

IESNA LM-80-2008

Measurement and Test Report

For

SHENZHEN LEPOWER OPTO ELECTRONICS CORP.,LTD3-5 Floors,Bldg B, Chuangfu Science Technology Park, Shihuan Rd No.202, Shangwu Community,
Shiyan St,Bao'an District, Shenzhen**Report No.:** R011607022L**Model No.:** LY-FE3535(LY-XMDD002)**Product Name:** FE35**Test Initiation Date:** 2016-07-01 to 2016-11-03**Revision Date:** 2016-11-05**Test Completion Date:** 2016-11-05**Tested By:** Alcander Lou**Reviewed By:** Raymond Song**Prepared By:** Shenzhen Anbotek Compliance Laboratory Limited,1/F., Building 1, SEC
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1-GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant : SHENZHEN LEPOWER OPTO ELECTRONICS CORP.,LTD

Trade Mark : N/A

Model Number : LY-FE3535(LY-XMDD002)

Part Type: LED package

Nominal CCT: 3000K

Number of LED Light Source tested : See tables.

Case temperature (test point temperature) : See tables.

Drive current of the LED light source during lifetime test : See tables.

Initial luminous flux and forward voltage at photometric measurement current : See tables.

Lumen maintenance data for each individual LED light source along with median value, standard deviation, minimum and maximum lumen maintenance value for all of the LED Light sources : See tables.

Observation of LED light source failure including the failure conditions and time of failure. : See tables.

LED light source monitoring interval : The LED light source are inspected at regular interval (24 hours) throughout the 6000 hours test.

Photometric measurement uncertainty : 1.5% on flux measurements for LM-80 testing.

Chromaticity shift reported over the Measurement time : See tables.

LED Light Source Test interval : At regular intervals(1000 hours) throughout the 6000 hours test.

Date of Receiving Sample : 2016-07-01

Test Duration : 2016-07-01 to 2016-11-03

1.2 Standards Used:

IESNA LM-80-08: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources

1.3 Test Facility Description

The test facility used by Shenzhen Anbotek Compliance Laboratory Limited is located at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,Nanshan District,Shenzhen, Guangdong, China.

1.4 Test Equipment List

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Digital Power Meter	YOKOGAWA	WT210	SE-074	0-600V/0-10A/0-100 Hz	2016-04-06	2017-04-05
Integrating sphere (0.3m)	LINKCOLOR	LCB-03	SE-150	0.3 m	2016-06-23	2017-06-22
Spectrum analyzer	LINKCOLOR	SPEC1000A	SE-154	/	2016-06-23	2017-06-22
DC power supply	LINKCOLOR	DC30V,5A	SE-433	DC 30V, 5A	2016-03-28	2017-03-27
AC power source	ALLPOWER ELECTRONIC	APW-110	SE-435	0-300V, 1000VA	2016-04-06	2017-04-05
Standard lamp	SENSING	12V/10W	SE-529	12V/10W	2016-03-30	2017-03-29
LM-80aging measurement system	KEYI	KY-3X-LH60	SE-564	55, 85, 105℃	2016-04-06	2017-04-05
LED aging pour source	KEYI	ZV-1000S	SE-573	5V1A 60CH	2016-03-28	2017-03-28
DC power supply	ITECH	IT6832	SE-598	30V 3A	2016-06-23	2017-06-22
DC power supply	EVERFINE	WY605	SE-605	DC 60V, 5A	2016-06-23	2017-06-22
Standard lamp	EVERFINE	D062	SE-606	1.5445A	2016-07-02	2017-07-01
Spectrum analyzer	EVERFINE	HAAS-2000	SE-607	380-780nm 1000-100000K	2016-06-23	2017-06-22
Integrating sphere (0.5m)	EVERFINE	AIS-2	SE-608	0.5m	2016-06-23	2017-06-22

2-Summary of Test Result

Data Set	Case Temperature(Ts) °C	Ambient Temperature(Ta)°C	Drive Current (mA)	Average Lumen Maintenance at 6000 hours	Average Chromaticity Shift ($\Delta u'v'$) at 6000 hours
1	53.6	54.4	350	--	--
2	83.1	83.9	350	--	--
3	103.5	104.3	350	--	--

3-Test Method

3.1 Photometric and Electrical Measurement

Total light output (luminous flux) for the $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ ambient temperature conditions is measured using a integrating sphere. Each LED package is operated at rated drive current(CC Mode).

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

3.2 Season the LED Package from 0 hours to 6000 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 package are operated steady state (no cycling) for a period of 6000 hours, checked the lumen flux and Chromaticity Shift every 1000 hours. The samples are inspected at regular intervals (24 hours) throughout the 6000 hours. The time and date of failure of each lamp is recorded. The actual elapsed time for each light package is in hour.

4-Data Set 1: 55°C ; 350mA

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	53.6°C
Ambient Temperature :	54.4°C
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V _F (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	2.99	135.00	99.70%	99.53%	99.25%	--	--	--
L2	3.00	132.30	99.55%	99.49%	99.39%	--	--	--
L3	2.99	131.50	99.85%	99.63%	99.25%	--	--	--
L4	2.99	134.20	100.07%	99.51%	99.39%	--	--	--
L5	3.00	134.40	99.55%	99.42%	98.83%	--	--	--
L6	3.00	131.20	99.54%	99.35%	99.28%	--	--	--
L7	2.98	133.90	99.85%	99.62%	99.12%	--	--	--
L8	3.00	130.20	99.62%	99.58%	99.11%	--	--	--
L9	2.99	132.80	99.70%	99.21%	99.10%	--	--	--
L10	2.98	135.00	99.70%	99.31%	98.86%	--	--	--
L11	2.98	136.30	99.71%	99.61%	99.18%	--	--	--
L12	2.98	134.80	99.63%	99.28%	99.05%	--	--	--
L13	2.98	134.50	99.93%	99.21%	98.92%	--	--	--
L14	3.00	131.30	99.47%	99.61%	99.12%	--	--	--
L15	3.00	132.20	99.39%	99.57%	99.22%	--	--	--
L16	2.98	135.20	99.70%	99.53%	98.99%	--	--	--
L17	3.00	131.70	99.54%	99.36%	99.19%	--	--	--
L18	2.97	132.50	99.77%	99.59%	99.07%	--	--	--
L19	2.98	135.20	99.56%	99.47%	98.87%	--	--	--
L20	2.98	135.30	99.63%	99.27%	98.87%	--	--	--
L21	2.98	132.30	99.70%	99.56%	99.12%	--	--	--
L22	3.00	133.10	99.70%	99.28%	99.06%	--	--	--
L23	2.99	132.10	99.70%	99.30%	99.40%	--	--	--
L24	2.99	132.20	99.70%	99.41%	99.12%	--	--	--
L25	2.97	134.30	99.70%	99.31%	99.22%	--	--	--
Avg.	2.99	133.34	99.68%	99.44%	99.12%	--	--	--
MIN	2.97	130.20	99.39%	99.21%	98.83%	--	--	--
MAX	3.00	136.30	100.07%	99.63%	99.40%	--	--	--
STDEV	0.0108	1.6284	0.0015	0.0014	0.0017	--	--	--
N	25	25	25	25	25	--	--	--

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	53.6°C
Ambient Temperature :	54.4°C
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

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

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	0.2452	0.5288	3083	0.0001	0.0010	0.0015	--	--	--
L2	0.2457	0.5249	3098	0.0002	0.0007	0.0012	--	--	--
L3	0.2453	0.5239	3116	0.0004	0.0010	0.0015	--	--	--
L4	0.2449	0.5263	3108	0.0003	0.0010	0.0015	--	--	--
L5	0.2461	0.5295	3059	0.0002	0.0004	0.0013	--	--	--
L6	0.2454	0.5255	3102	0.0002	0.0005	0.0014	--	--	--
L7	0.2518	0.5378	2880	0.0002	0.0005	0.0014	--	--	--
L8	0.2489	0.5280	3000	0.0003	0.0007	0.0013	--	--	--
L9	0.2455	0.5263	3094	0.0004	0.0004	0.0014	--	--	--
L10	0.2509	0.5364	2907	0.0002	0.0007	0.0014	--	--	--
L11	0.2446	0.5293	3095	0.0003	0.0008	0.0014	--	--	--
L12	0.2452	0.5287	3086	0.0002	0.0005	0.0015	--	--	--
L13	0.2449	0.5275	3100	0.0004	0.0006	0.0011	--	--	--
L14	0.2499	0.5315	2955	0.0001	0.0004	0.0015	--	--	--
L15	0.2444	0.5233	3144	0.0002	0.0005	0.0015	--	--	--
L16	0.2438	0.5238	3154	0.0002	0.0005	0.0012	--	--	--
L17	0.2455	0.5240	3110	0.0004	0.0009	0.0013	--	--	--
L18	0.2467	0.5300	3039	0.0003	0.0009	0.0016	--	--	--
L19	0.2441	0.5254	3136	0.0003	0.0005	0.0011	--	--	--
L20	0.2454	0.5267	3094	0.0003	0.0006	0.0014	--	--	--
L21	0.2450	0.5229	3131	0.0002	0.0009	0.0011	--	--	--
L22	0.2437	0.5277	3130	0.0001	0.0009	0.0016	--	--	--
L23	0.2458	0.5260	3088	0.0002	0.0006	0.0014	--	--	--
L24	0.2459	0.5286	3069	0.0004	0.0005	0.0012	--	--	--
L25	0.2461	0.5306	3052	0.0003	0.0007	0.0014	--	--	--
AV	0.2460	0.5277	3073	0.0003	0.0007	0.0014	--	--	--
MIN	0.2437	0.5229	2880	0.0001	0.0004	0.0011	--	--	--
MAX	0.2518	0.5378	3154	0.0004	0.0010	0.0016	--	--	--
STDEV	0.0021	0.0037	69.6862	0.0001	0.0002	0.0001	--	--	--
N	25	25	25	25	25	25	--	--	--

5-Data Set 2: 85°C; 350mA

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	83.1°C
Ambient Temperature :	83.9°C
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V _F (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L26	2.96	133.90	99.55%	99.15%	98.87%	--	--	--
L27	2.99	132.30	99.32%	99.19%	99.01%	--	--	--
L28	3.00	133.00	99.55%	99.23%	98.80%	--	--	--
L29	2.99	132.20	99.55%	99.38%	98.89%	--	--	--
L30	3.00	132.00	99.77%	99.48%	98.88%	--	--	--
L31	2.99	132.50	99.55%	99.54%	99.09%	--	--	--
L32	2.99	131.20	99.54%	99.46%	98.63%	--	--	--
L33	3.00	132.50	99.40%	99.51%	99.14%	--	--	--
L34	2.99	133.60	99.40%	99.50%	99.03%	--	--	--
L35	3.00	131.40	99.32%	99.25%	99.07%	--	--	--
L36	3.00	131.40	99.24%	99.15%	98.65%	--	--	--
L37	2.97	135.10	99.70%	99.17%	98.76%	--	--	--
L38	3.00	133.50	99.55%	99.32%	98.70%	--	--	--
L39	2.99	133.40	99.55%	99.27%	98.76%	--	--	--
L40	3.00	129.80	99.77%	99.32%	99.05%	--	--	--
L41	2.97	135.10	99.26%	99.28%	98.92%	--	--	--
L42	2.97	133.70	99.78%	99.30%	99.00%	--	--	--
L43	2.99	134.30	99.33%	99.35%	99.08%	--	--	--
L44	2.98	134.80	99.55%	99.35%	98.72%	--	--	--
L45	2.98	136.10	99.34%	99.12%	99.08%	--	--	--
L46	2.97	133.30	99.32%	99.23%	99.07%	--	--	--
L47	3.00	133.80	99.55%	99.35%	99.08%	--	--	--
L48	3.00	131.60	99.39%	99.51%	98.75%	--	--	--
L49	2.99	132.80	99.62%	99.27%	98.91%	--	--	--
L50	2.98	135.50	99.26%	99.20%	98.95%	--	--	--
Avg.	2.99	133.15	99.49%	99.31%	98.92%	--	--	--
MIN	2.96	129.80	99.24%	99.12%	98.63%	--	--	--
MAX	3.00	136.10	99.78%	99.54%	99.14%	--	--	--
STDEV	0.0123	1.5147	0.0017	0.0013	0.0016	--	--	--
N	25	25	25	25	25	--	--	--

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	83.1℃
Ambient Temperature :	83.9℃
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

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

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L26	0.2468	0.5304	3034	0.0005	0.0008	0.0016	--	--	--
L27	0.2451	0.5257	3108	0.0004	0.0007	0.0021	--	--	--
L28	0.2450	0.5268	3103	0.0004	0.0011	0.0016	--	--	--
L29	0.2452	0.5244	3116	0.0004	0.0011	0.0020	--	--	--
L30	0.2445	0.5247	3131	0.0005	0.0011	0.0020	--	--	--
L31	0.2461	0.5272	3072	0.0005	0.0009	0.0017	--	--	--
L32	0.2517	0.5377	2883	0.0004	0.0008	0.0018	--	--	--
L33	0.2452	0.5244	3115	0.0006	0.0011	0.0021	--	--	--
L34	0.2515	0.5346	2903	0.0005	0.0010	0.0017	--	--	--
L35	0.2466	0.5258	3069	0.0005	0.0011	0.0016	--	--	--
L36	0.2431	0.5197	3204	0.0007	0.0008	0.0018	--	--	--
L37	0.2452	0.5287	3084	0.0005	0.0009	0.0020	--	--	--
L38	0.2438	0.5216	3171	0.0005	0.0013	0.0019	--	--	--
L39	0.2448	0.5258	3115	0.0007	0.0011	0.0018	--	--	--
L40	0.2526	0.5347	2879	0.0006	0.0007	0.0018	--	--	--
L41	0.2452	0.5294	3081	0.0006	0.0010	0.0017	--	--	--
L42	0.2448	0.5324	3070	0.0007	0.0008	0.0019	--	--	--
L43	0.2444	0.5231	3145	0.0005	0.0011	0.0016	--	--	--
L44	0.2453	0.5257	3102	0.0004	0.0011	0.0019	--	--	--
L45	0.2444	0.5301	3096	0.0003	0.0010	0.0020	--	--	--
L46	0.2453	0.5278	3088	0.0004	0.0012	0.0018	--	--	--
L47	0.2450	0.5233	3128	0.0004	0.0008	0.0021	--	--	--
L48	0.2494	0.5320	2965	0.0005	0.0013	0.0022	--	--	--
L49	0.2463	0.5273	3067	0.0005	0.0013	0.0020	--	--	--
L50	0.2453	0.5282	3086	0.0005	0.0006	0.0021	--	--	--
AV	0.2461	0.5277	3073	0.0005	0.0010	0.0019	--	--	--
MIN	0.2431	0.5197	2879	0.0003	0.0006	0.0016	--	--	--
MAX	0.2526	0.5377	3204	0.0007	0.0013	0.0022	--	--	--
STDEV	0.0025	0.0043	82.5803	0.0001	0.0002	0.0002	--	--	--
N	25	25	25	25	25	25	--	--	--

6-Data Set 3: 105°C; 350mA

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	103.5°C
Ambient Temperature :	104.3°C
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

Lumen Maintenance (%)

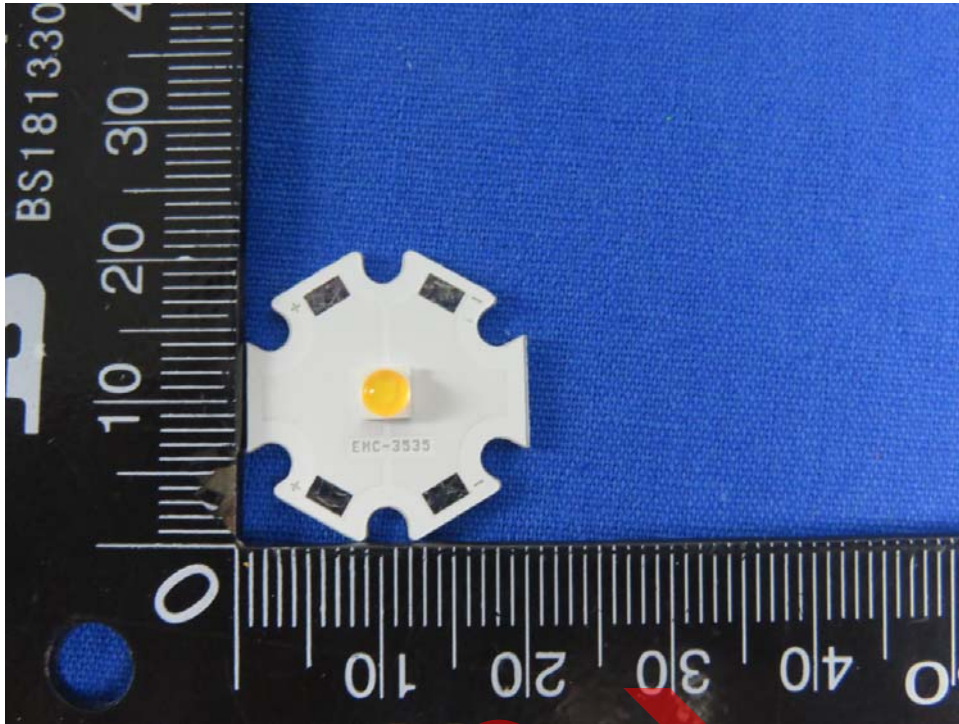
Sample No.	V _F (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L51	2.97	132.90	99.10%	98.81%	98.20%	--	--	--
L52	2.98	129.70	99.00%	98.96%	98.57%	--	--	--
L53	2.99	132.20	99.24%	98.75%	98.41%	--	--	--
L54	2.97	133.10	99.32%	98.94%	98.54%	--	--	--
L55	2.97	134.50	99.41%	99.03%	98.69%	--	--	--
L56	2.97	132.70	99.40%	98.83%	98.61%	--	--	--
L57	2.99	131.10	99.54%	99.05%	98.56%	--	--	--
L58	2.97	134.60	99.11%	98.80%	98.46%	--	--	--
L59	2.97	134.70	99.03%	99.14%	98.33%	--	--	--
L60	2.99	133.50	99.03%	98.97%	98.75%	--	--	--
L61	2.99	131.70	99.09%	98.79%	98.65%	--	--	--
L62	2.98	135.20	99.26%	98.90%	98.23%	--	--	--
L63	2.99	134.20	99.25%	98.82%	98.38%	--	--	--
L64	3.00	131.70	99.24%	99.09%	98.46%	--	--	--
L65	3.00	131.40	99.24%	98.88%	98.16%	--	--	--
L66	2.97	133.10	99.25%	98.86%	98.24%	--	--	--
L67	2.97	133.80	99.33%	98.89%	98.63%	--	--	--
L68	2.98	136.50	99.05%	98.73%	98.52%	--	--	--
L69	2.97	135.20	99.19%	99.00%	98.67%	--	--	--
L70	2.97	130.80	99.01%	98.96%	98.33%	--	--	--
L71	2.98	132.10	99.39%	99.13%	98.49%	--	--	--
L72	2.97	135.30	99.33%	98.74%	98.64%	--	--	--
L73	2.99	129.80	99.15%	98.81%	98.17%	--	--	--
L74	2.99	131.70	99.01%	99.07%	98.40%	--	--	--
L75	2.98	134.00	98.96%	99.04%	98.27%	--	--	--
Avg.	2.98	133.02	99.20%	98.92%	98.46%	--	--	--
MIN	2.97	129.70	98.96%	98.73%	98.16%	--	--	--
MAX	3.00	136.50	99.54%	99.14%	98.75%	--	--	--
STDEV	0.0101	1.7914	0.0016	0.0012	0.0018	--	--	--
N	25	25	25	25	25	--	--	--

Description of Light Sources tested :	LY-FE3535(LY-XMDD002)
Case Temperature :	102.3°C
Ambient Temperature :	103.1°C
Drive Current :	350mA
Measure Current :	350mA
Failures Observed :	None

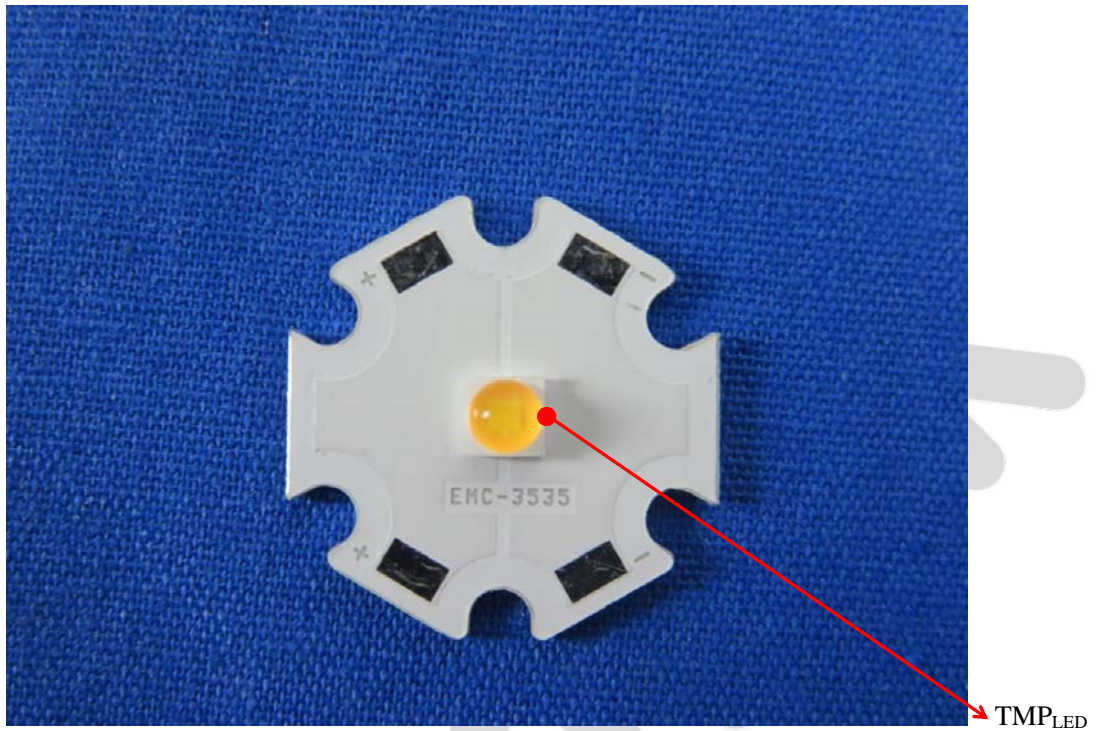
Chromaticity Shift ($\Delta u'v'$)

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L51	0.2452	0.5238	3119	0.0008	0.0012	0.0019	--	--	--
L52	0.2486	0.5332	2976	0.0007	0.0012	0.0021	--	--	--
L53	0.2444	0.5266	3119	0.0007	0.0012	0.0018	--	--	--
L54	0.2435	0.5224	3172	0.0008	0.0014	0.0019	--	--	--
L55	0.2508	0.5373	2905	0.0006	0.0010	0.0025	--	--	--
L56	0.2448	0.5265	3111	0.0007	0.0011	0.0022	--	--	--
L57	0.2445	0.5248	3130	0.0006	0.0013	0.0019	--	--	--
L58	0.2458	0.5263	3087	0.0008	0.0012	0.0017	--	--	--
L59	0.2445	0.5272	3113	0.0008	0.0010	0.0022	--	--	--
L60	0.2444	0.5238	3139	0.0005	0.0012	0.0021	--	--	--
L61	0.2458	0.5261	3089	0.0008	0.0017	0.0021	--	--	--
L62	0.2449	0.5302	3082	0.0007	0.0016	0.0021	--	--	--
L63	0.2472	0.5274	3043	0.0006	0.0016	0.0024	--	--	--
L64	0.2452	0.5283	3089	0.0007	0.0012	0.0023	--	--	--
L65	0.2453	0.5246	3112	0.0008	0.0013	0.0021	--	--	--
L66	0.2451	0.5259	3106	0.0008	0.0010	0.0019	--	--	--
L67	0.2438	0.5231	3161	0.0009	0.0013	0.0023	--	--	--
L68	0.2460	0.5318	3045	0.0009	0.0013	0.0020	--	--	--
L69	0.2457	0.5308	3059	0.0005	0.0017	0.0022	--	--	--
L70	0.2469	0.5234	3078	0.0007	0.0013	0.0024	--	--	--
L71	0.2446	0.5248	3127	0.0007	0.0016	0.0019	--	--	--
L72	0.2442	0.5284	3111	0.0008	0.0012	0.0021	--	--	--
L73	0.2495	0.5280	2985	0.0009	0.0016	0.0018	--	--	--
L74	0.2457	0.5277	3080	0.0007	0.0014	0.0018	--	--	--
L75	0.2442	0.5261	3127	0.0008	0.0017	0.0017	--	--	--
AV	0.2456	0.5271	3086.6	0.0007	0.0013	0.0021	--	--	--
MIN	0.2435	0.5224	2905	0.0005	0.0010	0.0017	--	--	--
MAX	0.2508	0.5373	3172	0.0009	0.0017	0.0025	--	--	--
STDEV	0.0018	0.0035	59.7941	0.0001	0.0002	0.0002	--	--	--
N	25	25	25	25	25	25	--	--	--

7-EUT Photos



8-TMP



---End of report---