

## 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 : 67-21S Series (3000K)

Manufacturer : Everlight Electronics Co., LTD

Rating : DC 150 mA

Test Standard/Method : IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources

Revision : 7

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**

Apr. 22, 2014

**2 DATE(S) OF PERFORMANCE OF THE TEST**

Apr. 24, 2014 ~Sep. 14, 2015

**3 IDENTITY OF SAMPLES**

Quantity	Model	Serial Number
25	67-21S Series	# A01- # A25(55 °C)
25	67-21S Series	# B01- # B25(85 °C)
25	67-21S Series	# C01- # C25(105 °C)

**4 TEST ITEMS**

4.1 Date Summary of Lumen and Color Maintenance

Test results were concluded by different Temperatures (Ts)

4.2 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.

4.2.1 Total Luminous Flux( $\Phi_v$ )

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.

4.2.2 Correlated Color Temperature (CCT), CIE Color Coordinate (CIE<sub>x</sub>, CIE<sub>y</sub>) & 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 2<sup>nd</sup> edition MRASUREMENT OF LEDS, CIE 15:2004 COLORIMETRY

**5 TESTING LABORATORY IS ACCREDITED BY**

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

5.2 EPA-Recognized Laboratories No.: 1125371

**6 TEST CONDITIONS**

6.1 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

6.2 Environmental Conditions:

Temperature: (25 ± 1) °C

Relative Humidity: < 65 %RH

6.3 Measurement Conditions:

Interval Time: 1000 h

Warm up Time: < 1 minute (initial)

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

6.4 UUT Conditions:

Drive Current: DC 150mA

Forward Voltage: 3V

Power Consumption: 0.5W (Rated Value)

Lumen: 50 lm – 60 lm

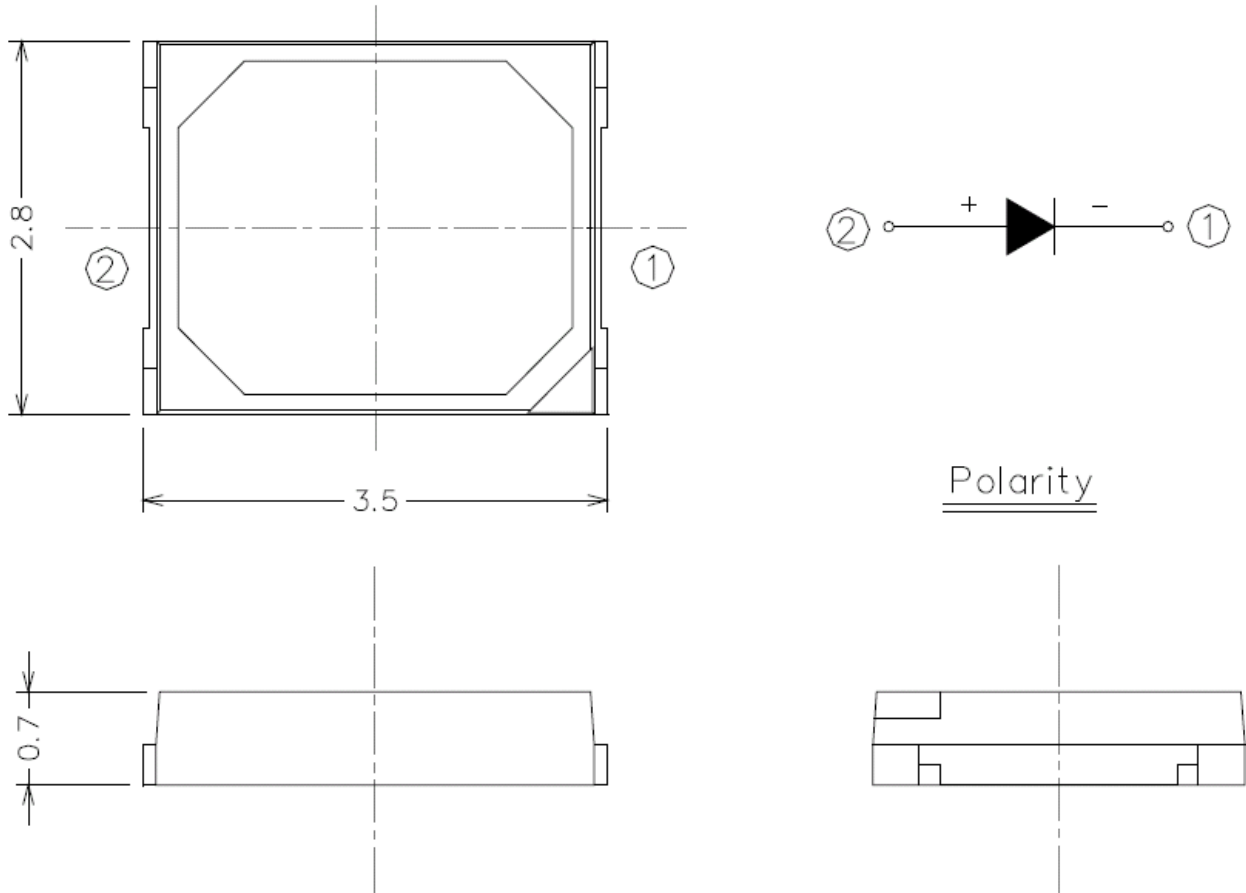
CCT: 3000K

Package Dimension: L 3.5 mm x W 2.8 mm

Prior operation: 0 h

Total Operation Duration: 10000 h

**6.5 Photograph of device**



**7 TEST SUMMARY:**

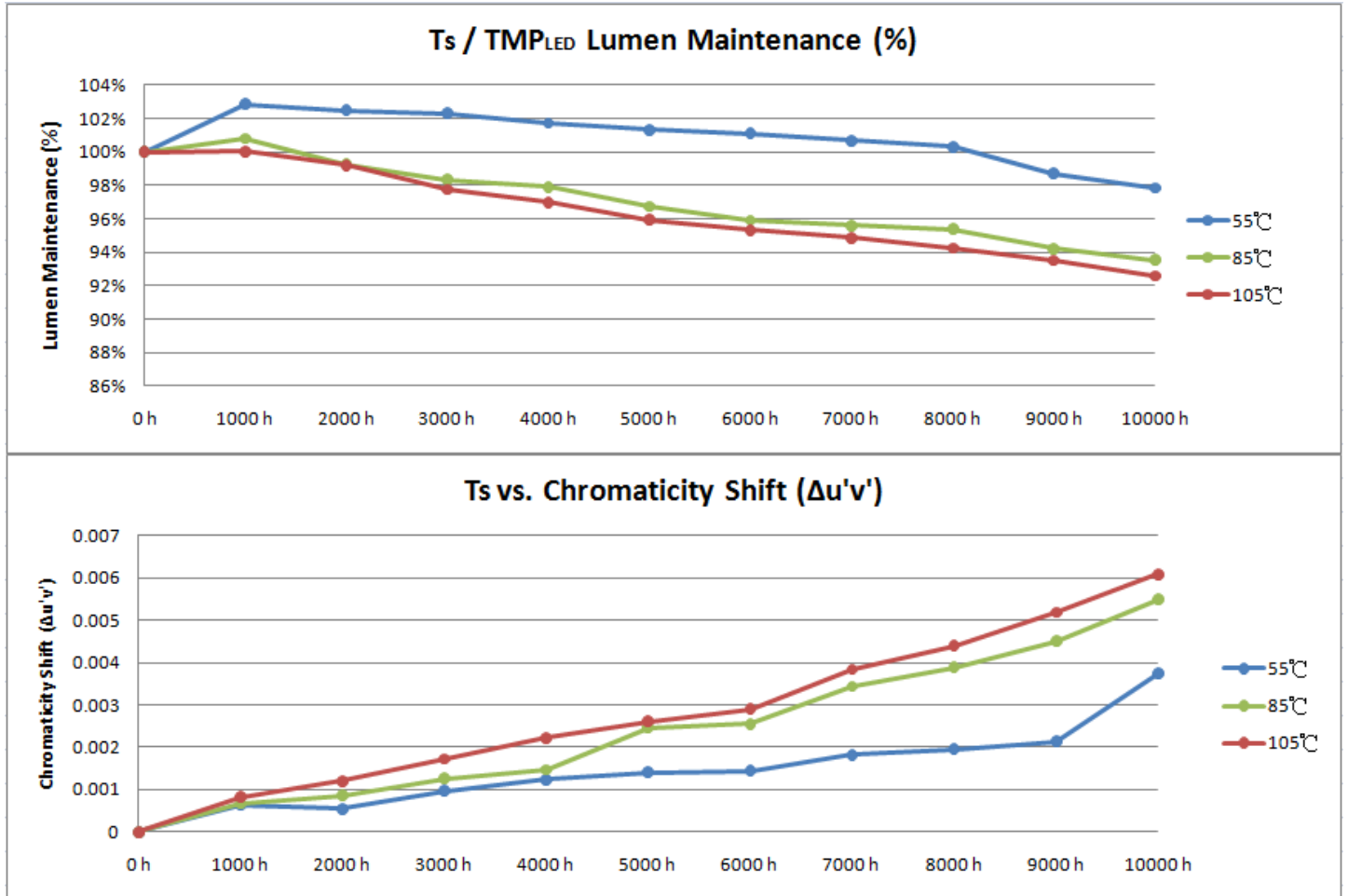
**7.1 Data Summary of Lumen and Color Maintenance**

Initial( 0 h)			Luminous Maintenance (%)										
Temp.	TLF (lm)	Vf(V)	0 h	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
55 °C	50.7	3.4	100%	102.85%	102.49%	102.29%	101.71%	101.31%	101.09%	100.67%	100.30%	98.72%	97.84%
85 °C	50.7	3.4	100%	100.81%	99.26%	98.34%	97.89%	96.74%	95.91%	95.59%	95.37%	94.21%	93.54%
105 °C	51.1	3.4	100%	100.03%	99.20%	97.74%	96.99%	95.92%	95.31%	94.87%	94.25%	93.51%	92.57%

Initial( 0 h)				Chromaticity Shift ( $\Delta u'v'$ )									
Temp.	CIE u'	CIE v'	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
55 °C	0.2494	0.5253	3009	0.00063	0.00054	0.00097	0.00123	0.00141	0.00144	0.00182	0.00196	0.00214	0.00374
85 °C	0.2491	0.5257	3014	0.00066	0.00085	0.00126	0.00146	0.00246	0.00255	0.00344	0.00389	0.00451	0.00549
105 °C	0.2497	0.5258	2998	0.00082	0.00120	0.00172	0.00222	0.00261	0.00290	0.00383	0.00440	0.00519	0.00609

7.2 Chart of lumen maintenance and TM-21 projection

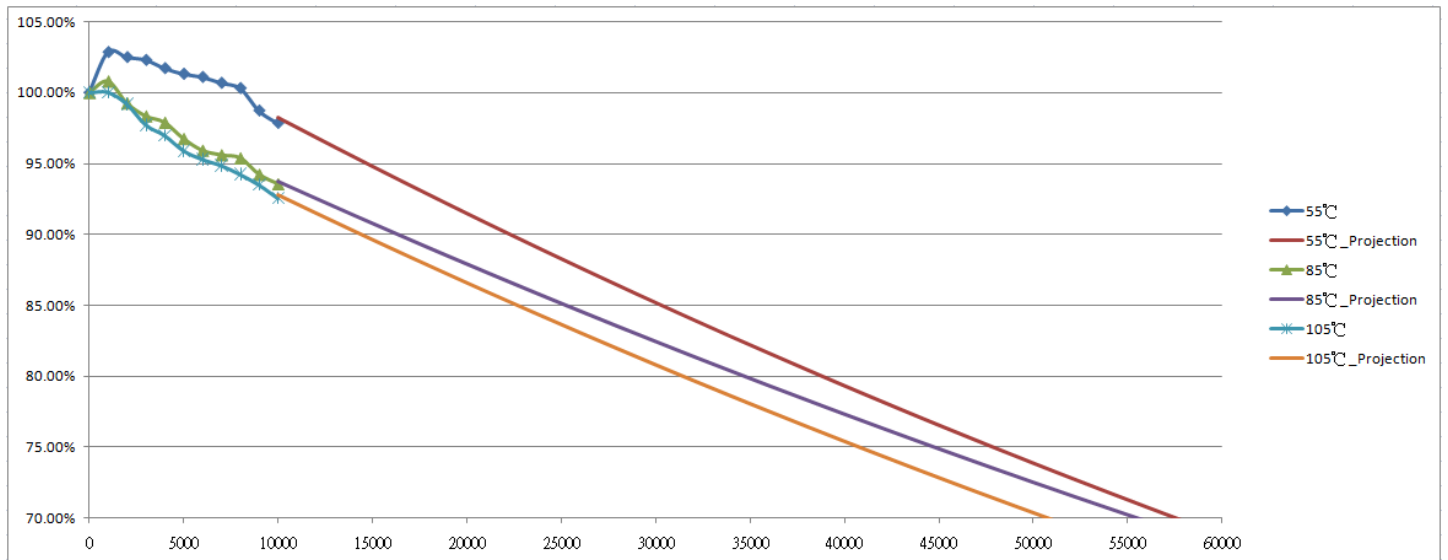
7.2.1 Chart of lumen maintenance



7.2.2 LM-80 test and TM-21 Projection

Table : Report at each LM-80 Test Condition

Case Temperature 1		Case Temperature 2		Case Temperature 3	
Temperature (°C):	55	Temperature (°C):	85	Temperature (°C):	105
Temperature (°K):	328.15	Temperature (°K):	358.15	Temperature (°K):	378.15
α:	7.13E-06	α:	6.40E-06	α:	6.90E-06
B:	1.05	B:	1.00	B:	0.99
Calculated L70 (hrs):	58000	Calculated L70 (hrs):	56000	Calculated L70 (hrs):	51000
Reported L70 (hrs):	58000	Reported L70 (hrs):	56000	Reported L70 (hrs):	51000



7.3 Lumen Maintenance and Color Maintenance Test

7.3.1 Test Condition: Ts = 55 °C

Requirement	
Case Temperature [Ts]: 54.3 °C	Average [Ts]: 54.3 °C
Ambient Temperature [Ta]: 53.1 °C	Average [Ta]: 53.1 °C
Driver Current: 150 mA	Air Flow: Minimized
Measurement Current: 150 mA	Relative Humidity: < 65 %RH

7.3.1.1 Total Luminous Flux (Φv)

S/N	Initial(0 h)		Luminous Maintenance(Φv)									
	TLF(lm)	Vf(V)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
A01	50.8	3.4	102.15%	102.27%	101.23%	100.56%	99.96%	100.04%	99.68%	99.15%	97.38%	97.07%
A02	50.8	3.4	102.09%	101.99%	101.47%	100.93%	100.44%	101.02%	100.76%	100.08%	97.94%	96.31%
A03	51.7	3.5	102.15%	101.81%	101.23%	100.89%	100.15%	100.40%	100.01%	99.71%	98.15%	97.97%
A04	51.0	3.4	102.54%	102.88%	102.27%	101.10%	100.87%	100.90%	100.40%	99.78%	97.74%	96.44%
A05	49.7	3.4	103.12%	102.81%	102.26%	101.58%	100.80%	100.55%	100.16%	99.79%	97.88%	96.43%
A06	51.6	3.5	102.87%	102.44%	101.93%	101.36%	100.74%	100.63%	100.21%	99.90%	98.02%	97.27%
A07	51.0	3.4	103.25%	103.23%	102.57%	101.92%	101.51%	101.69%	101.13%	100.76%	98.96%	97.77%
A08	51.4	3.4	103.32%	103.15%	102.80%	102.26%	101.97%	101.99%	101.44%	101.21%	99.44%	98.55%
A09	51.2	3.4	102.90%	102.49%	102.26%	101.88%	101.87%	101.50%	100.97%	100.77%	99.11%	98.90%
A10	51.2	3.4	102.51%	102.20%	101.82%	101.67%	101.21%	100.50%	100.28%	100.17%	98.58%	97.91%
A11	51.3	3.4	102.20%	102.02%	101.09%	100.59%	100.60%	100.20%	99.53%	99.35%	97.59%	96.90%
A12	51.0	3.4	102.34%	102.20%	102.07%	101.70%	101.20%	101.21%	100.74%	100.53%	98.70%	97.44%
A13	51.6	3.4	103.13%	102.77%	102.80%	102.24%	101.81%	101.67%	100.98%	100.80%	99.04%	98.35%
A14	49.0	3.5	103.68%	103.51%	103.23%	102.33%	102.23%	101.88%	101.28%	100.94%	99.29%	98.62%
A15	49.7	3.4	102.52%	102.34%	102.23%	101.70%	101.20%	101.06%	100.42%	100.13%	98.40%	97.47%
A16	50.5	3.4	102.81%	102.44%	102.60%	102.38%	101.82%	101.87%	101.28%	101.16%	99.50%	98.62%
A17	51.4	3.5	102.31%	101.61%	101.73%	101.44%	101.55%	101.32%	100.73%	100.40%	98.87%	97.97%
A18	50.7	3.5	102.82%	101.67%	102.19%	101.39%	100.96%	100.69%	100.26%	100.03%	98.53%	97.47%
A19	49.8	3.5	103.13%	102.85%	103.02%	102.35%	101.72%	101.13%	100.88%	100.67%	99.33%	97.79%
A20	50.7	3.4	104.23%	103.91%	103.21%	103.04%	102.77%	102.50%	102.22%	101.84%	100.49%	99.80%
A21	51.0	3.4	103.62%	103.09%	103.21%	102.37%	101.97%	101.50%	101.02%	100.64%	99.36%	98.58%
A22	50.8	3.4	102.77%	102.33%	102.26%	101.46%	101.02%	100.83%	100.60%	100.19%	99.00%	98.00%
A23	50.3	3.4	103.08%	102.81%	102.48%	101.73%	101.34%	100.14%	99.93%	98.81%	97.82%	96.62%
A24	49.3	3.4	103.52%	103.09%	103.19%	102.42%	102.09%	101.31%	101.41%	100.76%	99.57%	98.93%
A25	51.1	3.4	102.22%	100.40%	102.18%	101.50%	101.03%	100.76%	100.56%	100.06%	99.22%	98.81%
Avg.	50.7	3.4	102.85%	102.49%	102.29%	101.71%	101.31%	101.09%	100.67%	100.30%	98.72%	97.84%
Min.	49.0	3.4	102.09%	100.40%	101.09%	100.56%	99.96%	100.04%	99.53%	98.81%	97.38%	96.31%
Max.	51.7	3.5	104.23%	103.91%	103.23%	103.04%	102.77%	102.50%	102.22%	101.84%	100.49%	99.80%
Med.	51.0	3.4	102.82%	102.44%	102.26%	101.70%	101.21%	101.06%	100.73%	100.19%	98.87%	97.91%
STD.	0.7	0.01	0.0056	0.0072	0.0064	0.0062	0.0068	0.0064	0.0061	0.0069	0.0076	0.0091

7.3.1.2 CCT, CIE<sub>x</sub>, CIE<sub>y</sub> & Chromaticity Shift( $\Delta u'v'$ )

S/N	Initial( 0 h)			Chromaticity Shift( $\Delta u'v'$ )									
	CIE <sub>x</sub>	CIE <sub>y</sub>	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
A01	0.4377	0.4093	3033	0.00050	0.00054	0.00071	0.00100	0.00114	0.00100	0.00146	0.00177	0.00193	0.00311
A02	0.4432	0.4147	2984	0.00040	0.00073	0.00051	0.00102	0.00117	0.00100	0.00143	0.00155	0.00184	0.00405
A03	0.4408	0.4136	3015	0.00060	0.00082	0.00092	0.00102	0.00149	0.00133	0.00168	0.00187	0.00215	0.00347
A04	0.4395	0.4139	3040	0.00051	0.00060	0.00070	0.00114	0.00117	0.00122	0.00155	0.00184	0.00190	0.00389
A05	0.4363	0.4088	3052	0.00067	0.00061	0.00113	0.00150	0.00178	0.00180	0.00230	0.00242	0.00261	0.00512
A06	0.4417	0.4149	3011	0.00072	0.00061	0.00106	0.00144	0.00180	0.00175	0.00220	0.00224	0.00256	0.00432
A07	0.4404	0.4127	3014	0.00067	0.00073	0.00108	0.00148	0.00148	0.00148	0.00188	0.00210	0.00228	0.00448
A08	0.4397	0.4095	3001	0.00028	0.00022	0.00092	0.00114	0.00120	0.00130	0.00175	0.00192	0.00211	0.00332
A09	0.4459	0.4179	2967	0.00072	0.00061	0.00103	0.00117	0.00134	0.00130	0.00175	0.00193	0.00206	0.00333
A10	0.4441	0.4166	2985	0.00086	0.00061	0.00125	0.00134	0.00161	0.00161	0.00197	0.00215	0.00233	0.00389
A11	0.4388	0.4106	3024	0.00064	0.00051	0.00113	0.00144	0.00144	0.00125	0.00161	0.00179	0.00197	0.00384
A12	0.4418	0.4117	2984	0.00078	0.00061	0.00120	0.00136	0.00142	0.00161	0.00189	0.00206	0.00230	0.00452
A13	0.4377	0.409	3030	0.00067	0.00041	0.00108	0.00130	0.00144	0.00148	0.00189	0.00206	0.00225	0.00412
A14	0.4393	0.4103	3015	0.00067	0.00054	0.00103	0.00134	0.00139	0.00161	0.00192	0.00215	0.00237	0.00370
A15	0.4429	0.414	2985	0.00072	0.00060	0.00094	0.00117	0.00148	0.00148	0.00184	0.00210	0.00215	0.00375
A16	0.4432	0.414	2980	0.00086	0.00054	0.00130	0.00130	0.00153	0.00148	0.00184	0.00188	0.00211	0.00350
A17	0.4479	0.4193	2947	0.00086	0.00054	0.00121	0.00121	0.00130	0.00130	0.00162	0.00180	0.00202	0.00325
A18	0.4358	0.4079	3054	0.00063	0.00071	0.00100	0.00130	0.00153	0.00153	0.00184	0.00192	0.00211	0.00394
A19	0.4407	0.4134	3016	0.00064	0.00040	0.00086	0.00108	0.00136	0.00144	0.00184	0.00179	0.00197	0.00392
A20	0.439	0.412	3033	0.00022	0.00028	0.00042	0.00086	0.00103	0.00112	0.00148	0.00152	0.00170	0.00300
A21	0.4415	0.4117	2989	0.00045	0.00041	0.00086	0.00117	0.00130	0.00148	0.00184	0.00192	0.00211	0.00328
A22	0.4378	0.4099	3036	0.00072	0.00050	0.00114	0.00144	0.00166	0.00166	0.00197	0.00201	0.00211	0.00358
A23	0.4382	0.4094	3026	0.00058	0.00054	0.00089	0.00125	0.00148	0.00175	0.00224	0.00255	0.00264	0.00405
A24	0.4434	0.4151	2984	0.00057	0.00032	0.00081	0.00108	0.00125	0.00153	0.00184	0.00179	0.00197	0.00342
A25	0.4412	0.4164	3031	0.00067	0.00054	0.00095	0.00117	0.00139	0.00149	0.00184	0.00177	0.00193	0.00262
Avg.	0.4407	0.4127	3009.4	0.00063	0.00054	0.00097	0.00123	0.00141	0.00144	0.00182	0.00196	0.00214	0.00374
Min.	0.4358	0.4079	2947	0.00022	0.00022	0.00042	0.00086	0.00103	0.00100	0.00143	0.00152	0.00170	0.00262
Max.	0.4479	0.4193	3054	0.00086	0.00082	0.00130	0.00150	0.00180	0.00180	0.00230	0.00255	0.00264	0.00512
Med.	0.4407	0.4127	3015	0.00067	0.00054	0.00100	0.00121	0.00142	0.00148	0.00184	0.00192	0.00211	0.00375
STD.	0.0029	0.0031	27.57	0.00016	0.00014	0.00022	0.00017	0.00019	0.00022	0.00022	0.00024	0.00024	0.00054



7.3.2 Test Condition: Ts = 85 °C

Requirement	
Case Temperature [Ts]: 84.9 °C	Average [Ts]: 84.7 °C
Ambient Temperature [Ta]: 83.2 °C	Average [Ta]: 83.2 °C
Driver Current: 150 mA	Air Flow: Minimized
Measurement Current: 150 mA	Relative Humidity: < 65 %RH

7.3.2.1 Total Luminous Flux ( $\Phi_v$ )

S/N	Initial(0 h)		Luminous Maintenance( $\Phi_v$ )									
	TLF(lm)	Vf(V)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
B01	51.1	3.4	100.67%	98.26%	96.66%	95.41%	95.04%	94.24%	91.81%	91.46%	90.07%	88.92%
B02	50.4	3.4	100.42%	98.26%	97.33%	96.67%	94.74%	94.32%	94.39%	94.10%	93.72%	92.18%
B03	48.9	3.5	102.85%	101.57%	101.03%	101.29%	100.12%	99.51%	99.88%	99.37%	98.44%	97.53%
B04	48.9	3.4	102.03%	100.56%	99.70%	99.22%	97.41%	96.98%	97.06%	96.74%	96.73%	96.45%
B05	49.4	3.4	101.70%	101.23%	101.01%	101.09%	99.47%	97.84%	99.80%	99.53%	98.99%	98.56%
B06	50.1	3.4	100.74%	98.12%	96.84%	96.12%	95.92%	95.17%	94.04%	93.71%	92.15%	91.32%
B07	51.3	3.5	100.82%	99.22%	99.03%	98.80%	97.51%	96.49%	96.51%	96.31%	95.43%	94.62%
B08	49.7	3.4	101.02%	99.62%	98.46%	97.92%	96.30%	95.80%	94.88%	94.61%	93.53%	92.27%
B09	51.9	3.4	100.20%	99.05%	98.23%	97.69%	96.10%	95.21%	96.02%	95.69%	95.08%	94.53%
B10	50.7	3.4	100.25%	97.74%	96.54%	95.85%	95.37%	94.64%	92.65%	92.65%	91.73%	91.24%
B11	48.7	3.4	101.86%	100.12%	99.38%	98.96%	96.98%	96.11%	96.17%	96.22%	95.42%	95.17%
B12	52.4	3.4	101.50%	101.52%	101.51%	101.58%	100.55%	99.50%	99.63%	99.43%	97.84%	97.61%
B13	51.7	3.4	100.52%	99.75%	98.85%	98.83%	97.34%	96.39%	96.57%	96.22%	94.26%	93.63%
B14	51.5	3.4	101.74%	100.69%	99.88%	99.73%	98.53%	97.50%	97.83%	97.42%	95.74%	95.02%
B15	51.0	3.5	99.69%	98.10%	97.12%	96.78%	96.62%	95.73%	94.31%	94.38%	93.62%	93.41%
B16	50.7	3.5	100.51%	98.37%	97.08%	95.53%	95.28%	94.88%	93.21%	92.84%	91.35%	90.54%
B17	51.4	3.5	99.48%	98.20%	96.81%	96.67%	95.19%	94.59%	95.16%	95.04%	93.82%	93.61%
B18	51.3	3.4	99.70%	98.50%	97.83%	97.61%	96.09%	94.93%	94.95%	94.53%	93.17%	92.89%
B19	50.7	3.4	100.08%	98.30%	97.75%	97.39%	96.38%	95.74%	96.28%	95.89%	94.09%	93.47%
B20	50.6	3.5	100.77%	98.88%	97.34%	96.50%	96.22%	95.35%	93.63%	93.68%	91.99%	91.24%
B21	50.9	3.4	100.43%	98.99%	98.22%	97.80%	96.50%	95.58%	95.71%	95.45%	94.29%	93.86%
B22	51.6	3.4	101.09%	99.91%	98.90%	98.68%	97.15%	96.19%	96.38%	96.36%	94.78%	94.16%
B23	50.9	3.4	100.99%	98.24%	96.72%	95.89%	95.46%	94.36%	92.39%	92.32%	90.95%	89.92%
B24	51.0	3.4	100.26%	98.99%	98.31%	97.82%	96.46%	95.57%	95.58%	95.77%	94.63%	93.91%
B25	49.5	3.4	100.91%	99.30%	97.95%	97.40%	95.76%	95.11%	94.92%	94.64%	93.44%	92.44%
Avg.	50.7	3.4	100.81%	99.26%	98.34%	97.89%	96.74%	95.91%	95.59%	95.37%	94.21%	93.54%
Min.	48.7	3.4	99.48%	97.74%	96.54%	95.41%	94.74%	94.24%	91.81%	91.46%	90.07%	88.92%
Max.	52.4	3.5	102.85%	101.57%	101.51%	101.58%	100.55%	99.51%	99.88%	99.53%	98.99%	98.56%
Med.	50.9	3.4	100.74%	98.99%	98.22%	97.69%	96.38%	95.58%	95.58%	95.45%	94.09%	93.61%
STD.	1.0	0.01	0.0080	0.0114	0.0144	0.0175	0.0153	0.0143	0.0217	0.0212	0.0224	0.0240

7.3.2.2 CCT, CIE<sub>x</sub>, CIE<sub>y</sub> & Chromaticity Shift( $\Delta u'v'$ )

S/N	Initial( 0 h)			Chromaticity Shift( $\Delta u'v'$ )									
	CIE <sub>x</sub>	CIE <sub>y</sub>	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
B01	0.4408	0.4155	3030	0.00095	0.00102	0.00153	0.00188	0.00303	0.00311	0.00408	0.00463	0.00540	0.00623
B02	0.4403	0.4115	3007	0.00088	0.00082	0.00119	0.00149	0.00257	0.00247	0.00341	0.00373	0.00432	0.00533
B03	0.4375	0.4137	3071	0.00044	0.00053	0.00034	0.00042	0.00069	0.00057	0.00136	0.00201	0.00304	0.00361
B04	0.4360	0.4101	3068	0.00034	0.00009	0.00044	0.00080	0.00194	0.00193	0.00276	0.00314	0.00380	0.00474
B05	0.4372	0.4124	3065	0.00023	0.00025	0.00016	0.00024	0.00124	0.00106	0.00192	0.00244	0.00305	0.00404
B06	0.4370	0.4086	3038	0.00075	0.00137	0.00192	0.00214	0.00316	0.00297	0.00389	0.00477	0.00596	0.00637
B07	0.4425	0.4132	2985	0.00079	0.00117	0.00143	0.00152	0.00266	0.00275	0.00352	0.00406	0.00496	0.00566
B08	0.4460	0.4182	2967	0.00070	0.00098	0.00123	0.00168	0.00270	0.00265	0.00358	0.00392	0.00432	0.00552
B09	0.4397	0.4122	3022	0.00092	0.00117	0.00157	0.00186	0.00281	0.00276	0.00347	0.00392	0.00512	0.00552
B10	0.4397	0.4139	3037	0.00095	0.00138	0.00179	0.00208	0.00325	0.00343	0.00442	0.00457	0.00539	0.00617
B11	0.4362	0.4101	3064	0.00034	0.00004	0.00072	0.00087	0.00204	0.00223	0.00300	0.00335	0.00371	0.00495
B12	0.4465	0.4194	2970	0.00034	0.00022	0.00033	0.00041	0.00140	0.00146	0.00226	0.00242	0.00332	0.00402
B13	0.4440	0.4163	2986	0.00106	0.00120	0.00159	0.00160	0.00264	0.00261	0.00358	0.00406	0.00482	0.00566
B14	0.4458	0.4165	2959	0.00003	0.00026	0.00045	0.00060	0.00160	0.00170	0.00252	0.00286	0.00371	0.00446
B15	0.4412	0.4142	3014	0.00076	0.00115	0.00159	0.00168	0.00282	0.00303	0.00405	0.00430	0.00446	0.00590
B16	0.4372	0.4102	3048	0.00073	0.00098	0.00178	0.00221	0.00251	0.00313	0.00404	0.00470	0.00510	0.00630
B17	0.4441	0.4168	2987	0.00085	0.00102	0.00137	0.00163	0.00257	0.00256	0.00333	0.00378	0.00413	0.00538
B18	0.4464	0.4189	2967	0.00079	0.00084	0.00111	0.00119	0.00219	0.00233	0.00324	0.00378	0.00404	0.00538
B19	0.4398	0.4116	3017	0.00079	0.00112	0.00165	0.00166	0.00229	0.00267	0.00352	0.00406	0.00442	0.00566
B20	0.4417	0.4134	3000	0.00070	0.00103	0.00171	0.00208	0.00322	0.00345	0.00442	0.00477	0.00547	0.00637
B21	0.4429	0.4137	2983	0.00070	0.00103	0.00143	0.00144	0.00251	0.00253	0.00356	0.00413	0.00435	0.00573
B22	0.4399	0.4113	3012	0.00047	0.00076	0.00136	0.00152	0.00258	0.00265	0.00372	0.00400	0.00475	0.00560
B23	0.4410	0.4136	3012	0.00066	0.00112	0.00178	0.00215	0.00343	0.00387	0.00484	0.00533	0.00555	0.00693
B24	0.4361	0.4079	3048	0.00066	0.00089	0.00143	0.00165	0.00282	0.00299	0.00411	0.00448	0.00522	0.00608
B25	0.4444	0.4165	2981	0.00066	0.00089	0.00151	0.00174	0.00281	0.00283	0.00330	0.00407	0.00439	0.00567
Avg.	0.4410	0.4136	3013.5	0.00066	0.00085	0.00126	0.00146	0.00246	0.00255	0.00344	0.00389	0.00451	0.00549
Min.	0.4360	0.4079	2959	0.00003	0.00004	0.00016	0.00024	0.00069	0.00057	0.00136	0.00201	0.00304	0.00361
Max.	0.4465	0.4194	3071	0.00106	0.00138	0.00192	0.00221	0.00343	0.00387	0.00484	0.00533	0.00596	0.00693
Med.	0.4408	0.4136	3012	0.00070	0.00098	0.00143	0.00163	0.00258	0.00265	0.00352	0.00406	0.00442	0.00566
STD.	0.0034	0.0031	34.79	0.00025	0.00039	0.00053	0.00058	0.00067	0.00075	0.00080	0.00081	0.00080	0.00081

7.3.3 Test Condition: Ts = 105 °C

Requirement	
Case Temperature [Ts]: 104.7 °C	Average [Ts]: 104.6 °C
Ambient Temperature [Ta]: 102.0 °C	Average [Ta]: 101.8 °C
Driver Current: 150 mA	Air Flow: Minimized
Measurement Current: 150 mA	Relative Humidity: < 65 %RH

7.3.3.1 Total Luminous Flux ( $\Phi_v$ )

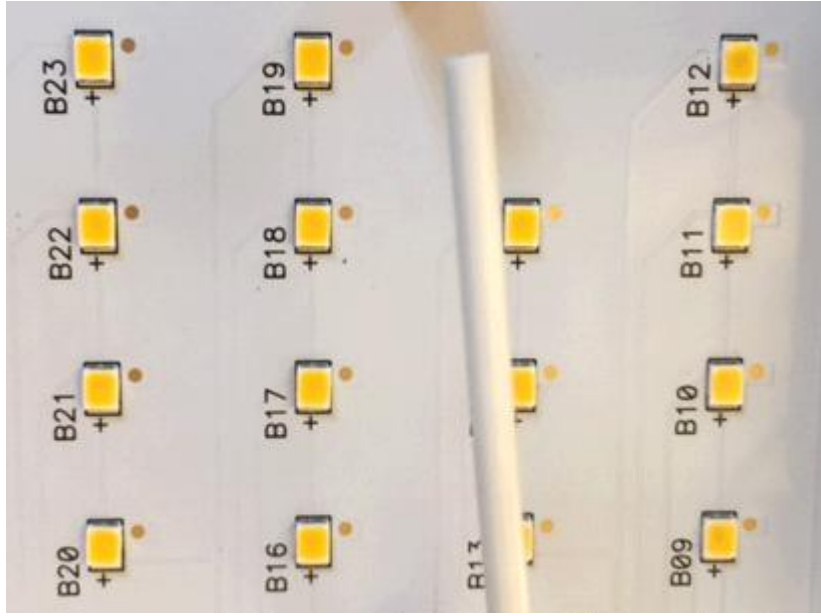
S/N	Initial(0 h)		Luminous Maintenance( $\Phi_v$ )									
	TLF(lm)	Vf(V)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
C01	51.2	3.4	99.85%	98.68%	96.73%	95.45%	95.42%	94.54%	93.07%	91.94%	91.32%	90.55%
C02	51.4	3.4	99.60%	98.78%	97.15%	96.35%	96.09%	95.17%	93.26%	92.06%	91.32%	90.46%
C03	50.7	3.4	99.92%	98.94%	96.82%	96.05%	95.65%	95.11%	92.34%	91.34%	90.74%	89.95%
C04	51.4	3.4	99.98%	99.30%	98.04%	97.00%	95.87%	94.83%	95.10%	94.02%	93.47%	92.17%
C05	52.0	3.4	100.02%	99.39%	97.94%	97.12%	95.43%	94.81%	94.68%	93.75%	93.08%	92.06%
C06	51.0	3.4	99.82%	99.09%	97.67%	97.12%	95.27%	94.69%	94.10%	93.21%	92.59%	91.31%
C07	51.1	3.4	99.46%	98.18%	96.82%	95.93%	96.11%	95.34%	93.72%	92.93%	92.48%	91.27%
C08	51.8	3.4	99.24%	98.59%	97.42%	96.48%	95.39%	94.95%	94.97%	94.26%	93.72%	92.65%
C09	51.4	3.4	99.95%	98.09%	96.42%	95.34%	95.39%	94.86%	92.21%	91.65%	91.22%	90.37%
C10	50.7	3.4	100.17%	98.54%	96.94%	96.06%	95.91%	95.42%	92.57%	91.86%	91.25%	89.96%
C11	50.1	3.4	100.31%	100.21%	99.07%	97.83%	96.50%	96.11%	95.66%	95.01%	94.54%	93.42%
C12	50.7	3.4	99.79%	99.01%	97.82%	96.72%	95.70%	95.37%	95.44%	94.96%	94.42%	93.38%
C13	51.0	3.4	102.29%	101.56%	100.12%	99.37%	98.17%	97.07%	97.72%	97.08%	96.33%	95.52%
C14	52.2	3.5	99.19%	98.41%	96.99%	96.39%	94.96%	94.40%	94.20%	93.95%	93.38%	92.24%
C15	51.1	3.5	100.31%	99.43%	97.97%	97.18%	95.68%	95.23%	95.08%	94.61%	93.92%	93.01%
C16	51.0	3.4	99.63%	98.81%	97.25%	96.62%	95.35%	94.92%	94.68%	94.30%	93.56%	92.57%
C17	52.3	3.4	99.68%	98.94%	98.04%	97.09%	95.71%	94.71%	95.23%	94.69%	93.73%	92.74%
C18	50.0	3.4	100.45%	99.21%	97.68%	96.75%	95.25%	94.56%	94.78%	94.49%	93.58%	92.06%
C19	51.4	3.4	99.66%	99.10%	97.93%	97.90%	96.71%	96.50%	96.46%	96.20%	95.46%	94.42%
C20	51.2	3.4	102.01%	101.16%	99.47%	98.68%	97.10%	96.74%	96.98%	96.65%	95.61%	94.74%
C21	52.6	3.4	99.19%	98.87%	97.67%	97.70%	96.87%	96.53%	97.11%	96.70%	95.85%	95.18%
C22	50.6	3.4	99.92%	99.54%	98.29%	98.15%	96.71%	95.99%	96.32%	95.86%	94.69%	94.18%
C23	50.3	3.4	100.10%	99.25%	97.76%	97.33%	95.82%	95.11%	95.40%	94.86%	93.83%	93.22%
C24	49.1	3.4	100.04%	99.08%	97.37%	96.83%	95.29%	94.80%	95.18%	94.80%	93.63%	93.03%
C25	51.6	3.4	100.16%	99.83%	98.10%	97.32%	95.64%	95.01%	95.48%	95.09%	94.00%	93.78%
Avg.	51.1	3.4	100.03%	99.20%	97.74%	96.99%	95.92%	95.31%	94.87%	94.25%	93.51%	92.57%
Min.	49.1	3.4	99.19%	98.09%	96.42%	95.34%	94.96%	94.40%	92.21%	91.34%	90.74%	89.95%
Max.	52.6	3.5	102.29%	101.56%	100.12%	99.37%	98.17%	97.07%	97.72%	97.08%	96.33%	95.52%
Med.	51.1	3.4	99.92%	99.08%	97.68%	97.00%	95.70%	95.11%	95.08%	94.49%	93.63%	92.65%
STD.	0.8	0.01	0.0072	0.0081	0.0086	0.0095	0.0073	0.0074	0.0146	0.0162	0.0152	0.0159

7.3.3.2 CCT, CIE<sub>x</sub>, CIE<sub>y</sub> & Chromaticity Shift( $\Delta u'v'$ )

S/N	Initial( 0 h)			Chromaticity Shift( $\Delta u'v'$ )									
	CIE <sub>x</sub>	CIE <sub>y</sub>	CCT	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h	10000 h
C01	0.4443	0.4159	2978	0.00081	0.00132	0.00200	0.00314	0.00383	0.00415	0.00535	0.00579	0.00665	0.007561
C02	0.4464	0.4182	2962	0.00080	0.00126	0.00181	0.00250	0.00313	0.00354	0.00451	0.00495	0.00582	0.006694
C03	0.4457	0.417	2963	0.00080	0.00130	0.00181	0.00260	0.00334	0.00386	0.00485	0.00522	0.00604	0.006926
C04	0.4469	0.4193	2963	0.00090	0.00117	0.00155	0.00211	0.00210	0.00240	0.00324	0.00369	0.00449	0.005536
C05	0.4414	0.4116	2990	0.00081	0.00122	0.00181	0.00255	0.00329	0.00364	0.00483	0.00541	0.00631	0.007256
C06	0.4394	0.4093	3005	0.00081	0.00102	0.00160	0.00211	0.00285	0.00329	0.00434	0.00492	0.00592	0.006946
C07	0.4389	0.4116	3030	0.00132	0.00202	0.00240	0.00321	0.00367	0.00391	0.00487	0.00561	0.00657	0.007741
C08	0.442	0.413	2992	0.00090	0.00117	0.00160	0.00211	0.00209	0.00206	0.00300	0.00352	0.00444	0.005382
C09	0.4403	0.4114	3006	0.00091	0.00130	0.00190	0.00269	0.00341	0.00388	0.00494	0.00556	0.00640	0.007341
C10	0.4426	0.4123	2976	0.00091	0.00140	0.00202	0.00263	0.00345	0.00386	0.00474	0.00541	0.00624	0.007023
C11	0.4402	0.4133	3023	0.00042	0.00099	0.00122	0.00194	0.00220	0.00252	0.00349	0.00405	0.00487	0.005692
C12	0.4379	0.4131	3059	0.00091	0.00126	0.00160	0.00221	0.00212	0.00228	0.00305	0.00358	0.00448	0.005186
C13	0.4437	0.4152	2982	0.00050	0.00094	0.00117	0.00153	0.00140	0.00151	0.00231	0.00286	0.00358	0.004294
C14	0.4384	0.4107	3033	0.00120	0.00155	0.00230	0.00271	0.00316	0.00349	0.00449	0.00519	0.00604	0.007134
C15	0.4419	0.4145	3005	0.00081	0.00098	0.00141	0.00170	0.00180	0.00197	0.00273	0.00333	0.00402	0.004494
C16	0.442	0.4136	2997	0.00070	0.00103	0.00140	0.00170	0.00171	0.00192	0.00261	0.00330	0.00392	0.004604
C17	0.44	0.4114	3011	0.00063	0.00050	0.00206	0.00150	0.00210	0.00251	0.00362	0.00452	0.00559	0.006351
C18	0.4391	0.4102	3017	0.00080	0.00122	0.00182	0.00224	0.00294	0.00316	0.00409	0.00461	0.00537	0.00645
C19	0.4421	0.4139	2997	0.00091	0.00117	0.00136	0.00165	0.00160	0.00175	0.00251	0.00295	0.00367	0.004342
C20	0.4394	0.41	3010	0.00050	0.00099	0.00161	0.00200	0.00235	0.00267	0.00338	0.00403	0.00470	0.005644
C21	0.4365	0.4078	3040	0.00081	0.00098	0.00120	0.00150	0.00152	0.00161	0.00244	0.00300	0.00348	0.004328
C22	0.4431	0.4143	2984	0.00091	0.00108	0.00141	0.00180	0.00214	0.00235	0.00329	0.00386	0.00452	0.005636
C23	0.444	0.4159	2983	0.00090	0.00126	0.00170	0.00220	0.00253	0.00289	0.00379	0.00431	0.00506	0.006042
C24	0.4446	0.4178	2987	0.00080	0.00141	0.00209	0.00257	0.00307	0.00332	0.00435	0.00483	0.00546	0.006401
C25	0.4455	0.4161	2960	0.00071	0.00140	0.00206	0.00269	0.00351	0.00390	0.00498	0.00550	0.00617	0.007245
Avg.	0.4419	0.4135	2998.1	0.00082	0.00120	0.00172	0.00222	0.00261	0.00290	0.00383	0.00440	0.00519	0.00609
Min.	0.4365	0.4078	2960	0.00042	0.00050	0.00117	0.00150	0.00140	0.00151	0.00231	0.00286	0.00348	0.00429
Max.	0.4469	0.4193	3059	0.00132	0.00202	0.00240	0.00321	0.00383	0.00415	0.00535	0.00579	0.00665	0.00774
Med.	0.4420	0.4133	2997	0.00081	0.00122	0.00170	0.00220	0.00253	0.00289	0.00379	0.00452	0.00537	0.00635
STD.	0.0028	0.0029	25.96	0.00019	0.00027	0.00034	0.00049	0.00074	0.00084	0.00094	0.00094	0.00101	0.00111

**8 TEMPERATURE MEASUREMENT POINT (TMP) DEFINITION**

Ta (Measured Point of Ambient Temperature)



Ts (Measured Point of Case Temperature)

