SHENZHEN GUANGMAI ELECTRONICS CO.,LTD.

TEST REPORT

Prepared For:	SHENZHEN GUANGMAI ELECTRONICS CO.,LTD. 5th Floor,B Building,Jingang Tech park,Fuyong,Baoan District,Shenzhen
Product Name:	LED5050
Model Number:	5050
Prepared By:	Shenzhen BST Technology Co., Ltd. Building No.23-24, Zhiheng industrial park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China.
Test Date:	Aug.9, 2017 –Jun.17, 2019
Date of Report:	Jun.17, 2019
Report No.:	BST190612590201UR

TEST REPORT

LUMEN MAINTENANCE TESTING ACCORDING TO THE IESNA LM-80-15 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	:	SHENZHEN GUANGMAI ELECTRONICS CO.,LTD.
Address	:	5th Floor,B Building,Jingang Tech park,Fuyong,Baoan District,Shenzhen
Standard	:	IES LM-80-15
Non-standard test method	:	N.A.
Type of test object	:	LED5050
Trademark	:	GMKJ 光脉科技
Model/type reference	:	5050
Rating	:	21-24V ⎓ 45mA ,1W
Manufacturer	:	SHENZHEN GUANGMAI ELECTRONICS CO.,LTD.
Address	:	5th Floor,B Building,Jingang Tech park,Fuyong,Baoan District,Shenzhen

Name and address of the testing laboratory:	**Shenzhen BST Technology Co., Ltd.** **Building No.23-24, Zhiheng industrial park,** **Guankouer Road, Nantou, Nanshan District,** **Shenzhen, Guangdong, China**

Prepared by : Tracy Yang
Engineer

Reviewer : Owen
Supervisor

Approved & Authorized Signer :
Manager

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℃ T_A=53.9℃ R.H.<65% I_F=45mA	Ts=85℃ T_A=84.6℃ R.H.<65% I_F=45mA	Ts=104.9℃ T_A=103.4℃ R.H.<65% I_F=45mA
Duration(hour)	15000	15000	15000
Interval(hour)	1000,2000,3000,4000, 5000,6000,7000,8000, 9000,10000,11000,12000, 13000,14000,15000	1000,2000,3000,4000, 5000,6000,7000,8000, 9000,10000,11000,12000, 13000,14000,15000	1000,2000,3000,4000, 5000,6000,7000,8000, 9000,10000,11000,12000, 13000,14000,15000
Sample number	20	20	20
Average Lumen Maintenance at 15000 hour	94.64%	93.91%	93.05%
Average Chromaticity Shift △u'v' at 15000 hour	0.0030	0.0034	0.0037
Failure	None	None	None
α	3.465E-06	3.602E-06	4.242E-06
β	0.999	0.993	0.993
Calculated L70(15K) (hours)	103,000	104,000	82,000
Reported TM-21 L70 Lifetime:	>90,000	>90,000	82,000

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℃/45mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	23.05	210.71	100.07	99.28	99.11	98.61	98.18	97.83	97.45	97.08	96.77
2	22.98	209.80	100.17	99.41	98.85	98.62	98.10	97.83	97.48	97.11	96.85
3	21.13	211.22	100.09	99.33	98.83	98.49	98.21	97.79	97.48	97.13	96.82
4	23.97	209.03	99.88	99.63	99.05	98.40	98.20	97.86	97.44	97.02	96.83
5	22.94	210.58	99.92	99.56	99.14	98.43	98.20	97.79	97.40	97.05	96.76
6	23.10	210.68	100.04	99.64	99.09	98.65	98.19	97.83	97.41	97.03	96.81
7	22.97	209.24	100.02	99.36	98.78	98.28	98.21	97.87	97.44	97.13	96.82
8	23.09	209.51	100.13	99.44	99.04	98.39	98.19	97.76	97.51	97.09	96.82
9	22.97	209.72	100.03	99.26	99.02	98.39	98.12	97.74	97.79	97.50	96.99
10	22.02	210.30	99.92	99.63	98.79	98.49	98.13	97.77	97.44	97.05	96.74
11	23.15	207.48	100.23	99.33	98.74	98.63	98.12	97.87	97.52	97.00	96.78
12	22.99	207.23	99.97	99.26	98.81	98.25	98.15	97.79	97.51	97.02	96.83
13	23.14	207.79	100.29	99.29	98.86	98.53	98.17	97.80	97.45	96.99	96.82
14	21.96	212.97	99.92	99.58	98.83	98.26	98.18	97.87	97.43	97.14	96.85
15	23.05	211.56	100.01	99.51	98.77	98.27	98.23	97.76	97.46	96.98	96.85
16	23.02	208.69	99.91	99.53	99.08	98.40	98.15	97.88	97.42	97.12	96.81
17	23.06	209.01	100.17	99.25	98.82	98.31	98.16	97.83	97.47	97.05	96.79
18	23.03	209.16	100.22	99.57	98.74	98.21	98.13	97.76	97.52	97.11	96.78
19	23.00	209.80	100.04	99.33	98.89	98.49	98.21	97.86	97.43	97.00	96.77
20	21.08	212.63	100.26	99.29	99.14	98.57	98.17	97.88	97.43	97.02	96.74
Avg.	22.79	209.86	**100.06**	**99.42**	**98.92**	**98.43**	**98.17**	**97.82**	**97.47**	**97.08**	**96.81**
Median	23.01	209.76	100.04	99.39	98.86	98.42	98.18	97.83	97.45	97.05	96.82
δ	0.683	1.498	0.123	0.139	0.141	0.137	0.035	0.045	0.081	0.108	0.053
Min.	21.08	207.23	99.88	99.25	98.74	98.21	98.10	97.74	97.40	96.98	96.74
Max.	23.97	212.97	100.29	99.64	99.14	98.65	98.23	97.88	97.79	97.50	96.99

Sample No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	96.60	96.57	96.36	95.82	95.49	94.93
2	96.74	96.56	95.97	95.43	95.10	94.54
3	96.60	96.25	95.93	95.39	95.06	94.50
4	96.76	96.72	95.89	95.35	95.02	94.46
5	96.64	96.30	96.23	95.69	95.36	94.80
6	96.40	96.37	96.12	95.58	95.25	94.69
7	96.59	96.32	96.21	95.67	95.34	94.78
8	96.54	96.210	95.87	95.33	95.00	94.44
9	96.84	96.64	96.31	95.77	95.44	94.88
10	96.49	96.45	96.40	95.86	95.53	94.97
11	96.51	96.16	96.00	95.46	95.13	94.57
12	96.47	96.27	96.23	95.69	95.36	94.80
13	96.53	96.35	96.06	95.52	95.19	94.63
14	96.46	96.38	96.32	95.78	95.45	94.89
15	96.55	96.30	96.19	95.65	95.32	94.76
16	96.76	96.10	95.89	95.35	95.02	94.46
17	96.65	96.35	95.74	95.20	94.87	94.31
18	96.57	96.35	95.84	95.30	94.97	94.41
19	96.40	96.04	95.89	95.35	95.02	94.46
20	96.65	96.25	96.14	95.60	95.27	94.71
Avg.	**96.59**	**96.35**	**96.08**	**95.54**	**95.21**	**94.64**
Median	96.58	96.34	96.09	95.55	95.22	94.66
δ	0.118	0.169	0.192	0.192	0.192	0.192
Min.	96.40	96.04	95.74	95.20	94.87	94.31
Max.	96.84	96.72	96.40	95.86	95.53	94.97

TM-21 PROJECTION

Test duration:15000h

Failure:0

α: 3.465E-06

β:0.999

Calculated L_{70}:103,000

Reported L_{70}: >90,000

Operating Condition: 55℃/45mA

No.	CCT(K)	Chromaticity Shift △u'v'								
	0h (Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3098	0.0001	0.0003	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
2	3135	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0015	0.0017
3	3074	0.0001	0.0004	0.0006	0.0008	0.0010	0.0011	0.0013	0.0015	0.0017
4	3164	0.0004	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021
5	3140	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018
6	3117	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016
7	3086	0.0001	0.0003	0.0004	0.0008	0.0011	0.0014	0.0015	0.0017	0.0018
8	3130	0.0001	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018
9	3082	0.0002	0.0004	0.0006	0.0007	0.0009	0.0013	0.0016	0.0017	0.0018
10	3133	0.0003	0.0004	0.0006	0.0008	0.0010	0.0014	0.0016	0.0018	0.0021
11	3116	0.0001	0.0003	0.0005	0.0007	0.0012	0.0015	0.0017	0.0019	0.0021
12	3099	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	0.0014	0.0015	0.0019
13	3111	0.0003	0.0003	0.0005	0.0008	0.0009	0.0012	0.0013	0.0016	0.0018
14	3080	0.0002	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0015	0.0016
15	3118	0.0004	0.0006	0.0007	0.0009	0.0011	0.0012	0.0014	0.0016	0.0017
16	3111	0.0002	0.0004	0.0006	0.0008	0.0009	0.0010	0.0012	0.0014	0.0016
17	3098	0.0004	0.0005	0.0007	0.0009	0.0010	0.0012	0.0013	0.0015	0.0018
18	3086	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018
19	3135	0.0003	0.0005	0.0007	0.0011	0.0013	0.0015	0.0018	0.0020	0.0021
20	3086	0.0001	0.0004	0.0006	0.0009	0.0014	0.0016	0.0017	0.0019	0.0020
Avg.	**3110**	**0.0002**	**0.0004**	**0.0006**	**0.0008**	**0.0010**	**0.0013**	**0.0014**	**0.0017**	**0.0018**
Median	3111	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0018
δ	23.73	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	3074	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016
Max.	3164	0.0004	0.0006	0.0007	0.0011	0.0014	0.0016	0.0018	0.0020	0.0021

No.	Chromaticity Shift △u'v'					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031
2	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029
3	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029
4	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033
5	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
6	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
7	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
8	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
9	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
10	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033
11	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033
12	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031
13	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
14	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
15	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029
16	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
17	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
18	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
19	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033
20	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
Avg.	**0.0020**	**0.0022**	**0.0024**	**0.0026**	**0.0028**	**0.0030**
Median	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
δ	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
Max.	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033

Operating Condition: 85℃/45mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	23.10	209.69	99.71	98.85	98.33	97.86	97.49	97.16	96.82	96.51	95.95
2	22.01	210.04	99.89	99.02	98.59	97.78	97.47	97.17	96.82	96.47	95.94
3	22.45	210.99	99.75	98.95	98.35	97.65	97.46	97.17	96.86	96.42	95.92
4	21.02	212.96	99.49	99.07	98.58	97.74	97.42	97.31	96.89	96.42	96.03
5	23.03	208.73	99.63	98.74	98.45	97.60	97.57	97.13	96.89	96.40	95.92
6	22.05	211.25	99.55	98.80	98.60	97.68	97.49	97.33	96.82	96.43	95.95
7	22.97	211.61	99.49	98.92	98.39	97.75	97.53	97.35	96.90	96.43	95.96
8	23.05	210.96	99.86	99.02	98.49	97.84	97.50	97.13	96.87	96.51	96.00
9	21.87	211.07	99.67	99.02	98.34	97.71	97.55	97.17	96.88	96.47	95.98
10	21.58	212.98	99.86	99.14	98.25	97.80	97.44	97.27	96.85	96.46	96.01
11	23.04	208.69	99.50	98.85	98.37	97.96	97.43	97.28	96.94	96.46	95.92
12	23.35	210.54	99.56	98.81	98.31	97.95	97.47	97.09	96.83	96.48	95.98
13	22.15	212.04	99.84	98.79	98.26	97.97	97.56	97.26	96.92	96.48	95.93
14	22.97	210.99	99.82	99.00	98.54	97.66	97.48	97.19	96.98	96.41	96.03
15	23.08	210.04	99.84	99.04	98.24	97.62	97.42	97.25	96.91	96.44	96.02
16	23.11	211.82	99.87	99.11	98.39	97.74	97.43	97.17	96.83	96.45	96.02
17	23.63	213.25	99.66	98.72	98.26	97.86	97.49	97.30	97.00	96.48	95.96
18	22.04	211.61	99.83	98.96	98.30	97.87	97.48	97.28	96.93	96.45	95.94
19	21.98	211.82	99.84	99.17	98.23	97.89	97.45	97.21	96.90	96.53	95.96
20	23.13	209.07	99.62	99.05	98.49	97.73	97.57	97.16	96.90	96.48	96.05
Avg.	22.58	211.01	**99.71**	**98.95**	**98.39**	**97.78**	**97.49**	**97.22**	**96.89**	**96.46**	**95.97**
Median	22.97	211.03	99.73	98.98	98.36	97.77	97.48	97.20	96.89	96.46	95.96
δ	0.676	1.305	0.139	0.131	0.120	0.111	0.048	0.073	0.050	0.034	0.041
Min.	21.02	208.69	99.49	98.72	98.23	97.60	97.42	97.09	96.82	96.40	95.92
Max.	23.63	213.25	99.89	99.17	98.60	97.97	97.57	97.35	97.00	96.53	96.05

Sample No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	95.78	95.61	95.26	94.72	94.39	93.83
2	95.80	95.40	95.27	94.73	94.40	93.84
3	95.89	95.69	95.57	95.03	94.70	94.14
4	95.84	95.37	95.19	94.65	94.32	93.76
5	95.78	95.60	95.08	94.54	94.21	93.65
6	95.74	95.52	95.38	94.84	94.51	93.95
7	95.87	95.54	95.20	94.66	94.33	93.77
8	95.76	95.46	95.14	94.60	94.27	93.71
9	95.61	95.44	95.32	94.78	94.45	93.89
10	95.80	95.60	95.53	94.99	94.66	94.10
11	95.85	95.72	95.62	95.08	94.75	94.19
12	95.80	95.51	95.30	94.76	94.43	93.87
13	95.80	95.63	95.44	94.90	94.57	94.01
14	95.71	95.48	95.37	94.83	94.50	93.94
15	95.76	95.73	95.43	94.89	94.56	94.00
16	95.74	95.68	95.61	95.07	94.74	94.18
17	95.81	95.15	95.32	94.78	94.45	93.89
18	95.72	95.37	95.18	94.64	94.31	93.75
19	95.86	95.46	95.28	94.74	94.41	93.85
20	95.91	95.74	95.49	94.95	94.62	94.06
Avg.	**95.79**	**95.54**	**95.35**	**94.81**	**94.48**	**93.91**
Median	95.80	95.53	95.32	94.78	94.45	93.89
δ	0.068	0.146	0.154	0.154	0.154	0.154
Min.	95.61	95.15	95.08	94.54	94.21	93.65
Max.	95.91	95.74	95.62	95.08	94.75	94.19

TM-21 PROJECTION

Test duration:15000h

Failure:0

α: 3.602E-06

β:0.993

Calculated L_{70}:97,000

Reported L_{70}: >90,000

Operating Condition: 85℃/45mA

No.	CCT(K)	Chromaticity Shift △u'v'								
	0h (Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3102	0.0003	0.0006	0.0010	0.0012	0.0014	0.0017	0.0019	0.0020	0.0022
2	3141	0.0003	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022
3	3126	0.0001	0.0003	0.0005	0.0007	0.0011	0.0014	0.0015	0.0017	0.0019
4	3117	0.0002	0.0004	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0020
5	3081	0.0004	0.0007	0.0009	0.0011	0.0015	0.0017	0.0020	0.0021	0.0023
6	3048	0.0001	0.0003	0.0006	0.0007	0.0013	0.0015	0.0017	0.0019	0.0020
7	3074	0.0002	0.0004	0.0006	0.0007	0.0014	0.0017	0.0018	0.0020	0.0021
8	3078	0.0004	0.0007	0.0008	0.0010	0.0017	0.0019	0.0020	0.0023	0.0025
9	3047	0.0004	0.0007	0.0009	0.0012	0.0016	0.0019	0.0020	0.0021	0.0024
10	3085	0.0003	0.0007	0.0009	0.0013	0.0017	0.0019	0.0021	0.0024	0.0026
11	3098	0.0002	0.0006	0.0008	0.0010	0.0014	0.0015	0.0018	0.0020	0.0022
12	3026	0.0003	0.0006	0.0008	0.0013	0.0016	0.0017	0.0018	0.0020	0.0022
13	3123	0.0002	0.0006	0.0008	0.0012	0.0015	0.0018	0.0020	0.0021	0.0023
14	3102	0.0003	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020
15	3101	0.0004	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0020	0.0022
16	3106	0.0003	0.0005	0.0009	0.0014	0.0015	0.0019	0.0021	0.0022	0.0024
17	3045	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0016	0.0018
18	3069	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0014	0.0016	0.0019
19	3114	0.0002	0.0006	0.0008	0.0010	0.0014	0.0018	0.0021	0.0023	0.0024
20	3116	0.0002	0.0004	0.0009	0.0012	0.0017	0.0019	0.0020	0.0022	0.0023
Avg.	**3090**	**0.0003**	**0.0005**	**0.0008**	**0.0010**	**0.0014**	**0.0017**	**0.0018**	**0.0020**	**0.0022**
Median	3100	0.0003	0.0006	0.0008	0.0010	0.0014	0.0017	0.0019	0.0020	0.0022
δ	30.31	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	3026	0.0001	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0018
Max.	3141	0.0004	0.0007	0.0010	0.0014	0.0017	0.0019	0.0021	0.0024	0.0026

No.	Chromaticity Shift △u'v'					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
2	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
3	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031
4	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
5	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
6	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
7	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033
8	0.0027	0.0029	0.0031	0.0033	0.0035	0.0037
9	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
10	0.0028	0.0030	0.0032	0.0034	0.0036	0.0038
11	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
12	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
13	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
14	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
15	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
16	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
17	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
18	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031
19	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
20	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
Avg.	**0.0024**	**0.0026**	**0.0028**	**0.0030**	**0.0032**	**0.0034**
Median	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
δ	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030
Max.	0.0028	0.0030	0.0032	0.0034	0.0036	0.0038

Operating Condition: 105℃/45mA

Sample No.	VF(V)	LF(lm)	Lumen Maintenance (%)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	23.78	209.69	99.19	98.63	97.59	97.13	96.8	96.62	96.25	95.95	95.57
2	22.61	210.04	98.81	98.56	97.56	97.09	96.83	96.58	96.36	95.93	95.61
3	23.12	210.99	98.88	98.19	97.8	97.09	96.86	96.63	96.36	95.94	95.64
4	22.64	211.96	99.19	98.55	97.64	97.25	96.8	96.6	96.27	95.92	95.55
5	23.53	209.73	98.8	98.36	97.66	97.25	96.77	96.51	96.28	95.93	95.63
6	23.05	211.25	98.97	98.43	97.87	97.42	96.93	96.52	96.26	95.97	95.67
7	22.97	211.61	98.83	98.39	97.65	97.03	96.86	96.47	96.29	95.92	95.67
8	23.05	208.96	99.06	98.24	97.63	97.37	96.85	96.51	96.25	95.88	95.63
9	22.27	211.07	98.88	98.29	97.69	97.09	96.79	96.66	96.26	95.96	95.67
10	21.68	212.98	99.12	98.25	97.84	97.04	96.87	96.61	96.3	95.92	95.56
11	23.04	208.69	98.85	98.32	97.58	97.18	96.93	96.68	96.25	95.97	95.61
12	23.15	210.54	99.01	98.52	97.63	97.09	96.91	96.65	96.31	95.91	95.67
13	22.09	212.04	99.15	98.5	97.74	97.27	96.77	96.48	96.34	95.89	95.52
14	22.97	210.99	99.19	98.28	97.84	97.33	96.8	96.52	96.35	95.97	95.65
15	23.08	210.04	98.96	98.25	97.64	97.16	96.85	96.6	96.37	95.95	95.67
16	22.71	211.82	99.11	98.28	97.77	97.12	96.93	96.55	96.35	95.9	95.57
17	22.14	211.25	98.98	98.58	97.79	97.28	96.88	96.57	96.25	95.98	95.56
18	23.04	210.61	98.89	98.36	97.56	97.25	96.9	96.59	96.29	95.94	95.48
19	22.73	211.82	98.91	98.2	97.68	97.12	96.85	96.48	96.32	95.89	95.55
20	23.13	211.07	99.04	98.24	97.82	97.16	96.87	96.63	96.3	95.92	95.56
Avg.	22.84	210.86	**98.99**	**98.37**	**97.70**	**97.19**	**96.85**	**96.57**	**96.30**	**95.93**	**95.60**
Median	23.01	211.03	98.98	98.34	97.67	97.16	96.86	96.59	96.30	95.93	95.61
δ	0.486	1.058	0.130	0.137	0.099	0.108	0.051	0.063	0.041	0.029	0.056
Min.	21.68	208.69	98.80	98.19	97.56	97.03	96.77	96.47	96.25	95.88	95.48
Max.	23.78	212.98	99.19	98.63	97.87	97.42	96.93	96.68	96.37	95.98	95.67

Sample No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	95.34	94.82	94.39	93.85	93.52	92.96
2	95.47	94.92	94.62	94.08	93.75	93.19
3	95.55	95.06	94.52	93.98	93.65	93.09
4	95.10	94.46	94.30	93.76	93.43	92.87
5	95.46	94.90	94.59	94.05	93.72	93.16
6	95.47	94.85	94.37	93.83	93.50	92.94
7	95.40	94.40	94.37	93.83	93.50	92.94
8	95.14	94.63	94.38	93.84	93.51	92.95
9	95.45	94.90	94.32	93.78	93.45	92.89
10	95.34	94.82	94.40	93.86	93.53	92.97
11	95.51	94.97	94.56	94.02	93.69	93.13
12	95.35	94.78	94.66	94.12	93.79	93.23
13	95.26	94.82	94.68	94.14	93.81	93.25
14	95.50	94.36	94.39	93.85	93.52	92.96
15	95.49	94.97	94.52	93.98	93.65	93.09
16	95.38	94.93	94.75	94.21	93.88	93.32
17	95.35	94.51	94.46	93.92	93.59	93.03
18	95.04	94.51	94.47	93.93	93.60	93.04
19	95.30	94.66	94.35	93.81	93.48	92.92
20	95.40	94.76	94.68	94.14	93.81	93.25
Avg.	**95.37**	**94.75**	**94.49**	**93.95**	**93.62**	**93.05**
Median	95.39	94.82	94.47	93.93	93.60	93.03
δ	0.137	0.203	0.134	0.134	0.134	0.134
Min.	95.04	94.36	94.30	93.76	93.43	92.87
Max.	95.55	95.06	94.75	94.21	93.88	93.32

TM-21 PROJECTION

Test duration:15000h

Failure:0

α:4.242E-06

β:0.993

Calculated L_{70}:82,000

Reported L_{70}: 82,000

Operating Condition: 105℃/45mA

No.	CCT(K)	Chromaticity Shift △u'v'								
	0h (Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3099	0.0005	0.0008	0.0011	0.0017	0.0019	0.0021	0.0022	0.0024	0.0028
2	3144	0.0003	0.0007	0.0013	0.0016	0.0020	0.0023	0.0024	0.0025	0.0027
3	3120	0.0004	0.0007	0.0009	0.0014	0.0015	0.0019	0.0020	0.0022	0.0024
4	3123	0.0006	0.0008	0.0012	0.0016	0.0017	0.0021	0.0021	0.0022	0.0027
5	3089	0.0004	0.0008	0.0010	0.0014	0.0017	0.0019	0.0021	0.0024	0.0026
6	3056	0.0005	0.0007	0.0011	0.0015	0.0017	0.0019	0.0023	0.0024	0.0027
7	3070	0.0006	0.0008	0.0012	0.0017	0.0017	0.0019	0.0021	0.0023	0.0025
8	3082	0.0004	0.0008	0.0012	0.0014	0.0015	0.0017	0.0019	0.0021	0.0022
9	3047	0.0004	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019	0.0021	0.0023
10	3085	0.0003	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024
11	3098	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020
12	3052	0.0007	0.0011	0.0013	0.0015	0.0018	0.0021	0.0023	0.0025	0.0027
13	3123	0.0002	0.0006	0.0010	0.0012	0.0016	0.0019	0.0020	0.0022	0.0024
14	3102	0.0003	0.0008	0.0013	0.0017	0.0017	0.0020	0.0022	0.0025	0.0027
15	3101	0.0004	0.0010	0.0013	0.0015	0.0017	0.0019	0.0023	0.0024	0.0026
16	3086	0.0002	0.0006	0.0008	0.0012	0.0014	0.0016	0.0018	0.0020	0.0023
17	3045	0.0003	0.0007	0.0010	0.0013	0.0017	0.0021	0.0024	0.0025	0.0027
18	3069	0.0002	0.0007	0.0011	0.0015	0.0017	0.0020	0.0024	0.0026	0.0028
19	3114	0.0002	0.0010	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025	0.0027
20	3116	0.0002	0.0008	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025
Avg.	**3091**	**0.0004**	**0.0008**	**0.0011**	**0.0014**	**0.0017**	**0.0019**	**0.0021**	**0.0023**	**0.0025**
Median	3094	0.0004	0.0008	0.0011	0.0015	0.0017	0.0019	0.0021	0.0024	0.0026
δ	27.44	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	3045	0.0002	0.0006	0.0008	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020
Max.	3144	0.0007	0.0011	0.0014	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028

No.	Chromaticity Shift △u'v'					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0030	0.0032	0.0034	0.0036	0.0038	0.0040
2	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
3	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
4	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
5	0.0028	0.0030	0.0032	0.0034	0.0036	0.0038
6	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
7	0.0027	0.0029	0.0031	0.0033	0.0035	0.0037
8	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
9	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
10	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
11	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
12	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
13	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
14	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
15	0.0028	0.0030	0.0032	0.0034	0.0036	0.0038
16	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
17	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
18	0.0030	0.0032	0.0034	0.0036	0.0038	0.0040
19	0.0029	0.0031	0.0033	0.0035	0.0037	0.0039
20	0.0027	0.0029	0.0031	0.0033	0.0035	0.0037
Avg.	**0.0027**	**0.0029**	**0.0031**	**0.0033**	**0.0035**	**0.0037**
Median	0.0028	0.0030	0.0032	0.0034	0.0036	0.0038
δ	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032
Max.	0.0030	0.0032	0.0034	0.0036	0.0038	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

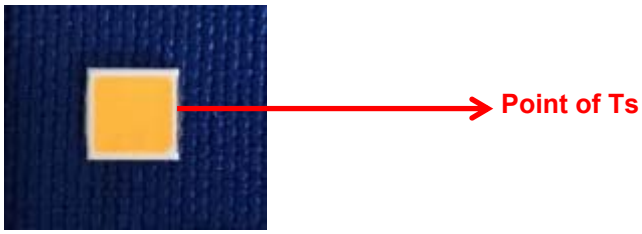
Device	Manufacture	Model No	Serial No	Cal Due
AC Power Source	ALL POWER	APW-110N	992257	2019-08-28
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2019-08-30
Hybrid Recorder (60 channel)	AGILENT	34970A	MY41009304	2019-09-13

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,℃: 25±5℃
Relative Humidity, % : 56 %
Supply voltage: 120 V 60 Hz Type of thermocouples: K

Temperature measurement point of [Ts]:



ANNEX:

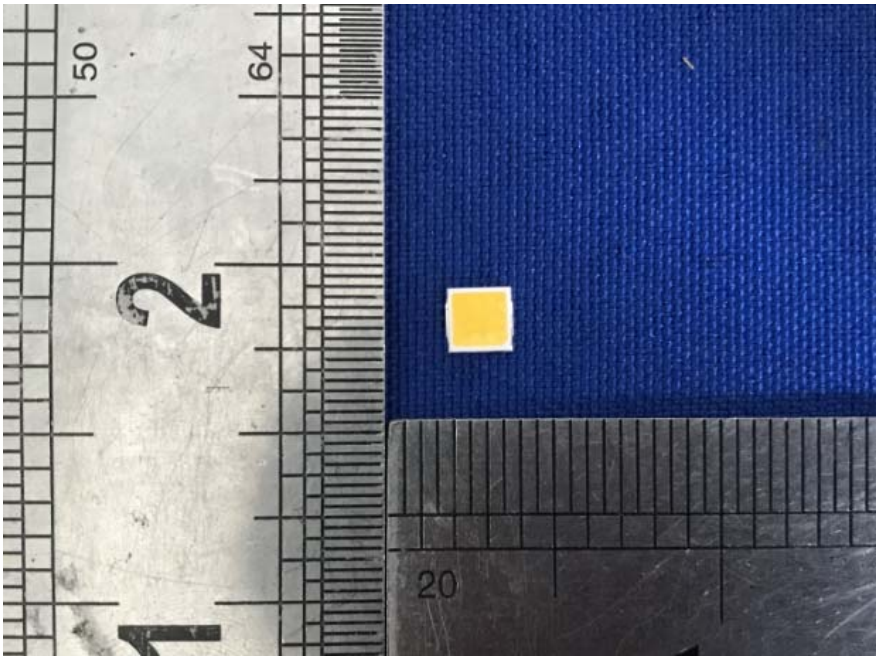


Photo-documentation