中国认可
国际互认
检测
TESTING
CNAS L6478

TEST REPORT

Reference No.	:	WTX21F01010015N
Applicant	:	Guangzhou Tianxin photoelectric Co., Ltd.
Address	:	#15-1., Jingu Road South, Huadong Town, Huadu District, Guangzhou, China
Manufacturer	:	Guangzhou Tianxin photoelectric Co., Ltd.
Address	:	#15-1., Jingu Road South, Huadong Town, Huadu District, Guangzhou, China
Product Name	:	COB
Model No.	:	TX-2828SW200
Test specification	:	ANSI/IES LM-80-15 Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
Date of Receipt sample	:	2021-01-29
Date of Test	:	2021-01-29 to 2022-04-07
Date of Issue	:	2022-04-07
Test Report Form No.	:	WPL-LM8015A-01A
Test Result	:	**See following pages**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:
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Tested by: Finn Yu

Approved by: Kiwi Xu

1. Description of Test Samples

Sample Size:

Total 50 samples were selected in this test. The samples were numbered from A1 to A11 and B12 to B22.

Part Type:	COB
Part Number:	TX-2828SW200
Drive Level:	DC 3500mA
Nominal CCT:	2700K
Power:	141.05W
Average Current Density per LED die:	757mA/mm^2
Average Power Density per LED die:	0.1799W/mm^2
CRI:	95
Die Spacing:	0.17mm

Family products covered by this report:

According to ENERGY STAR® Requirements for the Use of LM-80 Data, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of ENERGY STAR® Requirements for the Use of LM-80 Data (September 28, 2017).

This report covers the following models:

Model Name	Current (mA)	Power (W)	CCT (K)	Number of dies	Driver current per die (mA)	Current Density per die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
TX-2828SW200	3500	141.05	≥2200	91	500	757	0.1799	0.17
TX-1303SW08	200	3.72		6	200	745	0.0209	0.55
TX-1307SW06	200	7.44		12	200	745	0.0417	0.25
TX-1307SW08	200	7.44		12	200	745	0.0417	0.25
TX-H1307SW08	500	10.85		14	250	378	0.0609	0.27
TX-1309SW06	330	10.23		10	330	731	0.0574	0.22
TX-H1309SW08	400	14.88		12	400	605	0.0835	0.23
TX-H1312SW08	500	18.6		12	500	757	0.1044	0.27
TX-1314SW09	500	15.5		10	500	757	0.0870	0.28
TX-1512SW11	400	14.88		24	200	745	0.0592	0.44
TX-1512SW11	500	18.6		36	167	621	0.0740	0.20
TX-H1512SW11	600	22.32		24	300	454	0.0888	0.28
TX-H1516SW11	600	22.32		24	300	454	0.0888	0.28
TX-1825SW14	800	29.76		48	200	745	0.0934	0.36
TX-H1825SW14	1000	37.2		36	333	505	0.1168	0.29
TX-1908SW17	700	15.19		14	350	530	0.0421	0.98
TX-1936SW17	1200	48.36		65	240	363	0.1340	0.25
TX-H1936SW17	1200	48.36		65	240	363	0.1340	0.25

TX-2860SW25	1900	76.57	≥2200	91	271	411	0.0977	0.33
TX-3210SW8	340	10.54		30	113	422	0.0269	1.05
TX-H1935SW17	1600	59.52		60	320	484	0.1649	0.28
TX-1950SW17	1700	63.24		60	340	515	0.1752	0.28
TX-H2560SW21	2750	102.3		84	393	595	0.1798	0.28
TX-2828SW150	3500	141.05		91	500	757	0.1799	0.17
TX-3840SW200	3000	111.6		72	500	757	0.0734	0.44

2. Standards Used

● IESNA LM-80-15: IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
● CIE 127:2007: measurement of LEDs
● ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products(This test method was not accredited by CNAS)
● IES TM-21-19: PROJECTING LONG-TERM LUMEN, PHOTON, AND RADIANT FLUX MAINTENANCE OF LED LIGHT SOURCES

3. Test Facility

The testing facility used by Waltek Testing Group (Foshan) Co., Ltd. is located at No. 13-19, 2/F, 2nd Building, Sunlink International Machinery City, Chencun Town, Shunde District, Foshan, Guangdong, China

4. Operating Cycle

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within ±3% of the specified value of the manufacturer during maintenance test, and was within ±0.5% during photometric and electrical measurement test.

5. Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within ±3% of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to 25°C ± 2°C, RH <65%.

6. Photometric Measurement Method

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 4π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

7. Measurement Uncertainty

The uncertainty of power meter DC current U=0.08% of rdg (K=2), multimeter DC current U=0.20% of rdg (K=2), at the 95% confidence level.
The uncertainty of the light output measurements is U=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the temperature is U=0.3°C (K=2), at the 95% confidence level.

8. Sample Set

Data Set 1: 85°C, 3500mA	
Part Number:	TX-2828SW200
Number of Units:	11
Actual Case Temperature(T_S):	T_S > 83°C
Actual Ambient Temperature(T_A):	T_A > 80°C
Life Test Drive Current:	I_F = 3500mA
Measurement Current:	I_F = 3500mA

Data Set 2: 105°C, 3500mA	
Part Number:	TX-2828SW200
Number of Units:	11
Actual Case Temperature(T_S):	T_S > 103°C
Actual Ambient Temperature(T_A):	T_A > 100°C
Life Test Drive Current:	I_F = 3500mA
Measurement Current:	I_F = 3500mA

9. Summary of Test Result

Data Set	Sample Size	Failures Observed	Test Interval	Test Duration	α	β	TM-21 Lifetime	
							L70	L90
1	11	0	1000h	10000h	2.5465E-06	0.9998	>55000	41000
2	11	0	1000h	10000h	4.6998E-06	0.9973	>55000	22000

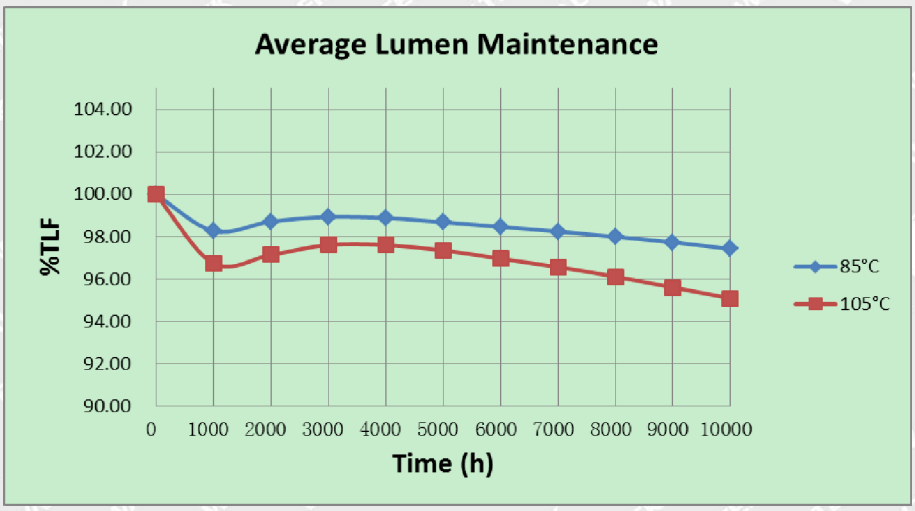
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

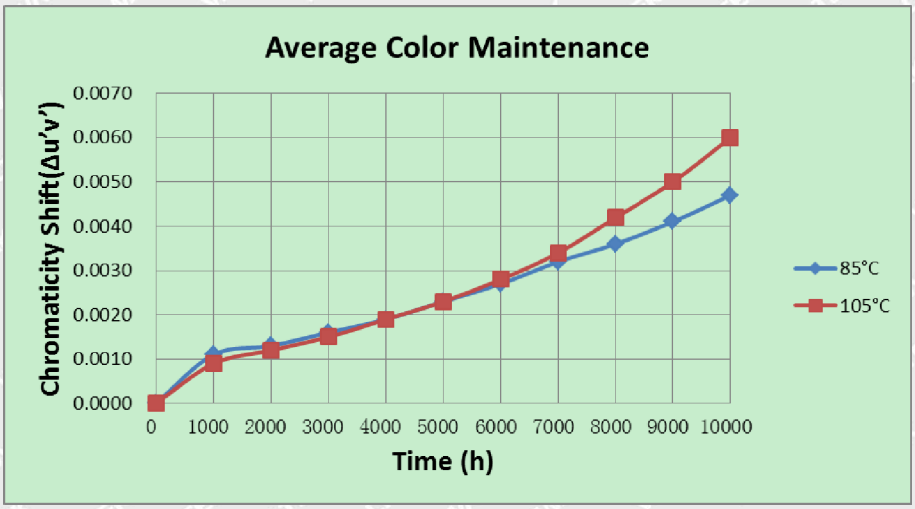
Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	98.27	98.71	98.93	98.88	98.68	98.46	98.24	97.99	97.73	97.42
2	96.74	97.14	97.61	97.60	97.35	96.96	96.56	96.11	95.60	95.09

Average Chromaticity Shift

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0.0011	0.0013	0.0016	0.0019	0.0023	0.0027	0.0032	0.0036	0.0041	0.0047
2	0.0009	0.0012	0.0015	0.0019	0.0023	0.0028	0.0034	0.0042	0.0050	0.0060

Average Lumen Maintenance and Chromaticity Shift VS. Time





Appendix: Data sheet

Data Set 1, 85°C, 3500mA (Lumen Maintenance)											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
A01	13545	98.65	99.09	99.34	99.10	99.13	98.98	98.76	98.63	98.24	97.93
A02	13222	98.56	99.01	99.34	98.99	99.17	98.83	98.60	98.32	98.20	97.89
A03	12787	98.56	99.25	99.26	99.11	98.89	98.44	98.23	97.95	97.70	97.38
A04	12906	98.49	98.67	99.00	98.98	98.61	98.41	98.16	97.97	97.81	97.50
A05	13247	97.81	98.53	98.93	98.97	98.88	98.54	98.39	98.05	97.76	97.44
A06	13428	98.34	98.62	98.89	99.13	98.87	98.70	98.51	98.20	98.05	97.74
A07	13049	98.28	98.97	99.12	98.94	98.98	98.96	98.61	98.23	97.91	97.60
A08	13457	98.40	98.58	98.49	98.32	98.02	97.79	97.52	97.38	97.09	96.77
A09	13169	97.79	98.04	97.95	97.82	97.44	97.39	97.26	96.88	96.57	96.25
A10	13553	98.60	98.67	99.11	98.77	98.89	98.73	98.39	98.25	98.03	97.72
A11	13575	97.49	98.41	98.75	98.44	98.62	98.27	98.20	98.05	97.68	97.36
Ave.	**13267**	**98.27**	**98.71**	**98.93**	**98.78**	**98.68**	**98.46**	**98.24**	**97.99**	**97.73**	**97.42**
Max	13575	98.65	99.25	99.34	99.13	99.17	98.98	98.76	98.63	98.24	97.93
Min	12787	97.49	98.04	97.95	97.82	97.44	97.39	97.26	96.88	96.57	96.25
Med	13247	98.40	98.67	99.00	98.97	98.88	98.54	98.39	98.05	97.81	97.50
Std.dev	271	0.39	0.35	0.41	0.42	0.52	0.49	0.46	0.48	0.50	0.50

Data Set 1, 85°C, 3500mA (Chromaticity Shift_Δu'v')												
S/N	Initial(0hr)			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
	CIE u'	CIE v'	CCT (K)										
A01	0.4109	0.4082	2673	0.0011	0.0014	0.0018	0.0022	0.0026	0.0030	0.0034	0.0037	0.0043	0.0048
A02	0.4097	0.4133	2671	0.0012	0.0015	0.0017	0.0019	0.0022	0.0026	0.0032	0.0036	0.0040	0.0047
A03	0.4106	0.4124	2698	0.0011	0.0014	0.0017	0.0020	0.0024	0.0029	0.0034	0.0039	0.0042	0.0049
A04	0.4105	0.4136	2673	0.0013	0.0015	0.0018	0.0021	0.0025	0.0028	0.0033	0.0036	0.0042	0.0049
A05	0.4095	0.4126	2694	0.0011	0.0014	0.0017	0.0021	0.0025	0.0029	0.0033	0.0036	0.0041	0.0048
A06	0.4090	0.4116	2683	0.0006	0.0008	0.0012	0.0014	0.0019	0.0024	0.0030	0.0035	0.0040	0.0044
A07	0.4102	0.4136	2688	0.0013	0.0016	0.0019	0.0022	0.0027	0.0031	0.0036	0.0040	0.0045	0.0048
A08	0.4093	0.4097	2660	0.0013	0.0016	0.0018	0.0021	0.0026	0.0029	0.0034	0.0039	0.0044	0.0051
A09	0.4106	0.4146	2659	0.0007	0.0010	0.0013	0.0016	0.0020	0.0024	0.0029	0.0035	0.0038	0.0045
A10	0.4098	0.4140	2672	0.0008	0.0011	0.0013	0.0015	0.0018	0.0022	0.0025	0.0030	0.0037	0.0043
A11	0.4090	0.4139	2695	0.0012	0.0015	0.0018	0.0021	0.0025	0.0030	0.0033	0.0036	0.0039	0.0043
Ave.	**0.4099**	**0.4125**	**2679**	**0.0011**	**0.0013**	**0.0016**	**0.0019**	**0.0023**	**0.0027**	**0.0032**	**0.0036**	**0.0041**	**0.0047**
Max	0.4109	0.4146	2698	0.0013	0.0016	0.0019	0.0022	0.0027	0.0031	0.0036	0.0040	0.0045	0.0051
Min	0.4090	0.4082	2659	0.0006	0.0008	0.0012	0.0014	0.0018	0.0022	0.0025	0.0030	0.0037	0.0043
Med	0.4098	0.4133	2673	0.0011	0.0014	0.0017	0.0021	0.0025	0.0029	0.0033	0.0036	0.0041	0.0048
Std.dev	0.0007	0.0020	14	0.0003	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003

Data Set 1, 85°C, 3500mA (Forward Voltage)											
S/N	VF(V)										
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
A01	38.61	38.64	38.59	38.53	38.46	38.41	38.41	38.41	38.36	38.35	38.33
A02	38.88	38.90	38.86	38.78	38.78	38.76	38.73	38.68	38.66	38.65	38.59
A03	38.94	38.96	38.96	38.94	38.92	38.87	38.79	38.79	38.78	38.71	38.70
A04	38.70	38.70	38.68	38.67	38.67	38.67	38.63	38.56	38.55	38.53	38.46
A05	39.06	39.01	38.97	38.91	38.91	38.87	38.86	38.79	38.72	38.66	38.65
A06	38.34	38.37	38.34	38.28	38.28	38.21	38.15	38.10	38.05	38.01	37.94
A07	39.26	39.25	39.18	39.11	39.09	39.02	38.96	38.94	38.92	38.87	38.82
A08	38.48	38.49	38.43	38.41	38.40	38.40	38.34	38.29	38.29	38.27	38.20
A09	38.57	38.52	38.46	38.40	38.38	38.31	38.30	38.25	38.18	38.17	38.13
A10	38.60	38.57	38.54	38.51	38.50	38.48	38.44	38.44	38.39	38.36	38.36
A11	39.16	39.13	39.07	39.04	38.99	38.94	38.90	38.87	38.84	38.83	38.81
Ave.	**38.78**	**38.78**	**38.73**	**38.69**	**38.67**	**38.63**	**38.59**	**38.56**	**38.52**	**38.49**	**38.45**
Max	39.26	39.25	39.18	39.11	39.09	39.02	38.96	38.94	38.92	38.87	38.82
Min	38.34	38.37	38.34	38.28	38.28	38.21	38.15	38.10	38.05	38.01	37.94
Med	38.70	38.70	38.68	38.67	38.67	38.67	38.63	38.56	38.55	38.53	38.46
Std.dev	0.30	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.29	0.28	0.29

Data Set 2, 105°C, 3500mA (Lumen Maintenance)											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
B12	13444	96.90	97.55	97.98	98.42	97.98	97.68	97.41	96.79	96.09	95.62
B13	12972	97.01	97.71	97.69	97.80	97.52	96.94	96.41	95.84	95.29	94.91
B14	12656	97.14	97.22	97.88	97.95	97.69	97.44	96.98	96.45	96.04	95.43
B15	13416	97.09	97.18	97.29	97.55	97.41	96.80	96.49	96.13	95.62	95.33
B16	13510	96.87	97.09	97.69	97.52	97.46	97.24	96.88	96.34	95.96	95.34
B17	13568	96.76	96.94	97.72	97.57	97.63	97.31	96.84	96.49	95.91	95.39
B18	13401	95.84	96.47	96.95	96.88	96.68	96.33	95.80	95.48	95.01	94.51
B19	12636	96.82	97.66	98.51	98.43	98.01	97.57	97.27	96.73	96.16	95.55
B20	13180	96.58	96.68	97.50	97.24	96.88	96.42	95.96	95.69	95.18	94.69
B21	13571	96.61	96.89	97.40	97.32	96.87	96.49	96.01	95.58	95.08	94.68
B22	13377	96.48	97.11	97.15	96.90	96.70	96.38	96.09	95.65	95.23	94.53
Ave.	**13248**	**96.74**	**97.14**	**97.61**	**97.60**	**97.35**	**96.96**	**96.56**	**96.11**	**95.60**	**95.09**
Max	13571	97.14	97.71	98.51	98.43	98.01	97.68	97.41	96.79	96.16	95.62
Min	12636	95.84	96.47	96.95	96.88	96.68	96.33	95.80	95.48	95.01	94.51
Med	13401	96.82	97.11	97.69	97.55	97.46	96.94	96.49	96.13	95.62	95.33
Std.dev	345	0.36	0.39	0.43	0.52	0.49	0.51	0.55	0.48	0.45	0.43

Data Set 2, 105°C, 3500mA (Chromaticity Shift_Δu'v')												
S/N	Initial(0hr)			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
	CIE u'	CIE v'	CCT (K)										
B12	0.4106	0.4127	2699	0.0007	0.0009	0.0012	0.0017	0.0023	0.0028	0.0034	0.0041	0.0050	0.0060
B13	0.4109	0.4133	2664	0.0007	0.0010	0.0014	0.0017	0.0021	0.0025	0.0031	0.0037	0.0046	0.0055
B14	0.4088	0.4122	2650	0.0008	0.0012	0.0014	0.0018	0.0022	0.0026	0.0032	0.0038	0.0046	0.0056
B15	0.4106	0.4149	2696	0.0010	0.0013	0.0016	0.0019	0.0022	0.0028	0.0034	0.0043	0.0051	0.0060
B16	0.4089	0.4087	2661	0.0007	0.0010	0.0013	0.0017	0.0020	0.0025	0.0032	0.0040	0.0047	0.0058
B17	0.4095	0.4094	2686	0.0011	0.0013	0.0015	0.0019	0.0023	0.0029	0.0035	0.0042	0.0050	0.0061
B18	0.4107	0.4111	2696	0.0010	0.0014	0.0016	0.0020	0.0025	0.0031	0.0034	0.0041	0.0049	0.0059
B19	0.4101	0.4100	2679	0.0010	0.0013	0.0017	0.0020	0.0025	0.0030	0.0037	0.0046	0.0054	0.0063
B20	0.4106	0.4087	2678	0.0012	0.0015	0.0018	0.0022	0.0027	0.0034	0.0040	0.0050	0.0059	0.0069
B21	0.4095	0.4123	2691	0.0010	0.0014	0.0017	0.0020	0.0024	0.0030	0.0037	0.0044	0.0053	0.0064
B22	0.4099	0.4100	2667	0.0008	0.0011	0.0013	0.0017	0.0022	0.0026	0.0030	0.0037	0.0044	0.0055
Ave.	**0.4100**	**0.4112**	**2679**	**0.0009**	**0.0012**	**0.0015**	**0.0019**	**0.0023**	**0.0028**	**0.0034**	**0.0042**	**0.0050**	**0.0060**
Max	0.4109	0.4149	2699	0.0012	0.0015	0.0018	0.0022	0.0027	0.0034	0.0040	0.0050	0.0059	0.0069
Min	0.4088	0.4087	2650	0.0007	0.0009	0.0012	0.0017	0.0020	0.0025	0.0030	0.0037	0.0044	0.0055
Med	0.4101	0.4111	2679	0.0010	0.0013	0.0015	0.0019	0.0023	0.0028	0.0034	0.0041	0.0050	0.0060
Std.dev	0.0007	0.0020	16	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0004

Data Set 2, 105°C, 3500mA (Forward Voltage)											
S/N	VF(V)										
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
B12	39.28	39.22	39.21	39.18	39.13	39.13	39.07	39.06	39.05	39.02	38.98
B13	38.63	38.67	38.65	38.63	38.57	38.52	38.51	38.47	38.40	38.36	38.35
B14	38.79	38.71	38.69	38.62	38.54	38.47	38.46	38.39	38.33	38.28	38.23
B15	38.80	38.79	38.78	38.71	38.64	38.61	38.57	38.54	38.53	38.51	38.50
B16	38.46	38.46	38.42	38.41	38.35	38.31	38.28	38.23	38.20	38.19	38.17
B17	38.49	38.47	38.42	38.40	38.38	38.37	38.37	38.30	38.27	38.21	38.20
B18	38.39	38.34	38.28	38.26	38.21	38.18	38.12	38.06	38.03	37.96	37.93
B19	38.98	38.92	38.89	38.86	38.80	38.78	38.70	38.69	38.66	38.62	38.59
B20	39.17	39.20	39.14	39.07	39.06	39.05	39.00	38.94	38.91	38.87	38.85
B21	38.93	38.86	38.83	38.77	38.73	38.66	38.61	38.58	38.56	38.53	38.53
B22	38.73	38.73	38.70	38.70	38.68	38.63	38.57	38.53	38.51	38.45	38.40
Ave.	**38.79**	**38.76**	**38.73**	**38.69**	**38.64**	**38.61**	**38.57**	**38.53**	**38.50**	**38.45**	**38.43**
Max	39.28	39.22	39.21	39.18	39.13	39.13	39.07	39.06	39.05	39.02	38.98
Min	38.39	38.34	38.28	38.26	38.21	38.18	38.12	38.06	38.03	37.96	37.93
Med	38.79	38.73	38.70	38.70	38.64	38.61	38.57	38.53	38.51	38.45	38.40
Std.dev	0.29	0.28	0.29	0.28	0.28	0.29	0.28	0.29	0.30	0.31	0.31

Attachment 1: Equipment List

Equipment	Model/Type	Cal. Due. Date
DC power supply	EVERFINE WY305-V1	2023-01-11
Digital Power Meter	EVERFINE PF2010A-V1	2023-01-11
High accuracy array spectroradio meter	EVERFINE HAAS-2000	2023-01-11
Integrating Sphere	EVERFINE R98&R80&0.3m	2023-01-11
Standard light source	EVERFINE D204	2023-01-11
Standard light source	EVERFINE D062	2023-01-11
Temperature & Humidity Datalogger	Testo 608-H1	2023-01-11
AC power supply	EVERFINE DPS 1060	2023-01-11
DC power supply	EVERFINE WY12010	2023-01-11
Digital Power Meter	EVERFINE PF2010A-V1-CAN	2023-01-11
Digital power meter	YOKOGAWA WT310E	2023-01-11
LED accelerated aging and longevity test system	EVERFINE LT-200A	2023-01-11
Walk-in Environmental Test Lab	Dongzhixu BUL-50-26	2023-01-11
Environmental Chamber	KSON THS-D4C-100	2023-01-11
Multimeter	FLUKE 15B	2023-01-11
Temperature Recorder	YOKOGAWA DR231-00-33-1R	2023-01-11

Attachment 2: Photo document

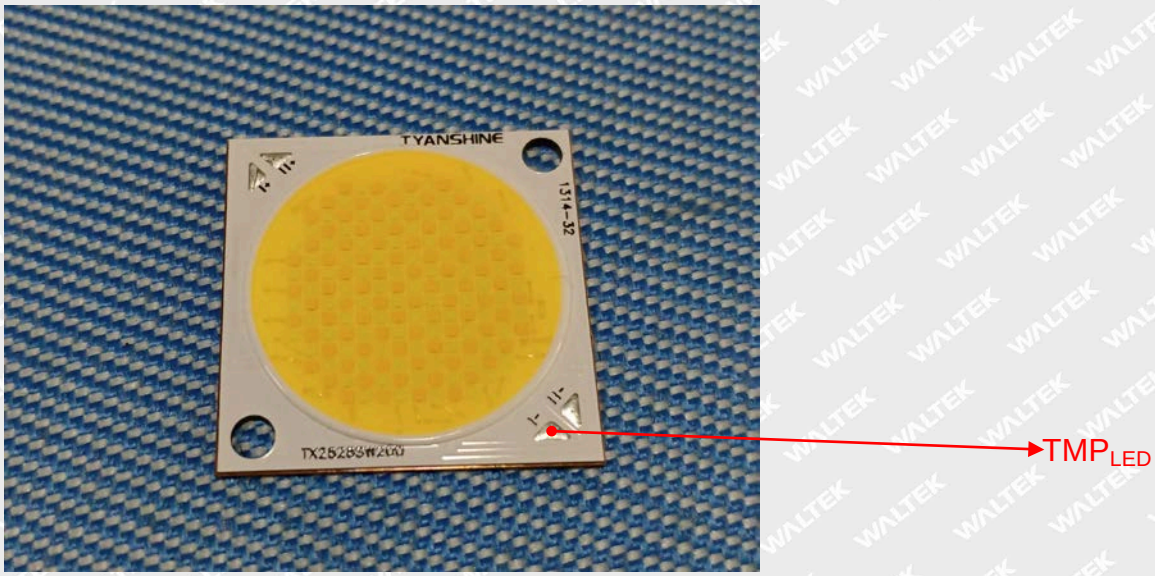


Photo 1

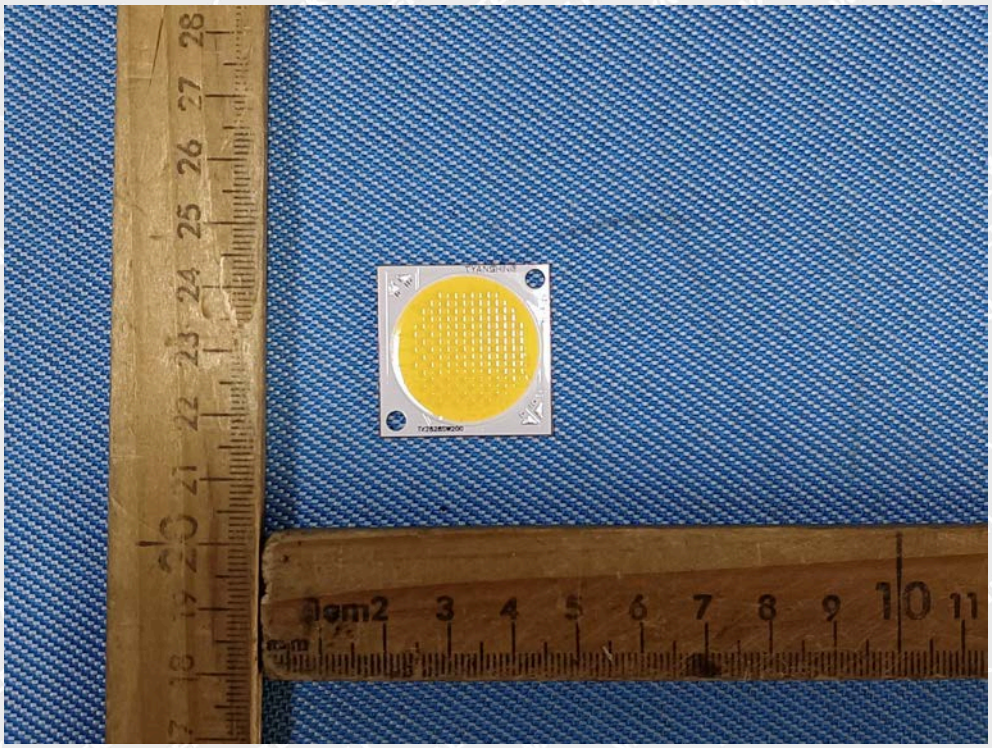


Photo 2

====== End of Report ======