TEKNİK ŞARTNAME SUNUM

SUPRA | 4676

30x60 SIVA ALTI LED PANEL ARMATÜR

DÖKÜMAN NO

INO_TSS_4676

İNOLED AYDINLATMA A.Ş.
Selimpaşa Mahallesi, 5007. Sokak, B Blok, No: 13/2
Silivri / İstanbul / Türkiye
www.inoled.com.tr

Revizyon No
Rev.00

Yayın Tarihi
15.04.2026

İÇİNDEKİLER

SUPRA
4676

30x60 SIVA ALTI LED PANEL ARMATÜR

OPTİK VE ELEKTRİKSEL PERFORMANS

- Armatür güç tüketimi 17 W'ın maksimum %5 üzerinde olmalıdır.
- Armatür toplam ışık akısı 1870 lm ±%10 olmalıdır.
- 3000K, 4000K ve 6500K ±%5 renk sıcaklığına sahip olmalıdır.
- CRI (renksel geriverim indeksi) ≥80 olmalıdır.
- Armatür optik açısı 120° ±%10 olmalıdır.
- Yüksek optik verim için yüksek geçirgenlikli opal difüzör kullanılmalıdır.
- LED paket ömrü minimum L70 ≥102.000 saat olmalıdır.
- LED'ler PCB üzerine SMD teknolojisi ile otomatik lehimleme yöntemiyle monte edilmiş olmalıdır.
- LED PCB iç bağlantısı terminal blok konnektör ile sağlanmalıdır.
- Yalıtım koruma sınıfı Class II olmalıdır.
- Ters polarite koruması bulunmalıdır. LED'ler ters polarize edilmemelidir.

SÜRÜCÜ

- Sürücü 50-60 Hz, 198-264 V AC gerilim aralığında çalışmalıdır.
- EN IEC 61347-1 ve EN IEC 61347-2-13 standartlarına uygun ENEC belgeli LED sürücü kullanılmalıdır.
- Sürücü güç faktörü ≥0,95 olmalıdır.
- Sürücü verimliliği minimum %87 olmalıdır.
- THD gerilim <%3, akım <%15 olmalıdır.
- Minimum 1 kV ani gerilim darbelerine dayanıklı olmalıdır.
- Sürücü kısa devre korumasına sahip olmalıdır.
- Sürücü açık devre korumasına sahip olmalıdır.
- Sürücü aşırı yük korumasına sahip olmalıdır.

MEKANİK YAPI

- Armatür 295x595 mm ölçülerinde olmalıdır. Yüksekliği minimum 65 mm olmalıdır.
- Gövde minimum 0,50 mm kalınlığında DKP sacdan imal edilmiş olmalıdır.
- Çerçeve minimum 0,70 mm kalınlığında DKP sacdan imal edilmiş olmalıdır.
- Gövde RAL 9003 elektrostatik toz boyalı olmalıdır.
- Armatür minimum 1 mm kalınlığında opal PMMA difüzöre sahip olmalıdır.
- Kullanım, montaj ve bakım sırasında yaralanmaya sebep olabilecek keskin kenar, çapak ve sivri yüzeyler bulunmamalıdır.
- Sürücü veya LED modüllerden herhangi birinin arızalanması durumunda ürün değiştirilebilir yapıda olmalıdır.
- Armatürün; toz ve sıvı girişine karşı koruma sınıfı TS EN 60598-2-2'ye göre IP40 olmalıdır.
- Armatürün; dış mekanik darbelere karşı dayanımı en az TS EN 62262'ye göre IK04 olmalıdır.

DİĞER ÖZELLİKLER

- Armatürün çalışma sıcaklık aralığı -30 °C ~ +45 °C olmalıdır.
- Ağırlık 1,85 kg ±%5 olmalıdır.
- Armatürün bütünü ile imalat kaynaklı hatalara karşı 5 yıl garantiye sahip olmalıdır.
- Led üretim tesisi ESD (Elektro Statik Deşarj) korumalı olmalıdır.
- Armatürler güvenle sevke uygun olarak paketlenecektir. Her ambalajlanmış olan ürün üzerinde üretici ismi, ürün modeli içeren etiket bulunacaktır. Her ürünün detaylı kullanma kılavuzu kutu içerisinde bulunmalıdır.

UYGUNLUK VE ÜRETİCİ

- Üretici firma geçerli kapasite raporuna sahip olmalıdır.
- Üretici firma yerli malı belgesine sahip olmalıdır.
- Üretici firma marka tescil belgesine sahip olmalıdır.

BELGELER

- Armatür TS EN 60598-1, TS EN 60598-2-2 standardına uygun olarak tasarlanıp, test edilip, üretilmelidir ve ilgili TSE belgeleri sunulmalıdır.
- CE deklarasyonuna sahip olup ilgili belgeler sunulmalıdır.
- LED ışık kaynağı için LM-80 test raporu sunulmalı, ömür projeksiyonu IES TM-21 metoduna göre hesaplanmış olmalıdır.
- Led armatür için LM79 (TS EN 13032) fotometrik raporları bağımsız bir akredite laboratuvar tarafından hazırlanmış olmalı ve sunulmalıdır.
- Üretici firma, TSE tarafından CIG23 kapsamında yılda en az bir kez üretim yeri denetimine tabi tutulmalı olup, bu denetimlerin sürekliliği belgelendirilip, sunulmalıdır.
- LED Sürücülerin ENEC Belgeleri sunulmalıdır.
- Armatüre ait teknik veri dosyası (datasheet) sunulmalıdır.
- Armatüre ait Eulumdat (.ldt) dosyaları sunulmalıdır.

TEKNİK VERİ DOSYASI

SUPRA

17W SIVA ALTI BACKLIGHT LED PANEL ARMATÜR

4676

Kullanım Alanları

- Ofis aydınlatmaları
- Market ve Süpermarketler
- Asansör Lobileri, Oteller ve Konferans Salonları
- Okullar ve Eğitim Kurumları
- Mağazalar ve AVM'ler

Genel Özellikler

Gövde Materyali	:	DKP SAC (>0,5mm)
Çerçeve Materyali	:	DKP SAC (>07mm)
Difüzör Materyali	:	PMMA (Polimetil Metakrilat)
Ürün Rengi	:	RAL 9016
Darbe Dayanımı	:	IK 04
IP Seviyesi	:	IP40
Çalışma Sıcaklığı	:	-30°C ~ +45°C
Ürün Ömrü	:	50.000 saat
Dim Özelliği	:	Dim Edilemez
Montaj Tipi	:	Sıva Altı Montaj

Elektriksel Özellikler

Güç	:	17W ±%10
Çalışma Gerilimi	:	220-240V AC
Çalışma Frekansı	:	50/60 Hz
Güç Faktörü	:	≥0,95
Flicker Oranı	:	PST LM≤1.0 SVM≤0.4 (Flicker Yapmaz)
Koruma Sınıfı	:	II

Optik Özellikler

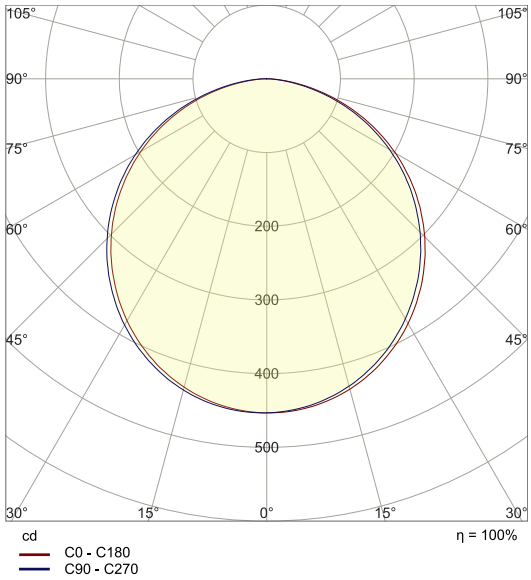
Işık Akısı	:	1870 Lm ±%10
Aydınlatma Verimi	:	110 Lm/w ±%10
Renksel Geriverim Endeksi (CRI)	:	≥80
Işık Açısı	:	120°
Renk Sıcaklığı	:	6500K, 3000K, 4000K
Renk Toleransı (SDCM)	:	≤ 3
Fotobiyolojik Risk Grubu	:	RG0 - IEC 62471

EU 2019/2015 Enerji verimliliği direktifine göre güç ve ışık akısı değerleri için ±10% tolerans mevcuttur.

Teknik Veri Dosyası

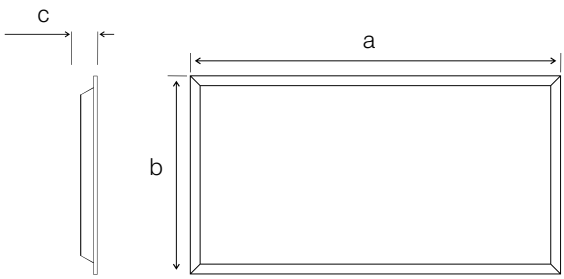
LED Çipi Özellikleri

LED Markası : OSRAM LED
LED Modeli : GW JTLRS1.EM
LED Ömrü : 102.000 saat



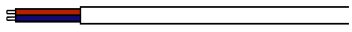
Işık Şiddeti Dağılım Eğrisi (Polar)

Boyutlar & Ağırlık



a	b	c	Ağırlık
295 mm	595 mm	65 mm	1850 g

Kablo Uzunluğu



125mm

Paketleme Verisi

Ürün Kodu	Koli İçi Miktar	Koli Ağırlığı
4676	5 adet	10 kg

Teknik Veri Dosyası

TÜRK STANDARDLARI ENSTİTÜSÜ

TÜRK STANDARDLARINA UYGUNLUK BELGESİ

TURKISH STANDARDS INSTITUTION

CERTIFICATE OF CONFORMITY TO TURKISH STANDARDS

Markanın Tanımı Description of the Mark

TSE veya/or  veya/or TSE

BELGE NUMARASI *REFERENCE NUMBER OF LICENCE*	102860-TSE-02/03
BELGENİN İLK VERİLİŞ TARİHİ *DATE OF FIRST ISSUE OF LICENCE*	01.06.2023
BELGENİN SON GEÇERLİLİK TARİHİ *LICENCE VALID UNTIL*	08.01.2026
BELGE SAHİBİ KURULUŞUN ADI *NAME OF THE LICENCE HOLDER*	TELSA ELEKTRİK AYDINLATMA SANAYİ TİCARET LİMİTED ŞİRKETİ
BELGE SAHİBİ KURULUŞUN ADRESİ *ADRESS OF THE LICENCE HOLDER*	SELİMPAŞA MAHALLESİ, 5007. SK. NO:13, 34590 SİLİVRİ İSTANBUL/TÜRKİYE
ÜRETİM YERİ ADI *NAME OF THE MANUFACTURING PLACE*	TELSA ELEKTRİK AYDINLATMA SAN. TİC. LTD. ŞTİ
ÜRETİM YERİ ADRESİ *ADRESS OF THE MANUFACTURING PLACE*	SELİMPAŞA MAHALLESİ, 5007. SK. NO:13, 34590 SİLİVRİ İSTANBUL / TÜRKİYE
İPTAL EDİLEN BELGE NUMARASI (Varsa) *INDICATION OF SUPERSEDED LICENCE (if any)*	102860-TSE-02/02
TESCİLLİ TİCARİ MARKASI *REGISTERED TRADE MARK*	inoled
İLGİLİ TÜRK STANDARDI *RELATED TURKISH STANDARD*	TS EN 60598-2-2 / 11.09.2014 -- TS EN IEC 60598-1 / 12.04.2021 -- TS EN IEC 60598-1/A11 / 28.04.2022

BELGE KAPSAMI
SCOPE OF LICENCE

LUMIA Model (Ürün Kodu: 4274), 220-240 V, 50/60 Hz., II Sınıfı, IP40, Max 40 W Sıva Altı Backlight LED Panel (K.G.: 23.06.2025)
SUPRA Model, 220-240 V, 50/60 Hz., II Sınıfı, IP40, 30x30, 30x60, 30x120, 60x60, 12-36 W Arası (dahil) Sıva Altı Backlight LED Panel (K.G.: 23.06.2025)
LADIA Model, 220-240 V, 50/60 Hz., II Sınıfı, IP40, 8-28 W arası (dahil) Sıva Altı Downlight LEDli Armatür (K.G.: 23.06.2025)

e-imzalı/e-signed

24.06.2025

Belgelendirme Merkezi Başkanı Adına
Musa TOKKAN

İSTANBUL BELGELENDİRME MÜDÜRÜ V.

TSE Belgesi

*TSE İSTANBUL BELGELENDİRME MÜDÜRLÜĞÜ * Adres: Çayırova Tren İstasyonu Yanı ÇAYIROVA/GEBZE * Telefon: 2627231273* Faks: 2627231606
*TSE BELGELENDİRME MERKEZ BAŞKANLIĞI; Adres: Necatibey Cad. No:112 06100 Bakanlıklar/ANKARA – Telefon: 0 312 416 64 81 / 416 64 27, Faks:0 312 416 66 17 E-posta :bmb@tse.org.tr , web : www.tse.org.tr

AT UYGUNLUK BEYANI
EC DECLARATION OF COMFORMITY

Firma / *Firm* : İNOLED AYDINLATMA A.Ş.
Adres / *Adress* : Selimpaşa Mahallesi, 5007. Sokak No:13, 34590, Silivri/İstanbul Türkiye

Ticari Marka / *Trade Mark* : INOLED
Ürün Tanımı / *Product Description* : SUPRA BACKLIGHT LED PANEL ARMATÜR
SUPRA BACKLIGHT LED PANEL LUMINAIRE
Ürün Kodu / *Item Code* : 4664, 4670, 4674, 4676, 4678, 4684

İLGİLİ STANDARTLAR / *Related Standards*

LVD
: EN 60598-1:2021
: EN 60598-2-2:2012
: EN 61347-1:2015+A1:2021
: EN 61347-2-13:2014+A1:2017
: EN 62031:2020

EMC
: EN 55015:2019+A11:2020
: EN 61547:2009
: EN 61000-3-2:2014
: EN 61000-3-3:2013+A1:2019

İLGİLİ DİREKTİFLER / *Related Directives*

: 2014/35/EU
: 2014/30/EU

YETKİLİ

ADI SOYADI : SERDAR ASLAN
ÜNVANI : GENEL MÜDÜR
TARİH : 6.01.2026

İMZA

İNOLED AYDINLATMA A.Ş.
Selimpaşa Mah. 5007. Sok. B Blok No: 13/2
Silivri/İstanbul - Silivri V.D. 478 122 8914

Bu Direktifin gerektirdiği teknik yapı dosyası İNOLED AYDINLATMA A.Ş. Şirketinin Merkezinde saklanmaktadır.
The required technical files of this Directive is kept at the Head Office of İNOLED AYDINLATMA A.Ş.

CE Uygunluk Beyanı

Selimpaşa Mahallesi, 5007. Sokak No:13, 34590, Silivri/İstanbul Türkiye T: 0212 512 08 73 F: 0212 690 19 42
www.inoled.com.tr

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

C E R T I F I C A T E

No. U6 004006 0279 Rev. 00

Holder of Certificate: **Lifud Technology Co., Ltd.**
(1/F-3/F, Building F, Kutto Industrial Park)
1/F-3/F, Building B, No.26 Xinhe Road
Xinqiao Community, Xinqiao Street
Bao'an District
518104 Shenzhen, Guangdong
PEOPLE'S REPUBLIC OF CHINA

Certification Mark:

Product: **Power supplies (LED Driver)**

The product was voluntarily tested according to the listed standards. The product can be marked with the certification mark shown above. It is not permitted to alter the certification mark in any way. In addition, the certificate holder must not transfer the certificate to third parties. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: www.tuvsud.com/ps-cert

Test report no.: 64142235021901

Date, 2023-09-26

(Taylor Yao)

ENEC Sertifikası

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

C E R T I F I C A T E

No. U6 004006 0279 Rev. 00

Model(s):

**LF-GIF009YS; LF-GIF009YS0250H;
LF-GIF009YS0220H; LF-GIF009YS0200H;
LF-GIF009YS0180H; LF-GIF009YS0160H;
LF-GIF009YS0135H; LF-GIF013YS;
LF-GIF013YS0350H; LF-GIF013YS0300H;
LF-GIF013YS0250H; LF-GIF013YS0200H;
LF-GIF018YS0500H; LF-GIF018YS0450H;
LF-GIF018YS0400H; LF-GIF018YS0350H;
LF-GIF018YS(D)0500H; LF-GIF018YS(D)0450H;
LF-GIF018YS(D)0400H; LF-GIF018YS(D)0350H;
LF-GIF024YS0600H; LF-GIF024YS0550H;
LF-GIF024YS0500H; LF-GIF024YS0450H;
LF-GIF024YS(D)0600H; LF-GIF024YS(D)0550H;
LF-GIF024YS(D)0500H; LF-GIF024YS(D)0450H**

Brand Name: **LiFud**

Parameters:

Rated Input Voltage: 220-240VAC
Rated Frequency: 50/60Hz
Rated Input Current: See below table for details
Rated Output: See below table for details
Protection against Electric Shock: Class II; SELV
Degree of Protection: IP20
Method of Installation: Independent
Type of Output: Constant current type
ta: 50°C
tc: See below table for details

Tested according to:

EN 61347-2-13:2014/A1:2017
EN 61347-1:2015/A1:2021
EN IEC 62384:2020

Production Facility(ies):

093012

ENEC Sertifikası

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

TÜV®

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

CERTIFICATE

No. U6 004006 0279 Rev. 00

Model	Rated Input Current (A) Max.	Output Voltage (VDC)	I_{rated} (mA)	U_{out} (VDC)	P_{rated} (W)	Value of tc (°C)
LF-GIF009YS	0.07	25-42	100	55	4.2	75
			150		6.3	
			200		8.4	
			250		10.5	
LF-GIF009YS0250H	0.07	25-42	250	55	10.5	
LF-GIF009YS0220H	0.07	25-42	220	55	9.2	
LF-GIF009YS0200H	0.07	25-42	200	55	8.4	
LF-GIF009YS0180H	0.07	25-42	180	55	7.5	
LF-GIF009YS0160H	0.07	25-42	160	55	6.7	
LF-GIF009YS0135H	0.07	25-42	135	55	5.6	
LF-GIF013YS	0.09	25-42	200	55	8.4	85
			250		10.5	
			300		12.6	
			350		14.7	
LF-GIF013YS0350H	0.09	25-42	350	55	14.7	
LF-GIF013YS0300H	0.09	25-42	300	55	12.6	
LF-GIF013YS0250H	0.09	25-42	250	55	10.5	
LF-GIF013YS0200H	0.09	25-42	200	55	8.4	
LF-GIF018YS0500H	0.13	25-36	500	55	18	85
LF-GIF018YS0450H	0.13	25-40	450	55	18	
LF-GIF018YS0400H	0.13	25-42	400	55	16.8	
LF-GIF018YS0350H	0.13	25-42	350	55	14.7	
LF-GIF018YS(D)0500H	0.13	25-36	500	55	18	
LF-GIF018YS(D)0450H	0.13	25-40	450	55	18	
LF-GIF018YS(D)0400H	0.13	25-42	400	55	16.8	
LF-GIF018YS(D)0350H	0.13	25-42	350	55	14.7	
LF-GIF024YS0600H	0.2	25-39	600	55	23.4	85
LF-GIF024YS0550H	0.2	25-42	550	55	23.1	
LF-GIF024YS0500H	0.2	25-42	500	55	21	
LF-GIF024YS0450H	0.2	25-42	450	55	18.9	
LF-GIF024YS(D)0600H	0.2	25-39	600	55	23.4	
LF-GIF024YS(D)0550H	0.2	25-42	550	55	23.1	
LF-GIF024YS(D)0500H	0.2	25-42	500	55	21	
LF-GIF024YS(D)0450H	0.2	25-42	450	55	18.9	

ENEC Sertifikası

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

TÜV®

TMCLAB TEST VE BELGELENDİRME HİZ. SAN. VE TİC. A.Ş.

AB-2033-T
TMCTR260079
04- 26

DENEY RAPORU
TEST REPORT

Müşterinin Adı / Adresi : **İNOLED AYDINLATMA A.Ş.**
Customer Name / Address : **SELİMPAŞA MAHALLESİ, 5007. SOKAK, B BLOK, NO: 13/2, 34590 SİLİVRİ/İSTANBUL TÜRKİYE.**

İstek Numarası : **TMCSP0081**
Order number

Numunenin Adı ve Tarifi : **17W 30x60 BACKLIGHT SIVA ÜSTÜ LED PANEL ARMATÜR (6500K)**
Name and identity of test item

Numunenin Kabul Tarihi : **13.04.2026**
The date of receipt of test item

Açıklamalar :
Remarks

Deneyin Yapıldığı Tarih : **15.04.2026**
Date of Test

Raporun Sayfa Sayısı :**7**
Number of pages of the Report

Deney laboratuvarı olarak faaliyet gösteren TMCLAB TEST VE BELGELENDİRME HİZMETLERİ SANAYİ VE TİCARET ANONİM ŞİRKETİ, TÜRKAK'tan AB-2033-T Akreditasyon dosya numarası ile *TS EN ISO/IEC 17025:2017* standardına göre akredite edilmiştir.
TMCLAB Test ve Belgelendirme Hizmetleri San. ve Tic. A.Ş. accredited by TÜRKAK under registration number AB- 2033-T *for TS EN ISO/IEC 17025:2017 as test laboratory.*
Türk Akreditasyon Kurumu(TÜRKAK) deney raporlarının tanınırlığı konusunda Avrupa Akreditasyon Birliği (EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanıma anlaşması imzalamıştır.
Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of test reports
Deney ve /veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.
The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are

Mühür/Kaşe *Seal*	**Yayımlandığı Tarih** *Date*	**Laboratuvar Deney Personeli** *Laboratory Test Personnel*	**Laboratuvar Müdürü** *Laboratory Manager*
	22.04.2026		

LM-79 Fotometrik Raporu

"*" işaretli deneyler akreditasyon kapsamı dahilinde değildir.
Bu raporun hiçbir bölümü tek başına veya kısmen kullanılamaz ve TMCLAB Test ve Belgelendirme Laboratuvarı'nın izni olmadan çoğaltılamaz. İmzasız raporlar geçersizdir.
This report shall not be reproduced other than in full except with permission of the laboratory. Test reports without signature are not valid.

İÇİNDEKİLER
Contents

LM-79 Fotometrik Raporu

1. Deney Standarttı (*Test Standard*)

☐	*TS EN 60598-1:2024*	☐	*TS EN 60598-2-5:2016*	☐	*TS EN 60068-2-75:2014*	☐	*TS EN 13032-2:2017*
☐	*TS EN IEC 60598-2-1:2021*	☐	*TS EN 60204-1+A1:2019*	☐	*TS EN 60068-1:2014*	☐	*TS EN 13032-4:2019*
☐	*TS EN 60598-2-2:2024*	☐	*TS EN 60598-2-13:2010*	☐	*TS EN 60068-2-1:2008*	☑	*LM 79-19*
☐	*TS 8700 EN 60598-2-5:2016*	☐	*TS 3033 EN 60529:1997*	☐	*TS EN 60068-2-2:2008*	☐	*LM 82-20*
☐	*TS EN 60598-2-3:2005 (*)*	☐	*TS EN 62262:2002*	☐	*TS EN 13032-1:2012*	☐	*TS EN ISO 2808:2019*
☐	*TS EN ISO 2409:2020*	☐		☐		☐	

2. Deney Sonuçları (Test Results):

Sonuçlar ek sayfalarda verilmiştir.
Results are given at next pages

3. Deney Çevre Şartları (*Test Environmental Conditions*)

Ortam Sıcaklığı : 23.0 °C ± 2.0 °C
Ambient Temperature

Bağıl Nem : 50.0 %Rh ± 20.0 %Rh
Relative Humidity

4. Ölçüm Belirsizliği (*Measurement Uncertainty):*

Deney sonuçları ile ilgili uygunluk beyanı verildiğinde, ölçüm belirsizliği değeri PR-14 Karar Kuralı Prosedürüne "Basit Kabul Karar Kuralına" göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır.
When a declaration of conformity is made regarding the test results, the measurement uncertainty value is evaluated according to the "Simple acceptnce Rule" in PR-14 Decision Rule Procedure and the results are reported as is without evaluating the measurement uncertainty.

Genişletilmiş ölçüm belirsizlikleri müşteri talebi veya yasal mevzuatlar zorunlu kıldığı durumlarda belirtilir.
Beyan edilen genişletilmiş ölçüm belirsizliği, standart belirsizliğin, k=2 olarak alınan genişletme katsayısı ile çarpımı sonucunda bulunan değerdir ve %95 oranında güvenilirlik sağlamaktadır.
Extended measurement uncertainties are specified when required by customer request or legal regulations.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

5. Feragat beyanı (*Disclaimer)*
Müşterinin özel talebi veya yasal gereklilik olmaması durumunda, uygunluk değerlendirmesi yapılmaz.
In the event that the customer has no special request or legal requirement, a conformity assessment is not made.

Deney sonuçları sadece deneyi yapılan numunenin teslim alındığı hâli için geçerlidir.
Test results are only related to the sample delivered to the laboratory.

Numuneye ait bilgiler müşteri tarafından sağlanmış olup bilgilerin doğruluğu laboratuvarımızın sorumluluğunda değildir.
The information regarding the sample is provided by the customer and our laboratory is not responsible for the accuracy of the information.

6. Karar kuralının açık tanımı (*Definition of Decision Rule)*:
PR-14 Karar Kuralı Prosedürüne göre Basit Kabul Karar Kuralı uygulanır. / *Simple Acceptance Deicision Rule applied as PR-14 Decision Rule Procedure*

Sonuçların teslim alınan numune için geçerli olduğuna dair beyan / *Statement that the results are valid for the sample received:*
Deney sonuçları sadece yukarıda bilgileri verilen teste ait olup, test tarihinden itibaren ve raporda belirtilmiş olan şartlar altında geçerlidir. Bu raporda verilen sonuçlar, numunenin rapor tarihindeki durumuna aittir.
The test results belong only to the test given above and are valid from the test date and under the conditions stated in the report. The results given in this report belong to the condition of the sample on the report date.

LM-79 Fotometrik Raporu

7. Numune Bilgileri (*Sample Information*)

Marka : **İNOLED**
Brand

Model : **SUPRA-S**
Model

Seri Numarası : **--**
Serial Number

Beyan Giriş Gücü (W) : **17W**
Input Power

Beyan Gerilimi (V) : **AC 220–240 V**
Rated Voltage

8. Kullanılan Cihazlar (*Test Equipments*):

Cihaz İsmi/*Device Name*	Model Tipi/*Model Type*	Üretici/*Manufaturer*	Kalibrasyon Tarihi/*Cal. Date*	Son Kalib. Tarihi/*Last.Cal.Date*
AC Power Supply	**LSP VARC SERİES**	LISUN GROUP	23.01.2026	23.01.2027
DC Power Supply	**DC3010**	LISUN GROUP	10.07.2025	10.07.2026
Powermeter	**LS2012**	LISUN GROUP	10.07.2025	10.07.2026
Calorimeter	**LMS-9000CG**	LISUN GROUP	10.07.2025	10.07.2026

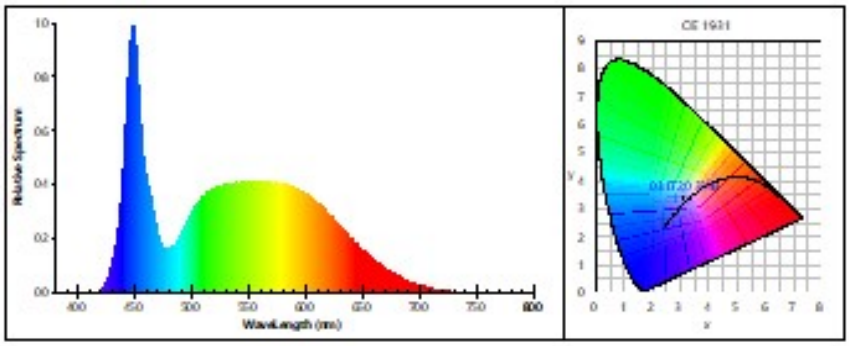
9. Numune Bileşenleri (Component List):

Bileşen Detayları	İmalatçı/Marka Detayları	Tip/Model Numarası	Bileşene Ait Teknik Özellikler	Bileşeninin Belgelendirildiği Standart	İlgili Belgenin Sertifikası vb. Numarası
Driver	LIFUD	LF-GIF18YS0400H			

LM-79 Fotometrik Raporu

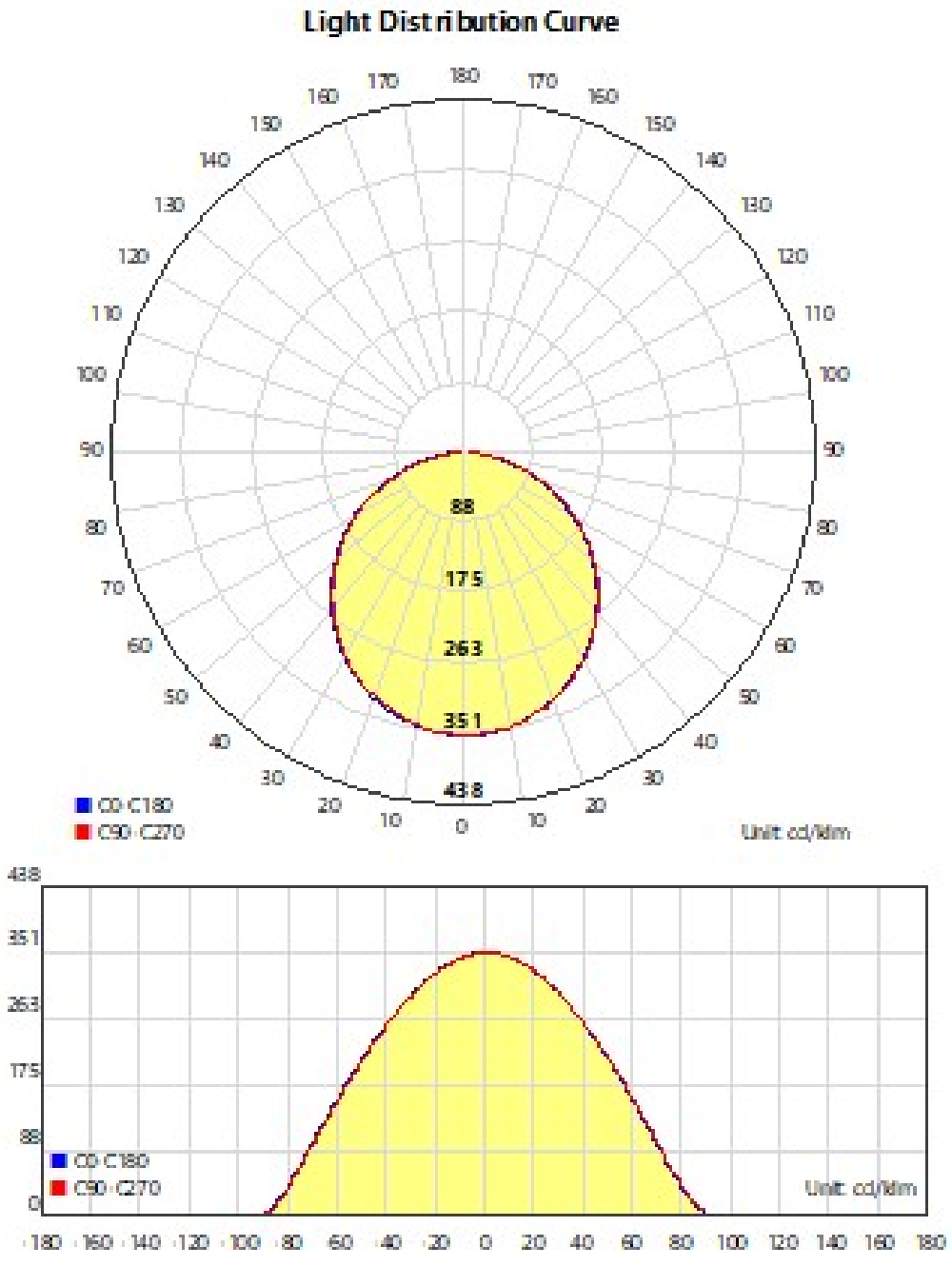
10. Deney Uygulama Sonuçları (Test Application Results)

Ölçülen Güç(w) *Input Power*	16.97
Ölçülen Gerilim(v) *Input voltage*	220
Ölçülen Akım(A) *Input Current*	0.0800
Güç Faktörü(PF) *Power Factor*	0.970
Ölçülen Frekans(Hz) *Input Frequency*	49.99
Ortam Sıcaklığı(°C) *Ambient Temperature*	25
Stabilizasyon Süresi(dk.) *Stabilization Time*	30
Toplam Işık Akısı(lm) *Total Luminous Flux(lm)*	1818
Armatür Etkinligi(lm/w) *Luminaire Effectiveness (lm/w)*	107
İlişkili Renk Sıcaklığı(k) *Correlated Color Temperature(deg.k)*	6236
Renksel Geri Verim İndeksi Ortalaması(RA) *Color Rendering Index Average(RA)*	82
CIE(X,Y) *CIE(X,Y)*	0.3172,0.3348
CIE(U,V) *CIE(U,V)*	0.1988,0.3147
CIE(U',V') *CIE(U',V')*	0.1988,0.4720
Peak Wavelength(nm) *Peak Wavelength(nm)*	448
Dominant Wavelength(nm) *Dominant Wavelength(nm)*	492
R9 *R9*	6
Beam Angle(°) *Beam Angle(°)*	112



LM-79 Fotometrik Raporu

11. Işık Yoğunluğu Dağılım Eğri Grafikleri



LM-79 Fotometrik Raporu

12. Görsel Dökümantasyon (Test Photographs)

LM-79 Fotometrik Raporu

TM-21 PROJEKSİYON ÖZETİ

- Aşağıda sunulan tablolar, LED ışık kaynağına ait lumen bakım projeksiyonunu özetlemektedir. Değerler, referans LM-80 test verileri kullanılarak IES TM-21 metoduna göre hesaplanmıştır. Bu bölüm, TM-21 projeksiyon sonuçlarını sunmakta olup, LED paket seviyesinde öngörülen performans ve çalışma süresi değerlerini göstermektedir.

Bay Area Compliance Laboratories Corp. (Shenzhen)
5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.
The NVLAP Lab Code is 200707-0

1.8 Sample Set

Data Set 1: 55°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 2: 85°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 3: 105°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

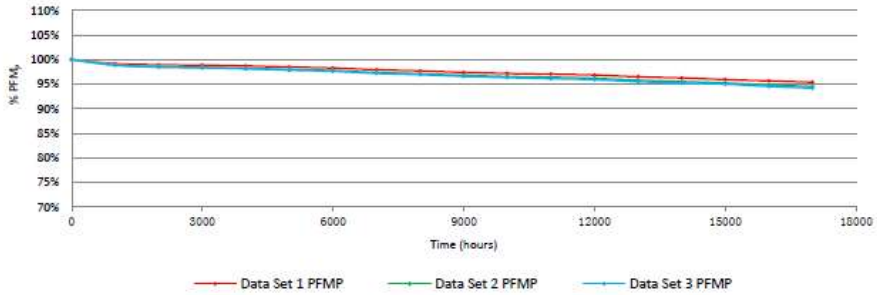
Bay Area Compliance Laboratories Corp. (Shenzhen)
5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.
The NVLAP Lab Code is 200707-0

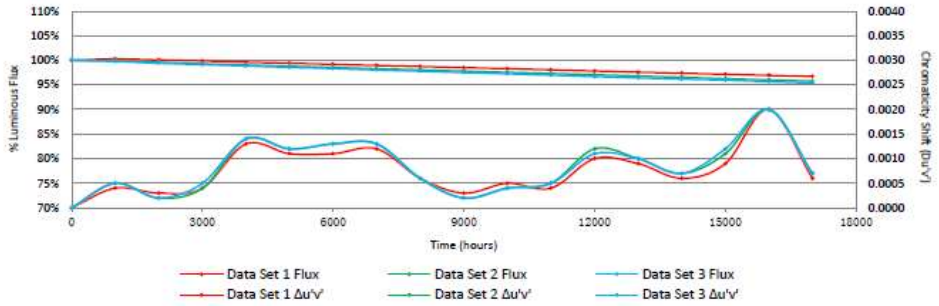
2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime	Reported TM-21 L_{80} Lifetime	Reported TM-21 L_{90} Lifetime
1	25	0	1000hrs	17000hrs	2.298E-06	1.00	>102000 hours	00,000 hours	48,000 hours
2	25	0	1000hrs	17000hrs	2.635E-06	1.00	>102000 hours	85,000 hours	41,000 hours
3	25	0	1000hrs	17000hrs	2.738E-06	0.99	>102000 hours	81,000 hours	38,000 hours

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q_{90} Lifetime
1	25	0	1000hrs	17000hrs	2.625E-06	0.998	39,000 hours
2	25	0	1000hrs	17000hrs	2.955E-06	0.995	34,000 hours
3	25	0	1000hrs	17000hrs	3.090E-06	0.994	32,000 hours

Bay Area Compliance Laboratories Corp. (Shenzhen)
5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial
Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.
The NVLAP Lab Code is 200707-0





Note:
**: The items tested by Bay Area Compliance Laboratories Corp. (Dongguan) and covered by IAS accreditation, the reference report No. is RSZ200810503-10-12000 (test Date: 2020-09-09 to 2022-03-17).

TM-21 Özeti

OSRAM

IES LM-80-15 Test Report

240163W1 – 2024-June-18

DURIS® E 2835

LM-80 & TM-21 Raporu

Published by ams-OSRAM AG
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Phone +43 3136 500-0
ams-osram.com

ams OSRAM

TEST REPORT

According to ANSI/IES LM-80-15
For

OSRAM Opto Semiconductors (Malaysia) Sdn. Bhd.

Bayan Lepas Free Industrial Zone 11900 Bayan Lepas, Penang, Malaysia

Model: GW JTLRS1.EM-KZL5-A838-1

Report Type: 17000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	SZ2230202-04763E-EE
Test Date:	2020-09-09 to 2023-01-11
Report Date:	2024-03-01
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

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Note:
**: The items tested by Bay Area Compliance Laboratories Corp. (Dongguan) and covered by IAS accreditation, the reference report No. is RSZ200810503-10-12000 (test Date: 2020-09-09 to 2022-03-17). Bay Area Compliance Laboratories Corp. (Dongguan) is EPA-Recognized Laboratories and the ORG ID: 1109266.

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1 - General Information

1.1 Description of LED Light Sources#

Sample Size:

75 PCS test samples were in good condition and received on 2020-08-10. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

Manufacturer:	OSRAM Opto Semiconductors (Malaysia) Sdn. Bhd.
Part Number:	GW JTLRS1.EM-KZL5-A838-1
Part Type:	LED Package
Drive Level:	DC 100mA
Wavelength:	610nm
CCT	2700K
Power:	1.0W
Average Current Density per LED die:	730.5 mA/mm^2
Average Power Density per LED die:	7.5W/mm^2
CRI:	80
Die Spacing:	0.03mm

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.
These manufacturing lots are picked to represent a wide parametric distribution.

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:

Model Name	Total Input Current (mA)	Power (W)	CCT (K)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
GW JTLRS1.EM-KZL5-A838-1	100	1.0	2700	3	100	730.5	0.10	0.03
GW JTLRS1.EM-KZL5-XX58-1	100	1.0	2700	3	100	730.5	0.10	0.03
GW JTLRS1.EM-K5L4-XX57-1	100	1.0	3000	3	100	730.5	0.10	0.03
GW JTLRS1.EM-LVL4-XX56-1	100	1.0	3500	3	100	730.5	0.10	0.03
GW JTLRS1.EM-LVL5-XX55-1	100	1.0	4000	3	100	730.5	0.10	0.03
GW JTLRS1.EM-LVL5-XX53-1	100	1.0	5000	3	100	730.5	0.10	0.03
GW JTLRS1.EM-LVL5-XX52-1	100	1.0	5700	3	100	730.5	0.10	0.03
GW JTLRS1.EM-LVL5-XX51-1	100	1.0	6500	3	100	730.5	0.10	0.03
GW JTLRS1.EM-KZLY-XX510-1	100	1.0	2200	3	100	730.5	0.10	0.03
GW JTLxSx.xM-xxxx-xxxx-x-x	100	1.0	2200 - 6500	≤3	≤100	≤730.5	≤0.10	≥0.03

GW JTL<u>x</u>S<u>x</u>.<u>x</u>M-<u>xxxx</u>-<u>xxxx</u>-<u>x</u>-<u>x</u>
1 2 3 4 5 6 7

Identifiers Information (if any):
1. The first X can be alphanumeric, it is an internal product code which use to represent product
2. The second X can be alphanumeric, it is an internal product code which used to represent product feature;
3. The third X represent internal reference code, it can be alphanumeric;
4. The fourth X represent brightness binning range, it can be alphanumeric;

LM-80 & TM-21 Raporu

5. The fifth X represent CCT based on internal management code, it can be alphanumeric;
6. The sixth X represent product Vf range, it can be alphanumeric;
7. The seventh X represent product version, it can be blank or alphanumeric.

Note:

1、 The applicant OSRAM Opto Semiconductors (Malaysia) Sdn. Bhd. declare that their products with model GW JTLRS1.EM-KZL5-A838-1 are the same to the products in report# RSZ200810503-10-17000 and is authorized by original applicant to use their test data.
2、 All the data in previous report (RSZ200810503-10-17000) is shared in this report.

1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- *CIE 127:2007: Measurement of LEDs (This standard was not accredited by NVLAP)
- *ANSI/ASABE S640 JUL2017 Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms) (This standard was not accredited by NVLAP)
- *ANSI/ASABE S642 SEP2018: Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development (This standard was not accredited by NVLAP)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2022-09-27	2023-09-26
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2022-11-18	2023-11-17
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2022-09-27	2023-09-26
Standard Light Source	EVERFINE	D062	1011093	2021-10-15	2023-10-14
Multilayer aging machine	BACL	B2-270	20013	2022-11-18	2023-11-17
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-60-03	N/A	2022-11-18	2023-11-17

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 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure spectral power distribution and photon flux. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Shenzhen) 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: 55°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 2: 85°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 3: 105°C, 100mA

Part Number:	GW JTLRS1.EM-KZL5-A838-1
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

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2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime	Reported TM-21 L_{80} Lifetime	Reported TM-21 L_{90} Lifetime
1	25	0	1000hrs	17000hrs	2.298E-06	1.006	>102000 hours	100,000 hours	48,000 hours
2	25	0	1000hrs	17000hrs	2.635E-06	1.001	>102000 hours	85,000 hours	41,000 hours
3	25	0	1000hrs	17000hrs	2.738E-06	0.999	>102000 hours	81,000 hours	38,000 hours

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q_{90} Lifetime
1	25	0	1000hrs	17000hrs	2.625E-06	0.998	39,000 hours
2	25	0	1000hrs	17000hrs	2.955E-06	0.995	34,000 hours
3	25	0	1000hrs	17000hrs	3.090E-06	0.994	32,000 hours

Average Photon Flux Maintenance, Photosynthetic 400-700nm (PFM_P) (Percentage of Initial)

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	99.18%	98.94%	98.88%	98.72%	98.48%	98.29%	97.93%	97.71%	97.39%	97.19%	97.04%	96.86%
2	98.92%	98.57%	98.41%	98.24%	97.99%	97.76%	97.36%	97.12%	96.80%	96.56%	96.41%	96.19%
3	98.86%	98.48%	98.34%	98.15%	97.86%	97.64%	97.20%	96.94%	96.60%	96.34%	96.13%	95.92%

	**13000hrs	**14000hrs	**15000hrs	**16000hrs	**17000hrs
	96.50%	96.27%	95.94%	95.66%	95.40%
	95.80%	95.53%	95.24%	94.83%	94.53%
	95.50%	95.23%	95.02%	94.55%	94.20%

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	100.27 %	100.07 %	99.87%	99.62%	99.40%	99.18%	98.95%	98.74%	98.51%	98.29%	98.06%	97.82%
2	99.87%	99.59%	99.29%	99.04%	98.78%	98.54%	98.28%	98.04%	97.78%	97.54%	97.31%	97.06%
3	99.76%	99.42%	99.13%	98.86%	98.58%	98.33%	98.04%	97.78%	97.51%	97.25%	96.98%	96.70%

	**13000hrs	**14000hrs	**15000hrs	**16000hrs	**17000hrs
	97.59%	97.37%	97.15%	96.93%	96.74%
	96.79%	96.53%	96.25%	96.00%	95.75%
	96.42%	96.18%	95.97%	95.66%	95.38%

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Average Chromaticity Shift

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	0.0004	0.0003	0.0004	0.0013	0.0011	0.0011	0.0012	0.0006	0.0003	0.0005	0.0004	0.0010
2	0.0005	0.0002	0.0004	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0012
3	0.0005	0.0002	0.0005	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0011

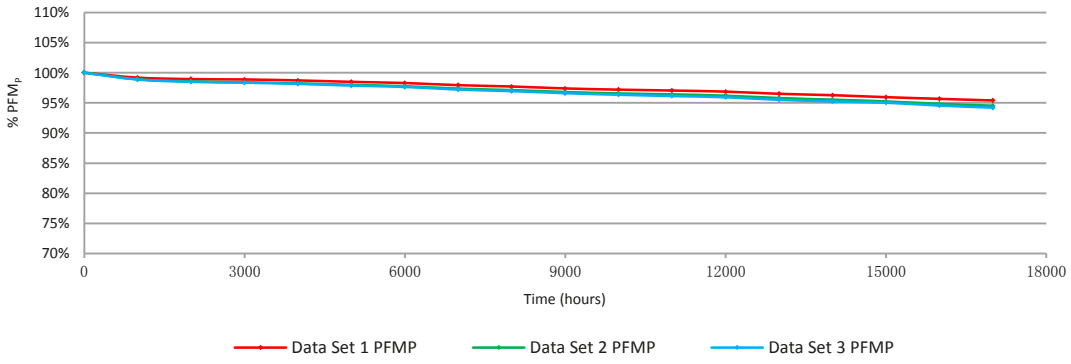
13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
0.0009	0.0006	0.0009	0.002	0.0006
0.0010	0.0007	0.0011	0.002	0.0007
0.0010	0.0007	0.0012	0.002	0.0007

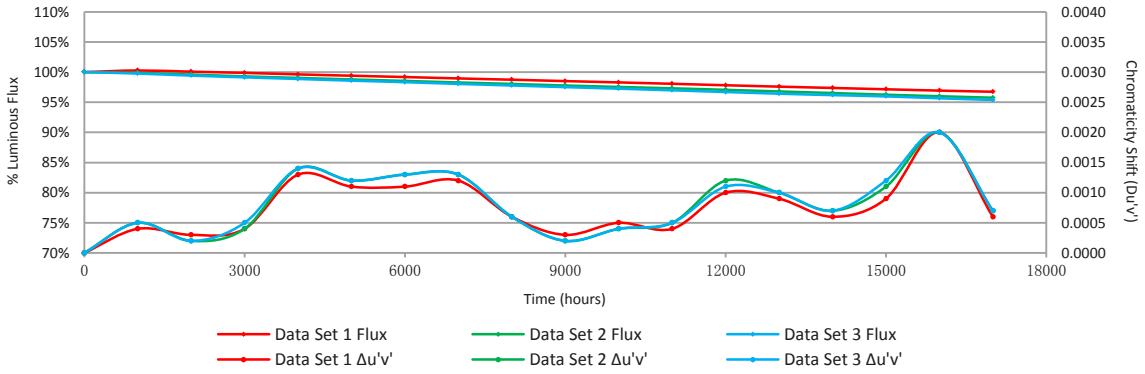
Average Peak Wavelength

Data Set:	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	607.5	607.4	606.9	607.5	606.7	607.3	607.5	607.4	608.3	608.0	607.7	608.0
2	607.2	607.7	608.0	606.9	606.9	607.2	606.9	607.0	607.6	607.5	608.0	607.9
3	607.8	607.7	607.7	607.6	607.1	608.1	607.8	607.4	607.3	606.9	607.7	607.7

13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
608.0	607.7	606.9	607.3	608.0
607.4	607.9	607.5	606.9	607.0
607.1	607.0	608.2	606.8	607.2

LM-80 & TM-21 Raporu





Note：
**: The items tested by Bay Area Compliance Laboratories Corp. (Dongguan) and covered by IAS accreditation, the reference report No. is RSZ200810503-10-12000 (test Date: 2020-09-09 to 2022-03-17).

LM-80 & TM-21 Raporu

3 - Test Data

3.1 Data Set 1, 55°C, 100mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	1.8285	98.71	98.47	98.42	98.40	98.07	98.00	97.45	97.19	96.96	96.76	96.60	96.53
2	1.8355	98.92	98.89	98.81	98.81	98.40	98.09	97.64	97.41	97.16	97.01	96.77	96.68
3	1.8315	99.47	99.03	99.05	99.09	98.95	98.68	98.17	97.97	97.59	97.41	97.36	97.19
4	1.8252	99.28	98.84	98.89	98.54	98.43	98.22	97.95	97.65	97.17	97.04	97.03	97.01
5	1.8142	99.00	98.51	98.46	98.37	98.22	98.24	97.75	97.44	97.03	96.81	96.46	96.06
6	1.8339	99.54	99.07	98.63	98.61	98.45	98.30	97.96	97.77	97.51	97.20	96.90	96.64
7	1.8164	99.29	99.12	98.82	98.76	98.59	98.52	98.19	97.80	97.58	97.54	97.42	97.34
8	1.8261	99.46	99.16	99.13	98.90	98.43	98.29	97.91	97.73	97.51	97.19	97.08	96.80
9	1.8021	99.10	98.77	98.61	98.51	98.35	98.14	97.81	97.70	97.21	96.95	96.80	96.57
10	1.8304	99.75	99.39	99.23	99.13	98.97	98.51	98.25	98.17	97.84	97.60	97.62	97.33
11	1.8302	99.70	99.42	99.18	99.12	98.91	98.75	98.34	98.19	97.84	97.62	97.46	97.16
12	1.8108	98.85	98.80	98.95	98.81	98.54	98.34	98.11	97.86	97.61	97.60	97.44	97.34
13	1.8282	99.45	99.20	99.11	98.92	98.82	98.62	98.32	98.05	97.77	97.44	97.41	97.22
14	1.8307	98.90	98.93	98.79	98.60	98.31	98.18	98.00	97.79	97.32	97.30	97.08	96.92
15	1.8204	99.32	99.21	99.06	98.63	98.30	98.13	97.79	97.74	97.32	97.16	97.01	97.06
16	1.8217	99.00	98.66	98.84	98.48	98.30	98.13	97.63	97.48	97.14	97.15	96.94	96.61
17	1.8075	99.39	99.40	99.40	99.19	98.74	98.52	98.21	98.00	97.69	97.46	97.30	97.03
18	1.8186	98.81	98.62	98.88	98.69	98.52	98.39	98.02	97.99	97.78	97.60	97.58	97.66
19	1.8078	99.02	98.94	98.95	98.64	98.14	97.99	97.52	97.22	96.81	96.69	96.54	96.25
20	1.8394	98.63	98.40	98.50	98.29	98.20	97.85	97.53	97.08	96.74	96.55	96.19	95.99
21	1.8168	99.50	99.35	99.16	98.77	98.62	98.30	97.92	97.78	97.47	97.25	96.96	96.76
22	1.8391	99.46	99.05	99.12	98.93	98.71	98.74	98.30	98.13	98.03	97.77	97.57	97.46
23	1.8109	98.91	98.85	98.88	98.70	98.53	98.42	98.03	97.88	97.68	97.35	97.30	97.16
24	1.8010	99.28	99.10	98.96	99.02	98.81	98.67	98.42	98.15	97.62	97.35	97.09	96.97
25	1.8302	98.71	98.28	98.14	98.07	97.64	97.25	97.02	96.63	96.37	96.07	95.98	95.79
Avg.	1.8223	99.18	98.94	98.88	98.72	98.48	98.29	97.93	97.71	97.39	97.19	97.04	96.86
Med.	1.8252	99.28	98.94	98.89	98.70	98.45	98.30	97.96	97.78	97.51	97.25	97.08	96.97
st dev	0.0112	0.3265	0.3208	0.2920	0.2825	0.3084	0.3277	0.3347	0.3833	0.3975	0.3949	0.4361	0.4780
Min.	1.8010	98.63	98.28	98.14	98.07	97.64	97.25	97.02	96.63	96.37	96.07	95.98	95.79
Max.	1.8394	99.75	99.42	99.40	99.19	98.97	98.75	98.42	98.19	98.03	97.77	97.62	97.66

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No.	400-700nm Photon Flux Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
1	96.16	96.07	95.87	95.49	95.27
2	96.33	96.21	95.78	95.45	95.18
3	96.81	96.51	96.34	95.99	95.77
4	96.61	96.06	95.73	95.50	95.22
5	95.73	95.62	95.57	95.14	94.81
6	96.22	95.95	95.68	95.48	95.21
7	97.02	96.87	96.58	96.23	95.96
8	96.54	96.40	96.00	95.72	95.45
9	96.27	96.02	95.87	95.50	95.22
10	96.96	96.89	96.59	96.32	95.94
11	96.65	96.47	96.08	95.89	95.56
12	96.81	96.45	96.27	95.98	95.65
13	96.90	96.59	96.16	95.72	95.45
14	96.50	96.19	95.84	95.43	95.26
15	96.74	96.42	96.29	95.91	95.58
16	96.35	96.18	96.76	95.73	95.52
17	96.74	96.56	95.56	96.10	95.77
18	97.32	97.23	95.95	96.72	96.34
19	95.96	95.74	96.29	95.09	94.87
20	95.55	95.19	96.88	94.54	94.43
21	96.44	96.17	95.68	95.33	95.22
22	97.13	96.82	94.25	96.46	96.13
23	96.68	96.53	95.84	95.42	95.20
24	96.64	96.52	96.39	96.06	95.72
25	95.44	95.03	94.21	94.31	94.20
Avg.	96.50	96.27	95.94	95.66	95.40
Med.	96.61	96.40	95.95	95.72	95.45
st dev	0.47	0.5061	0.6308	0.55	0.4919
Min.	95.44	95.03	94.21	94.31	94.20
Max.	97.32	97.23	96.88	96.72	96.34

LM-80 & TM-21 Raporu

3.2 Data Set 1, 55°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	124.30	99.68	99.44	99.36	99.20	98.87	98.71	98.31	98.07	97.99	97.67	97.43	97.35
2	124.90	99.84	99.76	99.60	99.44	99.12	98.72	98.40	98.24	98.08	97.84	97.52	97.36
3	125.20	100.48	100.08	99.92	99.84	99.76	99.44	99.04	98.88	98.56	98.40	98.32	98.00
4	124.20	100.32	99.92	99.84	99.36	99.28	99.03	98.95	98.63	98.15	98.07	97.99	97.91
5	122.20	100.74	100.33	100.08	99.92	99.84	99.75	99.43	99.10	98.69	98.53	98.20	97.79
6	125.70	100.56	100.16	99.52	99.44	99.28	99.20	98.89	98.73	98.65	98.25	97.77	97.53
7	122.80	100.41	100.24	99.76	99.67	99.51	99.43	99.19	98.86	98.70	98.62	98.45	98.37
8	123.90	100.48	100.24	100.16	99.84	99.44	99.19	98.95	98.71	98.63	98.31	98.06	97.82
9	121.70	100.25	99.92	99.59	99.51	99.26	99.10	98.85	98.69	98.36	98.03	97.95	97.53
10	125.70	100.56	100.32	99.92	99.76	99.68	99.12	99.05	98.97	98.65	98.41	98.33	97.93
11	124.90	100.56	100.32	100.00	99.84	99.60	99.44	99.12	98.96	98.80	98.56	98.24	97.92
12	122.40	100.16	100.16	100.16	99.92	99.67	99.43	99.35	99.10	99.02	98.86	98.69	98.53
13	125.20	100.08	99.84	99.52	99.36	99.28	99.04	98.88	98.64	98.32	98.08	98.00	97.76
14	126.10	99.60	99.68	99.37	99.13	98.81	98.65	98.57	98.41	98.02	97.94	97.70	97.46
15	125.60	100.16	100.08	99.76	99.28	98.96	98.81	98.57	98.49	98.09	98.01	97.77	97.69
16	124.00	100.24	99.92	99.92	99.52	99.35	99.11	98.71	98.55	98.39	98.31	97.98	97.66
17	122.90	100.65	100.73	100.65	100.41	99.92	99.67	99.59	99.27	99.02	98.78	98.54	98.29
18	123.60	100.24	100.08	100.16	99.92	99.76	99.60	99.43	99.35	99.27	99.11	98.95	98.87
19	122.50	100.33	100.24	100.08	99.67	99.18	99.10	98.69	98.37	98.12	97.88	97.71	97.39
20	125.40	99.76	99.52	99.52	99.20	99.12	98.80	98.56	98.17	97.85	97.69	97.21	96.97
21	123.70	100.24	100.08	99.76	99.27	99.11	98.79	98.54	98.46	98.22	98.06	97.66	97.33
22	125.10	100.64	100.32	100.32	100.00	99.84	99.76	99.52	99.36	99.20	99.04	98.80	98.56
23	124.20	100.08	100.08	100.00	99.68	99.52	99.36	99.19	99.03	98.95	98.55	98.39	98.23
24	121.80	100.49	100.41	100.16	100.08	99.84	99.75	99.59	99.34	98.93	98.60	98.28	98.19
25	123.60	100.24	99.84	99.51	99.35	98.95	98.54	98.46	98.06	97.98	97.57	97.49	97.17
Avg.	124.06	100.27	100.07	99.87	99.62	99.40	99.18	98.95	98.74	98.51	98.29	98.06	97.82
Med.	124.20	100.25	100.08	99.92	99.67	99.35	99.12	98.95	98.71	98.56	98.31	98.00	97.79
st dev	1.32	0.31	0.29	0.32	0.33	0.33	0.37	0.39	0.40	0.42	0.4224	0.4480	0.4740
Min.	121.70	99.60	99.44	99.36	99.13	98.81	98.54	98.31	98.06	97.85	97.57	97.21	96.97
Max.	126.10	100.74	100.73	100.65	100.41	99.92	99.76	99.59	99.36	99.27	99.11	98.95	98.87

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No.	Lumen Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
1	97.10	97.02	96.86	96.70	96.54
2	97.12	97.04	96.72	96.48	96.32
3	97.76	97.44	97.36	97.12	96.96
4	97.58	97.10	96.94	96.70	96.46
5	97.55	97.46	97.22	97.05	96.81
6	97.30	96.98	96.82	96.66	96.50
7	98.21	98.05	97.80	97.56	97.31
8	97.66	97.50	97.18	97.01	96.77
9	97.45	97.12	97.04	96.80	96.55
10	97.77	97.61	97.37	97.30	96.98
11	97.52	97.36	97.04	96.88	96.72
12	98.04	97.71	97.63	97.39	97.22
13	97.52	97.20	96.88	96.57	96.33
14	97.22	96.91	96.67	96.43	96.27
15	97.53	97.21	97.13	96.89	96.66
16	97.58	97.42	97.26	97.10	96.94
17	98.13	97.97	97.80	97.64	97.40
18	98.71	98.62	98.46	98.30	97.98
19	97.22	97.06	96.82	96.49	96.33
20	96.65	96.33	96.09	95.93	95.85
21	97.17	96.85	96.52	96.20	96.12
22	98.32	98.16	98.08	97.84	97.60
23	97.83	97.75	97.10	96.78	96.62
24	97.87	97.78	97.54	97.45	97.21
25	96.93	96.52	96.36	96.04	95.95
Avg.	97.59	97.37	97.15	96.93	96.74
Med.	97.55	97.36	97.10	96.88	96.66
st dev	0.47	0.5198	0.5376	0.56	0.5163
Min.	96.65	96.33	96.09	95.93	95.85
Max.	98.71	98.62	98.46	98.30	97.98

LM-80 & TM-21 Raporu

3.3 Data Set 1, 55°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	9.108	9.088	9.105	9.114	9.098	9.093	9.070	9.096	9.095	9.102	9.112	9.127	9.115
2	9.126	9.111	9.131	9.136	9.113	9.114	9.100	9.119	9.124	9.123	9.129	9.151	9.129
3	9.131	9.116	9.134	9.143	9.112	9.122	9.100	9.127	9.121	9.128	9.136	9.154	9.133
4	9.121	9.104	9.116	9.126	9.104	9.114	9.093	9.111	9.113	9.113	9.113	9.143	9.117
5	9.107	9.091	9.105	9.108	9.086	9.101	9.079	9.093	9.097	9.113	9.110	9.124	9.106
6	9.135	9.125	9.132	9.135	9.113	9.125	9.098	9.123	9.123	9.122	9.134	9.162	9.135
7	9.125	9.110	9.118	9.122	9.101	9.111	9.085	9.109	9.109	9.103	9.116	9.139	9.119
8	9.139	9.136	9.139	9.143	9.125	9.133	9.110	9.129	9.128	9.125	9.143	9.168	9.144
9	9.132	9.116	9.125	9.124	9.110	9.118	9.093	9.112	9.110	9.114	9.129	9.148	9.125
10	9.081	9.075	9.080	9.082	9.061	9.072	9.043	9.067	9.065	9.081	9.080	9.100	9.071
11	9.088	9.072	9.080	9.091	9.067	9.081	9.052	9.088	9.076	9.089	9.087	9.103	9.083
12	9.127	9.114	9.118	9.121	9.109	9.119	9.087	9.108	9.104	9.107	9.120	9.138	9.117
13	9.120	9.091	9.104	9.111	9.097	9.101	9.077	9.096	9.115	9.115	9.102	9.152	9.106
14	9.078	9.065	9.073	9.079	9.063	9.076	9.047	9.067	9.083	9.082	9.075	9.098	9.077
15	9.059	9.044	9.051	9.072	9.042	9.060	9.031	9.065	9.038	9.074	9.057	9.095	9.054
16	9.145	9.123	9.132	9.139	9.119	9.126	9.102	9.127	9.130	9.129	9.136	9.160	9.133
17	9.104	9.091	9.098	9.103	9.084	9.091	9.066	9.086	9.079	9.104	9.105	9.137	9.098
18	9.109	9.101	9.112	9.122	9.093	9.105	9.079	9.103	9.103	9.109	9.113	9.132	9.117
19	9.084	9.081	9.089	9.099	9.075	9.084	9.070	9.086	9.080	9.084	9.086	9.105	9.085
20	9.128	9.151	9.129	9.140	9.115	9.127	9.100	9.123	9.124	9.122	9.129	9.146	9.133
21	9.126	9.125	9.118	9.136	9.112	9.121	9.102	9.121	9.119	9.114	9.130	9.149	9.129
22	9.119	9.143	9.129	9.132	9.111	9.116	9.095	9.116	9.118	9.113	9.126	9.145	9.123
23	9.106	9.105	9.119	9.121	9.102	9.101	9.083	9.107	9.111	9.109	9.113	9.137	9.110
24	9.108	9.101	9.116	9.116	9.096	9.113	9.075	9.107	9.113	9.117	9.120	9.133	9.115
25	9.131	9.123	9.139	9.143	9.115	9.141	9.102	9.124	9.128	9.140	9.135	9.148	9.133
Avg.	9.113	9.104	9.112	9.118	9.097	9.107	9.082	9.104	9.104	9.109	9.113	9.136	9.112
Med.	9.120	9.105	9.118	9.122	9.102	9.113	9.085	9.108	9.111	9.113	9.116	9.139	9.117
st dev	0.022	0.025	0.023	0.021	0.021	0.020	0.021	0.019	0.023	0.017	0.022	0.021	0.023
Min.	9.059	9.044	9.051	9.072	9.042	9.060	9.031	9.065	9.038	9.074	9.057	9.095	9.054
Max.	9.145	9.151	9.139	9.143	9.125	9.141	9.110	9.129	9.130	9.140	9.143	9.168	9.144

LM-80 & TM-21 Raporu

No.	Forward Voltage (V)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
1	9.110	9.104	9.119	9.127	9.122
2	9.123	9.132	9.148	9.118	9.144
3	9.134	9.134	9.149	9.103	9.146
4	9.126	9.119	9.116	9.133	9.131
5	9.107	9.117	9.121	9.128	9.119
6	9.127	9.128	9.127	9.131	9.145
7	9.110	9.115	9.115	9.123	9.131
8	9.135	9.137	9.129	9.102	9.159
9	9.121	9.125	9.138	9.135	9.137
10	9.070	9.075	9.093	9.136	9.087
11	9.069	9.081	9.098	9.116	9.087
12	9.113	9.124	9.124	9.138	9.138
13	9.093	9.108	9.111	9.130	9.128
14	9.080	9.071	9.098	9.132	9.097
15	9.055	9.056	9.072	9.115	9.077
16	9.132	9.134	9.124	9.139	9.147
17	9.097	9.094	9.105	9.126	9.117
18	9.107	9.108	9.119	9.101	9.121
19	9.080	9.086	9.104	9.119	9.104
20	9.117	9.124	9.125	9.144	9.155
21	9.123	9.126	9.131	9.121	9.145
22	9.120	9.120	9.149	9.149	9.144
23	9.128	9.110	9.139	9.135	9.134
24	9.105	9.112	9.136	9.110	9.127
25	9.122	9.125	9.144	9.142	9.142
Avg.	9.108	9.111	9.121	9.126	9.127
Med.	9.113	9.117	9.124	9.128	9.131
st dev	0.022	0.022	0.019	0.013	0.022
Min.	9.055	9.056	9.072	9.101	9.077
Max.	9.135	9.137	9.149	9.149	9.159

LM-80 & TM-21 Raporu

3.4 Data Set 1, 55°C, 100mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift (Δu'v')											
	**0hr(Initial)		**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	0.2631	0.5289	0.0003	0.0004	0.0003	0.0009	0.0009	0.0008	0.0010	0.0003	0.0004	0.0008	0.0002	0.0007
2	0.2632	0.5285	0.0004	0.0003	0.0002	0.0012	0.0011	0.0011	0.0011	0.0006	0.0002	0.0005	0.0004	0.0009
3	0.2603	0.5276	0.0006	0.0001	0.0006	0.0015	0.0013	0.0012	0.0013	0.0007	0.0003	0.0004	0.0006	0.0009
4	0.2622	0.5285	0.0004	0.0003	0.0003	0.0010	0.0010	0.0010	0.0011	0.0005	0.0001	0.0006	0.0002	0.0007
5	0.2613	0.5265	0.0002	0.0004	0.0004	0.0013	0.0010	0.0011	0.0011	0.0005	0.0002	0.0006	0.0003	0.0011
6	0.2596	0.5279	0.0002	0.0002	0.0003	0.0011	0.0010	0.0010	0.0010	0.0004	0.0002	0.0008	0.0002	0.0008
7	0.2632	0.5275	0.0005	0.0001	0.0004	0.0014	0.0012	0.0013	0.0011	0.0007	0.0001	0.0006	0.0003	0.0014
8	0.2627	0.5282	0.0005	0.0001	0.0006	0.0016	0.0013	0.0013	0.0014	0.0008	0.0003	0.0004	0.0006	0.0013
9	0.2636	0.5277	0.0006	0.0002	0.0007	0.0017	0.0015	0.0013	0.0015	0.0009	0.0002	0.0003	0.0008	0.0013
10	0.2624	0.5310	0.0002	0.0002	0.0002	0.0010	0.0009	0.0009	0.0009	0.0004	0.0004	0.0009	0.0002	0.0007
11	0.2624	0.5295	0.0002	0.0003	0.0003	0.0012	0.0010	0.0010	0.0011	0.0005	0.0001	0.0006	0.0003	0.0009
12	0.2622	0.5272	0.0005	0.0001	0.0004	0.0015	0.0012	0.0012	0.0013	0.0007	0.0001	0.0005	0.0004	0.0009
13	0.2622	0.5293	0.0003	0.0002	0.0004	0.0011	0.0009	0.0011	0.0011	0.0005	0.0002	0.0004	0.0004	0.0010
14	0.2618	0.5313	0.0002	0.0004	0.0004	0.0009	0.0007	0.0008	0.0009	0.0003	0.0004	0.0009	0.0003	0.0006
15	0.2614	0.5314	0.0003	0.0004	0.0004	0.0010	0.0008	0.0009	0.0010	0.0004	0.0004	0.0008	0.0002	0.0008
16	0.2607	0.5275	0.0004	0.0001	0.0002	0.0013	0.0010	0.0012	0.0011	0.0007	0.0001	0.0006	0.0004	0.0009
17	0.2629	0.5303	0.0002	0.0003	0.0002	0.0010	0.0008	0.0008	0.0010	0.0004	0.0002	0.0007	0.0002	0.0008
18	0.2607	0.5275	0.0009	0.0005	0.0006	0.0017	0.0015	0.0016	0.0017	0.0010	0.0006	0.0003	0.0007	0.0011
19	0.2636	0.5293	0.0006	0.0002	0.0004	0.0014	0.0012	0.0012	0.0012	0.0008	0.0003	0.0003	0.0005	0.0011
20	0.2627	0.5298	0.0003	0.0004	0.0002	0.0012	0.0009	0.0009	0.0010	0.0004	0.0001	0.0006	0.0002	0.0007
21	0.2613	0.5269	0.0002	0.0003	0.0003	0.0012	0.0009	0.0010	0.0011	0.0004	0.0002	0.0007	0.0001	0.0008
22	0.2609	0.5274	0.0004	0.0002	0.0002	0.0012	0.0012	0.0010	0.0012	0.0005	0.0001	0.0005	0.0004	0.0010
23	0.2603	0.5295	0.0006	0.0002	0.0004	0.0013	0.0012	0.0012	0.0013	0.0006	0.0004	0.0002	0.0005	0.0011
24	0.2631	0.5273	0.0009	0.0005	0.0009	0.0018	0.0018	0.0018	0.0016	0.0011	0.0006	0.0002	0.0009	0.0015
25	0.2620	0.5275	0.0006	0.0001	0.0005	0.0014	0.0014	0.0013	0.0014	0.0007	0.0002	0.0003	0.0006	0.0012
Avg.	0.2620	0.5286	0.0004	0.0003	0.0004	0.0013	0.0011	0.0011	0.0012	0.0006	0.0003	0.0005	0.0004	0.0010
Med.	0.2622	0.5282	0.0004	0.0002	0.0004	0.0012	0.0010	0.0011	0.0011	0.0005	0.0002	0.0006	0.0004	0.0009
st dev	0.0011	0.0014	0.0002	0.0001	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002
Min.	0.2596	0.5265	0.0002	0.0001	0.0002	0.0009	0.0007	0.0008	0.0009	0.0003	0.0001	0.0002	0.0001	0.0006
Max.	0.2636	0.5314	0.0009	0.0005	0.0009	0.0018	0.0018	0.0018	0.0017	0.0011	0.0006	0.0009	0.0009	0.0015

LM-80 & TM-21 Raporu

No.	Chromaticity Shift (Δu'v')				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
1	0.0007	0.0004	0.0012	0.0021	0.0007
2	0.0008	0.0004	0.0010	0.0020	0.0006
3	0.0010	0.0007	0.0012	0.0022	0.0008
4	0.0007	0.0004	0.0009	0.0019	0.0005
5	0.0010	0.0006	0.0008	0.0019	0.0006
6	0.0008	0.0004	0.0008	0.0018	0.0004
7	0.0013	0.0009	0.0011	0.0022	0.0008
8	0.0011	0.0010	0.0015	0.0023	0.0008
9	0.0012	0.0009	0.0009	0.0019	0.0009
10	0.0005	0.0003	0.0004	0.0015	0.0003
11	0.0007	0.0006	0.0005	0.0016	0.0005
12	0.0009	0.0007	0.0012	0.0021	0.0007
13	0.0008	0.0004	0.0009	0.0019	0.0005
14	0.0006	0.0004	0.0009	0.0016	0.0004
15	0.0006	0.0003	0.0004	0.0016	0.0004
16	0.0009	0.0009	0.0008	0.0019	0.0005
17	0.0007	0.0002	0.0008	0.0016	0.0004
18	0.0011	0.0008	0.0013	0.0024	0.0011
19	0.0010	0.0007	0.0011	0.0020	0.0006
20	0.0006	0.0006	0.0008	0.0018	0.0005
21	0.0008	0.0004	0.0008	0.0017	0.0003
22	0.0008	0.0006	0.0010	0.0019	0.0005
23	0.0008	0.0006	0.0009	0.0020	0.0006
24	0.0016	0.0011	0.0014	0.0024	0.0010
25	0.0010	0.0007	0.0009	0.0024	0.0009
Avg.	0.0009	0.0006	0.0009	0.0020	0.0006
Med.	0.0008	0.0006	0.0009	0.0019	0.0006
st dev	0.0002	0.0002	0.0003	0.0003	0.0002
Min.	0.0005	0.0002	0.0004	0.0015	0.0003
Max.	0.0016	0.0011	0.0015	0.0024	0.0011

LM-80 & TM-21 Raporu

3.5 Data Set 1, 55°C, 100mA (Peak Wavelength)

No.	Peak Wavelength (nm)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
1	607.8	607.8	609.2	606.8	609.8	604.9	607.9	608.5	606.8	607.8	607.2	605.4	610.2
2	608.5	610.1	608.4	606.5	606.2	606.6	609.1	610.0	607.1	605.4	608.7	609.8	608.8
3	606.8	607.7	604.7	606.8	606.2	607.8	605.2	606.8	607.7	607.1	608.2	606.9	611.4
4	606.8	608.1	603.7	607.5	604.8	607.1	606.5	605.5	605.5	610.4	603.9	604.2	609.2
5	607.8	605.8	604.9	609.1	610.1	611.1	608.2	606.8	604.8	614.0	609.9	609.5	608.8
6	608.2	607.2	607.2	605.8	606.0	607.8	607.9	604.9	605.1	608.4	608.3	608.8	605.5
7	608.8	607.8	608.2	604.2	607.8	606.2	606.5	608.8	609.5	605.8	609.5	605.2	606.2
8	608.1	609.4	607.2	608.2	605.9	606.2	607.8	610.6	609.1	610.4	605.8	608.1	607.5
9	609.8	607.2	607.1	604.6	610.3	607.8	607.2	609.4	605.9	607.8	607.8	608.4	609.1
10	607.5	609.1	607.7	606.8	607.8	607.2	604.3	609.1	607.1	607.2	610.1	606.8	609.9
11	604.2	605.5	609.4	608.8	609.1	602.8	609.5	608.2	607.5	610.0	606.5	607.5	606.5
12	608.1	610.0	607.2	607.9	607.9	607.8	608.1	608.8	603.9	608.8	612.1	607.0	606.8
13	607.3	606.8	605.6	606.5	609.2	603.5	604.5	602.2	610.4	607.5	607.5	606.5	604.6
14	607.2	609.1	607.8	606.3	608.1	603.9	607.5	606.5	606.1	606.5	608.5	612.1	608.5
15	603.9	607.5	604.5	606.1	605.9	609.1	606.8	604.4	605.2	605.4	605.9	605.9	609.8
16	605.9	607.1	608.5	604.9	607.4	607.2	606.7	608.8	609.5	608.2	607.2	609.5	610.1
17	608.8	607.0	607.2	606.8	606.5	607.5	609.1	606.8	605.8	612.8	606.1	609.2	610.1
18	606.9	607.0	607.2	609.2	604.8	609.0	604.7	607.1	607.2	613.1	607.8	605.5	606.3
19	609.5	607.5	608.2	605.0	607.9	607.1	608.8	604.8	608.5	606.5	604.2	608.8	610.4
20	611.1	608.5	609.1	607.8	607.8	608.8	611.4	608.8	605.9	607.8	608.5	607.5	606.0
21	610.4	604.7	608.7	608.8	608.5	604.8	606.2	610.7	609.8	608.5	605.8	609.8	607.6
22	608.3	607.4	605.5	604.2	607.8	605.1	606.8	603.9	609.7	609.8	609.3	609.2	605.9
23	607.2	606.0	608.8	608.1	606.5	604.7	607.8	606.5	605.8	604.5	609.4	607.5	606.2
24	609.1	609.1	608.8	606.5	608.0	604.2	607.1	609.5	608.5	606.0	612.7	604.8	604.6
25	607.9	605.2	609.1	610.3	607.8	610.5	607.5	610.3	612.1	608.7	608.1	608.8	610.4
Avg.	607.8	607.5	607.4	606.9	607.5	606.7	607.3	607.5	607.4	608.3	608.0	607.7	608.0
Med.	607.9	607.5	607.7	606.8	607.8	607.1	607.5	608.2	607.1	607.8	608.1	607.5	608.5
st dev	1.6	1.4	1.6	1.6	1.5	2.1	1.6	2.3	2.1	2.4	2.1	1.9	2.0
Min.	603.9	604.7	603.7	604.2	604.8	602.8	604.3	602.2	603.9	604.5	603.9	604.2	604.6
Max.	611.1	610.1	609.4	610.3	610.3	611.1	611.4	610.7	612.1	614.0	612.7	612.1	611.4

LM-80 & TM-21 Raporu

No.	Peak Wavelength (nm)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
1	606.6	607.3	607.5	608.5	608.8
2	608.8	608.4	603.5	607.5	610.1
3	609.8	613.0	609.2	603.6	608.8
4	609.7	609.4	609.8	606.9	609.1
5	607.5	612.1	611.1	608.5	606.8
6	606.6	606.5	611.4	607.2	607.2
7	608.5	608.8	609.1	607.5	605.9
8	608.5	609.1	604.5	604.8	606.9
9	609.1	610.1	600.9	608.8	608.8
10	606.8	608.8	610.7	608.5	609.9
11	609.4	608.5	608.8	607.1	605.6
12	607.5	605.8	608.7	607.3	610.0
13	607.2	610.1	606.8	606.2	609.1
14	608.8	607.9	600.1	610.5	607.5
15	607.1	604.2	607.8	607.5	607.8
16	607.5	611.7	605.2	606.5	606.5
17	611.1	607.5	607.2	609.5	605.9
18	611.1	605.5	607.5	608.8	604.9
19	607.8	602.9	603.2	605.9	607.8
20	605.2	605.5	605.5	607.5	610.8
21	607.2	605.5	607.6	607.1	608.5
22	608.9	605.5	605.2	604.9	609.2
23	606.8	604.9	609.8	606.7	607.1
24	603.6	607.3	606.5	607.9	609.1
25	607.8	606.2	605.5	608.1	609.1
Avg.	608.0	607.7	606.9	607.3	608.0
Med.	607.8	607.5	607.5	607.5	608.5
st dev	1.7	2.5	3.0	1.5	1.6
Min.	603.6	602.9	600.1	603.6	604.9
Max.	611.1	613.0	611.4	610.5	610.8

LM-80 & TM-21 Raporu

3.6 Data Set 1, 55°C, 100mA (Color coordinates)

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**0hr(Initial)		**1000hrs		**2000hrs		**3000hrs		**4000hrs		**5000hrs		**6000hrs	
1	0.2631	0.5289	0.2632	0.5286	0.2635	0.5291	0.2633	0.5287	0.2628	0.5280	0.2628	0.5281	0.2630	0.5281
2	0.2632	0.5285	0.2629	0.5282	0.2634	0.5287	0.2632	0.5283	0.2626	0.5275	0.2625	0.5276	0.2627	0.5275
3	0.2603	0.5276	0.2598	0.5272	0.2602	0.5277	0.2599	0.5271	0.2594	0.5264	0.2596	0.5265	0.2597	0.5266
4	0.2622	0.5285	0.2621	0.5281	0.2625	0.5286	0.2622	0.5282	0.2618	0.5276	0.2618	0.5276	0.2618	0.5276
5	0.2613	0.5265	0.2612	0.5263	0.2616	0.5267	0.2613	0.5261	0.2606	0.5254	0.2608	0.5256	0.2609	0.5255
6	0.2596	0.5279	0.2596	0.5277	0.2597	0.5281	0.2597	0.5276	0.2591	0.5269	0.2591	0.5270	0.2591	0.5270
7	0.2632	0.5275	0.2629	0.5271	0.2631	0.5276	0.2632	0.5271	0.2625	0.5263	0.2627	0.5264	0.2625	0.5264
8	0.2627	0.5282	0.2624	0.5278	0.2627	0.5283	0.2623	0.5277	0.2616	0.5270	0.2619	0.5272	0.2620	0.5271
9	0.2636	0.5277	0.2632	0.5272	0.2634	0.5277	0.2633	0.5271	0.2625	0.5264	0.2628	0.5264	0.2630	0.5265
10	0.2624	0.5310	0.2623	0.5308	0.2625	0.5312	0.2624	0.5308	0.2619	0.5301	0.2621	0.5302	0.2621	0.5302
11	0.2624	0.5295	0.2624	0.5293	0.2626	0.5297	0.2625	0.5292	0.2617	0.5285	0.2620	0.5286	0.2620	0.5286
12	0.2622	0.5272	0.2619	0.5268	0.2621	0.5273	0.2620	0.5269	0.2613	0.5260	0.2616	0.5262	0.2615	0.5262
13	0.2622	0.5293	0.2621	0.5290	0.2624	0.5294	0.2624	0.5289	0.2617	0.5283	0.2619	0.5284	0.2618	0.5283
14	0.2618	0.5313	0.2619	0.5311	0.2621	0.5315	0.2621	0.5311	0.2616	0.5304	0.2618	0.5306	0.2617	0.5305
15	0.2614	0.5314	0.2614	0.5311	0.2618	0.5316	0.2617	0.5311	0.2610	0.5305	0.2612	0.5306	0.2611	0.5306
16	0.2607	0.5275	0.2605	0.5272	0.2607	0.5276	0.2608	0.5273	0.2601	0.5264	0.2602	0.5266	0.2602	0.5264
17	0.2629	0.5303	0.2629	0.5301	0.2631	0.5305	0.2628	0.5301	0.2623	0.5295	0.2625	0.5296	0.2625	0.5296
18	0.2607	0.5275	0.2599	0.5270	0.2602	0.5274	0.2602	0.5271	0.2595	0.5263	0.2597	0.5264	0.2597	0.5262
19	0.2636	0.5293	0.2631	0.5290	0.2634	0.5294	0.2633	0.5290	0.2627	0.5282	0.2630	0.5283	0.2628	0.5284
20	0.2627	0.5298	0.2626	0.5295	0.2630	0.5300	0.2628	0.5296	0.2621	0.5288	0.2624	0.5290	0.2622	0.5290
21	0.2613	0.5269	0.2612	0.5267	0.2614	0.5272	0.2611	0.5267	0.2607	0.5259	0.2610	0.5261	0.2609	0.5260
22	0.2609	0.5274	0.2607	0.5271	0.2609	0.5276	0.2609	0.5272	0.2602	0.5264	0.2602	0.5264	0.2604	0.5265
23	0.2603	0.5295	0.2599	0.5291	0.2601	0.5296	0.2600	0.5293	0.2595	0.5285	0.2596	0.5285	0.2597	0.5285
24	0.2631	0.5273	0.2624	0.5267	0.2626	0.5271	0.2624	0.5267	0.2618	0.5260	0.2619	0.5260	0.2619	0.5260
25	0.2620	0.5275	0.2616	0.5270	0.2621	0.5275	0.2619	0.5270	0.2612	0.5263	0.2613	0.5263	0.2613	0.5264
Avg.	0.2620	0.5286	0.2618	0.5282	0.2620	0.5287	0.2619	0.5282	0.2613	0.5275	0.2615	0.5276	0.2615	0.5276
Med.	0.2622	0.5282	0.2621	0.5278	0.2624	0.5283	0.2622	0.5277	0.2616	0.5270	0.2618	0.5272	0.2618	0.5271
st dev	0.0011	0.0014	0.0011	0.0015	0.0012	0.0014	0.0011	0.0015	0.0011	0.0015	0.0011	0.0015	0.0011	0.0015
Min.	0.2596	0.5265	0.2596	0.5263	0.2597	0.5267	0.2597	0.5261	0.2591	0.5254	0.2591	0.5256	0.2591	0.5255
Max.	0.2636	0.5314	0.2632	0.5311	0.2635	0.5316	0.2633	0.5311	0.2628	0.5305	0.2630	0.5306	0.2630	0.5306

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**7000hrs		**8000hrs		**9000hrs		**10000hrs		**11000hrs		**12000hrs	
1	0.2624	0.5282	0.2632	0.5286	0.2634	0.5292	0.2638	0.5293	0.2630	0.5287	0.2629	0.5282
2	0.2624	0.5277	0.2628	0.5280	0.2632	0.5287	0.2635	0.5289	0.2631	0.5281	0.2629	0.5277
3	0.2593	0.5267	0.2598	0.5271	0.2600	0.5275	0.2605	0.5279	0.2598	0.5273	0.2598	0.5269
4	0.2614	0.5278	0.2619	0.5281	0.2623	0.5286	0.2626	0.5289	0.2622	0.5283	0.2620	0.5278
5	0.2606	0.5257	0.2611	0.5260	0.2615	0.5266	0.2618	0.5269	0.2611	0.5263	0.2606	0.5257
6	0.2589	0.5272	0.2594	0.5275	0.2597	0.5281	0.2602	0.5285	0.2595	0.5277	0.2593	0.5272
7	0.2624	0.5267	0.2629	0.5269	0.2631	0.5274	0.2637	0.5278	0.2631	0.5272	0.2622	0.5265
8	0.2616	0.5273	0.2621	0.5276	0.2624	0.5282	0.2628	0.5286	0.2623	0.5278	0.2617	0.5273
9	0.2625	0.5267	0.2631	0.5269	0.2634	0.5276	0.2638	0.5279	0.2629	0.5273	0.2628	0.5267
10	0.2617	0.5304	0.2622	0.5306	0.2627	0.5312	0.2632	0.5314	0.2624	0.5308	0.2623	0.5303
11	0.2616	0.5288	0.2623	0.5290	0.2624	0.5296	0.2628	0.5299	0.2624	0.5292	0.2619	0.5288
12	0.2612	0.5263	0.2618	0.5266	0.2621	0.5273	0.2626	0.5275	0.2619	0.5270	0.2617	0.5264
13	0.2614	0.5285	0.2620	0.5288	0.2624	0.5293	0.2626	0.5295	0.2620	0.5289	0.2617	0.5284
14	0.2613	0.5306	0.2619	0.5310	0.2621	0.5315	0.2626	0.5317	0.2621	0.5312	0.2618	0.5307
15	0.2607	0.5307	0.2615	0.5310	0.2618	0.5315	0.2620	0.5319	0.2615	0.5312	0.2615	0.5306
16	0.2599	0.5267	0.2604	0.5269	0.2607	0.5276	0.2611	0.5279	0.2605	0.5272	0.2603	0.5267
17	0.2620	0.5298	0.2627	0.5300	0.2630	0.5305	0.2635	0.5307	0.2628	0.5301	0.2624	0.5297
18	0.2593	0.5265	0.2600	0.5268	0.2601	0.5274	0.2605	0.5277	0.2601	0.5271	0.2599	0.5267
19	0.2627	0.5285	0.2630	0.5288	0.2633	0.5293	0.2637	0.5296	0.2631	0.5291	0.2628	0.5285
20	0.2620	0.5291	0.2625	0.5294	0.2627	0.5299	0.2632	0.5302	0.2627	0.5296	0.2625	0.5291
21	0.2605	0.5262	0.2611	0.5266	0.2613	0.5271	0.2617	0.5275	0.2612	0.5268	0.2608	0.5263
22	0.2599	0.5267	0.2605	0.5271	0.2609	0.5275	0.2612	0.5278	0.2605	0.5272	0.2603	0.5266
23	0.2592	0.5288	0.2598	0.5291	0.2599	0.5297	0.2604	0.5297	0.2599	0.5292	0.2596	0.5287
24	0.2619	0.5263	0.2623	0.5266	0.2625	0.5271	0.2629	0.5274	0.2624	0.5267	0.2620	0.5263
25	0.2610	0.5265	0.2616	0.5269	0.2618	0.5276	0.2622	0.5277	0.2616	0.5271	0.2613	0.5265
Avg.	0.2611	0.5278	0.2617	0.5281	0.2619	0.5286	0.2624	0.5289	0.2618	0.5283	0.2615	0.5278
Med.	0.2614	0.5273	0.2619	0.5276	0.2623	0.5282	0.2626	0.5286	0.2621	0.5278	0.2617	0.5273
st dev	0.0011	0.0015	0.0011	0.0015	0.0012	0.0015	0.0012	0.0014	0.0011	0.0014	0.0011	0.0015
Min.	0.2589	0.5257	0.2594	0.5260	0.2597	0.5266	0.2602	0.5269	0.2595	0.5263	0.2593	0.5257
Max.	0.2627	0.5307	0.2632	0.5310	0.2634	0.5315	0.2638	0.5319	0.2631	0.5312	0.2629	0.5307

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	13000hrs		14000hrs		15000hrs		16000hrs		17000hrs	
1	0.2628	0.5283	0.2629	0.5286	0.2622	0.5281	0.2617	0.5273	0.2626	0.5284
2	0.2628	0.5278	0.2631	0.5281	0.2624	0.5279	0.2620	0.5269	0.2629	0.5280
3	0.2597	0.5268	0.2598	0.5271	0.2593	0.5270	0.2589	0.5259	0.2598	0.5270
4	0.2618	0.5279	0.2620	0.5282	0.2613	0.5282	0.2611	0.5270	0.2620	0.5280
5	0.2606	0.5258	0.2608	0.5261	0.2609	0.5258	0.2603	0.5249	0.2610	0.5260
6	0.2591	0.5273	0.2594	0.5275	0.2590	0.5274	0.2586	0.5264	0.2594	0.5275
7	0.2622	0.5266	0.2626	0.5268	0.2622	0.5271	0.2619	0.5257	0.2627	0.5269
8	0.2618	0.5275	0.2619	0.5276	0.2614	0.5275	0.2612	0.5265	0.2621	0.5276
9	0.2627	0.5269	0.2629	0.5272	0.2629	0.5271	0.2626	0.5261	0.2631	0.5270
10	0.2622	0.5305	0.2624	0.5307	0.2622	0.5306	0.2616	0.5297	0.2625	0.5307
11	0.2620	0.5289	0.2620	0.5291	0.2620	0.5292	0.2616	0.5281	0.2622	0.5290
12	0.2616	0.5265	0.2617	0.5267	0.2611	0.5267	0.2609	0.5255	0.2618	0.5266
13	0.2618	0.5286	0.2620	0.5289	0.2615	0.5287	0.2611	0.5277	0.2621	0.5288
14	0.2614	0.5308	0.2617	0.5309	0.2610	0.5309	0.2610	0.5299	0.2618	0.5309
15	0.2612	0.5308	0.2615	0.5311	0.2610	0.5312	0.2606	0.5300	0.2615	0.5310
16	0.2602	0.5268	0.2600	0.5269	0.2601	0.5270	0.2597	0.5259	0.2605	0.5270
17	0.2624	0.5298	0.2628	0.5301	0.2621	0.5301	0.2619	0.5290	0.2627	0.5300
18	0.2599	0.5267	0.2601	0.5269	0.2595	0.5269	0.2591	0.5257	0.2599	0.5268
19	0.2628	0.5287	0.2631	0.5288	0.2627	0.5286	0.2623	0.5278	0.2632	0.5289
20	0.2623	0.5293	0.2623	0.5294	0.2620	0.5294	0.2615	0.5284	0.2623	0.5295
21	0.2607	0.5263	0.2611	0.5265	0.2606	0.5266	0.2604	0.5255	0.2613	0.5266
22	0.2603	0.5268	0.2604	0.5270	0.2601	0.5268	0.2598	0.5259	0.2606	0.5270
23	0.2597	0.5289	0.2598	0.5291	0.2596	0.5290	0.2590	0.5280	0.2600	0.5290
24	0.2619	0.5263	0.2622	0.5266	0.2619	0.5265	0.2616	0.5254	0.2624	0.5266
25	0.2614	0.5267	0.2616	0.5269	0.2613	0.5269	0.2605	0.5256	0.2614	0.5268
Avg.	0.2614	0.5279	0.2616	0.5281	0.2612	0.5280	0.2608	0.5270	0.2617	0.5281
Med.	0.2618	0.5275	0.2619	0.5276	0.2613	0.5275	0.2611	0.5265	0.2620	0.5276
st dev	0.0011	0.0015	0.0011	0.0015	0.0011	0.0015	0.0011	0.0015	0.0011	0.0015
Min.	0.2591	0.5258	0.2594	0.5261	0.2590	0.5258	0.2586	0.5249	0.2594	0.5260
Max.	0.2628	0.5308	0.2631	0.5311	0.2629	0.5312	0.2626	0.5300	0.2632	0.5310

LM-80 & TM-21 Raporu

3.7 Data Set 2, 85°C, 100mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
26	1.8261	98.09	97.52	97.56	97.51	97.21	97.11	96.79	96.75	96.26	96.01	95.81	95.76
27	1.8120	98.70	98.16	97.84	97.68	97.62	97.41	97.10	96.98	96.78	96.54	96.15	96.06
28	1.8106	99.17	98.60	98.25	98.16	98.06	97.84	97.55	97.49	97.18	96.99	96.68	96.23
29	1.8223	99.04	98.59	98.52	98.35	97.96	97.71	97.39	97.21	96.98	96.84	96.43	96.18
30	1.8361	98.80	98.46	98.22	97.82	97.66	97.46	96.87	96.53	96.18	95.84	95.66	95.43
31	1.8207	99.04	98.65	98.42	98.23	97.76	97.46	96.90	96.64	96.38	96.03	95.99	95.55
32	1.8106	99.02	98.71	98.53	98.21	97.96	97.81	97.36	97.16	96.97	96.48	96.22	95.80
33	1.8081	98.95	98.62	98.31	98.02	97.88	97.80	97.33	97.16	96.94	96.62	96.52	96.48
34	1.7997	98.82	98.53	98.40	98.30	98.36	97.98	97.48	97.15	96.82	96.68	96.75	96.49
35	1.8249	99.37	99.07	98.82	98.50	98.44	98.19	97.74	97.32	97.01	96.82	96.78	96.67
36	1.8116	98.55	98.43	98.59	98.47	98.33	98.23	98.00	97.81	97.30	97.11	96.93	96.86
37	1.8107	98.70	98.55	98.56	98.49	98.33	98.07	97.65	97.41	97.01	96.78	96.77	96.53
38	1.8107	98.92	98.30	98.15	97.96	97.75	97.61	97.29	96.93	96.60	96.39	96.42	96.13
39	1.8231	98.77	98.22	98.28	98.04	97.87	97.72	97.34	97.11	96.79	96.39	96.40	96.26
40	1.8325	98.81	98.70	98.53	98.26	97.77	97.48	96.97	96.77	96.35	96.14	95.78	95.53
41	1.8274	98.77	98.62	98.21	98.07	97.61	97.18	96.98	96.71	96.27	95.93	95.73	95.73
42	1.8303	98.79	98.56	98.41	98.18	97.76	97.33	96.64	96.48	96.31	96.12	95.82	95.55
43	1.8121	99.46	98.90	98.69	98.70	98.15	97.95	97.44	97.08	96.60	96.37	96.30	96.20
44	1.7982	99.38	98.93	98.93	98.84	98.48	98.48	98.02	97.55	97.28	96.95	96.74	96.65
45	1.8111	99.00	98.63	98.55	98.41	98.19	97.79	97.31	97.27	97.11	96.86	96.62	96.52
46	1.8212	98.44	98.28	98.22	98.19	98.05	97.80	97.51	97.35	96.76	96.68	96.60	96.33
47	1.8146	98.88	98.55	98.36	98.03	97.78	97.66	97.26	97.16	96.85	96.52	96.48	96.24
48	1.8108	99.12	98.93	98.66	98.53	98.11	97.67	97.29	96.94	96.70	96.58	96.66	96.15
49	1.8307	99.48	98.91	98.76	98.62	98.42	98.31	98.01	97.73	97.49	97.39	97.25	96.84
50	1.8256	99.05	98.80	98.54	98.50	98.18	98.00	97.76	97.36	97.14	97.01	96.76	96.61
Avg.	1.8177	98.92	98.57	98.41	98.24	97.99	97.76	97.36	97.12	96.80	96.56	96.41	96.19
Med.	1.8146	98.92	98.60	98.42	98.23	97.96	97.79	97.34	97.16	96.82	96.58	96.48	96.23
st dev	0.0101	0.32	0.32	0.30	0.31	0.32	0.34	0.3775	0.3514	0.3614	0.3987	0.4201	0.4258
Min.	1.7982	98.09	97.52	97.56	97.51	97.21	97.11	96.64	96.48	96.18	95.84	95.66	95.43
Max.	1.8361	99.48	99.07	98.93	98.84	98.48	98.48	98.02	97.81	97.49	97.39	97.25	96.86

LM-80 & TM-21 Raporu

No.	400-700nm Photon Flux Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
26	95.35	95.25	94.28	94.74	94.30
27	95.61	95.34	95.70	94.87	94.59
28	95.75	95.44	96.00	94.66	94.39
29	95.73	95.32	94.64	94.77	94.44
30	95.02	94.95	93.42	94.17	93.95
31	95.14	94.91	94.50	94.30	93.92
32	95.36	94.92	95.14	94.28	94.00
33	95.80	95.53	96.31	94.85	94.63
34	96.18	95.85	96.45	95.24	94.96
35	96.11	95.77	95.00	94.96	94.64
36	96.36	96.14	95.06	95.39	95.00
37	96.22	96.23	95.93	95.54	95.21
38	95.75	95.54	95.93	94.66	94.33
39	96.07	95.76	94.56	94.89	94.56
40	95.25	95.05	94.47	94.24	94.02
41	95.17	94.58	94.53	93.85	93.63
42	95.25	94.92	94.25	94.19	93.97
43	95.73	95.59	95.58	94.97	94.64
44	96.29	96.10	96.65	95.54	95.21
45	96.00	95.82	95.33	95.30	94.91
46	95.90	95.59	94.81	95.10	94.88
47	95.85	95.44	96.91	94.84	94.46
48	95.91	95.67	96.00	95.10	94.82
49	96.66	96.41	94.48	95.54	95.26
50	96.49	96.22	95.02	94.82	94.60
Avg.	95.80	95.53	95.24	94.83	94.53
Med.	95.80	95.54	95.06	94.85	94.59
st dev	0.45	0.4808	0.8753	0.47	0.4451
Min.	95.02	94.58	93.42	93.85	93.63
Max.	96.66	96.41	96.91	95.54	95.26

LM-80 & TM-21 Raporu

3.8 Data Set 2, 85°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
26	123.00	100.16	99.92	99.92	99.76	99.51	99.35	99.19	99.11	98.70	98.46	98.21	98.05
27	123.50	99.92	99.43	98.95	98.70	98.62	98.46	98.30	98.22	98.06	97.73	97.25	97.09
28	124.10	100.64	100.08	99.60	99.44	99.36	99.11	98.95	98.87	98.63	98.39	98.07	97.58
29	123.50	100.08	99.68	99.43	99.19	98.79	98.54	98.38	98.14	97.98	97.81	97.41	97.00
30	126.00	99.76	99.37	98.97	98.57	98.41	98.17	97.70	97.38	97.06	96.75	96.51	96.19
31	123.70	100.08	99.76	99.43	99.11	98.71	98.30	97.98	97.66	97.41	97.09	97.01	96.52
32	122.80	100.24	100.00	99.67	99.35	99.10	98.94	98.70	98.37	98.29	97.80	97.39	97.07
33	122.90	99.43	99.19	98.70	98.37	98.21	98.13	97.80	97.64	97.48	97.15	96.99	96.83
34	121.70	100.08	99.84	99.59	99.42	99.34	99.10	98.69	98.36	98.19	98.03	97.95	97.70
35	126.00	100.08	99.84	99.44	99.05	98.89	98.65	98.33	97.94	97.70	97.54	97.46	97.30
36	122.80	100.16	100.00	100.08	99.84	99.76	99.59	99.51	99.35	98.78	98.70	98.37	98.29
37	122.90	100.08	100.00	99.84	99.67	99.51	99.27	98.94	98.78	98.37	98.21	98.13	97.88
38	123.40	99.84	99.19	98.95	98.62	98.46	98.30	98.14	97.81	97.41	97.24	97.16	96.92
39	124.60	99.52	99.04	99.04	98.64	98.48	98.31	98.07	97.83	97.59	97.27	97.11	97.03
40	125.30	99.44	99.36	99.04	98.72	98.24	97.92	97.53	97.37	96.97	96.65	96.25	96.09
41	124.20	99.52	99.44	98.95	98.71	98.23	97.83	97.75	97.42	97.10	96.78	96.54	96.46
42	123.70	99.84	99.76	99.43	99.11	98.63	98.22	97.66	97.57	97.41	97.17	96.77	96.52
43	124.30	99.84	99.36	98.95	98.87	98.39	98.15	97.83	97.51	97.02	96.78	96.70	96.54
44	122.80	99.84	99.59	99.43	99.19	98.86	98.78	98.45	97.96	97.88	97.56	97.15	97.07
45	124.60	99.52	99.20	98.96	98.72	98.48	98.07	97.75	97.67	97.59	97.27	97.03	96.87
46	124.00	99.76	99.68	99.52	99.44	99.19	99.03	98.79	98.63	98.15	98.06	97.90	97.58
47	124.40	99.44	99.20	98.87	98.47	98.15	97.99	97.75	97.67	97.43	97.11	97.03	96.70
48	123.50	99.68	99.60	99.11	98.95	98.54	98.06	97.81	97.49	97.25	97.17	97.09	96.60
49	125.90	99.92	99.44	99.13	98.89	98.65	98.57	98.41	98.09	98.01	97.86	97.62	97.22
50	125.70	99.92	99.76	99.36	99.20	98.89	98.65	98.57	98.17	98.01	97.93	97.61	97.37
Avg.	123.97	99.87	99.59	99.29	99.04	98.78	98.54	98.28	98.04	97.78	97.54	97.31	97.06
Med.	123.70	99.84	99.60	99.36	99.05	98.65	98.46	98.30	97.94	97.70	97.54	97.16	97.03
st dev	1.15	0.30	0.31	0.37	0.41	0.46	0.49	0.54	0.56	0.54	0.5745	0.5659	0.5652
Min.	121.70	99.43	99.04	98.70	98.37	98.15	97.83	97.53	97.37	96.97	96.65	96.25	96.09
Max.	126.00	100.64	100.08	100.08	99.84	99.76	99.59	99.51	99.35	98.78	98.70	98.37	98.29

LM-80 & TM-21 Raporu

No.	Lumen Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
26	97.80	97.64	97.48	97.24	96.91
27	96.84	96.60	96.44	96.28	95.95
28	97.18	96.94	96.62	96.29	96.05
29	96.76	96.36	96.19	95.95	95.71
30	95.95	95.79	95.56	95.24	95.08
31	96.20	95.96	95.72	95.55	95.23
32	96.66	96.25	96.01	95.77	95.52
33	96.42	96.18	95.77	95.61	95.44
34	97.53	97.21	97.04	96.71	96.47
35	96.83	96.51	96.19	95.87	95.63
36	97.96	97.72	97.39	97.07	96.82
37	97.64	97.56	97.23	97.07	96.83
38	96.60	96.43	96.03	95.71	95.46
39	96.87	96.63	96.23	95.91	95.67
40	95.93	95.69	95.37	95.13	94.89
41	95.97	95.41	95.17	94.85	94.69
42	96.36	96.04	95.80	95.47	95.31
43	96.14	95.98	95.90	95.58	95.33
44	96.82	96.66	96.58	96.25	96.01
45	96.55	96.47	96.23	95.99	95.67
46	97.26	97.02	96.85	96.69	96.45
47	96.46	96.06	95.82	95.66	95.34
48	96.52	96.19	96.03	95.87	95.63
49	97.14	96.90	96.43	96.19	95.95
50	97.30	97.14	96.18	95.94	95.70
Avg.	96.79	96.53	96.25	96.00	95.75
Med.	96.76	96.47	96.19	95.91	95.67
st dev	0.58	0.6144	0.6025	0.61	0.5882
Min.	95.93	95.41	95.17	94.85	94.69
Max.	97.96	97.72	97.48	97.24	96.91

LM-80 & TM-21 Raporu

3.9 Data Set 2, 85°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
26	9.118	9.130	9.114	9.121	9.102	9.118	9.083	9.107	9.109	9.105	9.116	9.132	9.117
27	9.116	9.101	9.118	9.123	9.102	9.105	9.089	9.105	9.105	9.109	9.109	9.130	9.110
28	9.094	9.076	9.085	9.101	9.077	9.108	9.058	9.076	9.079	9.097	9.095	9.108	9.092
29	9.094	9.077	9.088	9.095	9.076	9.081	9.060	9.083	9.085	9.090	9.091	9.103	9.090
30	9.128	9.108	9.127	9.140	9.112	9.115	9.093	9.120	9.124	9.126	9.127	9.140	9.125
31	9.119	9.111	9.114	9.113	9.099	9.104	9.083	9.100	9.110	9.103	9.107	9.129	9.110
32	9.119	9.098	9.113	9.120	9.097	9.106	9.081	9.101	9.101	9.105	9.106	9.127	9.106
33	9.119	9.099	9.118	9.127	9.098	9.110	9.085	9.108	9.110	9.115	9.110	9.126	9.115
34	9.121	9.115	9.112	9.125	9.100	9.104	9.085	9.109	9.125	9.104	9.120	9.130	9.115
35	9.110	9.095	9.098	9.117	9.085	9.088	9.083	9.096	9.106	9.118	9.106	9.120	9.106
36	9.113	9.089	9.099	9.127	9.085	9.096	9.079	9.097	9.103	9.108	9.101	9.115	9.104
37	9.100	9.080	9.098	9.104	9.084	9.088	9.068	9.089	9.099	9.101	9.098	9.114	9.096
38	9.148	9.131	9.149	9.148	9.127	9.130	9.116	9.130	9.145	9.134	9.148	9.158	9.135
39	9.083	9.064	9.083	9.088	9.070	9.076	9.047	9.072	9.081	9.096	9.083	9.095	9.083
40	9.107	9.092	9.110	9.116	9.090	9.096	9.085	9.099	9.103	9.103	9.104	9.122	9.106
41	9.097	9.087	9.103	9.100	9.085	9.090	9.070	9.089	9.101	9.114	9.100	9.112	9.094
42	9.138	9.118	9.142	9.142	9.124	9.127	9.106	9.131	9.134	9.133	9.136	9.155	9.138
43	9.123	9.109	9.125	9.126	9.101	9.113	9.093	9.110	9.122	9.123	9.119	9.138	9.119
44	9.093	9.076	9.092	9.096	9.078	9.082	9.064	9.084	9.092	9.101	9.092	9.116	9.094
45	9.102	9.083	9.107	9.104	9.091	9.101	9.072	9.096	9.102	9.108	9.109	9.138	9.108
46	9.126	9.098	9.118	9.125	9.108	9.107	9.093	9.110	9.128	9.124	9.116	9.136	9.112
47	9.101	9.083	9.100	9.096	9.083	9.085	9.064	9.084	9.091	9.109	9.092	9.123	9.094
48	9.120	9.097	9.106	9.126	9.105	9.106	9.083	9.107	9.118	9.116	9.113	9.129	9.112
49	9.110	9.091	9.106	9.113	9.095	9.124	9.081	9.097	9.144	9.122	9.103	9.124	9.110
50	9.123	9.109	9.123	9.125	9.103	9.114	9.087	9.106	9.114	9.114	9.145	9.155	9.123
Avg.	9.113	9.097	9.110	9.117	9.095	9.103	9.080	9.100	9.109	9.111	9.110	9.127	9.109
Med.	9.116	9.097	9.110	9.120	9.097	9.105	9.083	9.100	9.106	9.109	9.107	9.127	9.110
st dev	0.015	0.017	0.016	0.016	0.014	0.015	0.015	0.015	0.018	0.011	0.016	0.016	0.014
Min.	9.083	9.064	9.083	9.088	9.070	9.076	9.047	9.072	9.079	9.090	9.083	9.095	9.083
Max.	9.148	9.131	9.149	9.148	9.127	9.130	9.116	9.131	9.145	9.134	9.148	9.158	9.138

No.	Forward Voltage (V)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
26	9.117	9.125	9.136	9.117	9.138
27	9.115	9.120	9.122	9.123	9.136
28	9.087	9.094	9.105	9.110	9.101
29	9.089	9.097	9.107	9.118	9.119
30	9.133	9.135	9.131	9.106	9.149
31	9.110	9.118	9.115	9.113	9.129
32	9.101	9.113	9.119	9.128	9.125
33	9.110	9.114	9.111	9.116	9.129
34	9.111	9.124	9.127	9.124	9.139
35	9.114	9.110	9.115	9.112	9.122
36	9.118	9.109	9.101	9.113	9.126
37	9.112	9.099	9.101	9.106	9.123
38	9.145	9.145	9.136	9.126	9.138
39	9.087	9.086	9.103	9.125	9.099
40	9.108	9.110	9.128	9.110	9.121
41	9.107	9.145	9.122	9.128	9.114
42	9.145	9.140	9.136	9.140	9.160
43	9.119	9.123	9.129	9.113	9.143
44	9.105	9.095	9.107	9.112	9.112
45	9.109	9.103	9.102	9.116	9.116
46	9.120	9.123	9.124	9.127	9.125
47	9.112	9.111	9.112	9.118	9.107
48	9.115	9.115	9.127	9.111	9.124
49	9.104	9.118	9.119	9.117	9.125
50	9.123	9.123	9.131	9.120	9.134
Avg.	9.113	9.116	9.119	9.118	9.126
Med.	9.112	9.115	9.119	9.117	9.125
st dev	0.014	0.015	0.012	0.008	0.014
Min.	9.087	9.086	9.101	9.106	9.099
Max.	9.145	9.145	9.136	9.140	9.160

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3.10 Data Set 2, 85°C, 100mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift (Δu'v')											
	**0hr(Initial)		**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
26	0.2604	0.5272	0.0006	0.0003	0.0006	0.0017	0.0016	0.0016	0.0018	0.0009	0.0004	0.0001	0.0008	0.0015
27	0.2609	0.5285	0.0004	0.0001	0.0004	0.0013	0.0012	0.0012	0.0012	0.0006	0.0001	0.0006	0.0005	0.0010
28	0.2623	0.5321	0.0006	0.0002	0.0005	0.0014	0.0012	0.0013	0.0014	0.0008	0.0004	0.0002	0.0006	0.0012
29	0.2623	0.5273	0.0006	0.0000	0.0004	0.0016	0.0014	0.0013	0.0015	0.0009	0.0004	0.0003	0.0006	0.0012
30	0.2628	0.5312	0.0006	0.0002	0.0004	0.0014	0.0012	0.0012	0.0012	0.0007	0.0003	0.0004	0.0006	0.0009
31	0.2610	0.5265	0.0004	0.0002	0.0004	0.0015	0.0013	0.0014	0.0014	0.0007	0.0002	0.0004	0.0005	0.0011
32	0.2621	0.5278	0.0004	0.0001	0.0004	0.0014	0.0013	0.0013	0.0014	0.0008	0.0003	0.0003	0.0007	0.0012
33	0.2632	0.5269	0.0005	0.0001	0.0005	0.0014	0.0012	0.0013	0.0013	0.0007	0.0001	0.0004	0.0005	0.0014
34	0.2629	0.5271	0.0006	0.0003	0.0003	0.0013	0.0012	0.0013	0.0014	0.0006	0.0004	0.0006	0.0005	0.0014
35	0.2604	0.5301	0.0006	0.0001	0.0005	0.0013	0.0012	0.0011	0.0012	0.0005	0.0000	0.0004	0.0005	0.0011
36	0.2624	0.5294	0.0004	0.0001	0.0004	0.0012	0.0011	0.0012	0.0011	0.0006	0.0002	0.0006	0.0005	0.0007
37	0.2617	0.5286	0.0005	0.0001	0.0005	0.0014	0.0013	0.0012	0.0013	0.0006	0.0002	0.0004	0.0006	0.0011
38	0.2615	0.5275	0.0006	0.0002	0.0006	0.0014	0.0012	0.0013	0.0014	0.0007	0.0002	0.0004	0.0005	0.0013
39	0.2638	0.5305	0.0003	0.0002	0.0004	0.0012	0.0011	0.0012	0.0011	0.0004	0.0001	0.0003	0.0004	0.0015
40	0.2613	0.5278	0.0004	0.0002	0.0002	0.0013	0.0013	0.0011	0.0011	0.0005	0.0001	0.0006	0.0004	0.0011
41	0.2616	0.5266	0.0004	0.0002	0.0004	0.0014	0.0013	0.0012	0.0016	0.0008	0.0002	0.0004	0.0008	0.0015
42	0.2639	0.5277	0.0004	0.0002	0.0002	0.0014	0.0010	0.0012	0.0014	0.0005	0.0001	0.0006	0.0004	0.0010
43	0.2600	0.5266	0.0005	0.0001	0.0005	0.0014	0.0011	0.0014	0.0015	0.0006	0.0002	0.0004	0.0006	0.0013
44	0.2605	0.5265	0.0004	0.0001	0.0005	0.0016	0.0014	0.0013	0.0014	0.0006	0.0003	0.0002	0.0006	0.0016
45	0.2624	0.5305	0.0002	0.0004	0.0004	0.0011	0.0008	0.0010	0.0011	0.0003	0.0002	0.0008	0.0004	0.0009
46	0.2624	0.5298	0.0007	0.0002	0.0006	0.0015	0.0012	0.0014	0.0013	0.0007	0.0003	0.0003	0.0006	0.0010
47	0.2621	0.5294	0.0005	0.0001	0.0005	0.0014	0.0012	0.0012	0.0013	0.0006	0.0002	0.0004	0.0006	0.0011
48	0.2618	0.5278	0.0005	0.0001	0.0005	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0003	0.0011
49	0.2608	0.5287	0.0004	0.0002	0.0004	0.0012	0.0011	0.0011	0.0011	0.0004	0.0000	0.0005	0.0004	0.0009
50	0.2593	0.5292	0.0006	0.0002	0.0003	0.0015	0.0013	0.0013	0.0014	0.0007	0.0002	0.0002	0.0008	0.0011
Avg.	0.2618	0.5285	0.0005	0.0002	0.0004	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0012
Med.	0.2618	0.5278	0.0005	0.0002	0.0004	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0011
st dev	0.0012	0.0016	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0002
Min.	0.2593	0.5265	0.0002	0.0000	0.0002	0.0011	0.0008	0.0010	0.0011	0.0003	0.0000	0.0001	0.0003	0.0007
Max.	0.2639	0.5321	0.0007	0.0004	0.0006	0.0017	0.0016	0.0016	0.0018	0.0009	0.0004	0.0008	0.0008	0.0016

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No.	Chromaticity Shift (Δu'v')				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
26	0.0012	0.0011	0.0014	0.0022	0.0008
27	0.0009	0.0007	0.0009	0.0019	0.0004
28	0.0012	0.0009	0.0014	0.0021	0.0008
29	0.0009	0.0005	0.0012	0.0019	0.0004
30	0.0010	0.0006	0.0012	0.0020	0.0007
31	0.0011	0.0010	0.0012	0.0021	0.0008
32	0.0013	0.0009	0.0011	0.0021	0.0007
33	0.0012	0.0007	0.0011	0.0021	0.0008
34	0.0011	0.0008	0.0012	0.0021	0.0007
35	0.0008	0.0007	0.0012	0.0019	0.0006
36	0.0008	0.0004	0.0008	0.0020	0.0006
37	0.0010	0.0006	0.0013	0.0021	0.0004
38	0.0011	0.0009	0.0012	0.0021	0.0006
39	0.0011	0.0006	0.0010	0.0021	0.0008
40	0.0008	0.0006	0.0009	0.0019	0.0006
41	0.0013	0.0009	0.0010	0.0023	0.0007
42	0.0010	0.0006	0.0009	0.0018	0.0005
43	0.0011	0.0008	0.0011	0.0022	0.0007
44	0.0011	0.0008	0.0011	0.0021	0.0009
45	0.0008	0.0006	0.0009	0.0016	0.0006
46	0.0011	0.0006	0.0010	0.0021	0.0007
47	0.0011	0.0008	0.0009	0.0020	0.0009
48	0.0011	0.0006	0.0011	0.0019	0.0007
49	0.0008	0.0006	0.0009	0.0019	0.0005
50	0.0009	0.0007	0.0011	0.0020	0.0006
Avg.	0.0010	0.0007	0.0011	0.0020	0.0007
Med.	0.0011	0.0007	0.0011	0.0021	0.0007
st dev	0.0002	0.0002	0.0002	0.0001	0.0001
Min.	0.0008	0.0004	0.0008	0.0016	0.0004
Max.	0.0013	0.0011	0.0014	0.0023	0.0009

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3.11 Data Set 2, 85°C, 100mA (Peak Wavelength)

No.	Peak Wavelength (nm)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
26	607.1	608.5	608.5	607.5	606.8	605.2	608.5	603.5	606.2	608.8	613.4	613.0	605.5
27	609.4	607.5	605.5	608.4	605.5	607.4	605.3	606.2	609.2	608.8	604.0	603.9	609.8
28	607.8	604.9	610.8	610.6	606.1	606.2	606.5	604.2	604.7	606.9	604.8	608.5	609.8
29	606.2	607.9	608.4	609.8	609.1	609.4	608.2	611.1	606.5	611.8	604.8	608.8	603.2
30	605.0	608.4	608.5	604.5	604.9	606.2	607.8	611.1	604.5	608.2	609.1	607.8	608.2
31	606.2	607.2	608.7	604.6	607.9	608.4	609.1	606.4	605.8	606.5	608.7	608.5	610.5
32	607.5	608.2	606.9	608.4	606.3	607.1	606.8	603.8	605.5	607.5	604.5	607.3	604.9
33	608.5	607.5	607.5	607.5	608.8	606.2	605.5	608.2	604.7	606.3	606.1	608.5	610.5
34	604.5	604.8	609.1	608.5	606.2	607.8	606.2	608.8	607.4	605.2	610.7	609.6	609.6
35	607.9	607.8	609.1	606.5	606.5	608.1	608.8	602.2	608.8	606.5	605.5	608.5	609.1
36	608.5	606.5	604.9	605.5	608.2	605.9	608.8	607.9	609.5	604.9	611.2	604.5	607.6
37	609.2	604.7	607.9	606.2	607.5	604.8	607.8	609.2	608.8	606.8	605.8	606.8	604.2
38	607.2	608.5	608.2	609.9	607.7	606.2	608.5	609.9	609.2	608.8	609.2	608.2	603.9
39	607.2	607.5	605.5	609.1	607.2	607.8	607.8	610.2	604.2	612.4	607.4	609.0	611.8
40	606.5	606.2	608.2	610.8	607.8	602.8	607.8	605.5	609.8	608.5	608.3	607.2	605.8
41	608.8	607.5	606.5	607.5	608.9	608.4	604.8	605.2	606.1	608.2	611.7	606.5	613.1
42	609.1	607.8	609.1	610.2	606.8	607.8	604.9	607.2	605.2	607.2	605.1	608.2	609.4
43	605.1	605.5	607.9	608.9	606.2	606.2	606.9	609.1	608.5	607.8	608.5	607.6	610.1
44	604.2	608.5	605.2	606.2	608.8	607.7	608.2	604.6	608.1	607.5	608.4	609.4	611.1
45	607.6	609.1	609.1	606.2	604.8	608.9	607.5	609.5	608.8	602.9	603.5	608.8	604.9
46	608.8	608.5	608.4	611.1	606.5	608.8	606.5	605.8	610.3	607.4	609.8	608.1	606.6
47	608.8	608.8	608.8	609.8	604.5	606.5	607.4	606.5	605.5	608.1	609.5	609.1	606.2
48	606.8	606.3	606.8	608.5	607.6	604.5	608.2	603.9	606.2	608.5	603.5	609.5	607.8
49	608.8	605.2	608.4	608.1	605.0	610.5	606.2	608.5	605.8	606.1	606.1	605.5	606.8
50	608.5	606.5	605.8	605.6	606.5	604.4	605.8	604.9	605.6	608.5	608.1	607.3	607.5
Avg.	607.4	607.2	607.7	608.0	606.9	606.9	607.2	606.9	607.0	607.6	607.5	608.0	607.9
Med.	607.6	607.5	608.2	608.4	606.8	607.1	607.5	606.5	606.2	607.5	608.1	608.2	607.8
st dev	1.5	1.4	1.5	1.9	1.3	1.8	1.3	2.6	1.9	2.0	2.7	1.8	2.7
Min.	604.2	604.7	604.9	604.5	604.5	602.8	604.8	602.2	604.2	602.9	603.5	603.9	603.2
Max.	609.4	609.1	610.8	611.1	609.1	610.5	609.1	611.1	610.3	612.4	613.4	613.0	613.1

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No.	Peak Wavelength (nm)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
26	607.5	609.8	603.6	607.5	607.8
27	608.8	605.5	603.5	608.1	604.5
28	609.1	607.5	608.8	605.5	606.2
29	604.8	608.5	607.1	608.2	608.8
30	607.5	607.8	606.4	606.2	605.2
31	607.4	612.1	610.1	605.8	608.4
32	606.1	607.3	609.1	608.1	609.1
33	610.1	606.2	606.5	608.8	606.8
34	607.8	608.8	611.8	608.8	607.8
35	605.2	608.5	607.2	605.8	603.6
36	611.4	601.9	608.7	608.8	606.8
37	608.9	607.8	609.4	605.5	605.1
38	607.8	607.2	603.5	605.5	609.1
39	608.8	610.4	604.7	606.7	608.8
40	603.7	607.7	609.8	605.2	606.8
41	605.1	604.2	611.7	607.5	610.8
42	608.5	610.5	610.1	608.1	606.2
43	607.5	608.8	602.2	608.8	607.2
44	606.8	611.4	610.5	606.5	605.8
45	607.8	608.4	604.2	608.5	607.8
46	610.8	606.8	610.2	608.6	605.6
47	606.2	606.5	604.8	603.6	607.4
48	605.8	610.2	613.1	604.9	608.2
49	606.5	607.1	607.8	605.5	603.9
50	606.2	607.2	603.5	605.1	608.1
Avg.	607.4	607.9	607.5	606.9	607.0
Med.	607.5	607.8	607.8	606.7	607.2
st dev	1.9	2.2	3.1	1.6	1.8
Min.	603.7	601.9	602.2	603.6	603.6
Max.	611.4	612.1	613.1	608.8	610.8

LM-80 & TM-21 Raporu

3.12 Data Set 2, 85°C, 100mA (Color coordinates)

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**0hr(Initial)		**1000hrs		**2000hrs		**3000hrs		**4000hrs		**5000hrs		**6000hrs	
26	0.2604	0.5272	0.2610	0.5272	0.2601	0.5271	0.2600	0.5267	0.2593	0.5259	0.2593	0.5261	0.2595	0.5259
27	0.2609	0.5285	0.2605	0.5283	0.2608	0.5286	0.2606	0.5283	0.2600	0.5275	0.2603	0.5275	0.2601	0.5276
28	0.2623	0.5321	0.2619	0.5317	0.2621	0.5321	0.2620	0.5317	0.2614	0.5310	0.2616	0.5311	0.2615	0.5311
29	0.2623	0.5273	0.2619	0.5269	0.2623	0.5273	0.2621	0.5269	0.2613	0.5260	0.2615	0.5262	0.2617	0.5261
30	0.2628	0.5312	0.2623	0.5308	0.2626	0.5311	0.2627	0.5308	0.2619	0.5301	0.2621	0.5302	0.2622	0.5302
31	0.2610	0.5265	0.2607	0.5262	0.2610	0.5267	0.2607	0.5262	0.2600	0.5254	0.2601	0.5255	0.2602	0.5254
32	0.2621	0.5278	0.2619	0.5275	0.2622	0.5279	0.2619	0.5275	0.2612	0.5267	0.2612	0.5268	0.2612	0.5268
33	0.2632	0.5269	0.2629	0.5265	0.2633	0.5270	0.2632	0.5264	0.2624	0.5257	0.2625	0.5259	0.2625	0.5258
34	0.2629	0.5271	0.2624	0.5268	0.2627	0.5273	0.2626	0.5270	0.2620	0.5262	0.2623	0.5261	0.2620	0.5262
35	0.2604	0.5301	0.2600	0.5297	0.2603	0.5302	0.2601	0.5297	0.2597	0.5290	0.2599	0.5290	0.2599	0.5291
36	0.2624	0.5294	0.2621	0.5291	0.2624	0.5295	0.2622	0.5291	0.2617	0.5284	0.2618	0.5285	0.2618	0.5284
37	0.2617	0.5286	0.2614	0.5282	0.2617	0.5287	0.2614	0.5282	0.2609	0.5275	0.2610	0.5275	0.2610	0.5276
38	0.2615	0.5275	0.2610	0.5272	0.2614	0.5277	0.2610	0.5272	0.2606	0.5264	0.2608	0.5265	0.2607	0.5265
39	0.2638	0.5305	0.2637	0.5302	0.2639	0.5307	0.2636	0.5302	0.2632	0.5295	0.2632	0.5296	0.2632	0.5295
40	0.2613	0.5278	0.2611	0.5275	0.2614	0.5280	0.2612	0.5276	0.2606	0.5267	0.2607	0.5267	0.2608	0.5268
41	0.2616	0.5266	0.2613	0.5263	0.2616	0.5268	0.2614	0.5263	0.2607	0.5255	0.2608	0.5256	0.2609	0.5256
42	0.2639	0.5277	0.2637	0.5274	0.2639	0.5279	0.2638	0.5275	0.2631	0.5266	0.2634	0.5268	0.2632	0.5267
43	0.2600	0.5266	0.2597	0.5262	0.2600	0.5267	0.2600	0.5261	0.2592	0.5254	0.2595	0.5256	0.2593	0.5254
44	0.2605	0.5265	0.2603	0.5261	0.2604	0.5266	0.2602	0.5261	0.2595	0.5253	0.2597	0.5254	0.2598	0.5254
45	0.2624	0.5305	0.2624	0.5303	0.2627	0.5307	0.2626	0.5302	0.2619	0.5295	0.2622	0.5297	0.2621	0.5295
46	0.2624	0.5298	0.2619	0.5293	0.2622	0.5298	0.2620	0.5294	0.2614	0.5287	0.2618	0.5288	0.2616	0.5287
47	0.2621	0.5294	0.2620	0.5289	0.2620	0.5294	0.2619	0.5289	0.2612	0.5283	0.2616	0.5283	0.2616	0.5283
48	0.2618	0.5278	0.2615	0.5274	0.2617	0.5279	0.2615	0.5274	0.2610	0.5267	0.2611	0.5268	0.2612	0.5267
49	0.2608	0.5287	0.2606	0.5283	0.2609	0.5289	0.2607	0.5283	0.2603	0.5276	0.2603	0.5277	0.2603	0.5277
50	0.2593	0.5292	0.2589	0.5288	0.2591	0.5293	0.2592	0.5289	0.2583	0.5281	0.2585	0.5282	0.2587	0.5281
Avg.	0.2618	0.5285	0.2615	0.5281	0.2617	0.5286	0.2615	0.5281	0.2609	0.5273	0.2611	0.5274	0.2611	0.5274
Med.	0.2618	0.5278	0.2615	0.5275	0.2617	0.5280	0.2615	0.5276	0.2610	0.5267	0.2611	0.5268	0.2612	0.5268
st dev	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016
Min.	0.2593	0.5265	0.2589	0.5261	0.2591	0.5266	0.2592	0.5261	0.2583	0.5253	0.2585	0.5254	0.2587	0.5254
Max.	0.2639	0.5321	0.2637	0.5317	0.2639	0.5321	0.2638	0.5317	0.2632	0.5310	0.2634	0.5311	0.2632	0.5311

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**7000hrs		**8000hrs		**9000hrs		**10000hrs		**11000hrs		**12000hrs	
26	0.2589	0.5262	0.2597	0.5267	0.2600	0.5272	0.2603	0.5273	0.2598	0.5267	0.2594	0.5261
27	0.2599	0.5278	0.2604	0.5281	0.2608	0.5286	0.2613	0.5289	0.2605	0.5282	0.2603	0.5277
28	0.2611	0.5313	0.2617	0.5316	0.2619	0.5320	0.2623	0.5323	0.2619	0.5317	0.2614	0.5313
29	0.2612	0.5263	0.2618	0.5266	0.2619	0.5272	0.2626	0.5274	0.2618	0.5269	0.2616	0.5263
30	0.2619	0.5304	0.2623	0.5307	0.2625	0.5311	0.2631	0.5314	0.2623	0.5308	0.2623	0.5304
31	0.2599	0.5257	0.2605	0.5260	0.2608	0.5266	0.2612	0.5269	0.2606	0.5262	0.2602	0.5258
32	0.2609	0.5270	0.2615	0.5272	0.2618	0.5278	0.2621	0.5281	0.2615	0.5274	0.2612	0.5270
33	0.2622	0.5261	0.2628	0.5263	0.2631	0.5268	0.2634	0.5272	0.2629	0.5265	0.2624	0.5258
34	0.2617	0.5263	0.2624	0.5268	0.2627	0.5274	0.2631	0.5277	0.2625	0.5268	0.2618	0.5263
35	0.2595	0.5293	0.2602	0.5296	0.2604	0.5301	0.2607	0.5304	0.2600	0.5298	0.2598	0.5292
36	0.2616	0.5286	0.2621	0.5289	0.2626	0.5295	0.2629	0.5297	0.2621	0.5290	0.2621	0.5288
37	0.2607	0.5278	0.2613	0.5282	0.2615	0.5286	0.2619	0.5289	0.2612	0.5283	0.2610	0.5278
38	0.2604	0.5267	0.2609	0.5271	0.2613	0.5276	0.2617	0.5279	0.2612	0.5271	0.2606	0.5266
39	0.2629	0.5298	0.2636	0.5301	0.2637	0.5306	0.2639	0.5308	0.2635	0.5302	0.2626	0.5296
40	0.2605	0.5271	0.2610	0.5274	0.2614	0.5279	0.2618	0.5281	0.2613	0.5274	0.2606	0.5269
41	0.2603	0.5257	0.2610	0.5261	0.2614	0.5267	0.2618	0.5270	0.2609	0.5263	0.2605	0.5256
42	0.2628	0.5268	0.2636	0.5273	0.2639	0.5278	0.2643	0.5281	0.2636	0.5274	0.2633	0.5269
43	0.2589	0.5256	0.2597	0.5261	0.2598	0.5266	0.2603	0.5269	0.2596	0.5262	0.2592	0.5256
44	0.2595	0.5255	0.2601	0.5260	0.2602	0.5266	0.2606	0.5267	0.2601	0.5260	0.2594	0.5254
45	0.2617	0.5297	0.2624	0.5302	0.2626	0.5306	0.2631	0.5308	0.2622	0.5302	0.2619	0.5297
46	0.2615	0.5289	0.2620	0.5292	0.2621	0.5297	0.2625	0.5301	0.2619	0.5294	0.2618	0.5290
47	0.2612	0.5285	0.2618	0.5289	0.2621	0.5292	0.2624	0.5296	0.2617	0.5290	0.2614	0.5285
48	0.2608	0.5269	0.2614	0.5273	0.2616	0.5278	0.2620	0.5281	0.2617	0.5275	0.2611	0.5269
49	0.2600	0.5279	0.2607	0.5283	0.2608	0.5287	0.2612	0.5290	0.2606	0.5284	0.2603	0.5280
50	0.2581	0.5284	0.2588	0.5287	0.2591	0.5291	0.2592	0.5294	0.2587	0.5287	0.2586	0.5284
Avg.	0.2607	0.5276	0.2613	0.5280	0.2616	0.5285	0.2620	0.5287	0.2614	0.5281	0.2610	0.5276
Med.	0.2608	0.5271	0.2614	0.5274	0.2616	0.5279	0.2620	0.5281	0.2615	0.5275	0.2611	0.5270
st dev	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0016
Min.	0.2581	0.5255	0.2588	0.5260	0.2591	0.5266	0.2592	0.5267	0.2587	0.5260	0.2586	0.5254
Max.	0.2629	0.5313	0.2636	0.5316	0.2639	0.5320	0.2643	0.5323	0.2636	0.5317	0.2633	0.5313

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	13000hrs		14000hrs		15000hrs		16000hrs		17000hrs	
26	0.2595	0.5264	0.2596	0.5265	0.2592	0.5265	0.2591	0.5254	0.2599	0.5266
27	0.2602	0.5279	0.2603	0.5282	0.2600	0.5282	0.2598	0.5269	0.2608	0.5281
28	0.2613	0.5314	0.2616	0.5316	0.2610	0.5315	0.2609	0.5306	0.2617	0.5315
29	0.2617	0.5266	0.2620	0.5269	0.2613	0.5267	0.2612	0.5257	0.2622	0.5269
30	0.2620	0.5306	0.2625	0.5307	0.2618	0.5306	0.2615	0.5297	0.2623	0.5307
31	0.2602	0.5258	0.2601	0.5261	0.2599	0.5260	0.2597	0.5249	0.2605	0.5259
32	0.2610	0.5271	0.2613	0.5273	0.2612	0.5272	0.2607	0.5262	0.2616	0.5273
33	0.2623	0.5261	0.2626	0.5265	0.2622	0.5264	0.2619	0.5252	0.2627	0.5263
34	0.2619	0.5266	0.2622	0.5267	0.2618	0.5266	0.2616	0.5255	0.2624	0.5266
35	0.2598	0.5295	0.2599	0.5296	0.2594	0.5295	0.2593	0.5286	0.2601	0.5296
36	0.2619	0.5288	0.2621	0.5291	0.2617	0.5290	0.2612	0.5278	0.2620	0.5289
37	0.2610	0.5279	0.2614	0.5281	0.2606	0.5279	0.2604	0.5270	0.2615	0.5282
38	0.2607	0.5268	0.2608	0.5270	0.2604	0.5270	0.2601	0.5259	0.2610	0.5271
39	0.2629	0.5299	0.2633	0.5301	0.2628	0.5302	0.2623	0.5290	0.2632	0.5300
40	0.2607	0.5273	0.2608	0.5274	0.2606	0.5272	0.2602	0.5263	0.2610	0.5273
41	0.2606	0.5258	0.2609	0.5261	0.2607	0.5261	0.2601	0.5249	0.2611	0.5261
42	0.2632	0.5270	0.2634	0.5274	0.2631	0.5274	0.2628	0.5263	0.2637	0.5272
43	0.2592	0.5258	0.2594	0.5260	0.2590	0.5261	0.2587	0.5248	0.2597	0.5260
44	0.2597	0.5257	0.2600	0.5259	0.2596	0.5258	0.2592	0.5248	0.2600	0.5258
45	0.2619	0.5299	0.2619	0.5302	0.2617	0.5300	0.2616	0.5291	0.2621	0.5300
46	0.2617	0.5290	0.2619	0.5294	0.2616	0.5292	0.2611	0.5282	0.2620	0.5292
47	0.2613	0.5286	0.2616	0.5288	0.2616	0.5287	0.2609	0.5278	0.2616	0.5287
48	0.2609	0.5271	0.2615	0.5273	0.2608	0.5273	0.2607	0.5262	0.2615	0.5272
49	0.2602	0.5281	0.2605	0.5282	0.2601	0.5281	0.2597	0.5271	0.2607	0.5282
50	0.2587	0.5285	0.2587	0.5288	0.2584	0.5286	0.2581	0.5276	0.2589	0.5287
Avg.	0.2610	0.5278	0.2612	0.5280	0.2608	0.5279	0.2605	0.5269	0.2614	0.5279
Med.	0.2610	0.5273	0.2614	0.5274	0.2608	0.5274	0.2607	0.5263	0.2615	0.5273
st dev	0.0011	0.0016	0.0012	0.0016	0.0012	0.0016	0.0012	0.0017	0.0011	0.0016
Min.	0.2587	0.5257	0.2587	0.5259	0.2584	0.5258	0.2581	0.5248	0.2589	0.5258
Max.	0.2632	0.5314	0.2634	0.5316	0.2631	0.5315	0.2628	0.5306	0.2637	0.5315

LM-80 & TM-21 Raporu

3.13 Data Set 3, 105°C, 100mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
51	1.8220	98.77	98.39	98.05	98.00	97.57	97.55	97.27	97.04	96.92	96.42	96.20	95.95
52	1.8286	98.27	98.14	98.07	97.78	97.39	97.13	96.77	96.69	96.54	96.12	95.88	95.79
53	1.8222	98.89	98.75	98.53	98.24	97.96	97.76	97.08	97.06	96.72	96.69	96.62	96.41
54	1.8297	98.37	98.09	98.06	97.97	97.66	97.55	97.11	97.07	96.98	96.66	96.50	96.55
55	1.8094	98.70	98.41	98.38	98.41	98.14	97.99	97.50	97.18	96.89	96.69	96.62	96.23
56	1.7885	98.89	98.28	98.07	98.00	97.79	97.58	97.17	96.71	96.60	96.40	96.43	96.01
57	1.8032	99.24	98.95	98.90	98.67	98.60	98.54	98.02	97.67	97.52	97.23	96.69	96.64
58	1.8109	98.45	98.26	97.89	97.52	97.44	97.42	97.01	96.67	96.21	95.84	95.76	95.72
59	1.8119	98.24	97.90	97.88	97.56	97.28	97.08	96.51	96.20	95.81	95.19	94.99	94.56
60	1.8236	98.67	98.11	98.28	97.99	97.69	97.43	96.91	96.69	96.25	95.79	95.70	95.35
61	1.8189	98.53	97.95	97.93	97.66	97.58	97.44	96.89	96.51	96.15	95.83	95.75	95.33
62	1.8200	98.97	98.48	98.21	98.01	97.80	97.48	97.20	96.98	96.36	96.12	96.03	95.77
63	1.8313	98.89	98.43	98.25	98.06	97.65	97.30	97.04	96.89	96.52	96.07	95.87	95.80
64	1.8331	99.02	98.59	98.44	98.27	97.97	97.48	97.21	96.90	96.63	96.55	96.19	95.91
65	1.8256	99.16	98.63	98.31	98.13	97.93	97.40	97.05	96.72	96.33	96.26	96.03	95.79
66	1.8040	99.01	98.59	98.22	97.85	97.53	97.27	97.04	96.73	96.51	96.36	96.05	95.88
67	1.8201	99.41	98.95	98.78	98.52	98.12	97.96	97.45	97.20	96.76	96.44	96.15	96.14
68	1.8142	99.12	98.84	98.83	98.58	98.32	97.99	97.48	97.25	96.87	96.58	96.40	96.25
69	1.8276	99.24	98.89	98.79	98.56	98.27	98.12	97.50	97.38	96.98	96.70	96.42	96.31
70	1.8121	98.58	98.18	98.09	98.00	97.83	97.64	97.41	97.17	96.67	96.42	96.15	96.13
71	1.8268	98.89	98.55	98.31	98.14	97.88	97.73	97.26	96.83	96.44	96.21	96.22	96.11
72	1.8191	99.02	98.69	98.66	98.36	98.20	98.01	97.42	97.17	96.80	96.51	96.12	95.93
73	1.8155	98.99	98.48	98.58	98.30	98.06	97.90	97.48	97.13	96.67	96.54	96.33	96.08
74	1.8114	99.45	99.10	98.71	98.67	98.15	97.92	97.54	97.25	96.90	96.75	96.44	96.35
75	1.8192	98.76	98.42	98.20	98.39	97.79	97.32	96.72	96.38	96.06	96.01	95.75	95.10
Avg.	1.8180	98.86	98.48	98.34	98.15	97.86	97.64	97.20	96.94	96.60	96.34	96.13	95.92
Med.	1.8192	98.89	98.48	98.28	98.13	97.83	97.55	97.20	96.98	96.63	96.42	96.15	95.95
st dev	0.0102	0.33	0.32	0.31	0.33	0.32	0.35	0.3227	0.3311	0.3619	0.4116	0.3761	0.4635
Min.	1.7885	98.24	97.90	97.88	97.52	97.28	97.08	96.51	96.20	95.81	95.19	94.99	94.56
Max.	1.8331	99.45	99.10	98.90	98.67	98.60	98.54	98.02	97.67	97.52	97.23	96.69	96.64

LM-80 & TM-21 Raporu

No.	400-700nm Photon Flux Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
51	95.50	95.08	95.32	94.57	94.13
52	95.30	95.14	95.41	94.61	94.39
53	95.94	95.58	94.58	94.89	94.56
54	95.98	95.73	93.05	95.04	94.71
55	95.88	95.87	95.61	94.84	94.51
56	95.53	95.29	95.88	94.44	94.21
57	96.47	96.29	93.82	95.44	95.05
58	95.25	94.94	95.12	94.37	93.93
59	94.15	93.69	94.99	93.00	92.67
60	94.87	94.72	94.87	94.10	93.72
61	95.02	94.79	95.51	94.29	93.90
62	95.43	95.24	95.66	94.62	94.29
63	95.24	95.15	94.61	94.52	94.14
64	95.39	95.23	93.48	94.65	94.32
65	95.37	95.23	95.07	94.54	94.22
66	95.35	95.00	96.01	94.35	94.07
67	95.81	95.69	95.89	95.05	94.72
68	95.79	95.64	94.81	94.97	94.48
69	96.04	95.58	95.09	95.10	94.77
70	95.82	95.45	95.09	94.59	94.20
71	95.63	95.17	94.24	94.54	94.10
72	95.54	95.10	94.89	94.39	94.00
73	95.57	95.20	94.40	94.41	93.97
74	95.85	95.58	96.51	94.84	94.57
75	94.66	94.35	95.69	93.72	93.45
Avg.	95.50	95.23	95.02	94.55	94.20
Med.	95.53	95.23	95.09	94.57	94.21
st dev	0.48	0.51	0.8053	0.48	0.48
Min.	94.15	93.69	93.05	93.00	92.67
Max.	96.47	96.29	96.51	95.44	95.05

LM-80 & TM-21 Raporu

3.14 Data Set 3, 105°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)											
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
51	124.70	100.16	99.76	99.28	99.20	98.80	98.72	98.56	98.40	98.24	97.75	97.51	97.19
52	125.50	99.36	99.20	99.04	98.73	98.33	98.01	97.85	97.77	97.69	97.21	96.89	96.81
53	124.80	99.68	99.60	99.20	98.88	98.48	98.40	97.84	97.76	97.60	97.52	97.28	97.04
54	123.60	100.16	99.92	99.76	99.51	99.27	99.11	98.79	98.71	98.62	98.38	98.14	98.06
55	124.80	99.36	99.04	98.88	98.80	98.64	98.40	98.08	97.76	97.60	97.28	97.20	96.71
56	121.60	99.84	99.26	98.85	98.77	98.52	98.27	98.11	97.62	97.53	97.37	97.29	96.88
57	122.50	100.08	99.84	99.59	99.27	99.18	99.10	98.78	98.37	98.29	98.04	97.55	97.39
58	123.40	99.43	99.27	98.95	98.38	98.30	98.22	97.97	97.65	97.24	96.92	96.76	96.68
59	123.40	99.35	99.11	98.87	98.62	98.30	98.06	97.65	97.33	96.92	96.43	96.19	95.71
60	125.10	99.36	98.88	98.88	98.48	98.16	97.92	97.52	97.36	96.96	96.56	96.24	95.92
61	123.50	99.27	98.70	98.54	98.22	98.14	97.98	97.57	97.17	96.84	96.60	96.44	95.95
62	123.20	99.92	99.51	99.03	98.86	98.62	98.21	98.13	97.89	97.40	97.08	97.00	96.67
63	125.40	99.84	99.44	99.12	98.88	98.48	98.09	97.93	97.85	97.53	97.13	96.81	96.65
64	124.90	100.08	99.60	99.28	99.04	98.72	98.24	98.08	97.84	97.68	97.52	97.04	96.64
65	124.20	99.84	99.36	98.95	98.63	98.47	97.91	97.67	97.34	97.02	96.94	96.62	96.30
66	123.20	99.92	99.51	99.03	98.54	98.30	98.05	97.89	97.56	97.40	97.32	96.92	96.67
67	123.80	99.84	99.43	99.19	98.95	98.55	98.30	97.98	97.74	97.33	97.01	96.69	96.53
68	123.90	99.84	99.68	99.44	99.11	98.87	98.55	98.14	97.90	97.58	97.42	97.18	96.93
69	125.80	99.84	99.68	99.36	99.05	98.81	98.57	98.09	97.93	97.62	97.30	96.98	96.90
70	123.30	99.43	99.11	98.86	98.70	98.54	98.30	98.22	97.97	97.57	97.32	97.00	96.92
71	125.00	99.52	99.20	98.80	98.56	98.32	98.08	97.84	97.44	97.12	96.88	96.80	96.56
72	123.60	100.24	99.92	99.76	99.27	99.19	98.95	98.54	98.30	97.98	97.65	97.25	96.93
73	122.50	99.92	99.59	99.51	99.18	98.86	98.78	98.45	98.12	97.71	97.63	97.31	97.06
74	123.50	100.32	99.92	99.51	99.35	98.79	98.54	98.30	98.06	97.73	97.57	97.25	97.09
75	123.80	99.27	98.95	98.63	98.55	97.98	97.50	97.01	96.69	96.45	96.37	96.12	95.40
Avg.	123.96	99.76	99.42	99.13	98.86	98.58	98.33	98.04	97.78	97.51	97.25	96.98	96.70
Med.	123.80	99.84	99.44	99.04	98.86	98.54	98.27	98.08	97.77	97.57	97.30	97.00	96.71
st dev	1.04	0.33	0.34	0.33	0.33	0.33	0.39	0.40	0.43	0.48	0.4813	0.4568	0.5502
Min.	121.60	99.27	98.70	98.54	98.22	97.98	97.50	97.01	96.69	96.45	96.37	96.12	95.40
Max.	125.80	100.32	99.92	99.76	99.51	99.27	99.11	98.79	98.71	98.62	98.38	98.14	98.06

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No.	Lumen Maintenance (%)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
51	96.87	96.55	96.39	96.07	95.83
52	96.49	96.25	96.18	95.94	95.70
53	96.79	96.39	96.23	95.91	95.67
54	97.73	97.41	97.17	96.93	96.68
55	96.55	96.47	95.99	95.67	95.43
56	96.46	96.38	96.05	95.64	95.39
57	97.22	97.06	96.73	96.49	96.16
58	96.27	96.03	95.87	95.54	95.22
59	95.38	94.89	94.65	94.41	94.08
60	95.60	95.52	95.28	94.96	94.64
61	95.79	95.63	95.55	95.22	94.90
62	96.43	96.35	96.19	95.86	95.62
63	96.17	96.09	95.93	95.69	95.45
64	96.40	96.24	96.08	95.84	95.52
65	96.05	95.97	95.81	95.49	95.17
66	96.35	96.02	95.86	95.45	95.21
67	96.37	96.28	96.12	95.80	95.56
68	96.61	96.45	96.29	95.88	95.56
69	96.74	96.34	96.18	96.03	95.71
70	96.76	96.35	95.94	95.70	95.38
71	96.32	95.84	95.76	95.36	95.04
72	96.68	96.28	96.04	95.71	95.39
73	96.65	96.24	95.92	95.59	95.27
74	96.76	96.52	96.28	96.03	95.71
75	95.07	94.83	94.67	94.35	94.10
Avg.	96.42	96.18	95.97	95.66	95.38
Med.	96.46	96.28	96.04	95.70	95.43
st dev	0.56	0.5526	0.5331	0.55	0.5542
Min.	95.07	94.83	94.65	94.35	94.08
Max.	97.73	97.41	97.17	96.93	96.68

LM-80 & TM-21 Raporu

3.15 Data Set 3, 105°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
51	9.092	9.069	9.083	9.081	9.084	9.077	9.062	9.080	9.085	9.105	9.090	9.103	9.087
52	9.118	9.092	9.114	9.111	9.101	9.110	9.093	9.103	9.115	9.111	9.115	9.130	9.110
53	9.132	9.096	9.140	9.128	9.114	9.121	9.102	9.124	9.130	9.133	9.131	9.142	9.129
54	9.125	9.113	9.126	9.123	9.105	9.120	9.102	9.116	9.117	9.114	9.122	9.136	9.127
55	9.100	9.087	9.095	9.101	9.088	9.091	9.070	9.091	9.103	9.102	9.100	9.109	9.100
56	9.136	9.108	9.129	9.138	9.122	9.125	9.104	9.139	9.133	9.133	9.136	9.146	9.133
57	9.131	9.114	9.125	9.129	9.115	9.120	9.100	9.137	9.122	9.124	9.130	9.147	9.127
58	9.124	9.103	9.119	9.127	9.110	9.106	9.093	9.115	9.115	9.113	9.121	9.136	9.123
59	9.090	9.068	9.087	9.090	9.082	9.087	9.064	9.084	9.088	9.108	9.113	9.121	9.096
60	9.112	9.090	9.115	9.135	9.104	9.099	9.083	9.105	9.106	9.102	9.109	9.134	9.108
61	9.121	9.099	9.113	9.120	9.110	9.103	9.104	9.112	9.105	9.105	9.116	9.136	9.119
62	9.080	9.060	9.083	9.078	9.063	9.068	9.052	9.076	9.074	9.079	9.083	9.099	9.083
63	9.102	9.078	9.103	9.095	9.087	9.091	9.070	9.097	9.092	9.116	9.109	9.116	9.100
64	9.124	9.102	9.126	9.125	9.120	9.114	9.095	9.121	9.123	9.127	9.140	9.148	9.125
65	9.128	9.113	9.137	9.134	9.122	9.124	9.104	9.121	9.121	9.125	9.134	9.151	9.131
66	9.089	9.061	9.091	9.079	9.070	9.072	9.054	9.077	9.076	9.083	9.076	9.096	9.079
67	9.152	9.137	9.156	9.160	9.133	9.137	9.110	9.137	9.136	9.127	9.145	9.152	9.150
68	9.123	9.101	9.119	9.114	9.110	9.113	9.087	9.108	9.113	9.114	9.118	9.140	9.115
69	9.103	9.083	9.108	9.097	9.089	9.090	9.070	9.098	9.101	9.106	9.102	9.123	9.106
70	9.113	9.089	9.115	9.108	9.100	9.099	9.083	9.105	9.106	9.105	9.110	9.133	9.112
71	9.103	9.085	9.105	9.102	9.084	9.092	9.068	9.086	9.092	9.114	9.098	9.116	9.106
72	9.097	9.078	9.105	9.126	9.081	9.087	9.066	9.087	9.086	9.094	9.100	9.119	9.100
73	9.139	9.166	9.153	9.150	9.129	9.131	9.112	9.130	9.131	9.122	9.143	9.166	9.144
74	9.131	9.095	9.130	9.136	9.120	9.119	9.104	9.125	9.123	9.122	9.129	9.151	9.133
75	9.128	9.112	9.131	9.126	9.109	9.111	9.089	9.113	9.112	9.114	9.119	9.136	9.123
Avg.	9.116	9.096	9.116	9.117	9.102	9.104	9.086	9.107	9.108	9.112	9.116	9.131	9.115
Med.	9.121	9.095	9.115	9.123	9.105	9.106	9.089	9.108	9.112	9.114	9.116	9.136	9.115
st dev	0.018	0.023	0.020	0.022	0.019	0.019	0.018	0.019	0.018	0.014	0.018	0.018	0.018
Min.	9.080	9.060	9.083	9.078	9.063	9.068	9.052	9.076	9.074	9.079	9.076	9.096	9.079
Max.	9.152	9.166	9.156	9.160	9.133	9.137	9.112	9.139	9.136	9.133	9.145	9.166	9.150

No.	Forward Voltage (V)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
51	9.095	9.095	9.109	9.107	9.110
52	9.117	9.150	9.128	9.131	9.141
53	9.124	9.140	9.147	9.145	9.141
54	9.121	9.139	9.143	9.146	9.144
55	9.093	9.110	9.117	9.119	9.122
56	9.129	9.141	9.150	9.146	9.151
57	9.139	9.147	9.138	9.131	9.141
58	9.116	9.123	9.135	9.136	9.129
59	9.086	9.102	9.113	9.123	9.105
60	9.110	9.112	9.128	9.120	9.128
61	9.112	9.123	9.129	9.125	9.128
62	9.089	9.087	9.097	9.105	9.097
63	9.102	9.102	9.114	9.111	9.121
64	9.132	9.152	9.146	9.131	9.142
65	9.120	9.127	9.129	9.124	9.149
66	9.101	9.101	9.096	9.101	9.100
67	9.144	9.144	9.146	9.144	9.146
68	9.117	9.141	9.137	9.136	9.146
69	9.113	9.107	9.119	9.116	9.121
70	9.107	9.120	9.131	9.137	9.134
71	9.099	9.117	9.121	9.119	9.116
72	9.086	9.104	9.110	9.113	9.119
73	9.132	9.132	9.134	9.133	9.138
74	9.145	9.136	9.131	9.129	9.149
75	9.121	9.121	9.125	9.131	9.138
Avg.	9.114	9.123	9.127	9.126	9.130
Med.	9.116	9.123	9.129	9.129	9.134
st dev	0.017	0.019	0.015	0.013	0.016
Min.	9.086	9.087	9.096	9.101	9.097
Max.	9.145	9.152	9.150	9.146	9.151

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3.16 Data Set 3, 105°C, 100mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift (Δu'v')											
	**0hr(Initial)		**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
51	0.2606	0.5300	0.0003	0.0001	0.0004	0.0013	0.0011	0.0012	0.0011	0.0005	0.0001	0.0003	0.0004	0.0009
52	0.2594	0.5288	0.0004	0.0001	0.0004	0.0016	0.0013	0.0014	0.0015	0.0008	0.0003	0.0001	0.0008	0.0012
53	0.2606	0.5279	0.0004	0.0001	0.0004	0.0014	0.0013	0.0013	0.0013	0.0007	0.0002	0.0004	0.0006	0.0011
54	0.2604	0.5264	0.0005	0.0002	0.0006	0.0014	0.0013	0.0013	0.0012	0.0004	0.0001	0.0006	0.0005	0.0011
55	0.2610	0.5306	0.0002	0.0004	0.0003	0.0011	0.0009	0.0009	0.0009	0.0004	0.0001	0.0006	0.0002	0.0008
56	0.2620	0.5283	0.0004	0.0002	0.0004	0.0015	0.0012	0.0013	0.0014	0.0006	0.0002	0.0005	0.0005	0.0010
57	0.2635	0.5282	0.0003	0.0002	0.0004	0.0012	0.0010	0.0011	0.0011	0.0005	0.0001	0.0007	0.0004	0.0007
58	0.2637	0.5303	0.0006	0.0001	0.0006	0.0014	0.0013	0.0013	0.0014	0.0006	0.0003	0.0002	0.0005	0.0010
59	0.2625	0.5299	0.0004	0.0002	0.0003	0.0013	0.0010	0.0012	0.0013	0.0007	0.0001	0.0004	0.0006	0.0011
60	0.2598	0.5280	0.0002	0.0004	0.0003	0.0011	0.0010	0.0010	0.0009	0.0004	0.0003	0.0008	0.0003	0.0007
61	0.2633	0.5275	0.0003	0.0001	0.0004	0.0014	0.0012	0.0012	0.0013	0.0005	0.0001	0.0006	0.0004	0.0011
62	0.2647	0.5288	0.0006	0.0001	0.0006	0.0014	0.0013	0.0014	0.0015	0.0009	0.0002	0.0002	0.0006	0.0011
63	0.2623	0.5301	0.0007	0.0003	0.0007	0.0015	0.0014	0.0013	0.0015	0.0008	0.0004	0.0002	0.0006	0.0011
64	0.2622	0.5286	0.0008	0.0002	0.0007	0.0015	0.0013	0.0015	0.0016	0.0009	0.0004	0.0002	0.0006	0.0011
65	0.2646	0.5298	0.0004	0.0002	0.0004	0.0012	0.0009	0.0010	0.0011	0.0005	0.0002	0.0005	0.0004	0.0007
66	0.2617	0.5291	0.0006	0.0001	0.0004	0.0012	0.0012	0.0012	0.0011	0.0004	0.0002	0.0006	0.0004	0.0013
67	0.2635	0.5281	0.0006	0.0002	0.0008	0.0016	0.0013	0.0016	0.0016	0.0008	0.0003	0.0002	0.0006	0.0016
68	0.2622	0.5285	0.0004	0.0000	0.0003	0.0012	0.0011	0.0012	0.0012	0.0005	0.0002	0.0006	0.0004	0.0013
69	0.2613	0.5305	0.0003	0.0001	0.0003	0.0012	0.0010	0.0011	0.0010	0.0005	0.0002	0.0006	0.0003	0.0011
70	0.2614	0.5279	0.0004	0.0002	0.0005	0.0014	0.0013	0.0013	0.0013	0.0004	0.0000	0.0005	0.0004	0.0014
71	0.2614	0.5278	0.0005	0.0001	0.0005	0.0014	0.0012	0.0013	0.0013	0.0006	0.0001	0.0004	0.0005	0.0013
72	0.2611	0.5270	0.0005	0.0001	0.0004	0.0014	0.0011	0.0013	0.0011	0.0006	0.0001	0.0006	0.0004	0.0009
73	0.2644	0.5281	0.0008	0.0004	0.0009	0.0018	0.0016	0.0016	0.0016	0.0010	0.0005	0.0003	0.0009	0.0019
74	0.2638	0.5299	0.0006	0.0001	0.0006	0.0012	0.0010	0.0010	0.0012	0.0004	0.0004	0.0004	0.0002	0.0013
75	0.2623	0.5270	0.0004	0.0002	0.0005	0.0017	0.0015	0.0015	0.0014	0.0007	0.0002	0.0004	0.0005	0.0015
Avg.	0.2621	0.5287	0.0005	0.0002	0.0005	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0011
Med.	0.2622	0.5285	0.0004	0.0002	0.0004	0.0014	0.0012	0.0013	0.0013	0.0006	0.0002	0.0004	0.0005	0.0011
st dev	0.0015	0.0012	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0003
Min.	0.2594	0.5264	0.0002	0.0000	0.0003	0.0011	0.0009	0.0009	0.0009	0.0004	0.0000	0.0001	0.0002	0.0007
Max.	0.2647	0.5306	0.0008	0.0004	0.0009	0.0018	0.0016	0.0016	0.0016	0.0010	0.0005	0.0008	0.0009	0.0019

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No.	Chromaticity Shift (Δu'v')				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
51	0.0008	0.0006	0.0005	0.0018	0.0004
52	0.0014	0.0010	0.0016	0.0021	0.0008
53	0.0010	0.0007	0.0012	0.0021	0.0007
54	0.0009	0.0005	0.0011	0.0019	0.0006
55	0.0006	0.0004	0.0008	0.0014	0.0004
56	0.0009	0.0008	0.0010	0.0020	0.0007
57	0.0007	0.0004	0.0010	0.0017	0.0004
58	0.0010	0.0007	0.0014	0.0019	0.0009
59	0.0011	0.0006	0.0009	0.0019	0.0006
60	0.0009	0.0004	0.0008	0.0016	0.0004
61	0.0011	0.0009	0.0015	0.0020	0.0008
62	0.0012	0.0009	0.0015	0.0021	0.0008
63	0.0011	0.0007	0.0013	0.0021	0.0010
64	0.0011	0.0008	0.0012	0.0023	0.0010
65	0.0008	0.0005	0.0011	0.0017	0.0005
66	0.0012	0.0009	0.0011	0.0018	0.0006
67	0.0014	0.0008	0.0017	0.0023	0.0010
68	0.0011	0.0007	0.0011	0.0019	0.0006
69	0.0009	0.0006	0.0009	0.0017	0.0006
70	0.0011	0.0006	0.0012	0.0019	0.0007
71	0.0011	0.0008	0.0014	0.0020	0.0007
72	0.0007	0.0004	0.0009	0.0019	0.0006
73	0.0015	0.0012	0.0016	0.0025	0.0011
74	0.0008	0.0008	0.0014	0.0019	0.0008
75	0.0012	0.0008	0.0013	0.0022	0.0009
Avg.	0.0010	0.0007	0.0012	0.0020	0.0007
Med.	0.0011	0.0007	0.0012	0.0019	0.0007
st dev	0.0002	0.0002	0.0003	0.0002	0.0002
Min.	0.0006	0.0004	0.0005	0.0014	0.0004
Max.	0.0015	0.0012	0.0017	0.0025	0.0011

LM-80 & TM-21 Raporu

3.17 Data Set 3, 105°C, 100mA (Peak Wavelength)

No.	Peak Wavelength (nm)												
	**0hr(Initial)	**1000hrs	**2000hrs	**3000hrs	**4000hrs	**5000hrs	**6000hrs	**7000hrs	**8000hrs	**9000hrs	**10000hrs	**11000hrs	**12000hrs
51	603.8	608.1	608.8	607.2	607.8	607.5	609.1	607.5	608.5	610.1	608.5	607.2	607.2
52	606.8	608.4	610.0	609.2	607.8	605.2	606.9	609.5	608.1	610.0	607.2	607.8	606.5
53	605.5	608.4	604.6	605.8	604.2	606.5	608.4	604.9	607.2	606.4	608.1	607.2	605.8
54	606.5	603.6	609.8	610.1	606.2	604.9	604.7	610.1	609.5	605.8	605.9	608.5	604.5
55	609.1	609.5	607.2	604.2	609.1	604.5	608.5	604.9	607.4	605.8	604.5	600.3	609.8
56	606.5	606.5	606.0	607.5	604.9	609.8	605.2	609.1	608.8	610.4	606.3	607.5	606.3
57	607.8	607.5	608.8	609.1	607.7	610.5	608.8	609.1	606.2	613.4	607.7	606.1	606.9
58	607.4	609.1	609.8	606.5	612.1	604.8	609.8	608.8	605.8	606.2	606.8	606.7	612.1
59	608.8	607.2	607.8	607.1	606.5	608.1	608.4	606.8	608.4	608.4	605.7	608.6	608.8
60	608.8	609.1	608.1	607.1	607.8	606.7	608.8	604.5	605.9	608.8	606.2	609.2	608.1
61	607.0	606.2	609.2	606.9	608.1	607.8	607.8	607.0	610.1	604.2	606.5	611.8	607.5
62	609.2	608.8	608.1	612.9	609.1	609.1	609.8	606.2	605.9	605.2	607.5	608.2	607.5
63	609.2	606.4	606.0	606.5	606.5	606.2	604.9	609.1	605.5	604.6	604.6	609.4	604.6
64	609.3	604.0	609.1	607.8	607.8	608.8	607.4	609.1	608.8	606.5	605.5	609.4	606.2
65	607.5	607.4	605.5	608.8	607.8	608.5	611.4	608.5	604.5	608.7	607.1	609.0	604.3
66	608.8	607.6	605.9	607.8	605.5	606.8	606.8	607.8	606.3	606.5	605.8	608.1	613.0
67	609.3	610.8	609.4	610.4	609.8	608.5	609.7	608.0	607.3	607.3	608.2	607.3	606.8
68	609.1	610.1	607.2	606.5	608.0	606.1	612.4	608.1	606.9	609.8	605.8	607.8	611.5
69	606.8	606.8	607.2	607.1	606.2	606.2	609.8	608.2	605.5	605.8	609.6	608.2	606.5
70	609.1	609.1	608.4	606.2	609.1	606.2	606.2	608.8	608.5	604.9	605.9	605.2	608.2
71	608.1	605.2	607.8	608.1	607.1	607.1	606.5	608.1	607.2	607.5	611.1	606.8	607.0
72	603.4	607.4	606.5	607.5	606.4	607.5	607.2	609.5	607.2	606.1	604.4	610.5	605.2
73	607.1	609.4	607.0	607.2	606.2	607.9	605.9	608.5	608.8	607.8	606.1	609.5	611.1
74	604.5	609.4	607.1	607.6	610.4	607.2	609.8	606.5	605.9	605.1	607.5	610.1	604.9
75	605.9	608.4	608.1	607.8	607.5	604.9	609.0	607.0	609.8	606.6	609.8	602.2	612.8
Avg.	607.4	607.8	607.7	607.7	607.6	607.1	608.1	607.8	607.4	607.3	606.9	607.7	607.7
Med.	607.5	608.1	607.8	607.5	607.8	607.1	608.4	608.1	607.2	606.5	606.5	608.1	607.0
st dev	1.8	1.8	1.5	1.7	1.8	1.6	2.0	1.5	1.5	2.2	1.7	2.4	2.6
Min.	603.4	603.6	604.6	604.2	604.2	604.5	604.7	604.5	604.5	604.2	604.4	600.3	604.3
Max.	609.3	610.8	610.0	612.9	612.1	610.5	612.4	610.1	610.1	613.4	611.1	611.8	613.0

LM-80 & TM-21 Raporu

No.	Peak Wavelength (nm)				
	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
51	604.9	606.6	606.4	607.5	606.6
52	604.5	608.8	603.2	604.5	607.2
53	606.5	605.8	604.2	608.5	607.1
54	604.8	605.5	610.1	607.3	607.5
55	608.8	607.8	610.4	605.8	607.5
56	604.8	609.1	606.5	604.9	603.3
57	603.9	608.5	612.4	605.5	606.5
58	607.8	606.0	604.8	608.1	609.1
59	607.5	605.8	609.5	609.6	608.8
60	607.8	607.8	606.2	604.2	608.5
61	605.1	607.0	608.5	605.2	608.2
62	610.8	605.5	608.7	606.5	611.0
63	606.3	606.0	605.5	606.5	606.8
64	609.7	607.2	611.8	605.9	605.9
65	608.5	607.2	609.5	606.2	605.4
66	604.9	609.2	611.7	606.8	607.3
67	607.6	606.5	610.5	607.5	608.5
68	606.8	605.5	610.1	608.2	605.6
69	607.5	604.2	610.8	608.5	605.5
70	606.8	605.3	603.9	607.3	606.2
71	604.9	610.1	610.8	607.8	608.6
72	606.8	604.3	604.8	607.2	603.2
73	611.8	606.8	612.8	606.8	607.5
74	609.4	607.6	607.1	607.7	609.0
75	608.8	610.7	604.3	607.2	609.1
Avg.	607.1	607.0	608.2	606.8	607.2
Med.	606.8	606.8	608.7	607.2	607.3
st dev	2.1	1.7	3.0	1.3	1.8
Min.	603.9	604.2	603.2	604.2	603.2
Max.	611.8	610.7	612.8	609.6	611.0

LM-80 & TM-21 Raporu

3.18 Data Set 3, 105°C, 100mA (Color coordinates)

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**0hr(Initial)		**1000hrs		**2000hrs		**3000hrs		**4000hrs		**5000hrs		**6000hrs	
51	0.2606	0.5300	0.2605	0.5297	0.2607	0.5301	0.2603	0.5297	0.2599	0.5289	0.2600	0.5291	0.2600	0.5290
52	0.2594	0.5288	0.2592	0.5285	0.2595	0.5289	0.2591	0.5285	0.2583	0.5276	0.2587	0.5277	0.2587	0.5276
53	0.2606	0.5279	0.2604	0.5276	0.2606	0.5280	0.2604	0.5275	0.2598	0.5267	0.2601	0.5267	0.2600	0.5268
54	0.2604	0.5264	0.2600	0.5261	0.2603	0.5266	0.2601	0.5259	0.2597	0.5252	0.2598	0.5253	0.2598	0.5252
55	0.2610	0.5306	0.2609	0.5304	0.2613	0.5308	0.2610	0.5303	0.2606	0.5296	0.2607	0.5298	0.2608	0.5297
56	0.2620	0.5283	0.2618	0.5280	0.2622	0.5284	0.2621	0.5279	0.2611	0.5271	0.2615	0.5272	0.2614	0.5272
57	0.2635	0.5282	0.2634	0.5279	0.2636	0.5284	0.2634	0.5278	0.2629	0.5272	0.2631	0.5273	0.2631	0.5272
58	0.2637	0.5303	0.2633	0.5299	0.2636	0.5304	0.2632	0.5300	0.2628	0.5292	0.2628	0.5293	0.2630	0.5292
59	0.2625	0.5299	0.2622	0.5296	0.2623	0.5300	0.2624	0.5296	0.2616	0.5289	0.2620	0.5290	0.2618	0.5289
60	0.2598	0.5280	0.2599	0.5278	0.2602	0.5282	0.2599	0.5277	0.2594	0.5270	0.2596	0.5270	0.2595	0.5270
61	0.2633	0.5275	0.2632	0.5272	0.2634	0.5276	0.2631	0.5271	0.2625	0.5264	0.2628	0.5264	0.2629	0.5264
62	0.2647	0.5288	0.2643	0.5284	0.2646	0.5288	0.2646	0.5282	0.2639	0.5276	0.2640	0.5277	0.2641	0.5275
63	0.2623	0.5301	0.2618	0.5296	0.2620	0.5300	0.2618	0.5296	0.2613	0.5290	0.2614	0.5290	0.2616	0.5290
64	0.2622	0.5286	0.2616	0.5280	0.2622	0.5284	0.2620	0.5279	0.2614	0.5273	0.2617	0.5274	0.2615	0.5273
65	0.2646	0.5298	0.2646	0.5294	0.2648	0.5299	0.2647	0.5294	0.2641	0.5287	0.2643	0.5289	0.2643	0.5288
66	0.2617	0.5291	0.2613	0.5287	0.2618	0.5292	0.2616	0.5287	0.2611	0.5281	0.2611	0.5281	0.2611	0.5281
67	0.2635	0.5281	0.2634	0.5275	0.2636	0.5279	0.2632	0.5274	0.2626	0.5268	0.2629	0.5269	0.2628	0.5267
68	0.2622	0.5285	0.2620	0.5282	0.2622	0.5285	0.2623	0.5282	0.2617	0.5274	0.2618	0.5275	0.2617	0.5274
69	0.2613	0.5305	0.2613	0.5302	0.2613	0.5306	0.2612	0.5302	0.2608	0.5294	0.2609	0.5296	0.2609	0.5295
70	0.2614	0.5279	0.2614	0.5275	0.2614	0.5281	0.2613	0.5274	0.2606	0.5268	0.2608	0.5268	0.2607	0.5268
71	0.2614	0.5278	0.2611	0.5274	0.2614	0.5279	0.2614	0.5273	0.2607	0.5266	0.2609	0.5267	0.2608	0.5266
72	0.2611	0.5270	0.2608	0.5266	0.2612	0.5271	0.2610	0.5266	0.2605	0.5257	0.2606	0.5260	0.2607	0.5258
73	0.2644	0.5281	0.2639	0.5275	0.2640	0.5280	0.2637	0.5275	0.2631	0.5268	0.2634	0.5268	0.2634	0.5268
74	0.2638	0.5299	0.2634	0.5295	0.2638	0.5298	0.2634	0.5295	0.2630	0.5290	0.2633	0.5290	0.2633	0.5290
75	0.2623	0.5270	0.2622	0.5266	0.2625	0.5270	0.2622	0.5265	0.2616	0.5255	0.2618	0.5256	0.2619	0.5256
Avg.	0.2621	0.5287	0.2619	0.5283	0.2622	0.5287	0.2620	0.5283	0.2614	0.5275	0.2616	0.5276	0.2616	0.5276
Med.	0.2622	0.5285	0.2618	0.5280	0.2622	0.5284	0.2620	0.5279	0.2613	0.5273	0.2615	0.5274	0.2615	0.5273
st dev	0.0015	0.0012	0.0015	0.0012	0.0014	0.0012	0.0015	0.0012	0.0015	0.0013	0.0014	0.0013	0.0015	0.0013
Min.	0.2594	0.5264	0.2592	0.5261	0.2595	0.5266	0.2591	0.5259	0.2583	0.5252	0.2587	0.5253	0.2587	0.5252
Max.	0.2647	0.5306	0.2646	0.5304	0.2648	0.5308	0.2647	0.5303	0.2641	0.5296	0.2643	0.5298	0.2643	0.5297

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	**7000hrs		**8000hrs		**9000hrs		**10000hrs		**11000hrs		**12000hrs	
51	0.2598	0.5293	0.2603	0.5296	0.2607	0.5300	0.2608	0.5302	0.2603	0.5297	0.2601	0.5292
52	0.2582	0.5279	0.2588	0.5283	0.2591	0.5288	0.2595	0.5289	0.2588	0.5283	0.2587	0.5278
53	0.2596	0.5270	0.2603	0.5273	0.2604	0.5279	0.2609	0.5281	0.2603	0.5274	0.2600	0.5270
54	0.2595	0.5256	0.2602	0.5260	0.2605	0.5263	0.2608	0.5268	0.2602	0.5259	0.2600	0.5254
55	0.2603	0.5300	0.2609	0.5302	0.2611	0.5307	0.2615	0.5309	0.2610	0.5304	0.2607	0.5299
56	0.2609	0.5275	0.2616	0.5278	0.2618	0.5283	0.2624	0.5286	0.2617	0.5279	0.2614	0.5275
57	0.2627	0.5274	0.2634	0.5277	0.2636	0.5283	0.2640	0.5287	0.2632	0.5279	0.2633	0.5275
58	0.2627	0.5293	0.2633	0.5298	0.2634	0.5303	0.2637	0.5305	0.2633	0.5300	0.2631	0.5295
59	0.2615	0.5291	0.2620	0.5294	0.2624	0.5299	0.2626	0.5303	0.2619	0.5297	0.2618	0.5291
60	0.2592	0.5273	0.2597	0.5276	0.2601	0.5281	0.2605	0.5284	0.2600	0.5278	0.2598	0.5273
61	0.2624	0.5266	0.2631	0.5270	0.2634	0.5275	0.2638	0.5279	0.2631	0.5272	0.2627	0.5266
62	0.2636	0.5278	0.2642	0.5281	0.2645	0.5287	0.2649	0.5289	0.2643	0.5284	0.2640	0.5279
63	0.2612	0.5291	0.2617	0.5295	0.2619	0.5299	0.2623	0.5303	0.2618	0.5297	0.2616	0.5292
64	0.2612	0.5274	0.2617	0.5279	0.2618	0.5285	0.2624	0.5287	0.2620	0.5280	0.2617	0.5276
65	0.2639	0.5289	0.2646	0.5293	0.2648	0.5298	0.2651	0.5299	0.2646	0.5294	0.2644	0.5291
66	0.2609	0.5283	0.2615	0.5287	0.2619	0.5292	0.2621	0.5295	0.2614	0.5289	0.2608	0.5281
67	0.2624	0.5270	0.2631	0.5274	0.2633	0.5279	0.2637	0.5282	0.2631	0.5276	0.2625	0.5268
68	0.2614	0.5276	0.2620	0.5280	0.2624	0.5285	0.2627	0.5289	0.2620	0.5282	0.2613	0.5275
69	0.2607	0.5297	0.2612	0.5300	0.2615	0.5305	0.2619	0.5307	0.2612	0.5302	0.2607	0.5296
70	0.2605	0.5270	0.2613	0.5275	0.2614	0.5279	0.2618	0.5282	0.2612	0.5276	0.2606	0.5268
71	0.2604	0.5269	0.2611	0.5273	0.2613	0.5278	0.2617	0.5280	0.2611	0.5274	0.2608	0.5267
72	0.2603	0.5262	0.2609	0.5264	0.2612	0.5270	0.2616	0.5273	0.2609	0.5266	0.2607	0.5262
73	0.2631	0.5271	0.2637	0.5274	0.2640	0.5278	0.2641	0.5282	0.2637	0.5276	0.2630	0.5268
74	0.2629	0.5291	0.2636	0.5295	0.2640	0.5302	0.2641	0.5302	0.2636	0.5298	0.2629	0.5289
75	0.2616	0.5258	0.2622	0.5263	0.2624	0.5268	0.2627	0.5270	0.2622	0.5265	0.2616	0.5257
Avg.	0.2612	0.5278	0.2619	0.5282	0.2621	0.5287	0.2625	0.5289	0.2619	0.5283	0.2615	0.5277
Med.	0.2612	0.5275	0.2617	0.5279	0.2619	0.5285	0.2624	0.5287	0.2618	0.5280	0.2614	0.5275
st dev	0.0015	0.0012	0.0015	0.0012	0.0015	0.0012	0.0014	0.0012	0.0015	0.0012	0.0014	0.0013
Min.	0.2582	0.5256	0.2588	0.5260	0.2591	0.5263	0.2595	0.5268	0.2588	0.5259	0.2587	0.5254
Max.	0.2639	0.5300	0.2646	0.5302	0.2648	0.5307	0.2651	0.5309	0.2646	0.5304	0.2644	0.5299

LM-80 & TM-21 Raporu

No.	u'	v'	u'	v'	u'	v'	u'	v'	u'	v'
	13000hrs		14000hrs		15000hrs		16000hrs		17000hrs	
51	0.2600	0.5294	0.2601	0.5296	0.2602	0.5297	0.2596	0.5285	0.2604	0.5297
52	0.2583	0.5280	0.2586	0.5282	0.2579	0.5282	0.2579	0.5273	0.2588	0.5282
53	0.2599	0.5272	0.2601	0.5274	0.2596	0.5272	0.2592	0.5263	0.2601	0.5274
54	0.2599	0.5257	0.2602	0.5259	0.2595	0.5258	0.2594	0.5248	0.2601	0.5259
55	0.2606	0.5301	0.2609	0.5302	0.2603	0.5303	0.2602	0.5294	0.2609	0.5302
56	0.2613	0.5277	0.2613	0.5280	0.2614	0.5275	0.2607	0.5268	0.2616	0.5277
57	0.2631	0.5276	0.2634	0.5278	0.2627	0.5276	0.2625	0.5268	0.2634	0.5278
58	0.2630	0.5296	0.2632	0.5298	0.2624	0.5299	0.2625	0.5288	0.2630	0.5297
59	0.2616	0.5292	0.2620	0.5295	0.2616	0.5296	0.2612	0.5285	0.2621	0.5294
60	0.2593	0.5273	0.2596	0.5277	0.2592	0.5274	0.2590	0.5266	0.2597	0.5276
61	0.2625	0.5267	0.2626	0.5270	0.2620	0.5268	0.2621	0.5259	0.2628	0.5269
62	0.2639	0.5279	0.2641	0.5281	0.2634	0.5281	0.2634	0.5272	0.2641	0.5282
63	0.2615	0.5293	0.2618	0.5296	0.2611	0.5295	0.2609	0.5286	0.2615	0.5295
64	0.2615	0.5277	0.2619	0.5279	0.2612	0.5279	0.2607	0.5268	0.2616	0.5278
65	0.2643	0.5291	0.2644	0.5293	0.2637	0.5292	0.2637	0.5283	0.2645	0.5293
66	0.2607	0.5284	0.2609	0.5287	0.2607	0.5286	0.2606	0.5277	0.2613	0.5286
67	0.2627	0.5270	0.2630	0.5275	0.2620	0.5272	0.2621	0.5263	0.2629	0.5273
68	0.2614	0.5278	0.2616	0.5281	0.2614	0.5277	0.2611	0.5269	0.2619	0.5280
69	0.2608	0.5298	0.2609	0.5300	0.2605	0.5300	0.2604	0.5290	0.2610	0.5300
70	0.2606	0.5271	0.2610	0.5274	0.2604	0.5273	0.2602	0.5264	0.2609	0.5274
71	0.2607	0.5270	0.2609	0.5272	0.2603	0.5270	0.2602	0.5262	0.2611	0.5272
72	0.2609	0.5263	0.2609	0.5266	0.2603	0.5265	0.2601	0.5254	0.2609	0.5264
73	0.2633	0.5271	0.2635	0.5273	0.2629	0.5276	0.2627	0.5263	0.2635	0.5274
74	0.2632	0.5293	0.2632	0.5294	0.2625	0.5294	0.2625	0.5285	0.2632	0.5294
75	0.2618	0.5259	0.2619	0.5263	0.2614	0.5261	0.2611	0.5251	0.2620	0.5261
Avg.	0.2615	0.5279	0.2617	0.5282	0.2611	0.5281	0.2610	0.5271	0.2617	0.5281
Med.	0.2614	0.5277	0.2616	0.5280	0.2612	0.5277	0.2607	0.5268	0.2616	0.5278
st dev	0.0015	0.0013	0.0015	0.0012	0.0014	0.0013	0.0014	0.0013	0.0014	0.0012
Min.	0.2583	0.5257	0.2586	0.5259	0.2579	0.5258	0.2579	0.5248	0.2588	0.5259
Max.	0.2643	0.5301	0.2644	0.5302	0.2637	0.5303	0.2637	0.5294	0.2645	0.5302

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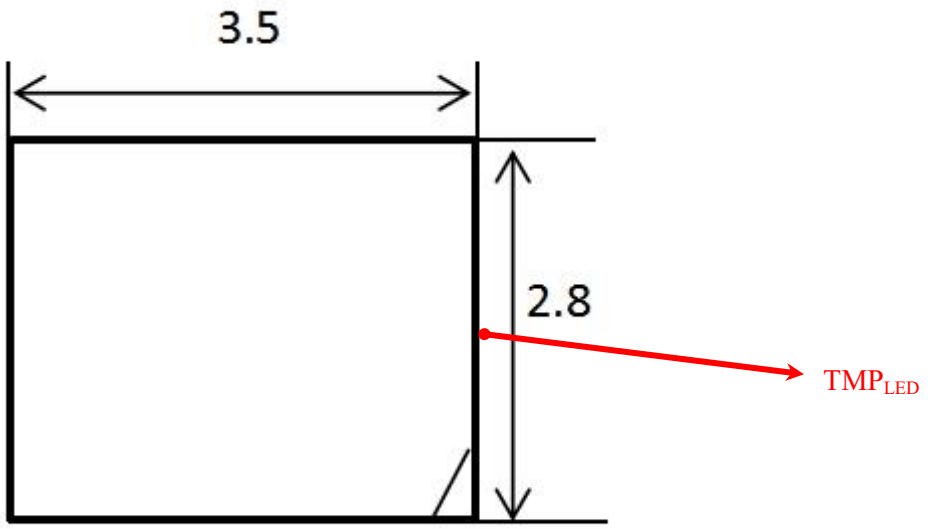
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo

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Directions

1. The information marked “superscript #” is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
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3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
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**********END OF REPORT**********

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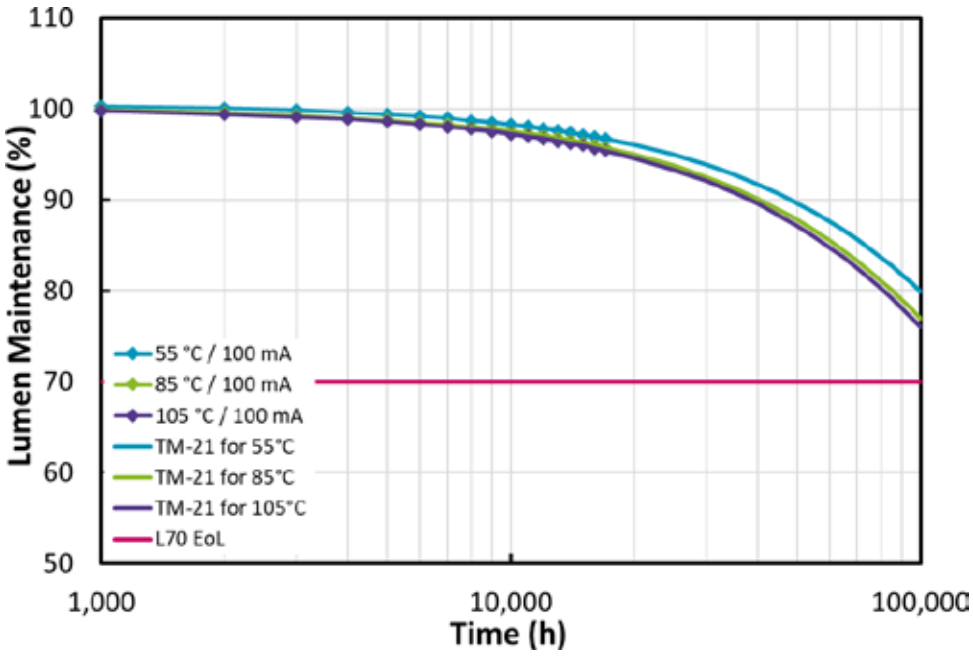
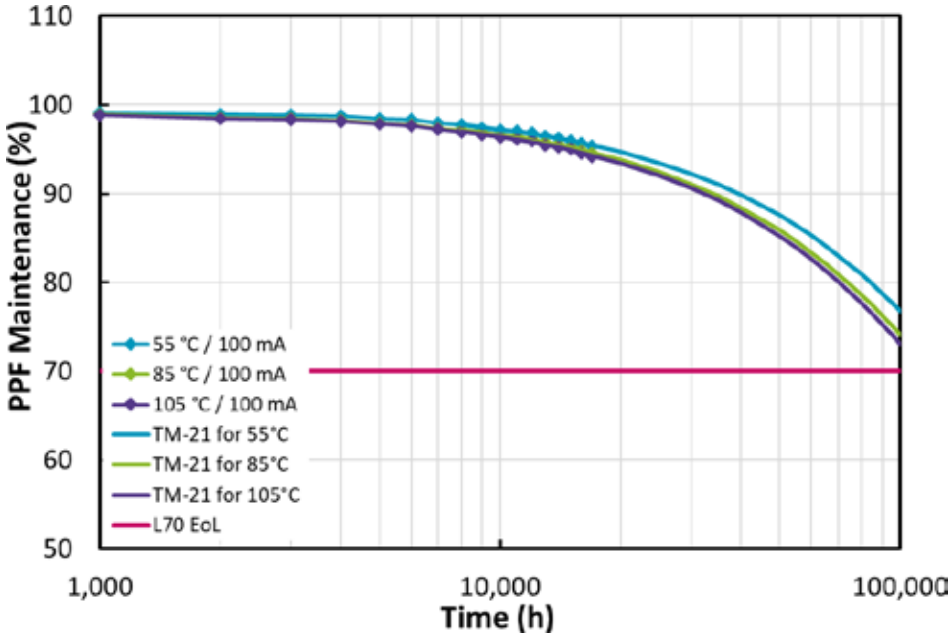
Appendix A:
Lumen Maintenance Projection (IES TM-21-11)

For Information Only!

1. Graphic chart





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Appendix B:
Additional Models Covered By Testing

The 28 September 2017 *ENERGY STAR® Requirements for the Use of LM-80 Data defines conditions for which a LM-80 report is applied to cover models that have not been directly tested.*

The test results in this report applies to the following list of models:

- DURIS® E 2835 GW JTLRS1.EM with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTLRS1.CM with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTLRS1.CM_ECO with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTLPS1.EM with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.EM_ECO with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.EM_GEN2 with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.EM_SA with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.EM_Plus with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS2.EM with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.CM with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.CM_GEN2 with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.CM_SA with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS1.CM_Plus with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS2.CM with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLPS4.EM with CCT 2200 K – 6500 K up to 250mA
- DURIS® E 2835 GW JTLMS1.EM with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTLMS1.CM with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTLMS2.EM with CCT 2200 K – 6500 K up to 100mA
- DURIS® E 2835 GW JTL6S1.EM with CCT 2200 K – 6500 K up to 60mA
- DURIS® E 2835 GW JTL6S1.CM with CCT 2200 K – 6500 K up to 60mA
- DURIS® E 2835 GW JTLPS1.KM with CCT 2200 K – 6500 K up to 200mA
- DURIS® E 2835 GW JTLPS1.SM with CCT 2200 K – 6500 K up to 200mA
- DURIS® E 2835 GW JTLPS4.SM with CCT 2200 K – 6500 K up to 200mA
- DURIS® E 2835 GW JTLPS5.SM with CCT 2200 K – 6500 K up to 200mA

Note: The devices are stressed and tested at average current density per LED die of 730.5mA/mm². This report can be referenced when the current employed in application is lower than the specified current of the respective devices as stated above.

Disclaimer

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The Information contained in this Document does not constitute an independent warranty. The committed behavior is described in the Product data sheet.
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Further explanations:
Data: The Data used in this Document consider the reliability test results under the mentioned driving conditions only. For Product information on the maximum operating conditions please refer to the Product data sheet or contact your local sales partner.
Conditions: The conditions for the generation of the Data are as follows:

1. The Data and curves shown in this Document are based on experiments carried out under laboratory conditions on a random sample size of LED/IRED/Laser with readouts at discrete readout times (where applicable). Thus, the Data above represent a limited number of production lots only and may differ between different assembly lots over time (including chip or package changes). Thus, the behavior of the LED/IRED/Laser in the final application may differ from the Data. The behavior of the LED/IRED/Laser at conditions or readout times deviating from those stated above may not be deduced from the Data.
2. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.
3. Possible differences in the thermal management of OSRAM and customer's setup may lead to a different aging behavior.
4. The lifetime projection data presented in this Document has been evaluated in accordance with the lifetime extrapolation method described and defined in IES TM-21-11. The lifetime projection is based on the Data shown in this Document. The data had been collected and assembled according to IES LM-80-15.

END OF DOCUMENT

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