	99.16	98.90	98.57	97.56
10	2.83	9.40	100.03	99.76	99.13	98.39	98.06	97.29
11	2.84	9.42	100.20	99.67	99.06	98.80	97.87	97.56
12	2.89	9.71	99.87	99.13	98.46	97.07	96.98	96.13
13	2.85	9.73	100.02	99.96	98.65	97.65	96.74	95.89
14	2.84	9.91	100.30	99.86	99.19	98.56	96.99	96.39
15	2.89	9.58	100.05	99.64	98.27	97.21	96.63	95.60
16	2.86	9.63	100.13	99.88	98.91	97.72	96.90	96.07
17	2.83	9.90	100.05	99.73	98.52	97.97	96.64	96.14
18	2.81	9.80	100.84	99.92	98.62	97.26	96.19	95.80
19	2.87	9.74	100.12	99.83	98.56	97.74	96.85	96.17
20	2.88	9.40	100.20	99.89	99.30	98.90	97.07	96.96
Avg.	2.85	9.63	100.21	99.77	98.93	98.17	97.35	96.58
Median	2.85	9.64	100.17	99.85	98.99	98.22	97.05	96.46
δ	0.030	0.170	0.277	0.209	0.369	0.636	0.657	0.639
Min.	2.80	9.40	99.87	99.13	98.27	97.07	96.19	95.60
Max.	2.89	9.97	101.03	99.97	99.59	99.01	98.57	97.82

Operating Condition: 85℃/20mA

No.	Chromaticity Shift △u'v'					
	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.0007	0.0011	0.0013	0.0023	0.0026	0.0029
2	0.0007	0.0012	0.0014	0.0020	0.0023	0.0026
3	0.0010	0.0015	0.0017	0.0024	0.0027	0.0033
4	0.0012	0.0012	0.0017	0.0023	0.0027	0.0029
5	0.0011	0.0011	0.0017	0.0023	0.0026	0.0027
6	0.0011	0.0012	0.0015	0.0021	0.0024	0.0026
7	0.0013	0.0020	0.0026	0.0033	0.0035	0.0037
8	0.0013	0.0013	0.0020	0.0025	0.0032	0.0034
9	0.0012	0.0013	0.0016	0.0023	0.0028	0.0031
10	0.0014	0.0012	0.0015	0.0022	0.0026	0.0030
11	0.0012	0.0013	0.0017	0.0023	0.0030	0.0032
12	0.0012	0.0011	0.0014	0.0020	0.0027	0.0031
13	0.0012	0.0009	0.0014	0.0020	0.0023	0.0029
14	0.0013	0.0016	0.0014	0.0018	0.0021	0.0023
15	0.0010	0.0013	0.0017	0.0020	0.0021	0.0022
16	0.0012	0.0016	0.0016	0.0023	0.0027	0.0028
17	0.0013	0.0018	0.0021	0.0028	0.0027	0.0032
18	0.0011	0.0013	0.0020	0.0025	0.0028	0.0030
19	0.0011	0.0014	0.0016	0.0022	0.0024	0.0027
20	0.0014	0.0014	0.0016	0.0023	0.0026	0.0029
Average	0.0012	0.0013	0.0017	0.0023	0.0026	0.0029
Median	0.0012	0.0013	0.0016	0.0023	0.0027	0.0029
δ	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.0007	0.0009	0.0013	0.0018	0.0021	0.0022
Max.	0.0014	0.0020	0.0026	0.0033	0.0035	0.0037

Operating Condition: 105℃/20mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.88	9.69	100.13	99.95	98.68	97.55	96.21	95.91
2	2.80	9.54	100.07	99.87	99.10	98.54	97.14	96.06
3	2.80	9.49	100.01	**99.81**	98.52	97.54	96.17	95.42
4	2.89	9.56	100.04	99.76	98.62	97.76	96.53	95.78
5	2.84	9.70	100.08	99.87	98.46	97.07	96.85	95.58
6	2.85	9.75	100.02	99.92	99.66	98.55	97.25	96.24
7	2.80	9.50	99.90	98.56	97.04	96.75	95.63	94.85
8	2.88	9.46	99.95	99.17	98.74	97.36	96.28	95.62
9	2.87	9.57	99.87	99.05	98.61	97.27	96.02	**95.75**
10	2.83	9.48	100.10	99.92	99.63	98.59	97.05	95.91
11	2.84	9.72	100.12	99.87	99.60	98.73	97.25	96.18
12	2.89	9.54	101.09	100.05	99.73	98.52	97.07	95.84
13	2.85	9.49	100.19	99.97	98.72	97.26	96.09	95.39
14	2.89	9.66	100.23	99.87	99.52	98.53	97.03	95.83
15	2.89	9.72	100.30	100.13	99.68	98.41	97.12	96.29
16	2.88	9.75	99.97	99.60	98.64	97.23	96.17	96.17
17	2.83	9.60	99.97	99.69	98.67	97.20	96.69	95.76
18	2.81	9.46	99.92	99.68	98.60	97.15	96.48	96.12
19	2.87	9.67	100.20	99.97	99.59	98.51	97.08	96.08
20	2.88	9.78	100.11	99.84	99.52	98.62	97.26	96.19
Avg.	2.85	9.61	100.11	99.73	98.97	97.86	96.67	95.85
Median	2.86	9.59	100.08	99.87	98.73	97.66	96.77	95.88
δ	0.032	0.107	0.250	0.372	0.647	0.662	0.492	0.346
Min.	2.80	9.46	99.87	98.56	97.04	96.75	95.63	94.85
Max.	2.89	9.78	101.09	100.13	99.73	98.73	97.26	96.29

Operating Condition: 105℃/20mA

No.	CCT(K)	Chromaticity Shift △u'v'					
	Oh(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2907	0.0014	0.0016	0.0018	0.0021	0.0025	0.0027
2	3031	0.0012	0.0015	0.0020	0.0027	0.0030	0.0034
3	2976	0.0011	0.0016	0.0018	0.0022	0.0026	0.0028
4	3018	0.0010	0.0011	0.0012	0.0017	0.0021	0.0026
5	3043	0.0011	0.0012	0.0015	0.0021	0.0023	0.0027
6	3032	0.0020	0.0024	0.0032	0.0034	0.0036	0.0040
7	2957	0.0018	0.0022	0.0030	0.0032	0.0034	0.0039
8	2960	0.0018	0.0022	0.0025	0.0027	0.0034	0.0036
9	3066	0.0020	0.0024	0.0026	0.0028	0.0030	0.0034
10	3041	0.0018	0.0020	0.0024	0.0026	0.0028	0.0030
11	2995	0.0014	0.0016	0.0023	0.0023	0.0024	0.0026
12	2980	0.0016	0.0018	0.0022	0.0024	0.0023	0.0029
13	2934	0.0012	0.0015	0.0022	0.0025	0.0028	0.0031
14	2967	0.0013	0.0016	0.0019	0.0024	0.0025	0.0028
15	3053	0.0012	0.0014	0.0021	0.0023	0.0025	0.0027
16	3065	0.0013	0.0015	0.0022	0.0022	0.0028	0.0031
17	3052	0.0013	0.0014	0.0021	0.0024	0.0025	0.0029
18	3033	0.0013	0.0016	0.0021	0.0025	0.0026	0.0032
19	3079	0.0014	0.0016	0.0022	0.0024	0.0028	0.0032
20	2906	0.0013	0.0016	0.0021	0.0025	0.0027	0.0033
Average	3005	0.0014	0.0017	0.0022	0.0025	0.0027	0.0031
Median	3025	0.0013	0.0016	0.0022	0.0024	0.0027	0.0031
6	52.05	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004
Min.	2906	0.0010	0.0011	0.0012	0.0017	0.0021	0.0026
Max.	3079	0.0020	0.0024	0.0032	0.0034	0.0036	0.0040

In situ Temperature and Driver Current Measurements of Final Product

1.1 Reference Standard

ANSI/UL 8750-2009: Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products
ANSI/UL 153-2002: Standard for Safety of Portable Electric Luminaires
ANSI/UL 1598-2008: Standard for Safety of Luminaires

1.2 Test Equipment

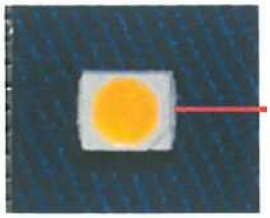
Device	Manufacture	Model No	Serial No	Cal Due
AC Power Source	ALL POWER	APW-110N	992257	2018-08-28
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2018-08-30
Hybrid Recorder (60 channel)	AGILENT	34970A	MY41009304	2018-09-13

Statement of Traceability: Shenzhen BST Technology Co., Ltd. that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

1.3 - Temperature Measurement Data The sample was operated until constant temperatures were obtained, temperature was considered constant if the sample was operating for at least three hours and upon three A successive readings - taken at 15 minute intervals - were within one degree and were not rising. Thermocouples were attached at locations described in the results by means of a cement made of water glass and Fuller's earth, solder, or epoxy.

Ambient Temperature,°C: 25±5°C
Relative Humidity, % : 56 %
Supply voltage: 120 V 60 Hz Type of thermocouples: K

Temperature measurement point of [Ts]:



» Point of Ts

ANNEX:

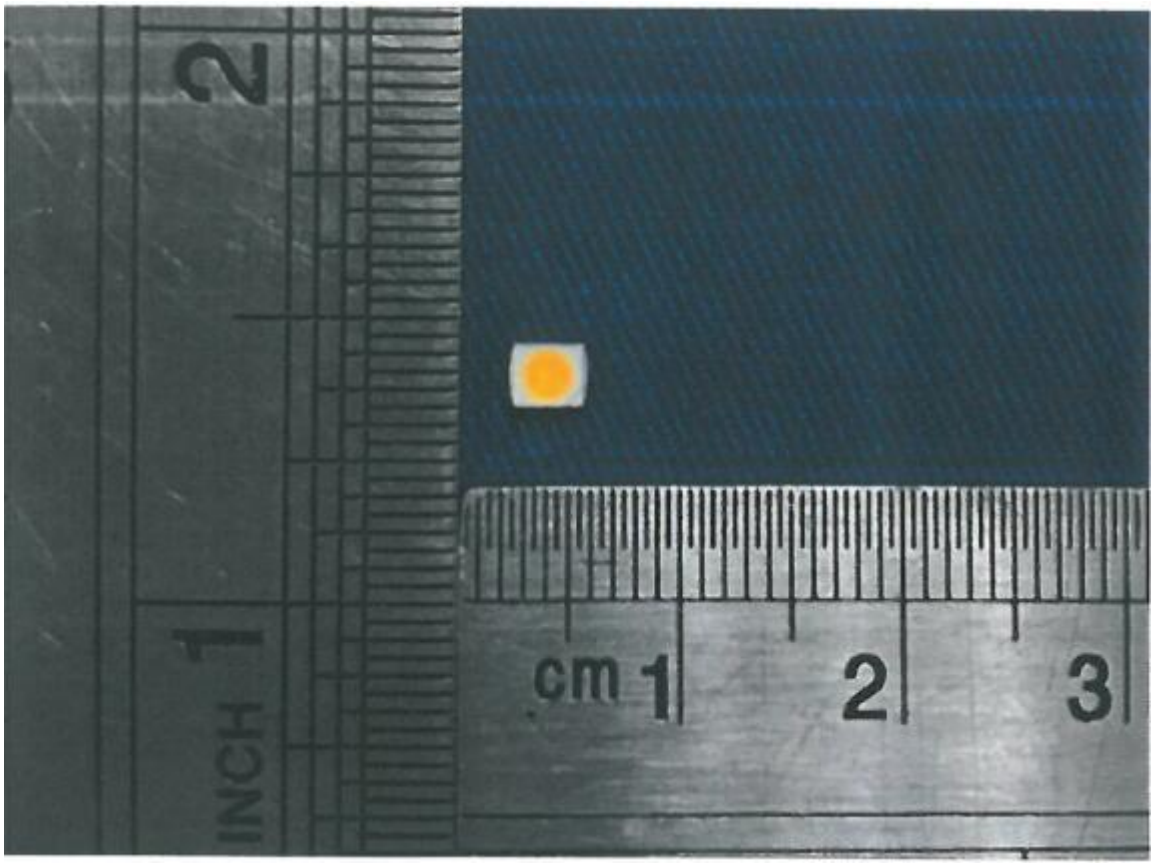


Photo-documentation