



Report No. : T-15-05-VLP-0076-TP

Page 1 of 11

LM-80 TEST REPORT



The following tested product(s) were submitted and identified by the vendor as:

Applicant	:	EVERLIGHT ELECTRONICS CO., LTD
Address of Applicant	:	No. 6-8, Zhonghua Rd., Shulin Dist., New Taipei City 23860, Taiwan
Testing Laboratory	:	Reliability Lab, Everlight Electronics
Testing Address	:	No.25, Lane 76, Sec. 3, Chung Yang Road, Tucheng, New Taipei City 23673, Taiwan
Product Name	:	Low-Mid Power LED
Model/ Serial Number	:	2835S Series (2700K)
Manufacturer	:	Everlight Electronics Co., LTD
Rating	:	DC 120 mA
Test Standard/Method	:	IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources
Revision	:	2

The submitted products have been tested as requested and the following results were obtained, and the report, not applicable for lawsuit, refers only to the unit(s) submitted for test.

Signed for and on behalf of
EVERLIGHT Ltd.

Luca Tai

1 DATE OF RECEIPT OF SAMPLES

May 25, 2015

2 DATE(S) OF PERFORMANCE OF THE TEST

May 25, 2015 ~ Mar 11, 2016

3 MATERIAL / SERIAL NUMBER**4 IDENTITY OF SAMPLES**

Quantity	Model	Serial Number
25	2835S Series	# A01- # A25(55 °C)
25	2835S Series	# B01- # B25(105 °C)

5 TEST ITEMS**5.1 Date Summary of Lumen and Color Maintenance**

Test results were concluded by different Temperatures (Ts)

5.2 Lumen Maintenance and Color Maintenance Test

Testing specifications by different case temperatures according to IES LM-80-08 approved.

Method: Measuring Lumen Maintenance of LED Light Sources and client's requirements were implemented per the following items.

5.2.1 Total Luminous Flux(Φ_v)

The test results of total luminous flux were implemented referring to Clause 2 PROPERTIES OF LEDS & Clause 6 MEASUREMENT OF LUMINOUS FLUX of CIE127:2007 2nd edition MRASUREMENT OF LEDS and IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources, when the UUTs were powered with constant current of If.

5.2.2 Correlated Color Temperature (CCT), CIE Color Coordinate (CIE_x, CIE_y) & Chromaticity shift($\Delta u'$, $\Delta v'$)

The test results of correlated color temperature were implemented referring to CIE 127:2007 2nd editions MRASUREMENT OF LEDS, CIE 15:2004 COLORIMETY.

The test results of color coordinate were implemented referring to CIE 127:2007 2nd edition MRASUREMENT OF LEDS, CIE 15:2004 COLORIMETRY

6 TESTING LABORATORY IS ACCREDITED BY

6.1 ISO 17025 accredited in respect of laboratory is approved by TAF Certificate No. :
L2773-130705

6.2 EPA-Recognized Laboratories No.: 1125371

7 TEST CONDITIONS

7.1 Main Test Equipment:

Name	Brand	Model	Traceability	Calibration Date	Due Date
Spectroradiometer	Photal	LE-5400	NVLAP (200951-0)	2013/5/31	2016/5/31
Integrating Sphere	Labsphere	LMS-100CM			
Standard Light Source	Labsphere	SCL-1400			
Source Meter	Keithley	2612A	Chroma (TAF 0245)	2015/3/30	2016/3/30
Source Meter	Agilent	N5751A	宇正 (TAF 0742)	2015/2/25	2016/2/25
Digital Multimeter	Agilent	E3634A	ETC (TAF 0025)	2015/4/1	2016/4/1

7.2 Environmental Conditions:

Temperature: (25 ± 1) °C

Relative Humidity: < 65 %RH

7.3 Measurement Conditions:

Interval Time: 1000 h

Warm up Time: < 1 minute (initial)

Relative measurement uncertainty: 1.1 % (95 % Confidence Level)

7.4 UUT Conditions:

Drive Current: DC 120 mA

Forward Voltage: 9.9V

Power Consumption: 1.2 W (Rated Value)

Lumen: 100 lm – 140 lm

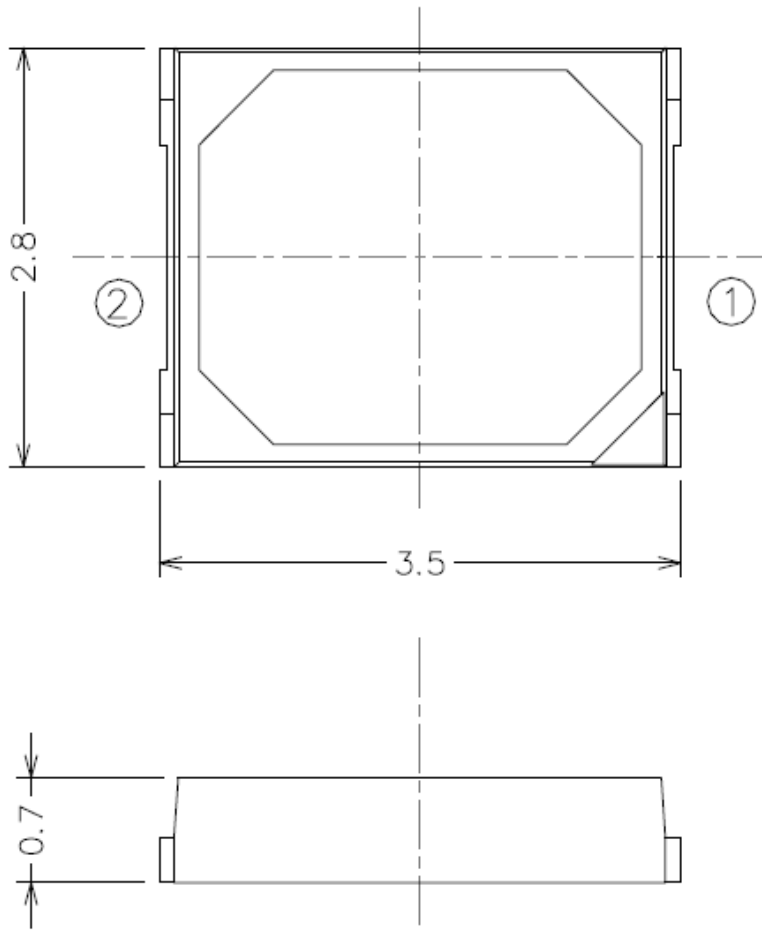
CCT: 2700K

Package Dimension: L 3.5 mm x W 2.8 mm

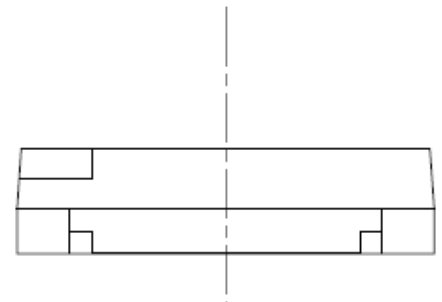
Prior operation: 0 h

Total Operation Duration: 6000 h

7.5 Photograph of device



Polarity



8 TEST SUMMARY:

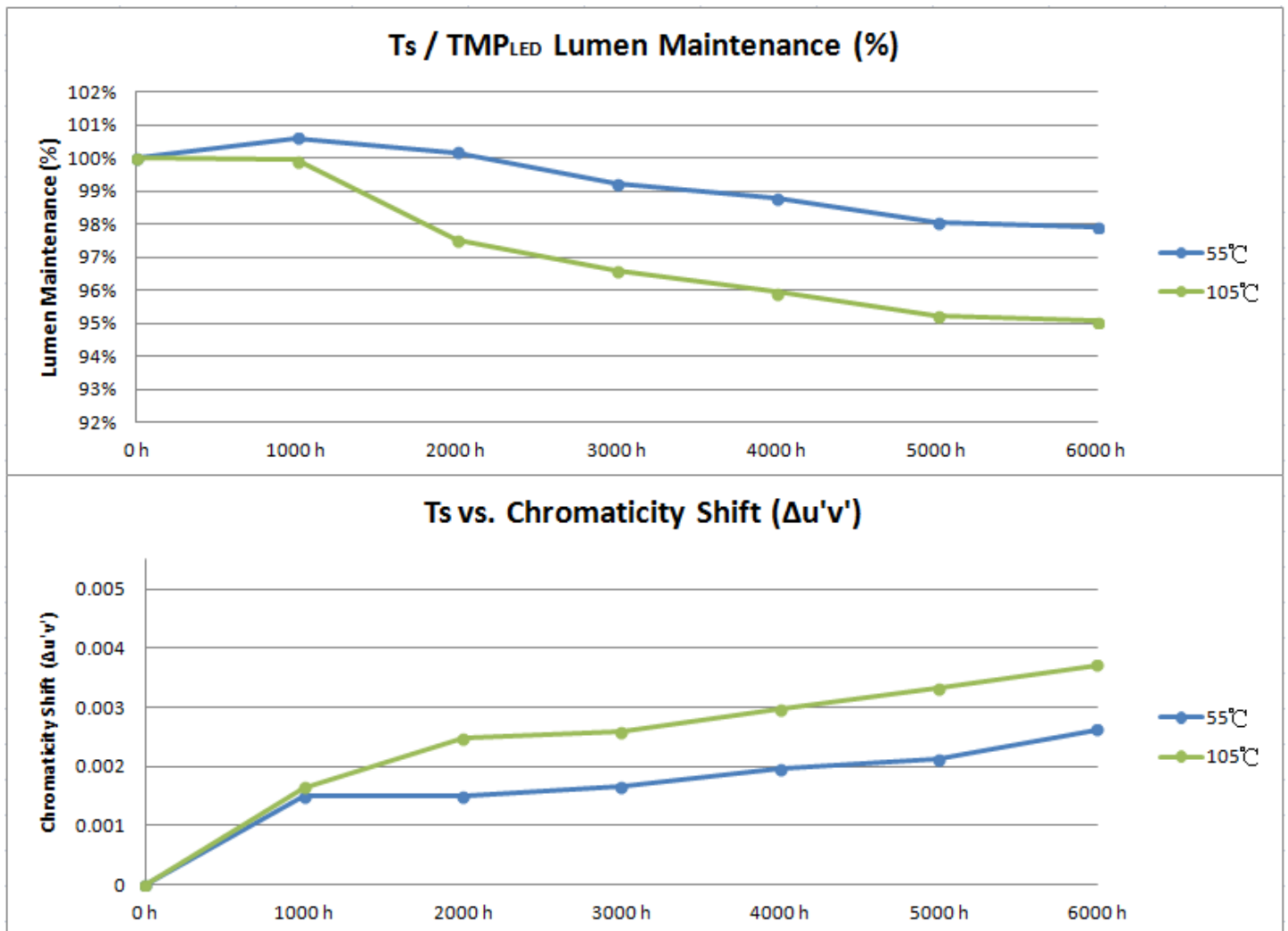
8.1 Data Summary of Lumen and Color Maintenance

Temp.	Initial(0 h)		Luminous Maintenance (%)						
	TLF(lm)	Vf(V)	0 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
55 °C	117.1	9.8	100%	100.61%	100.18%	99.23%	98.77%	98.07%	97.92%
105 °C	116.6	9.8	100%	99.94%	97.54%	96.60%	95.94%	95.24%	95.06%

Temp.	Initial(0 h)			Chromaticity Shift ($\Delta u'v'$)					
	CIE u'	CIE v'	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
55 °C	0.2544	0.5264	2851	0.00149	0.00150	0.00165	0.00197	0.00213	0.00263
105 °C	0.2543	0.5268	2857	0.00165	0.00248	0.00258	0.00296	0.00332	0.00372

8.2 Chart of lumen maintenance and TM-21 projection

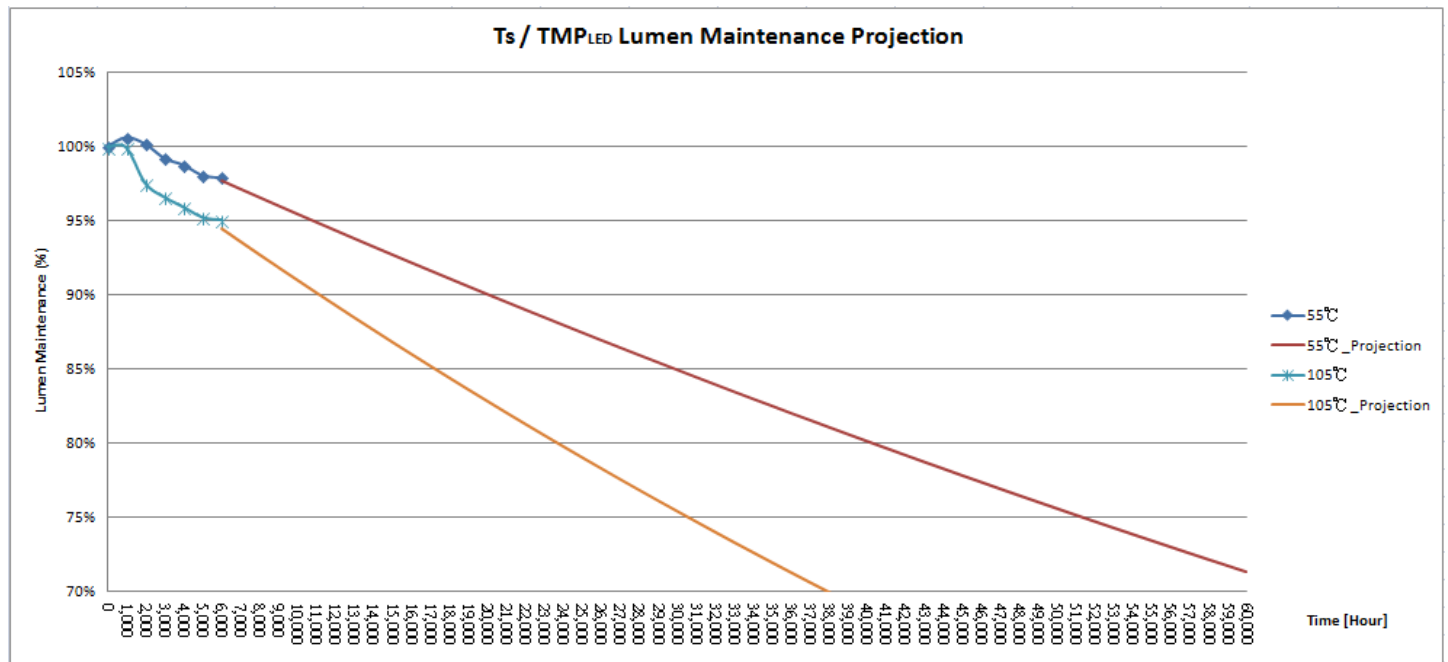
8.2.1 Chart of lumen maintenance



8.2.2 LM-80 test and TM-21 Projection

Table 1: Report at each LM-80 Test Condition

Case Temperature 1		Case Temperature 2	
Temperature (°C):	55	Temperature (°C):	105
Temperature (°K):	328.15	Temperature (°K):	378.15
α :	5.83E-06	α :	9.39E-06
B:	1.01	B:	1.00
Calculated L70 (hrs):	63000	Calculated L70 (hrs):	38000
Reported L70 (hrs):	>36000	Reported L70 (hrs):	>36000



8.3 Lumen Maintenance and Color Maintenance Test

8.3.1 Test Condition: Ts = 55 °C

Requirement

Case Temperature [Ts]: 54.5 °C

Average [Ts]: 54.5 °C

Ambient Temperature [Ta]: 52.6 °C

Average [Ta]: 52.6 °C

Driver Current: 120 mA

Air Flow: Minimized

Measurement Current: 120 mA

Relative Humidity: < 65 %RH

8.3.1.1 Total Luminous Flux (Φ_v)

S/N	Initial(0 h)		Luminous Maintenance(Φ_v)					
	TLF(lm)	Vf(V)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
A01	117.7	9.8	100.70%	99.58%	99.38%	98.97%	98.63%	98.56%
A02	117.5	9.8	101.01%	99.87%	98.71%	98.06%	97.84%	97.80%
A03	118.1	9.9	100.10%	99.45%	98.86%	98.34%	97.85%	97.35%
A04	116.3	9.8	100.52%	100.06%	99.17%	98.76%	98.40%	98.49%
A05	120.4	9.8	100.75%	99.55%	99.37%	99.00%	98.87%	98.94%
A06	114.3	9.8	100.23%	100.01%	99.78%	99.36%	98.68%	97.79%
A07	116.6	9.8	100.54%	99.86%	99.85%	99.23%	98.64%	98.62%
A08	115.9	9.8	100.51%	100.24%	99.49%	99.26%	98.71%	99.03%
A09	114.6	9.8	100.04%	99.69%	99.39%	99.35%	98.63%	97.77%
A10	117.0	9.8	100.85%	99.99%	99.01%	98.58%	97.89%	98.15%
A11	116.1	9.8	100.31%	100.32%	99.10%	98.47%	97.77%	97.98%
A12	118.7	9.8	100.72%	100.35%	98.88%	98.38%	97.52%	97.71%
A13	116.4	9.8	100.41%	100.49%	98.70%	98.25%	97.45%	97.74%
A14	115.9	9.8	100.37%	100.97%	99.07%	98.88%	98.15%	98.35%
A15	118.9	9.8	100.92%	100.58%	98.92%	98.37%	97.51%	97.87%
A16	114.3	9.7	100.37%	100.90%	98.58%	98.08%	97.09%	97.17%
A17	116.5	9.8	100.96%	100.30%	98.82%	98.45%	97.58%	97.72%
A18	119.1	9.8	100.51%	101.32%	98.69%	98.08%	97.05%	97.03%
A19	115.7	9.8	101.13%	100.95%	100.12%	99.52%	98.58%	97.58%
A20	118.3	9.8	101.31%	100.06%	99.63%	98.69%	98.29%	97.61%
A21	116.4	9.8	100.53%	100.30%	99.59%	99.22%	98.49%	98.83%
A22	118.0	9.8	100.62%	100.44%	99.86%	99.36%	98.35%	97.25%
A23	117.7	9.8	100.71%	99.73%	99.40%	99.33%	98.41%	97.76%
A24	118.6	9.8	100.72%	99.79%	99.49%	99.10%	98.36%	97.80%
A25	118.6	9.8	100.52%	99.59%	98.81%	98.15%	97.10%	97.02%
Avg.	117.1	9.8	100.61%	100.18%	99.23%	98.77%	98.07%	97.92%
Min.	114.3	9.7	100.04%	99.45%	98.58%	98.06%	97.05%	97.02%
Max.	120.4	9.9	101.31%	101.32%	100.12%	99.52%	98.87%	99.03%
Med.	117.0	9.8	100.54%	100.06%	99.17%	98.76%	98.29%	97.79%
St. Dev.	1.6	0.02	0.0031	0.0050	0.0043	0.0048	0.0057	0.0057

8.3.1.2 CCT, CIE_x, CIE_y & Chromaticity Shift($\Delta u'v'$)

S/N	Initial(0 h)			Chromaticity Shift($\Delta u'v'$)					
	CIE _x	CIE _y	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
A01	0.4487	0.4059	2829	0.00143	0.00136	0.00192	0.00197	0.00269	0.00242
A02	0.4459	0.4037	2855	0.00143	0.00166	0.00252	0.00166	0.00322	0.00211
A03	0.4467	0.4047	2851	0.00134	0.00143	0.00184	0.00206	0.00273	0.00269
A04	0.4469	0.4031	2834	0.00134	0.00139	0.00206	0.00184	0.00269	0.00238
A05	0.4465	0.4048	2854	0.00149	0.00144	0.00157	0.00157	0.00230	0.00210
A06	0.4463	0.4019	2834	0.00152	0.00148	0.00170	0.00179	0.00258	0.00273
A07	0.4542	0.4138	2810	0.00134	0.00150	0.00166	0.00184	0.00239	0.00244
A08	0.4466	0.4036	2843	0.00130	0.00149	0.00148	0.00180	0.00225	0.00221
A09	0.4448	0.4013	2853	0.00126	0.00136	0.00172	0.00201	0.00220	0.00291
A10	0.4434	0.4028	2888	0.00143	0.00139	0.00180	0.00206	0.00230	0.00256
A11	0.4465	0.403	2839	0.00157	0.00158	0.00161	0.00215	0.00230	0.00273
A12	0.4464	0.4038	2847	0.00148	0.00157	0.00139	0.00234	0.00216	0.00305
A13	0.4444	0.4014	2859	0.00166	0.00157	0.00152	0.00210	0.00225	0.00273
A14	0.4451	0.4029	2860	0.00157	0.00139	0.00136	0.00184	0.00206	0.00228
A15	0.4452	0.4042	2870	0.00157	0.00170	0.00134	0.00219	0.00202	0.00282
A16	0.4469	0.4033	2835	0.00188	0.00184	0.00255	0.00266	0.00348	0.00319
A17	0.4447	0.4009	2851	0.00166	0.00170	0.00166	0.00220	0.00239	0.00273
A18	0.4477	0.407	2853	0.00122	0.00139	0.00136	0.00218	0.00197	0.00289
A19	0.4452	0.4005	2840	0.00157	0.00150	0.00139	0.00188	0.00200	0.00295
A20	0.4418	0.4004	2893	0.00171	0.00141	0.00142	0.00166	0.00191	0.00278
A21	0.4477	0.404	2829	0.00152	0.00136	0.00153	0.00179	0.00241	0.00219
A22	0.4455	0.4035	2859	0.00149	0.00139	0.00126	0.00170	0.00197	0.00278
A23	0.4447	0.4038	2874	0.00148	0.00162	0.00126	0.00180	0.00175	0.00260
A24	0.4471	0.4054	2850	0.00149	0.00144	0.00134	0.00175	0.00189	0.00242
A25	0.4452	0.4042	2870	0.00148	0.00158	0.00126	0.00233	0.00197	0.00295
Avg.	0.4462	0.4038	2851.2	0.00149	0.00150	0.00162	0.00197	0.00232	0.00263
Min.	0.4418	0.4004	2810	0.00122	0.00136	0.00126	0.00157	0.00175	0.00210
Max.	0.4542	0.4138	2893	0.00188	0.00184	0.00255	0.00266	0.00348	0.00319
Med.	0.4463	0.4036	2851	0.00149	0.00148	0.00153	0.00188	0.00225	0.00273
St. Dev.	0.0022	0.0027	18.77	0.00015	0.00013	0.00035	0.00026	0.00041	0.00030

8.3.2 Test Condition: Ts = 105 °C

Requirement

Case Temperature [Ts]: 104.5 °C

Average [Ts]: 104.5 °C

Ambient Temperature [Ta]: 102.7 °C

Average [Ta]: 102.7 °C

Driver Current: 120 mA

Air Flow: Minimized

Measurement Current: 120 mA

Relative Humidity: < 65 %RH

8.3.2.1 Total Luminous Flux (Φ_v)

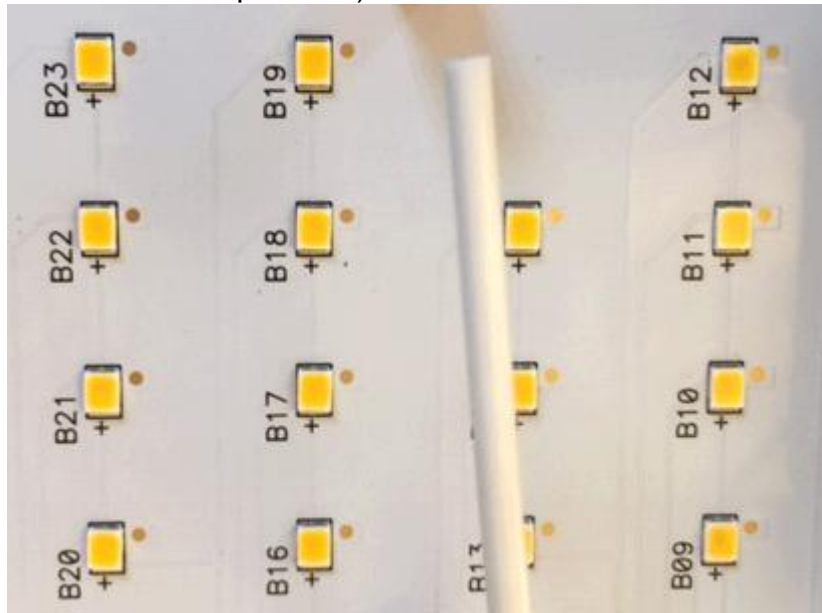
S/N	Initial(0 h)		Luminous Maintenance(Φ_v)					
	TLF(lm)	Vf(V)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
B01	118.4	9.9	100.43%	97.89%	97.16%	96.77%	96.06%	95.83%
B02	115.4	9.9	100.01%	97.36%	96.61%	95.94%	95.16%	95.16%
B03	116.3	9.9	99.91%	97.89%	96.89%	96.48%	95.72%	95.73%
B04	113.5	9.8	100.20%	98.04%	96.99%	96.40%	95.55%	95.45%
B05	113.4	9.8	100.20%	97.86%	97.09%	96.73%	95.93%	96.14%
B06	117.8	9.8	99.78%	97.11%	95.98%	95.13%	94.37%	94.29%
B07	119.5	9.8	99.80%	97.20%	96.27%	95.75%	94.91%	94.83%
B08	117.4	9.8	100.27%	98.45%	97.75%	96.05%	96.84%	97.15%
B09	116.2	9.8	99.81%	97.12%	96.16%	95.65%	94.77%	94.65%
B10	119.8	10.1	100.27%	97.79%	97.19%	96.85%	96.05%	96.12%
B11	115.3	9.8	100.51%	98.65%	97.89%	97.65%	97.21%	97.50%
B12	116.3	9.8	100.26%	96.14%	96.07%	95.91%	95.43%	95.68%
B13	118.6	9.9	99.92%	96.95%	95.80%	95.11%	94.19%	94.03%
B14	118.4	9.8	99.78%	97.20%	96.00%	95.39%	94.47%	94.29%
B15	116.4	9.8	99.62%	99.54%	97.38%	96.52%	95.88%	95.00%
B16	114.5	9.8	99.29%	97.07%	95.57%	94.64%	93.69%	93.60%
B17	118.0	9.8	99.73%	97.28%	96.33%	95.71%	94.71%	94.50%
B18	116.7	9.8	99.76%	97.79%	96.87%	96.36%	95.58%	95.46%
B19	117.7	9.8	99.31%	96.06%	95.70%	95.20%	94.64%	93.63%
B20	116.2	9.8	99.65%	97.01%	95.85%	95.16%	94.21%	93.82%
B21	115.6	9.8	99.86%	98.11%	96.15%	94.86%	94.73%	93.53%
B22	115.5	9.8	99.98%	97.70%	97.06%	96.66%	96.12%	96.03%
B23	118.2	9.8	100.67%	98.38%	97.77%	96.96%	96.46%	96.52%
B24	114.7	9.8	99.91%	97.09%	95.84%	95.07%	94.10%	93.58%
B25	114.6	9.8	99.63%	96.77%	96.64%	95.54%	94.25%	94.08%
Avg.	116.6	9.8	99.94%	97.54%	96.60%	95.94%	95.24%	95.06%
Min.	113.4	9.8	99.29%	96.06%	95.57%	94.64%	93.69%	93.53%
Max.	119.8	10.1	100.67%	99.54%	97.89%	97.65%	97.21%	97.50%
Med.	116.3	9.8	99.91%	97.36%	96.61%	95.91%	95.16%	95.00%
St. Dev.	1.8	0.06	0.0034	0.0077	0.0070	0.0077	0.0093	0.0114

8.3.2.2 CCT, CIE_x, CIE_y & Chromaticity Shift($\Delta u'v'$)

S/N	Initial(0 h)			Chromaticity Shift($\Delta u'v'$)					
	CIE _x	CIE _y	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h
B01	0.4436	0.4032	2886	0.00153	0.00248	0.00236	0.00259	0.00291	0.00331
B02	0.4434	0.4018	2879	0.00150	0.00247	0.00242	0.00282	0.00323	0.00351
B03	0.4475	0.4021	2816	0.00172	0.00244	0.00239	0.00277	0.00309	0.00345
B04	0.4441	0.4015	2865	0.00150	0.00236	0.00216	0.00268	0.00309	0.00349
B05	0.4435	0.4009	2870	0.00180	0.00240	0.00244	0.00269	0.00295	0.00326
B06	0.4427	0.4003	2878	0.00175	0.00255	0.00286	0.00331	0.00376	0.00425
B07	0.4459	0.4059	2872	0.00166	0.00270	0.00280	0.00318	0.00358	0.00398
B08	0.448	0.4117	2886	0.00150	0.00194	0.00197	0.00323	0.00256	0.00279
B09	0.4463	0.402	2835	0.00170	0.00278	0.00283	0.00313	0.00349	0.00399
B10	0.4477	0.4052	2839	0.00144	0.00220	0.00230	0.00255	0.00277	0.00345
B11	0.4458	0.4051	2867	0.00158	0.00227	0.00216	0.00237	0.00259	0.00273
B12	0.4477	0.4068	2851	0.00172	0.00076	0.00130	0.00153	0.00182	0.00202
B13	0.445	0.4022	2857	0.00175	0.00262	0.00284	0.00319	0.00367	0.00416
B14	0.4478	0.4047	2834	0.00161	0.00255	0.00258	0.00309	0.00358	0.00402
B15	0.4457	0.403	2853	0.00189	0.00311	0.00336	0.00355	0.00412	0.00457
B16	0.444	0.4003	2856	0.00175	0.00270	0.00302	0.00340	0.00380	0.00430
B17	0.4457	0.4027	2849	0.00175	0.00255	0.00266	0.00313	0.00362	0.00412
B18	0.4458	0.4026	2847	0.00144	0.00228	0.00233	0.00259	0.00295	0.00345
B19	0.449	0.4063	2827	0.00184	0.00356	0.00352	0.00376	0.00429	0.00470
B20	0.4419	0.3993	2882	0.00161	0.00255	0.00280	0.00322	0.00380	0.00420
B21	0.4462	0.4037	2849	0.00177	0.00276	0.00319	0.00372	0.00416	0.00472
B22	0.449	0.4065	2829	0.00161	0.00255	0.00250	0.00269	0.00295	0.00322
B23	0.4446	0.4023	2864	0.00142	0.00206	0.00197	0.00219	0.00238	0.00256
B24	0.4456	0.4053	2872	0.00172	0.00262	0.00280	0.00326	0.00376	0.00430
B25	0.4452	0.4026	2857	0.00166	0.00270	0.00302	0.00345	0.00394	0.00434
Avg.	0.4457	0.4035	2856.8	0.00165	0.00248	0.00258	0.00296	0.00332	0.00372
Min.	0.4419	0.3993	2816	0.00142	0.00076	0.00130	0.00153	0.00182	0.00202
Max.	0.4490	0.4117	2886	0.00189	0.00356	0.00352	0.00376	0.00429	0.00472
Med.	0.4457	0.4027	2857	0.00166	0.00255	0.00258	0.00313	0.00349	0.00398
St. Dev.	0.0019	0.0027	19.41	0.00013	0.00048	0.00048	0.00051	0.00062	0.00070

9 TEMPERATURE MEASUREMENT POINT (TMP) DEFINITION

Ta (Measured Point of Ambient Temperature)



Ts (Measured Point of Case Temperature)

