



中国认可  
国际互认  
检测  
TESTING  
CNAS L6478



# TEST REPORT

**Reference No.**..... : WTX22F09185174N  
**Applicant**..... : Guangzhou Tianxin photoelectric Co., Ltd.  
**Address**..... : #15-1., Jingu Road South, Huadong Town, Huadu District, Guangzhou, China  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product Name**..... : LED Chip  
**Model No.**..... : TX-5050RGBW  
**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** .... : 2021-06-07  
**Date of Test**..... : 2021-06-07 to 2022-09-19  
**Date of Issue**..... : 2022-09-19  
**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:

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## 1. Description of Test Samples

### Sample Size:

Total 33 samples were selected in this test. The samples were numbered from A1 to A11, B12 to B22 and C23 to C33.

Part Type:	LED Package
Part Number:	TX-5050RGBW
Drive Level:	DC 1000mA
Nominal CCT:	RGBW
Power:	12.4W
Average Current Density per LED die:	1051mA/mm <sup>2</sup>
Average Power Density per LED die:	0.5061W/mm <sup>2</sup>
CRI:	/
Die Spacing:	0.1mm

### 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 <sup>2</sup> )	Power Density per PCB (W/mm <sup>2</sup> )	Die Spacing (mm)
TX-5050RGBW	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGBW10FC120-NGVCND34-02A	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGBW10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050MCOY15FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGS10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGM10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGA10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGL10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RBY10FC120-NGVCND34-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RBB9FC120-NGVCND34-	1000	9.3	RGB	3	1000	1051	0.3796	0.1



TX-5050RGBW15VRD1-NG4AA-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGBW10VCD1-NG4AA-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGBW8VSD1-NG4AA-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1
TX-5050RGS10VCD1-NG4AA-	1000	12.4	RGBW	4	1000	1051	0.5061	0.1

## 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 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  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  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  $2^{\circ}C$  below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}C$  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  $\pm 3\%$  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  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%.



## 6. Photometric Measurement Method

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate  $u'v'$ .  $2\pi$  measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to  $25^\circ\text{C} \pm 2^\circ\text{C}$ , 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  $U=20\text{K}$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of the temperature is  $U=0.3^\circ\text{C}$  ( $K=2$ ), at the 95% confidence level.

## 8. Decision Rules:

For the measurement parameters that need to be assessed for compliance, the measurement uncertainty should be fully considered. In order to avoid mis-judgment on whether the measurement results meet the requirements of the standard, the following decision rules should be used:

For measurements results with only the lower limit of tolerance interval:

- When  $\eta_m \geq TI + U$ , we directly determine the measurement result as PASS (P).
- When  $\eta_m \leq TI - U$ , we directly determine the measurement result as FAIL (F).
- When  $TI - U \leq \eta_m \leq TI + U$ , we determine the measurement result as UNCERTAIN (UC).

For measurements results with only the upper limit of tolerance interval:

- When  $\eta_m \leq Tu - U$ , we directly determine the measurement result as PASS (P).
- When  $\eta_m \geq Tu + U$ , we directly determine the measurement result as FAIL (F).
- When  $Tu - U \leq \eta_m \leq Tu + U$ , we determine the measurement result as UNCERTAIN (UC).

For measurements results with the lower and upper limit of tolerance interval:

- When  $TI + U \leq \eta_m \leq Tu - U$ , we directly determine the measurement result as PASS (P).
- When  $\eta_m \leq TI - U$  and  $\eta_m \geq Tu + U$ , we directly determine the measurement result as FAIL (F).
- When  $TI - U \leq \eta_m \leq TI + U$  and  $Tu - U \leq \eta_m \leq Tu + U$  we determine the measurement result as UNCERTAIN (UC).

Here:

$\eta_m$ : Measurement value

TI: Lower limit of tolerance interval

Tu: Upper limit of tolerance interval

U: Expanded uncertainty



## 9. Sample Set

<b>Data Set 1: 55°C, 1000mA</b>	
Part Number:	TX-5050RGBW
Number of Units:	11
Actual Case Temperature( $T_S$ ):	$T_S > 53^\circ\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A > 50^\circ\text{C}$
Life Test Drive Current:	$I_F = 1000\text{mA}$
Measurement Current:	$I_F = 1000\text{mA}$
<b>Data Set 2: 85°C, 1000mA</b>	
Part Number:	TX-5050RGBW
Number of Units:	11
Actual Case Temperature( $T_S$ ):	$T_S > 83^\circ\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A > 80^\circ\text{C}$
Life Test Drive Current:	$I_F = 1000\text{mA}$
Measurement Current:	$I_F = 1000\text{mA}$
<b>Data Set 3: 105°C, 1000mA</b>	
Part Number:	TX-5050RGBW
Number of Units:	11
Actual Case Temperature( $T_S$ ):	$T_S > 103^\circ\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A > 100^\circ\text{C}$
Life Test Drive Current:	$I_F = 1000\text{mA}$
Measurement Current:	$I_F = 1000\text{mA}$



**10. Summary of Test Result**

Data Set	Sample Size	Failures Observed	Test Interval	Test Duration	$\alpha$	$\beta$	TM-21 Lifetime	
							L <sub>70</sub>	L <sub>90</sub>
1	25	0	1000h	10000h	2.0000E-06	1.0010	>55000h	53000h
2	25	0	1000h	10000h	2.6961E-06	1.0063	>55000h	41000h
3	25	0	1000h	10000h	4.9114E-06	1.0100	>55000h	23000h

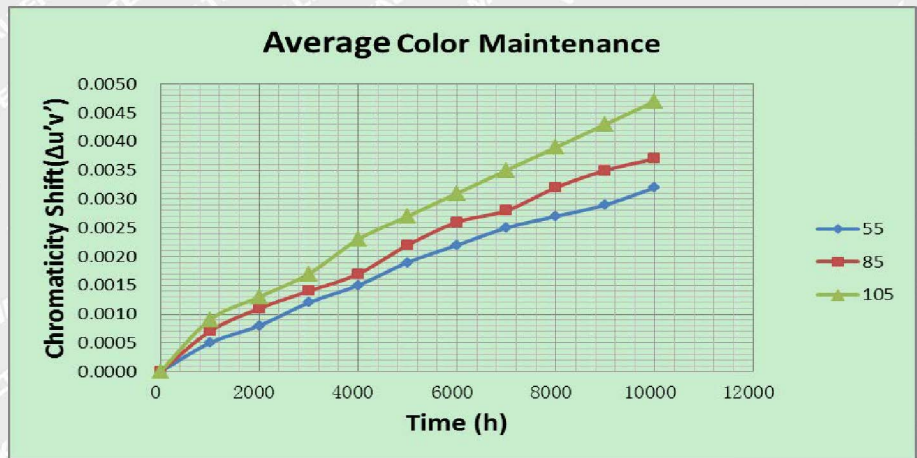
**Average Lumen Maintenance (Percentage of Initial Luminous Flux)**

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	100.31	100.60	100.31	99.92	99.52	99.24	99.04	98.92	98.86	98.81
2	100.42	100.93	100.54	99.86	99.35	99.01	98.67	98.44	98.20	98.02
3	100.08	100.00	99.67	99.20	98.68	98.08	97.45	96.98	96.62	96.30

**Average Chromaticity Shift**

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0.0005	0.0008	0.0012	0.0015	0.0019	0.0022	0.0025	0.0027	0.0029	0.0032
2	0.0007	0.0011	0.0014	0.0017	0.0022	0.0026	0.0028	0.0032	0.0035	0.0037
3	0.0009	0.0013	0.0017	0.0023	0.0027	0.0031	0.0035	0.0039	0.0043	0.0047

**Average Lumen Maintenance and Chromaticity Shift VS. Time**





### Appendix: Data sheet

Data Set 1, 55°C, 1000mA (Lumen Maintenance)											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
A01	633.84	100.70	100.70	100.35	100.05	99.65	99.41	99.10	98.91	98.88	98.86
A02	646.50	100.23	100.70	100.39	100.09	99.62	99.26	99.15	99.04	98.92	98.91
A03	658.65	99.99	100.25	99.96	99.62	99.27	99.02	98.97	98.95	98.88	98.82
A04	636.86	99.84	100.10	99.74	99.38	98.87	98.62	98.31	98.31	98.32	98.28
A05	658.84	100.08	100.43	100.27	99.95	99.51	99.22	99.22	99.13	99.04	99.02
A06	644.20	100.21	100.56	100.36	99.90	99.44	99.21	98.86	98.66	98.53	98.49
A07	637.05	100.16	100.21	99.82	99.31	99.04	98.89	98.56	98.37	98.40	98.32
A08	631.76	100.65	101.16	100.92	100.52	100.12	99.87	99.67	99.43	99.44	99.35
A09	645.52	100.66	100.71	100.44	100.04	99.57	99.22	99.02	99.00	99.01	98.93
A10	654.86	100.66	101.14	100.81	100.43	100.13	99.66	99.49	99.48	99.32	99.27
A11	643.83	100.18	100.61	100.30	99.88	99.49	99.28	99.09	98.88	98.73	98.70
<b>Ave.</b>	<b>644.72</b>	<b>100.31</b>	<b>100.60</b>	<b>100.31</b>	<b>99.92</b>	<b>99.52</b>	<b>99.24</b>	<b>99.04</b>	<b>98.92</b>	<b>98.86</b>	<b>98.81</b>
Max	658.84	100.70	101.16	100.92	100.52	100.13	99.87	99.67	99.48	99.44	99.35
Min	631.76	99.84	100.10	99.74	99.31	98.87	98.62	98.31	98.31	98.32	98.28
Med	644.20	100.21	100.61	100.35	99.95	99.51	99.22	99.09	98.95	98.88	98.86
Std.dev	9.09	0.29	0.33	0.35	0.36	0.37	0.32	0.36	0.35	0.34	0.33

Data Set 1, 55°C, 1000mA (Chromaticity Shift $\Delta u'v'$ )												
S/N	Initial(0hr)		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
	CIE $u'$	CIE $v'$										
A01	0.2324	0.3854	0.0007	0.0009	0.0011	0.0014	0.0017	0.0020	0.0023	0.0025	0.0027	0.0030
A02	0.2337	0.3853	0.0007	0.0009	0.0012	0.0015	0.0019	0.0022	0.0025	0.0028	0.0030	0.0032
A03	0.2343	0.3855	0.0005	0.0008	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028
A04	0.2348	0.3851	0.0005	0.0008	0.0012	0.0016	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031
A05	0.2346	0.3853	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0022	0.0025	0.0027	0.0029
A06	0.2331	0.3855	0.0005	0.0008	0.0011	0.0015	0.0019	0.0023	0.0025	0.0028	0.0031	0.0033
A07	0.2346	0.3854	0.0005	0.0009	0.0013	0.0015	0.0018	0.0021	0.0024	0.0026	0.0028	0.0030
A08	0.2331	0.3855	0.0005	0.0008	0.0012	0.0016	0.0020	0.0023	0.0027	0.0030	0.0032	0.0034
A09	0.2346	0.3852	0.0006	0.0009	0.0013	0.0016	0.0020	0.0024	0.0028	0.0031	0.0034	0.0037
A10	0.2332	0.3853	0.0004	0.0008	0.0012	0.0017	0.0021	0.0023	0.0025	0.0027	0.0030	0.0032
A11	0.2350	0.3853	0.0004	0.0007	0.0010	0.0014	0.0018	0.0021	0.0025	0.0027	0.0030	0.0032
<b>Ave.</b>	<b>0.2339</b>	<b>0.3853</b>	<b>0.0005</b>	<b>0.0008</b>	<b>0.0012</b>	<b>0.0015</b>	<b>0.0019</b>	<b>0.0022</b>	<b>0.0025</b>	<b>0.0027</b>	<b>0.0029</b>	<b>0.0032</b>
Max	0.2350	0.3855	0.0007	0.0009	0.0013	0.0017	0.0021	0.0024	0.0028	0.0031	0.0034	0.0037
Min	0.2324	0.3851	0.0004	0.0007	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0025	0.0028
Med	0.2343	0.3853	0.0005	0.0008	0.0012	0.0015	0.0019	0.0022	0.0025	0.0027	0.0030	0.0032
Std.dev	0.0008	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002



Data Set 1, 55°C, 1000mA (Forward Voltage)											
S/N	VF(V)										
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
A01	12.11	12.13	12.15	12.15	12.14	12.11	12.08	12.04	12.03	12.02	12.01
A02	12.23	12.26	12.28	12.30	12.29	12.26	12.24	12.22	12.19	12.17	12.16
A03	12.23	12.25	12.28	12.29	12.28	12.27	12.24	12.21	12.19	12.18	12.17
A04	12.09	12.12	12.13	12.14	12.12	12.11	12.08	12.05	12.04	12.03	12.01
A05	12.22	12.25	12.27	12.27	12.25	12.24	12.22	12.18	12.16	12.15	12.14
A06	12.20	12.22	12.24	12.24	12.22	12.19	12.16	12.13	12.11	12.09	12.07
A07	12.23	12.24	12.26	12.26	12.24	12.22	12.20	12.17	12.16	12.14	12.12
A08	12.09	12.12	12.15	12.16	12.15	12.12	12.10	12.07	12.06	12.05	12.04
A09	12.16	12.19	12.22	12.23	12.21	12.20	12.17	12.14	12.12	12.11	12.09
A10	12.23	12.25	12.28	12.29	12.28	12.26	12.23	12.21	12.19	12.17	12.15
A11	12.19	12.21	12.23	12.24	12.22	12.21	12.18	12.14	12.12	12.10	12.08
<b>Ave.</b>	<b>12.18</b>	<b>12.20</b>	<b>12.23</b>	<b>12.23</b>	<b>12.22</b>	<b>12.20</b>	<b>12.17</b>	<b>12.14</b>	<b>12.12</b>	<b>12.11</b>	<b>12.09</b>
Max	12.23	12.26	12.28	12.30	12.29	12.27	12.24	12.22	12.19	12.18	12.17
Min	12.09	12.12	12.13	12.14	12.12	12.11	12.08	12.04	12.03	12.02	12.01
Med	12.20	12.22	12.24	12.24	12.22	12.21	12.18	12.14	12.12	12.11	12.09
Std.dev	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06

Data Set 2, 85°C, 1000mA (Lumen Maintenance)											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
B01	657.34	100.27	100.79	100.48	99.86	99.36	98.96	98.60	98.30	98.00	97.93
B02	646.05	100.47	100.83	100.36	99.66	99.25	98.78	98.27	97.92	97.75	97.57
B03	634.55	100.66	101.18	100.70	99.97	99.40	99.22	98.99	98.67	98.34	98.32
B04	641.88	100.51	101.26	100.95	100.13	99.52	98.97	98.63	98.31	98.14	97.95
B05	659.49	100.35	100.66	100.29	99.64	99.10	98.82	98.35	98.23	98.05	97.84
B06	634.40	100.69	101.03	100.81	100.19	99.83	99.54	99.21	98.89	98.73	98.58
B07	633.67	100.16	100.87	100.30	99.67	99.02	98.70	98.53	98.44	98.11	97.89
B08	637.81	100.43	101.03	100.56	99.77	99.18	98.83	98.32	98.15	97.83	97.62
B09	632.35	100.62	101.13	100.81	100.16	99.51	99.23	98.71	98.45	98.26	98.00
B10	653.04	100.43	100.84	100.49	99.88	99.56	99.23	99.09	98.91	98.52	98.28
B11	641.91	100.05	100.60	100.22	99.56	99.10	98.88	98.66	98.57	98.43	98.26
<b>Ave.</b>	<b>642.95</b>	<b>100.42</b>	<b>100.93</b>	<b>100.54</b>	<b>99.86</b>	<b>99.35</b>	<b>99.01</b>	<b>98.67</b>	<b>98.44</b>	<b>98.20</b>	<b>98.02</b>
Max	659.49	100.69	101.26	100.95	100.19	99.83	99.54	99.21	98.91	98.73	98.58
Min	632.35	100.05	100.60	100.22	99.56	99.02	98.70	98.27	97.92	97.75	97.57
Med	641.88	100.43	100.87	100.49	99.86	99.36	98.96	98.63	98.44	98.14	97.95
Std.dev	9.36	0.19	0.20	0.23	0.21	0.23	0.24	0.30	0.29	0.28	0.29





Data Set 1, 85°C, 1000mA (Chromaticity Shift_Δu'v')												
S/N	Initial(Ohr)		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
	CIE u'	CIE v'										
B01	0.2330	0.3852	0.0006	0.0009	0.0013	0.0017	0.0020	0.0024	0.0028	0.0032	0.0035	0.0038
B02	0.2338	0.3855	0.0008	0.0011	0.0013	0.0016	0.0019	0.0023	0.0025	0.0028	0.0030	0.0032
B03	0.2340	0.3854	0.0009	0.0013	0.0015	0.0019	0.0024	0.0028	0.0031	0.0034	0.0037	0.0039
B04	0.2337	0.3852	0.0008	0.0013	0.0015	0.0018	0.0022	0.0026	0.0029	0.0032	0.0036	0.0039
B05	0.2333	0.3852	0.0007	0.0010	0.0014	0.0017	0.0021	0.0025	0.0027	0.0030	0.0032	0.0036
B06	0.2325	0.3855	0.0008	0.0012	0.0016	0.0020	0.0025	0.0029	0.0031	0.0034	0.0036	0.0039
B07	0.2326	0.3855	0.0006	0.0011	0.0014	0.0018	0.0022	0.0027	0.0030	0.0034	0.0037	0.0040
B08	0.2332	0.3851	0.0005	0.0009	0.0011	0.0015	0.0019	0.0023	0.0025	0.0028	0.0031	0.0034
B09	0.2342	0.3854	0.0005	0.0010	0.0014	0.0017	0.0022	0.0027	0.0030	0.0033	0.0035	0.0038
B10	0.2329	0.3854	0.0007	0.0009	0.0014	0.0017	0.0021	0.0025	0.0029	0.0031	0.0035	0.0038
B11	0.2335	0.3855	0.0009	0.0012	0.0015	0.0018	0.0022	0.0026	0.0028	0.0032	0.0036	0.0039
<b>Ave.</b>	<b>0.2333</b>	<b>0.3854</b>	<b>0.0007</b>	<b>0.0011</b>	<b>0.0014</b>	<b>0.0017</b>	<b>0.0022</b>	<b>0.0026</b>	<b>0.0028</b>	<b>0.0032</b>	<b>0.0035</b>	<b>0.0037</b>
Max	0.2342	0.3855	0.0009	0.0013	0.0016	0.0020	0.0025	0.0029	0.0031	0.0034	0.0037	0.0040
Min	0.2325	0.3851	0.0005	0.0009	0.0011	0.0015	0.0019	0.0023	0.0025	0.0028	0.0030	0.0032
Med	0.2333	0.3854	0.0007	0.0011	0.0014	0.0017	0.0022	0.0026	0.0029	0.0032	0.0035	0.0038
Std.dev	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002

Data Set 1, 85°C, 1000mA (Forward Voltage)												
S/N	VF(V)											
	Initial(Ohr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h	
B01	12.08	12.09	12.12	12.12	12.09	12.06	12.04	11.99	11.95	11.92	11.88	
B02	12.16	12.19	12.22	12.24	12.22	12.19	12.16	12.12	12.08	12.04	11.99	
B03	12.19	12.20	12.21	12.22	12.19	12.16	12.13	12.09	12.06	12.02	11.97	
B04	12.08	12.12	12.14	12.15	12.13	12.11	12.07	12.03	11.99	11.96	11.91	
B05	12.25	12.29	12.31	12.31	12.29	12.27	12.25	12.21	12.18	12.14	12.10	
B06	12.14	12.17	12.20	12.21	12.18	12.15	12.13	12.10	12.06	12.01	11.97	
B07	12.16	12.19	12.21	12.22	12.19	12.16	12.14	12.10	12.07	12.02	11.97	
B08	12.22	12.24	12.27	12.27	12.25	12.22	12.19	12.16	12.13	12.09	12.05	
B09	12.10	12.12	12.15	12.17	12.15	12.13	12.09	12.04	12.01	11.96	11.93	
B10	12.14	12.15	12.17	12.18	12.16	12.13	12.10	12.07	12.02	11.97	11.93	
B11	12.10	12.12	12.15	12.15	12.13	12.10	12.08	12.03	11.99	11.94	11.90	
<b>Ave.</b>	<b>12.15</b>	<b>12.17</b>	<b>12.20</b>	<b>12.20</b>	<b>12.18</b>	<b>12.15</b>	<b>12.13</b>	<b>12.09</b>	<b>12.05</b>	<b>12.01</b>	<b>11.96</b>	
Max	12.25	12.29	12.31	12.31	12.29	12.27	12.25	12.21	12.18	12.14	12.10	
Min	12.08	12.09	12.12	12.12	12.09	12.06	12.04	11.99	11.95	11.92	11.88	
Med	12.14	12.17	12.20	12.21	12.18	12.15	12.13	12.09	12.06	12.01	11.97	
Std.dev	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	



Data Set 1, 105°C, 1000mA (Lumen Maintenance)											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
C01	647.44	99.87	99.71	99.48	99.09	98.41	97.75	97.01	96.35	96.10	95.75
C02	631.77	100.27	99.99	99.64	99.14	98.57	98.13	97.57	96.94	96.65	96.22
C03	650.81	100.21	100.26	99.90	99.40	99.01	98.58	98.22	97.89	97.35	97.13
C04	633.10	100.19	100.05	99.86	99.38	98.88	98.13	97.30	96.98	96.55	96.20
C05	645.16	99.88	99.82	99.43	98.93	98.45	97.87	97.46	96.85	96.49	96.13
C06	633.05	100.16	100.22	99.93	99.34	98.74	98.30	97.88	97.48	96.93	96.49
C07	635.20	100.25	100.18	99.88	99.28	98.80	97.96	97.26	96.89	96.67	96.49
C08	652.30	99.84	99.82	99.41	99.14	98.47	97.76	97.06	96.46	96.22	95.90
C09	655.64	100.22	100.23	99.83	99.27	98.82	98.02	97.17	96.70	96.41	96.13
C10	644.50	100.01	99.88	99.51	99.02	98.60	98.11	97.31	96.91	96.50	96.31
C11	649.84	100.00	99.88	99.53	99.17	98.73	98.23	97.72	97.36	96.94	96.57
<b>Ave.</b>	<b>643.53</b>	<b>100.08</b>	<b>100.00</b>	<b>99.67</b>	<b>99.20</b>	<b>98.68</b>	<b>98.08</b>	<b>97.45</b>	<b>96.98</b>	<b>96.62</b>	<b>96.30</b>
Max	655.64	100.27	100.26	99.93	99.40	99.01	98.58	98.22	97.89	97.35	97.13
Min	631.77	99.84	99.71	99.41	98.93	98.41	97.75	97.01	96.35	96.10	95.75
Med	645.16	100.16	99.99	99.64	99.17	98.73	98.11	97.31	96.91	96.55	96.22
Std.dev	8.32	0.16	0.19	0.20	0.14	0.19	0.23	0.35	0.43	0.34	0.35

Data Set 1, 105°C, 1000mA (Chromaticity Shift_Δu'v')												
S/N	Initial(0hr)		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
	CIE u'	CIE v'										
C01	0.2339	0.3854	0.0010	0.0014	0.0018	0.0024	0.0029	0.0033	0.0038	0.0042	0.0045	0.0050
C02	0.2326	0.3855	0.0010	0.0014	0.0019	0.0024	0.0029	0.0032	0.0036	0.0039	0.0042	0.0047
C03	0.2345	0.3854	0.0009	0.0014	0.0018	0.0024	0.0027	0.0031	0.0034	0.0039	0.0042	0.0046
C04	0.2343	0.3855	0.0007	0.0011	0.0015	0.0019	0.0025	0.0028	0.0031	0.0036	0.0040	0.0044
C05	0.2328	0.3855	0.0006	0.0011	0.0015	0.0022	0.0026	0.0030	0.0034	0.0037	0.0040	0.0045
C06	0.2332	0.3855	0.0010	0.0015	0.0020	0.0023	0.0028	0.0031	0.0036	0.0040	0.0043	0.0047
C07	0.2333	0.3852	0.0007	0.0010	0.0016	0.0020	0.0025	0.0030	0.0034	0.0038	0.0042	0.0048
C08	0.2326	0.3851	0.0007	0.0013	0.0017	0.0023	0.0028	0.0032	0.0036	0.0040	0.0043	0.0048
C09	0.2341	0.3856	0.0009	0.0013	0.0016	0.0023	0.0027	0.0032	0.0035	0.0040	0.0044	0.0049
C10	0.2328	0.3851	0.0011	0.0015	0.0021	0.0028	0.0033	0.0037	0.0041	0.0045	0.0048	0.0053
C11	0.2339	0.3853	0.0008	0.0012	0.0016	0.0019	0.0024	0.0028	0.0031	0.0035	0.0039	0.0044
<b>Ave.</b>	<b>0.2335</b>	<b>0.3854</b>	<b>0.0009</b>	<b>0.0013</b>	<b>0.0017</b>	<b>0.0023</b>	<b>0.0027</b>	<b>0.0031</b>	<b>0.0035</b>	<b>0.0039</b>	<b>0.0043</b>	<b>0.0047</b>
Max	0.2345	0.3856	0.0011	0.0015	0.0021	0.0028	0.0033	0.0037	0.0041	0.0045	0.0048	0.0053
Min	0.2326	0.3851	0.0006	0.0010	0.0015	0.0019	0.0024	0.0028	0.0031	0.0035	0.0039	0.0044
Med	0.2333	0.3854	0.0009	0.0013	0.0017	0.0023	0.0027	0.0031	0.0035	0.0039	0.0042	0.0047
Std.dev	0.0007	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003



<b>Data Set 1, 105°C, 1000mA (Forward Voltage)</b>											
S/N	VF(V)										
	Initial(0hr)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
C01	12.13	12.15	12.15	12.13	12.11	12.08	12.06	12.03	11.99	11.96	11.89
C02	12.25	12.26	12.27	12.25	12.23	12.22	12.19	12.16	12.12	12.07	12.01
C03	12.15	12.19	12.20	12.17	12.15	12.14	12.12	12.07	12.04	12.00	11.95
C04	12.11	12.15	12.16	12.13	12.11	12.08	12.04	11.99	11.96	11.92	11.87
C05	12.13	12.15	12.16	12.13	12.11	12.09	12.06	12.03	11.98	11.94	11.91
C06	12.23	12.26	12.26	12.24	12.22	12.21	12.16	12.12	12.08	12.02	11.97
C07	12.21	12.22	12.24	12.21	12.20	12.18	12.14	12.11	12.08	12.02	11.96
C08	12.16	12.18	12.18	12.15	12.14	12.13	12.11	12.07	12.04	12.00	11.97
C09	12.23	12.25	12.25	12.23	12.21	12.20	12.17	12.14	12.10	12.07	12.04
C10	12.24	12.26	12.27	12.25	12.23	12.22	12.20	12.16	12.11	12.06	12.00
C11	12.11	12.14	12.16	12.14	12.12	12.11	12.08	12.04	11.99	11.96	11.93
<b>Ave.</b>	<b>12.18</b>	<b>12.20</b>	<b>12.21</b>	<b>12.18</b>	<b>12.17</b>	<b>12.15</b>	<b>12.12</b>	<b>12.08</b>	<b>12.04</b>	<b>12.00</b>	<b>11.95</b>
Max	12.25	12.26	12.27	12.25	12.23	12.22	12.20	12.16	12.12	12.07	12.04
Min	12.11	12.14	12.15	12.13	12.11	12.08	12.04	11.99	11.96	11.92	11.87
Med	12.16	12.19	12.20	12.17	12.15	12.14	12.12	12.07	12.04	12.00	11.96
Std.dev	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05

# WALTEK

**Attachment 1: Equipment List**

<b>Equipment</b>	<b>Model/Type</b>	<b>Cal. Due. Date</b>
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**

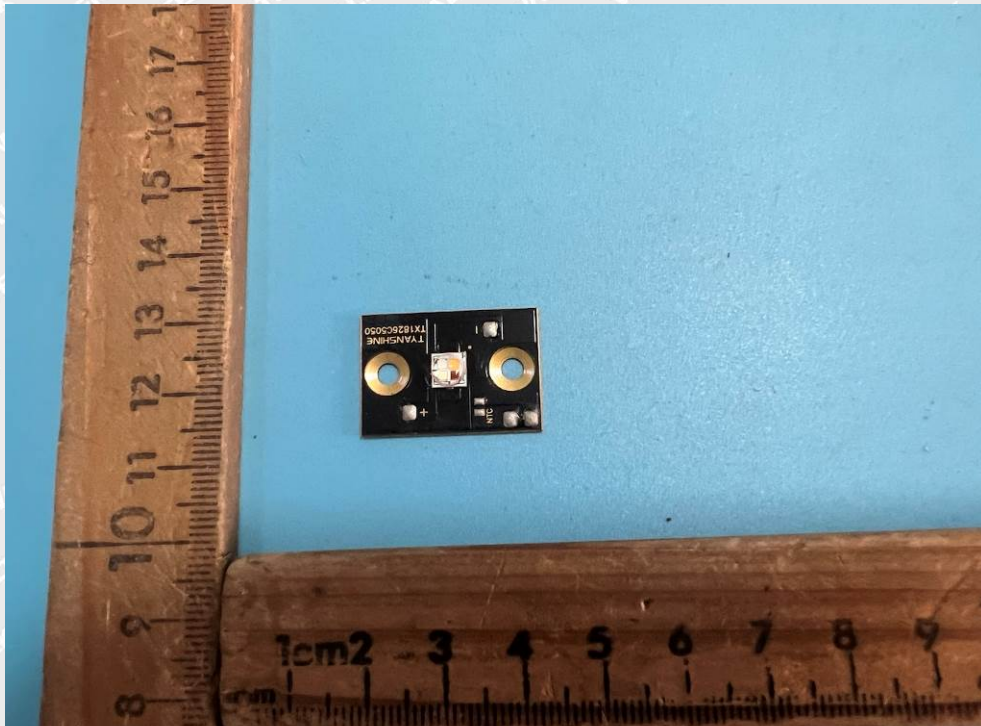


Photo 1

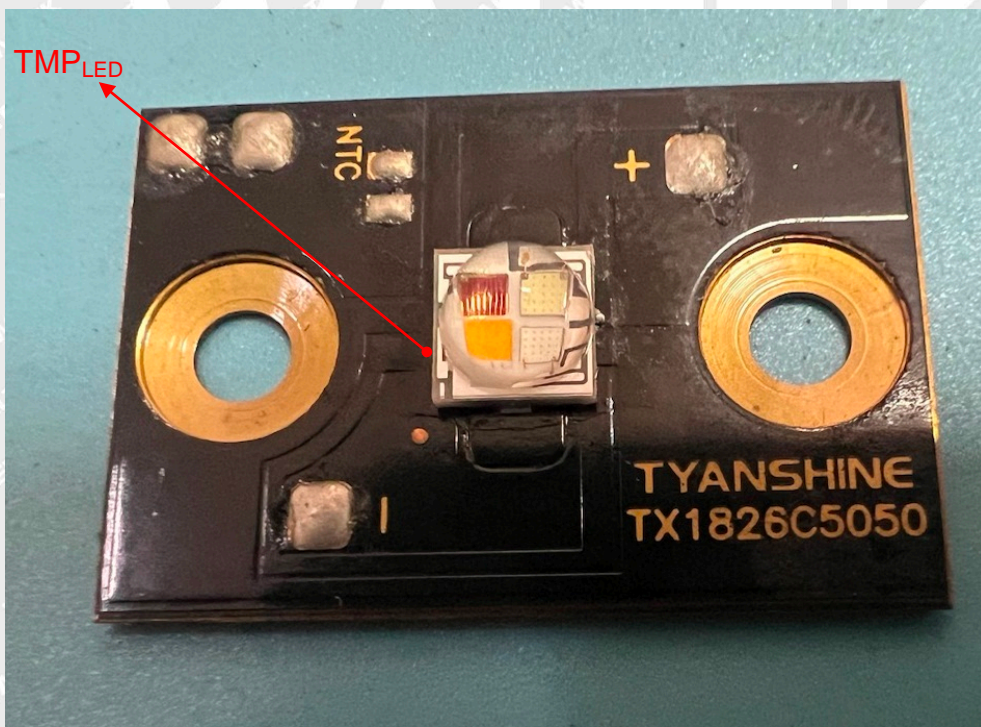


Photo 2

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