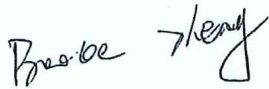


# TEST REPORT OF ANSI/IES LM-80-15

## Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

**Client**..... : SHENZHEN JUFEI OPTOELECTRONICS CO.,LTD.  
**Address**..... : No. 4, Eling Industrial Zone, Egongling community, Pinghu Street, Longgang District, Shenzhen City, Guangdong Province  
**Test Model**..... : 01.JT.12L3030M80N22  
**Brand Name**..... : SHENZHEN JUFEI OPTOELECTRONICS CO.,LTD.  
**Testing Laboratory**.... : Guangdong Meide Testing Technology Co., Ltd.  
**Address**..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.  
**Testing Location**..... : As above  
**Report No**..... : C02A21110265L00101  
**Test Date**..... : 2020-06-29 to 2021-12-08  
**Report Date**..... : 2022-01-06

**Tested by:**



Brooke Zheng/ Test Engineer

**Checked by:**



Sandy Chen/ Project Engineer

**Approved by:**



Jessie Li/ Technical Manager



Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.  
Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



## **ENERGY STAR® LM-80 Cover Sheet**

### **Administrative Information**

Tested subcomponent series: 3030  
Tested subcomponent model number: 01.JT.12L3030M80N22  
Report issue date: 2022-01-06  
Report revision date(if applicable): N/A  
Testing start date: 2020-06-29  
Testing completion date: 2021-12-08

### **DUT Identification**

DUT manufacture's name: SHENZHEN JUFEI OPTOELECTRONICS CO.,LTD.  
DUT identification,e.g., model number: 01.JT.12L3030M80N22  
Description of DUT,including if the DUT is an LED package or module: LED Package

### **DUT Characteristics**

Total input power(W): 2.0 W  
Average current density per LED die(mA/mm<sup>2</sup>): 603.9 mA/mm<sup>2</sup>  
Average power density per LED die(W/mm<sup>2</sup>): 2.01 W/mm<sup>2</sup>  
Representative CRI(Ra) of the tested sample set: 82  
(Indicate whether the reported value is the mean or Median value of the sample set,or per unit)  
Minimum die edge to die edge spacing: 0.2 mm



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## 1. General Information

### 1.1 Description of LED Light Sources

#### Sample Size:

75Pcs samples were received on 2020-06-01 ,The samples were numbered from S1 to S25 and S26 to S50 and S51 to S75.

Manufacture: SHENZHEN JUFEI OPTOELECTRONICS CO.,LTD.

Part Number: 01.JT.12L3030M80N22

Part Type: LED Package

Drive Level: DC 600mA per LED

Nominal CCT: 2700K, 6500K

Power: 2.0W

CRI: 82

#### Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days. These manufacturing lots are picked to represent a wide parametric distribution.

#### 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	CCT (K)	Current (mA)	Power (W)	Number of dies	Current density per die (mA/mm <sup>2</sup> )	Power density (W/mm <sup>2</sup> )	Die Spacing (mm)	Current of die (mA)
Test Model 01.JT.12L3030M80N22	2700, 6500	600	2.00	2	603.90	0.22	0.2	300
01.JT.12L3030M*N*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12L3030M*P*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12L3030M*T*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12K3030M*N*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12K3030M*P*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12K3030M*T*	≥2200	600	2.00	2	603.90	0.22	0.2	300
01.JT.12J3030M*N*	≥2200	360	1.10	2	581.25	0.12	0.2	180
01.JT.12J3030M*P*	≥2200	360	1.10	2	581.25	0.12	0.2	180
01.JT.12J3030M*T*	≥2200	360	1.10	2	581.25	0.12	0.2	180
01.JT.12G3030M*N*	≥2200	144	0.50	2	338.18	0.06	0.2	72
01.JT.12G3030M*P*	≥2200	144	0.50	2	338.18	0.06	0.2	72
01.JT.12G3030M*T*	≥2200	144	0.50	2	338.18	0.06	0.2	72
01.JT.22L3030M*N*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22L3030M*P*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22L3030M*T*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22K3030M*N*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22K3030M*P*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22K3030M*T*	≥2200	300	1.92	2	298.08	0.21	0.2	150
01.JT.22J3030M*N*	≥2200	200	1.41	2	234.85	0.13	0.2	100
01.JT.22J3030M*P*	≥2200	200	1.41	2	234.85	0.13	0.2	100
01.JT.22J3030M*T*	≥2200	200	1.41	2	234.85	0.13	0.2	100



Note: The "\*" in the model mean market code or internal code, it can be Numbers or letters. The "P" in the model means foreign customers except Japan, "T" means Japanese customers, "N" means domestic customers, which do not affect product property.

#### Disclaimer:

The truthfulness and accuracy of all the technical information above for the covered LED products is ensured by manufacturer of LED light source. Guangdong Meide Testing Technology Co., Ltd. isn't responsible or gives any guarantees for the truthfulness of the technical information.

### 1.2 Standards Used

- ANSI/IES LM-80-15 IES Approved Method for Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
- ENERGY STAR® Requirements for the use of LM-80 Data (This standard was not accredited by NVLAP)

### 1.3 Test equipment list

Test Equipment	Serial No	Model No	Calibration due date
Integrating Sphere System	MD-E033	0.5m	2022/05/18
Standard Light Source	MD-E034	D062	2022/05/18
High Accuracy Array Spectroradio Meter	MD-E011	HAAS-3000	2022/09/17
Digital Power Meter	MD-E008	PF310	2022/09/17
Precision digital stabilized DC power supply	MD-E009	WY305	2022/09/17
Temperature Tester	MD-E038	UFS-D8036	2022/08/28

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd. attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

### 1.4 Drive Level

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.

### 1.5 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  $25^{\circ}C \pm 2^{\circ}C$ ,  $RH < 65\%$ .



## 1.6 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.

The uncertainty of the light output (luminous flux) measurements is  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=18\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the temperature is  $U=0.5^{\circ}\text{C}$  ( $K=2$ ), at the 95% confidence level.

## 1.7 Sample Set

<b>Data Set 1:55°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (2700K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 53°C
Ambient Temperature( $T_A$ ):	> 50°C
Life Test Drive Current:	300mA
Measurement Current:	300mA

<b>Data Set 2:85°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (2700K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 83°C
Ambient Temperature( $T_A$ ):	> 80°C
Life Test Drive Current:	300mA
Measurement Current:	300mA

<b>Data Set 3:105°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (2700K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 103°C
Ambient Temperature( $T_A$ ):	> 100°C
Life Test Drive Current:	300mA
Measurement Current:	300mA



<b>Data Set 4:55°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (6500K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 53°C
Ambient Temperature( $T_A$ ):	> 50°C
Life Test Drive Current:	300mA
Measurement Current:	300mA

<b>Data Set 5:85°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (6500K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 83°C
Ambient Temperature( $T_A$ ):	> 80°C
Life Test Drive Current:	300mA
Measurement Current:	300mA

<b>Data Set 6:105°C,300mA</b>	
Part number:	01.JT.12L3030M80N22 (6500K)
Number of Units:	25
Case Temperature( $T_S$ ):	> 103°C
Ambient Temperature( $T_A$ ):	> 100°C
Life Test Drive Current:	300mA
Measurement Current:	300mA



## 2. SUMMARY OF TEST RESULT

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	$\alpha$	$\beta$	Reported TM-21 L <sub>70</sub> Lifetime	Reported TM-21 L <sub>90</sub> Lifetime
1	25	0	1000hrs	12000hrs	2.104E-06	1.000	>72000hrs	50000hrs
2	25	0	1000hrs	12000hrs	2.208E-06	0.998	>72000hrs	47000hrs
3	25	0	1000hrs	12000hrs	2.174E-06	0.993	>72000hrs	45000hrs
4	25	0	1000hrs	12000hrs	1.957E-06	0.999	>72000hrs	53000hrs
5	25	0	1000hrs	12000hrs	2.081E-06	0.997	>72000hrs	49000hrs
6	25	0	1000hrs	12000hrs	2.153E-06	0.994	>72000hrs	46000hrs

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 Q <sub>90</sub> Lifetime (400-700nm)	Reported TM-21 Q <sub>90</sub> Lifetime (700-800nm)
1	25	0	1000hrs	12000hrs	51000hrs	51000hrs
2	25	0	1000hrs	12000hrs	48000hrs	49000hrs
3	25	0	1000hrs	12000hrs	45000hrs	45000hrs
4	25	0	1000hrs	12000hrs	54000hrs	53000hrs
5	25	0	1000hrs	12000hrs	50000hrs	50000hrs
6	25	0	1000hrs	12000hrs	46000hrs	46000hrs

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	100.17%	99.80%	99.56%	99.26%	98.94%	98.73%	98.53%	98.31%	98.05%	97.86%	97.68%	97.52%
2	100.09%	99.69%	99.28%	99.02%	98.75%	98.49%	98.28%	98.04%	97.83%	97.61%	97.39%	97.21%
3	99.99%	99.46%	98.94%	98.64%	98.34%	98.03%	97.83%	97.61%	97.41%	97.20%	96.99%	96.75%
4	100.16%	99.91%	99.64%	99.34%	99.05%	98.76%	98.56%	98.35%	98.12%	97.96%	97.79%	97.61%
5	100.10%	99.69%	99.28%	99.00%	98.72%	98.43%	98.21%	97.99%	97.79%	97.60%	97.40%	97.20%
6	99.98%	99.57%	99.14%	98.81%	98.48%	98.16%	97.93%	97.72%	97.51%	97.31%	97.10%	96.89%





Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

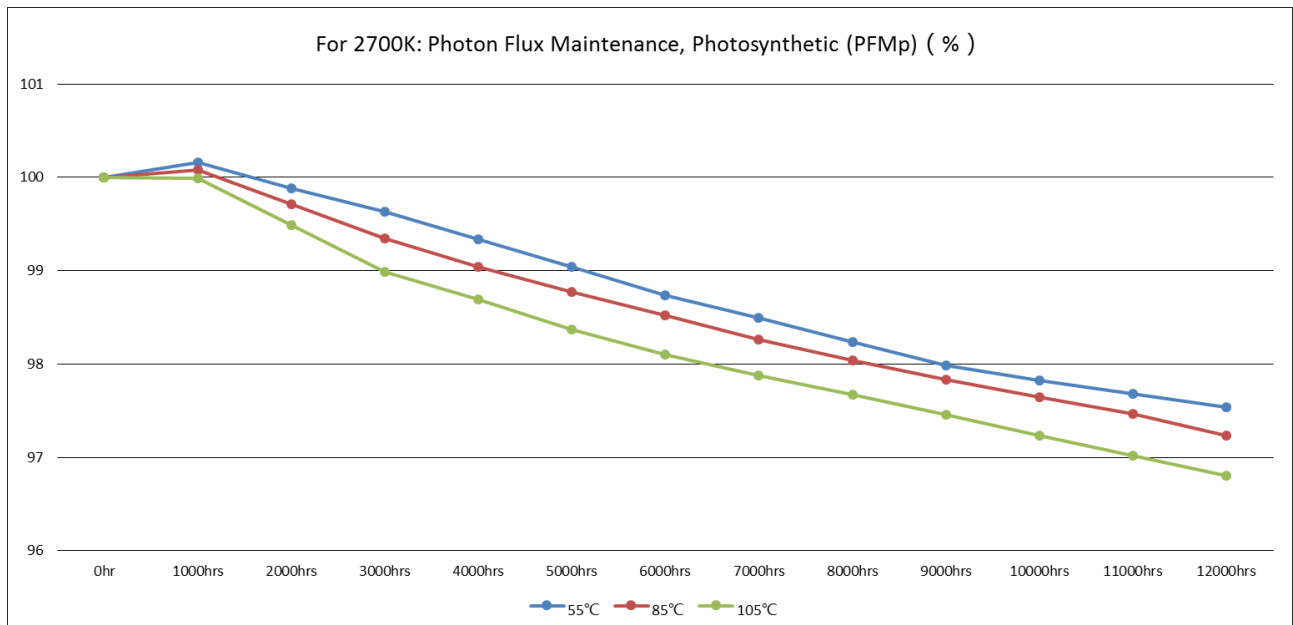
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	100.16%	99.89%	99.63%	99.34%	99.04%	98.74%	98.50%	98.24%	97.98%	97.82%	97.68%	97.54%
2	100.08%	99.71%	99.34%	99.04%	98.78%	98.52%	98.27%	98.04%	97.84%	97.64%	97.46%	97.23%
3	99.99%	99.49%	98.99%	98.69%	98.37%	98.10%	97.88%	97.67%	97.46%	97.24%	97.02%	96.81%
4	100.17%	99.84%	99.58%	99.30%	99.01%	98.73%	98.53%	98.32%	98.15%	97.92%	97.76%	97.60%
5	100.11%	99.68%	99.25%	98.93%	98.67%	98.40%	98.21%	97.98%	97.78%	97.58%	97.41%	97.23%
6	99.95%	99.51%	99.02%	98.74%	98.48%	98.21%	98.01%	97.77%	97.54%	97.34%	97.15%	96.96%

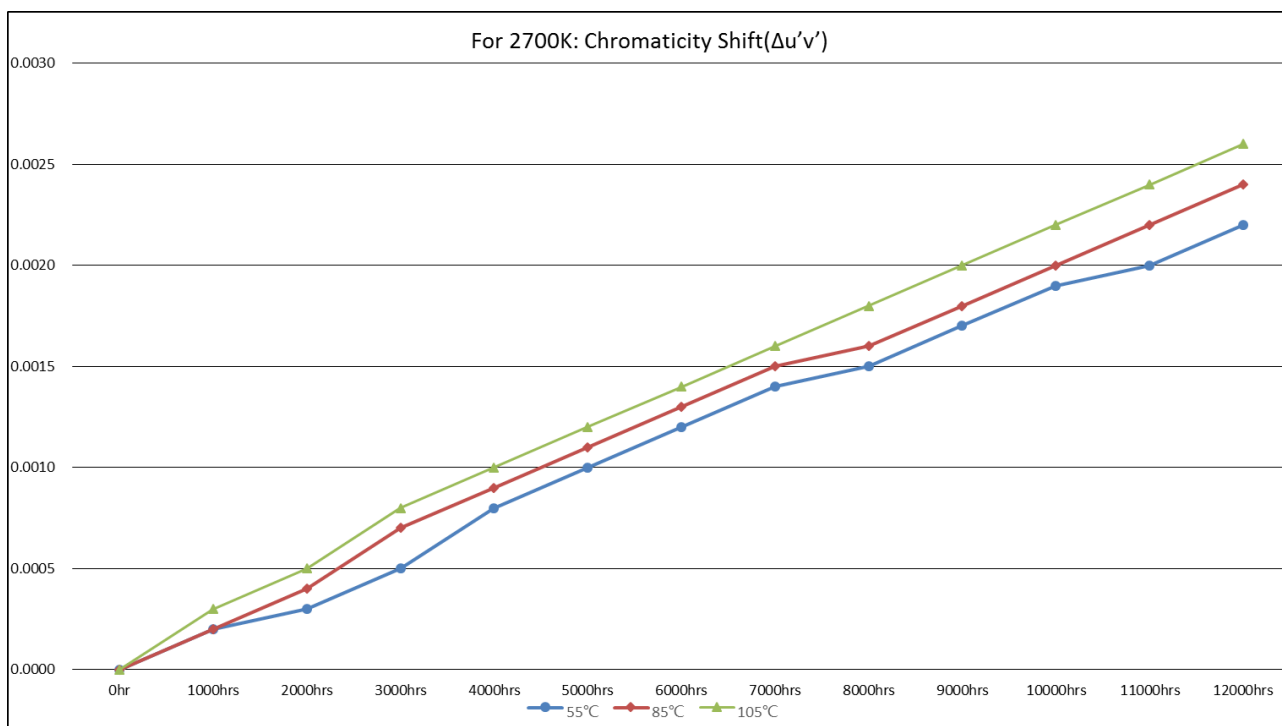
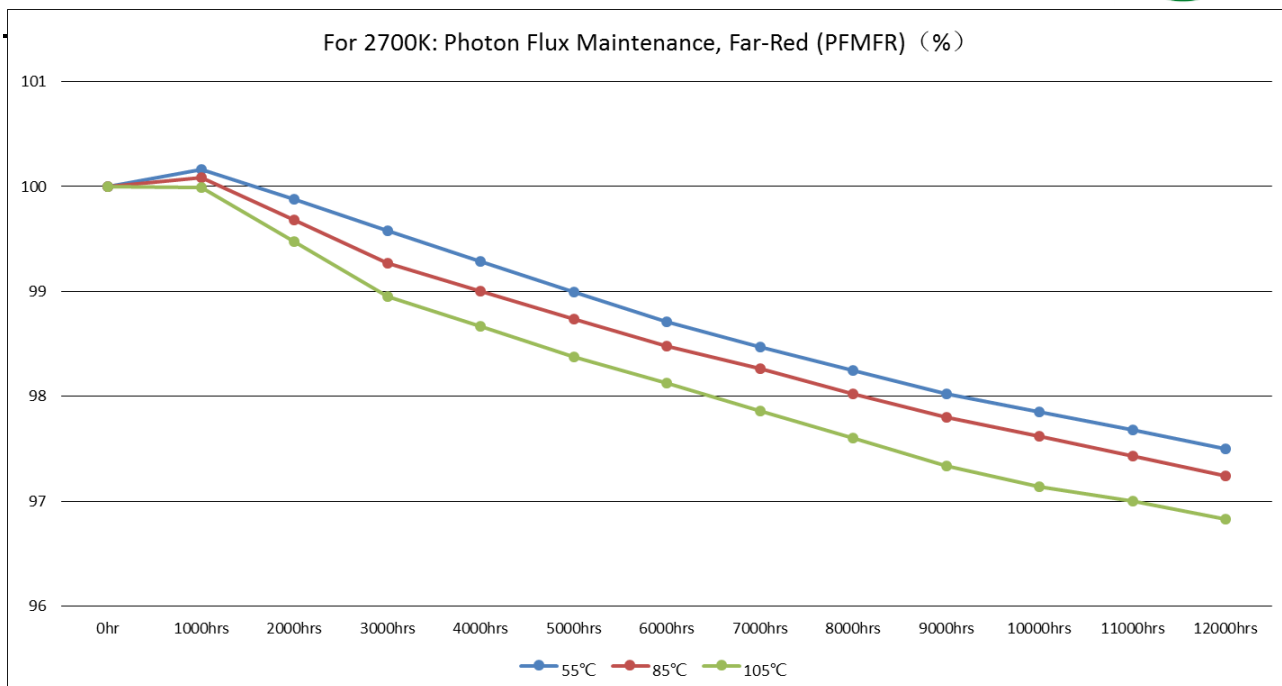
Average Photon Flux Maintenance, Far-Red (PFMFR) (Percentage of Initial Far-Red Photon Flux)

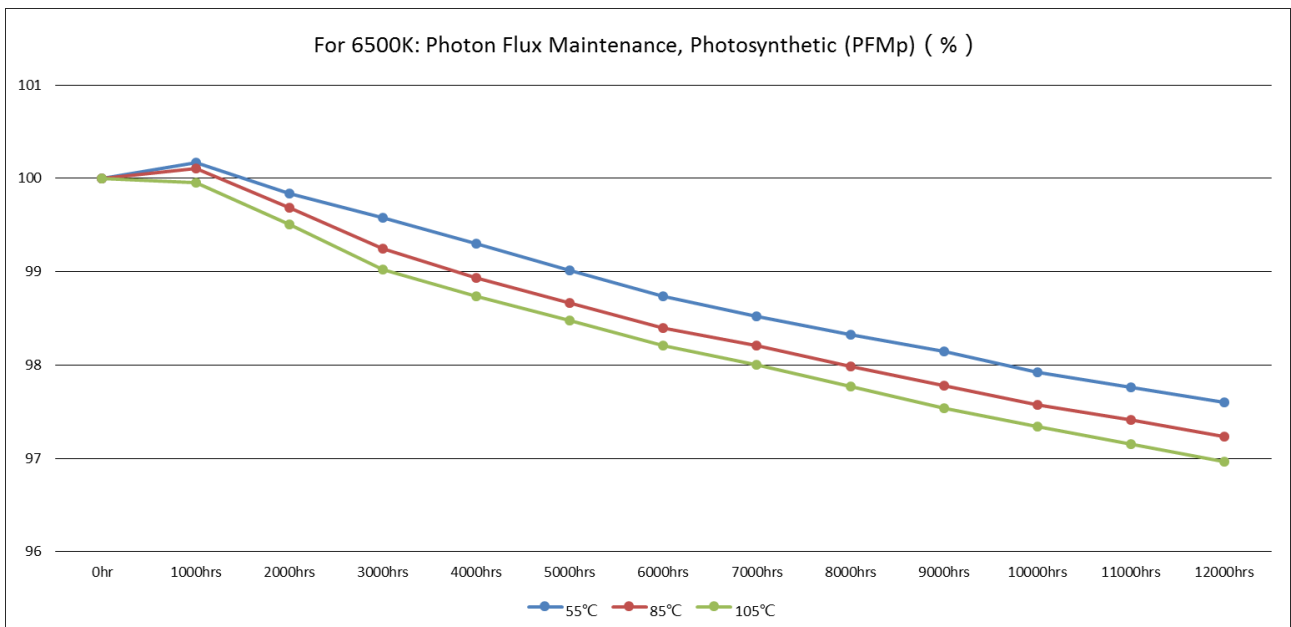
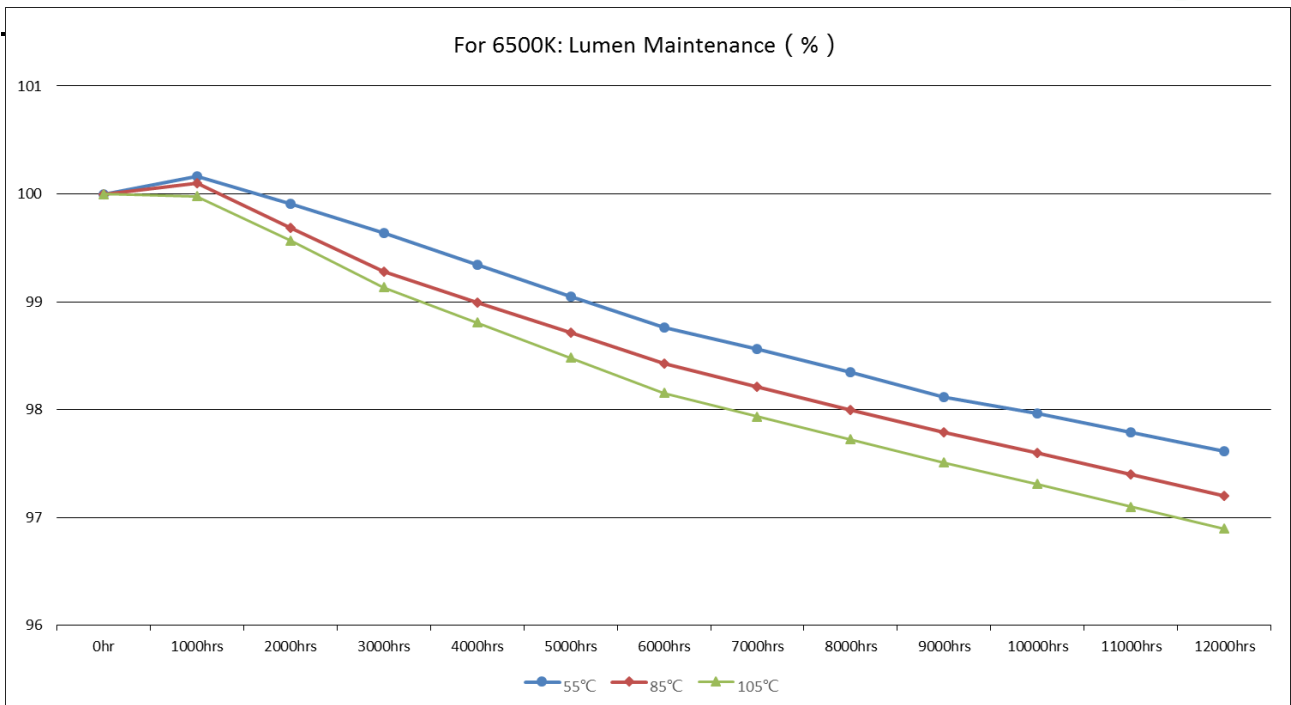
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	100.16%	99.88%	99.57%	99.29%	99.00%	98.71%	98.47%	98.25%	98.03%	97.85%	97.68%	97.50%
2	100.09%	99.68%	99.27%	99.01%	98.74%	98.48%	98.26%	98.02%	97.80%	97.62%	97.43%	97.24%
3	99.99%	99.48%	98.96%	98.67%	98.38%	98.12%	97.86%	97.60%	97.34%	97.14%	97.00%	96.83%
4	100.16%	99.87%	99.60%	99.35%	99.09%	98.83%	98.59%	98.34%	98.08%	97.95%	97.80%	97.69%
5	100.11%	99.71%	99.27%	98.97%	98.73%	98.48%	98.26%	98.01%	97.81%	97.64%	97.44%	97.28%
6	100.01%	99.54%	99.06%	98.78%	98.50%	98.23%	98.01%	97.80%	97.57%	97.34%	97.14%	96.95%

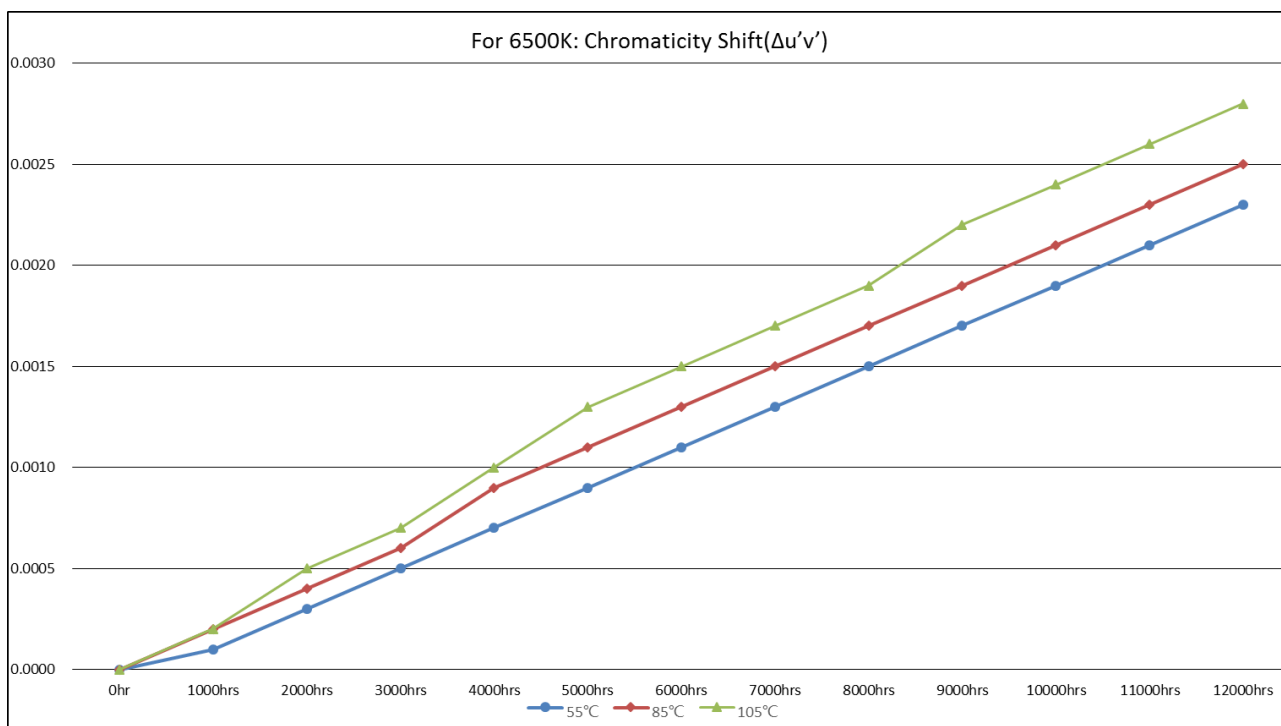
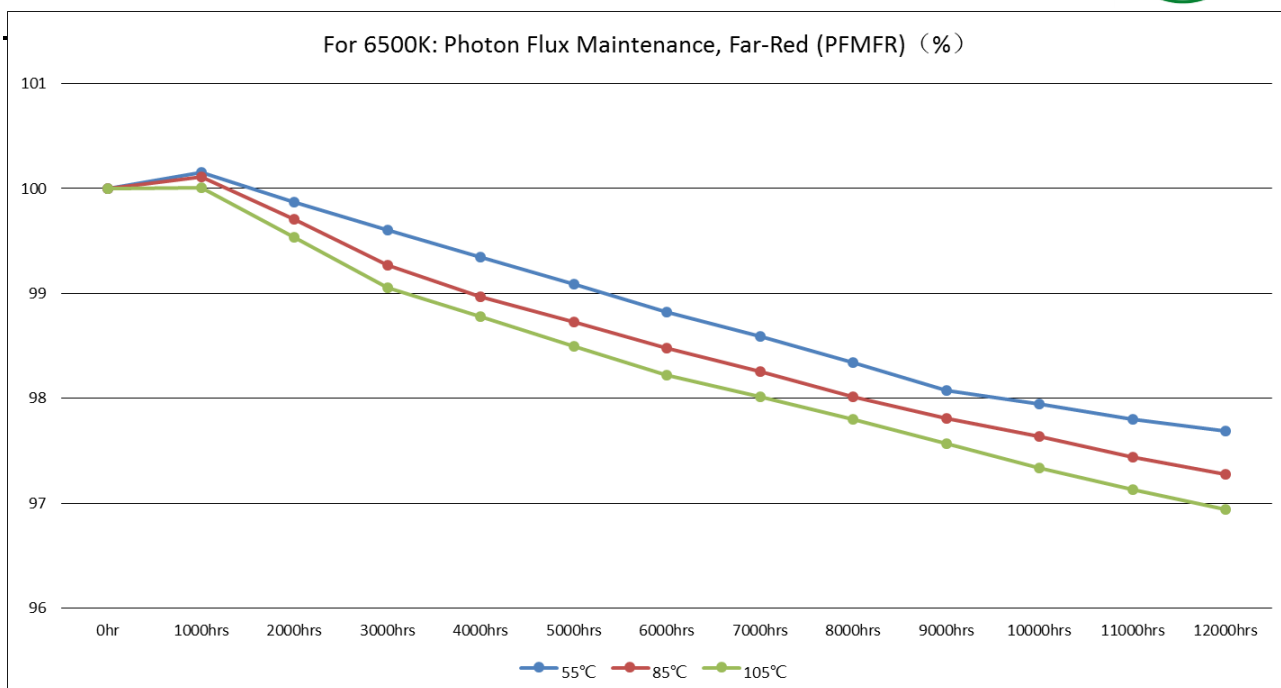
Average Chromaticity Shift ( $\Delta u'v'$ )

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0015	0.0017	0.0019	0.0020	0.0022
2	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0020	0.0022	0.0024
3	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026
4	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023
5	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025
6	0.0002	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028











### 3. Test Data

#### 3.1 Data Set 1, 55°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm) Ohr (Initial)	Lumen Maintenance (%)											
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	122.5	100.17	99.78	99.57	99.25	98.85	98.83	98.41	98.35	98.23	98.20	97.74	97.51
S2	122.1	100.14	99.78	99.54	99.30	98.95	98.81	98.59	98.18	97.89	97.98	97.71	97.56
S3	122.7	100.23	99.81	99.53	99.27	98.91	98.77	98.67	98.14	98.19	97.55	97.64	97.66
S4	122.2	100.19	99.85	99.55	99.18	98.95	98.62	98.58	98.34	98.30	98.22	97.59	97.45
S5	122.3	100.17	99.75	99.57	99.35	99.06	98.69	98.56	98.42	97.95	97.83	97.72	97.57
S6	122.4	100.20	99.75	99.63	99.27	98.90	98.79	98.47	98.33	97.99	97.70	97.48	97.51
S7	122.2	100.23	99.75	99.58	99.31	98.93	98.71	98.43	98.36	98.09	97.92	97.60	97.42
S8	122.3	100.13	99.84	99.58	99.31	99.03	98.65	98.43	98.44	98.17	97.75	97.73	97.50
S9	122.7	100.23	99.84	99.63	99.23	98.86	98.62	98.47	98.17	98.15	97.98	97.49	97.80
S10	121.9	100.12	99.85	99.57	99.26	98.89	98.73	98.36	98.40	97.91	97.85	97.76	97.36
S11	122.3	100.17	99.82	99.55	99.25	98.96	98.63	98.53	98.23	97.94	98.22	97.65	97.31
S12	122.7	100.12	99.75	99.55	99.32	98.97	98.75	98.50	98.38	97.93	97.74	97.64	97.56
S13	122.5	100.22	99.75	99.54	99.21	98.93	98.80	98.38	98.18	98.03	98.04	97.83	97.40
S14	122.9	100.23	99.76	99.57	99.31	99.02	98.75	98.68	98.35	97.75	98.11	97.58	97.34
S15	122.6	100.13	99.84	99.54	99.32	98.90	98.77	98.39	98.21	98.25	97.84	97.86	97.38
S16	123.0	100.13	99.77	99.62	99.24	98.89	98.71	98.60	98.23	98.25	97.56	97.68	97.48
S17	122.8	100.14	99.86	99.57	99.20	98.86	98.72	98.56	98.45	97.88	97.63	97.48	97.52
S18	122.5	100.14	99.75	99.55	99.21	98.98	98.82	98.68	98.39	97.92	97.88	97.86	97.78
S19	122.6	100.21	99.84	99.56	99.20	99.08	98.77	98.57	98.32	98.05	97.64	97.74	97.69
S20	122.6	100.19	99.83	99.54	99.31	99.04	98.81	98.58	98.42	98.13	97.70	97.70	97.31
S21	122.6	100.20	99.80	99.62	99.20	98.91	98.62	98.67	98.32	97.77	97.80	97.72	97.90
S22	122.6	100.18	99.82	99.54	99.18	99.00	98.71	98.68	98.26	98.21	97.60	97.91	97.43
S23	122.7	100.12	99.76	99.54	99.29	98.93	98.63	98.38	98.30	98.29	97.89	97.55	97.77
S24	122.5	100.13	99.83	99.54	99.20	98.84	98.81	98.57	98.43	98.17	98.21	97.72	97.45
S25	123.1	100.15	99.83	99.52	99.23	98.96	98.64	98.42	98.24	97.88	97.66	97.67	97.39
Ave.	122.5	100.17	99.80	99.56	99.26	98.94	98.73	98.53	98.31	98.05	97.86	97.68	97.52
Med.	122.6	100.17	99.81	99.55	99.25	98.93	98.73	98.56	98.33	98.05	97.84	97.70	97.50
St dev	0.2795	0.0399	0.0400	0.0314	0.0509	0.0666	0.0721	0.1066	0.0944	0.1650	0.2144	0.1162	0.1626
Min.	121.9	100.12	99.75	99.52	99.18	98.84	98.62	98.36	98.14	97.75	97.55	97.48	97.31
Max.	123.1	100.23	99.86	99.63	99.35	99.08	98.83	98.68	98.45	98.30	98.22	97.91	97.90



### 3.2 Data Set 1, 55°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp) )

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	1.76	100.13	99.78	99.43	99.12	98.81	98.49	98.24	97.96	97.75	97.62	97.48	97.38
S2	1.76	100.11	99.89	99.55	99.24	98.93	98.62	98.37	98.12	97.92	97.79	97.69	97.55
S3	1.76	100.19	99.84	99.63	99.39	99.14	98.83	98.58	98.29	98.08	97.95	97.85	97.71
S4	1.76	100.21	100.00	99.79	99.47	99.16	98.85	98.60	98.32	98.07	97.94	97.76	97.62
S5	1.76	100.21	100.00	99.79	99.48	99.17	98.86	98.65	98.37	98.08	97.95	97.85	97.67
S6	1.76	100.19	99.97	99.63	99.38	99.13	98.89	98.68	98.47	98.19	97.98	97.80	97.63
S7	1.76	100.19	99.98	99.63	99.32	99.08	98.76	98.56	98.27	98.06	97.89	97.75	97.61
S8	1.76	100.17	99.96	99.75	99.43	99.12	98.81	98.52	98.24	97.99	97.78	97.64	97.47
S9	1.76	100.17	99.82	99.61	99.30	98.99	98.75	98.54	98.29	98.00	97.83	97.65	97.48
S10	1.76	100.13	99.92	99.71	99.40	99.09	98.78	98.49	98.21	97.92	97.75	97.65	97.55
S11	1.74	100.11	99.77	99.55	99.31	99.00	98.69	98.40	98.15	97.90	97.77	97.59	97.45
S12	1.74	100.21	99.99	99.78	99.53	99.22	98.98	98.77	98.56	98.31	98.14	97.97	97.79
S13	1.74	100.11	99.76	99.55	99.24	98.93	98.62	98.37	98.16	97.96	97.75	97.57	97.43
S14	1.74	100.16	99.81	99.47	99.22	98.91	98.60	98.39	98.10	97.82	97.69	97.58	97.44
S15	1.74	100.18	99.96	99.75	99.44	99.13	98.81	98.61	98.40	98.11	97.91	97.77	97.59
S16	1.74	100.22	99.87	99.66	99.41	99.10	98.79	98.59	98.34	98.09	97.96	97.82	97.68
S17	1.74	100.11	99.90	99.55	99.24	98.93	98.63	98.38	98.09	97.80	97.63	97.46	97.32
S18	1.74	100.18	99.83	99.49	99.17	98.87	98.56	98.31	98.06	97.81	97.64	97.50	97.33
S19	1.77	100.21	100.00	99.78	99.54	99.23	98.98	98.69	98.45	98.24	98.11	97.97	97.87
S20	1.76	100.21	99.86	99.65	99.34	99.03	98.72	98.47	98.26	98.05	97.92	97.82	97.72
S21	1.76	100.21	99.86	99.65	99.40	99.09	98.78	98.53	98.24	98.00	97.86	97.69	97.59
S22	1.76	100.11	99.76	99.55	99.24	98.99	98.68	98.48	98.19	97.90	97.69	97.52	97.34
S23	1.76	100.12	99.77	99.56	99.25	98.94	98.63	98.34	98.05	97.77	97.56	97.38	97.24
S24	1.76	100.12	99.91	99.69	99.38	99.07	98.76	98.47	98.19	97.94	97.81	97.71	97.57
S25	1.76	100.14	99.93	99.58	99.27	98.95	98.64	98.35	98.10	97.82	97.61	97.51	97.41
Ave.	1.75	100.16	99.89	99.63	99.34	99.04	98.74	98.50	98.24	97.98	97.82	97.68	97.54
Med.	1.76	100.17	99.89	99.63	99.34	99.07	98.76	98.49	98.24	97.99	97.81	97.69	97.55
St dev	0.0098	0.0408	0.0830	0.1046	0.1113	0.1129	0.1246	0.1336	0.1449	0.1480	0.1545	0.1572	0.1577
Min.	1.74	100.11	99.76	99.43	99.12	98.81	98.49	98.24	97.96	97.75	97.56	97.38	97.24
Max.	1.77	100.22	100.00	99.79	99.54	99.23	98.98	98.77	98.56	98.31	98.14	97.97	97.87



### 3.3 Data Set 1, 55°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	0.0664	100.17	99.96	99.61	99.30	99.06	98.75	98.49	98.27	98.01	97.92	97.68	97.49
S2	0.0663	100.14	99.93	99.58	99.27	99.03	98.72	98.53	98.34	98.08	97.86	97.62	97.44
S3	0.0663	100.19	99.98	99.62	99.38	99.07	98.76	98.54	98.28	98.02	97.93	97.84	97.66
S4	0.0662	100.10	99.75	99.39	99.09	98.78	98.48	98.28	98.06	97.80	97.59	97.50	97.31
S5	0.0662	100.20	99.99	99.63	99.32	99.02	98.71	98.49	98.27	98.05	97.96	97.75	97.54
S6	0.0663	100.19	99.98	99.63	99.38	99.08	98.77	98.57	98.31	98.12	98.03	97.79	97.61
S7	0.0662	100.17	99.81	99.60	99.36	99.11	98.87	98.65	98.39	98.13	97.91	97.82	97.61
S8	0.0663	100.15	99.94	99.58	99.28	99.03	98.72	98.46	98.20	97.98	97.89	97.80	97.60
S9	0.0663	100.15	99.79	99.58	99.34	99.09	98.79	98.53	98.33	98.14	97.90	97.81	97.60
S10	0.0663	100.15	99.80	99.59	99.28	98.98	98.67	98.41	98.19	97.97	97.88	97.67	97.61
S11	0.0653	100.18	99.97	99.62	99.31	99.01	98.70	98.44	98.18	97.92	97.70	97.61	97.43
S12	0.0653	100.18	99.83	99.62	99.31	99.01	98.70	98.51	98.32	98.12	97.91	97.82	97.61
S13	0.0652	100.19	99.83	99.48	99.17	98.87	98.56	98.30	98.08	97.82	97.58	97.34	97.13
S14	0.0652	100.17	99.96	99.61	99.36	99.06	98.75	98.49	98.23	98.04	97.80	97.71	97.53
S15	0.0652	100.13	99.77	99.56	99.26	99.01	98.71	98.45	98.25	98.03	97.82	97.73	97.52
S16	0.0652	100.11	99.90	99.54	99.24	98.93	98.62	98.36	98.17	97.95	97.71	97.62	97.41
S17	0.0652	100.13	99.77	99.42	99.17	98.93	98.68	98.42	98.23	98.04	97.82	97.58	97.40
S18	0.0653	100.21	100.00	99.65	99.40	99.09	98.78	98.59	98.33	98.14	97.90	97.66	97.60
S19	0.0665	100.16	99.95	99.74	99.44	99.13	98.82	98.60	98.34	98.15	97.91	97.67	97.49
S20	0.0664	100.20	99.99	99.78	99.47	99.16	98.92	98.70	98.48	98.28	98.07	97.83	97.65
S21	0.0664	100.14	99.93	99.73	99.42	99.12	98.87	98.65	98.43	98.24	98.15	97.93	97.72
S22	0.0664	100.18	99.83	99.47	99.17	98.86	98.62	98.36	98.10	97.84	97.75	97.51	97.33
S23	0.0665	100.17	99.82	99.46	99.16	98.85	98.61	98.35	98.16	97.93	97.72	97.63	97.45
S24	0.0665	100.13	99.77	99.42	99.11	98.81	98.56	98.37	98.15	97.96	97.87	97.63	97.57
S25	0.0664	100.16	99.80	99.45	99.14	98.84	98.53	98.31	98.09	97.90	97.68	97.44	97.26
Ave.	0.0660	100.16	99.88	99.57	99.29	99.00	98.71	98.47	98.25	98.03	97.85	97.68	97.50
Med.	0.0663	100.17	99.90	99.59	99.30	99.02	98.71	98.49	98.25	98.03	97.88	97.67	97.53
St dev	0.0005	0.0291	0.0875	0.1012	0.1067	0.1090	0.1091	0.1148	0.1099	0.1231	0.1375	0.1390	0.1399
Min.	0.0652	100.10	99.75	99.39	99.09	98.78	98.48	98.28	98.06	97.80	97.58	97.34	97.13
Max.	0.0665	100.21	100.00	99.78	99.47	99.16	98.92	98.70	98.48	98.28	98.15	97.93	97.72





### 3.4 Data Set 1, 55°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	3.318	3.316	3.319	3.315	3.319	3.316	3.320	3.316	3.316	3.313	3.314	3.321	3.319
S2	3.321	3.317	3.321	3.318	3.319	3.318	3.316	3.316	3.318	3.324	3.319	3.319	3.324
S3	3.305	3.301	3.301	3.305	3.302	3.305	3.302	3.300	3.300	3.306	3.302	3.300	3.303
S4	3.308	3.304	3.305	3.305	3.305	3.306	3.307	3.306	3.303	3.308	3.310	3.308	3.309
S5	3.323	3.320	3.322	3.323	3.320	3.323	3.322	3.326	3.320	3.319	3.322	3.320	3.325
S6	3.305	3.307	3.301	3.302	3.306	3.302	3.303	3.302	3.300	3.303	3.303	3.303	3.302
S7	3.311	3.308	3.310	3.311	3.309	3.308	3.308	3.307	3.308	3.306	3.308	3.308	3.307
S8	3.312	3.309	3.308	3.314	3.309	3.307	3.314	3.308	3.308	3.313	3.309	3.308	3.315
S9	3.309	3.304	3.309	3.305	3.309	3.305	3.310	3.307	3.309	3.304	3.312	3.306	3.312
S10	3.324	3.320	3.322	3.322	3.324	3.320	3.326	3.325	3.321	3.321	3.323	3.326	3.327
S11	3.472	3.472	3.469	3.471	3.469	3.470	3.468	3.470	3.471	3.469	3.469	3.471	3.470
S12	3.474	3.471	3.470	3.471	3.472	3.476	3.476	3.471	3.470	3.471	3.470	3.472	3.474
S13	3.462	3.459	3.464	3.458	3.458	3.462	3.457	3.463	3.459	3.457	3.464	3.458	3.465
S14	3.450	3.447	3.448	3.447	3.449	3.446	3.451	3.446	3.451	3.449	3.452	3.450	3.446
S15	3.453	3.451	3.449	3.449	3.450	3.449	3.456	3.451	3.448	3.454	3.451	3.450	3.453
S16	3.331	3.329	3.328	3.329	3.326	3.330	3.333	3.329	3.331	3.326	3.332	3.331	3.326
S17	3.451	3.453	3.452	3.448	3.451	3.447	3.450	3.452	3.453	3.448	3.448	3.449	3.448
S18	3.456	3.456	3.454	3.458	3.456	3.454	3.457	3.457	3.453	3.456	3.458	3.458	3.452
S19	3.311	3.309	3.309	3.311	3.308	3.311	3.308	3.313	3.308	3.307	3.310	3.312	3.311
S20	3.312	3.308	3.308	3.313	3.314	3.309	3.313	3.311	3.314	3.313	3.309	3.311	3.309
S21	3.307	3.308	3.307	3.308	3.305	3.303	3.304	3.306	3.309	3.304	3.304	3.310	3.309
S22	3.321	3.319	3.319	3.317	3.318	3.317	3.319	3.316	3.323	3.322	3.323	3.318	3.316
S23	3.304	3.300	3.301	3.306	3.302	3.300	3.299	3.299	3.299	3.301	3.302	3.303	3.304
S24	3.310	3.312	3.311	3.306	3.311	3.308	3.312	3.311	3.308	3.313	3.305	3.309	3.311
S25	3.308	3.304	3.306	3.306	3.306	3.308	3.310	3.303	3.309	3.305	3.309	3.305	3.306
Ave.	3.354	3.352	3.353	3.353	3.353	3.352	3.354	3.353	3.352	3.353	3.353	3.353	3.354
Med.	3.318	3.316	3.319	3.315	3.318	3.316	3.316	3.316	3.316	3.313	3.314	3.318	3.316
St dev	0.0676	0.0680	0.0676	0.0672	0.0675	0.0679	0.0679	0.0681	0.0678	0.0675	0.0677	0.0675	0.0671
Min.	3.304	3.300	3.301	3.302	3.302	3.300	3.299	3.299	3.299	3.301	3.302	3.300	3.302
Max.	3.474	3.472	3.470	3.471	3.472	3.476	3.476	3.471	3.471	3.471	3.470	3.472	3.474



### 3.5 Data Set 1, 55°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	0.2598	0.5234	2775	0.0002	0.0005	0.0006	0.0009	0.0012	0.0013	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023
S2	0.2593	0.5225	2790	0.0003	0.0003	0.0004	0.0006	0.0009	0.0010	0.0014	0.0015	0.0017	0.0019	0.0020	0.0022
S3	0.2604	0.5232	2762	0.0002	0.0002	0.0004	0.0007	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023
S4	0.2595	0.5239	2779	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0016	0.0017	0.0019	0.0020	0.0023
S5	0.2596	0.5230	2781	0.0002	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018	0.0019	0.0020	0.0022
S6	0.2588	0.5217	2804	0.0003	0.0005	0.0006	0.0009	0.0012	0.0013	0.0015	0.0016	0.0017	0.0020	0.0021	0.0023
S7	0.2591	0.5222	2796	0.0003	0.0003	0.0005	0.0007	0.0010	0.0013	0.0014	0.0015	0.0017	0.0019	0.0022	0.0023
S8	0.2589	0.5215	2802	0.0002	0.0004	0.0005	0.0007	0.0010	0.0013	0.0014	0.0015	0.0017	0.0019	0.0021	0.0023
S9	0.2591	0.5233	2790	0.0002	0.0002	0.0003	0.0006	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0020	0.0022
S10	0.2588	0.5216	2805	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0015	0.0016	0.0017	0.0019	0.0021
S11	0.2542	0.5230	2904	0.0003	0.0005	0.0006	0.0008	0.0011	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022
S12	0.2546	0.5241	2888	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023
S13	0.2548	0.5240	2884	0.0003	0.0003	0.0005	0.0007	0.0010	0.0013	0.0015	0.0016	0.0017	0.0019	0.0020	0.0021
S14	0.2557	0.5245	2861	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	0.0014	0.0016	0.0017	0.0018	0.0019	0.0020
S15	0.2548	0.5252	2877	0.0002	0.0005	0.0006	0.0008	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016	0.0018	0.0019
S16	0.2545	0.5231	2896	0.0003	0.0003	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0018	0.0019	0.0020	0.0022
S17	0.2541	0.5230	2906	0.0002	0.0003	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022
S18	0.2544	0.5236	2896	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0013	0.0015	0.0017	0.0018	0.0020	0.0022
S19	0.2591	0.5223	2795	0.0002	0.0003	0.0006	0.0009	0.0011	0.0012	0.0015	0.0016	0.0018	0.0020	0.0021	0.0022
S20	0.2590	0.5214	2801	0.0002	0.0003	0.0004	0.0006	0.0009	0.0013	0.0014	0.0015	0.0017	0.0019	0.0021	0.0023
S21	0.2595	0.5240	2779	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0013	0.0014	0.0015	0.0017	0.0019	0.0021
S22	0.2597	0.5230	2778	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0022
S23	0.2588	0.5217	2804	0.0002	0.0004	0.0006	0.0009	0.0012	0.0012	0.0013	0.0014	0.0015	0.0018	0.0019	0.0021
S24	0.2591	0.5222	2795	0.0003	0.0003	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0017	0.0018	0.0020	0.0022
S25	0.2593	0.5232	2787	0.0003	0.0002	0.0003	0.0006	0.0009	0.0014	0.0016	0.0017	0.0018	0.0020	0.0022	0.0024
Ave.	0.2578	0.5230	2821	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0015	0.0017	0.0019	0.0020	0.0022
Med.	0.2590	0.5230	2801	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0015	0.0017	0.0019	0.0020	0.0022
St dev	0.0023	0.0010	49.0654	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2541	0.5214	2762	0.0002	0.0002	0.0003	0.0006	0.0009	0.0010	0.0013	0.0014	0.0015	0.0016	0.0018	0.0019
Max.	0.2604	0.5252	2906	0.0003	0.0005	0.0006	0.0009	0.0012	0.0014	0.0016	0.0017	0.0018	0.0020	0.0022	0.0024



### 3.6 Data Set 2, 85°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)											
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	123.5	100.08	99.69	99.30	98.98	98.70	98.38	98.09	97.79	97.50	97.32	97.06	96.91
S27	123.2	100.08	99.69	99.28	98.99	98.80	98.61	98.32	98.14	97.96	97.74	97.52	97.33
S28	123.0	100.08	99.69	99.28	99.08	98.77	98.45	98.15	97.95	97.78	97.51	97.34	97.14
S29	123.1	100.08	99.69	99.30	99.11	98.92	98.61	98.40	98.11	97.91	97.73	97.51	97.32
S30	123.6	100.06	99.67	99.26	98.98	98.69	98.41	98.23	97.94	97.73	97.56	97.34	97.10
S31	123.1	100.08	99.67	99.28	99.09	98.77	98.46	98.28	98.10	97.81	97.59	97.32	97.09
S32	123.1	100.07	99.66	99.24	99.05	98.86	98.58	98.38	98.08	97.90	97.68	97.46	97.27
S33	123.0	100.06	99.65	99.26	99.07	98.88	98.69	98.49	98.28	98.11	97.84	97.58	97.43
S34	123.1	100.09	99.68	99.26	98.95	98.76	98.57	98.36	98.07	97.87	97.69	97.52	97.28
S35	123.0	100.10	99.71	99.30	99.02	98.73	98.45	98.27	97.98	97.80	97.62	97.40	97.21
S36	123.1	100.08	99.69	99.28	98.99	98.68	98.39	98.22	97.92	97.72	97.50	97.28	97.13
S37	123.1	100.09	99.70	99.29	99.00	98.69	98.50	98.32	98.02	97.82	97.60	97.38	97.19
S38	126.2	100.08	99.66	99.25	99.06	98.78	98.46	98.26	98.08	97.78	97.56	97.34	97.15
S39	126.3	100.07	99.66	99.25	98.93	98.65	98.36	98.16	97.87	97.66	97.40	97.22	97.08
S40	126.1	100.09	99.68	99.26	98.95	98.63	98.44	98.24	98.03	97.83	97.61	97.44	97.29
S41	126.6	100.09	99.68	99.26	98.95	98.63	98.44	98.26	97.97	97.79	97.57	97.39	97.25
S42	126.2	100.09	99.70	99.29	99.10	98.82	98.63	98.45	98.25	97.95	97.69	97.46	97.32
S43	126.2	100.10	99.71	99.30	99.11	98.83	98.51	98.21	98.01	97.83	97.57	97.39	97.20
S44	122.5	100.10	99.68	99.27	98.95	98.76	98.57	98.37	98.17	97.97	97.74	97.57	97.33
S45	122.3	100.11	99.72	99.31	99.12	98.80	98.51	98.34	98.14	97.96	97.69	97.43	97.28
S46	122.4	100.11	99.69	99.28	98.96	98.64	98.33	98.13	97.95	97.75	97.57	97.40	97.16
S47	122.9	100.09	99.70	99.29	98.97	98.69	98.37	98.20	98.02	97.82	97.64	97.47	97.32
S48	122.7	100.10	99.71	99.29	99.01	98.69	98.50	98.30	98.01	97.71	97.49	97.22	97.03
S49	122.5	100.06	99.67	99.26	98.94	98.66	98.47	98.18	98.00	97.80	97.53	97.31	97.07
S50	122.4	100.11	99.70	99.28	99.09	98.90	98.62	98.42	98.12	97.94	97.72	97.46	97.31
Ave.	123.7	100.09	99.69	99.28	99.02	98.75	98.49	98.28	98.04	97.83	97.61	97.39	97.21
Med.	123.1	100.09	99.69	99.28	99.00	98.76	98.47	98.27	98.02	97.82	97.60	97.40	97.21
St dev	1.4923	0.0140	0.0186	0.0183	0.0635	0.0867	0.0953	0.1038	0.1126	0.1226	0.1162	0.1188	0.1205
Min.	122.3	100.06	99.65	99.24	98.93	98.63	98.33	98.09	97.79	97.50	97.32	97.06	96.91
Max.	126.6	100.11	99.72	99.31	99.12	98.92	98.69	98.49	98.28	98.11	97.84	97.58	97.43



### 3.7 Data Set 2, 85°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	1.76	100.07	99.71	99.35	99.13	98.96	98.79	98.59	98.45	98.23	98.03	97.83	97.58
S27	1.76	100.08	99.72	99.34	98.98	98.67	98.36	98.08	97.80	97.67	97.47	97.28	97.01
S28	1.76	100.08	99.72	99.35	98.98	98.67	98.35	98.16	97.88	97.74	97.54	97.35	97.09
S29	1.76	100.09	99.73	99.35	98.99	98.68	98.51	98.31	98.03	97.81	97.60	97.40	97.20
S30	1.76	100.07	99.71	99.35	99.13	98.82	98.65	98.45	98.23	98.01	97.81	97.60	97.34
S31	1.76	100.07	99.71	99.33	98.97	98.66	98.49	98.21	98.07	97.93	97.72	97.51	97.32
S32	1.76	100.08	99.70	99.34	98.98	98.66	98.35	98.07	97.93	97.71	97.51	97.37	97.17
S33	1.76	100.07	99.69	99.31	99.09	98.78	98.47	98.19	97.91	97.64	97.43	97.22	97.03
S34	1.76	100.08	99.70	99.34	99.12	98.80	98.49	98.16	97.88	97.74	97.53	97.40	97.20
S35	1.76	100.06	99.70	99.34	99.12	98.95	98.77	98.58	98.30	98.03	97.83	97.62	97.36
S36	1.76	100.07	99.69	99.33	98.96	98.79	98.47	98.28	98.00	97.73	97.58	97.44	97.19
S37	1.76	100.09	99.73	99.35	98.99	98.82	98.50	98.17	98.03	97.81	97.61	97.42	97.22
S38	1.77	100.09	99.71	99.35	99.13	98.82	98.65	98.45	98.23	97.95	97.74	97.60	97.41
S39	1.77	100.07	99.71	99.35	99.13	98.82	98.65	98.31	98.04	97.76	97.56	97.36	97.11
S40	1.77	100.07	99.69	99.33	99.11	98.79	98.48	98.28	98.14	98.00	97.79	97.60	97.35
S41	1.77	100.09	99.72	99.34	98.97	98.66	98.49	98.29	98.01	97.74	97.54	97.35	97.15
S42	1.77	100.08	99.70	99.34	98.98	98.81	98.50	98.22	97.94	97.80	97.66	97.47	97.20
S43	1.77	100.09	99.73	99.37	99.00	98.83	98.52	98.32	98.10	97.96	97.76	97.57	97.32
S44	1.74	100.10	99.74	99.37	99.02	98.70	98.39	98.11	97.89	97.67	97.46	97.25	96.99
S45	1.74	100.09	99.72	99.34	99.12	98.80	98.63	98.43	98.21	97.99	97.85	97.71	97.45
S46	1.74	100.08	99.71	99.35	98.99	98.68	98.51	98.18	97.96	97.82	97.61	97.42	97.22
S47	1.74	100.10	99.74	99.36	99.00	98.83	98.52	98.19	97.91	97.77	97.63	97.49	97.29
S48	1.74	100.07	99.71	99.35	98.98	98.67	98.37	98.03	97.81	97.59	97.38	97.24	97.05
S49	1.74	100.06	99.69	99.32	98.96	98.79	98.48	98.28	98.14	97.92	97.77	97.57	97.38
S50	1.74	100.09	99.73	99.36	99.13	98.96	98.65	98.37	98.09	97.87	97.66	97.47	97.21
Ave.	1.76	100.08	99.71	99.34	99.04	98.78	98.52	98.27	98.04	97.84	97.64	97.46	97.23
Med.	1.76	100.08	99.71	99.35	99.00	98.79	98.50	98.28	98.03	97.81	97.61	97.44	97.21
St dev	0.0138	0.0116	0.0151	0.0134	0.0694	0.0938	0.1207	0.1480	0.1591	0.1501	0.1538	0.1508	0.1456
Min.	1.74	100.06	99.69	99.31	98.96	98.66	98.35	98.03	97.80	97.59	97.38	97.22	96.99
Max.	1.77	100.10	99.74	99.37	99.13	98.96	98.79	98.59	98.45	98.23	98.03	97.83	97.58



### 3.8 Data Set 2, 85°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	0.0663	100.07	99.66	99.26	98.99	98.78	98.51	98.29	98.07	97.85	97.65	97.45	97.23
S27	0.0663	100.08	99.68	99.27	99.00	98.73	98.52	98.35	98.19	97.97	97.82	97.68	97.48
S28	0.0663	100.06	99.66	99.26	98.99	98.78	98.57	98.35	98.13	97.91	97.77	97.62	97.42
S29	0.0663	100.10	99.68	99.28	99.01	98.72	98.45	98.28	98.07	97.90	97.68	97.53	97.31
S30	0.0664	100.11	99.71	99.30	99.03	98.76	98.56	98.27	98.11	97.83	97.68	97.46	97.24
S31	0.0663	100.11	99.71	99.31	99.01	98.80	98.60	98.31	98.03	97.81	97.66	97.52	97.37
S32	0.0663	100.09	99.69	99.29	98.99	98.79	98.58	98.36	98.14	97.92	97.70	97.48	97.33
S33	0.0663	100.10	99.69	99.29	99.00	98.71	98.41	98.25	97.96	97.68	97.54	97.39	97.19
S34	0.0663	100.09	99.67	99.26	99.05	98.75	98.48	98.26	97.98	97.82	97.67	97.45	97.23
S35	0.0663	100.11	99.71	99.30	99.10	98.80	98.53	98.37	98.09	97.80	97.60	97.46	97.25
S36	0.0663	100.11	99.69	99.28	99.01	98.74	98.47	98.19	97.90	97.68	97.46	97.32	97.17
S37	0.0664	100.07	99.66	99.25	98.96	98.69	98.40	98.12	97.90	97.61	97.47	97.32	97.12
S38	0.0643	100.10	99.70	99.29	98.99	98.70	98.43	98.27	98.05	97.88	97.74	97.59	97.44
S39	0.0643	100.08	99.67	99.25	98.96	98.69	98.42	98.26	98.04	97.87	97.67	97.52	97.31
S40	0.0643	100.10	99.69	99.27	99.00	98.73	98.44	98.22	97.94	97.72	97.50	97.28	97.13
S41	0.0643	100.07	99.67	99.26	98.99	98.69	98.48	98.20	97.92	97.64	97.49	97.27	97.07
S42	0.0643	100.09	99.68	99.26	99.05	98.76	98.49	98.33	98.04	97.82	97.62	97.42	97.22
S43	0.0643	100.10	99.70	99.30	99.01	98.74	98.47	98.25	97.97	97.69	97.48	97.27	97.05
S44	0.0645	100.06	99.65	99.23	99.03	98.73	98.46	98.24	97.96	97.80	97.58	97.36	97.21
S45	0.0645	100.08	99.67	99.26	98.97	98.70	98.43	98.21	97.93	97.77	97.62	97.42	97.27
S46	0.0645	100.10	99.68	99.28	98.99	98.78	98.48	98.32	98.10	97.93	97.79	97.64	97.44
S47	0.0645	100.09	99.68	99.27	99.06	98.77	98.47	98.31	98.14	97.92	97.72	97.50	97.30
S48	0.0645	100.08	99.68	99.27	99.00	98.73	98.52	98.24	97.95	97.67	97.45	97.23	97.09
S49	0.0646	100.08	99.67	99.25	98.99	98.69	98.40	98.18	98.01	97.85	97.63	97.43	97.21
S50	0.0646	100.09	99.68	99.28	99.01	98.71	98.42	98.20	97.92	97.64	97.43	97.22	97.00
Ave.	0.0653	100.09	99.68	99.27	99.01	98.74	98.48	98.26	98.02	97.80	97.62	97.43	97.24
Med.	0.0646	100.09	99.68	99.27	99.00	98.73	98.47	98.26	98.03	97.82	97.63	97.45	97.23
St dev	0.0010	0.0138	0.0166	0.0191	0.0315	0.0362	0.0565	0.0637	0.0853	0.1062	0.1128	0.1284	0.1281
Min.	0.0643	100.06	99.65	99.23	98.96	98.69	98.40	98.12	97.90	97.61	97.43	97.22	97.00
Max.	0.0664	100.11	99.71	99.31	99.10	98.80	98.60	98.37	98.19	97.97	97.82	97.68	97.48



### 3.9 Data Set 2, 85°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	3.314	3.314	3.314	3.313	3.314	3.312	3.313	3.306	3.310	3.313	3.306	3.310	3.307
S27	3.310	3.305	3.308	3.309	3.308	3.308	3.312	3.304	3.302	3.307	3.309	3.306	3.310
S28	3.316	3.315	3.311	3.311	3.312	3.311	3.312	3.312	3.310	3.318	3.312	3.316	3.310
S29	3.317	3.315	3.315	3.317	3.313	3.319	3.316	3.313	3.314	3.310	3.309	3.316	3.309
S30	3.314	3.313	3.312	3.312	3.313	3.309	3.310	3.310	3.311	3.310	3.311	3.310	3.310
S31	3.319	3.317	3.319	3.321	3.314	3.321	3.317	3.318	3.315	3.317	3.319	3.311	3.316
S32	3.319	3.321	3.318	3.317	3.318	3.317	3.317	3.318	3.312	3.318	3.317	3.316	3.321
S33	3.319	3.319	3.317	3.314	3.318	3.317	3.315	3.318	3.312	3.316	3.319	3.316	3.315
S34	3.319	3.315	3.318	3.322	3.319	3.322	3.315	3.318	3.311	3.313	3.315	3.316	3.311
S35	3.315	3.314	3.310	3.313	3.313	3.311	3.317	3.314	3.311	3.314	3.311	3.314	3.307
S36	3.311	3.309	3.313	3.309	3.314	3.307	3.307	3.309	3.303	3.303	3.310	3.307	3.304
S37	3.319	3.317	3.318	3.322	3.319	3.317	3.321	3.316	3.318	3.315	3.315	3.321	3.311
S38	3.468	3.463	3.471	3.466	3.466	3.467	3.470	3.467	3.460	3.460	3.470	3.464	3.464
S39	3.457	3.453	3.455	3.459	3.455	3.456	3.459	3.457	3.454	3.453	3.453	3.455	3.455
S40	3.462	3.458	3.458	3.462	3.457	3.462	3.464	3.459	3.461	3.461	3.459	3.459	3.461
S41	3.455	3.457	3.454	3.453	3.453	3.458	3.453	3.452	3.455	3.448	3.448	3.451	3.449
S42	3.465	3.461	3.467	3.464	3.460	3.468	3.465	3.461	3.464	3.464	3.457	3.467	3.464
S43	3.465	3.468	3.460	3.464	3.461	3.463	3.460	3.458	3.458	3.464	3.461	3.464	3.464
S44	3.411	3.410	3.410	3.411	3.406	3.414	3.414	3.409	3.410	3.404	3.408	3.407	3.405
S45	3.416	3.416	3.419	3.416	3.414	3.419	3.414	3.413	3.410	3.408	3.412	3.412	3.409
S46	3.417	3.416	3.416	3.416	3.416	3.417	3.412	3.413	3.414	3.413	3.416	3.415	3.409
S47	3.414	3.414	3.414	3.417	3.413	3.413	3.414	3.412	3.411	3.406	3.411	3.410	3.411
S48	3.420	3.415	3.415	3.418	3.419	3.420	3.420	3.417	3.413	3.420	3.419	3.414	3.412
S49	3.420	3.419	3.420	3.415	3.420	3.419	3.418	3.419	3.417	3.416	3.417	3.419	3.418
S50	3.412	3.411	3.410	3.412	3.407	3.412	3.412	3.406	3.409	3.408	3.409	3.408	3.405
Ave.	3.379	3.377	3.378	3.378	3.377	3.378	3.378	3.376	3.374	3.375	3.376	3.376	3.374
Med.	3.411	3.410	3.410	3.411	3.406	3.412	3.412	3.406	3.409	3.404	3.408	3.407	3.405
St dev	0.0641	0.0640	0.0645	0.0644	0.0635	0.0653	0.0647	0.0642	0.0651	0.0637	0.0641	0.0643	0.0649
Min.	3.310	3.305	3.308	3.309	3.308	3.307	3.307	3.304	3.302	3.303	3.306	3.306	3.304
Max.	3.468	3.468	3.471	3.466	3.466	3.468	3.470	3.467	3.464	3.464	3.470	3.467	3.464



### 3.10 Data Set 2, 85°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	0.2584	0.5251	2848	0.0002	0.0004	0.0007	0.0009	0.0011	0.0014	0.0015	0.0018	0.0019	0.0021	0.0022	0.0025
S27	0.2581	0.5235	2878	0.0002	0.0003	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0019	0.0021	0.0024
S28	0.2583	0.5241	2874	0.0001	0.0003	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0023
S29	0.2581	0.5233	2834	0.0002	0.0005	0.0008	0.0010	0.0011	0.0014	0.0015	0.0016	0.0018	0.0019	0.0022	0.0023
S30	0.2584	0.5250	2878	0.0002	0.0004	0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0019	0.0022	0.0024	0.0026
S31	0.2578	0.5230	2860	0.0002	0.0006	0.0008	0.0010	0.0011	0.0015	0.0016	0.0019	0.0021	0.0024	0.0025	0.0027
S32	0.2586	0.5241	2868	0.0002	0.0005	0.0007	0.0009	0.0011	0.0012	0.0015	0.0016	0.0018	0.0019	0.0022	0.0025
S33	0.2587	0.5227	2877	0.0002	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0015	0.0016	0.0018	0.0019	0.0022
S34	0.2585	0.5226	2875	0.0001	0.0004	0.0007	0.0009	0.0011	0.0011	0.0014	0.0015	0.0017	0.0019	0.0021	0.0022
S35	0.2583	0.5240	2865	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0015	0.0016	0.0018	0.0019	0.0022	0.0023
S36	0.2587	0.5257	2865	0.0002	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0017	0.0019	0.0020	0.0022
S37	0.2589	0.5249	2858	0.0001	0.0003	0.0007	0.0009	0.0011	0.0012	0.0014	0.0015	0.0016	0.0018	0.0021	0.0022
S38	0.2515	0.5249	2856	0.0002	0.0004	0.0008	0.0010	0.0011	0.0013	0.0014	0.0016	0.0017	0.0020	0.0021	0.0023
S39	0.2506	0.5234	2864	0.0002	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013	0.0016	0.0017	0.0020	0.0021	0.0024
S40	0.2509	0.5239	2839	0.0002	0.0003	0.0006	0.0008	0.0010	0.0014	0.0016	0.0018	0.0021	0.0022	0.0025	0.0026
S41	0.2521	0.5248	2865	0.0001	0.0004	0.0008	0.0010	0.0012	0.0014	0.0015	0.0018	0.0020	0.0023	0.0025	0.0027
S42	0.2516	0.5248	2593	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0015	0.0016	0.0019	0.0020	0.0022	0.0024
S43	0.2514	0.5246	2601	0.0001	0.0003	0.0006	0.0008	0.0010	0.0012	0.0014	0.0015	0.0016	0.0018	0.0020	0.0022
S44	0.2545	0.5230	2599	0.0001	0.0005	0.0008	0.0010	0.0012	0.0014	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024
S45	0.2548	0.5236	2591	0.0002	0.0005	0.0007	0.0009	0.0011	0.0012	0.0013	0.0016	0.0017	0.0020	0.0021	0.0024
S46	0.2546	0.5229	2583	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0017	0.0018	0.0021	0.0022	0.0025
S47	0.2548	0.5246	2594	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0017	0.0018	0.0019	0.0021	0.0022
S48	0.2554	0.5248	2588	0.0002	0.0004	0.0006	0.0008	0.0010	0.0014	0.0017	0.0019	0.0021	0.0022	0.0024	0.0025
S49	0.2548	0.5233	2566	0.0001	0.0006	0.0008	0.0010	0.0012	0.0013	0.0014	0.0015	0.0018	0.0020	0.0022	0.0023
S50	0.2552	0.5252	2577	0.0001	0.0006	0.0009	0.0011	0.0012	0.0011	0.0013	0.0014	0.0015	0.0017	0.0018	0.0020
Ave.	0.2557	0.5241	2764	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0020	0.0022	0.0024
Med.	0.2554	0.5241	2856	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024
St dev	0.0030	0.0009	135.1652	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Min.	0.2506	0.5226	2566	0.0001	0.0003	0.0006	0.0008	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017	0.0018	0.0020
Max.	0.2589	0.5257	2878	0.0002	0.0006	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0021	0.0024	0.0025	0.0027



### 3.11 Data Set 3, 105°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)											
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	124.7	99.97	99.47	98.98	98.63	98.41	98.19	98.04	97.89	97.65	97.42	97.25	97.06
S52	124.8	100.03	99.47	98.97	98.62	98.28	97.93	97.68	97.44	97.15	96.98	96.74	96.49
S53	124.7	100.02	99.53	98.96	98.62	98.40	98.05	97.81	97.57	97.32	97.08	96.91	96.66
S54	125.2	100.02	99.45	98.88	98.54	98.20	97.85	97.71	97.46	97.17	96.94	96.70	96.45
S55	124.4	100.02	99.53	99.04	98.69	98.35	98.00	97.85	97.71	97.56	97.33	97.10	96.90
S56	124.7	99.99	99.42	98.93	98.58	98.24	97.89	97.74	97.50	97.21	96.97	96.74	96.49
S57	124.6	99.95	99.39	98.82	98.60	98.25	97.90	97.62	97.37	97.23	97.06	96.88	96.63
S58	124.8	100.03	99.54	98.97	98.75	98.40	98.05	97.81	97.57	97.42	97.18	97.01	96.82
S59	124.6	99.95	99.39	98.82	98.47	98.12	97.90	97.65	97.41	97.26	97.03	96.79	96.60
S60	125.0	99.96	99.47	98.98	98.63	98.41	98.06	97.77	97.62	97.48	97.31	97.07	96.88
S61	125.1	99.94	99.45	98.88	98.66	98.44	98.09	97.94	97.79	97.65	97.48	97.24	97.05
S62	125.2	100.03	99.46	98.89	98.67	98.45	98.22	97.94	97.69	97.55	97.37	97.14	96.95
S63	124.8	99.94	99.45	98.95	98.61	98.26	98.04	97.80	97.65	97.50	97.27	97.10	96.84
S64	125.1	100.00	99.51	98.94	98.59	98.24	97.89	97.75	97.46	97.31	97.08	96.91	96.72
S65	125.0	99.99	99.50	99.00	98.66	98.31	98.09	97.80	97.56	97.31	97.14	96.91	96.65
S66	125.1	100.03	99.46	98.90	98.67	98.45	98.10	97.96	97.67	97.52	97.35	97.11	96.92
S67	126.5	99.93	99.37	98.87	98.65	98.43	98.08	97.93	97.69	97.44	97.21	96.98	96.72
S68	126.3	100.00	99.51	99.01	98.79	98.57	98.22	98.08	97.93	97.69	97.52	97.28	97.03
S69	126.1	99.94	99.37	98.88	98.66	98.31	97.96	97.67	97.43	97.28	97.11	96.87	96.62
S70	125.1	100.02	99.53	99.03	98.69	98.34	98.12	97.88	97.63	97.49	97.25	97.08	96.83
S71	125.5	99.96	99.46	98.90	98.55	98.21	97.86	97.72	97.43	97.18	96.95	96.71	96.46
S72	125.7	100.04	99.55	99.06	98.71	98.49	98.14	97.85	97.61	97.32	97.08	96.91	96.65
S73	125.1	99.94	99.37	98.88	98.54	98.32	97.97	97.82	97.58	97.29	97.06	96.82	96.57
S74	124.8	100.01	99.52	99.03	98.68	98.33	98.11	97.96	97.68	97.53	97.29	97.12	96.87
S75	125.1	99.96	99.39	98.90	98.67	98.33	98.11	97.96	97.81	97.67	97.50	97.27	97.01
Ave.	125.1	99.99	99.46	98.94	98.64	98.34	98.03	97.83	97.61	97.41	97.20	96.99	96.75
Med.	125.1	99.99	99.46	98.94	98.65	98.33	98.05	97.81	97.61	97.42	97.18	96.98	96.72
St dev	0.5315	0.0366	0.0573	0.0678	0.0699	0.1035	0.1116	0.1233	0.1509	0.1681	0.1785	0.1803	0.1928
Min.	124.4	99.93	99.37	98.82	98.47	98.12	97.85	97.62	97.37	97.15	96.94	96.70	96.45
Max.	126.5	100.04	99.55	99.06	98.79	98.57	98.22	98.08	97.93	97.69	97.52	97.28	97.06





**3.12 Data Set 3, 105°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp))**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	1.77	99.98	99.53	98.98	98.74	98.38	98.15	97.91	97.68	97.50	97.33	97.11	96.89
S52	1.77	100.02	99.47	98.92	98.68	98.42	98.16	97.92	97.73	97.55	97.28	97.05	96.78
S53	1.77	100.02	99.46	98.91	98.55	98.19	97.93	97.71	97.47	97.28	97.01	96.79	96.57
S54	1.77	100.01	99.57	99.12	98.86	98.50	98.14	97.95	97.76	97.54	97.27	97.11	96.84
S55	1.77	99.99	99.54	99.10	98.74	98.38	98.14	97.95	97.73	97.49	97.27	97.05	96.78
S56	1.77	99.95	99.50	99.05	98.82	98.46	98.22	97.98	97.76	97.54	97.38	97.15	96.93
S57	1.77	100.01	99.56	99.11	98.75	98.39	98.16	97.93	97.71	97.49	97.22	97.06	96.79
S58	1.77	99.99	99.55	98.99	98.63	98.27	98.04	97.82	97.58	97.35	97.09	96.86	96.70
S59	1.77	100.01	99.46	99.01	98.65	98.39	98.16	97.92	97.70	97.51	97.28	97.06	96.90
S60	1.75	100.02	99.47	99.02	98.79	98.43	98.07	97.83	97.64	97.45	97.18	96.91	96.75
S61	1.75	99.96	99.51	98.96	98.70	98.34	97.98	97.74	97.56	97.32	97.05	96.89	96.62
S62	1.75	99.94	99.38	98.83	98.47	98.11	97.75	97.53	97.31	97.12	96.85	96.58	96.31
S63	1.74	99.99	99.54	98.99	98.73	98.47	98.24	98.00	97.81	97.62	97.35	97.19	97.03
S64	1.75	99.95	99.51	99.06	98.82	98.46	98.23	98.04	97.82	97.63	97.47	97.30	97.08
S65	1.75	99.96	99.51	98.96	98.72	98.49	98.23	97.99	97.80	97.61	97.45	97.23	96.96
S66	1.75	100.03	99.58	99.03	98.79	98.53	98.17	97.94	97.71	97.47	97.20	97.04	96.88
S67	1.76	99.97	99.42	98.97	98.71	98.47	98.21	98.03	97.79	97.55	97.28	97.01	96.74
S68	1.76	99.96	99.40	98.95	98.60	98.24	98.00	97.81	97.62	97.44	97.27	97.05	96.83
S69	1.76	99.94	99.38	98.83	98.60	98.24	98.00	97.76	97.57	97.34	97.17	96.95	96.79
S70	1.74	99.98	99.43	98.98	98.62	98.26	98.00	97.78	97.54	97.35	97.19	96.97	96.81
S71	1.74	99.99	99.55	98.99	98.63	98.40	98.04	97.85	97.61	97.37	97.10	96.88	96.66
S72	1.75	100.03	99.47	99.02	98.67	98.31	97.95	97.73	97.54	97.31	97.15	96.93	96.71
S73	1.75	99.98	99.43	98.98	98.72	98.46	98.22	98.04	97.85	97.66	97.44	97.27	97.11
S74	1.75	100.01	99.46	98.91	98.65	98.39	98.13	97.90	97.68	97.46	97.29	97.03	96.86
S75	1.75	99.98	99.53	98.98	98.72	98.36	98.13	97.94	97.75	97.53	97.36	97.09	96.87
Ave.	1.75	99.99	99.49	98.99	98.69	98.37	98.10	97.88	97.67	97.46	97.24	97.02	96.81
Med.	1.75	99.99	99.50	98.98	98.71	98.39	98.14	97.92	97.70	97.49	97.27	97.05	96.81
St dev	0.0100	0.0285	0.0585	0.0730	0.0900	0.1059	0.1189	0.1227	0.1259	0.1274	0.1445	0.1576	0.1676
Min.	1.74	99.94	99.38	98.83	98.47	98.11	97.75	97.53	97.31	97.12	96.85	96.58	96.31
Max.	1.77	100.03	99.58	99.12	98.86	98.53	98.24	98.04	97.85	97.66	97.47	97.30	97.11



### 3.13 Data Set 3, 105°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	0.0658	100.02	99.49	98.96	98.73	98.40	98.20	97.98	97.73	97.50	97.27	97.19	97.09
S52	0.0658	100.01	99.48	98.99	98.76	98.44	98.24	97.94	97.64	97.39	97.27	97.07	96.88
S53	0.0658	100.00	99.52	98.98	98.66	98.33	98.03	97.81	97.56	97.31	97.08	96.89	96.69
S54	0.0658	99.96	99.47	98.94	98.71	98.38	98.08	97.83	97.53	97.23	97.11	97.02	96.82
S55	0.0658	99.99	99.46	98.93	98.60	98.28	97.98	97.68	97.44	97.19	96.96	96.77	96.57
S56	0.0658	99.95	99.47	98.94	98.71	98.48	98.18	97.88	97.65	97.35	97.12	97.04	96.84
S57	0.0658	100.01	99.47	98.99	98.76	98.43	98.23	97.93	97.68	97.45	97.23	97.03	96.84
S58	0.0659	99.95	99.42	98.94	98.61	98.28	98.09	97.78	97.54	97.29	97.17	97.08	96.89
S59	0.0658	100.04	99.55	99.02	98.79	98.56	98.36	98.13	97.83	97.60	97.37	97.18	97.09
S60	0.0652	100.02	99.49	98.96	98.63	98.31	98.01	97.76	97.53	97.29	97.06	96.87	96.66
S61	0.0652	99.97	99.44	98.91	98.58	98.35	98.15	97.92	97.69	97.45	97.21	97.02	96.82
S62	0.0652	100.03	99.54	99.01	98.68	98.36	98.07	97.82	97.57	97.35	97.11	96.93	96.83
S63	0.0652	99.99	99.50	98.97	98.65	98.33	98.13	97.83	97.60	97.30	97.07	96.99	96.79
S64	0.0651	100.00	99.47	98.94	98.71	98.39	98.09	97.79	97.49	97.24	97.12	96.93	96.73
S65	0.0652	100.00	99.51	98.98	98.65	98.42	98.22	98.00	97.75	97.45	97.22	97.14	96.94
S66	0.0652	100.02	99.49	98.95	98.63	98.30	98.01	97.78	97.48	97.18	96.95	96.76	96.56
S67	0.0637	99.97	99.44	98.91	98.58	98.35	98.15	97.92	97.70	97.45	97.33	97.14	97.04
S68	0.0638	100.02	99.54	99.00	98.78	98.45	98.15	97.85	97.55	97.25	97.02	96.83	96.64
S69	0.0638	100.01	99.48	98.95	98.63	98.30	98.00	97.75	97.51	97.26	97.03	96.95	96.75
S70	0.0632	99.94	99.41	98.93	98.60	98.37	98.08	97.85	97.61	97.38	97.26	97.07	96.98
S71	0.0631	99.98	99.50	98.97	98.74	98.41	98.12	97.87	97.62	97.37	97.25	97.17	96.97
S72	0.0632	99.96	99.47	98.94	98.71	98.48	98.18	97.88	97.65	97.35	97.12	97.03	96.84
S73	0.0632	100.00	99.46	98.93	98.61	98.28	98.08	97.85	97.55	97.31	97.07	96.99	96.90
S74	0.0632	99.99	99.46	98.98	98.75	98.52	98.32	98.07	97.82	97.57	97.34	97.15	97.06
S75	0.0632	99.96	99.42	98.89	98.57	98.25	97.96	97.65	97.35	97.05	96.82	96.74	96.54
Ave.	0.0647	99.99	99.48	98.96	98.67	98.38	98.12	97.86	97.60	97.34	97.14	97.00	96.83
Med.	0.0652	100.00	99.47	98.95	98.66	98.37	98.12	97.85	97.60	97.35	97.12	97.02	96.84
St dev	0.0011	0.0273	0.0361	0.0332	0.0672	0.0808	0.1020	0.1092	0.1146	0.1256	0.1331	0.1333	0.1613
Min.	0.0631	99.94	99.41	98.89	98.57	98.25	97.96	97.65	97.35	97.05	96.82	96.74	96.54
Max.	0.0659	100.04	99.55	99.02	98.79	98.56	98.36	98.13	97.83	97.60	97.37	97.19	97.09



### 3.14 Data Set 3, 105°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	3.488	3.410	3.408	3.465	3.403	3.368	3.364	3.453	3.471	3.395	3.478	3.473	3.453
S52	3.486	3.474	3.459	3.428	3.393	3.386	3.358	3.377	3.427	3.445	3.468	3.392	3.480
S53	3.486	3.360	3.446	3.475	3.404	3.480	3.378	3.465	3.465	3.465	3.444	3.363	3.396
S54	3.486	3.425	3.466	3.398	3.466	3.440	3.431	3.376	3.486	3.484	3.412	3.378	3.374
S55	3.485	3.375	3.469	3.463	3.479	3.472	3.401	3.466	3.447	3.466	3.387	3.420	3.417
S56	3.484	3.353	3.415	3.445	3.358	3.432	3.464	3.393	3.457	3.460	3.473	3.438	3.382
S57	3.484	3.429	3.398	3.483	3.447	3.374	3.444	3.455	3.437	3.469	3.354	3.401	3.412
S58	3.484	3.353	3.353	3.485	3.480	3.449	3.414	3.358	3.450	3.483	3.486	3.396	3.431
S59	3.484	3.389	3.437	3.368	3.427	3.467	3.464	3.375	3.390	3.378	3.479	3.425	3.375
S60	3.370	3.357	3.440	3.474	3.427	3.413	3.373	3.474	3.452	3.396	3.475	3.397	3.471
S61	3.369	3.361	3.389	3.441	3.422	3.406	3.468	3.365	3.422	3.468	3.377	3.366	3.415
S62	3.368	3.481	3.416	3.396	3.486	3.444	3.440	3.354	3.408	3.429	3.481	3.386	3.380
S63	3.368	3.423	3.381	3.379	3.474	3.454	3.415	3.410	3.447	3.470	3.389	3.445	3.456
S64	3.365	3.402	3.392	3.400	3.484	3.448	3.373	3.407	3.380	3.437	3.381	3.378	3.362
S65	3.359	3.423	3.362	3.457	3.398	3.358	3.445	3.397	3.363	3.443	3.470	3.463	3.432
S66	3.357	3.398	3.467	3.381	3.421	3.455	3.416	3.387	3.451	3.397	3.455	3.393	3.442
S67	3.460	3.386	3.424	3.400	3.476	3.419	3.422	3.399	3.391	3.455	3.391	3.379	3.476
S68	3.469	3.362	3.441	3.366	3.453	3.477	3.418	3.387	3.456	3.483	3.445	3.475	3.371
S69	3.464	3.454	3.451	3.425	3.443	3.451	3.399	3.417	3.468	3.442	3.451	3.464	3.413
S70	3.466	3.402	3.400	3.356	3.444	3.432	3.485	3.461	3.466	3.391	3.370	3.450	3.403
S71	3.457	3.394	3.361	3.464	3.416	3.399	3.397	3.457	3.371	3.359	3.456	3.428	3.417
S72	3.462	3.394	3.429	3.413	3.363	3.367	3.479	3.407	3.430	3.386	3.419	3.452	3.402
S73	3.460	3.373	3.428	3.427	3.427	3.391	3.376	3.472	3.419	3.388	3.379	3.381	3.480
S74	3.477	3.388	3.388	3.438	3.463	3.473	3.429	3.468	3.415	3.485	3.452	3.459	3.418
S75	3.479	3.471	3.396	3.440	3.380	3.439	3.448	3.443	3.420	3.429	3.438	3.415	3.482
Ave.	3.445	3.401	3.417	3.427	3.433	3.428	3.420	3.417	3.432	3.436	3.432	3.417	3.422
Med.	3.466	3.394	3.416	3.428	3.427	3.439	3.418	3.407	3.437	3.443	3.445	3.415	3.417
St dev	0.0516	0.0383	0.0343	0.0392	0.0380	0.0375	0.0371	0.0404	0.0333	0.0389	0.0421	0.0359	0.0377
Min.	3.357	3.353	3.353	3.356	3.358	3.358	3.358	3.354	3.363	3.359	3.354	3.363	3.362
Max.	3.488	3.481	3.469	3.485	3.486	3.480	3.485	3.474	3.486	3.485	3.486	3.475	3.482



### 3.15 Data Set 3, 105°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	0.2559	0.5260	2848	0.0003	0.0006	0.0008	0.0011	0.0014	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0029
S52	0.2549	0.5246	2878	0.0003	0.0005	0.0008	0.0009	0.0012	0.0014	0.0016	0.0017	0.0019	0.0021	0.0024	0.0025
S53	0.2551	0.5244	2874	0.0003	0.0005	0.0008	0.0010	0.0013	0.0014	0.0017	0.0020	0.0022	0.0023	0.0024	0.0025
S54	0.2565	0.5260	2834	0.0003	0.0005	0.0007	0.0009	0.0012	0.0013	0.0015	0.0017	0.0020	0.0023	0.0025	0.0028
S55	0.2549	0.5246	2878	0.0003	0.0004	0.0007	0.0009	0.0011	0.0014	0.0017	0.0018	0.0020	0.0023	0.0024	0.0025
S56	0.2555	0.5255	2860	0.0003	0.0005	0.0007	0.0010	0.0011	0.0014	0.0016	0.0017	0.0019	0.0022	0.0024	0.0026
S57	0.2552	0.5251	2868	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0017	0.0020	0.0022	0.0025	0.0027
S58	0.2550	0.5245	2877	0.0003	0.0005	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027
S59	0.2551	0.5243	2875	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0017	0.0019	0.0021	0.0022	0.0024	0.0027
S60	0.2545	0.5290	2865	0.0003	0.0005	0.0009	0.0010	0.0012	0.0013	0.0016	0.0018	0.0020	0.0022	0.0025	0.0028
S61	0.2545	0.5291	2865	0.0003	0.0005	0.0008	0.0009	0.0011	0.0014	0.0016	0.0019	0.0020	0.0021	0.0024	0.0027
S62	0.2547	0.5292	2858	0.0003	0.0005	0.0008	0.0009	0.0011	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0025
S63	0.2548	0.5297	2856	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0022	0.0023	0.0024
S64	0.2545	0.5290	2864	0.0003	0.0005	0.0009	0.0010	0.0013	0.0015	0.0017	0.0018	0.0020	0.0021	0.0023	0.0025
S65	0.2551	0.5313	2839	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025
S66	0.2545	0.5291	2865	0.0003	0.0006	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0022	0.0023	0.0025	0.0026
S67	0.2506	0.5260	2972	0.0002	0.0004	0.0007	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026
S68	0.2510	0.5264	2961	0.0003	0.0005	0.0008	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019	0.0022	0.0023	0.0026
S69	0.2509	0.5265	2961	0.0003	0.0004	0.0007	0.0009	0.0012	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
S70	0.2508	0.5258	2967	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0017	0.0018	0.0021	0.0024	0.0025	0.0028
S71	0.2521	0.5274	2927	0.0003	0.0006	0.0008	0.0010	0.0011	0.0013	0.0015	0.0018	0.0019	0.0020	0.0022	0.0023
S72	0.2510	0.5276	2952	0.0002	0.0005	0.0007	0.0009	0.0010	0.0013	0.0016	0.0019	0.0021	0.0024	0.0027	0.0028
S73	0.2514	0.5281	2940	0.0003	0.0005	0.0007	0.0010	0.0012	0.0015	0.0016	0.0018	0.0021	0.0022	0.0025	0.0027
S74	0.2507	0.5260	2969	0.0003	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0019	0.0022	0.0023	0.0026	0.0027
S75	0.2512	0.5270	2951	0.0003	0.0005	0.0008	0.0010	0.0012	0.0015	0.0016	0.0019	0.0020	0.0023	0.0026	0.0029
Ave.	0.2536	0.5269	2896	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026
Med.	0.2545	0.5264	2875	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027
St dev	0.0020	0.0020	47.4409	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2506	0.5243	2834	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0023
Max.	0.2565	0.5313	2972	0.0003	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027	0.0029



### 3.16 Data Set 4, 55°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)											
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	131.9	100.17	99.97	99.67	99.41	99.08	98.83	98.63	98.43	98.23	98.01	97.78	97.69
S2	132.1	100.16	99.86	99.56	99.25	99.00	98.69	98.49	98.29	98.16	98.06	97.97	97.74
S3	132.3	100.20	99.90	99.60	99.27	98.96	98.70	98.50	98.20	98.07	97.84	97.75	97.52
S4	131.8	100.14	99.84	99.54	99.23	98.97	98.64	98.35	98.21	98.07	97.98	97.75	97.52
S5	131.8	100.16	99.96	99.65	99.40	99.15	98.89	98.76	98.46	98.16	97.93	97.70	97.61
S6	132.0	100.19	99.99	99.69	99.36	99.05	98.80	98.50	98.20	98.06	97.97	97.87	97.64
S7	132.5	100.14	99.94	99.64	99.33	99.07	98.82	98.68	98.55	98.41	98.19	97.96	97.73
S8	132.0	100.17	99.87	99.67	99.41	99.11	98.80	98.66	98.52	98.39	98.29	98.07	97.84
S9	131.6	100.11	99.91	99.60	99.27	99.02	98.71	98.58	98.28	98.14	97.91	97.82	97.59
S10	132.0	100.14	99.94	99.74	99.48	99.15	98.90	98.60	98.40	98.10	98.01	97.78	97.55
S11	132.9	100.17	99.97	99.66	99.41	99.08	98.83	98.69	98.39	98.19	97.97	97.74	97.51
S12	133.1	100.19	99.89	99.58	99.27	98.95	98.62	98.48	98.34	98.14	97.92	97.69	97.60
S13	133.2	100.19	99.89	99.58	99.27	99.02	98.77	98.57	98.27	97.97	97.88	97.78	97.69
S14	132.9	100.20	100.00	99.80	99.55	99.30	99.04	98.91	98.61	98.31	98.08	97.99	97.89
S15	132.7	100.12	99.92	99.72	99.39	99.08	98.77	98.57	98.43	98.13	97.91	97.68	97.58
S16	133.0	100.20	99.90	99.70	99.44	99.19	98.94	98.74	98.44	98.14	98.04	97.82	97.59
S17	133.0	100.12	99.82	99.62	99.29	99.03	98.70	98.51	98.21	97.91	97.81	97.59	97.36
S18	133.6	100.11	99.81	99.51	99.18	98.85	98.60	98.46	98.32	98.03	97.80	97.70	97.48
S19	133.3	100.11	99.81	99.50	99.20	98.89	98.56	98.26	98.12	97.92	97.70	97.47	97.37
S20	133.9	100.16	99.96	99.66	99.35	99.02	98.69	98.39	98.09	97.79	97.70	97.47	97.38
S21	134.1	100.17	99.97	99.67	99.34	99.01	98.70	98.57	98.37	98.23	98.14	98.04	97.81
S22	133.7	100.19	99.99	99.68	99.38	99.07	98.76	98.56	98.36	98.06	97.97	97.87	97.64
S23	133.7	100.13	99.93	99.73	99.47	99.14	98.81	98.68	98.54	98.34	98.25	98.02	97.93
S24	133.0	100.18	99.88	99.58	99.33	99.00	98.74	98.44	98.25	97.95	97.72	97.49	97.40
S25	132.6	100.21	99.91	99.61	99.30	98.99	98.66	98.52	98.39	98.09	97.99	97.90	97.67
Ave.	132.7	100.16	99.91	99.64	99.34	99.05	98.76	98.56	98.35	98.12	97.96	97.79	97.61
Med.	132.9	100.17	99.91	99.65	99.34	99.03	98.76	98.57	98.36	98.13	97.97	97.78	97.60
St dev	0.7298	0.0325	0.0572	0.0729	0.0927	0.0960	0.1121	0.1395	0.1358	0.1507	0.1565	0.1704	0.1569
Min.	131.6	100.11	99.81	99.50	99.18	98.85	98.56	98.26	98.09	97.79	97.70	97.47	97.36
Max.	134.1	100.21	100.00	99.80	99.55	99.30	99.04	98.91	98.61	98.41	98.29	98.07	97.93



**3.17 Data Set 4, 55°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp) )**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	1.94	100.08	99.64	99.19	98.87	98.63	98.39	98.17	98.04	97.75	97.45	97.19	97.06
S2	1.94	100.10	99.65	99.21	98.92	98.68	98.40	98.18	97.97	97.84	97.66	97.52	97.25
S3	1.94	100.09	99.65	99.20	98.91	98.67	98.40	98.27	97.97	97.84	97.68	97.42	97.30
S4	1.94	100.13	99.68	99.27	98.93	98.66	98.37	98.24	97.95	97.65	97.48	97.33	97.19
S5	1.94	100.11	99.69	99.25	98.91	98.67	98.39	98.10	97.80	97.59	97.43	97.31	97.19
S6	1.94	100.12	99.71	99.26	98.97	98.73	98.49	98.36	98.15	98.01	97.84	97.70	97.43
S7	1.93	100.12	99.70	99.28	98.96	98.72	98.44	98.14	97.85	97.63	97.34	97.19	96.93
S8	1.93	100.12	99.71	99.29	98.95	98.72	98.44	98.31	98.01	97.80	97.63	97.50	97.24
S9	1.93	100.10	99.68	99.26	98.93	98.65	98.42	98.28	97.99	97.85	97.70	97.58	97.43
S10	1.93	100.08	99.67	99.25	98.92	98.63	98.36	98.14	98.01	97.79	97.64	97.52	97.37
S11	1.93	100.08	99.67	99.25	98.96	98.68	98.44	98.30	98.17	97.96	97.80	97.66	97.52
S12	1.93	100.12	99.67	99.23	98.90	98.66	98.39	98.09	97.88	97.59	97.41	97.27	97.12
S13	1.93	100.08	99.64	99.20	98.87	98.59	98.31	98.10	97.88	97.75	97.60	97.47	97.33
S14	1.93	100.09	99.67	99.23	98.91	98.62	98.34	98.12	97.83	97.70	97.40	97.26	96.99
S15	1.94	100.12	99.70	99.28	98.95	98.67	98.39	98.18	97.96	97.67	97.51	97.37	97.23
S16	1.94	100.13	99.71	99.26	98.93	98.65	98.36	98.15	98.02	97.80	97.65	97.52	97.38
S17	1.94	100.11	99.69	99.24	98.95	98.72	98.48	98.34	98.05	97.92	97.74	97.48	97.35
S18	1.94	100.12	99.70	99.28	98.96	98.68	98.41	98.11	97.82	97.52	97.23	96.96	96.84
S19	1.94	100.13	99.68	99.24	98.90	98.62	98.35	98.21	98.08	97.95	97.65	97.51	97.36
S20	1.94	100.14	99.69	99.27	98.95	98.67	98.44	98.30	98.01	97.88	97.72	97.60	97.47
S21	1.94	100.12	99.70	99.25	98.93	98.69	98.45	98.32	98.10	97.97	97.68	97.41	97.27
S22	1.94	100.11	99.70	99.25	98.92	98.64	98.36	98.07	97.93	97.72	97.42	97.28	97.01
S23	1.94	100.11	99.66	99.25	98.91	98.64	98.35	98.22	98.01	97.87	97.58	97.44	97.17
S24	1.94	100.09	99.68	99.23	98.94	98.66	98.38	98.16	97.95	97.65	97.48	97.21	96.95
S25	1.94	100.13	99.71	99.27	98.98	98.74	98.47	98.25	98.12	97.83	97.67	97.55	97.40
Ave.	1.94	100.11	99.68	99.25	98.93	98.67	98.40	98.21	97.98	97.78	97.58	97.41	97.23
Med.	1.94	100.11	99.68	99.25	98.93	98.67	98.39	98.18	97.99	97.80	97.63	97.44	97.25
St dev	0.0028	0.0169	0.0220	0.0274	0.0287	0.0378	0.0461	0.0879	0.1011	0.1327	0.1526	0.1708	0.1843
Min.	1.93	100.08	99.64	99.19	98.87	98.59	98.31	98.07	97.80	97.52	97.23	96.96	96.84
Max.	1.94	100.14	99.71	99.29	98.98	98.74	98.49	98.36	98.17	98.01	97.84	97.70	97.52



**3.18 Data Set 4, 55°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	0.0389	100.10	99.79	99.56	99.32	99.07	98.78	98.51	98.24	97.97	97.88	97.71	97.60
S2	0.0388	100.11	99.79	99.57	99.32	99.07	98.78	98.49	98.22	97.95	97.78	97.67	97.58
S3	0.0388	100.20	99.88	99.66	99.41	99.16	98.87	98.60	98.31	98.04	97.95	97.84	97.74
S4	0.0388	100.19	99.87	99.56	99.27	99.02	98.73	98.53	98.25	97.96	97.79	97.69	97.60
S5	0.0389	100.21	99.90	99.58	99.34	99.05	98.81	98.52	98.33	98.13	97.96	97.79	97.62
S6	0.0389	100.14	99.82	99.51	99.22	98.97	98.73	98.54	98.26	97.98	97.86	97.75	97.66
S7	0.0388	100.13	99.91	99.68	99.44	99.15	98.87	98.60	98.40	98.21	98.12	97.95	97.83
S8	0.0389	100.13	99.91	99.69	99.44	99.15	98.86	98.67	98.48	98.19	98.02	97.84	97.73
S9	0.0388	100.11	99.89	99.67	99.43	99.18	98.93	98.73	98.45	98.17	98.00	97.83	97.72
S10	0.0388	100.12	99.81	99.59	99.34	99.09	98.84	98.56	98.28	98.00	97.88	97.77	97.68
S11	0.0384	100.18	99.87	99.55	99.31	99.06	98.81	98.52	98.25	97.98	97.89	97.80	97.71
S12	0.0384	100.17	99.94	99.63	99.38	99.14	98.90	98.63	98.43	98.14	98.03	97.86	97.75
S13	0.0384	100.16	99.85	99.53	99.24	99.00	98.71	98.52	98.33	98.04	97.92	97.83	97.72
S14	0.0383	100.21	99.99	99.68	99.39	99.10	98.85	98.58	98.38	98.09	97.98	97.81	97.70
S15	0.0384	100.11	99.89	99.57	99.28	98.99	98.71	98.51	98.22	97.95	97.84	97.67	97.58
S16	0.0384	100.19	99.87	99.65	99.40	99.11	98.86	98.67	98.38	98.11	97.93	97.76	97.65
S17	0.0385	100.13	99.91	99.59	99.34	99.10	98.85	98.66	98.37	98.10	97.93	97.75	97.58
S18	0.0384	100.16	99.84	99.53	99.28	98.99	98.74	98.45	98.18	97.89	97.80	97.63	97.54
S19	0.0384	100.20	99.88	99.66	99.42	99.18	98.93	98.66	98.46	98.27	98.16	98.07	97.95
S20	0.0383	100.11	99.89	99.57	99.33	99.09	98.84	98.64	98.37	98.18	98.07	97.90	97.73
S21	0.0383	100.22	99.90	99.68	99.44	99.15	98.91	98.64	98.35	98.08	97.99	97.82	97.73
S22	0.0383	100.16	99.85	99.53	99.29	99.00	98.76	98.57	98.30	98.03	97.94	97.82	97.65
S23	0.0383	100.11	99.79	99.57	99.33	99.09	98.85	98.65	98.38	98.11	98.00	97.83	97.74
S24	0.0375	100.22	100.00	99.68	99.44	99.15	98.90	98.71	98.44	98.17	98.00	97.82	97.73
S25	0.0375	100.14	99.83	99.61	99.32	99.07	98.82	98.62	98.43	98.16	98.05	97.88	97.76
Ave.	0.0385	100.16	99.87	99.60	99.35	99.09	98.83	98.59	98.34	98.08	97.95	97.80	97.69
Med.	0.0384	100.16	99.88	99.59	99.34	99.09	98.84	98.60	98.35	98.09	97.95	97.82	97.71
St dev	0.0004	0.0397	0.0548	0.0581	0.0663	0.0632	0.0672	0.0737	0.0848	0.0988	0.0973	0.0931	0.0905
Min.	0.0375	100.10	99.79	99.51	99.22	98.97	98.71	98.45	98.18	97.89	97.78	97.63	97.54
Max.	0.0389	100.22	100.00	99.69	99.44	99.18	98.93	98.73	98.48	98.27	98.16	98.07	97.95



### 3.19 Data Set 4, 55°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	3.447	3.442	3.467	3.411	3.453	3.401	3.367	3.406	3.360	3.442	3.365	3.468	3.340
S2	3.447	3.395	3.438	3.470	3.406	3.369	3.469	3.432	3.393	3.428	3.405	3.426	3.373
S3	3.447	3.377	3.392	3.448	3.349	3.401	3.344	3.351	3.370	3.380	3.430	3.403	3.467
S4	3.447	3.339	3.460	3.337	3.434	3.346	3.379	3.464	3.411	3.456	3.451	3.470	3.464
S5	3.447	3.389	3.456	3.455	3.393	3.390	3.379	3.387	3.341	3.348	3.416	3.371	3.416
S6	3.447	3.412	3.362	3.361	3.337	3.343	3.385	3.337	3.423	3.460	3.475	3.481	3.389
S7	3.447	3.363	3.343	3.466	3.331	3.413	3.444	3.464	3.447	3.442	3.341	3.468	3.358
S8	3.446	3.436	3.373	3.467	3.444	3.360	3.337	3.475	3.385	3.331	3.376	3.433	3.345
S9	3.447	3.336	3.466	3.358	3.368	3.443	3.393	3.413	3.347	3.356	3.369	3.479	3.371
S10	3.446	3.353	3.381	3.375	3.383	3.360	3.421	3.379	3.410	3.413	3.426	3.461	3.406
S11	3.483	3.412	3.414	3.391	3.343	3.416	3.456	3.453	3.399	3.334	3.433	3.413	3.345
S12	3.482	3.476	3.430	3.444	3.467	3.393	3.405	3.459	3.330	3.471	3.340	3.447	3.391
S13	3.481	3.477	3.401	3.375	3.410	3.335	3.413	3.398	3.471	3.418	3.389	3.428	3.419
S14	3.481	3.388	3.475	3.341	3.343	3.450	3.398	3.425	3.367	3.442	3.441	3.387	3.452
S15	3.481	3.479	3.407	3.353	3.341	3.381	3.393	3.410	3.408	3.398	3.460	3.441	3.410
S16	3.480	3.444	3.413	3.368	3.383	3.414	3.337	3.338	3.355	3.434	3.405	3.431	3.360
S17	3.480	3.443	3.461	3.393	3.356	3.399	3.433	3.380	3.423	3.421	3.428	3.397	3.471
S18	3.386	3.376	3.361	3.459	3.346	3.448	3.366	3.471	3.416	3.342	3.471	3.361	3.461
S19	3.385	3.452	3.474	3.378	3.458	3.333	3.433	3.351	3.453	3.477	3.478	3.351	3.462
S20	3.385	3.377	3.417	3.402	3.409	3.359	3.437	3.409	3.353	3.449	3.422	3.455	3.463
S21	3.384	3.474	3.401	3.413	3.465	3.422	3.402	3.376	3.367	3.476	3.415	3.435	3.398
S22	3.384	3.462	3.408	3.373	3.400	3.423	3.368	3.341	3.428	3.366	3.351	3.396	3.456
S23	3.383	3.472	3.354	3.438	3.348	3.414	3.424	3.393	3.358	3.360	3.471	3.437	3.401
S24	3.335	3.362	3.380	3.347	3.381	3.447	3.443	3.454	3.441	3.457	3.383	3.401	3.332
S25	3.334	3.416	3.389	3.338	3.465	3.383	3.332	3.359	3.386	3.377	3.443	3.470	3.470
Ave.	3.432	3.414	3.413	3.398	3.393	3.394	3.398	3.405	3.394	3.411	3.415	3.428	3.409
Med.	3.447	3.412	3.408	3.391	3.383	3.399	3.398	3.406	3.393	3.421	3.422	3.433	3.406
St dev	0.0464	0.0467	0.0405	0.0454	0.0465	0.0361	0.0390	0.0451	0.0384	0.0479	0.0422	0.0374	0.0475
Min.	3.334	3.336	3.343	3.337	3.331	3.333	3.332	3.337	3.330	3.331	3.340	3.351	3.332
Max.	3.483	3.479	3.475	3.470	3.467	3.450	3.469	3.475	3.471	3.477	3.478	3.481	3.471





### 3.20 Data Set 4, 55°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S1	0.2022	0.4621	6604	0.0002	0.0003	0.0005	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0022	0.0023	0.0026
S2	0.2018	0.4617	6661	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0017	0.0019	0.0021
S3	0.2021	0.4617	6629	0.0001	0.0002	0.0006	0.0008	0.0010	0.0013	0.0015	0.0017	0.0020	0.0021	0.0023	0.0025
S4	0.2022	0.4624	6581	0.0001	0.0003	0.0004	0.0007	0.0009	0.0012	0.0015	0.0016	0.0017	0.0019	0.0020	0.0023
S5	0.2024	0.4626	6550	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0018	0.0021	0.0022	0.0025
S6	0.2019	0.4614	6666	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0017	0.0018	0.0019	0.0021
S7	0.2025	0.4636	6482	0.0001	0.0003	0.0005	0.0006	0.0008	0.0011	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022
S8	0.2029	0.4645	6398	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0014	0.0016	0.0017	0.0020	0.0022
S9	0.2018	0.4616	6661	0.0002	0.0003	0.0004	0.0006	0.0009	0.0012	0.0014	0.0016	0.0017	0.0018	0.0019	0.0021
S10	0.2029	0.4633	6469	0.0001	0.0002	0.0003	0.0006	0.0008	0.0011	0.0013	0.0016	0.0017	0.0018	0.0021	0.0023
S11	0.2015	0.4642	6516	0.0002	0.0003	0.0004	0.0006	0.0009	0.0012	0.0015	0.0016	0.0019	0.0022	0.0023	0.0025
S12	0.2003	0.4624	6710	0.0002	0.0003	0.0006	0.0007	0.0010	0.0012	0.0015	0.0016	0.0019	0.0020	0.0022	0.0024
S13	0.2007	0.4624	6688	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0015	0.0018	0.0019	0.0021	0.0022
S14	0.2007	0.4630	6639	0.0002	0.0003	0.0005	0.0007	0.0009	0.0012	0.0014	0.0015	0.0018	0.0020	0.0022	0.0023
S15	0.2010	0.4634	6601	0.0002	0.0004	0.0005	0.0007	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018	0.0021	0.0022
S16	0.2015	0.4651	6455	0.0002	0.0003	0.0007	0.0008	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0020	0.0021
S17	0.2011	0.4636	6584	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0018	0.0019	0.0020
S18	0.2006	0.4688	6297	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0018	0.0020	0.0023	0.0025
S19	0.2006	0.4685	6314	0.0001	0.0003	0.0004	0.0007	0.0009	0.0011	0.0014	0.0015	0.0018	0.0020	0.0023	0.0025
S20	0.2002	0.4675	6398	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022
S21	0.2006	0.4694	6270	0.0001	0.0002	0.0003	0.0005	0.0008	0.0011	0.0012	0.0015	0.0017	0.0020	0.0021	0.0024
S22	0.2003	0.4678	6374	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0013	0.0016	0.0017	0.0020	0.0021	0.0022
S23	0.2003	0.4677	6376	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0021	0.0024
S24	0.2004	0.4592	6930	0.0002	0.0003	0.0006	0.0007	0.0010	0.0012	0.0013	0.0016	0.0018	0.0020	0.0021	0.0022
S25	0.2000	0.4587	6994	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020
Ave.	0.2013	0.4639	6554	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023
Med.	0.2011	0.4633	6581	0.0002	0.0003	0.0005	0.0007	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021	0.0022
St dev	0.0009	0.0029	179.4237	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
Min.	0.2000	0.4587	6270	0.0001	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020
Max.	0.2029	0.4694	6994	0.0002	0.0004	0.0007	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0022	0.0023	0.0026



### 3.21 Data Set 5, 85°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm) Ohr (Initial)	Lumen Maintenance (%)											
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	131.8	100.11	99.70	99.29	98.98	98.75	98.44	98.22	97.94	97.72	97.52	97.31	97.09
S27	132.4	100.13	99.72	99.31	98.98	98.67	98.44	98.17	97.94	97.67	97.46	97.24	97.09
S28	132.6	100.12	99.71	99.31	99.08	98.85	98.52	98.25	98.03	97.75	97.61	97.46	97.24
S29	132.1	100.10	99.69	99.28	98.95	98.64	98.31	98.17	97.89	97.62	97.40	97.17	96.95
S30	132.3	100.08	99.67	99.26	98.95	98.64	98.31	98.03	97.89	97.62	97.47	97.27	97.04
S31	132.3	100.08	99.67	99.27	99.04	98.71	98.48	98.26	98.12	97.98	97.77	97.63	97.48
S32	131.1	100.11	99.71	99.30	99.07	98.76	98.43	98.15	98.01	97.87	97.65	97.44	97.22
S33	130.9	100.10	99.69	99.29	99.06	98.73	98.42	98.14	97.87	97.73	97.58	97.43	97.21
S34	131.0	100.12	99.71	99.31	98.99	98.77	98.44	98.16	97.94	97.66	97.44	97.24	97.01
S35	131.2	100.09	99.68	99.27	99.05	98.82	98.51	98.37	98.23	98.00	97.80	97.59	97.39
S36	130.8	100.10	99.70	99.29	98.97	98.66	98.33	98.19	97.97	97.74	97.60	97.39	97.19
S37	131.1	100.07	99.66	99.26	99.03	98.72	98.40	98.18	97.91	97.63	97.41	97.20	96.98
S38	131.0	100.11	99.70	99.30	98.97	98.74	98.51	98.29	98.01	97.87	97.67	97.45	97.30
S39	131.1	100.08	99.67	99.26	98.95	98.62	98.39	98.12	97.84	97.57	97.34	97.20	96.97
S40	133.7	100.09	99.68	99.27	98.96	98.63	98.31	98.04	97.90	97.68	97.47	97.33	97.10
S41	133.8	100.07	99.67	99.26	98.93	98.70	98.47	98.25	98.11	97.97	97.75	97.52	97.38
S42	133.5	100.10	99.69	99.28	99.05	98.83	98.60	98.38	98.16	97.93	97.79	97.56	97.42
S43	134.4	100.10	99.69	99.29	99.06	98.83	98.50	98.23	98.01	97.87	97.64	97.42	97.20
S44	133.8	100.09	99.68	99.27	98.96	98.65	98.42	98.28	98.14	97.86	97.66	97.45	97.31
S45	134.1	100.08	99.67	99.27	98.95	98.62	98.29	98.02	97.74	97.60	97.38	97.23	97.01
S46	133.6	100.12	99.71	99.30	99.08	98.76	98.43	98.29	98.07	97.85	97.62	97.42	97.21
S47	133.7	100.09	99.69	99.28	98.96	98.74	98.51	98.37	98.09	97.95	97.75	97.53	97.32
S48	133.7	100.10	99.69	99.29	98.97	98.66	98.43	98.29	98.15	98.01	97.81	97.60	97.40
S49	133.9	100.08	99.67	99.26	98.93	98.70	98.39	98.17	97.95	97.80	97.66	97.45	97.23
S50	133.9	100.11	99.70	99.29	98.98	98.75	98.42	98.20	97.92	97.78	97.64	97.43	97.23
Ave.	132.6	100.10	99.69	99.28	99.00	98.72	98.43	98.21	97.99	97.79	97.60	97.40	97.20
Med.	132.4	100.10	99.69	99.28	98.98	98.72	98.43	98.20	97.97	97.78	97.62	97.43	97.21
St dev	1.2617	0.0168	0.0163	0.0163	0.0502	0.0702	0.0772	0.0982	0.1168	0.1389	0.1422	0.1364	0.1531
Min.	130.8	100.07	99.66	99.26	98.93	98.62	98.29	98.02	97.74	97.57	97.34	97.17	96.95
Max.	134.4	100.13	99.72	99.31	99.08	98.85	98.60	98.38	98.23	98.01	97.81	97.63	97.48



**3.22 Data Set 5, 85°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp))**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	1.94	100.08	99.64	99.19	98.87	98.63	98.39	98.17	98.04	97.75	97.45	97.19	97.06
S27	1.94	100.10	99.65	99.21	98.92	98.68	98.40	98.18	97.97	97.84	97.66	97.52	97.25
S28	1.94	100.09	99.65	99.20	98.91	98.67	98.40	98.27	97.97	97.84	97.68	97.42	97.30
S29	1.94	100.13	99.68	99.27	98.93	98.66	98.37	98.24	97.95	97.65	97.48	97.33	97.19
S30	1.94	100.11	99.69	99.25	98.91	98.67	98.39	98.10	97.80	97.59	97.43	97.31	97.19
S31	1.94	100.12	99.71	99.26	98.97	98.73	98.49	98.36	98.15	98.01	97.84	97.70	97.43
S32	1.93	100.12	99.70	99.28	98.96	98.72	98.44	98.14	97.85	97.63	97.34	97.19	96.93
S33	1.93	100.12	99.71	99.29	98.95	98.72	98.44	98.31	98.01	97.80	97.63	97.50	97.24
S34	1.93	100.10	99.68	99.26	98.93	98.65	98.42	98.28	97.99	97.85	97.70	97.58	97.43
S35	1.93	100.08	99.67	99.25	98.92	98.63	98.36	98.14	98.01	97.79	97.64	97.52	97.37
S36	1.93	100.08	99.67	99.25	98.96	98.68	98.44	98.30	98.17	97.96	97.80	97.66	97.52
S37	1.93	100.12	99.67	99.23	98.90	98.66	98.39	98.09	97.88	97.59	97.41	97.27	97.12
S38	1.93	100.08	99.64	99.20	98.87	98.59	98.31	98.10	97.88	97.75	97.60	97.47	97.33
S39	1.93	100.09	99.67	99.23	98.91	98.62	98.34	98.12	97.83	97.70	97.40	97.26	96.99
S40	1.94	100.12	99.70	99.28	98.95	98.67	98.39	98.18	97.96	97.67	97.51	97.37	97.23
S41	1.94	100.13	99.71	99.26	98.93	98.65	98.36	98.15	98.02	97.80	97.65	97.52	97.38
S42	1.94	100.11	99.69	99.24	98.95	98.72	98.48	98.34	98.05	97.92	97.74	97.48	97.35
S43	1.94	100.12	99.70	99.28	98.96	98.68	98.41	98.11	97.82	97.52	97.23	96.96	96.84
S44	1.94	100.13	99.68	99.24	98.90	98.62	98.35	98.21	98.08	97.95	97.65	97.51	97.36
S45	1.94	100.14	99.69	99.27	98.95	98.67	98.44	98.30	98.01	97.88	97.72	97.60	97.47
S46	1.94	100.12	99.70	99.25	98.93	98.69	98.45	98.32	98.10	97.97	97.68	97.41	97.27
S47	1.94	100.11	99.70	99.25	98.92	98.64	98.36	98.07	97.93	97.72	97.42	97.28	97.01
S48	1.94	100.11	99.66	99.25	98.91	98.64	98.35	98.22	98.01	97.87	97.58	97.44	97.17
S49	1.94	100.09	99.68	99.23	98.94	98.66	98.38	98.16	97.95	97.65	97.48	97.21	96.95
S50	1.94	100.13	99.71	99.27	98.98	98.74	98.47	98.25	98.12	97.83	97.67	97.55	97.40
Ave.	1.94	100.11	99.68	99.25	98.93	98.67	98.40	98.21	97.98	97.78	97.58	97.41	97.23
Med.	1.94	100.11	99.68	99.25	98.93	98.67	98.39	98.18	97.99	97.80	97.63	97.44	97.25
St dev	0.0028	0.0169	0.0220	0.0274	0.0287	0.0378	0.0461	0.0879	0.1011	0.1327	0.1526	0.1708	0.1843
Min.	1.93	100.08	99.64	99.19	98.87	98.59	98.31	98.07	97.80	97.52	97.23	96.96	96.84
Max.	1.94	100.14	99.71	99.29	98.98	98.74	98.49	98.36	98.17	98.01	97.84	97.70	97.52



**3.23 Data Set 5, 85°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	0.0374	100.13	99.72	99.28	99.01	98.82	98.61	98.33	98.06	97.90	97.73	97.46	97.25
S27	0.0373	100.09	99.69	99.25	98.99	98.68	98.36	98.09	97.79	97.63	97.41	97.14	97.04
S28	0.0374	100.13	99.74	99.30	98.92	98.72	98.51	98.36	98.08	97.80	97.63	97.41	97.25
S29	0.0374	100.09	99.70	99.25	99.00	98.81	98.62	98.32	98.04	97.74	97.61	97.45	97.29
S30	0.0374	100.09	99.69	99.25	99.00	98.81	98.61	98.32	98.16	98.01	97.83	97.57	97.41
S31	0.0374	100.10	99.70	99.26	99.01	98.70	98.39	98.24	98.08	97.93	97.70	97.44	97.23
S32	0.0371	100.10	99.70	99.27	98.90	98.59	98.28	98.00	97.70	97.40	97.28	97.11	96.95
S33	0.0371	100.11	99.70	99.26	98.99	98.80	98.59	98.44	98.29	98.13	97.96	97.69	97.54
S34	0.0371	100.12	99.73	99.28	99.02	98.70	98.51	98.23	98.08	97.78	97.66	97.49	97.38
S35	0.0372	100.11	99.72	99.28	98.90	98.70	98.39	98.23	98.08	97.93	97.80	97.59	97.48
S36	0.0372	100.10	99.70	99.27	98.90	98.59	98.28	98.12	97.83	97.67	97.45	97.28	97.07
S37	0.0371	100.13	99.74	99.29	99.03	98.84	98.63	98.35	98.07	97.92	97.69	97.53	97.42
S38	0.0372	100.10	99.71	99.27	98.90	98.71	98.40	98.24	97.97	97.69	97.56	97.40	97.29
S39	0.0371	100.10	99.71	99.27	98.90	98.59	98.39	98.23	97.95	97.80	97.57	97.31	97.10
S40	0.0383	100.11	99.70	99.27	98.90	98.71	98.50	98.20	98.05	97.77	97.64	97.48	97.27
S41	0.0382	100.09	99.68	99.25	98.98	98.67	98.36	98.06	97.91	97.76	97.58	97.41	97.21
S42	0.0382	100.12	99.73	99.29	99.03	98.84	98.53	98.38	98.10	97.82	97.59	97.43	97.22
S43	0.0382	100.13	99.73	99.29	99.03	98.82	98.61	98.46	98.16	98.01	97.83	97.67	97.51
S44	0.0382	100.08	99.69	99.25	98.87	98.56	98.36	98.06	97.78	97.63	97.45	97.29	97.08
S45	0.0382	100.14	99.74	99.30	99.03	98.84	98.63	98.35	98.20	98.05	97.92	97.76	97.65
S46	0.0382	100.11	99.72	99.27	98.90	98.71	98.40	98.12	97.82	97.54	97.42	97.20	96.99
S47	0.0382	100.08	99.69	99.25	98.99	98.78	98.47	98.19	97.91	97.64	97.46	97.19	97.09
S48	0.0382	100.12	99.73	99.30	99.03	98.84	98.64	98.37	98.07	97.79	97.66	97.50	97.34
S49	0.0382	100.13	99.72	99.28	99.01	98.70	98.49	98.34	98.06	97.91	97.73	97.57	97.46
S50	0.0382	100.13	99.72	99.28	99.02	98.71	98.51	98.35	98.08	97.92	97.80	97.63	97.47
Ave.	0.0377	100.11	99.71	99.27	98.97	98.73	98.48	98.26	98.01	97.81	97.64	97.44	97.28
Med.	0.0374	100.11	99.71	99.27	98.99	98.71	98.50	98.24	98.06	97.80	97.64	97.45	97.27
St dev	0.0005	0.0174	0.0182	0.0160	0.0563	0.0869	0.1168	0.1255	0.1440	0.1694	0.1693	0.1715	0.1859
Min.	0.0371	100.08	99.68	99.25	98.87	98.56	98.28	98.00	97.70	97.40	97.28	97.11	96.95
Max.	0.0383	100.14	99.74	99.30	99.03	98.84	98.64	98.46	98.29	98.13	97.96	97.76	97.65



### 3.24 Data Set 5, 85°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	3.387	3.436	3.419	3.445	3.424	3.451	3.400	3.382	3.396	3.419	3.401	3.433	3.381
S27	3.387	3.399	3.427	3.448	3.393	3.399	3.404	3.433	3.414	3.431	3.422	3.431	3.398
S28	3.386	3.447	3.421	3.395	3.384	3.459	3.440	3.388	3.431	3.402	3.399	3.444	3.414
S29	3.385	3.457	3.438	3.411	3.452	3.437	3.403	3.392	3.393	3.433	3.439	3.457	3.444
S30	3.385	3.395	3.444	3.447	3.441	3.433	3.405	3.448	3.450	3.387	3.384	3.441	3.411
S31	3.385	3.436	3.453	3.393	3.397	3.441	3.441	3.404	3.459	3.448	3.405	3.436	3.380
S32	3.448	3.427	3.406	3.437	3.430	3.387	3.399	3.408	3.437	3.407	3.454	3.449	3.438
S33	3.447	3.426	3.390	3.420	3.429	3.426	3.429	3.445	3.383	3.425	3.408	3.410	3.448
S34	3.446	3.437	3.418	3.391	3.409	3.457	3.383	3.430	3.389	3.416	3.429	3.408	3.404
S35	3.446	3.421	3.409	3.444	3.394	3.420	3.446	3.410	3.431	3.425	3.425	3.457	3.391
S36	3.446	3.457	3.427	3.429	3.442	3.402	3.434	3.448	3.399	3.385	3.436	3.428	3.436
S37	3.446	3.384	3.418	3.437	3.456	3.440	3.406	3.381	3.457	3.385	3.439	3.448	3.385
S38	3.446	3.427	3.415	3.398	3.397	3.391	3.413	3.454	3.392	3.402	3.445	3.425	3.453
S39	3.445	3.399	3.421	3.432	3.415	3.391	3.384	3.429	3.441	3.435	3.429	3.456	3.451
S40	3.457	3.436	3.418	3.431	3.381	3.396	3.416	3.439	3.433	3.412	3.407	3.422	3.394
S41	3.456	3.443	3.401	3.418	3.436	3.457	3.456	3.421	3.420	3.404	3.455	3.418	3.400
S42	3.456	3.435	3.450	3.450	3.412	3.426	3.405	3.444	3.453	3.399	3.441	3.447	3.408
S43	3.456	3.397	3.454	3.426	3.399	3.451	3.432	3.414	3.416	3.442	3.445	3.431	3.420
S44	3.455	3.384	3.423	3.445	3.430	3.457	3.446	3.455	3.403	3.453	3.452	3.394	3.457
S45	3.455	3.387	3.436	3.420	3.436	3.422	3.391	3.432	3.402	3.441	3.457	3.435	3.452
S46	3.455	3.418	3.441	3.406	3.433	3.400	3.408	3.411	3.416	3.411	3.431	3.431	3.436
S47	3.455	3.441	3.399	3.415	3.402	3.431	3.418	3.394	3.383	3.411	3.439	3.429	3.397
S48	3.455	3.385	3.388	3.391	3.444	3.450	3.412	3.424	3.435	3.414	3.441	3.402	3.431
S49	3.454	3.421	3.394	3.430	3.426	3.403	3.412	3.421	3.432	3.436	3.405	3.434	3.436
S50	3.454	3.425	3.435	3.390	3.449	3.433	3.449	3.440	3.449	3.404	3.457	3.437	3.420
Ave.	3.436	3.421	3.422	3.422	3.420	3.426	3.417	3.422	3.421	3.417	3.430	3.432	3.419
Med.	3.447	3.426	3.421	3.426	3.426	3.431	3.412	3.424	3.420	3.414	3.436	3.433	3.420
St dev	0.0289	0.0231	0.0191	0.0203	0.0223	0.0241	0.0209	0.0227	0.0243	0.0194	0.0208	0.0166	0.0248
Min.	3.385	3.384	3.388	3.390	3.381	3.387	3.383	3.381	3.383	3.385	3.384	3.394	3.380
Max.	3.457	3.457	3.454	3.450	3.456	3.459	3.456	3.455	3.459	3.453	3.457	3.457	3.457



### 3.25 Data Set 5, 85°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
				1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S26	0.1992	0.4608	6961	0.0002	0.0003	0.0006	0.0008	0.0010	0.0011	0.0013	0.0016	0.0017	0.0019	0.0020	0.0022
S27	0.1992	0.4608	6804	0.0003	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0018	0.0020	0.0022	0.0024
S28	0.1995	0.4607	6577	0.0003	0.0004	0.0006	0.0008	0.0011	0.0012	0.0015	0.0017	0.0019	0.0021	0.0022	0.0023
S29	0.1995	0.4614	6690	0.0003	0.0005	0.0006	0.0009	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0025	0.0026
S30	0.1993	0.4604	6597	0.0002	0.0004	0.0007	0.0011	0.0013	0.0016	0.0019	0.0022	0.0023	0.0026	0.0027	0.0029
S31	0.2003	0.4636	6581	0.0003	0.0005	0.0007	0.0010	0.0011	0.0014	0.0017	0.0019	0.0022	0.0024	0.0025	0.0028
S32	0.2011	0.4612	6560	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0021	0.0022	0.0024	0.0025
S33	0.2009	0.4594	6814	0.0002	0.0003	0.0005	0.0008	0.0011	0.0012	0.0015	0.0018	0.0019	0.0020	0.0023	0.0024
S34	0.2010	0.4599	6862	0.0002	0.0003	0.0005	0.0009	0.0012	0.0013	0.0015	0.0018	0.0019	0.0021	0.0023	0.0024
S35	0.1999	0.4580	6538	0.0003	0.0004	0.0006	0.0008	0.0009	0.0010	0.0013	0.0016	0.0018	0.0021	0.0023	0.0025
S36	0.2005	0.4591	6284	0.0003	0.0004	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0023
S37	0.2006	0.4594	6356	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0018	0.0020	0.0022
S38	0.2013	0.4599	6398	0.0003	0.0004	0.0006	0.0011	0.0012	0.0013	0.0016	0.0017	0.0020	0.0021	0.0023	0.0025
S39	0.2016	0.4602	6331	0.0003	0.0004	0.0005	0.0009	0.0010	0.0011	0.0012	0.0015	0.0018	0.0019	0.0020	0.0022
S40	0.2016	0.4671	6290	0.0003	0.0004	0.0005	0.0010	0.0011	0.0014	0.0017	0.0018	0.0019	0.0020	0.0022	0.0023
S41	0.2012	0.4668	6356	0.0003	0.0003	0.0005	0.0010	0.0011	0.0012	0.0015	0.0018	0.0019	0.0021	0.0022	0.0023
S42	0.2006	0.4660	6550	0.0003	0.0003	0.0006	0.0009	0.0010	0.0012	0.0014	0.0015	0.0016	0.0019	0.0020	0.0021
S43	0.2006	0.4669	6538	0.0003	0.0004	0.0006	0.0010	0.0012	0.0013	0.0015	0.0016	0.0017	0.0019	0.0020	0.0022
S44	0.2010	0.4678	6632	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0026
S45	0.2002	0.4650	6608	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0019	0.0021	0.0023	0.0025
S46	0.2006	0.4659	6525	0.0003	0.0006	0.0008	0.0010	0.0011	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0026
S47	0.2003	0.4656	6649	0.0003	0.0005	0.0007	0.0008	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0024	0.0026
S48	0.2008	0.4660	6383	0.0003	0.0006	0.0009	0.0010	0.0011	0.0014	0.0015	0.0018	0.0021	0.0023	0.0026	0.0027
S49	0.2015	0.4671	6503	0.0003	0.0004	0.0007	0.0010	0.0013	0.0016	0.0018	0.0021	0.0024	0.0026	0.0028	0.0029
S50	0.1993	0.4637	6435	0.0002	0.0004	0.0007	0.0009	0.0011	0.0012	0.0015	0.0018	0.0021	0.0022	0.0023	0.0026
Ave.	0.2005	0.4629	6553	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025
Med.	0.2006	0.4614	6550	0.0003	0.0004	0.0006	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025
St dev	0.0008	0.0032	179.4304	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.1992	0.4580	6284	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0015	0.0016	0.0018	0.0020	0.0021
Max.	0.2016	0.4678	6961	0.0003	0.0006	0.0009	0.0011	0.0013	0.0016	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029



### 3.26 Data Set 6, 105°C, 300mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)											
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	134.1	99.95	99.51	99.04	98.72	98.39	98.06	97.80	97.54	97.27	97.14	97.01	96.75
S52	134.5	99.96	99.51	99.04	98.71	98.39	98.06	97.80	97.66	97.39	97.12	96.89	96.76
S53	134.6	99.97	99.52	99.06	98.72	98.41	98.08	97.82	97.54	97.28	97.16	96.89	96.77
S54	134.0	100.02	99.65	99.18	98.87	98.54	98.21	97.94	97.66	97.52	97.39	97.27	97.14
S55	134.5	99.96	99.52	99.05	98.71	98.38	98.04	97.90	97.77	97.49	97.23	97.10	96.86
S56	134.2	99.98	99.63	99.24	98.92	98.58	98.25	97.98	97.84	97.70	97.58	97.34	97.08
S57	134.2	99.96	99.63	99.17	98.83	98.52	98.20	97.92	97.79	97.51	97.38	97.12	96.88
S58	134.4	99.99	99.54	99.16	98.83	98.50	98.19	97.91	97.63	97.37	97.11	96.98	96.86
S59	134.2	100.03	99.63	99.16	98.85	98.53	98.22	98.08	97.94	97.68	97.45	97.21	96.95
S60	133.9	99.96	99.63	99.16	98.84	98.50	98.19	98.05	97.79	97.65	97.42	97.16	96.92
S61	134.7	99.94	99.57	99.10	98.78	98.45	98.12	97.87	97.73	97.59	97.33	97.07	96.83
S62	134.2	99.97	99.52	99.06	98.72	98.41	98.08	97.82	97.56	97.28	97.02	96.79	96.52
S63	134.1	100.02	99.57	99.10	98.77	98.46	98.14	98.01	97.87	97.73	97.47	97.21	96.97
S64	134.2	99.99	99.62	99.16	98.83	98.49	98.16	97.90	97.62	97.48	97.36	97.09	96.86
S65	134.2	99.94	99.49	99.10	98.77	98.45	98.13	97.85	97.58	97.44	97.20	97.08	96.95
S66	134.2	100.02	99.58	99.19	98.85	98.52	98.18	98.05	97.91	97.77	97.65	97.41	97.28
S67	134.2	100.01	99.63	99.24	98.93	98.59	98.27	97.99	97.73	97.45	97.22	96.95	96.72
S68	133.7	99.95	99.50	99.11	98.78	98.45	98.12	97.85	97.57	97.29	97.03	96.76	96.53
S69	131.5	99.96	99.51	99.12	98.81	98.49	98.16	97.88	97.62	97.48	97.36	97.09	96.86
S70	132.1	99.97	99.63	99.16	98.84	98.50	98.17	98.03	97.89	97.63	97.40	97.27	97.15
S71	131.6	99.97	99.53	99.14	98.80	98.47	98.13	97.99	97.74	97.46	97.33	97.10	96.97
S72	131.9	100.02	99.65	99.19	98.86	98.52	98.21	98.07	97.81	97.56	97.29	97.16	97.04
S73	131.9	100.01	99.56	99.17	98.86	98.52	98.20	98.06	97.92	97.65	97.52	97.26	97.02
S74	131.9	99.92	99.47	99.09	98.75	98.42	98.11	97.83	97.69	97.56	97.32	97.06	96.80
S75	131.8	99.95	99.59	99.20	98.87	98.54	98.21	97.95	97.69	97.43	97.31	97.18	96.92
Ave.	133.6	99.98	99.57	99.14	98.81	98.48	98.16	97.93	97.72	97.51	97.31	97.10	96.89
Med.	134.2	99.97	99.57	99.16	98.83	98.49	98.16	97.92	97.73	97.49	97.33	97.10	96.88
St dev	1.1296	0.0303	0.0578	0.0595	0.0629	0.0595	0.0613	0.0916	0.1262	0.1467	0.1619	0.1609	0.1758
Min.	131.5	99.92	99.47	99.04	98.71	98.38	98.04	97.80	97.54	97.27	97.02	96.76	96.52
Max.	134.7	100.03	99.65	99.24	98.93	98.59	98.27	98.08	97.94	97.77	97.65	97.41	97.28



### 3.27 Data Set 6, 105°C, 300mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	1.96	99.92	99.43	98.89	98.61	98.38	98.14	97.97	97.82	97.52	97.39	97.19	96.95
S52	1.96	99.99	99.50	99.06	98.74	98.50	98.25	98.09	97.78	97.47	97.24	97.01	96.77
S53	1.96	99.99	99.50	99.05	98.74	98.49	98.25	98.09	97.92	97.77	97.56	97.44	97.31
S54	1.96	99.99	99.59	99.15	98.87	98.64	98.39	98.24	97.93	97.76	97.56	97.33	97.09
S55	1.96	99.96	99.57	99.13	98.85	98.60	98.31	98.16	97.86	97.55	97.42	97.22	97.10
S56	1.96	99.98	99.50	98.96	98.68	98.43	98.14	97.97	97.82	97.52	97.39	97.16	96.96
S57	1.96	99.91	99.43	98.89	98.62	98.37	98.08	97.78	97.63	97.48	97.24	97.12	96.99
S58	1.96	99.92	99.52	99.08	98.80	98.52	98.28	98.11	97.96	97.81	97.61	97.40	97.17
S59	1.96	99.99	99.59	99.15	98.87	98.62	98.37	98.07	97.76	97.59	97.47	97.27	97.14
S60	1.94	99.94	99.55	99.11	98.79	98.56	98.27	98.10	97.94	97.77	97.54	97.33	97.13
S61	1.94	99.92	99.53	99.09	98.77	98.52	98.23	98.07	97.76	97.45	97.22	97.02	96.89
S62	1.94	99.96	99.47	98.93	98.65	98.40	98.11	97.81	97.65	97.35	97.14	97.02	96.82
S63	1.94	99.91	99.42	98.88	98.57	98.28	97.99	97.69	97.54	97.23	97.02	96.79	96.56
S64	1.94	99.95	99.46	98.92	98.66	98.37	98.13	97.98	97.68	97.53	97.29	97.06	96.86
S65	1.94	100.03	99.60	99.07	98.80	98.51	98.22	98.07	97.77	97.46	97.23	96.99	96.87
S66	1.94	99.94	99.55	99.10	98.84	98.55	98.26	98.11	97.96	97.66	97.42	97.22	97.01
S67	1.94	99.96	99.47	99.03	98.75	98.50	98.27	98.11	97.96	97.80	97.67	97.55	97.34
S68	1.94	99.97	99.58	99.04	98.77	98.52	98.24	97.93	97.62	97.32	97.08	96.85	96.65
S69	1.92	99.91	99.43	98.98	98.72	98.43	98.18	98.03	97.88	97.71	97.48	97.36	97.12
S70	1.92	99.92	99.52	99.08	98.80	98.52	98.27	98.10	97.79	97.49	97.28	97.05	96.82
S71	1.92	99.99	99.60	99.06	98.79	98.51	98.26	98.09	97.78	97.63	97.40	97.20	96.99
S72	1.92	99.94	99.45	98.91	98.64	98.39	98.11	97.94	97.63	97.33	97.20	97.00	96.79
S73	1.92	99.95	99.46	99.02	98.75	98.51	98.22	97.92	97.61	97.45	97.24	97.12	96.99
S74	1.92	99.92	99.43	98.98	98.67	98.38	98.14	97.84	97.53	97.22	97.02	96.89	96.69
S75	1.92	99.92	99.53	98.99	98.67	98.43	98.19	97.88	97.73	97.58	97.35	97.22	97.02
Ave.	1.94	99.95	99.51	99.02	98.74	98.48	98.21	98.01	97.77	97.54	97.34	97.15	96.96
Med.	1.94	99.95	99.50	99.04	98.75	98.50	98.23	98.07	97.78	97.52	97.35	97.16	96.99
St dev	0.0184	0.0329	0.0617	0.0845	0.0855	0.0883	0.0910	0.1328	0.1347	0.1730	0.1788	0.1886	0.1950
Min.	1.92	99.91	99.42	98.88	98.57	98.28	97.99	97.69	97.53	97.22	97.02	96.79	96.56
Max.	1.96	100.03	99.60	99.15	98.87	98.64	98.39	98.24	97.96	97.81	97.67	97.55	97.34





**3.28 Data Set 6, 105°C, 300mA (Photon Flux Maintenance, Far-Red (PFMFR))**

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFM <sub>FR</sub> ) (%)											
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	0.0379	100.04	99.60	99.09	98.80	98.51	98.16	97.96	97.68	97.39	97.13	96.88	96.76
S52	0.0379	100.04	99.60	99.16	98.95	98.75	98.46	98.26	98.10	97.82	97.56	97.31	97.07
S53	0.0379	100.03	99.59	99.15	98.80	98.45	98.16	98.01	97.85	97.56	97.31	97.05	96.93
S54	0.0379	100.01	99.49	99.05	98.85	98.56	98.35	98.20	98.00	97.71	97.45	97.31	97.19
S55	0.0379	100.00	99.49	99.05	98.84	98.49	98.20	97.92	97.63	97.47	97.22	96.96	96.84
S56	0.0379	100.02	99.51	99.00	98.71	98.36	98.08	97.92	97.76	97.61	97.35	97.10	96.87
S57	0.0379	100.02	99.51	99.07	98.72	98.51	98.30	98.10	97.81	97.53	97.38	97.24	97.01
S58	0.0379	99.98	99.54	99.03	98.68	98.33	98.12	97.84	97.55	97.39	97.14	96.99	96.76
S59	0.0379	99.97	99.53	99.02	98.67	98.46	98.11	97.91	97.71	97.56	97.41	97.27	97.04
S60	0.0382	100.04	99.60	99.09	98.80	98.59	98.31	98.02	97.82	97.53	97.28	97.02	96.79
S61	0.0382	99.96	99.45	99.01	98.72	98.37	98.16	97.88	97.59	97.30	97.16	96.90	96.67
S62	0.0382	99.98	99.54	99.03	98.68	98.47	98.12	97.83	97.55	97.35	97.09	96.84	96.72
S63	0.0382	99.99	99.48	98.97	98.68	98.33	98.05	97.89	97.73	97.58	97.32	97.07	96.95
S64	0.0382	100.03	99.59	99.15	98.80	98.51	98.31	98.11	97.91	97.75	97.50	97.24	97.01
S65	0.0382	100.00	99.49	99.04	98.84	98.63	98.43	98.14	97.85	97.65	97.40	97.25	97.13
S66	0.0382	100.01	99.57	99.06	98.86	98.57	98.28	98.12	97.97	97.68	97.43	97.17	96.94
S67	0.0382	100.02	99.51	99.07	98.78	98.50	98.29	98.09	97.93	97.64	97.39	97.14	96.90
S68	0.0382	99.99	99.54	99.03	98.75	98.46	98.11	97.95	97.79	97.64	97.38	97.13	96.90
S69	0.0379	100.02	99.58	99.14	98.93	98.58	98.23	98.03	97.74	97.45	97.31	97.17	97.05
S70	0.0379	100.04	99.59	99.08	98.80	98.51	98.30	98.15	97.99	97.79	97.65	97.50	97.27
S71	0.0379	100.02	99.51	99.00	98.65	98.30	97.95	97.66	97.46	97.26	97.00	96.86	96.74
S72	0.0378	100.05	99.60	99.09	98.81	98.60	98.39	98.24	98.08	97.79	97.54	97.40	97.27
S73	0.0379	100.02	99.57	99.13	98.93	98.72	98.43	98.23	98.03	97.83	97.58	97.44	97.20
S74	0.0378	99.98	99.47	98.96	98.75	98.46	98.18	98.02	97.86	97.66	97.41	97.27	97.03
S75	0.0378	99.96	99.45	99.01	98.66	98.45	98.16	97.88	97.68	97.39	97.13	96.88	96.65
Ave.	0.0380	100.01	99.54	99.06	98.78	98.50	98.23	98.01	97.80	97.57	97.34	97.14	96.95
Med.	0.0379	100.02	99.54	99.05	98.80	98.50	98.20	98.02	97.81	97.58	97.38	97.14	96.94
St dev	0.0002	0.0262	0.0512	0.0565	0.0870	0.1124	0.1310	0.1496	0.1746	0.1660	0.1657	0.1883	0.1825
Min.	0.0378	99.96	99.45	98.96	98.65	98.30	97.95	97.66	97.46	97.26	97.00	96.84	96.65
Max.	0.0382	100.05	99.60	99.16	98.95	98.75	98.46	98.26	98.10	97.83	97.65	97.50	97.27



### 3.29 Data Set 6, 105°C, 300mA (Forward Voltage)

Sample Number	Forward Voltage(V)												
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	3.334	3.450	3.360	3.382	3.377	3.437	3.377	3.455	3.332	3.406	3.386	3.342	3.340
S52	3.333	3.349	3.458	3.403	3.400	3.451	3.342	3.450	3.457	3.449	3.441	3.357	3.381
S53	3.333	3.389	3.408	3.358	3.391	3.447	3.356	3.418	3.394	3.344	3.370	3.346	3.405
S54	3.332	3.374	3.338	3.378	3.437	3.383	3.412	3.378	3.451	3.396	3.432	3.392	3.422
S55	3.332	3.434	3.437	3.346	3.415	3.370	3.333	3.421	3.351	3.352	3.424	3.346	3.354
S56	3.332	3.393	3.395	3.404	3.344	3.392	3.455	3.380	3.406	3.376	3.398	3.383	3.390
S57	3.332	3.365	3.416	3.412	3.423	3.330	3.333	3.371	3.428	3.454	3.431	3.345	3.402
S58	3.332	3.442	3.427	3.416	3.440	3.409	3.333	3.438	3.331	3.343	3.397	3.329	3.445
S59	3.331	3.437	3.381	3.371	3.378	3.394	3.418	3.386	3.352	3.396	3.462	3.347	3.394
S60	3.464	3.365	3.414	3.433	3.386	3.381	3.403	3.380	3.435	3.445	3.449	3.360	3.376
S61	3.464	3.384	3.344	3.393	3.337	3.432	3.352	3.370	3.439	3.348	3.427	3.394	3.367
S62	3.463	3.339	3.419	3.351	3.434	3.408	3.414	3.360	3.459	3.357	3.401	3.423	3.444
S63	3.463	3.455	3.373	3.409	3.388	3.366	3.399	3.331	3.354	3.414	3.373	3.391	3.425
S64	3.462	3.452	3.349	3.406	3.392	3.364	3.373	3.343	3.387	3.423	3.438	3.440	3.404
S65	3.462	3.416	3.387	3.387	3.412	3.425	3.458	3.350	3.411	3.368	3.400	3.421	3.368
S66	3.462	3.432	3.384	3.355	3.447	3.373	3.449	3.407	3.448	3.449	3.353	3.332	3.370
S67	3.462	3.379	3.357	3.377	3.453	3.379	3.383	3.343	3.423	3.345	3.373	3.349	3.352
S68	3.462	3.408	3.457	3.405	3.383	3.409	3.336	3.355	3.358	3.437	3.355	3.342	3.358
S69	3.455	3.422	3.331	3.452	3.357	3.432	3.444	3.378	3.396	3.363	3.379	3.442	3.341
S70	3.454	3.442	3.407	3.350	3.350	3.401	3.423	3.418	3.443	3.393	3.403	3.402	3.332
S71	3.454	3.371	3.366	3.437	3.441	3.332	3.451	3.356	3.410	3.420	3.381	3.408	3.388
S72	3.454	3.441	3.371	3.371	3.355	3.366	3.375	3.402	3.399	3.388	3.457	3.409	3.378
S73	3.454	3.341	3.458	3.459	3.394	3.420	3.401	3.438	3.432	3.365	3.392	3.336	3.454
S74	3.454	3.450	3.415	3.431	3.355	3.353	3.345	3.387	3.456	3.408	3.390	3.362	3.429
S75	3.453	3.417	3.347	3.338	3.349	3.391	3.422	3.419	3.388	3.425	3.374	3.402	3.363
Ave.	3.413	3.406	3.392	3.393	3.394	3.394	3.391	3.389	3.406	3.395	3.403	3.376	3.387
Med.	3.454	3.416	3.387	3.393	3.391	3.392	3.399	3.380	3.410	3.396	3.398	3.362	3.381
St dev	0.0621	0.0378	0.0386	0.0339	0.0357	0.0334	0.0426	0.0355	0.0406	0.0370	0.0317	0.0355	0.0346
Min.	3.331	3.339	3.331	3.338	3.337	3.330	3.333	3.331	3.331	3.343	3.353	3.329	3.332
Max.	3.464	3.455	3.458	3.459	3.453	3.451	3.458	3.455	3.459	3.454	3.462	3.442	3.454

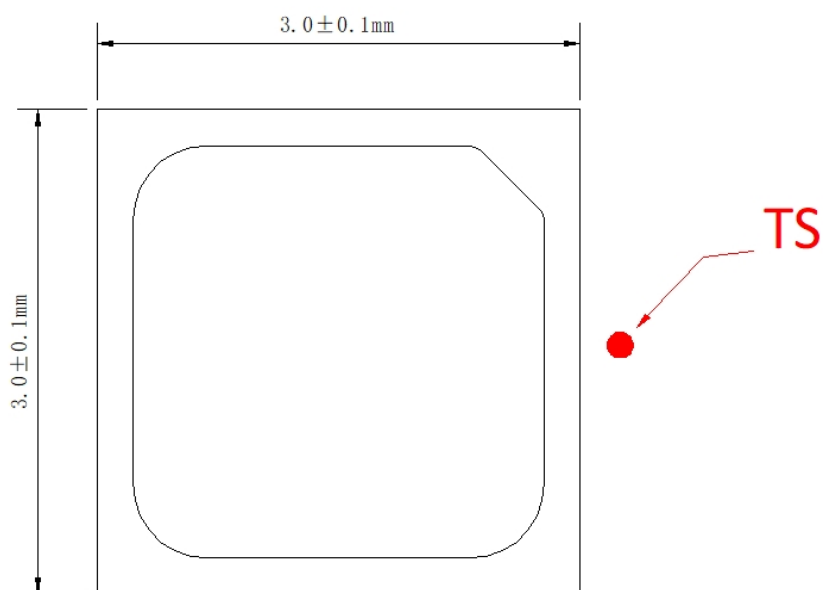


### 3.30 Data Set 6, 105°C, 300mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs
S51	0.1994	0.4598	6961	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027
S52	0.2004	0.4610	6804	0.0002	0.0005	0.0007	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028
S53	0.2020	0.4627	6577	0.0002	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0022	0.0025	0.0027
S54	0.2010	0.4621	6690	0.0003	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0020	0.0023	0.0025	0.0027
S55	0.2013	0.4631	6597	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027
S56	0.2017	0.4629	6581	0.0003	0.0005	0.0007	0.0010	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0025	0.0027
S57	0.2012	0.4638	6560	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0026
S58	0.2004	0.4609	6814	0.0003	0.0005	0.0007	0.0010	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0025	0.0027
S59	0.2001	0.4605	6862	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028
S60	0.2003	0.4651	6538	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027
S61	0.2022	0.4672	6284	0.0002	0.0005	0.0007	0.0010	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027
S62	0.2014	0.4669	6356	0.0002	0.0005	0.0007	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0027
S63	0.2012	0.4665	6398	0.0003	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028
S64	0.2015	0.4672	6331	0.0002	0.0005	0.0007	0.0010	0.0013	0.0015	0.0018	0.0020	0.0023	0.0026	0.0027	0.0029
S65	0.2018	0.4676	6290	0.0002	0.0005	0.0007	0.0009	0.0011	0.0014	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027
S66	0.2010	0.4673	6356	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0023	0.0025	0.0027
S67	0.2003	0.4649	6550	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027
S68	0.2003	0.4651	6538	0.0003	0.0005	0.0007	0.0010	0.0012	0.0015	0.0016	0.0019	0.0021	0.0023	0.0025	0.0028
S69	0.2006	0.4633	6632	0.0003	0.0005	0.0008	0.0010	0.0012	0.0015	0.0018	0.0019	0.0021	0.0024	0.0025	0.0028
S70	0.2009	0.4633	6608	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026	0.0028	0.0030
S71	0.2012	0.4643	6525	0.0003	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024	0.0027
S72	0.2006	0.4630	6649	0.0003	0.0005	0.0007	0.0010	0.0012	0.0015	0.0016	0.0018	0.0021	0.0024	0.0026	0.0029
S73	0.2017	0.4661	6383	0.0003	0.0005	0.0007	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023	0.0025	0.0027	0.0028
S74	0.2013	0.4646	6503	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030
S75	0.2018	0.4651	6435	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0029
Ave.	0.2010	0.4642	6553	0.0002	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028
Med.	0.2012	0.4643	6550	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027
St dev	0.0007	0.0023	179.4304	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.1994	0.4598	6284	0.0002	0.0005	0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026
Max.	0.2022	0.4676	6961	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0028	0.0030

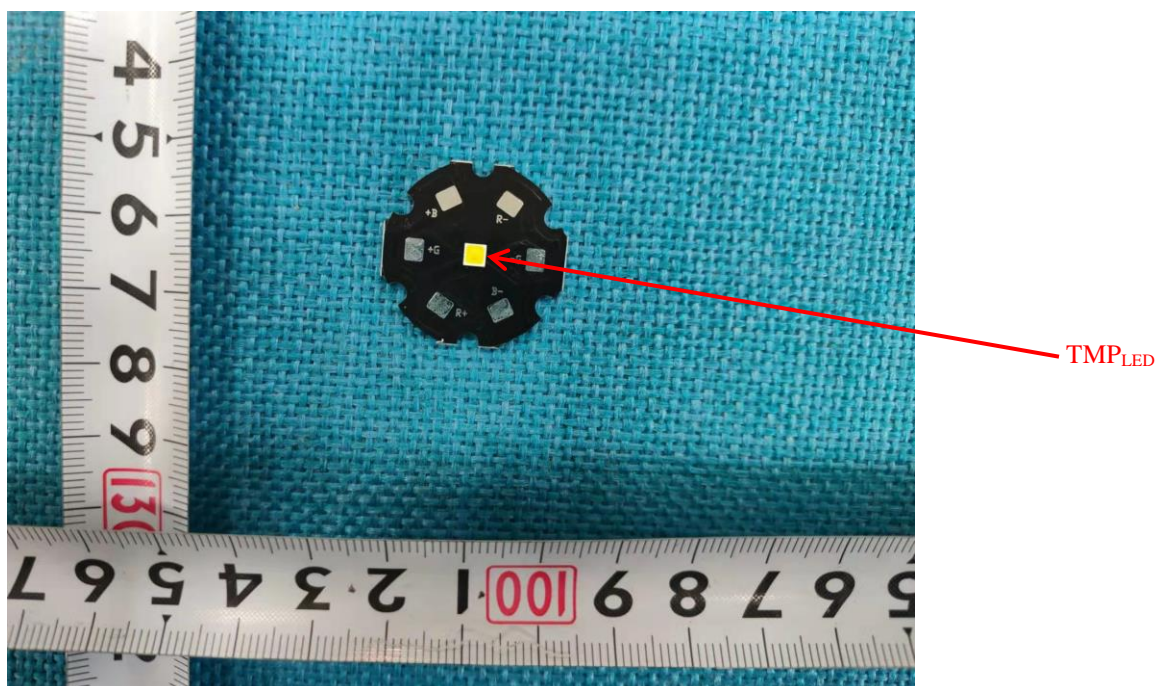
## 4 . EUT PHOTO

### 4.1 Mechanical Dimensions



All dimensions are in millimeter

### 4.2 EUT Photo



\*\*\*\*\* END OF THE TEST REPORT\*\*\*\*\*