TEST REPORT

ACCORDING TO IES LM-80-2015
For

APT Electronics Co., Ltd.

No.33，South of Huan Shi Road，Nansha District，Guangzhou

Model: SP240-99R9-WAMZ

Report Type: 6000 Hours Test Report	**Product Type:** LED Array
Test Engineer:	Pote Wang
Report Number:	RSZ160914516-10
Test Date:	2016-09-17 to 2017-06-23
Report Date:	2017-07-10
Reviewed By:	Daniel Duan / EE Manager
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

TABLE OF CONTENTS

1 - General Information

1.1 Description of LED Light Sources

Sample Size:

24 PCS samples were received on 2016-09-14. The samples were numbered from 1 to 12, 13 to 24.

Manufacturer:	APT Electronics Co., Ltd.
Part Number:	SP240-99R9-WAMZ
Part Type:	LED Array
Drive Level:	DC 4320mA
Nominal CCT:	2700K

Family products covered by this report:

According to ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products, the following products can be covered by this report base on the declaration letter of manufacturer. The information of these models shows that the covered products meet all section 3 item 7 requirements of ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products (September 9, 2011)

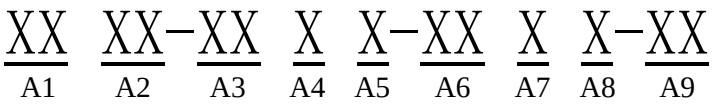
Series	Model Name	Number of Dies	Current (mA)	Chip Layout		Current Per Die (mA)	W	Power Density	Space of Die	Size
				Series	Parallel	Parallel			(W/mm^2)	
COB	SP240-99R9-WAMZ	324	4320	18	18	240	246	0.593	0.37	2828
COB	EP03-XXXX-XXLC	9	720	3	3	240	6	0.087	2.19	1313
COB	EP03-XXXX-XXLC	9	720	3	3	240	6	0.241	1.01	1215
COB	EP03-XXXX-XXLD	9	720	3	3	240	6	0.087	2.19	1313
COB	EP03-XXXX-XXLD	9	720	3	3	240	6	0.241	1.01	1215
COB	EP05-XXXX-XXKA	12	240	12	1	240	9	0.116	1.8	1313
COB	EP05-XXXX-XXKA	12	480	6	2	240	9	0.321	0.77	1215
COB	EP07-XXXX-XXED	18	720	6	3	240	14	0.173	1.33	1313
COB	EP09-XXXX-XXKB	24	480	12	2	240	18	0.231	1.05	1313
COB	EP13-XXXX-XXKD	36	720	12	3	240	27	0.347	0.72	1313
COB	EP13-XXXX-XXKD	36	720	12	3	240	27	0.165	1.38	1919
COB	EP18-XXXX-XXKE	48	960	12	4	240	36	0.22	1.09	1919
COB	EP22-XXXX-XXKG	60	1200	12	5	240	46	0.275	0.9	1919
COB	EP26-XXXX-XXKI	72	1440	12	6	240	55	0.33	0.75	1919
COB	EP30-XXXX-XXKX	84	1680	12	7	240	64	0.385	0.64	1919
COB	EP40-XXXX-XXKT	108	2160	12	9	240	82	0.197	1.2	2828
COB	EP50-XXXX-XXKR	144	2880	12	12	240	109	0.262	0.94	2828
COB	EP60-XXXX-XXPT	162	2160	18	9	240	123	0.295	0.84	2828
COB	EP04-XXXX-XXKA	12	240	12	1	240	9	0.321	0.77	1313
COB	EP07-XXXX-XXKM	24	480	12	2	240	18	0.285	0.87	1515
COB	EP12-XXXX-XXKD	48	960	12	4	240	36	0.57	0.39	1515
COB	EP16-XXXX-XXK2	60	1200	12	5	240	46	0.401	0.61	1818
COB	EP20-XXXX-XXK3	72	1440	12	6	240	55	0.481	0.49	1818
COB	EP30-XXXX-XXK4	96	1920	12	8	240	73	0.471	0.5	1818
COB	EP20-XXXX-XXK3	72	1440	12	6	240	55	0.192	1.22	2525
COB	EP30-XXXX-XXK4	96	1920	12	8	240	73	0.256	0.96	2525
COB	EP40-XXXX-XXK5	132	2640	12	11	240	100	0.352	0.7	2525

Series	Model Name	Number of Dies	Current (mA)	Chip Layout		Current Per Die (mA)	W	Power Density	Space of Die	Size
				Series	Parallel	Parallel			(W/mm^2)	
COB	SP03-XXXX-XXLA	12	240	12	1	240	9	0.12	1.75	1313
COB	SP03-XXXX-XXFB	12	480	6	2	240	18	0.12	1.75	1313
COB	SP06-XXXX-XXLB	24	480	12	2	240	18	0.241	1.01	1313
COB	SP09-XXXX-XXLC	36	720	12	3	240	27	0.361	0.69	1313
COB	SP13-XXXX-XXLD	48	960	12	4	240	36	0.481	0.49	1313
COB	SP16-XXXX-XXLE	60	1200	12	5	240	46	0.24	1.01	1919
COB	SP19-XXXX-XXLF	72	1440	12	6	240	55	0.288	0.86	1919
COB	SP26-XXXX-XXLH	96	1920	12	8	240	73	0.385	0.64	1919
COB	SP40-XXXX-XXLL	144	2880	12	12	240	109	0.262	0.94	2828
COB	SP60-XXXX-XXML	216	2880	18	12	240	164	0.393	0.62	2828
COB	SP80-XXXX-XXMM	324	4320	18	18	240	246	0.593	0.37	2828
COB	PP05-XXXX-XXDF	12	720	4	3	240	9	0.273	0.9	1215
COB	PP05-XXXX-XXLA	12	240	12	1	240	9	0.273	0.9	1215
COB	PP05-XXXX-XXFD	12	480	6	2	240	9	0.273	0.9	1215
COB	PP05-XXXX-XXLB	24	480	12	2	240	18	0.547	0.41	1215
COB	PP09-XXXX-XXHF	24	720	8	3	240	18	0.547	0.41	1215
COB	PP09-XXXX-XXDM	24	1440	4	6	240	19	0.547	0.41	1215
COB	PP09-XXXX-XXLC	24	480	12	2	240	18	0.547	0.41	1215
COB	PP10-XXXX-XXLE	36	720	12	3	240	27	0.428	0.57	1619
COB	PP16-XXXX-XXLH	48	960	12	4	240	36	0.273	0.9	1619
COB	PP21-XXXX-XXLJ	60	1200	12	5	240	46	0.342	0.73	2024
COB	PP22-XXXX-XXN2	70	1200	14	5	240	53	0.399	0.62	2024
COB	PP32-XXXX-XXLQ	96	1920	12	8	240	73	0.411	0.59	2024
COB	PP42-XXXX-XXLW	132	2640	12	11	240	100	0.371	0.67	2828
COB	PP55-XXXX-XXLY	192	3840	12	16	240	146	0.349	0.71	2828
COB	PP10-XXXX-XXLE-AG	36	720	12	3	240	27	0.428	0.57	2024
COB	PP16-XXXX-XXLH-AG	48	960	12	4	240	36	0.273	0.9	2024
COB	PP21-XXXX-XXLJ-AG	60	1200	12	5	240	46	0.342	0.73	2024
COB	FP04-XXXX-XXEV	20	960	5	4	240	15	0.456	0.53	1215
COB	FP04-XXXX-XXLB	12	240	12	1	240	9	0.273	0.9	1215
COB	FP05-XXXX-XXLB	24	480	12	2	240	18	0.547	0.41	1215
COB	FP07-XXXX-XXLC	24	480	12	2	240	18	0.547	0.41	1215
COB	FP10-XXXX-XXLE	36	720	12	3	240	27	0.428	0.57	1619
COB	FP30-XXXX-XXW1	108	960	27	4	240	82	0.59	0.38	1924
COB	FP43-XXXX-XXY3	130	1100	26	5	220	97	0.578	0.37	1924
COB	FC07-XXXX-XXJD	20	480	10	2	240	15	0.456	0.53	1215
COB	PA07-XXXX-XXLC	24	480	12	2	240	18	0.547	0.41	1215
COB	PA10-XXXX-XXLE	36	720	12	3	240	27	0.428	0.57	1619
COB	PA16-XXXX-XXLH	48	960	12	4	240	36	0.273	0.9	2024
COB	PA21-XXXX-XXLJ	60	1200	12	5	240	46	0.342	0.73	2024
COB	PA32-XXXX-XXLQ	96	1920	12	8	240	73	0.411	0.59	2024
COB	PA42-XXXX-XXLW	132	2640	12	11	240	100	0.371	0.67	2828
COB	PA55-XXXX-XXLY	288	3840	12	16	240	146	0.524	0.44	2828
COB	PB07-XXXX-XXLC	24	480	12	2	240	18	0.547	0.41	1215
COB	PB10-XXXX-XXLE	36	720	12	3	240	27	0.428	0.57	1619
COB	PB16-XXXX-XXLH	48	960	12	4	240	36	0.273	0.9	2024
COB	PB21-XXXX-XXLJ	60	1200	12	5	240	46	0.342	0.73	2024
COB	PB32-XXXX-XXLQ	96	1920	12	8	240	73	0.411	0.59	2024
COB	PB42-XXXX-XXLW	132	2640	12	11	240	100	0.371	0.67	2828
COB	PB55-XXXX-XXLY	288	3840	12	16	240	146	0.524	0.44	2828

Series	Model Name	Number of Dies	Current (mA)	Chip Layout		Current Per Die (mA)	W	Power Density	Space of Die	Size
				Series	Parallel	Parallel			(W/mm^2)	
COB	PC10-XXXX-XXLE	36	720	12	3	240	27	0.428	0.57	1619

Model description as above is part of items according to the case as blow .It can be further described by other model number if the new item follows below regulation.

Model Number Format:



A1	A2	A3	A4	A5	A6	A7	A8	A9
Model Style	Power	Flux	CCT	Ra	Color bin	Rating Voltage	Rating Current	Fixed code

Note:

A1: Letter XX can be replaced by the letter EP, SP, FP, FC, PP, PA, PB, PC

A2: Letter XX can be replaced from 1 to 240 .It means the rating Power

A3: Letter X can be replaced by the letter from A to Z or from 0~9

: Letter X can be replaced by the letter from A to Z or from 0~9

A4: Letter X can be replaced by the letter from A to Z

A5: Letter X can be replaced by the letter 7, 8, 9, A, B, D, E

A6: Letter X can be replaced by the letter from A to Z,

: Letter X can be replaced by the letter from A to Z or from 0~9

A7: Letter X can be replaced by the letter from A to Z or from 0~9, it just means the rating voltage

A8: Letter X can be replaced by the letter from A to Z or from 0~9, it just means the rating voltage

A9: Letter XX can be replaced by AG or blank

Disclaimer:

The truthfulness and accuracy of all the technical information above for the covered LED products is ensured by manufacturer of LED light source. Bay Area Compliance Laboratories Corp. (Dongguan) isn't responsible or gives any guarantees for the truthfulness of the technical information.

1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products(This test method was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
1.0m integrating sphere	SENSING	SCD-20008	N/A	N/A	2017-07-07	2018-07-07
spectroradiometer	SENSING	SCD-20008	N/A	N/A	2017-07-07	2018-07-07
DC Power Supply	Hanshenpuyuan	HSPY-100-05	2013010210003	N/A	2017-05-05	2018-05-05
Standard Light Source	EVERFINE	D062	1011093	3000K	2016-09-13	2017-09-13
Multilayer aging machine	BACL	B3-900	20030	25°C~130°C	2017-03-03	2018-03-03
Adjustable constant-current DC switching power supply	GUTE	DK-60V20A	120 5036	1200W	2016-08-29	2017-08-29
Adjustable constant-current DC switching power supply	GUTE	DK-60V50A	120 5037	3000W	2016-10-27	2017-10-27
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	(50/15A)	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090009	(50/15A)	2016-12-15	2017-12-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	(50/15A)	2017-03-03	2018-03-03

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 ±3% of the specified value of the manufacturer during maintenance test, and was within ±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°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 “Special Limits”.

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

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

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

1.6 Measurement Uncertainty

The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°C (K=2), at the 95% confidence level.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

1.8 Sample Set

Data Set 1: 85°C, 4320mA

Part Number:	SP240-99R9-WAMZ
Number of Units:	12
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	4320mA
Measurement Current:	4320mA

Data Set 2: 115°C,4320mA

Part Number:	SP240-99R9-WAMZ
Number of Units:	12
Case Temperature:	>113°C
Ambient Temperature:	>110°C
Life Test Drive Current:	4320mA
Measurement Current:	4320mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L_{70} Lifetime
1	12	0	1000	6000	>33000hours
2	12	0	1000	6000	>33000hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000	2000	3000	4000	5000	6000
1	99.73%	99.35%	98.55%	97.99%	97.26%	96.76%
2	99.69%	99.24%	97.97%	97.19%	96.27%	95.46%

Average Color Maintenance

Data Set:	1000	2000	3000	4000	5000	6000
1	0.0010	0.0014	0.0016	0.0018	0.0020	0.0021
2	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023

3 - Test Data

3.1 Data Set 1, 85°C, 4320mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	25179.22	99.29	98.86	98.15	97.58	96.86	96.81
2	25279.41	99.50	98.89	98.00	97.45	97.27	96.61
3	25284.08	99.67	99.36	98.62	98.07	97.34	96.73
4	25165.24	99.70	99.13	98.21	97.71	97.22	96.62
5	25167.32	99.66	99.40	98.57	97.98	97.04	96.85
6	25172.23	99.84	99.71	98.76	98.16	97.17	96.47
7	25221.17	99.92	99.52	98.52	98.00	97.19	97.00
8	25228.16	99.92	99.74	99.10	98.41	97.63	97.07
9	25207.19	99.73	99.36	98.60	98.05	97.52	97.01
10	25242.14	99.86	99.47	98.65	98.19	97.58	96.76
11	25221.17	99.78	99.12	98.51	98.03	97.12	96.88
12	25200.20	99.92	99.61	98.87	98.28	97.23	96.31
Ave.	25213.96	99.73	99.35	98.55	97.99	97.26	96.76
Med.	25214.18	99.75	99.38	98.59	98.04	97.22	96.78
st dev	40.49	0.1900	0.2940	0.3102	0.2832	0.2256	0.2266
Min.	25165.24	99.29	98.86	98.00	97.45	96.86	96.31
Max.	25284.08	99.92	99.74	99.10	98.41	97.63	97.07

TM-21 Projection:

Test Duration: 6000 hours

Failures Observed: 0

α: 6.304E-06

β: 1.005

Reported L_{70}: >33000 hours

3.2 Data Set 1, 85°C, 4320mA (Forward Voltage)

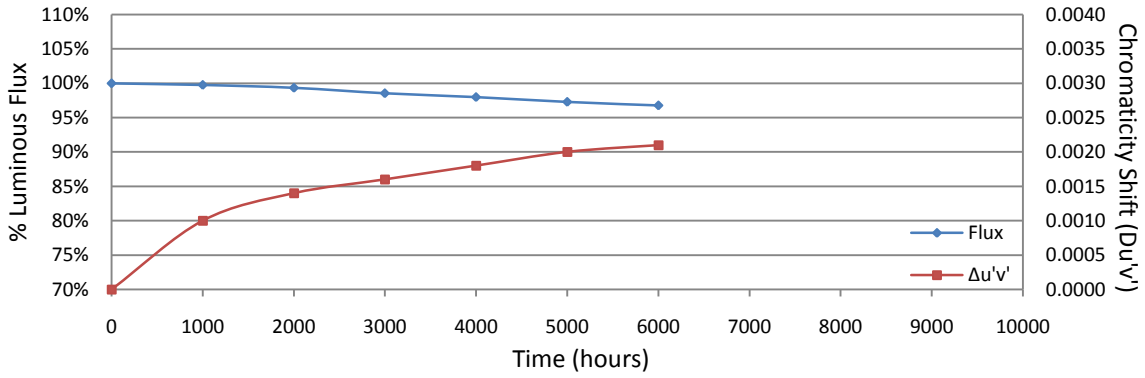
No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	56.35	56.75	57.74	57.65	57.71	57.65	57.01
2	56.40	56.86	57.44	57.48	57.57	57.48	57.44
3	56.84	57.12	56.93	57.40	58.34	56.93	56.93
4	56.84	57.41	57.44	57.71	58.36	57.44	57.44
5	56.31	56.74	57.01	57.59	57.75	57.01	57.01
6	56.37	56.82	57.11	57.36	57.71	57.11	57.44
7	56.31	56.68	56.74	57.70	57.55	56.74	56.93
8	56.77	57.19	57.28	57.82	57.64	57.28	57.44
9	56.30	56.79	56.98	57.76	57.48	57.76	57.74
10	56.20	56.75	57.41	57.30	57.10	57.30	57.44
11	56.30	56.68	56.93	57.80	57.23	57.80	56.93
12	56.73	57.42	57.02	57.69	58.13	57.69	57.44
Ave.	56.48	56.93	57.17	57.61	57.71	57.35	57.27
Med.	56.36	56.81	57.07	57.67	57.68	57.37	57.44
st dev	0.24	0.28	0.29	0.18	0.39	0.35	0.28
Min.	56.20	56.68	56.74	57.30	57.10	56.74	56.93
Max.	56.84	57.42	57.74	57.82	58.36	57.80	57.74

3.3 Data Set 1, 85°C, 4320mA (Color Rendering Index)

No.	Color Rendering Index						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	93.50	92.88	93.05	92.86	91.93	92.86	93.05
2	92.99	92.49	92.86	92.70	92.74	92.70	92.86
3	92.79	93.06	92.91	92.82	92.44	92.82	92.91
4	92.89	92.34	92.98	92.78	92.62	92.78	92.98
5	92.94	92.56	92.34	92.86	92.75	92.86	92.34
6	93.35	92.42	92.98	92.50	92.88	92.50	92.98
7	93.02	93.35	92.23	92.68	92.32	92.68	92.23
8	92.83	92.35	92.68	92.01	92.80	92.01	92.68
9	92.81	92.43	92.68	92.70	92.44	92.70	92.68
10	92.02	92.55	92.87	93.18	92.94	93.18	93.05
11	93.06	92.68	92.86	91.79	92.83	91.79	92.86
12	92.72	92.23	92.88	92.76	93.11	92.76	92.91
Ave.	92.91	92.61	92.78	92.64	92.65	92.64	92.79
Med.	92.92	92.52	92.87	92.73	92.75	92.73	92.89
st dev	0.36	0.33	0.26	0.38	0.32	0.38	0.27
Min.	92.02	92.23	92.23	91.79	91.93	91.79	92.23
Max.	93.50	93.35	93.05	93.18	93.11	93.18	93.05

3.4 Data Set 1, 85°C, 4320mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2615	0.5262	2726	0.0010	0.0015	0.0017	0.0019	0.0022	0.0019
2	0.2611	0.5266	2732	0.0012	0.0019	0.0022	0.0025	0.0021	0.0023
3	0.2604	0.5262	2750	0.0011	0.0013	0.0014	0.0015	0.0016	0.0017
4	0.2610	0.5269	2734	0.0010	0.0017	0.0017	0.0018	0.0022	0.0021
5	0.2608	0.5269	2738	0.0009	0.0014	0.0015	0.0017	0.0020	0.0023
6	0.2610	0.5266	2734	0.0009	0.0012	0.0015	0.0017	0.0017	0.0021
7	0.2606	0.5270	2742	0.0009	0.0012	0.0016	0.0020	0.0018	0.0020
8	0.2609	0.5276	2732	0.0011	0.0013	0.0016	0.0018	0.0023	0.0022
9	0.2610	0.5268	2734	0.0010	0.0012	0.0014	0.0016	0.0018	0.0018
10	0.2616	0.5263	2724	0.0009	0.0014	0.0017	0.0021	0.0025	0.0030
11	0.2608	0.5265	2740	0.0009	0.0009	0.0011	0.0012	0.0015	0.0017
12	0.2610	0.5277	2730	0.0010	0.0014	0.0017	0.0020	0.0020	0.0022
Ave.	0.2610	0.5268	2735	0.0010	0.0014	0.0016	0.0018	0.0020	0.0021
Med.	0.2610	0.5267	2734	0.0010	0.0014	0.0016	0.0018	0.0020	0.0021
st dev	0.0003	0.0005	7	0.0001	0.0002	0.0003	0.0003	0.0003	0.0004
Min.	0.2604	0.5262	2724	0.0009	0.0009	0.0011	0.0012	0.0015	0.0017
Max.	0.2616	0.5277	2750	0.0012	0.0019	0.0022	0.0025	0.0025	0.0030



3.5 Data Set 2, 115°C, 4320mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
13	25207.19	99.89	99.36	97.98	97.22	96.35	95.67
14	25256.42	99.12	98.82	97.39	96.53	96.03	95.38
15	25144.27	99.95	99.57	98.25	97.52	96.35	95.51
16	25095.34	99.98	99.26	98.34	97.49	96.34	95.23
17	25249.13	99.60	99.13	98.12	97.38	96.28	95.39
18	24920.58	99.96	99.55	98.28	97.41	96.36	95.46
19	25200.20	99.66	99.18	97.92	96.99	96.32	95.50
20	25208.30	99.94	99.21	97.72	96.84	96.31	95.58
21	25025.44	99.90	99.44	97.97	97.25	96.55	95.56
22	24948.54	99.59	99.34	97.90	97.14	96.15	95.62
23	24990.49	99.61	99.38	98.36	97.68	96.35	95.61
24	25018.45	99.13	98.60	97.47	96.77	95.91	94.96
Ave.	25105.36	99.69	99.24	97.97	97.19	96.27	95.46
Med.	25119.81	99.77	99.30	97.98	97.24	96.33	95.51
st dev	120.96	0.3068	0.2845	0.3239	0.3455	0.1699	0.1978
Min.	24920.58	99.12	98.60	97.39	96.53	95.91	94.96
Max.	25256.42	99.98	99.57	98.36	97.68	96.55	95.67

TM-21 Projection:

Test Duration: 6000 hours

Failures Observed: 0

α: 9.027E-06

β: 1.008

Reported L_{70}: >33000 hours

3.6 Data Set 2, 115°C, 4320mA (Forward Voltage)

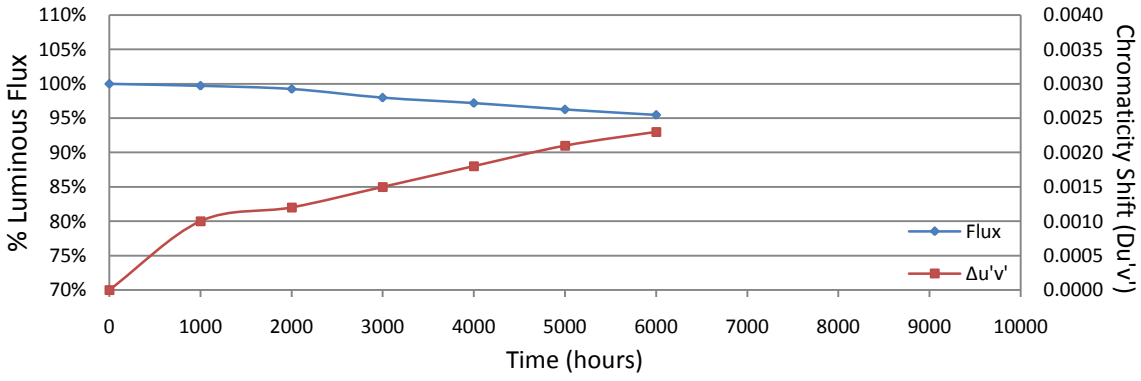
No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
13	56.75	57.27	57.11	57.29	57.54	57.29	57.11
14	56.54	57.09	56.79	57.66	57.12	57.66	56.79
15	56.84	57.26	57.14	57.37	57.48	57.37	57.14
16	56.27	56.61	56.85	57.29	56.96	57.26	56.85
17	56.24	56.65	56.67	57.55	57.06	56.61	56.67
18	56.59	57.10	56.65	57.29	56.54	56.65	56.65
19	56.18	56.62	56.47	56.80	57.02	57.10	56.47
20	56.11	56.73	57.37	57.44	57.07	56.62	57.37
21	56.59	57.28	56.88	57.51	56.49	56.73	56.88
22	56.56	57.02	56.69	57.35	57.01	57.35	56.79
23	56.64	57.21	56.57	57.00	56.14	57.00	57.14
24	56.67	56.14	56.42	56.93	57.24	56.93	56.85
Ave.	56.50	56.92	56.80	57.29	56.97	57.05	56.89
Med.	56.58	57.06	56.74	57.32	57.04	57.05	56.85
st dev	0.24	0.36	0.29	0.26	0.41	0.35	0.25
Min.	56.11	56.14	56.42	56.80	56.14	56.61	56.47
Max.	56.84	57.28	57.37	57.66	57.54	57.66	57.37

3.7 Data Set 2, 115° C, 4320mA (Color Rendering Index)

No.	Color Rendering Index						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
13	92.87	92.66	92.52	93.71	92.87	93.71	92.52
14	93.27	92.55	92.36	93.46	92.77	93.46	92.36
15	92.99	92.39	92.41	92.19	92.67	92.19	92.41
16	93.02	92.40	92.38	93.02	92.99	93.02	92.38
17	92.86	92.55	92.00	92.86	93.09	92.86	92.07
18	93.01	92.57	92.17	92.26	92.81	93.22	92.17
19	92.26	92.68	92.10	93.25	92.78	92.93	92.10
20	93.22	92.49	92.55	92.98	92.57	92.76	92.55
21	92.93	92.04	92.03	93.28	92.76	92.63	92.03
22	92.76	92.25	92.10	93.06	92.27	93.02	92.41
23	92.63	92.21	92.10	92.63	92.98	92.86	92.38
24	92.76	92.45	91.89	92.88	92.63	93.22	92.00
Ave.	92.88	92.44	92.22	92.97	92.77	92.99	92.28
Med.	92.90	92.47	92.14	93.00	92.78	92.98	92.37
st dev	0.27	0.19	0.22	0.45	0.22	0.39	0.20
Min.	92.26	92.04	91.89	92.19	92.27	92.19	92.00
Max.	93.27	92.68	92.55	93.71	93.09	93.71	92.55

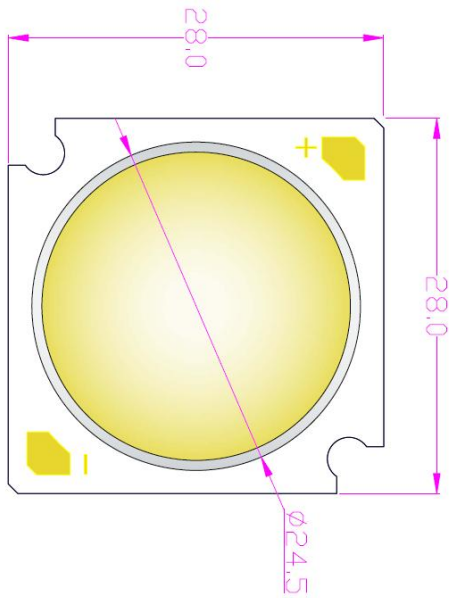
3.8 Data Set 2, 115°C, 4320mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
13	0.2608	0.5263	2740	0.0009	0.0013	0.0018	0.0027	0.0029	0.0029
14	0.2611	0.5263	2734	0.0011	0.0012	0.0017	0.0022	0.0025	0.0029
15	0.2610	0.5267	2734	0.0009	0.0011	0.0012	0.0013	0.0015	0.0015
16	0.2611	0.5270	2730	0.0011	0.0013	0.0015	0.0017	0.0021	0.0023
17	0.2610	0.5271	2734	0.0011	0.0013	0.0016	0.0019	0.0022	0.0024
18	0.2611	0.5270	2730	0.0009	0.0011	0.0013	0.0015	0.0021	0.0021
19	0.2614	0.5269	2724	0.0010	0.0012	0.0016	0.0019	0.0025	0.0028
20	0.2610	0.5271	2734	0.0009	0.0013	0.0015	0.0017	0.0018	0.0019
21	0.2607	0.5275	2738	0.0009	0.0014	0.0017	0.0020	0.0022	0.0029
22	0.2610	0.5274	2732	0.0010	0.0012	0.0016	0.0020	0.0022	0.0025
23	0.2608	0.5274	2736	0.0009	0.0011	0.0013	0.0015	0.0015	0.0017
24	0.2609	0.5274	2732	0.0010	0.0010	0.0010	0.0010	0.0014	0.0017
Ave.	0.2610	0.5270	2733	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023
Med.	0.2610	0.5271	2734	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023
st dev	0.0002	0.0004	4	0.0001	0.0001	0.0002	0.0004	0.0005	0.0005
Min.	0.2607	0.5263	2724	0.0009	0.0010	0.0010	0.0010	0.0014	0.0015
Max.	0.2614	0.5275	2740	0.0011	0.0014	0.0018	0.0027	0.0029	0.0029



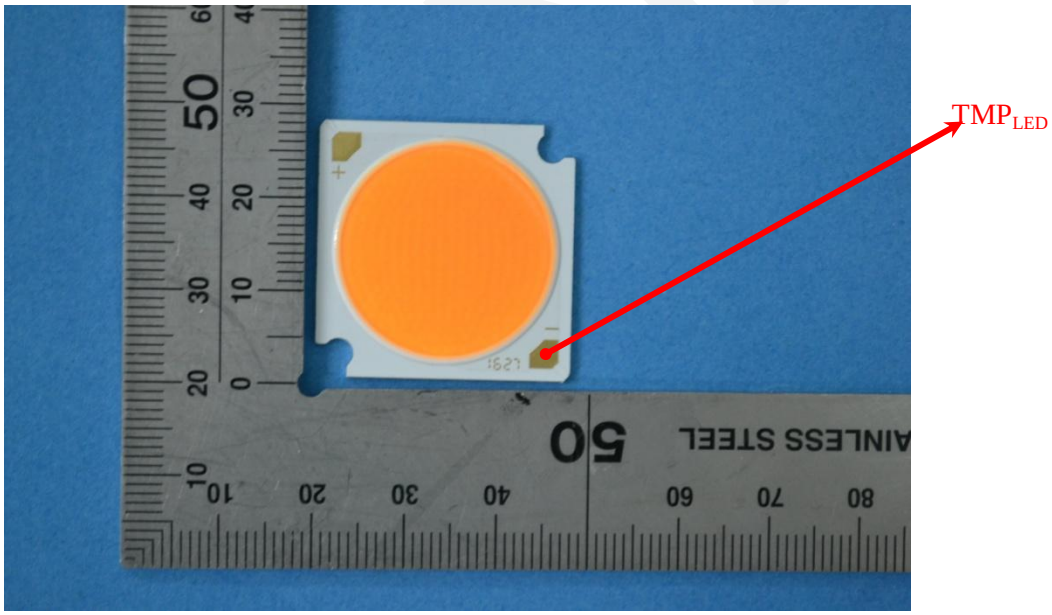
4 - EUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 EUT Photo



**********END OF REPORT**********