Test Report

Client Name	:	SHENZHEN XUANCAI ELECTRONIC CO.,LTD
Address	:	F Building MAOYUAN Industrial Park, XIAWEI Industrial Zone, GUANLAN Street, LONGHUA New DISE SHENZHEN, GUANGDONG, China
Product Name	:	2828 60W COB
Date	:	xxx

Shenzhen Anbotek Pengcheng Compliance Laboratory Limited

Report No.:	PCANL190802007-01
Product Description:	2828 60W COB
Model No.:	XC2824-M1210-A3080-F31
Test Initiation Date:	2018-07-14
Test Completion Date:	2019-08-16
Test Standard:	IES LM-80-15
Test Laboratory:	Shenzhen Anbotek Pengcheng Compliance Laboratory Limited
Testing location:	Zone B, 1/F., Building 2, Hengchangrong High Tech Industrial Park, Huangtian, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

Tested by **Reviewed by**

Lenin Ye / Lenin Ye Flora Zhang/ Flora Zhang

Anbotek Compliance Laboratory Limited * Approved *

Note: 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 Shenzhen Anbotek Pengcheng Compliance Laboratory Limited. 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.

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1 General Information

1.1 Product Description for Device under Test (DUT)

Part Number:	XC2824-M1210-A3080-F31
Part type:	COB Package
Nominal CCT:	3000K
Nominal CRI:	80
Nominal Input Power(W):	60W
Mean Initial Forward Voltage(V):	36V
Nominal LED Die Area(mm^2):	0.392 mm^2
Average Current per LED Die(mA):	150 mA
Average current density per LED Die(mA/mm^2):	382.653 mA/mm^2
Average power per LED Die(W):	0.5 W
Average power density per LED Die(W/mm^2):	1.276 W/mm^2
Minimum Spacing from Die Edge to Die Edge(mm):	0..9 mm

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:

2828 60W COB, 2828 54W COB，2828 50W COB，2828 48W COB，2828 42W COB，2828 40W COB，2828 36W COB，2828 30W COB，2828 24W COB，2828 20W COB

CCT: 3000K, 3500K, 4000K, 5000K, 6000K, 6500K

1.2 Standards Used

IESNA LM-80-15: IES Approved Method for Measuring Luminous Flux and Color Maintenance of LED, Arrays and Modules.

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 NVLAP)

1.3 Test Facility Description

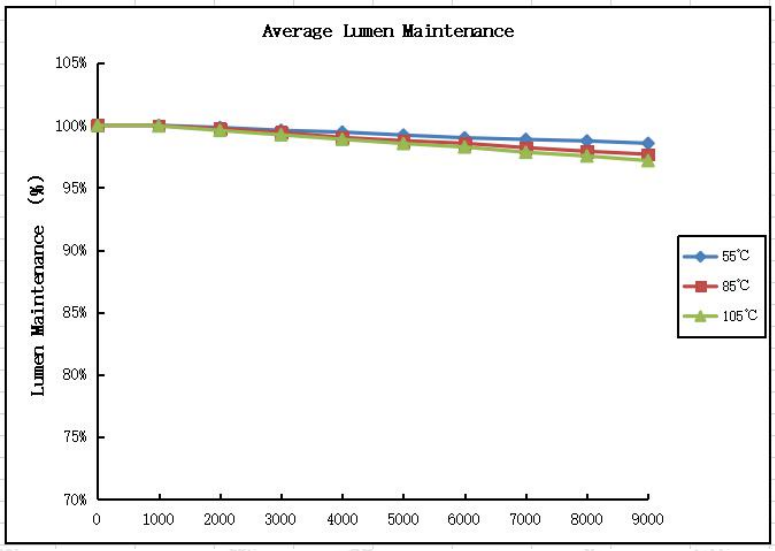
The test facility used by Shenzhen Anbotek Pengcheng Compliance Laboratory Limited is located at Zone B, 1/F., Building 2, Hengchangrong High-Tech Industrial Park, Huangtian, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

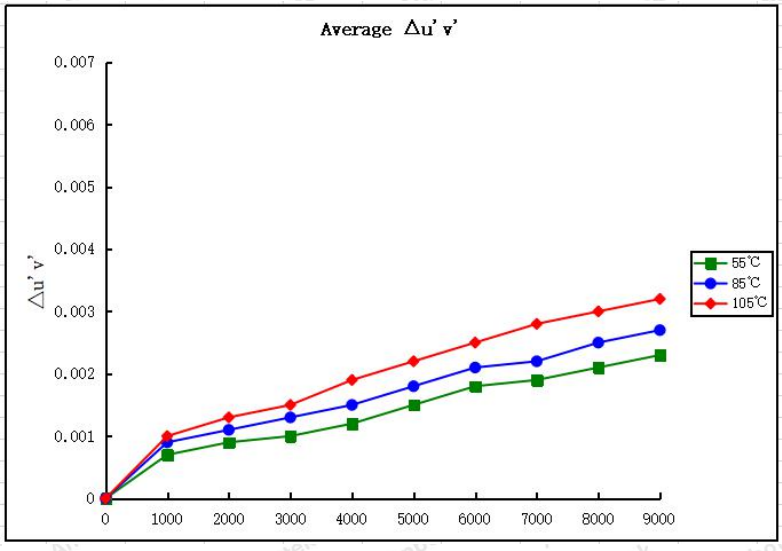
1.4 Test Equipment List

Device	Manufacture	Model No.	Serial No.	Calibration Date	Calibration Due Date
Digital Power Meter	YOKOGAWA	WT210	SE-074	2019-06-06	2020-06-05
LM-80 Aging Test System	KEYI	KY-3X-LH60	SE-564	2019-06-06	2020-06-05
DC Power Supply	EVERFINE	WY605	SE-605	2019-06-06	2020-06-05
Standard Lamp	EVERFINE	D062	SE-606	2019-06-06	2020-06-05
Spectrum Analyzer	EVERFINE	HAAS-2000	SE-607	2019-06-06	2020-06-05
Integrating Sphere (0.5m)	EVERFINE	AIS-2	SE-608	Before use	Before use

2 Summary of Test Result

Data Set	1	2	3
Nominal case temperatures	55°C	85°C	105°C
Drive Current	1500 mA	1500 mA	1500 mA
Condition	Ts=54.8°C Ta=54.6°C R.H.＜65% IF=1500 mA	Ts=84.7°C Ta=84.5°C R.H.＜65% IF=1500 mA	Ts=104.9°C Ta=104.5°C R.H.＜65% IF=1500 mA
sample size	25	25	25
Duration (in Hours)	9000	9000	9000
Intervals (in Hours)	1000	1000	1000
Failures Observed	0	0	0
Average Lumen Maintenance at 9000h	98.56%	97.68%	97.17%
Average Chromaticity Shift at 9000h	0.0023	0.0027	0.0032
α	1.743E-06	2.803E-06	3.489E-06
β	1.001	1.002	1.003
Reported L_{70}(9000h) TM-21 Lifetime	>54000	>54000	>54000
Reported L_{80}(9000h) TM-21 Lifetime	>54000	>54000	>54000
Reported L_{90}(9000h) TM-21 Lifetime	>54000	38000	31000





3 Test Method

3.1 Photometric and Electrical Measurement

Total light output (luminous flux) for the 25°C±1°C ambient temperature conditions is measured using a integrating sphere. Each LED is operated at rated drive current (DC Mode).

The total uncertainty of the light output measurements is estimated, at the 95% confidence level, not to exceed±1.6% over the wavelength range 380-800nm.

3.2 Season the LED from 0 hours to 9000 hours

Three LM-80 aging measurement system Temperature Chambers are using for Seasoning, and the temperature is set to 55°C, 85°C, 105°C (manufacture defined), the airflow is minimum to keep the uniformity to temperature. LED are operated steady state (no cycling) for a period of 9000 hours, checked the lumen flux and Chromaticity Shift every 1000 hours. The samples are inspected at regular intervals (24 hours) throughout the 9000 hours. The time and date of failure of each lamp is recorded. The actual elapsed time for each light LED is in hour.

4 Test Data

4.1 Data Set 1: 55°C, 1500 mA (Lumen Maintenance)

Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	54.8°C
Ambient Temperature:	54.6°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Lumen Maintenance (%)

Sample No.	VF(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
L1	35.89	8259.7	99.99%	99.84%	99.59%	99.51%	99.32%	98.97%	98.86%	98.76%	98.63%
L2	35.65	8266.3	99.99%	99.77%	99.64%	99.49%	99.26%	99.03%	98.90%	98.70%	98.52%
L3	35.71	8255.5	100.02%	99.81%	99.63%	99.41%	99.13%	98.97%	98.85%	98.78%	98.64%
L4	35.69	8283.6	99.99%	99.83%	99.60%	99.50%	99.14%	99.01%	98.89%	98.74%	98.52%
L5	35.75	8276.9	100.01%	99.85%	99.63%	99.46%	99.33%	98.97%	98.90%	98.71%	98.51%
L6	35.82	8258.7	100.02%	99.88%	99.61%	99.42%	99.29%	99.00%	98.90%	98.72%	98.56%
L7	35.79	8270.8	100.01%	99.82%	99.57%	99.43%	99.16%	98.95%	98.91%	98.71%	98.49%
L8	35.83	8268.1	100.02%	99.89%	99.65%	99.49%	99.26%	99.03%	98.87%	98.75%	98.63%
L9	35.77	8292.2	100.00%	99.88%	99.56%	99.39%	99.20%	98.98%	98.87%	98.79%	98.52%
L10	35.68	8273.6	99.99%	99.82%	99.57%	99.39%	99.28%	98.96%	98.85%	98.69%	98.62%
L11	35.95	8284.7	100.02%	99.78%	99.58%	99.52%	99.29%	99.02%	98.89%	98.78%	98.51%
L12	35.79	8245.5	99.99%	99.82%	99.59%	99.46%	99.13%	99.01%	98.84%	98.71%	98.61%
L13	35.86	8257.4	100.01%	99.85%	99.59%	99.45%	99.26%	99.01%	98.87%	98.78%	98.55%
L14	35.89	8278.9	100.01%	99.84%	99.56%	99.41%	99.12%	99.00%	98.84%	98.78%	98.53%
L15	35.87	8264.3	99.98%	99.78%	99.60%	99.46%	99.27%	99.06%	98.85%	98.77%	98.59%
L16	35.74	8249.7	100.01%	99.85%	99.61%	99.49%	99.18%	99.05%	98.84%	98.73%	98.58%
L17	35.63	8255.6	100.00%	99.83%	99.62%	99.40%	99.22%	99.00%	98.88%	98.78%	98.50%
L18	35.86	8281.5	100.01%	99.77%	99.62%	99.39%	99.20%	98.97%	98.91%	98.73%	98.55%
L19	35.75	8252.7	100.00%	99.86%	99.59%	99.51%	99.17%	98.99%	98.88%	98.78%	98.59%
L20	35.88	8287.1	99.98%	99.79%	99.56%	99.47%	99.27%	98.95%	98.86%	98.76%	98.57%
L21	35.91	8254.4	99.99%	99.83%	99.59%	99.50%	99.26%	98.99%	98.88%	98.75%	98.52%
L22	35.82	8275.7	100.00%	99.79%	99.63%	99.49%	99.14%	99.02%	98.86%	98.77%	98.58%
L23	35.62	8286.3	99.99%	99.82%	99.61%	99.44%	99.14%	98.99%	98.87%	98.76%	98.57%
L24	35.58	8257.9	100.00%	99.83%	99.62%	99.50%	99.15%	98.97%	98.89%	98.72%	98.52%
L25	35.77	8269.5	100.01%	99.86%	99.62%	99.45%	99.30%	98.99%	98.90%	98.72%	98.55%
AV	**35.78**	**8268.26**	**100.00%**	**99.83%**	**99.60%**	**99.46%**	**99.22%**	**99.00%**	**98.87%**	**98.75%**	**98.56%**
Median	35.79	8268.10	100.00%	99.83%	99.60%	99.46%	99.22%	98.99%	98.87%	98.75%	98.55%
MIN	35.58	8245.50	99.98%	99.77%	99.56%	99.39%	99.12%	98.95%	98.84%	98.69%	98.49%
MAX	35.95	8292.20	100.02%	99.89%	99.65%	99.52%	99.33%	99.06%	98.91%	98.79%	98.64%
STDEV	0.10	13.30	0.0001	0.0003	0.0003	0.0004	0.0007	0.0003	0.0002	0.0003	0.0004
N	25	25	25	25	25	25	25	25	25	25	25

4.2 Data Set 1: 55°C, 1500 mA (Chromaticity Shift)

Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	54.8°C
Ambient Temperature:	54.6°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Chromaticity Shift (△ u'v')

Sample No.	u'	v'	CCT(K)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs
L1	0.2475	0.5213	3096	0.0007	0.0010	0.0010	0.0012	0.0015	0.0017	0.0021	0.0021	0.0024
L2	0.2487	0.5201	3088	0.0007	0.0008	0.0010	0.0013	0.0017	0.0017	0.0017	0.0023	0.0025
L3	0.2474	0.5212	3092	0.0007	0.0009	0.0011	0.0011	0.0017	0.0019	0.0019	0.0020	0.0022
L4	0.2471	0.5213	3065	0.0006	0.0008	0.0010	0.0012	0.0014	0.0019	0.0021	0.0022	0.0023
L5	0.2469	0.5215	3084	0.0007	0.0008	0.0009	0.0011	0.0015	0.0018	0.0018	0.0021	0.0021
L6	0.2473	0.5211	3092	0.0007	0.0008	0.0009	0.0013	0.0016	0.0016	0.0020	0.0024	0.0024
L7	0.2474	0.5212	3075	0.0007	0.0011	0.0010	0.0014	0.0016	0.0018	0.0021	0.0023	0.0022
L8	0.2478	0.5213	3083	0.0007	0.0010	0.0010	0.0012	0.0014	0.0019	0.0017	0.0023	0.0021
L9	0.2483	0.5204	3088	0.0008	0.0008	0.0011	0.0012	0.0013	0.0020	0.0018	0.0020	0.0024
L10	0.2472	0.5212	3074	0.0006	0.0010	0.0011	0.0013	0.0013	0.0018	0.0019	0.0024	0.0021
L11	0.2479	0.5209	3056	0.0007	0.0007	0.0010	0.0013	0.0015	0.0019	0.0018	0.0019	0.0023
L12	0.2485	0.5202	3078	0.0007	0.0011	0.0011	0.0012	0.0016	0.0019	0.0021	0.0020	0.0022
L13	0.2472	0.5213	3065	0.0008	0.0009	0.0011	0.0012	0.0013	0.0017	0.0018	0.0021	0.0023
L14	0.2476	0.5210	3087	0.0007	0.0009	0.0012	0.0012	0.0016	0.0019	0.0020	0.0021	0.0024
L15	0.2471	0.5215	3081	0.0007	0.0007	0.0010	0.0011	0.0014	0.0020	0.0017	0.0019	0.0026
L16	0.2474	0.5212	3075	0.0007	0.0009	0.0010	0.0014	0.0015	0.0016	0.0021	0.0022	0.0024
L17	0.2472	0.5212	3074	0.0007	0.0007	0.0009	0.0012	0.0016	0.0019	0.0021	0.0023	0.0024
L18	0.2479	0.5209	3056	0.0007	0.0011	0.0011	0.0012	0.0013	0.0017	0.0019	0.0021	0.0021
L19	0.2485	0.5202	3078	0.0008	0.0010	0.0011	0.0012	0.0015	0.0018	0.0021	0.0024	0.0025
L20	0.2474	0.5211	3093	0.0007	0.0011	0.0011	0.0013	0.0015	0.0018	0.0020	0.0020	0.0022
L21	0.2472	0.5213	3065	0.0007	0.0009	0.0010	0.0011	0.0015	0.0016	0.0021	0.0021	0.0022
L22	0.2471	0.5213	3065	0.0007	0.0010	0.0010	0.0012	0.0015	0.0017	0.0018	0.0023	0.0024
L23	0.2469	0.5215	3084	0.0007	0.0008	0.0011	0.0012	0.0017	0.0017	0.0018	0.0020	0.0025
L24	0.2473	0.5211	3092	0.0007	0.0009	0.0010	0.0011	0.0015	0.0019	0.0019	0.0020	0.0023
L25	0.2476	0.5210	3087	0.0007	0.0008	0.0010	0.0012	0.0015	0.0018	0.0020	0.0021	0.0022
AV	**0.2475**	**0.5211**	**3079**	**0.0007**	**0.0009**	**0.0010**	**0.0012**	**0.0015**	**0.0018**	**0.0019**	**0.0021**	**0.0023**
Median	0.2474	0.5212	3081	0.0007	0.0009	0.0010	0.0012	0.0015	0.0018	0.0019	0.0021	0.0023
MIN	0.2469	0.5201	3056	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0021
MAX	0.2487	0.5215	3096	0.0008	0.0011	0.0012	0.0014	0.0017	0.0020	0.0021	0.0024	0.0026
STDEV	0.0005	0.0004	11.69	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001
N	25	25	25	25	25	25	25	25	25	25	25	25

4.3 Data Set 2: 85°C, 1500 mA (Lumen Maintenance)

Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	84.7°C
Ambient Temperature:	84.5°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Lumen Maintenance (%)

Sample No.	VF(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
L26	35.88	8287.1	100.00%	99.70%	99.56%	98.94%	98.78%	98.58%	98.34%	97.90%	97.70%
L27	35.91	8254.4	99.97%	99.72%	99.50%	99.03%	98.72%	98.61%	98.05%	97.90%	97.68%
L28	35.82	8275.7	99.96%	99.65%	99.53%	98.96%	98.74%	98.50%	98.28%	97.98%	97.74%
L29	35.62	8286.3	99.99%	99.81%	99.33%	99.09%	98.76%	98.50%	98.31%	97.99%	97.64%
L30	35.58	8257.9	100.00%	99.68%	99.47%	98.95%	98.76%	98.59%	98.19%	97.80%	97.67%
L31	35.77	8269.5	99.95%	99.85%	99.36%	98.93%	98.72%	98.49%	98.21%	97.97%	97.67%
L32	35.86	8257.4	99.96%	99.63%	99.49%	99.18%	98.80%	98.53%	98.19%	97.86%	97.64%
L33	35.89	8278.9	99.98%	99.66%	99.52%	98.92%	98.79%	98.59%	98.32%	97.83%	97.67%
L34	35.87	8264.3	99.97%	99.64%	99.51%	99.08%	98.82%	98.61%	98.31%	98.04%	97.65%
L35	35.74	8249.7	99.98%	99.71%	99.55%	99.26%	98.72%	98.62%	98.26%	97.97%	97.70%
L36	35.63	8255.6	99.97%	99.79%	99.42%	99.23%	98.83%	98.59%	98.11%	97.93%	97.64%
L37	35.86	8281.5	99.96%	99.70%	99.42%	99.28%	98.80%	98.52%	98.12%	98.04%	97.72%
L38	35.75	8252.7	99.99%	99.80%	99.43%	98.91%	98.83%	98.49%	98.08%	97.94%	97.64%
L39	35.89	8278.9	99.96%	99.67%	99.33%	99.18%	98.81%	98.57%	98.23%	97.83%	97.74%
L40	35.77	8292.2	99.98%	99.66%	99.34%	98.94%	98.72%	98.61%	98.35%	97.87%	97.67%
L41	35.68	8273.6	99.99%	99.82%	99.48%	98.89%	98.77%	98.56%	98.18%	97.84%	97.74%
L42	35.65	8266.3	99.97%	99.74%	99.42%	98.90%	98.80%	98.59%	98.31%	98.02%	97.66%
L43	35.71	8255.5	99.99%	99.84%	99.37%	98.93%	98.72%	98.50%	98.07%	97.96%	97.65%
L44	35.69	8283.6	99.99%	99.76%	99.34%	99.20%	98.75%	98.58%	98.16%	97.94%	97.68%
L45	35.75	8276.9	100.00%	99.67%	99.47%	98.93%	98.75%	98.52%	98.10%	97.89%	97.69%
L46	35.82	8258.7	99.99%	99.71%	99.55%	98.99%	98.78%	98.59%	98.26%	97.90%	97.68%
L47	35.79	8270.8	99.97%	99.71%	99.51%	98.99%	98.73%	98.51%	98.14%	97.93%	97.74%
L48	35.83	8268.1	99.97%	99.68%	99.35%	99.08%	98.76%	98.50%	98.28%	97.99%	97.64%
L49	35.63	8255.6	99.99%	99.76%	99.34%	99.07%	98.76%	98.58%	98.21%	97.87%	97.64%
L50	35.86	8281.5	99.97%	99.85%	99.37%	98.94%	98.75%	98.57%	98.20%	97.89%	97.67%
AV	**35.77**	**8269.31**	**99.98%**	**99.73%**	**99.44%**	**99.03%**	**98.77%**	**98.56%**	**98.21%**	**97.92%**	**97.68%**
Median	35.77	8269.50	99.98%	99.71%	99.43%	98.99%	98.76%	98.57%	98.21%	97.93%	97.67%
MIN	35.58	8249.70	99.95%	99.63%	99.33%	98.89%	98.72%	98.49%	98.05%	97.80%	97.64%
MAX	35.91	8292.20	100.00%	99.85%	99.56%	99.28%	98.83%	98.62%	98.35%	98.04%	97.74%
STDEV	0.10	12.59	0.0001	0.0007	0.0008	0.0012	0.0004	0.0005	0.0009	0.0007	0.0003
N	25	25	25	25	25	25	25	25	25	25	25

4.4 Data Set 2: 85°C, 1500 mA (Chromaticity Shift)

Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	84.7°C
Ambient Temperature:	84.5°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Chromaticity Shift (△ u'v')

Sample No.	u'	v'	CCT(K)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs
L26	0.2471	0.5213	3065	0.0010	0.0011	0.0013	0.0015	0.0017	0.0021	0.0022	0.0026	0.0025
L27	0.2469	0.5215	3084	0.0008	0.0010	0.0011	0.0016	0.0020	0.0023	0.0021	0.0024	0.0028
L28	0.2473	0.5211	3092	0.0010	0.0011	0.0012	0.0017	0.0019	0.0024	0.0019	0.0028	0.0030
L29	0.2474	0.5212	3075	0.0010	0.0010	0.0011	0.0015	0.0017	0.0021	0.0022	0.0026	0.0029
L30	0.2472	0.5213	3065	0.0009	0.0011	0.0014	0.0014	0.0018	0.0020	0.0020	0.0025	0.0026
L31	0.2476	0.5210	3087	0.0009	0.0010	0.0013	0.0017	0.0018	0.0019	0.0021	0.0025	0.0023
L32	0.2471	0.5215	3081	0.0009	0.0010	0.0012	0.0015	0.0018	0.0019	0.0025	0.0027	0.0026
L33	0.2474	0.5212	3075	0.0010	0.0010	0.0011	0.0014	0.0016	0.0023	0.0025	0.0023	0.0027
L34	0.2472	0.5212	3074	0.0009	0.0011	0.0012	0.0016	0.0019	0.0019	0.0022	0.0022	0.0027
L35	0.2479	0.5209	3056	0.0010	0.0012	0.0014	0.0014	0.0019	0.0023	0.0025	0.0024	0.0026
L36	0.2485	0.5202	3078	0.0009	0.0010	0.0011	0.0014	0.0019	0.0018	0.0021	0.0021	0.0023
L37	0.2474	0.5211	3093	0.0009	0.0010	0.0013	0.0016	0.0017	0.0022	0.0024	0.0028	0.0030
L38	0.2476	0.5210	3078	0.0010	0.0010	0.0014	0.0016	0.0018	0.0018	0.0020	0.0027	0.0030
L39	0.2471	0.5215	3093	0.0009	0.0011	0.0015	0.0016	0.0018	0.0022	0.0024	0.0026	0.0024
L40	0.2472	0.5213	3065	0.0009	0.0012	0.0014	0.0014	0.0020	0.0022	0.0021	0.0026	0.0026
L41	0.2471	0.5213	3065	0.0010	0.0011	0.0014	0.0017	0.0018	0.0023	0.0022	0.0024	0.0026
L42	0.2469	0.5215	3084	0.0008	0.0010	0.0015	0.0015	0.0017	0.0019	0.0023	0.0021	0.0030
L43	0.2468	0.5217	3065	0.0009	0.0011	0.0011	0.0016	0.0019	0.0022	0.0020	0.0027	0.0024
L44	0.2479	0.5203	3087	0.0010	0.0011	0.0013	0.0014	0.0018	0.0023	0.0021	0.0024	0.0030
L45	0.2485	0.5202	3078	0.0010	0.0011	0.0012	0.0014	0.0016	0.0024	0.0023	0.0027	0.0026
L46	0.2474	0.5211	3093	0.0009	0.0010	0.0011	0.0014	0.0016	0.0019	0.0021	0.0024	0.0024
L47	0.2472	0.5213	3065	0.0009	0.0010	0.0012	0.0016	0.0020	0.0022	0.0021	0.0025	0.0027
L48	0.2478	0.5213	3083	0.0009	0.0011	0.0012	0.0016	0.0019	0.0024	0.0020	0.0026	0.0028
L49	0.2483	0.5206	3078	0.0010	0.0010	0.0012	0.0016	0.0017	0.0023	0.0020	0.0027	0.0030
L50	0.2475	0.5211	3093	0.0009	0.0010	0.0011	0.0015	0.0017	0.0021	0.0020	0.0026	0.0026
AV	**0.2475**	**0.5211**	**3078**	**0.0009**	**0.0011**	**0.0013**	**0.0015**	**0.0018**	**0.0021**	**0.0022**	**0.0025**	**0.0027**
Median	0.2474	0.5212	3078	0.0009	0.0010	0.0012	0.0015	0.0018	0.0022	0.0021	0.0026	0.0026
MIN	0.2468	0.5202	3056	0.0008	0.0010	0.0011	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023
MAX	0.2485	0.5217	3093	0.0010	0.0012	0.0015	0.0017	0.0020	0.0024	0.0025	0.0028	0.0030
STDEV	0.0005	0.0004	10.98	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
N	25	25	25	25	25	25	25	25	25	25	25	25

4.5 Data Set 3: 105°C, 1500 mA (Lumen Maintenance)

Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	104.9°C
Ambient Temperature:	104.5°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Lumen Maintenance (%)

Sample No.	VF(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
L51	35.87	8264.3	99.99%	99.62%	99.25%	98.82%	98.61%	98.28%	97.80%	97.51%	97.08%
L52	35.74	8249.7	99.96%	99.58%	99.16%	98.85%	98.49%	98.36%	97.78%	97.59%	97.28%
L53	35.63	8255.6	99.90%	99.52%	99.12%	98.76%	98.69%	98.25%	97.92%	97.57%	97.26%
L54	35.86	8281.5	99.98%	99.73%	99.16%	98.84%	98.45%	98.16%	97.91%	97.49%	97.10%
L55	35.75	8252.7	99.98%	99.62%	99.34%	98.92%	98.51%	98.36%	97.89%	97.56%	97.27%
L56	35.89	8278.9	99.98%	99.60%	99.39%	99.05%	98.46%	98.33%	97.77%	97.52%	97.13%
L57	35.77	8292.2	99.95%	99.53%	99.38%	98.89%	98.46%	98.29%	97.84%	97.60%	97.27%
L58	35.89	8278.9	99.89%	99.54%	99.32%	98.84%	98.49%	98.28%	97.81%	97.61%	97.19%
L59	35.87	8264.3	99.94%	99.73%	99.37%	98.99%	98.57%	98.28%	97.81%	97.59%	97.13%
L60	35.82	8275.7	99.91%	99.51%	99.38%	98.95%	98.55%	98.32%	97.87%	97.48%	97.11%
L61	35.79	8245.5	99.95%	99.49%	99.13%	99.00%	98.51%	98.26%	97.81%	97.53%	97.16%
L62	35.68	8273.6	99.91%	99.60%	99.14%	99.01%	98.50%	98.14%	97.84%	97.48%	97.29%
L63	35.95	8284.7	99.93%	99.65%	99.13%	98.79%	98.64%	98.11%	97.89%	97.59%	97.06%
L64	35.79	8245.5	100.00%	99.60%	99.42%	98.97%	98.68%	98.29%	97.92%	97.52%	97.08%
L65	35.86	8281.5	99.93%	99.51%	99.12%	98.93%	98.50%	98.34%	97.84%	97.51%	97.08%
L66	35.75	8252.7	99.99%	99.55%	99.12%	98.87%	98.51%	98.25%	97.76%	97.57%	97.09%
L67	35.88	8287.1	99.89%	99.67%	99.28%	98.77%	98.52%	98.15%	97.77%	97.55%	97.15%
L68	35.91	8254.4	99.98%	99.60%	99.30%	98.91%	98.58%	98.32%	97.89%	97.56%	97.13%
L69	35.68	8273.6	99.94%	99.50%	99.24%	98.86%	98.67%	98.24%	97.87%	97.56%	97.28%
L70	35.68	8273.6	99.98%	99.50%	99.19%	98.82%	98.47%	98.14%	97.80%	97.49%	97.05%
L71	35.95	8284.7	99.97%	99.58%	99.20%	98.84%	98.59%	98.33%	97.79%	97.54%	97.20%
L72	35.79	8245.5	99.91%	99.55%	99.13%	98.78%	98.66%	98.33%	97.80%	97.58%	97.27%
L73	35.86	8257.4	99.94%	99.71%	99.15%	98.81%	98.50%	98.19%	97.91%	97.56%	97.23%
L74	35.75	8276.9	99.98%	99.64%	99.18%	98.88%	98.50%	98.28%	97.89%	97.50%	97.13%
L75	35.86	8257.4	99.98%	99.62%	99.35%	98.97%	98.50%	98.33%	97.86%	97.55%	97.15%
AV	**35.81**	**8267.52**	**99.95%**	**99.59%**	**99.24%**	**98.88%**	**98.54%**	**98.26%**	**97.84%**	**97.54%**	**97.17%**
Median	35.82	8273.60	99.95%	99.60%	99.20%	98.87%	98.51%	98.28%	97.84%	97.55%	97.15%
MIN	35.63	8245.50	99.89%	99.49%	99.12%	98.76%	98.45%	98.11%	97.76%	97.48%	97.05%
MAX	35.95	8292.20	100.00%	99.73%	99.42%	99.05%	98.69%	98.36%	97.92%	97.61%	97.29%
STDEV	0.09	14.79	0.0003	0.0007	0.0011	0.0008	0.0008	0.0008	0.0005	0.0004	0.0008
N	25	25	25	25	25	25	25	25	25	25	25

4.6 Data Set 3: 105°C, 1500 mA (Chromaticity Shift)

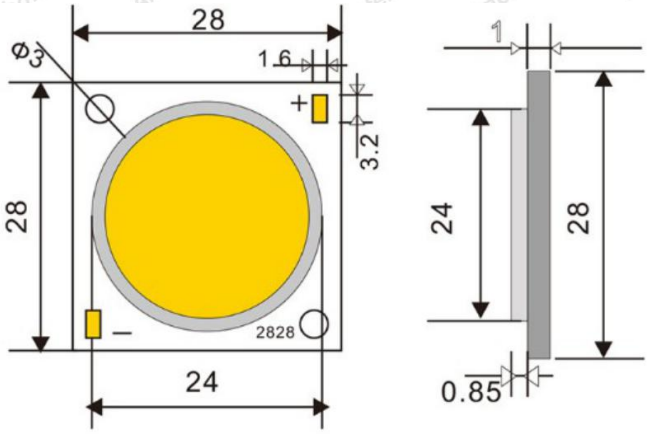
Description of Light Sources Tested:	XC2824-M1210-A3080-F31
Case Temperature:	104.9°C
Ambient Temperature:	104.5°C
Drive Current:	1500 mA
Measure Current:	1500 mA
Failures Observed:	None

Chromaticity Shift (△ u'v')

Sample No.	u'	v'	CCT(K)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs
L51	0.2472	0.5213	3065	0.0011	0.0012	0.0014	0.0021	0.0023	0.0026	0.0029	0.0026	0.0029
L52	0.2479	0.5209	3056	0.0009	0.0013	0.0016	0.0018	0.0022	0.0026	0.0027	0.0029	0.0034
L53	0.2485	0.5202	3078	0.0009	0.0014	0.0015	0.0019	0.0020	0.0023	0.0029	0.0032	0.0031
L54	0.2474	0.5211	3093	0.0009	0.0013	0.0016	0.0019	0.0023	0.0026	0.0030	0.0033	0.0033
L55	0.2472	0.5213	3065	0.0009	0.0013	0.0014	0.0018	0.0022	0.0025	0.0024	0.0034	0.0032
L56	0.2471	0.5213	3065	0.0009	0.0013	0.0016	0.0019	0.0020	0.0024	0.0030	0.0034	0.0032
L57	0.2469	0.5215	3084	0.0010	0.0013	0.0015	0.0021	0.0019	0.0025	0.0031	0.0027	0.0033
L58	0.2473	0.5211	3092	0.0010	0.0013	0.0015	0.0019	0.0024	0.0024	0.0028	0.0028	0.0031
L59	0.2481	0.5208	3084	0.0010	0.0013	0.0015	0.0020	0.0022	0.0023	0.0031	0.0027	0.0033
L60	0.2474	0.5212	3075	0.0009	0.0011	0.0016	0.0018	0.0021	0.0025	0.0027	0.0029	0.0033
L61	0.2483	0.5204	3088	0.0010	0.0011	0.0016	0.0020	0.0021	0.0026	0.0031	0.0033	0.0033
L62	0.2472	0.5212	3074	0.0010	0.0012	0.0015	0.0017	0.0023	0.0024	0.0030	0.0032	0.0031
L63	0.2474	0.5211	3093	0.0010	0.0012	0.0016	0.0017	0.0025	0.0024	0.0029	0.0028	0.0032
L64	0.2476	0.5210	3078	0.0011	0.0013	0.0015	0.0017	0.0020	0.0026	0.0030	0.0029	0.0031
L65	0.2468	0.5217	3065	0.0010	0.0014	0.0015	0.0020	0.0025	0.0026	0.0026	0.0029	0.0034
L66	0.2479	0.5203	3087	0.0010	0.0014	0.0014	0.0018	0.0024	0.0025	0.0026	0.0034	0.0036
L67	0.2485	0.5202	3078	0.0011	0.0012	0.0016	0.0018	0.0024	0.0023	0.0030	0.0033	0.0032
L68	0.2469	0.5215	3084	0.0010	0.0013	0.0014	0.0020	0.0024	0.0024	0.0028	0.0030	0.0029
L69	0.2473	0.5211	3092	0.0011	0.0012	0.0016	0.0020	0.0020	0.0024	0.0024	0.0031	0.0030
L70	0.2474	0.5212	3075	0.0009	0.0012	0.0016	0.0018	0.0025	0.0025	0.0023	0.0034	0.0034
L71	0.2472	0.5213	3065	0.0009	0.0011	0.0014	0.0021	0.0023	0.0023	0.0029	0.0026	0.0029
L72	0.2476	0.5210	3087	0.0010	0.0012	0.0015	0.0020	0.0023	0.0026	0.0028	0.0028	0.0034
L73	0.2471	0.5215	3081	0.0009	0.0013	0.0015	0.0018	0.0021	0.0026	0.0029	0.0031	0.0033
L74	0.2474	0.5212	3075	0.0009	0.0013	0.0016	0.0019	0.0022	0.0026	0.0030	0.0032	0.0032
L75	0.2472	0.5212	3074	0.0009	0.0013	0.0016	0.0018	0.0023	0.0025	0.0026	0.0033	0.0032
AV	**0.2475**	**0.5211**	**3078**	**0.0010**	**0.0013**	**0.0015**	**0.0019**	**0.0022**	**0.0025**	**0.0028**	**0.0030**	**0.0032**
Median	0.2474	0.5212	3078	0.0010	0.0013	0.0015	0.0019	0.0023	0.0025	0.0029	0.0031	0.0032
MIN	0.2468	0.5202	3056	0.0009	0.0011	0.0014	0.0017	0.0019	0.0023	0.0023	0.0026	0.0029
MAX	0.2485	0.5217	3093	0.0011	0.0014	0.0016	0.0021	0.0025	0.0026	0.0031	0.0034	0.0036
STDEV	0.0005	0.0004	10.43	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0002	0.0003	0.0002
N	25	25	25	25	25	25	25	25	25	25	25	25

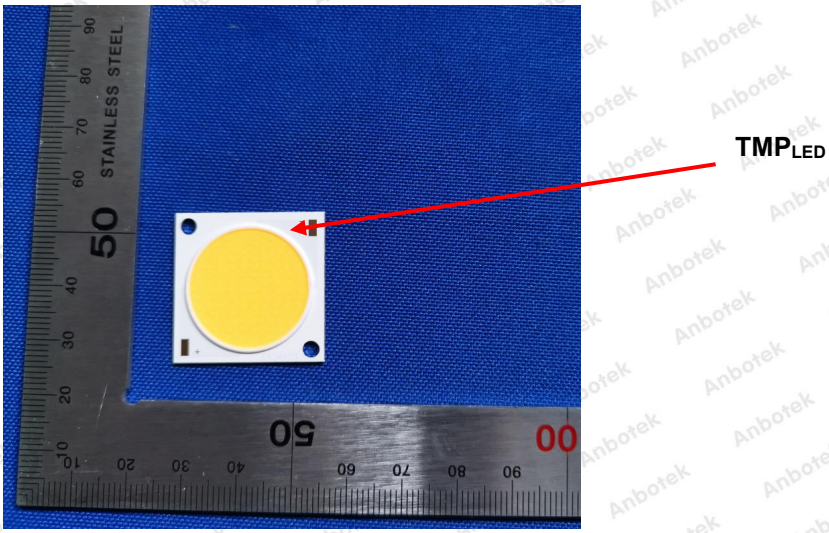
5 EUT Photo

5.1 EUT Mechanical Dimensions



Unit:mm
Tolerances unless otherwise specified:+/-0.2

5.2 EUT PHOTO



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