



Sistema de Cadastramento Unificado de Fornecedores - SICAF

Declaração

Declaramos para os fins exigidos na legislação, conforme documentação registrada no SICAF, que a situação do fornecedor no momento é a seguinte:

Dados do Fornecedor

CNPJ: 22.683.848/0001-03 DUNS®: 944965788
Razão Social: ACR COMERCIO E SERVICOS LTDA
Nome Fantasia: ACR COMERCIO E SERVICOS
Situação do Fornecedor: Credenciado Data de Vencimento do Cadastro: 10/03/2026
Natureza Jurídica: SOCIEDADE EMPRESÁRIA LIMITADA
MEI: Não
Porte da Empresa: Empresa de Pequeno

Ocorrências e Impedimentos

Ocorrência: Nada Consta
Impedimento de Licitar: Nada Consta
Ocorrências Impeditivas indiretas: Nada Consta
Vínculo com "Serviço Público": Nada Consta

Níveis cadastrados:

Documento(s) assinalado(s) com "*" está(ão) com prazo(s) vencido(s).

Fornecedor possui alguma pendência no Nível de Cadastramento indicado. Verifique mais informações sobre pendências nas funcionalidades de consulta.

Automática: a certidão foi obtida através de integração direta com o sistema emissor. Manual: a certidão foi inserida manualmente pelo fornecedor.

I - Credenciamento**II - Habilitação Jurídica (Possui Pendência)****III - Regularidade Fiscal e Trabalhista Federal**

Receita Federal e PGFN	Validade:	14/07/2025	Automática
FGTS	Validade:	22/05/2025	Automática
Trabalhista (http://www.tst.jus.br/certidao)	Validade:	26/07/2025	Automática

IV - Regularidade Fiscal Estadual/Distrital e Municipal (Possui Pendência)

Receita Estadual/Distrital	Validade:	11/03/2025 (*)
Receita Municipal	Validade:	16/03/2025 (*)

VI - Qualificação Econômico-Financeira

Validade: 31/05/2025



CONTROLADORIA-GERAL DA UNIÃO

Certidão Negativa Correccional - Entes Privados (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **ACR COMERCIO E SERVICOS LTDA**

CPF/CNPJ: **22.683.848/0001-03**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM, mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes ou de procedimentos acusatórios em andamento, relativos ao CPF/CNPJ consultado.

Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.

Os [Sistemas ePAD e CGU-PJ](#) consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.

O [Cadastro Nacional de Empresas Inidôneas e Suspensas \(CEIS\)](#) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.

O [Cadastro Nacional de Empresas Punidas \(CNEP\)](#) apresenta a relação de empresas que sofreram quaisquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).

O [Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas \(CEPIM\)](#) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.

Certidão emitida às 13:47:10 do dia 12/05/2025 , com validade até o dia 11/06/2025.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: rJFxHEf8yZ3A2i4riRLr

Qualquer rasura ou emenda invalidará este documento.



CONTROLADORIA-GERAL DA UNIÃO

Certidão Negativa Correccional - Entes Privados (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **CLAUDINEI ROBERTO LUNARDON**

CPF/CNPJ: **874.541.909-44**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM, mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes ou de procedimentos acusatórios em andamento, relativos ao CPF/CNPJ consultado.

Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.

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Certidão emitida às 13:47:46 do dia 12/05/2025 , com validade até o dia 11/06/2025.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: XnF0YhYiCFklzHkWv24b

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PREFEITURA DE MARMELEIRO - PR
EDITAL DE PREGÃO Nº 012/2025
PROCESSO ADMINISTRATIVO ELETRÔNICO Nº 674/2025
MODALIDADE: PREGÃO ELETRÔNICO
TIPO: MENOR PREÇO POR ITEM

OBJETO:REGISTRO DE PREÇOS para futura e eventual contratação de empresa para fornecimento de luminárias de LED e braços de postes para manutenção da iluminação pública do Município de Marmeleiro, atendendo as necessidades do Departamento de Urbanismo.

PROPOSTA DE PREÇOS

A empresa ACR COMÉRCIO E SERVIÇOS LTDA , estabelecida na RUA NICOLAU SCHEFFER 255 - SANTA CÂNDIDA - CURITIBA - PR, FONE: (041) 99887-2440, E-MAIL: acr.mo@hotmail.com, inscrita no CNPJ sob nº 22.683.848/0001-03, neste ato representada por CLAUDINEI ROBERTO LUNARDON – SÓCIO, CARTEIRA DE IDENTIDADE: 6130828-8 SSP/PR CPF: 874.541.909-44, RUA GENÊSIS 65 - SANTA CÂNDIDA - CURITIBA - PR,propõe fornecer à Prefeitura Municipal de Marmeleiro, em estrito cumprimento ao previsto no Edital de Pregão Eletrônico nº 012/2025, conforme abaixo discriminado:

COTA RESERVADA PARA ME E EPP						
ITAM	DESCRIÇÃO DOS PRODUTOS	UNI.	QTDE	MARCA MODELO	PREÇO UNIT.	PREÇO TOTAL
2	Luminária LED (100W): Potência nominal mínima de 90W e máxima de 100W, tensão bivolt automática 127V/220V. Fluxo luminoso mínimo de 11.000 lúmens; eficiência luminosa mínima de 110 lúmens / W; índice e reprodução de cores (IRC) mínimo de 70%; temperatura de cor correlata (TCC) de 4500K á 5000K; fator de potência mínimo de 0,95; expectativa de vida útil de no mínimo 50.000h para L80; distorção harmônica total (THD) máxima de 10%; tecnologia dos LED's tipo SMD Surface Mount Device ou COB; distribuição luminosa transversal tipo II, longitudinal média e/ou curta e controle de distribuição luminosa do tipo limitada ou totalmente limitada, conforme NBR 5101; corpo em alumínio injetado a alta pressão com pintura epóxi na cor cinza ou corpo extrudado; para instalação em postes e/ou braços de iluminação pública com diâmetro de 48,5mm a 60,3mm, fixação realizada por parafusos de aço inox, com controlador eletrônico para módulos de LED (driver) alojado (interno) ao corpo da luminária; conjunto óptico formado por conjuntos modulares; com tomada e relé fotoelétrico (com garantia de 5 anos) compatível com a luminária conforme NBR 5123 incorporada ao corpo da luminária; índice de proteção contra penetração de poeira e água IP 66 para o conjunto óptico e para o compartimento do driver; índice de proteção contra impactos de no mínimo IK08.	UNI.	225	LUMINÁRIA RAJIX RLP1005E RELE DREI-K RFL01	R\$ 182,95	R\$ 41.163,75
TOTAL						R\$ 41.163,75

VALOR TOTAL DA PROPOSTA - R\$ 41.163,75 (Quarenta e um mil cento e sessenta e três reais e setenta e cinco centavos).

ACR Comércio e Serviços Ltda
CNPJ: 22.683.848/0001-03
Rua Nicolau Scheffer, 255
Santa Cândida - Curitiba - PR
CEP 82640-230

A validade desta proposta é de 60 (sessenta) dias corridos, contados da data da abertura da sessão pública do PREGÃO ELETRÔNICO.

A apresentação da proposta implicará na plena aceitação das condições estabelecidas neste Aviso de Contratação Direta e seus anexos.

Declaro que a proponente atende aos requisitos de habilitação e o declarante atesta a veracidade das informações prestadas (art. 63, I, da Lei nº 14.133/2021).

Responsável pela assinatura do Contrato:

- Nome: CLAUDINEI ROBERTO LUNARDON - SÓCIO

- CPF: 874.541.909-44

- Endereço: RUA GENÊSIS 65 - SANTA CÂNDIDA - CURITIBA - PR

- Telefone: FONE: (041) 99887-2440

- e-mail: acr.mo@hotmail.com

Informar Agência e Conta para pagamento: CAIXA ECONÔMICA AGÊNCIA: 1632 C/C: 578196683-4

Nos preços ofertados já estão inclusos os tributos, fretes, taxas, seguros, encargos sociais, trabalhistas e todas as demais despesas necessárias à execução do objeto.

Curitiba, 12 de Maio de 2025.

CLAUDINEI ROBERTO LUNARDON:87454190944
0944

Assinado de forma digital
por CLAUDINEI ROBERTO
LUNARDON:87454190944
Dados: 2025.05.12 09:52:34
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Claudinei Roberto Lunardon
CPF – 874.541.909-44
RG – 6130828-8
Sócio

LUMINÁRIA PÚBLICA LED

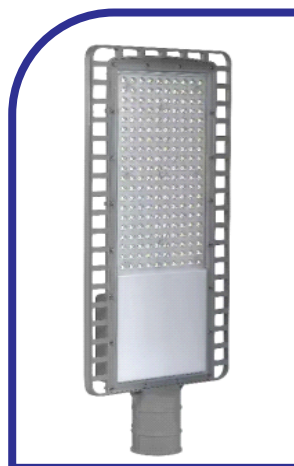
POTÊNCIA
30-50-100-150-200W



30 E 50W



100W



150W



200W

* Imagens meramente ilustrativas



5 ANOS DE GARANTIA



VIDA ÚTIL
50.000H



110 ~ 277 VAC



PROTEÇÃO
IP66



CLASSIFICAÇÃO
DE EFICIÊNCIA
ENERGÉTICA



CERTIFICADA
NO INMETRO

A iluminação pública é um aspecto importante da infraestrutura urbana e pode ter um impacto significativo na segurança e no bem-estar dos cidadãos. As **LUMINÁRIAS PÚBLICAS LED da RAJIX** são uma opção popular para iluminação pública, pois oferecem vários benefícios em comparação com as tecnologias de iluminação convencionais.

Em termos de tecnologia, as luminárias **LUMINÁRIAS PÚBLICAS LED da RAJIX** são projetadas para serem mais eficientes em termos de energia do que as lâmpadas VAPOR DE SÓDIO ou VAPOR METÁLICO. Elas usam diodos emissores de luz (LEDs) para produzir luz, que é mais brilhante e mais uniforme do que a luz produzida por lâmpada. Além disso, as luminárias LED têm uma vida útil mais longa do que as lâmpadas convencionais, o que significa que elas precisam ser substituídas com menos frequência.

Em relação à durabilidade, as **LUMINÁRIAS PÚBLICAS LED da RAJIX** são construídas para durar muito tempo, com uma vida útil estimada em até 50.000 horas. Além disso, as luminárias LED são mais resistentes a vibrações e impactos do que as lâmpadas convencionais, o que as torna ideais para uso em áreas públicas movimentadas.

Destaques do produto

- **5 Anos de garantia**
- **Índice de proteção IP66 / Resistência IK08**
- **Estrutura em alumínio injetado**
- **Certificada no INMETRO**
- **Pintura eletrostática a pó**
- **Vida útil de 50.000 horas**

LUMINÁRIA PÚBLICA LED

POTÊNCIA
30-50-100-150-200W

INFORMAÇÕES TÉCNICAS

CARACTERÍSTICAS ELÉTRICAS

Tipo do LED	LED SMD 3030
Tensão de alimentação	110 ~ 277 VAC
Frequência de operação	50Hz / 60Hz
Fator de potência	≥0,55
THD	≤10%
Driver de alimentação	Invólucro em Alumínio anodizado / Proteção IP67
DPS (Classe 1)	DPS interno ao driver 10KV / 10KA
Base para Relé	3 pinos
Alimentação	Cabo PP 3x1,5mm ² (L; L/N; G)

CARACTERÍSTICAS ÓPTICAS

Abertura de lente	Tipol II Média
Temperatura de cor	5000K
IRC	>70
Vida útil	>50.000h <i>* Comprovada através de ensaio LM-80 e projeção TM-21</i>

CARACTERÍSTICAS CONSTRUTIVAS

Índice de Proteção	IP66
Resistência mecânica	IK08
Temperatura de operação	-5°C - +50°C
Instalação	Bocal para fixação em braços de Ø48mm até Ø65mm, angulação de -5° até +5°
Material do corpo	Alumínio injetado sob pressão <i>* A.A. 369.00</i>
Pintura	Pintura eletrostática a pó com proteção UV <i>* Pintura Epóxi Poliéster</i>
Cores	Cinza
Material da lente	Lente óptica em policarbonato
Material dos elementos de fixação	Aço inoxidável 304

Normas aplicáveis

Portaria n.º 20, de 15 de fevereiro de 2017

NBR IEC - 60598-1 Requisitos Gerais e Ensaios

NBR IEC - 60529 Grau de Proteção para Invólucros de Equipamentos Elétricos (Código IP)

NBR IEC - 62031 Módulos de LED para Iluminação em Geral - Especificações de Segurança

IES LM 80-08 - Approved Method for Measurements Lumen Maintenance of LED Light Sources

IES TM 21- Projecting Long Term Lumen Maintenance of LED light Sources

LUMINÁRIA PÚBLICA LED

POTÊNCIA
30-50-100-150-200W

MODELOS DISPONÍVEIS

CÓDIGO	TCC	CORRENTE NOMINAL	POTÊNCIA	EFICIÊNCIA	FLUXO	PESO
RLP0305E	5000K	127vac = 0,236mA 220Vac = 0,136mA	30W	140 lm/W	4200 lm	1,61 kg
RLP0505E		127vac = 0,393mA 220Vac = 0,227mA	50W	140 lm/W	7000 lm	2,77 kg
RLP1005E		127vac = 0,787mA 220Vac = 0,454mA	100W	140 lm/W	14000 lm	4,90 kg
RLP1505E		127vac = 1,181mA 220Vac = 0,681mA	150W	140 lm/W	21000 lm	4,92 kg
RLP2005E		127vac = 1,574mA 220Vac = 0,909mA	200W	140 lm/W	28000 lm	1,61 kg

* Valores de eficiência podem variar em $\pm 10\%$ com relação ao valor nominal

INSTRUÇÕES DE USO

LUMINÁRIA PÚBLICA LED

RAJIX

E N E R G Y

Instrução para manuseio

- Desligue a energia elétrica antes de instalar, remover ou fazer a manutenção;
- A instalação, manutenção e reparos devem ser efetuado por um profissional qualificado, de acordo com as normas ABNT NBR5410;
- Utilize cabos e conexões certificadas;
- Não utilize ou conecte a luminária se os cabos de energia estiverem danificados, molhados ou superaquecidos;
- Não olhe diretamente para a fonte de luz;
- Evite armazenar e usar em ambientes corrosivo ou contendo substâncias nocivas, como sulfeto, haleta;
- Não modifique, altere ou desmonte a luminária. A realização dessa atividade, ocorrerá a perda da garantia;

Instalação

- Instalar em local arejado, para que ocorrerá dissipação de calor.
- Altura recomendada da instalação varia de acordo com o potência (ver abaixo):
- 50W: 3-4m / 100W: 5-6m / 150W: 7-8m / 200W: 8-9m / 240W: 9-10m

- A tensão de trabalho do produto é AC **100V - 277V** | 50/60Hz. Não exceda a faixa de tensão de trabalho;
- Sugestão de cabo 1mm². Fio marrom é «L», o fio azul é «N» e o fio verde-amarelo é o «PE»;
- Isolar os fios, após interligação;
- Posicione a luminária no braço e aperte os parafusos.

Manutenção

- Limpe regularmente a lente da luminária para manter um a boa transmissão de luz;
- Retire a poeira do revestimento externo regularmente para manter um bom desempenho de dissipação de calor;
- Não limpe com água ou solução corrosiva , mas sim com um pano seco;
- Ao substituir o parafuso, certifique-se de que é o mesmo tamanho e material;
- Faça manutenções preventivas periódicas;
- Fazer inspeções visuais. Verifique se, não há infiltração, partes danificadas, corrosão ou aquecimento em alguma parte da luminária.

Condições de Operação

As luminárias devem ser projetadas para trabalhar sob as seguintes condições de utilização:

a) altitude não superior a 1.500 m;

b) temperatura média do ar ambiente, num período de 24 h, não superior a + 20 °C;

c) temperatura do ar ambiente entre - 5 °C e + 50 °C;

d) umidade relativa do ar até 100 %.

Condições de utilização fora dos limites acima especificados devem ser definidas caso a caso, conforme a região ou aplicação.

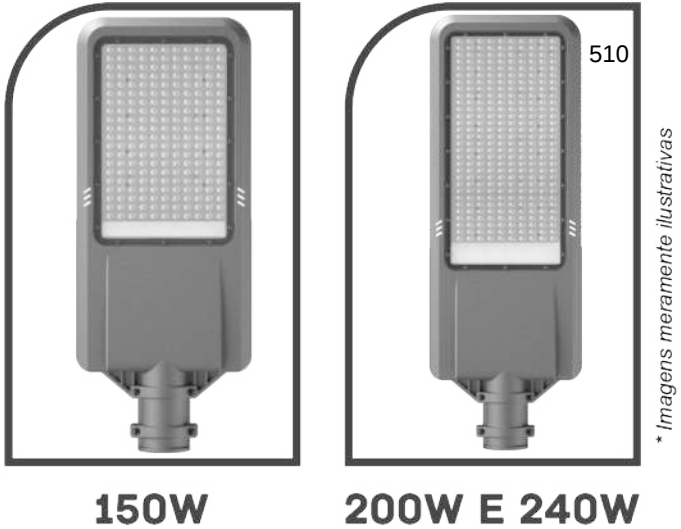
Condições de garantia para o consumidor

- Garantia de 5 anos a partir da data de aquisição;
- Para proceder a troca de produtos defeituosos apresente a nota fiscal no estabelecimento onde foi adquirido o produto;
- Não será coberto pela garantia, se o produto for desmontado ou modificado, por uso inadequado, negligência, danos em consequência da instalação por pessoas inabilitadas, agentes corrosivos, acidentes, explosão ou qualquer ação da natureza e fatores ambientais;
- Não mergulhe na água;
- A instalação em local inadequado ou rede elétrica incompatível com as especificadas no produto ou a má qualidade do aterramento ou a não existência dela, acarretará na perda da garantia.
- Produto frágil e não perecível;
- Descartar em local apropriado.



LUMINÁRIAS					
Código	RLP0504	RLP1004	RLP1504	RLP2004	RLP2404
Potência [W]	50W	100W	150W	200W	240W
Fluxo Luminoso [lm]	7.500	15.000	22.500	30.000	36.000
Eficiência [lm/W]	150	150	150	150	150
Tensão [V]	BIVOLT AC 100V - 277V				
Frequência [Hz]	50/60				
Temperatura de cor [K]	4.000				
LED	SMD 3030				
Índice de reprodução de cor [IRC]	>70				
Fator de potência	> 0,92	> 0,95	> 0,95	> 0,95	> 0,95
Protetor de surto	10kV				
Material	Alumínio injetado e Policarbonato				
Grau de Proteção [IP]	IP66				
Resistência Mecânica	IK08				
Vida útil [h]	97.000				
Classificação fotométrica	Média - Tipo II - Limitada				
Diâmetro do braço	60mm				
Parafuso	Parafuso Allen Médio MB de Aço inoxidável - 2 unidades				
Torque	8 n.m				
Área máxima exposta ao vento	0,04689	0,10403	0,14075	0,16919	0,16919
Garantia	5 Anos				
Validade para armazenamento	Indeterminada				
Tipo de proteção contra choque elétrico	Classe I				
Peso produto [kg]	1,612	2,772	3,72	4,90	4,92
Medida [C x L x A]	500x210x65	550x225x65	600x245x70	660x265x70	660x265x70
País de origem	China				
Posição normal de operação	0° na Horizontal				

DRIVER SUNCOM					
Código	RLP0504	RLP1004	RLP1504	RLP2004	RLP2404
Modelo	HVC-75W-56X	HVC-100W-56X	HVC-150W-56X	HVC-200W-56X	HVC-240W-56X
Potência	1 de 50W	1 de 100W	1 de 150W	1 de 200W	1 de 240W
Corrente nominal	127V: 0,900A 220V: 2,100A	127V: 1,300A 220V: 3,000A	127V: 1,800A 220V: 4,500A	127V: 2,600A 220V: 5,600A	127V: 3,500A 220V: 6,700A



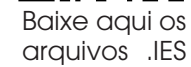
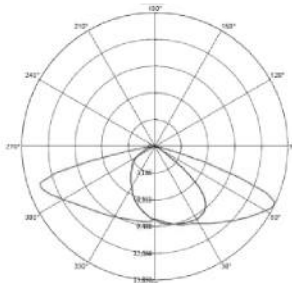
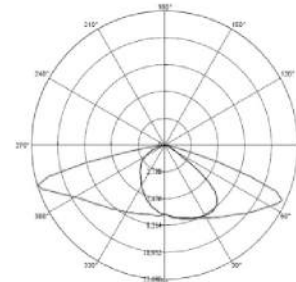
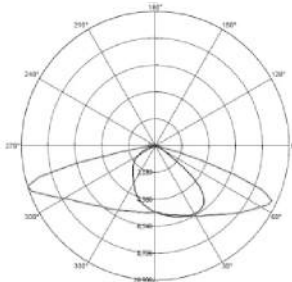
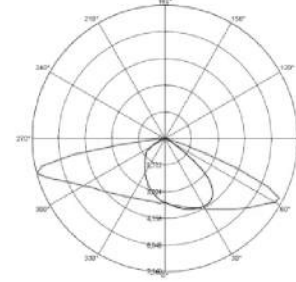
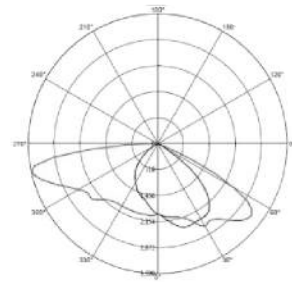
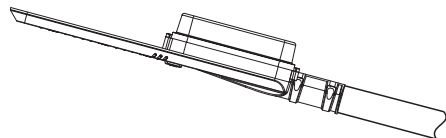
LUMINÁRIAS					
Código	RLP0505	RLP1005	RLP1505	RLP2005	RLP2405
Potência [W]	50W	100W	150W	200W	240W
Fluxo Luminoso [lm]	7.500	15.000	22.500	30.000	36.000
Eficiência [lm/W]	150	150	150	150	150
Tensão [V]	BIVOLT AC 100V - 277V				
Frequência [Hz]	50/60				
Temperatura de cor [K]	5.000				
LED	SMD 3030				
Índice de reprodução de cor [IRC]	>70				
Fator de potência	> 0,92	> 0,95	> 0,95	> 0,95	> 0,95
Protetor de surto	10kV				
Material	Alumínio injetado e Policarbonato				
Grau de Proteção [IP]	IP66				
Resistência Mecânica	IK08				
Vida útil [h]	97.000				
Classificação fotométrica	Média - Tipo II - Limitada				
Diâmetro do braço	60mm				
Parafuso	Parafuso Allen Médio MB de Aço inoxidável - 2 unidades				
Torque	8 n.m				
Área máxima exposta ao vento	0,04689	0,10403	0,14075	0,16919	0,16919
Garantia	5 Anos				
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Tipo de proteção contra choque elétrico	Classe I				
Peso produto [kg]	1,612	2,772	3,72	4,90	4,92
Medida [C x L x A]	500x210x65	550x225x65	600x245x70	660x265x70	660x265x70
País de origem	China				
Posição normal de operação	0° na Horizontal				

DRIVER SUNCOM					
Código	RLP0504	RLP1004	RLP1504	RLP2004	RLP2404
Modelo	HVC-75W-56X	HVC-100W-56X	HVC-150W-56X	HVC-200W-56X	HVC-240W-56X
Potência	1 de 50W	1 de 100W	1 de 150W	1 de 200W	1 de 240W
Corrente nominal	127V: 0,900A 220V: 2,100A	127V: 1,300A 220V: 3,000A	127V: 1,800A 220V: 4,500A	127V: 2,600A 220V: 5,600A	127V: 3,500A 220V: 6,700A

* Imagens meramente ilustrativas

Figura da dimensão/diagrama de fiação:

- Parafuso de fixação do poste de luz: 2 peças de parafusos de aço inoxidável M8 - Chave Allen





ver. - 2024-01-31

CERTIFICADO DE GARANTIA

A **RAJIX** garante ao consumidor do produto adquirido, a garantia pelo período previsto no Código de Defesa do Consumidor de 60 (sesenta) meses. Garantia com validade a contar da data de emissão da Nota Fiscal de venda e conforme condições descritas neste termo.

A **RAJIX** poderá, a qualquer tempo, mediante aviso por escrito em carta AR ou por e-mail enviado ao CLIENTE, dar por rescindido de pleno direito a garantia no caso de constatação do descumprimento de qualquer um dos termos listados no item CONDIÇÕES DA GARANTIA, deste termo.

1. **PRAZO DE COBERTURA**

- 1.1. O prazo de cobertura da garantia começa a ser contado a partir da data de emissão da nota fiscal.

2. **CONDIÇÕES DE GARANTIA**

A garantia fornecida pela RAJIX é limitada, e torna-se inválida ou nula caso seja identificada alguma das condições elencadas:

- 2.1. Defeitos que não sejam provenientes de fabricação.
- 2.2. Operação inadequada ou em desconformidade com as recomendações do Manual de Instruções, ou do Manual de Especificações Técnicas do produto.
- 2.3. Instalação do produto em rede elétrica em desacordo com o range de tensão nominal do equipamento.
- 2.4. Modificações, adaptações, abertura do produto ou serviços de manutenção realizados por empresas ou pessoas não autorizadas.
- 2.5. Danos físicos causados ao produto, como, por exemplo, queda, acidente, transportes ou armazenamento inadequados.
- 2.6. Danos causados por intempéries (descargas atmosféricas, vendavais etc.).
- 2.7. Produtos enviados em condições de notória avaria.
- 2.8. Perdas e danos, lucros cessantes, manutenção de caráter preventivo ou qualquer perda resultante do mal uso e da incapacidade do uso do produto, nem custos de reparação ou substituição de qualquer outro bem que seja danificado.

- 2.9. não se houver por eles responsabilizado. O caso fortuito ou força maior verifica-se no fato necessário, cujos efeito não era possível evitar ou impedir.
- 2.10. Instalação do produto em temperatura ambiente fora dos limites definidos na especificação técnica do produto.
- 2.11. Utilização do produto em ambiente diferente daquele para o qual foi desenvolvido
- 2.12. Oxidação dos terminais de contato da tomada 3 ou 7 pinos do produto devido à exposição a umidade, quando presente esse tipo de equipamento no produto.
- 2.13. Quando aplicável DPS (dispositivo de proteção de surto), e partes de vidro, como refratores, não estão cobertos pelo termo de garantia.
- 2.14. Pintura do corpo, da lente ou qualquer outra parte da luminária, assim como eventuais danos à lente do produto decorrentes do mau uso (riscos, ranhuras, fissuras, manchas etc.).
- 2.15. A instalação elétrica em desacordo com a (i) Norma ABNT NBR 5410; (ii) Norma ABNT NBR 5419; (iii) AVCB (Auto de Vistoria do Corpo de Bombeiros) Instrução Técnica número 41/2011, válido durante todo o período de utilização do Produto; (iv) Lei 11.337 de 23 de julho de 2.006 que "Determina a obrigatoriedade de as edificações possuírem sistema de aterramento e instalações elétricas compatíveis com a utilização de condutor-terra de proteção, bem como torna obrigatória a existência de condutor- terra de proteção nos aparelhos elétricos que especifica".

3. TÓPICOS GERAIS

- 3.1. Esta garantia inclui a reparação do produto em caso de defeito de fabricação que o torne inadequado ao uso, e à substituição de partes e/ou peças defeituosas de fábrica, sempre mantendo as especificações originais.
- 3.2. A Garantia concedida somente será válida se as obrigações financeiras assumidas pelo cliente estiverem em dia e/ou quitadas.
- 3.3. Os custos de mão de obra para instalação/desinstalação do Produto não estão cobertos por esta Garantia.
- 3.4. Produtos expostos a agentes fertilizantes, ácidos e/ou outros agentes altamente corrosivos terão tempo de garantia reduzido a um total de 24 meses.
- 3.5. Nenhum distribuidor ou revendedor está autorizado a alterar, modificar e/ou estender os termos e prazos da Garantia Contratual ou Garantia Total.
- 3.6. Todo e qualquer dispositivo (Ex.: shorting cap, relé-fotoelétrico, módulo de tele gestão, dimmer etc.) de fornecedores terceiros, que venha a ser integrado ao produto, deve ser novo e possuir grau de proteção IP igual ou superior.

- 3.7. Caso o produto que apresente defeito tenha sido descontinuado ou não esteja disponível, poderemos substituí-lo por um similar ou superior, ainda que apresente diferenças em termos de design e especificação técnica.
- 3.8. Esta garantia é exclusiva e substitui quaisquer outras garantias implícitas ou explícitas, incluindo, mas não se limitando a, garantias de comercialização ou adequação a um determinado propósito. Em nenhum caso a RAJIX será responsável por quaisquer danos indiretos, incidentais ou consequentes decorrentes do uso do produto.
- 3.9. A RAJIX se reserva o direito de atualizar o presente termo de garantia, independentemente de comunicação prévia.

4. MANUTENÇÃO E CUIDADOS

- 4.1. A fim de evitar que haja uma redução no fluxo luminoso causada por meios externos, recomenda-se que seja realizada limpeza nas partes óticas das luminárias de maneira periódica, usando somente pano umedecido e detergente neutro.
- 4.2. Recomenda-se remoção e limpeza em caso de acúmulo de material na área externa da luminária que é responsável pela dissipação térmica, a fim de evitar redução na vida útil do produto.

5. PROCEDIMENTO

- 5.1. Caso o produto apresente algum defeito originário de fábrica, é de responsabilidade do cliente entrar em contato com a RAJIX para relatar o ocorrido. O contato pode ser feito a partir dos seguintes canais disponibilizados:
 - Em nosso site, através do link <https://rajix.com.br/contato/>
 - Via e-mail em rajix@rajix.com.br;
 - Contato via telefone com o SAC, no número (41) 98442-7900, nos horários de segunda à sexta, das 8h00 às 12h00, e das 13h30 às 17h30.
- 5.2. Todo e qualquer procedimento de garantia prestado pela RAJIX será feito somente mediante apresentação da Nota Fiscal de aquisição do produto, a fim de verificar se o produto está dentro do prazo de cobertura de garantia.
- 5.3. Para realizar o envio do produto, o cliente deve emitir Nota Fiscal de Remessa em Garantia, e enviar para rajix@rajix.com.br.
- 5.4. Quando em garantia, o envio do produto e custos atrelados, são de responsabilidade do CLIENTE. O retorno do produto, bem como seus custos, será realizado pela RAJIX.

6. REPAROS APÓS TÉRMINO DO PERÍODO DE GARANTIA, OU DE ITENS EXCLUSOS DA GARANTIA

- 6.1. Em casos de reparo de equipamentos fora do prazo de cobertura, ou não contemplados por garantia por quaisquer motivos citados neste termo, o reparo do equipamento será realizado somente após a aprovação de orçamento de reparo por parte do cliente.
- 6.2. Em todos os casos em que o produto não estiver acobertado pela garantia o envio e recebimento do produto, bem como todos os custos atrelados, são de responsabilidade do cliente.

7. CONDIÇÕES DE DEVOLUÇÃO

- 7.1. Para condições de devolução, a mesma deve ser feita dentro do prazo de até 7(sete) dias após o recebimento do produto.
- 7.2. A mercadoria deve retornar nas mesmas condições do ato de recebimento, com sua embalagem original, lacrada, sem rasuras, completa, com todos os manuais e acessórios que fazem parte do conjunto.
- 7.3. O produto não poderá ter sido usado/energizado.

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Registro de Objeto

Consultar registros concedidos

Detalhes do Registro 012308/2023

Status

Ativo

Concessão

10/01/2024

RAJIX COMERCIAL LTDA

Avenida República Argentina, 1505 SALA 2012 Cep:80620-010 | AGUA VERDE - CURITIBA - PR

Tel: (Telefone) 41984996644 - raphael@rajix.com.br (<mailto:raphael@rajix.com.br>) - CNPJ:

(CNPJ)46.889.684/0001-25



Programa de Avaliação da Conformidade

Luminárias para Iluminação Pública Viária

Portaria Inmetro

nº (número) 62 de 17/02/2022

Nome de Família

LED Luminária de Iluminação

Pública / REFOND / RF-

W*HP32DS-AF-I3 / IP66 /

50000h

Certificado

6176791.31

↵Pesquisar histórico de alterações

Data

Alteração

Marca

Modelo

Descrição

Data	Alteração	Marca	Modelo	Descrição
10/01/2024	Incluido	RAJIX	RLP0305E	30W/4200lm/140lm/W/FP > 0,95/5000K
10/01/2024	Incluido	RAJIX	RLP0505E	50W/7000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluido	RAJIX	RLP1005E	100W/14000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluido	RAJIX	RLP1505E	150W/21000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluido	RAJIX	RLP2005E	200W/28000lm/140lm/W/FP > 0,97/5000K

<< Voltar





Thelma Leoni Sabim

Tradutora Pública e Intérprete Comercial – Inglês
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Livro: 17

Tradução nº: 1618

Folha 53

Documento: Relatório de Ensaio ANSI/IES LM-80-15-----

***Certifico e dou fé** para os devidos fins que me foi apresentado o documento em inglês acima referenciado o qual traduzo para o vernáculo no seguinte teor:*

[cabeçalho repetido em todas as páginas]

[ícone] **Meide®**

Guangdong Meide Testing Technology Co., Ltd.

NvLap® [ícone] ilac-MRA

TESTING

CÓDIGO NVLAP LAB: 600177-0

RELATÓRIO DE ENSAIO ANSI/IES LM-80-15

Métodos aprovados para medição do fluxo luminoso e manutenção de cores dos encapsulamentos, matrizes e módulos LED

Cliente.....: Shenzhen Tongyifang Optoelectronic Technology Co., Ltd.

Endereço.....: Edifício No.4, Parque Industrial XinLianHe, Estrada JinCheng, Vila ShaJing,
Distrito de BaoAn, Cidade de ShenZhen

Modelo em teste.....: SE3

Nome da marca.....: [imagem do logo] TYF LED

Laboratório de ensaios : Guangdong Meide Testing Technology Co., Ltd.

Endereço.....: 1º andar, Área B, Parque Industrial Jinbaisheng, Sede na Estrada 2, Lago Songshan, Zona de Desenvolvimento Industrial de Alta Tecnologia, Cidade de Dongguan, Província de Guangdong, China.

Local do ensaio.....: Mesmo que acima

Relatório No.....: C02A18100404L01001

Data do teste.....: 02/11/2018 a 25/11/2020

Data do relatório...: 04/12/2020

Testado por:

[assinatura]

Tim Qian/ Engenheiro de Teste

Verificado por:

[assinatura]

Luke Lei/ Eng. de Projetos

[ícone] **Meide**

* CERTIFICADO *

Guangdong Meide Testing Technology Co., Ltd.

Aprovado por:

[assinatura]

Jessie Li/Gerente Técnica

Nota 1: os dados do ensaio são válidos apenas para a(s) amostra(s) testada. Este relatório de ensaio foi preparado para o cliente acima indicado e para o dispositivo aqui descrito. Ele não pode ser duplicado nem usado parcialmente sem o consentimento prévio por escrito da Guangdong Meide Testing Technology Co., Ltd. Este relatório não deve ser usado pelo cliente para reivindicar certificação, aprovação ou endosso do produto pelo NVLAP.NIST ou qualquer agência do Governo Federal. Nota 2: Este relatório não implica certificação, aprovação ou endosso do produto pela NVLAP, NIST ou qualquer agência do Governo Federal.

Relatório nº: C02A18100404L01001

Página 1 de 18

[rodapé repetido em cada página]

Laboratório: Guangdong Meide Testing Technology Co., Ltd.

Endereço: 1º andar, Área B, Parque Industrial Jinbaisheng, Sede Estrada 2, Lago Songshan, Zona de Desenvolvimento de Alta Tecnologia Industrial

Cidade de Dongguan, Província de Guangdong, China.

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Tradução nº: 1618

Folha 54

Folha de rosto ENERGY STAR® LM-80

Informações Administrativas

Série de subcomponentes testada:	Não aplicável
Número do modelo do subcomponente testado:	SE3
Data de emissão do relatório:	04/12/2020
Data de revisão do relatório (se aplicável):	Não aplicável
Data início do ensaio:	02/11/2018
Data conclusão do ensaio:	25/11/2020

Identificação do Dispositivo em Teste (DUT)

Nome do fabricante do DUT:	Shenzhen Tongyifang Optoelectronic Technology Co., Ltd.
Identificação do DUT, p.ex. núm. do modelo:	SE3
Descrição do DUT, inclusive se o dispositivo for um encapsulamento ou módulo de LED:	Encapsulamento LED

Características do DUT

Potência total de entrada (W):	2W
Densidade média de corrente por pastilha LED (mA/mm ²):	301,95 mA/mm ²
Densidade média de potência por pastilha LED (W/mm ²):	1,006 W/mm ²
IRC (Ra) representativo do conjunto de amostras em teste: (Indica se o valor relatado é o valor médio ou mediano do conjunto de amostras, ou por unidade)	80
Espaçamento mínimo entre as bordas da pastilha:	0,19 mm

Relatório nº: C02A18100404L01001

Página 2 de 18



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Livro: 17

Tradução nº: 1618

Folha 55

Índice

1. Informações Gerais.....	4
1.1 Descrição das fontes de luz de LED.....	4
1.2 Padrões usados.....	5
1.3 Lista de equipamentos do ensaio.....	5
1.4 Nível de dreno.....	5
1.5 Condições ambientais para teste de manutenção.....	5
1.6 Método de medição fotométrica.....	5
1.7 Conjunto de amostras.....	6
2. SUMÁRIO DOS RESULTADOS DO TESTE.....	7
3. Dados do ensaio.....	10
3.1 Conjunto de dados 1, 85°C, 300mA (manutenção de lúmen).....	10
3.2 Conjunto de dados 1, 85°C, 300mA (manutenção do fluxo de fótons fotossintéticos).....	11
3.3 Conjunto de dados 1, 85°C, 300mA (tensão direta).....	12
3.4 Conjunto de dados 1, 85°C, 300mA (variação de cromaticidade).....	13
3.5 Conjunto de dados 2, 105°C, 300mA (manutenção de lúmen).....	14
3.6 Conjunto de dados 2, 105°C, 300mA (manutenção do fluxo de fótons fotossintéticos).....	15
3.7 Conjunto de dados 2, 105°C, 300mA (tensão direta).....	16
3.8 Conjunto de dados 2, 105°C, 300mA (variação de cromaticidade).....	17
4 . FOTO DO EQUIPAMENTO EM TESTE.....	18
4.1 Dimensões mecânicas.....	18
4.2 Foto do equipamento em teste.....	18

Relatório nº: C02A18100404L01001

Página 3 of 18



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Tradução nº: 1618

Folha 56

1. Informações Gerais

1.1 Descrição das fontes de luz de LED

Tamanho da amostra:

Foram recebidas amostras de 50 unidades em 01/11/2018. As amostras foram numeradas de S1 a S25 e S26 a S50.

Fabricação:	Shenzhen Tongyifang OptoelectronicTechnologyCo., Ltd
Número de peça:	SE3
Tipo de peça:	Encapsulamento LED
Nível do dreno:	CC 300mA
TCC (Temperatura de Cor Correlata) nominal:	2700K
Potência:	2W
IRC (Índice de Renderização de Cores):	80

Método de amostragem:

As amostras de LED para testes IESNA LM-80 consistem em unidades construídas a partir de três lotes de fabricação, com cada lote composto de diferentes lotes de wafers produzidos em dias não consecutivos. Esses lotes de fabricação são escolhidos para representar uma ampla distribuição paramétrica.

Família de produtos abrangidos por este relatório:

De acordo com os Requisitos da ENERGY STAR® para o Uso de Dados LM-80, os seguintes produtos podem ser cobertos por este relatório com base nas informações e declarações fornecidas pelo fabricante. As informações desses modelos mostram que os produtos cobertos atendem os requisitos da seção 4 dos Requisitos da ENERGY STAR® para o uso de dados LM-80 (28 de setembro de 2017)

Este relatório abrange os seguintes modelos:

Nome do modelo	Corrente (mA)	Potência: (W)	Qtde de pastilhas	Densidade de corrente por pastilha (mA/mm²)	Densidade de potência (W/mm²)	Espacamento pastilhas (mm)	Corrente do driver da pastilha (mA)
Modelo em teste SE3	300	2	4	301,95	0,0022	0,19	150
SE32022	300	2	4	301,95	0,0022	0,19	150
SE32041	150	2	4	301,95	0,0022	0,19	150
SE32014	600	2	4	301,95	0,0022	0,19	150
SE31531	150	1.5	3	301,95	0.0017	0,19	150
SE31513	450	1.5	3	301,95	0.0017	0,19	150
SE31021	150	1	2	301,95	0.0011	0,19	150
SE31012	300	1	2	301,95	0.0011	0,19	150

Exclusão de responsabilidade:

A veracidade e precisão de todas as informações técnicas acima para os produtos LED cobertos são garantidas pelo fabricante da fonte de luz LED. Guangdong Meide Testing TechnologyCo., Ltd. não é responsável tampouco oferece qualquer garantia pela veracidade das informações técnicas.

Relatório nº: C02A18100404L01001

Página 4 de 18



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Livro: 17

Tradução nº: 1618

Folha 57

1.2 Padrões usados

- Método aprovado pela IES ANSI/IES LM-80-15 para fluxo luminoso e manutenção de cores dos encapsulamentos, matrizes e módulos
- Requisitos da ENERGY STAR® para o uso de dados LM-80 (Este padrão não foi credenciado pelo NVLAP)

1.3 Lista de equipamentos do ensaio

Equipamento do ensaio	No. de série	No. modelo	Vcto. da calibração
Sistema de esfera integradora	MD-E033	0.5m	19/05/2021
Fonte de luz padrão	MD-E034	D062	19/05/2021
Radiômetro de matriz de alta precisão	MD-E011	HAAS-3000	2021/09/29
Medidor digital de energia	MD-E008	PF310	2021/09/29
Fonte de alimentação CC estabilizada digital de precisão	MD-E009	WY305	2021/09/29
Testador de temperatura	MD-E038	UFS-D8036	17/06/2021

Declaração de rastreabilidade: Guangdong Meide Testing Technology Co., Ltd. atestou que toda a calibração foi realizada usando padrões adequados rastreáveis aos padrões primários nacionais e ao Sistema Internacional de Unidade (SI).

1.4 Nível de dreno

As amostras são acionadas com corrente contínua constante (CC) durante testes de manutenção, medições fotométricas e elétricas. O valor da corrente foi regulado dentro de $\pm 3\%$ do valor especificado pelo fabricante durante o teste de manutenção, e ficou dentro de $\pm 0,5\%$ durante o teste de medição fotométrica e elétrica.

1.5 Condições ambientais para teste de manutenção

Para o teste de manutenção do lúmen, as amostras dentro de um conjunto de dados foram instaladas em placas de resfriamento em câmaras térmicas com fluxo mínimo de ar ambiente. A temperatura do invólucro e a temperatura ambiente foram monitoradas por termopares, um dos quais foi soldado ao ponto mais frio do invólucro do dispositivo em teste (TMP do LED), enquanto o outro foi montado a uma distância de 5 mm acima do local do ponto de medição de temperatura.

Durante o ensaio de vida, os pontos de medição de temperatura (TMP) dos LEDs mais frios foram mantidos a uma temperatura maior ou igual a 2°C abaixo da temperatura nominal do invólucro. O ar circundante foi mantido a uma temperatura maior ou igual a 5°C abaixo da temperatura nominal do invólucro. Os termopares foram protegidos da radiação óptica direta do dispositivo em teste e estão em conformidade com a ASTM E230 Tabela 1 "Limites Especiais".

As amostras foram conectadas à fonte de alimentação CC em circuitos em série com corrente constante. A corrente direta foi regulada dentro de $\pm 3\%$ do valor especificado pelo fabricante.

A umidade relativa dentro da câmara foi mantida abaixo de 65% durante o ensaio.

Para medição fotométrica, a temperatura ambiente durante o ensaio foi ajustada para $25^\circ\text{C} \pm 2^\circ\text{C}$, UR < 65%.

1.6 Método de medição fotométrica

A esfera integradora e o radiômetro foram usados para medir o fluxo luminoso e foi usada a medição da coordenada de cromaticidade $u'v'$.2n e a amostra foi energizada pela fonte de alimentação CC. A corrente direta foi regulada dentro de $\pm 0,5\%$ do valor nominal. O sistema de teste foi calibrado usando lâmpada halógena de referência. A temperatura ambiente durante o teste foi ajustada para $25^\circ\text{C} \pm 2^\circ\text{C}$, umidade relativa < 65%. O ponto de medição de temperatura foi localizado na esfera e a temperatura foi detectada por uma sonda de temperatura.

A incerteza das medições de saída de luz (fluxo luminoso) é $U = 2,1\%$ ($K = 2$), no nível de confiança de 95%. A incerteza das medições de temperatura de cor correlacionadas é $U = 18\text{K}$ ($K = 2$), no nível de confiança de 95%. A incerteza da temperatura é $U = 0,5^\circ\text{C}$ ($K = 2$), no nível de confiança de 95%.



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Livro: 17

Tradução nº: 1618

Folha 58

1.7 Conjunto de amostras

Conjunto de dados 1:85°C,300mA	
Número de peça:	SE3
Número de unidades:	25
Temp. do invólucro (TS):	>83°C
Temperatura ambiente (TA):	>80°C
Corrente de dreno do teste de vida:	300mA
Corrente de medição:	300mA

Conjunto de dados 2:105°C,300mA	
Número de peça:	SE3
Número de unidades:	25
Temp. do invólucro (TS):	>103°C
Temperatura ambiente (TA):	>100°C
Corrente de dreno do teste de vida:	300mA
Corrente de medição:	300mA

Relatório N°: C02A18100404L01001

Página 6 de 18



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Folha 59

2. SUMÁRIO DOS RESULTADOS DO ENSAIO

Conj. dados:	Tamanho amostra	Falhas observadas:	Intervalo do teste	Duração do teste	α	β	Duração L70 TM-21 relatada	Duração L90 TM-21 relatada
--------------	-----------------	--------------------	--------------------	------------------	----------	---------	----------------------------	----------------------------

Média da manutenção do fluxo (porcentagem do fluxo luminoso inicial)

[2 tabelas sendo que apenas os cabeçalhos constam na tradução. Para valores, ver o original]

Conj. dados	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000h
-------------	--------	--------	--------	--------	--------	--------	--------	--------	-------

Conj. dados	10000 h	11000 h	12000 h	13000 h	14000 h	15000 h	16000 h	17000 h	18000h
-------------	---------	---------	---------	---------	---------	---------	---------	---------	--------

Média da manutenção do fluxo de fótons fotossintéticos (porcentagem do fluxo de fótons fotossintéticos)

[2 tabelas sendo que apenas os cabeçalhos constam na tradução. Para valores, ver o original]

Conj. dados	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000h
-------------	--------	--------	--------	--------	--------	--------	--------	--------	-------

Conj. dados	10000 h	11000 h	12000 h	13000 h	14000 h	15000 h	16000 h	17000 h	18000h
-------------	---------	---------	---------	---------	---------	---------	---------	---------	--------

Média da variação de cromaticidade ($\Delta u' v'$)

[2 tabelas sendo que apenas os cabeçalhos constam na tradução. Para valores, ver o original]

Conj. dados	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000h
-------------	--------	--------	--------	--------	--------	--------	--------	--------	-------

Conj. dados	10000 h	11000 h	12000 h	13000 h	14000 h	15000 h	16000 h	17000 h	18000h
-------------	---------	---------	---------	---------	---------	---------	---------	---------	--------

Relatório Nº: C02A18100404L01001

Página 7 de 18



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Tradução nº: 1618

Folha 60

Manutenção do fluxo (%)
[gráfico]

Manutenção do PPF (%)
[gráfico]

Relatório N°: C02A18100404L01001

Página 8 de 18

Variação de cromaticidade ($\Delta u' v'$)
[gráfico]

Relatório N°: C02A18100404L01001

Página 9 de 18

3. Dados do ensaio

3.1 Conjunto de dados 1, 85°C, 300mA (manutenção de lúmen)
[tabela]

Relatório N°: C02A18100404L01001

Página 10 de 18

3.2 Conjunto de dados 1, 85°C, 300mA (manutenção do fluxo de fótons fotossintéticos)
[tabela]

Relatório N°: C02A18100404L01001

Página 11 de 18

3.3 Conjunto de dados 1, 85°C, 300mA (tensão direta)
[tabela]

Relatório N°: C02A18100404L01001

Página 12 de 18

3.4 Conjunto de dados 1, 85°C, 300mA (variação de cromaticidade)
[tabela]

Relatório N°: C02A18100404L01001

Página 13 de 18

3.5 Conjunto de dados 2, 105°C, 300mA (manutenção de lúmen)
[tabela]

Relatório N°: C02A18100404L01001

Página 14 de 18

3.6 Conjunto de dados 2, 105°C, 300mA (manutenção do fluxo de fótons fotossintéticos)
[tabela]

Relatório N°: C02A18100404L01001

Página 15 de 18

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Tradução nº: 1618

Folha 61

3.7 Conjunto de dados 2, 105°C, 300mA (tensão direta)

[tabela]

Relatório N°: C02A18100404L01001

Página 16 de 18

3.8 Conjunto de dados 2, 105°C, 300mA (variação de cromaticidade)

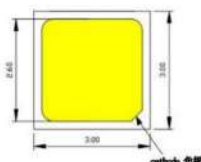
[tabela]

Relatório N°: C02A18100404L01001

Página 17 de 18

4. FOTO DO EQUIPAMENTO EM TESTE**4.1 Dimensões mecânicas**

[imagem]



Todas as dimensões estão em milímetros

4.2 Foto do equipamento em teste

[imagem]

***** FIM DO RELATÓRIO DE ENSAIO *****

Relatório N°: C02A18100404L01001

Página 18 de 18

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Curitiba, 7 de março de 2024

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TEST REPORT

Application No.....: S202309014523

Applicant's name.....: ZHEJIANG LEAD TOP ELECTRICAL CO.,LTD.

Applicant's address : NO.16, FIRST YONGXING RO AD, WENZHOU, ZHEJIANG, CHINA

Sample description: : LOCKING TYPE RECEPTACLES

Model.....: LT605, LT605R, LT635, LT605 (PBT), EK605 (PBT)

Date of receipt of test item.....: 2023-09-08

Test location: Room 02,The 2nd floor No.201, GRG Technological Building,163 Ping Yun Rd, Tianhe District, Guangzhou, China

Test standard.....: ANSI C136.41-2021
For Roadway and Area Lighting Equipment—Interface between an External Locking Type Control Device and Ballast or Driver

Test date(s): 2023-09-11

Test result: The test results are in compliance with the above mentioned standards

Date of issue: 2023-09-15

Tested by:

Bill Luo

Bill Luo

Reviewed by:

Alvin Zhang

Alvin Zhang

Approved by:

Jinjin Teng

Jinjin Teng



Other aspects:

1. This report replaces the original report S20191111443502-G1, which is invalid immediately after this report is issued.
2. The report S20191111443502-G1 was originally issued on 2019.12.23. The Second modification to the report was made on 2020.11.05, The modification content includes: (1) add model LT605 (PBT).
3. The page numbers involved in this modification are page 15, 29, 37, 46 and 47 of the report No.:S20191111443502-G2.
4. The Third revision which test time on 2022.05.13, only for Cl.9 rating, report No. S20191111443502-G3.
5. All the test data from Original report No.: S20191111443502-G2.
6. The fourth revision time on 2023-02-07, only for revision of test standard ANSI C136.41-2013, report No. S20191111443502-G4. The modification content includes: (1) MARKING REQUIREMENTS
7. All the test data from Original report No.: S20191111443502-G3.
8. This report replace report No.:S20191111443501-G3 which is invalid immediately after this report issued.
9. The fifth revision time on 2023-09-11, only for add model EK605 (PBT) and add trade mark EFEK, report No. S20191111443502-G5.
10. All the test data from Original report No.: S20191111443502-G4.
11. This report replace report No.:S20191111443501-G4 which is invalid immediately after this report issued.

Abbreviations: P = passed; F = failed; N/A = not applicable

The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced, except in full, without the written approval of FGTEST.

In China, this test report is only used for scientific research, teaching or internal quality control if there is no China Metrology Accreditation (CMA) mark.

Headquarters Add.: Area B of the 3rd floor, XEDA Sci-Tech Park, Xiqing Economic Development Area, Tianjing, China

Tel:+86-020-66289500-8260,

Email: fygd@grgtest.com

<http://www.fgtest.cn>

TRF No.: FG.WI-07- ANSI C136.41-2021 (1.0)

Reports Inquiry :<https://grgtest.com>

Test item description .: LOCKING TYPE RECEPTACLES

Trade mark LEAD TOP and EFEK

Manufacturer ZHEJIANG LEAD TOP ELECTRICAL CO.,LTD

Address NO.16, FIRST YONGXING ROAD, WENZHOU, ZHEJIANG, CHINA

Factory ZHEJIANG LEAD TOP ELECTRICAL CO.,LTD

Address NO.16, FIRST YONGXING ROAD, WENZHOU, ZHEJIANG, CHINA

Ratings.....: Max 480Vac; Max.15A; Dimming 0-10VDC, DALI

Test items particulars:

Classification of installation and use N/A

Supply Connection N/A

List of Attachments (including a total number of pages in each attachment):

Attachment No.1: Test report of ANSI C136.10-2017 (20 pages);

Attachment No.2 to 10: product information (18 pages);

General product information:

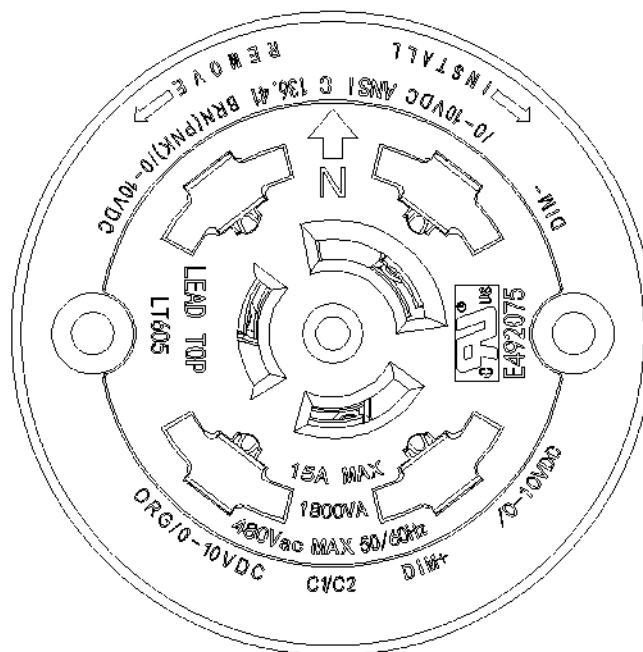
All models have the same mechanical and electrical construction, the same installation, except different sizes.

All tests were performed on models: LT635

Sizes (Cl.4.2 for ANSI C136.10 and Cl6.2 for ANSI C136.41) were carried out on model LT605, LT605 (PBT) and LT605R.

EK605 (PBT) is totally the same with LT605 (PBT), except model name and trade mark .

Copy of marking plate:





ANSI C136.41-2021

Clause	Requirement + Test	Result - Remark	Verdict
5	GENERAL REQUIREMENTS		P
5.1	Background		P
5.2	Dimming Standards		P
5.2.1	0-10 VDC		P
5.2.2	Digital Addressable Lighting Interface (DALI)		P
5.3	Contact Designation (Table 1)		P
6	MECHANICAL REQUIREMENTS		P
6.1	Plug Type		N/A
	The plug used in a dimmable photocontrol (or more broadly, a locking-type dimmable control device) shall be configured with the standard 3 conductors as defined in ANSI C136.10-2017 (referenced in Figure 2), with the addition of two (optionally four) spring-type conductors with limiting dimensions per Figure 1.		N/A
	The type of conductor may be of spring contact type or a bent metal member with a spring quality.		N/A
	If using a bent metal member, it shall be formed with a low-stress relaxation material (e.g., beryllium copper alloy, copper-nickel silicon alloy).		N/A
	The conductors shall have the appropriate mechanical strength and current-carrying capacity required for the dimmable photocontrol application.		N/A
	The material surface shall be gold plated with nickel under-plating to prevent galvanic corrosion and ensure compatibility with various producers of compliant receptacles.		N/A
	The gold plating should be Type II, Class 0.75 per ASTM B-488-11.		N/A
6.2	Receptacle Type		P
	The receptacle shall be configured with the standard 3 conductors as defined in ANSI C136.10-2017 (referenced in Figure 3 and Figure 4), with the addition of two (optionally four) conductive contacts with limiting dimensions per Figure 5.	See table 6.2	P
	The pad surfaces shall be gold plated with nickel under-plating to prevent galvanic corrosion and ensure compatibility with various producers of compliant controls.	Material surface gold plated with nickel	P
	The gold plating should be Type II, Class 0.75 per ASTM B-488-11.		P



ANSI C136.41-2021

Clause	Requirement + Test	Result - Remark	Verdict
	If the dimming control connector or the receptacle is supplied with wire leads: The dimming control wire leads attached to this plug shall be 18 American Wire Gauge (AWG) or larger. Insulation shall be rated 105 °C, 600V minimum. The wire should also be outdoor-rated and ROHS compliant.	Dimming control wire: 18AWG, 105 °C, 600V	P
	For polarity-sensitive control circuits (e.g., 0-10V), the positive dimming conductor shall have insulation that is violet in color, and the common dimming conductor shall have insulation that is a color different than those already in use.		P
6.3	Vibration Test		N/A
	The plug used in a locking-type dimmable control device shall be installed in a compliant, dimmable receptacle and subject to the vibration test specified in ANSI C136.31.		N/A
	The plug and receptacle shall be mounted to the vibration table in a manner that is consistent with the way the receptacle is mounted in the luminaire. The frequency range may be extended to 55 Hz to find a fundamental resonant frequency.		N/A
	If a fundamental resonant frequency is not found, a sweep from 2 Hz to 55 Hz at 1 octave/minute shall be run for one hour. The test shall be run with a displacement of 0.250 inches or an acceleration of 3.0 G (29.4 m/s ²) measured at the receptacle, whichever is less.		N/A
	The contact resistance of the dimming conductors shall not exceed 0.17 ohms after the vibration test (receptacle wires may be omitted from the measurement).		N/A
7	ELECTRICAL REQUIREMENTS		P
7.1	Plug Type		N/A
	See the reference specification for the particular dimming method used for proper electrical requirements.		N/A
	In general, the voltage and current limitations of the spring contact shall comply with the applicable dimming standard.		N/A
	Safety standards, such as UL 773, UL 60730, UL 1310, UL 1598, UL 8750, etc., might involve additional electrical requirements and limitations, including but not limited to separation of circuits. This standard does not address these requirements.		N/A
7.2	Receptacle Type		P



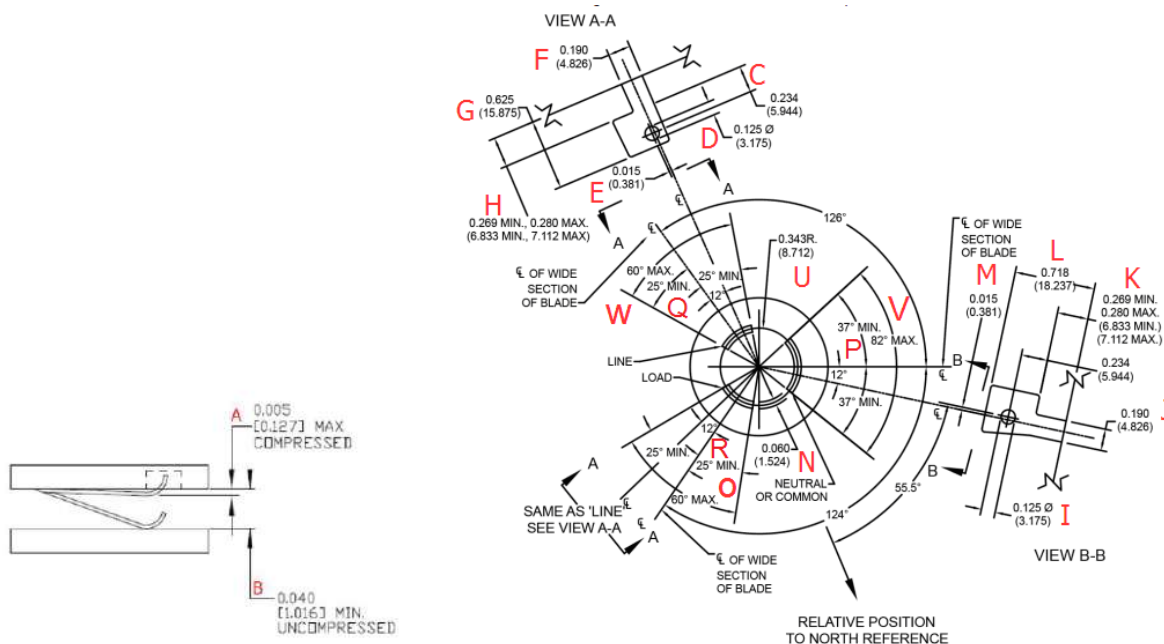
ANSI C136.41-2021

Clause	Requirement + Test	Result - Remark	Verdict
	The receptacle shall be capable of withstanding the voltage and current requirements of both the 0-10VDC dimming method and DALI.		P
	For the purposes of this standard, the conductive dimming contacts shall be capable of carrying 1500mA and shall be limited to 30VDC.	1500mA, 29VDC	P
	Safety standards, such as UL 773, UL60730, UL 1310, UL 1598, UL 8750, etc., might involve additional electrical requirements and limitations, including but not limited to separation of circuits. This standard does not address these requirements.		N/A
8	MARKING REQUIREMENTS		P
	In addition to the marking requirements of ANSI C136.10, the receptacle shall be clearly marked (labeled) on the mating surface of the housing to indicate the contact number and color as indicated or with factoryterminated wires having insulation in the designated colors: 4 VIO 5 PNK 6 BRN 7 ORG		P
	If markings on the rear are used, it will be as presented as Contact number and Li, Lo, and N.		P
	Control devices and luminaires that are intended for use with multiple contact designations, as shown in Table 1, may be marked with multiple Types separated by a slash, such as Type B1/B2. Any devices that are marked in this manner shall be suitable for use with the designated control types.	C1/C2	P
	Control Devices may be suitable for mounting to receptacle types other than their designated type without full function. This may be indicated by a marking on the device or in the provided installation instructions/documentation of the control device type and compatible luminaire types, along with any cautions, warnings, and limitations.		P
	Luminaires with receptacles may be suitable for accepting control device types other than their designated type without full function. This may be indicated by a marking on the luminaire or in the provided installation instructions/documentation of the luminaire and compatible control device types, along with any cautions, warnings, and limitations.		P

ANSI C136.41-2021

ANSI C136.41-2021			
Clause	Requirement + Test	Result - Remark	Verdict

6.1	TABLE: Plug Dimensions			
Location	1st Sample	2nd Sample	3rd Sample	Limit (mm)
A	—	—	—	0.127 MAX
B	—	—	—	1.016MIN
C	—	—	—	5.944 ± 0.127
D	—	—	—	Ø 3.175 ± 0.127
E	—	—	—	0.381 ± 0.127
F	—	—	—	4.826 ± 0.127
G	—	—	—	15.875 ± 0.127
H	—	—	—	6.833MIN., 7.112MAX
I	—	—	—	Ø 3.175 ± 0.127
J	—	—	—	4.825 ± 0.127
K	—	—	—	6.833MIN., 7.112MAX
L	—	—	—	18.237 ± 0.127
M	—	—	—	0.381 ± 0.127
N	—	—	—	1.524 ± 0.127
U	—	—	—	8.712 ± 0.127
V	—	—	—	82°MAX
W	—	—	—	60°MAX
O	—	—	—	60°MAX
P	—	—	—	37°MIN
Q	—	—	—	25°MIN
R	—	—	—	25°MIN





ANSI C136.41-2021

Clause	Requirement + Test	Result - Remark	Verdict
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6.2	TABLE: Receptacle Dimensions for model LT635				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.314	6.359	6.391	6.350 ± 0.127	
B	0.657	0.693	0.614	0.635 ± 0.127	
C	Ø 2.314	Ø 2.357	Ø 2.381	Ø2.362 ± 0.127	
D	6.394	6.516	6.612	6.223MIN., 6.706MAX.	
E	8.713	8.759	8.764	8.712 ± 0.127	
F	2.058	2.112	2.145	1.905 TO 2.286	
G	18.1°	18.2°	17.9°	18° ± 0.5°	
H	55°	54°	56°	33°MIN	
I	48°	50°	51°	70°MAX	
J	18.2°	18.1°	18.3°	18° ± 0.5°	
K	55°	53°	54°	33°MIN.	
L	46°	47°	45°	70°MAX.	
M	18.2°	18.1°	18.3°	18° ± 0.5°	
N	35.1°	35.2°	35.3°	35° ± 0.5°	
O	76°	78°	77°	45°MIN.	
P	71°	73°	72°	95°MAX.	
Q	123.9°	124.1°	124.2°	124° ± 0.5°	
R	126.1°	125.9°	126.2°	126° ± 0.5°	
T	23.962	24.076	24.029	15.875MIN	
U	2.054	2.143	2.123	2.362(+0.000,-0.787)	
V	10.174	10.569	11.123	6.350 MIN	
W	64.531	65.156	65.293	66.675(+0.000,-3.175)	
X	39.415	40.192	40.313	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	3.02	3.04	3.06	2.79 MIN.	
AA	23.0°	23.2°	29.7°	22°MIN.	
BB	46.7°	46.5°	46.9°	48°MAX.	
CC	74.9°	74.2°	74.6°	75° ± 0.5°	
DD	104.9°	105.2°	105.1°	105° ± 0.5°	
EE	Ø 36.64	Ø 36.60	Ø 36.70	Ø36.58 ± 0.127	

6.2	TABLE: Receptacle Dimensions for model LT605				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.394	6.315	6.351	6.350 ± 0.127	
B	0.615	0.663	0.638	0.635 ± 0.127	
C	Ø 2.353	Ø 2.315	Ø 2.364	Ø2.362 ± 0.127	
D	6.431	6.513	6.553	6.223MIN., 6.706MAX.	
E	8.723	8.757	8.794	8.712 ± 0.127	
F	1.989	2.057	2.113	1.905 TO 2.286	
G	18.2°	18.1°	17.8°	18° ± 0.5°	
H	55°	54°	55°	33°MIN	
I	48°	49°	50°	70°MAX	
J	18.2°	18.1°	18.1°	18° ± 0.5°	
K	54°	53°	55°	33°MIN.	
L	48°	47°	49°	70°MAX.	
M	18.1°	18.3°	18.2°	18° ± 0.5°	



ANSI C136.41-2021

Clause	Requirement + Test			Result - Remark	Verdict
N	35.2°	35.1°	35.3°	35°± 0.5°	
O	67°	66°	68°	45°MIN.	
P	75°	77°	76°	95°MAX.	
Q	123.9°	124.1°	124.2°	124°± 0.5°	
R	126.1°	125.8°	126.2°	126°± 0.5°	
T	23.658	24.138	24.579	15.875MIN	
U	2.056	2.113	2.014	2.362(+0.000,-0.787)	
V	10.147	10.321	10.238	6.350 MIN	
W	64.973	65.145	65.394	66.675(+0.000,-3.175)	
X	35.152	36.145	36.313	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	3.10	2.98	3.06	2.79 MIN.	
AA	29.8°	30.1°	30.0°	22°MIN.	
BB	45.9°	46.2°	45.6°	48°MAX.	
CC	75.1°	74.8°	75.1°	75°± 0.5°	
DD	104.7°	105.2°	104.9°	105°± 0.5°	
EE	Ø 36.56	Ø 36.70	Ø 36.63	Ø36.58 ± 0.127	

6.2	TABLE: Receptacle Dimensions for model LT605R				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.315	6.373	6.394	6.350 ± 0.127	
B	0.613	0.665	0.691	0.635 ± 0.127	
C	Ø 2.323	Ø 2.379	Ø 2.353	Ø2.362 ± 0.127	
D	6.483	6.574	6.493	6.223MIN., 6.706MAX.	
E	8.757	8.713	8.798	8.712 ± 0.127	
F	2.035	2.118	2.081	1.905 TO 2.286	
G	18.1°	18.3°	18.2°	18°± 0.5°	
H	50°	49°	51°	33°MIN	
I	51°	53°	52°	70°MAX	
J	18.2°	18.3°	18.1°	18°± 0.5°	
K	55°	54°	56°	33°MIN.	
L	49°	51°	50°	70°MAX.	
M	18.1°	18.2°	18.3°	18°± 0.5°	
N	35.3°	34.9°	35.2°	35°± 0.5°	
O	56°	55°	75°	45°MIN.	
P	77°	75°	76°	95°MAX.	
Q	124.1°	123.9°	124.2°	124°± 0.5°	
R	126.2°	126.3°	126.1°	126°± 0.5°	
T	23.163	24.578	24.163	15.875MIN	
U	1.945	2.157	2.113	2.362(+0.000,-0.787)	
V	11.437	11.949	12.105	6.350 MIN	
W	64.512	65.137	64.981	66.675(+0.000,-3.175)	
X	37.124	38.279	39.513	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	3.01	2.99	3.00	2.79 MIN.	
AA	27.8°	28.2°	27.70°	22°MIN.	
BB	46.7°	46.29°	45.8°	48°MAX.	
CC	74.9°	75.1°	74.6°	75°± 0.5°	
DD	104.8°	105.2°	104.9°	105°± 0.5°	



ANSI C136.41-2021

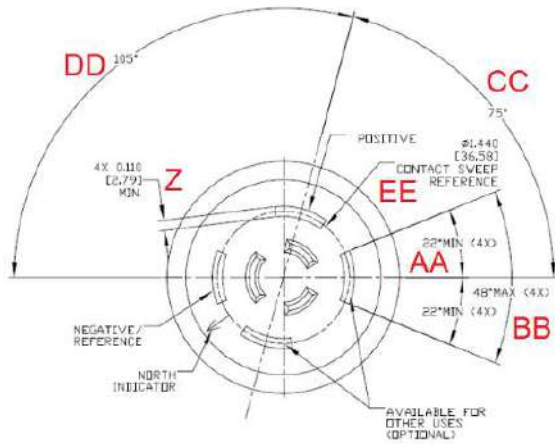
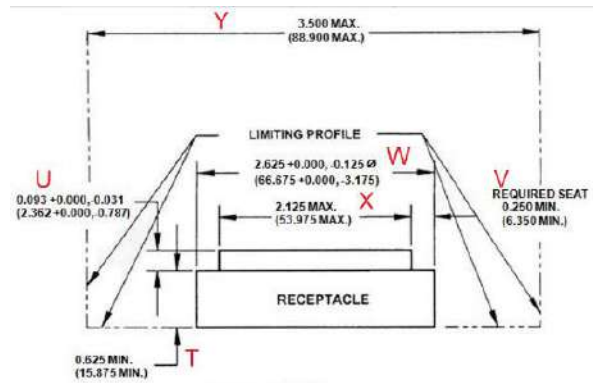
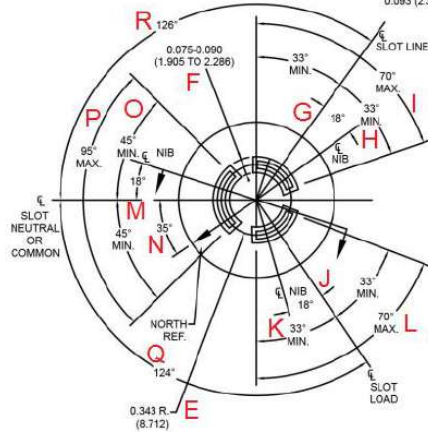
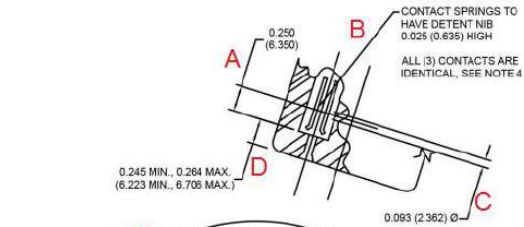
Clause	Requirement + Test	Result - Remark	Verdict
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EE	Ø 36.64	Ø 36.55	Ø 36.59	Ø36.58 ± 0.127
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6.2	TABLE: Receptacle Dimensions for model LT605 (PBT)				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.30	6.29	6.31	6.350 ± 0.127	
B	0.61	0.62	0.62	0.635 ± 0.127	
C	Ø 2.28	Ø 2.30	Ø 2.31	Ø2.362 ± 0.127	
D	6.41	6.38	6.44	6.223MIN., 6.706MAX.	
E	8.72	8.70	8.75	8.712 ± 0.127	
F	2.11	2.14	2.06	1.905 TO 2.286	
G	17.9°	17.8°	18.1°	18°± 0.5°	
H	52°	54°	53°	33°MIN	
I	51°	53°	51°	70°MAX	
J	18.1°	17.9°	18.3°	18°± 0.5°	
K	53°	51°	54°	33°MIN.	
L	47°	45°	45°	70°MAX.	
M	18.1°	18.1°	18.0°	18°± 0.5°	
N	35.2°	35.1°	35.0°	35°± 0.5°	
O	72°	72°	74°	45°MIN.	
P	73°	71°	72°	95°MAX.	
Q	123.8°	124.1°	124.4°	124°± 0.5°	
R	125.7°	125.8°	125.6°	126°± 0.5°	
T	24.12	23.95	23.93	15.875MIN	
U	2.19	2.25	2.17	2.362(+0.000,-0.787)	
V	10.91	11.2	10.95	6.350 MIN	
W	65.03	65.09	64.84	66.675(+0.000,-3.175)	
X	40.17	40.04	39.95	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	3.08	3.02	3.04	2.79 MIN.	
AA	23.8°	24.1°	23.7°	22°MIN.	
BB	46.3°	46.5°	46.0°	48°MAX.	
CC	74.5°	74.8°	75.1°	75°± 0.5°	
DD	104.8°	104.6°	105.1°	105°± 0.5°	
EE	Ø 35.65	Ø 36.67	Ø 36.63	Ø36.58 ± 0.127	



Clause	Requirement + Test	Result - Remark	Verdict
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ANSI C136.41-2021

Clause	Requirement + Test	Result - Remark	Verdict
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	Critical components	P
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Object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Line/Load/ Neutral/ Dimming contact point	ZHEJIANG LEAD TOP ELECTRICAL CO.,L TD	LT605, LT605R, LT635	Line/Load/Neutral contact point 1.5mm thick Copper nickel alloy; Dimming contact point 0.25mm thick, Copper nickel alloy gold plating, ASTM B488 -11 Type II, Class 0.75	ANSI C136.10 ANSI C136.41	Tested with appliance
Plastic enclosure-black	SHANGHAI EUROPEAN-ASIAN SYNTHETIC MATERIAL CO LTD	EA-5555Je	V-0,150°C	UL 94	UL E176036
Dimming wire leads	ZHEJIANG XINXIN ELECTRONIC WIRE ROD CO LTD	1015	18 AWG,600 V 105°C	UL 758	UL E225383
Line/Load/ Neutral/ wire leads	ZHEJIANG XINXIN ELECTRONIC WIRE ROD CO LTD	1015	14 AWG,600 V 105°C	UL 758	UL E225383



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
4	<i>Mechanical Requirements</i>		P
4.1	Receptacle Type		P
	The receptacle shall be of the 3 conductors or multi-conductor locking type.		P
	For 3 conductor varieties, its configuration, contacts, and limiting dimensions shall be in accordance with Figure 1.	See table 4.1	P
	For configuration, contacts, and limiting dimensions of multi-conductor receptacles refer to ANSI C136.41.		P
4.2	Receptacle Dimensions		P
	The receptacle shall be so designed that, when installed on a luminaire or other equipment, its configuration and limiting dimensions will be in accordance with Figure 2(b).	See table 4.2	P
4.3	Receptacle Orientation		P
	When mounted on a luminaire, the receptacle shall be designed and mounted so that it can be turned 350 degrees, but no more than 360 degrees, and securely positioned at an angular adjustment with ± 15 degrees.		P
	The means for adjusting orientation shall be externally accessible.		P
	Upward sensing controls do not require rotating receptacles.		P
4.4	Receptacle Mounting		P
	With the luminaire mounted as intended, the seat between the receptacle and the photocontrol shall be mounted as close to horizontal as possible.		P
	Maximum deviation from the horizontal is 45 degrees.		P
4.5	Plug Type		N/A
	The plug used in the photocontrol, shorting cap, or open cap shall be of the 3 conductor or multiconductor, locking type.		N/A
	For 3 conductor varieties, its configuration, blades, and limiting dimensions shall be in accordance with Figure 3.		N/A
	Blades shall be within ± 5 degrees from vertical.		N/A
	For configuration, contacts, and limiting dimensions of multi-conductor receptacles refer to ANSI C136.41.		N/A
4.6	Sealing		N/A
	A sealing means shall be provided as part of the photocontrol, shorting cap, or open cap to form a rain tight seal on the "required seat" of the receptacle. The "required seat" of the receptacle, shown in Figure 2(b), shall be a smooth flat surface.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	With the photocontrol, shorting cap, or open cap installed in its locking position, the sealing means shall not encroach on the area within the limiting profile of the mounting shown in Figure 2(b).		N/A
	No obstructions or projections other than the electrical contacts and sealing means shall project below the limiting profile shown in Figure 2(a).		N/A
	The configuration and limiting dimensions of the device shall be in accordance with Figure 2(a).		N/A
	A rain tight seal is determined by compliance with test specified in Clause 6.3		N/A
4.7	Shorting and Open Caps		N/A
	The contour of the shorting or open cap housing shall be as shown in Figure 4. If the overall dimension "A" is equal to or less than 1.0 in. (25.4 mm), then the upper portion of the housing may be eliminated.		N/A
	Thus, dimension "B" will be the overall height.		N/A
4.8	Flammability		N/A
	A polymeric enclosure of a photocontrol, shorting cap or open cap shall have a minimum flammability rating of UL 94 HB.		N/A
4.9	Ingress Protection		N/A
	The enclosure of a photocontrol, shorting cap, or open cap shall have an ingress protection rating of IP 53per ANSI C136.25 that should be maintained for the rated life of the product.		N/A
4.10	Plug-Receptacle Interface Temperature		N/A
	The photocontrol, shorting cap, or open cap shall not deform when the maximum plug-receptacle interface temperature is 90°C for four hours.		N/A
4.11	Low-Temperature Impact		N/A
	A polymeric enclosure of a photocontrol, shorting cap, or open cap shall be capable of withstanding exposure to low temperature.		N/A
	This capability is tested by exposing a complete device to the conditioning described in 4.11.1 and the impact test described in 4.11.2.		N/A
4.11.1	Conditioning		N/A
	The test sample shall be acclimated to an ambient temperature of -29.0°C ±1.0°C for 24 hours minimum.		N/A
	Within 10 seconds of removal from the cold chamber, the device is to be mounted into a receptacle and subjected to the impact test of 4.11.2.		N/A
4.11.2	Impact Test		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	An impact of a minimum of 1 ft.-lb. (1.36 N-m) shall be applied to external surfaces, excluding the vertically mounted window, by means of a solid, smooth, steel sphere, weighing 1.2 lbs. (0.54 kg), 2 in. (50.8 mm) in diameter, dropped from 10 in. (0.254 m).		N/A
	The photocontrol, shorting cap, or open cap shall meet all the requirements of this document after being subjected to the impact test.		N/A
5	Electrical Requirements		P
5.1	Insulation Voltage Classification		P
	Insulating materials of the receptacle and plug shall be rated 600 volts, as defined in ANSI C136.2.		P
5.2	Receptacle Heat-Cycle Test		P
5.2.1	Setup		P
	The temperature on the line or load receptacle contact shall be measured by means of a thermocouple attached to the outside surface of the inner blade opposite the detent of the receptacle contact.		P
	The receptacle shall be securely mounted in a horizontal position on an aluminum plate that has a minimum area of 6 in.2(38.7 cm2), 1/8 in. (0.317 cm) thick.		P
	The test shall be performed at an ambient temperature of 25°C ±5°C.		P
5.2.2	Conditioning		P
	A shorting cap with brass blades shall be inserted, locked, and removed five times before starting the test.		P
5.2.3	Procedure		P
	The same shorting cap that was used in clause 5.2.2 shall be inserted and locked into the test receptacle.		P
	A minimum current of 15 A shall be applied to the line and load contacts of the test receptacle. The current shall be applied for 15 cycles, each consisting of a 20-hour "on" period and a 4-hour "off" period.		P
5.2.4	Pass/Fail Criteria		P
	The receptacle shall be considered to have failed if the temperature rise on the receptacle contacts at the end of any 20-hour period is greater than 30°C.	See table 5.2	P
5.3	Dielectric Withstand		N/A
	Photocontrols, shorting caps, or open caps shall meet the dielectric withstand requirements of C136.2.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	For multi-conductor photocontrols of the C136.41 variety, all electrical connections shall be considered "current carrying.		N/A
6	Environmental Requirements		P
6.1	Ambient Temperature Range		P
	Photocontrols, shorting caps, or open caps and receptacles shall operate over the ambient temperature range of -40°C to 65°C		P
6.2	Temperature Test		N/A
	With receptacle mounted to a test plate as defined in Clause 5.2.1, in a draft free room set at the highest rated ambient temperature.		N/A
	The photocontrol, shorting cap, or open cap, is to be operated at its rated load, voltage and frequency until steady state temperatures are attained.		N/A
	The temperature rise of any component shall not alter or render inoperative any material or component part.		N/A
6.3	Environmental Tests		N/A
	The photocontrol, shorting cap, or open cap, when properly installed in its receptacle mounting, shall pass the environmental tests as described in clauses 6.3.1, 6.3.2, 6.3.3, and 6.3.4.		N/A
6.3.1	Humidity Test		N/A
	The assembly of the photocontrol, shorting cap, or open cap and receptacle shall be exposed to 96% $\pm$ 2% relative humidity at 50°C $\pm$ 2°C for 168 hours when operating at rated voltage and load.		N/A
	The photocontrol shall be cycled on for 12 hours and off for 12 hours for the duration of the test. Within 1 minute of its removal from the humidity chamber, the assembly shall be subjected to the dielectric voltage withstand requirements described in clause 5.3.		N/A
	Within 10 minutes after the removal from the humidity chamber, the photocontrol shall meet the light level requirements of clause 10.1.		N/A
6.3.2	Rain Test		N/A
	The assembly of the photocontrol, shorting cap, or open cap and receptacle shall be subjected to the rain tightness test described in UL 773.		N/A
	Within 5 minutes after completion of the rain test, the device shall be tested and shall meet the dielectric voltage withstand requirements of clauses 5.3 and the operational requirements of section 10.		N/A
	Furthermore, the sealing requirements of clause 4.6 shall be validated.		N/A
6.3.3	Weathering Test		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	All components of the housing assembly of the photocontrol, shorting cap, or open cap shall be subjected to a closed environmental UVB chamber in accordance to ASTM G154-12a.		N/A
	The test specimens shall be positioned on the platform so that they are exposed directly to the arc tube of the lamp.		N/A
	The specimens shall be located between 4 inches and 8 inches away from the lamp.		N/A
	A typical exposure cycle includes 8 hours of UV exposure at 50°C ±2°C followed by a 4 hour condensation period at 40°C ±2°C.		N/A
	Exposure periods shall be 504 hours (21 days) for a standard life photocontrol and 1,008 hours (42 days) for a long life photocontrol. Following exposure, the samples shall meet the requirements of the impact test described in 4.11.2 (at 25°C ±2°C) and the light level requirements of clause 10.1.		N/A
6.3.4	Salt Spray (Fog) Test		N/A
	The assembly of the photocontrol, shorting cap, or open cap and receptacle shall be subjected to a fine mist of salt solution, per ASTM B117-11 standard.		N/A
	The test chamber shall be held at 35°C for the duration of the test.		N/A
	The specimens shall be supported or suspended between 15 and 30 degrees from the vertical and preferable parallel to the principal direction of horizontal flow of fog through the chamber.		N/A
	Exposure periods are 240 hours (10 days) for a standard life photocontrol and 480 hours (20 days) for a long life photocontrol.		N/A
	Following the exposure, external surfaces may be cleaned per ASTM B117-11 and then allowed to dry in a 40% ±5% relative humidity at 25°C ±5°C environment for no more than 2 hours.		N/A
	Immediately following the dry time, test specimens shall be tested for operation and shall meet the requirements of clauses 5.3 and 10.1.		N/A
7	Surge Performance Requirements		N/A
7.1	Photocontrol, Shorting Cap, and Open Cap		
	When surge protection is provided, the photocontrol, shorting cap, or open cap shall withstand the combination wave test as outlined in ANSI C136.2 with the clarifications noted in Table 1 of this standard.		N/A
	The device shall be tested according to the design life classification of the device per section 9.2.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	Unless otherwise specified, surge protection for shorting and open caps shall be designed to operate at 120V, 208V, 240V, 277V, and 480V line voltages.		N/A
7.2	Pass/Fail Criteria		N/A
	Damage that results in a photocontrol, shorting cap, or open cap not meeting the test requirements specified in clauses 5.3 and 6.3.2 shall indicate a failure of the device.		N/A
	Additionally, damage that results in a photocontrol not meeting the operating requirements specified in clause 10 shall indicate a failure of the device.		N/A
8	<i>Marking and Color Coding</i>		P
8.1	Marking		N/A
	The photocontrol enclosure should be color coded in accordance with clause 8.3 and shall be clearly and permanently marked with its voltage rating, load ratings, north orientation, rotation of installation and removal, the name of the manufacturer, and the model number.		N/A
	The color coding of the photocontrol enclosure shall be permanent for the life of the control.		N/A
	North orientation marking is not required on upward sensing type photocontrols.		N/A
8.2	Receptacle Marking		P
	The rotatable receptacle or adjustment assembly shall be permanently marked with a north reference mark indicated by an arrow and "N" or "NORTH" in the position as shown in Figure 2.		P
8.3	Photocontrol Color Coding		N/A
	Table 2 includes photocontrol color coding by voltage rating and operating voltage and represents recommended color coding designations.		N/A
	This table is supplied for historic reference.		N/A
	Alternate photocontrol cover colors may be specified by the end user		N/A
8.4	Shorting and Open Cap Color coding		N/A
	Shorting caps shall be color coded black.		N/A
	Open caps shall be color coded red.		N/A
9	<i>Ratings</i>		N/A
9.1	Load Ratings		N/A
	The photocontrol shall have a minimum load rating of both 1,000 watts incandescent lamp load and 1,800 VA magnetic ballasted load.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	Photocontrols rated for electronic loads do not have a minimum required electronic load rating but shall be tested according to the procedure described in section 11.7 to validate the claimed rating (in Amperes).		N/A
9.2	Design Life Classification		N/A
	Photocontrols, shorting caps, or open caps shall be classified based on their ability to pass the performance requirements of this document.		N/A
	Literature shall include the design life classification "Standard Life" or "Long Life."		N/A
	Long Life photocontrols, shorting caps, and open caps shall meet the Long Life requirements specified in clauses 6.3.3, 6.3.4, and 7.1.		N/A
	Long life photocontrols shall also meet the Long Life requirements in clauses 11.4, 11.5, 11.6.		N/A
	For electronic load rated devices, clause 11.7 applies.		N/A
9.3	Luminaire System Protection		N/A
	Photocontrols, shorting caps, or open caps designated for luminaire system protection shall limit the maximum surge voltage to 3000 V _{PEAK} when tested at the rated surge level.		N/A
10	Operating Requirements		N/A
10.1	Photocontrol Calibration		N/A
	The photocontrol shall turn on within the limits of +100% (twice) and -50% (half) of its calibrated light level setting at rated voltage and frequency:		N/A
	Over a range of input voltages as indicated in clause 8.3 and an ambient temperature of 25°C ±5°C.		N/A
	Photocontrols designed to operate over several voltages shall operate within the above limits when operated at the upper voltage rating.		N/A
	a. Over a range of ambient temperatures from -40°C to 65°C with relative humidity up through 96% when operated at nominal voltage. Photocontrols designed to operate at 120/240 V, 208/240/277 V, or 120/208/240/277V shall operate within the above limits when operated at the upper voltage rating.		N/A
10.2	Light Levels		N/A
	Measurements and calibration for operating light levels shall be in accordance with the following clauses.		N/A
10.2.1	Mounting		N/A
	All measurements of operating light levels shall be based on the performance of photocontrols mounted fully exposed to the sky to within 5° of true horizon and shielded from artificial light.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	Photocontrols requiring north orientation shall be oriented to within 15° of true north.		N/A
	Operating light levels are defined in foot-candles of daylight illuminations as determined by measurements with a conventional color corrected photometer held in a vertical plane, facing within 15° of true north and within 5° of true horizon, and located within 1 ft. (0.305 m) vertically and 15 ft. (4.572 m) laterally of the photocontrol under test.		N/A
	All measurements shall be made to a precision of $\pm 15\%$. Instrument accuracy shall be maintained by proper calibration against filament lamp candlepower standards, traceable to the National Institute of Standards and Technology (NIST).		N/A
10.2.2	Measurements		N/A
	The nominal or rated operating light levels shall be determined by the average of measurements taken in accordance with 10.2.1 on at least three clear, cloudless days.		N/A
	The photocontrol shall be operated at rated voltage and frequency.		N/A
10.2.3	Illumination		N/A
	Measurement and/or adjustment of the photocontrol operating light levels under illumination shall be correlated to average performance under daylight illumination in accordance with 10.2.1 and 10.2.2.		N/A
10.3	Specifications		N/A
	Light levels shall be measured according to the procedure outlined in clause 10.2.1. Standard light levels commonly used are the following:		N/A
	The photocontrol is to be adjusted to turn on at 1.5 fc ± 0.5 fc (16.1 lux ± 5.4 lux) and a maximum turn-off at 6 fc (65 lux), as measured in accordance with clause 10.2.3; or		N/A
	For areas with average night pavement illumination greater than 1.0 fc (10.8 lux), a north facing photocontrol should turn on at 1.6 times the average design pavement illumination with the turn-off not to exceed three times the turn-on light level; or		N/A
	As specified by the user.		N/A
11	Load Test Procedures		N/A
11.1	Load Test Supply		N/A
	The load test supply shall be capable of providing an instantaneous inrush current per Table 3.		N/A
	If the electronic load test of clause 11.7 is required, the source shall also provide minimum inrush currents per Table 5.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	Note: The supply voltage may dip during the inrush current pulse provided that the minimum inrush levels are still met.		N/A
11.2	Test Cycle		N/A
	The photocontrol shall be cycled at a rate no faster than 1 cycle in 4 minutes, as described, with the following time period: dark for 1.5 min., then maintained at 20 fc (215 lux) minimum for 2.5 min.		N/A
11.3	Continuous Current Load Test		N/A
	The photocontrol shall be tested for 4 hours with a continuous current load of 15 amps for devices rated from 120–277 volts and 5 amps for devices rated from 347–480 volts.		N/A
	The photocontrol shall be tested at an ambient temperature of 25°C ±5°C and a plug-receptacle interface temperature of 90°C ±5°C.		N/A
	This test shall be performed in a draft free environment.		N/A
	After the test, the control shall meet the requirements of clauses 6.3.1, 6.3.2, 7.1, 10.3, 11.4, 11.5, 11.6, and for electronic load rated devices, 11.7.		N/A
11.4	Incandescent Lamp Load Test		N/A
	The photocontrol shall be connected to a supply as described in clause 11.1.		N/A
	The lamp load shall be a single 1,000 watt, 120 volt tungsten filament lamp for photocontrols rated at 120 volts.		N/A
	For photocontrols rated at 208 volts, 240 volts, 277 volts, 347 volts, and/or 480 volts, a suitable series/parallel combination of tungsten filament lamps shall be used that provide a 1,000 watt load. Photocontrols rated for multiple voltages need only to be tested at the lowest and highest voltage rating.		N/A
	The photocontrol shall complete a minimum of 3,650 cycles as per clause 11.2 with no failure to transfer the load.		N/A
	Photocontrols classified as Long Life shall complete a minimum of 7,300 cycles as per clause 11.2 with no failure to transfer the load.		N/A
11.5	AC Capacitor Load		N/A
	The photocontrol shall be connected to a supply as described in clause 11.1.		N/A
	The AC capacitor load shall be in accordance with Table 4.		N/A
	The load capacitor shall be an oil-filled, film type with a parallel bleeding resistor sufficient to fully discharge the capacitor during the off cycle described in 11.2.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
	Photocontrols rated for multiple voltages need only to be tested at the lowest and highest voltage rating.		N/A
	The photocontrol shall complete a minimum of 3,650 cycles as per clause 11.2 with no failure to transfer the load.		N/A
	Photocontrols classified as Long Life shall complete a minimum of 7,300 cycles as per clause 11.2 with no failure to transfer the load.		N/A
11.6	Inductive Load		N/A
	The photocontrol shall be connected to a supply as described in clause 11.1.		N/A
	The inductive load shall be configured to provide a power factor of 0.4 to 0.6 and current sufficient to create the VA rating of the control at the rated voltage. Photocontrols rated for multiple voltages need only be tested at the lowest and highest voltage rating.		N/A
	The photocontrol shall complete a minimum of 3,650 cycles as per clause 11.2 with no failure to transfer the load. Photocontrols classified as Long Life shall complete a minimum of 7,300 cycles as per clause 11.2 with no failure to transfer the load.		N/A
11.7	Electronic Load		N/A
	The following load test is only required for photocontrols rated for electronic loads. The electronic load test circuit (see Figure 5 as a reference circuit) shall produce the peak current levels and pulse width in Table 5 as illustrated in Figure 6. Impedance, Z, is used in conjunction with capacitance, C, to create the required peak inrush current and current pulse width in Table 5 when the photocontrol is switched at peak line voltage. Resistance, R, should be sized to fully discharge capacitor C during the off cycle. Switch S1 can optionally be replaced with a short circuit. Otherwise, it is closed when the photocontrol is electrically open. A steady state load is not required by the test.		N/A
	Photocontrols classified as Standard Life shall complete a minimum of 3,650 cycles as per clause 11.2 with no failure to transfer the load.		N/A
	Photocontrols classified as Long Life shall complete a minimum of 7,300 cycles as per clause 11.2 with no failure to transfer the load.		N/A
	The cycle rate defined in section 11.2 may be increased to no faster than one every ten seconds while maintaining minimum inrush current and capacitor discharge requirements.		N/A
	Photocontrols rated at multiple voltages need only to be tested at the highest rated voltage and specified current rating.		N/A



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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4.1&4.2&5.6	TABLE: Receptacle and Sealing Dimensions for model LT635				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.412	6.398	6.324	6.350 ± 0.127	
B	0.671	0.684	0.629	0.635 ± 0.127	
C	Ø 2.331	Ø 2.316	Ø 2.374	Ø 2.362 ± 0.127	
D	6.378	6.543	6.513	6.223MIN., 6.706MAX.	
E	8.781	8.716	8.763	8.712 ± 0.127	
F	1.992	2.143	2.127	1.905 TO 2.286	
G	18.1°	18.3°	17.8°	18° ± 0.5°	
H	52°	56°	55°	33° MIN	
I	45°	48°	49°	70° MAX	
J	18.2°	17.9°	18.3°	18° ± 0.5°	
K	55°	54°	57°	33° MIN.	
L	48°	45°	49°	70° MAX.	
M	18.1°	17.8°	18.1°	18° ± 0.5°	
N	35.2°	34.9°	35.1°	35° ± 0.5°	
O	75°	77°	78°	45° MIN.	
P	71°	74°	72°	95° MAX.	
Q	124.1°	124.3°	123.9°	124° ± 0.5°	
R	126.2°	125.8°	126.1°	126° ± 0.5°	
T	18.35	18.31	18.34	15.875 MIN	
U	2.129	2.115	2.108	2.362(+0.000,-0.787)	
V	11.214	10.926	10.831	6.350 MIN	
W	65.135	64.951	65.843	66.675(+0.000,-3.175)	
X	41.541	42.913	41.841	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	—	—	—	69.850 MIN.	
AA	—	—	—	9.525 ± 3.175	
BB	—	—	—	6.350 MIN.	
CC	—	—	—	53.975 MIN.	
DD	—	—	—	3.277 TO 1.727	

4.1&4.2&5.6	TABLE: Receptacle and Sealing Dimensions for model LT605				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.358	6.318	6.395	6.350 ± 0.127	
B	0.618	0.681	0.653	0.635 ± 0.127	
C	Ø 2.361	Ø 2.315	Ø 2.376	Ø 2.362 ± 0.127	
D	6.473	6.521	6.612	6.223MIN., 6.706MAX.	
E	8.711	8.766	8.789	8.712 ± 0.127	
F	1.996	2.152	2.136	1.905 TO 2.286	
G	18.1°	18.2°	17.9°	18° ± 0.5°	
H	52°	55°	53°	33° MIN	
I	48°	50°	51°	70° MAX	
J	17.9°	18.1°	18.3°	18° ± 0.5°	
K	51°	50°	52°	33° MIN.	



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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L	49°	47°	48°	70° MAX.
M	18.2°	17.9°	18.1°	18° ± 0.5°
N	35.1°	35.3°	34.8°	35° ± 0.5°
O	67°	69°	66°	45° MIN.
P	73°	71°	72°	95° MAX.
Q	124.2°	124.1°	123.9°	124° ± 0.5°
R	126.1°	126.3	126.2°	126° ± 0.5°
T	16.94	16.92	16.95	15.875 MIN
U	2.105	2.184	1.983	2.362(+0.000,-0.787)
V	11.054	10.591	10.919	6.350 MIN
W	64.163	65.712	65.256	66.675(+0.000,-3.175)
X	31.129	33.635	32.315	53.975 MAX.
Y	—	—	—	88.900 MAX.
Z	—	—	—	69.850 MIN.
AA	—	—	—	9.525 ± 3.175
BB	—	—	—	6.350 MIN.
CC	—	—	—	53.975 MIN.
DD	—	—	—	3.277 TO 1.727

4.1&4.2&5.6	TABLE: Receptacle and Sealing Dimensions for model LT605R				P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)	
A	6.314	6.397	6.368	6.350 ± 0.127	
B	0.617	0.639	0.684	0.635 ± 0.127	
C	Ø 2.339	Ø 2.315	Ø 2.386	Ø2.362 ± 0.127	
D	6.413	6.537	6.594	6.223MIN., 6.706MAX.	
E	8.789	8.713	8.753	8.712 ± 0.127	
F	2.132	2.097	2.151	1.905 TO 2.286	
G	18.1°	17.8°	18.3°	18° ± 0.5°	
H	49°	53°	50°	33° MIN	
I	52°	53°	51°	70° MAX	
J	18.1°	17.9°	17.8°	18° ± 0.5°	
K	56°	55°	57°	33° MIN.	
L	48°	47°	49°	70° MAX.	
M	18.1°	18.3°	17.8°	18° ± 0.5°	
N	35.2°	34.9°	35.1°	35° ± 0.5°	
O	68°	67°	69°	45° MIN.	
P	76°	75°	74°	95° MAX.	
Q	124.1°	124.3°	123.9°	124° ± 0.5°	
R	126.1°	126.2°	125.9°	126° ± 0.5°	
T	16.62	16.59	16.66	15.875 MIN	
U	2.114	2.121	1.958	2.362(+0.000,-0.787)	
V	11.354	11.239	11.213	6.350 MIN	
W	63.981	65.512	64.313	66.675(+0.000,-3.175)	
X	33.156	34.653	33.574	53.975 MAX.	
Y	—	—	—	88.900 MAX.	
Z	—	—	—	69.850 MIN.	
AA	—	—	—	9.525 ± 3.175	
BB	—	—	—	6.350 MIN.	



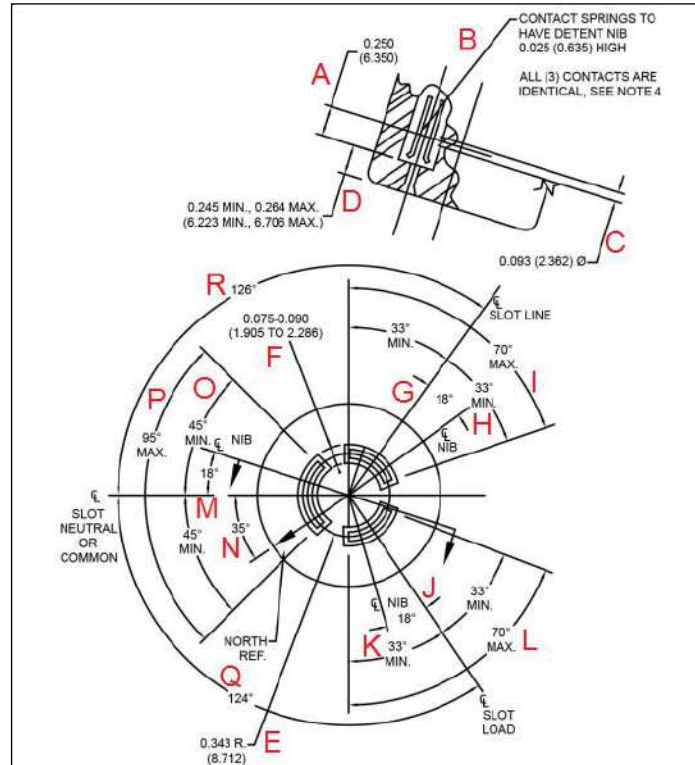
Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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CC	—	—	—	53.975 MIN.
DD	—	—	—	3.277 TO 1.727
4.1&4.2&5.6	TABLE: Receptacle and Sealing Dimensions for model LT605 (PBT)			P
Location	1 st Sample	2 nd Sample	3 rd Sample	Limit (mm)
A	6.42	6.44	6.43	6.350 ± 0.127
B	0.64	0.66	0.66	0.635 ± 0.127
C	Ø 2.34	Ø 2.36	Ø 2.39	Ø2.362 ± 0.127
D	6.42	6.51	6.48	6.223MIN., 6.706MAX.
E	8.69	8.71	8.70	8.712 ± 0.127
F	2.01	2.10	2.08	1.905 TO 2.286
G	18.2°	18.0°	17.9°	18° ± 0.5°
H	49.8°	49.4°	49.7°	33° MIN
I	46.0°	48.2°	48.0°	70° MAX
J	18.0°	17.9°	18.2°	18° ± 0.5°
K	54.1°	55.0°	54.7°	33° MIN.
L	47.1°	47.1°	48.2°	70° MAX.
M	18.1°	17.8°	18.1°	18° ± 0.5°
N	35.1°	34.2°	34.9°	35° ± 0.5°
O	71.4°	73.2°	72.8°	45° MIN.
P	73.4°	71.8°	72.6°	95° MAX.
Q	124.2°	124.8°	124.6°	124° ± 0.5°
R	125.9°	126.0°	126.1°	126° ± 0.5°
T	18.21	18.09	18.11	15.875 MIN
U	2.13	2.24	2.25	2.362(+0.000,-0.787)
V	10.29	10.32	10.19	6.350 MIN
W	64.95	64.84	65.02	66.675(+0.000,-3.175)
X	42.03	42.11	42.08	53.975 MAX.
Y	—	—	—	88.900 MAX.
Z	—	—	—	69.850 MIN.
AA	—	—	—	9.525 ± 3.175
BB	—	—	—	6.350 MIN.
CC	—	—	—	53.975 MIN.
DD	—	—	—	3.277 TO 1.727

Attachment No.1: ANSI C136.10-2017

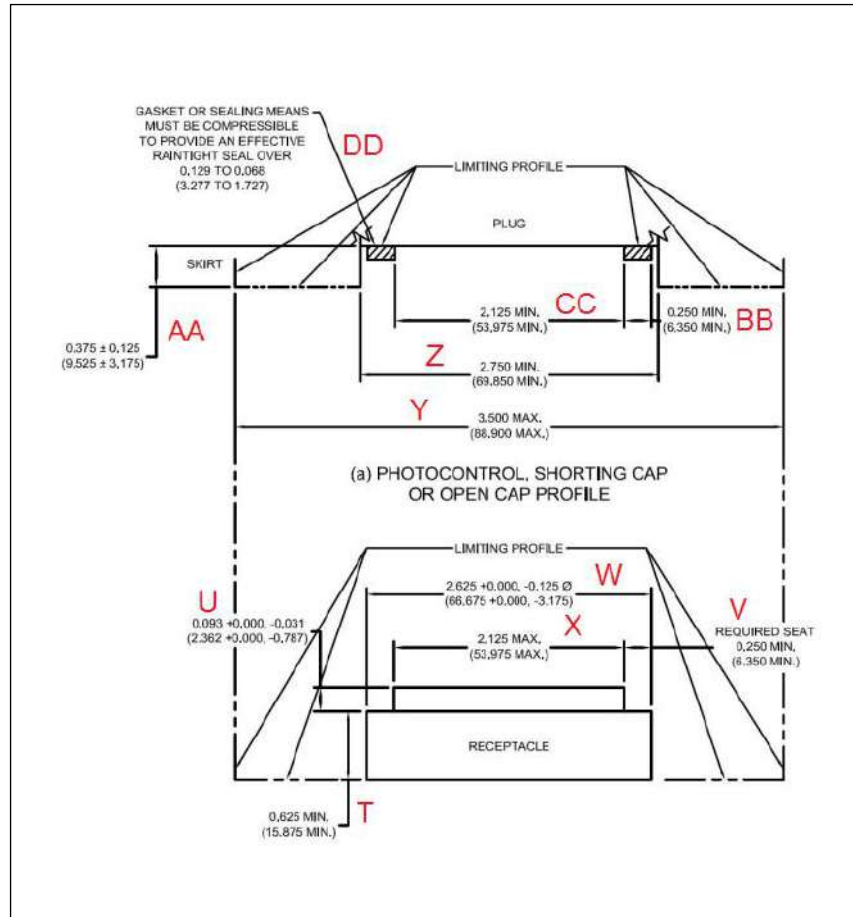
Clause	Requirement + Test	Result - Remark	Verdict
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Attachment No.1: ANSI C136.10-2017

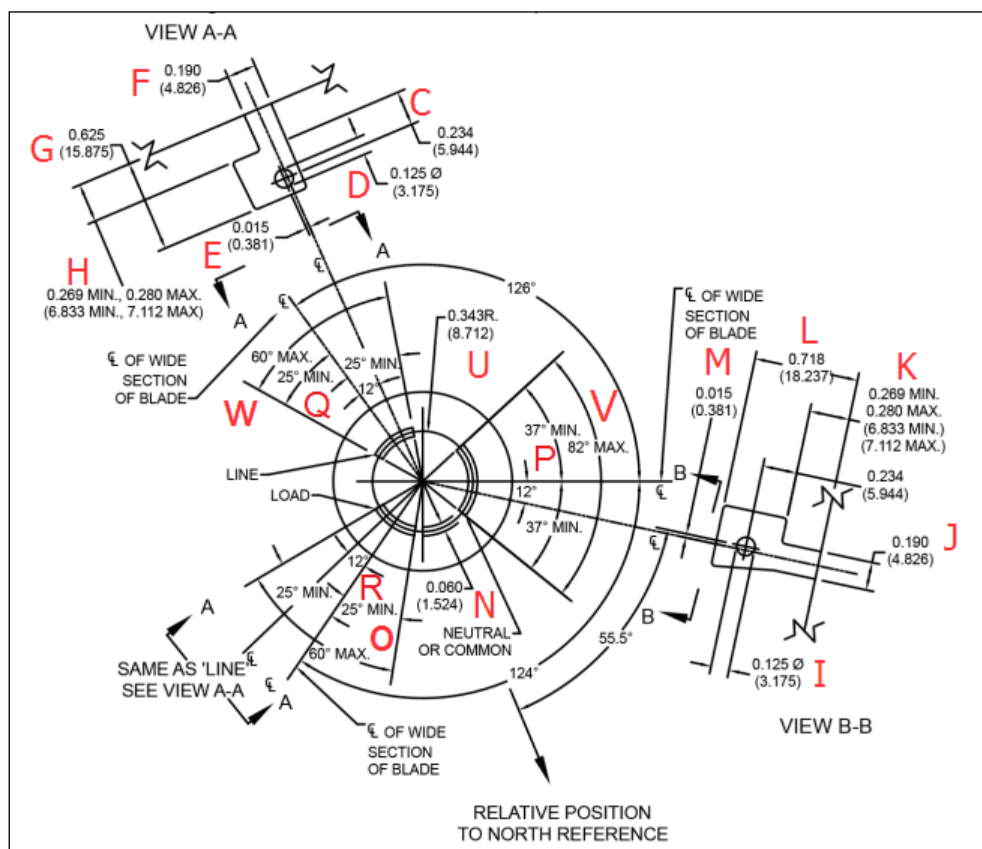
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Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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4.5	TABLE: Plug Dimensions				N/A
Location	1 st Sample	2 nd Sample	3 rd sample	Limit (mm)	
C	—	—	—	5.944 ± 0.127	
D	—	—	—	Ø 3.175 ± 0.127	
E	—	—	—	0.381 ± 0.127	
F	—	—	—	4.826 ± 0.127	
G	—	—	—	15.875 ± 0.127	
H	—	—	—	6.833MIN., 7.112MAX.	
I	—	—	—	Ø 3.175 ± 0.127	
J	—	—	—	4.825 ± 0.127	
K	—	—	—	6.833MIN., 7.112MAX.	
L	—	—	—	18.237 ± 0.127	
M	—	—	—	0.381 ± 0.127	
N	—	—	—	1.524 ± 0.127	
U	—	—	—	8.712 ± 0.127	
V	—	—	—	82° MAX.	
W	—	—	—	60° MAX.	
O	—	—	—	60° MAX.	
P	—	—	—	37° MIN.	
Q	—	—	—	25° MIN.	
R	—	—	—	25° MIN.	

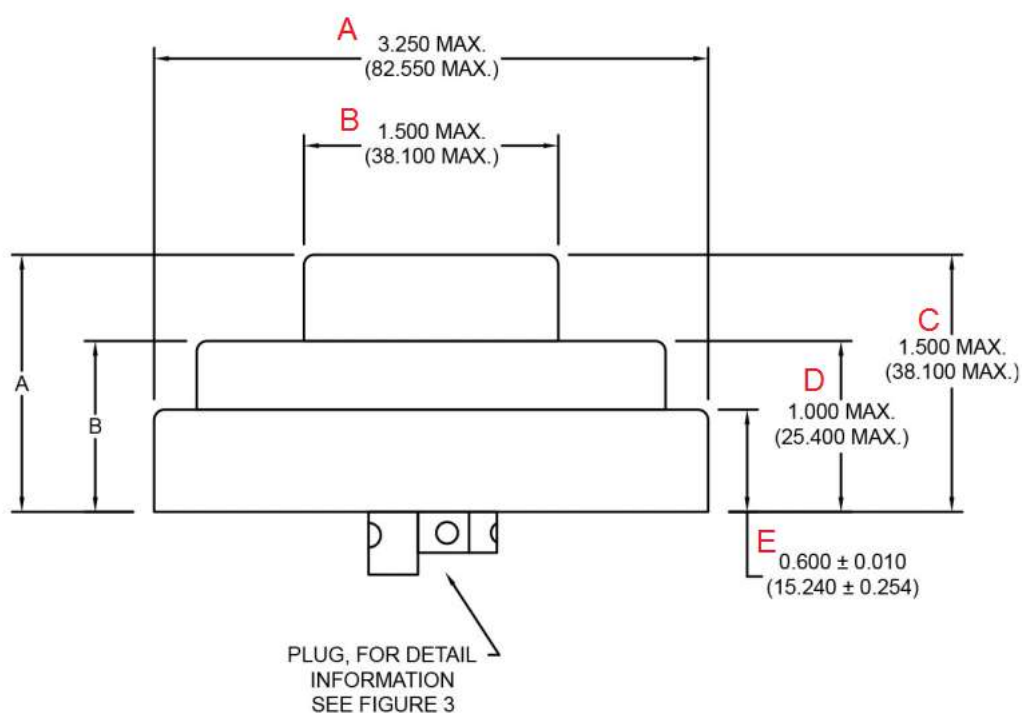




Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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4.7	TABLE: Shorting and Open Caps Dimensions				N/A
Location	1 st Sample	2 nd Sample	3 rd sample	Limit (mm)	
A	—	—	—	82.550 MAX.	
B	—	—	—	38.100 MAX.	
C	—	—	—	38.100 MAX.	
D	—	—	—	25.400 MAX.	
E	—	—	—	15.240 ± 0.254	





Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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5.2	TABLE: Receptacle temperature rise measurements (current of 15 A)			P
	Test current	15 A		—
	Test voltage	480V~		—
	Maximum temperature T of part / at	Max. measured temperature (°C)	Temperature rise(K)	Limit temperature rise (K)
	receptacle contacts / L	39.4	14.4	30
	receptacle contacts / N	46.1	21.1	30
	receptacle contacts / Load	39.6	14.6	30
	ambient	25.0	/	/

5.3	TABLE: Dielectric withstand			N/A
	Test voltage applied between:	Test voltage unit (Va.c)	Flashover / breakdown (Yes / No)	
	—	—	—	

4.10 & 6.2	TABLE: temperature rise measurements (rated voltage 120V and ambient 70 °C)			N/A
	Test power	—		—
	Test voltage	—		—
	Model:	—		—
	Maximum temperature T of part / at	Max. measured temperature (°C)		Limit temperature(°C)
		incandescent lamp	high-intensity discharge	
	—	—	—	—

4.10 & 6.2	TABLE: temperature rise measurements (rated voltage 208V and ambient 70 °C)			N/A
	Test power	—		—
	Test voltage	—		—
	Model:	—		—
	Maximum temperature T of part / at	Max. measured temperature (°C)		Limit temperature(°C)
		incandescent lamp	high-intensity discharge	
	—	—	—	—

4.10 & 6.2	TABLE: temperature rise measurements (rated voltage 240V and ambient 70 °C)			N/A
	Test power	—		—



Attachment No.1: ANSI C136.10-2017

Clause	Requirement + Test	Result - Remark	Verdict
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	Test voltage	—	—
	Model:	—	—
Maximum temperature T of part / at	Max. measured temperature (°C)		Limit temperature(°C)
	incandescent lamp	high-intensity discharge	
—	—	—	—

4.10 & 6.2	TABLE: temperature rise measurements (rated voltage 277V and ambient 70 °C)		N/A
	Test power	/	—
	Test voltage	/	—
	Model:	/	—
Maximum temperature T of part / at	Max. measured temperature (°C)		Limit temperature(°C)
	incandescent lamp	high-intensity discharge	
—	—	—	—

10	TABLE: lighting levels measurements (ambient 25 °C)		N/A
	Ambient lux value		
Test voltage	Turn on	Turn off	
—	—	—	
Supplementary information: When turn on mode, ambient luminance shall between 16Lux±6 Lux, turn off mode ambient luminance shall <65Lux.			

10	TABLE: lighting levels measurements(After the Humidity)		N/A
	Ambient lux value		
Test voltage	Turn on	Turn off	
—	—	—	
Supplementary information: When turn on mode, ambient luminance shall between 16Lux±6 Lux, turn off mode ambient luminance shall <65Lux.			

10	TABLE: lighting levels measurements(After the Rain)		N/A
	Ambient lux value		
Test voltage	Turn on	Turn off	
—	—	—	
Supplementary information: When turn on mode, ambient luminance shall between 16Lux±6 Lux, turn off mode ambient luminance shall <65Lux.			

10	TABLE: lighting levels measurements(After the Weathering)		N/A
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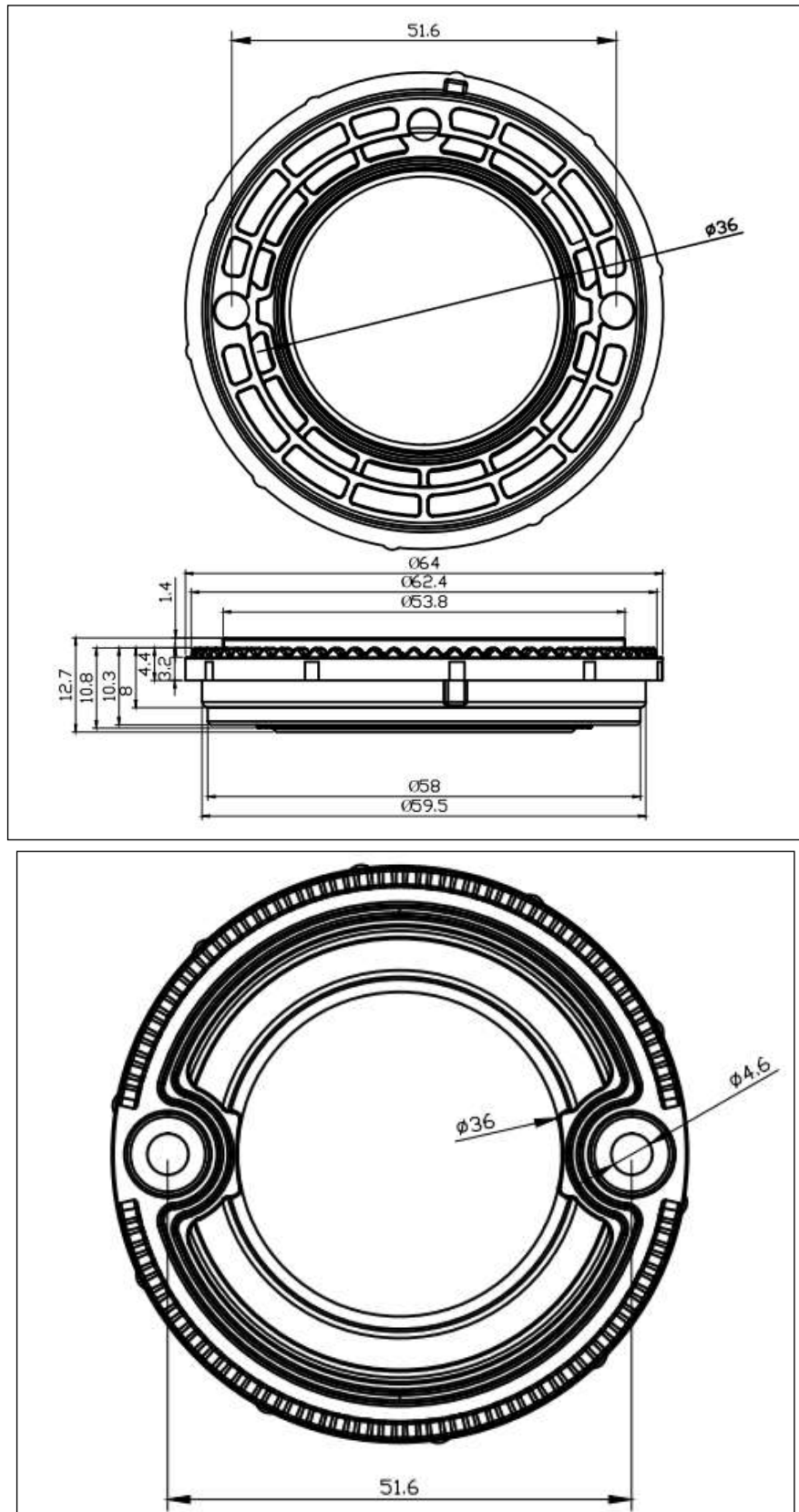


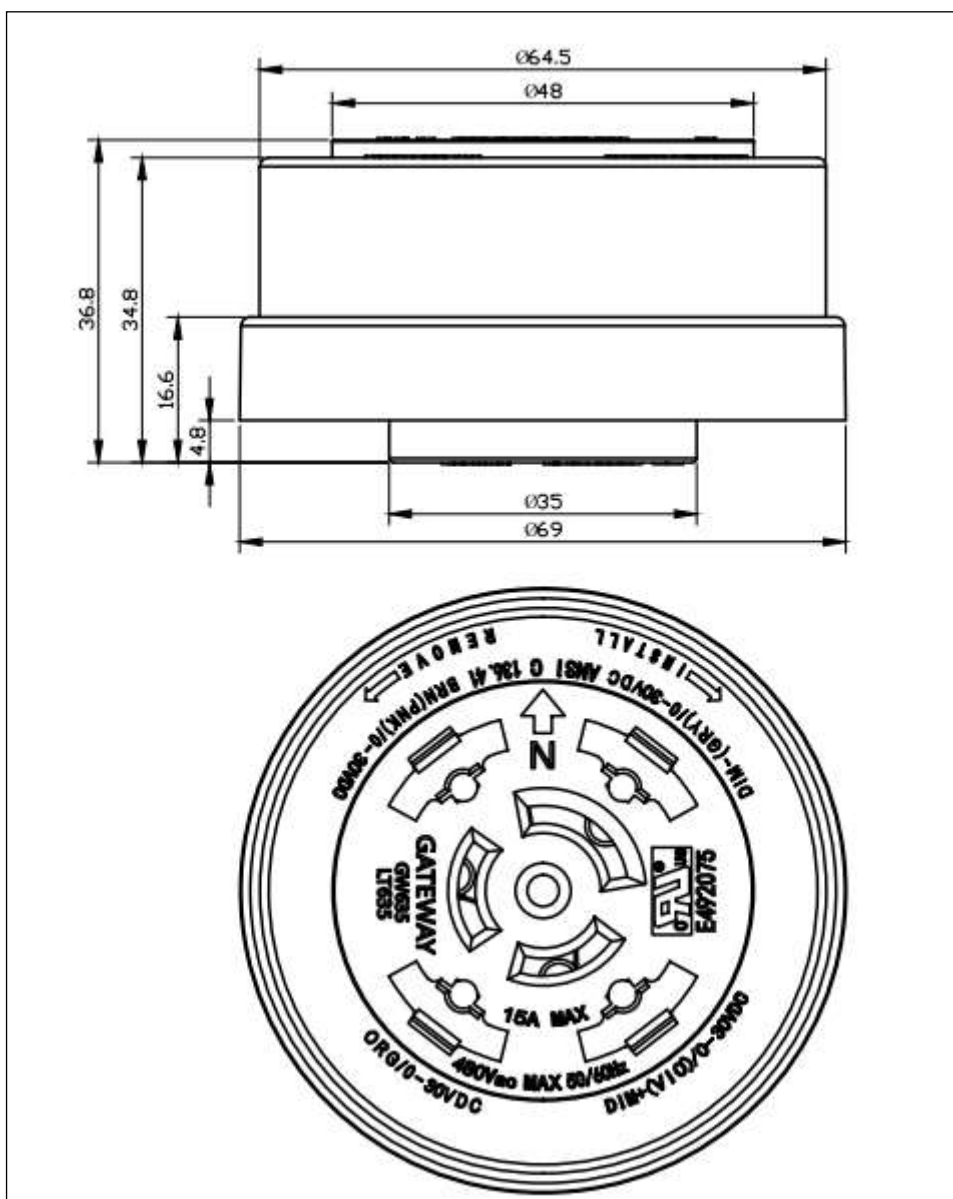
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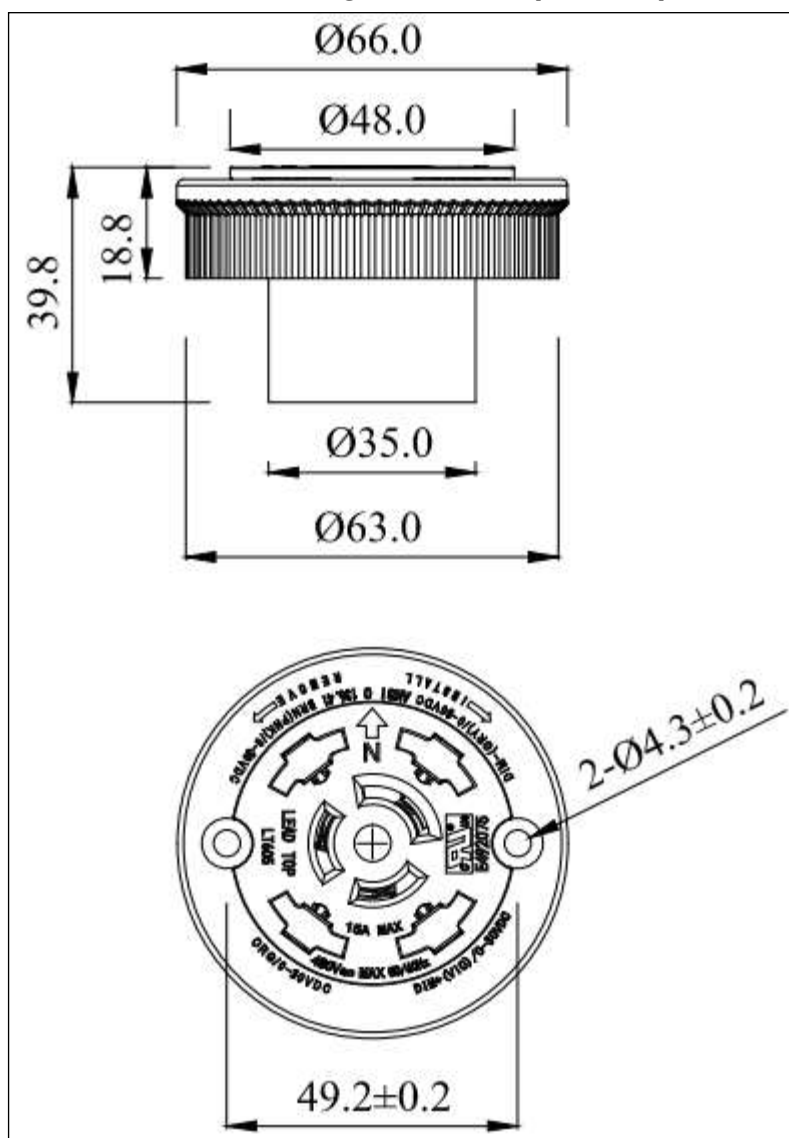
Clause	Requirement + Test	Result - Remark	Verdict
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	Ambient lux value	
Test voltage	Turn on	Turn off
—	—	—
Supplementary information: When turn on mode, ambient luminance shall between 16Lux $\pm$ 6 Lux, turn off mode ambient luminance shall <65Lux.		

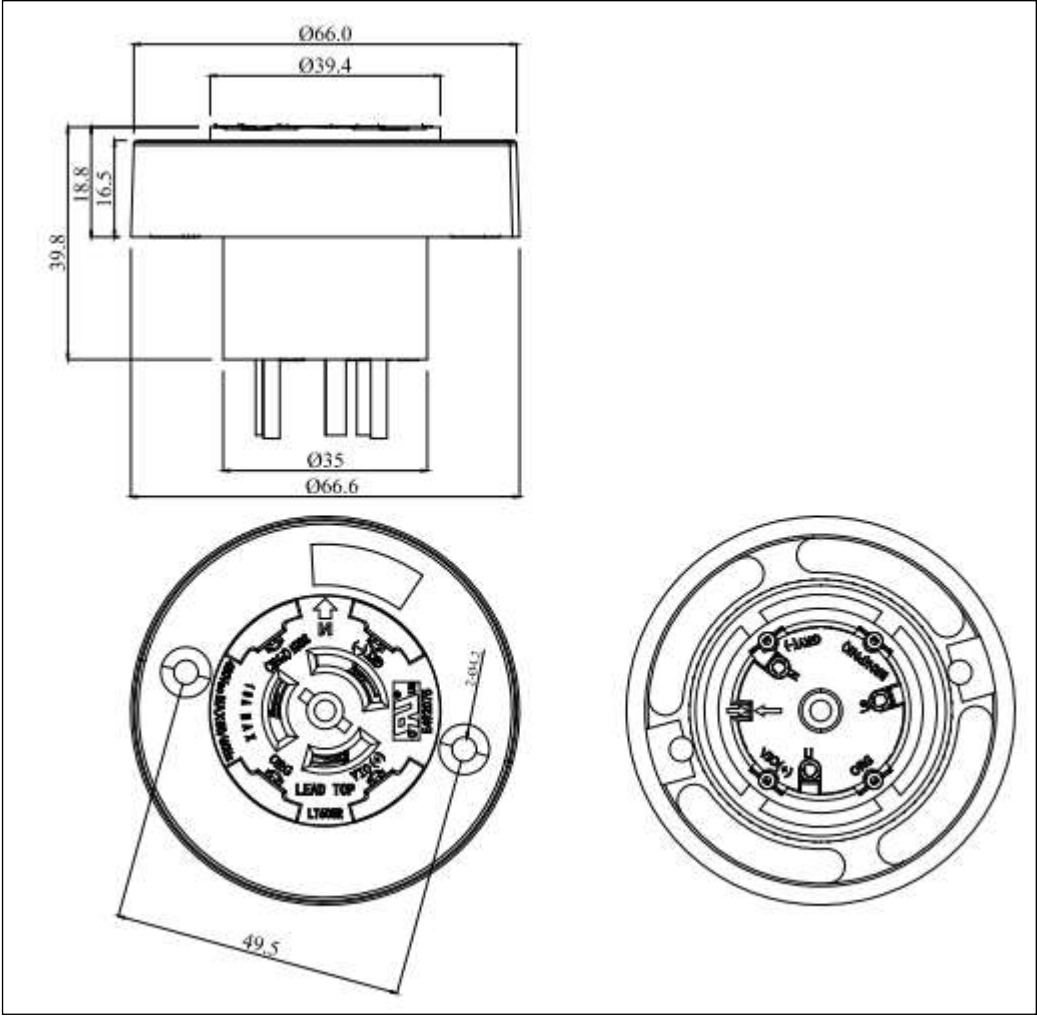
10	TABLE: lighting levels measurements(After the Salt Spray (Fog))	N/A
	Ambient lux value	
Test voltage	Turn on	Turn off
—	—	—
Supplementary information: When turn on mode, ambient luminance shall between 16Lux $\pm$ 6 Lux, turn off mode ambient luminance shall <65Lux.		

Attachment 2 Dimension figure of Receptacles (model LT635)

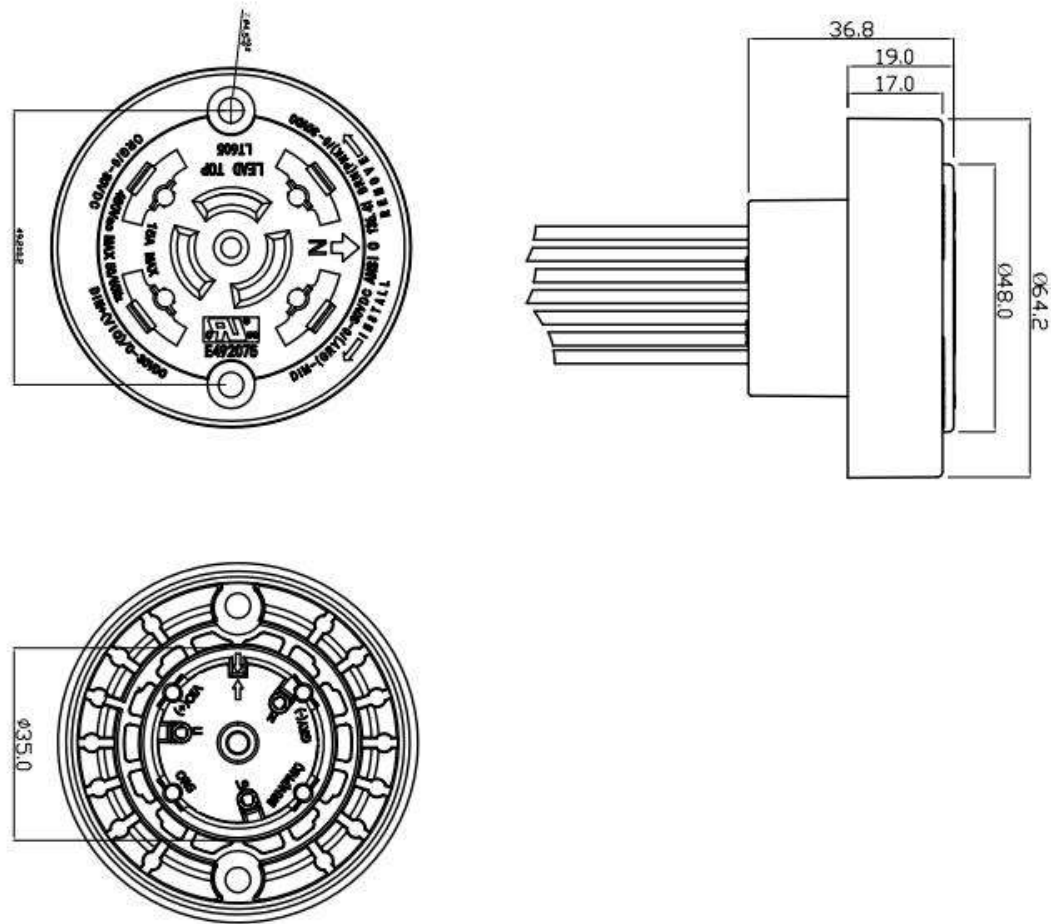


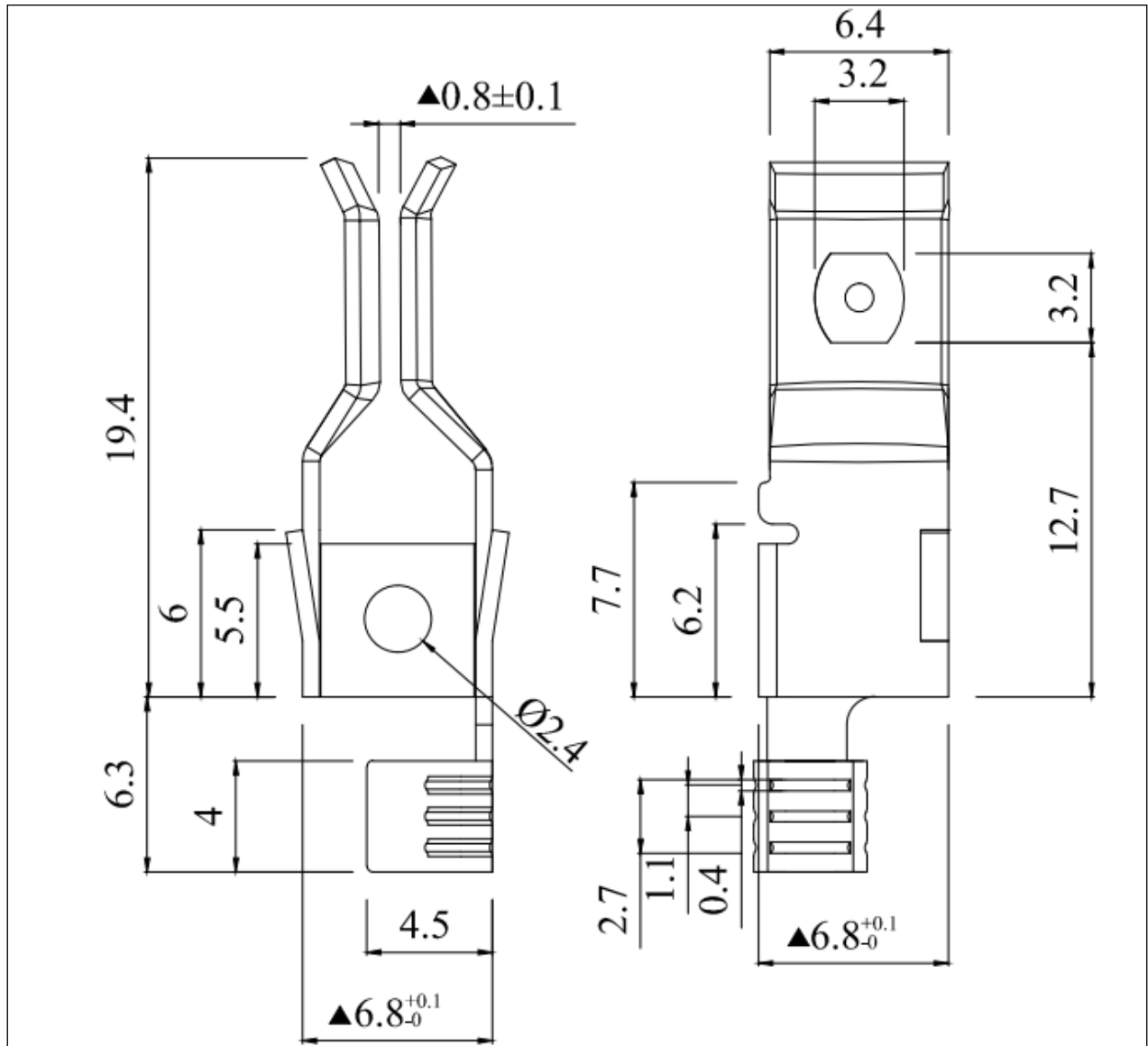


Attachment 6 Dimension figure of Receptacles (model LT605R)

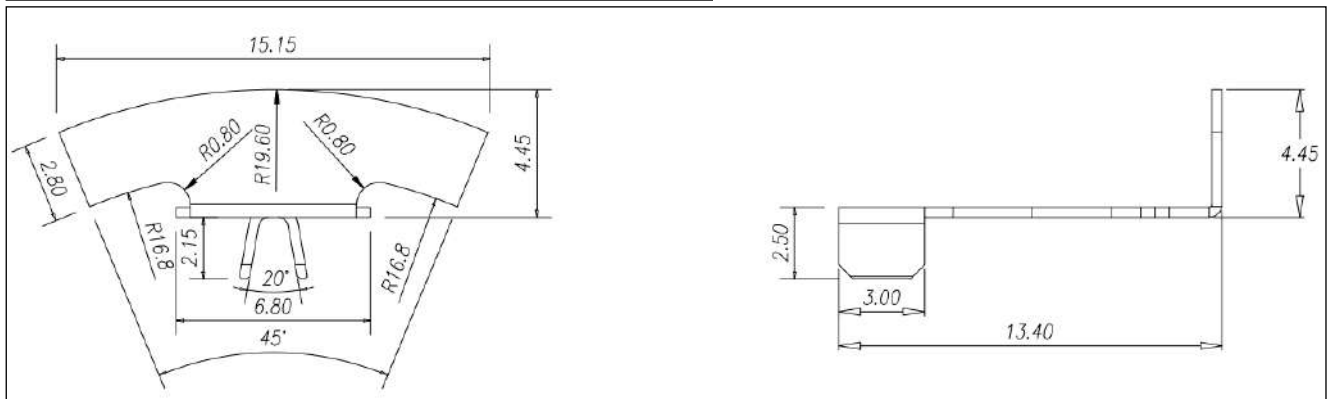
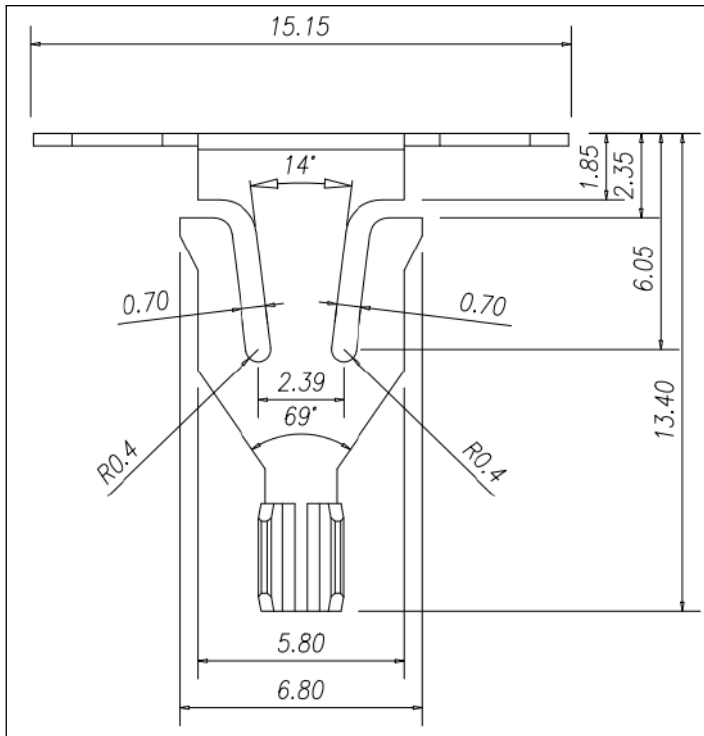


Attachment 7 Dimension figure of Receptacles (model LT605 (PBT))



Attachment 8 Dimension figure of Line/Load/ Neutral pin (All Models)

Attachment 9 Dimension figure of Dimming pins (All Models)



Attachment 10 Photos of product

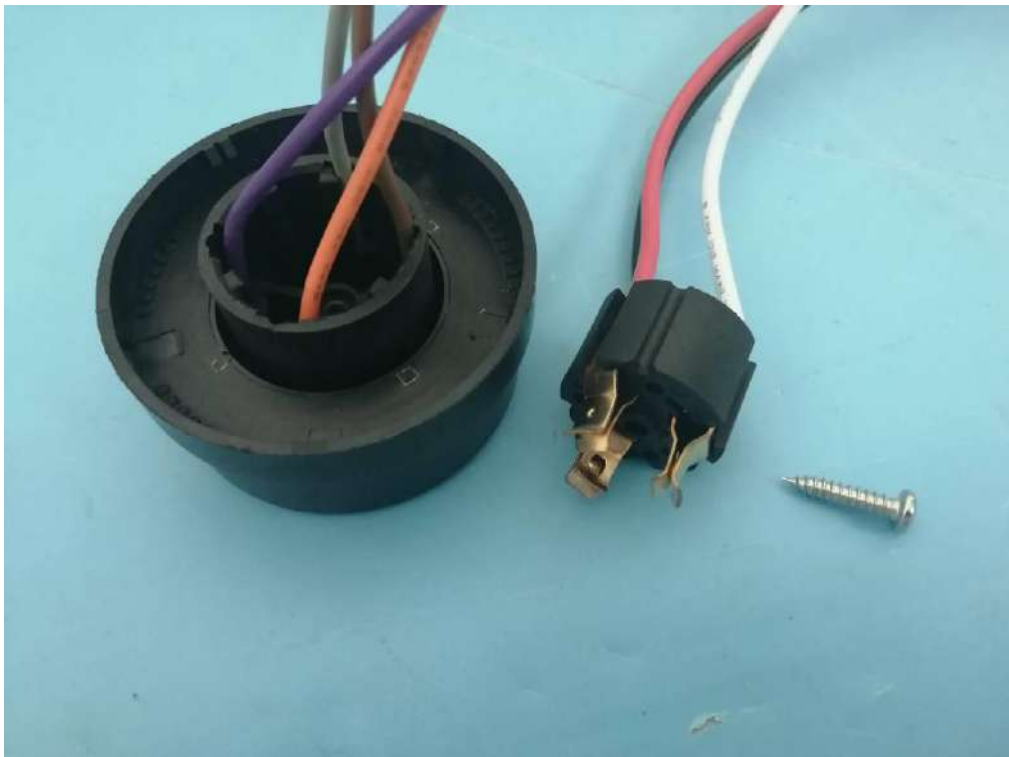
Overall view for model LT635



Overall view for model LT635



Overall view for model LT635



Internal view for model LT635



Contact pin view for all models



Dimming contact pin view for all models



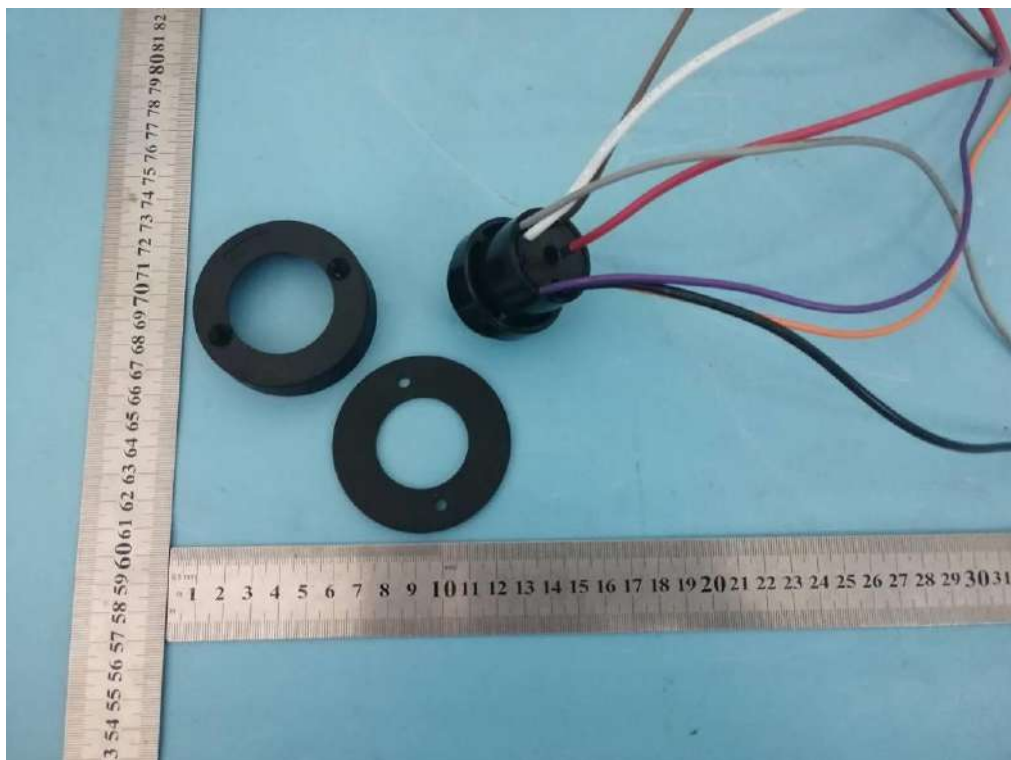
Overall view for model LT605R



Overall view for model LT605R



Overall view for model LT605R



Overall view for model LT605R



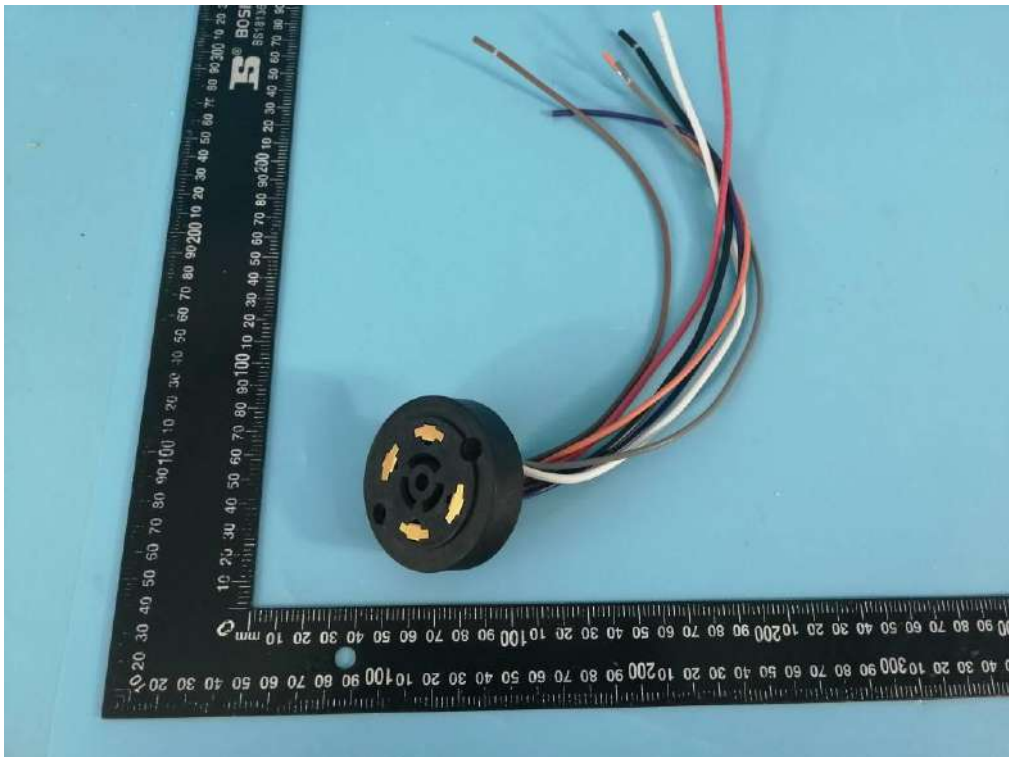
Overall view for model LT605



Overall view for model LT605



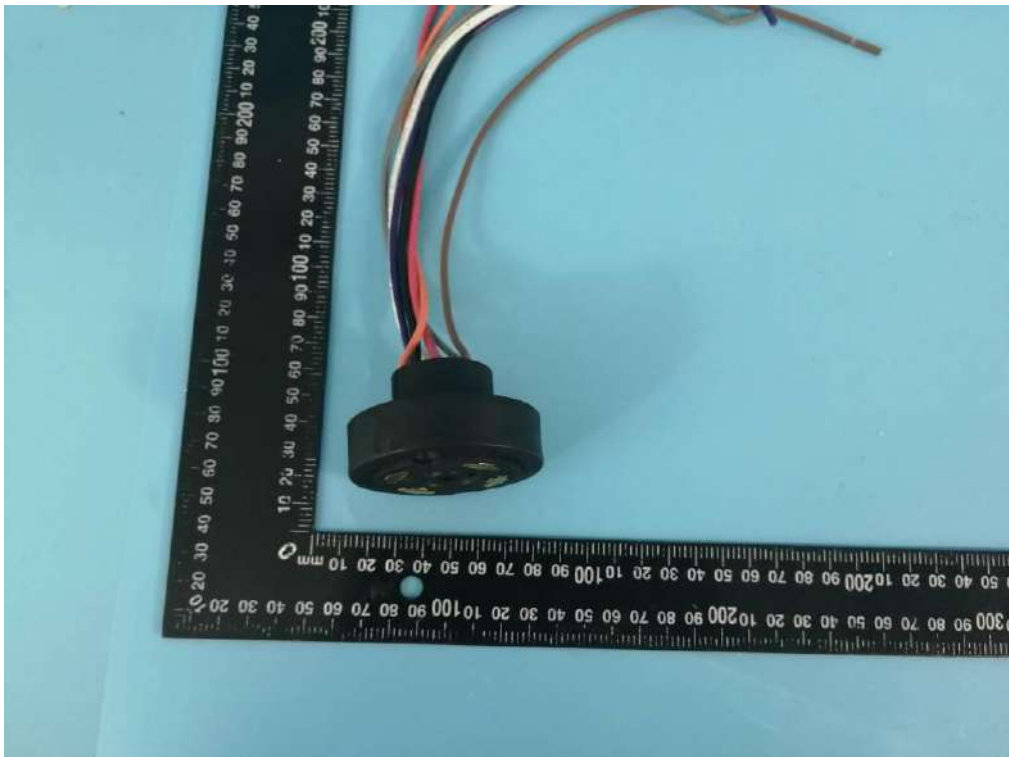
Overall view for model LT605



Overall view for model LT605 (PBT)



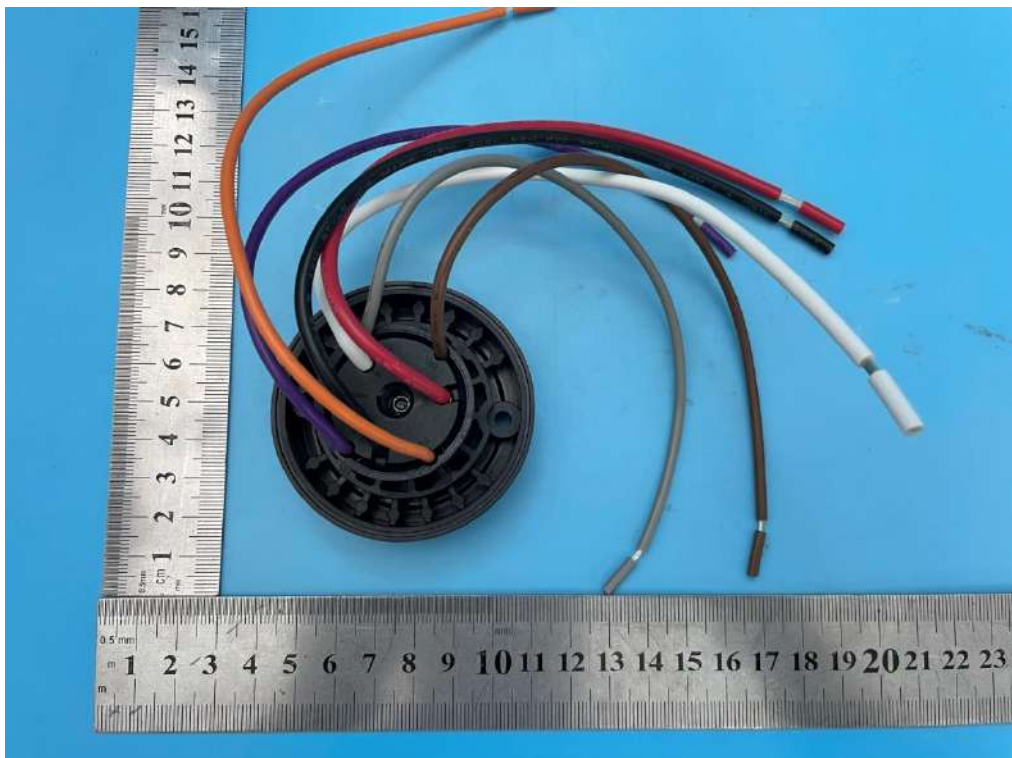
Overall view for model LT605 (PBT)



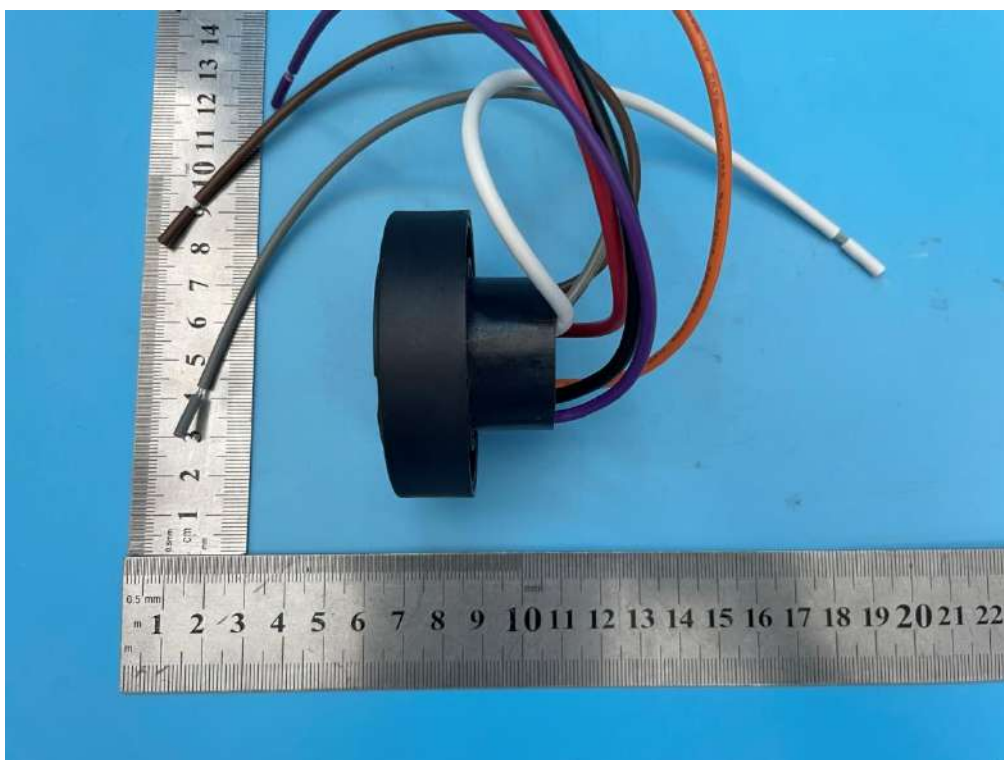
Overall view for model LT605 (PBT)



Overall view for model EK605 (PBT)



Overall view for model EK605 (PBT)



Overall view for model EK605 (PBT)

--End--

CERTIFICADO *CERTIFICATE*

Certificado número 6176791.31
Certificate number

Página *Page* 1/5

Solicitante *Applicant* RAJIX COMERCIAL LTDA
CNPJ No.: 46.889.684/0001-25
Avenida República Argentina, 1505, Sala 2012, Curitiba - PR,
CEP: 80620-010, Brasil

Produto *Product* LED Luminária de Iluminação Pública *Street light LED*
Nome comercial RAJIX

Trade name
Família *family*

LED Luminária de Iluminação Pública / REFOND / RF-W*HP32DS-AF-I3 / IP66 / 50000h

Para luminárias com Tecnologia LED / *for luminaires with LED technology*

Marca <i>Brand</i>	Modelo <i>Model</i>	Descrição Técnica do Modelo <i>Technical Description of the Model</i>	Código de barras <i>Bar code</i>
RAJIX	RLP0305E	30W/4200lm/140lm/W/FP > 0,95/5000K	7898727311775
RAJIX	RLP0505E	50W/7000lm/140lm/W/FP > 0,97/5000K	7898727311782
RAJIX	RLP1005E	100W/14000lm/140lm/W/FP > 0,97/5000K	7898727311799
RAJIX	RLP1505E	150W/21000lm/140lm/W/FP > 0,97/5000K	7898727311805
RAJIX	RLP2005E	200W/28000lm/140lm/W/FP > 0,97/5000K	7898727311812

Programa de certificação ou Portaria
Certification program or Regulation

Portaria INMETRO n.º 62:2022
Portaria INMETRO n.º 200:2021 (RGCP)

Modelo de certificação
Certification model

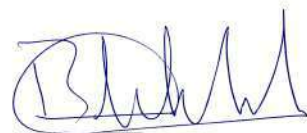
Modelo 5 - com ensaios de tipo, avaliação e aprovação dos Sistemas de Gestão do fabricante, e acompanhamento através de auditorias no fabricante e ensaio em amostras retiradas do comércio.

Model 5: Type test, evaluation and approval of the manufacturer's Quality Management System, surveillance through audits on the factory and test on samples taken in market and on the manufacturer.

Emissão *Date of issue*
Validade *Expiry date*

14/12/2023
14/12/2027

DEKRA Certification B.V.



Bram Holtus
Diretor-Gerente *Managing Director*



Nelson Coelho
Gerente de Certificação *Certification Manager*

© A publicação integral deste certificado e dos relatórios anexos é permitida



DEKRA Certification B.V. Av. Gerônimo de Camargo, 2000 – Recreio Estoril - Atibaia / SP - CEP 12944-000 - Brasil

Tel.: +55 11 4418-7268 Webpage: <http://dekra.com.br/PTC/> - OCP 0089

DEKRA Certification B.V. Meander 1051, 6825 MJ Amhem P.O. Box 5185, 6802 ED Amhem, The Netherlands

T +31 88 96 83000 - F +31 88 96 83100 - www.dekra-product-safety.com - Company registration 09085396

Certificado número *Certificate number* 6176791.31
Página *Page* 2/5
Emissão *Date of issue* 14/12/2023

A DEKRA por este meio deste declara que o produto acima mencionado foi certificado com base em um ensaio de tipo de acordo com as normas acima mencionadas, uma avaliação do local de produção com base em programa de certificação e portarias do Inmetro acima mencionadas e em um contrato de certificação sob número 6157856. DEKRA hereby declares that the above mentioned product has been certified on the basis of a type test according to the above mentioned standards, an inspection of the production location on the basis of above mentioned INMETRO certification programs or regulations and an agreement under number 6157856.

A DEKRA, como um Organismo de Certificação acreditado pela CGCRE (Coordenação Geral de Acreditação do Inmetro), por este meio deste concede o direito de uso do Selo de Identificação da Conformidade conforme item 11 e Anexo III da Portaria do Inmetro n.º 62:2022. DEKRA, as a Certification Body accredited by CGCRE (Coordenação Geral de Acreditação do Inmetro), hereby grants the right to use of the Seal of Conformity Identification as item 11 and Annex III of Inmetro Regulation n.º 62:2022.

Certificado de Conformidade válido somente acompanhado das páginas de 1 a 5.
This Certificate of Conformity is only valid when accompanied by pages 1 to 5.

Localização da fábrica *Factory location*

Chun'an County, Hangzhou City, Zhejiang Province, China

Fabricante *Manufacturer*

Não aplicável *Not applicable*

Representante local *Local representative*

Não aplicável *Not applicable*

ESPECIFICAÇÃO DO PRODUTO CERTIFICADO *SPECIFICATION OF THE CERTIFIED PRODUCT*

Produto *Product* LED Luminária de Iluminação Pública *Street light LED*
Nome comercial *Trade name* RAJIX
Modelo ensaiado *Tested model* RLP0305E; RLP0505E; RLP1005E; RLP1505E; RLP2005E
Normas aplicáveis *Applicable standards* Portaria INMETRO n.º 62:2022
Portaria INMETRO n.º 200:2021 (RGCP)
Tensão nominal *Rated voltage* 110-277V
Frequência nominal *Rated frequency* 50/60Hz
Entrada nominal *Rated input* Verifique a tabela na página 1. *Check table on page 1*
Código de barras *Bar code* Verifique a tabela na página 1. *Check table on page 1*

LISTA DOS DOCUMENTOS DE CERTIFICAÇÃO *LIST OF CERTIFICATION DOCUMENTS*

Relatório de ensaio *Test report* 6176790.50P (2023-12-13)
DEKRA Testing and Certification (Shanghai) Ltd.
Relatório de avaliação da conformidade *Conformity assessment report* DEKRA arquivo 6176791.00 *DEKRA file 6176791.00*
Relatório de auditoria *Audit report* 6157857 (2023-04-24)
DEKRA Testing and Certification (Shanghai) Ltd.



DEKRA Certification B.V. Av. Gerônimo de Camargo, 2000 – Recreio Estoril - Atibaia / SP - CEP 12944-000 - Brasil
Tel.: +55 11 4418-7268 Webpage: <http://dekra.com.br/PTC/> - OCP 0089

DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem P.O. Box 5185, 6802 ED Arnhem, The Netherlands
T +31 88 96 83000 - F +31 88 96 83100 - www.dekra-product-safety.com - Company registration 09085396

Certificado número *Certificate number* 6176791.31
Página *Page* 3/5
Emissão *Date of issue* 14/12/2023

HISTÓRIA CERTIFICAÇÃO *CERTIFICATION HISTORY*

Revisão

Revision

Descrição das revisões *Description of the revisions*

00	Data de emissão <i>Issue date</i>	14/12/2023	Emissão Inicial <i>Initial issuance.</i>
----	--------------------------------------	------------	--

OBSERVAÇÕES *REMARKS*

O produto e quaisquer variações aceitáveis no mesmo estão especificados no certificado e nos documentos aqui referidos.
The product and any acceptable variation thereto is specified in this certificate and the documents herein referred to.

A validade deste Certificado de Conformidade está atrelada à realização das avaliações de manutenção e tratamento de possíveis não conformidades, de acordo com as orientações emitidas pelo Organismo de Certificação de Produtos previstas nos Requisitos de Avaliação da Conformidade específicos. Para verificação da condição atualizada de regularidade deste Certificado de Conformidade deve ser consultado o banco de dados e services certificados do INMETRO. *The validity of this Certificate is subject to the realization of "regular continuance evaluations" and the processing of any possible non-compliance in accordance with guidelines issued by the Product Certification Body and specified in the particular Compliance Evaluation Requirements. To check the current condition of validity of this Certificate of Conformity, the database of products and services certified by INMETRO must be consulted.*

A marca de certificação do INMETRO deve ser aplicada ao produto conforme especificado neste certificado, pela duração do contrato de certificação do INMETRO de número 6157856 e de acordo com as condições do contrato de certificação. *The INMETRO certification mark shall be applied to the product as specified in this certificate for the duration of the INMETRO certification agreement with number 6157856 and under the conditions of the certification agreement.*

A versão inglesa deste certificado é líder. Em caso de discrepância, prevalece a versão inglesa.
The English version in this certificate is leading. In case of any discrepancy, the binding version is the English text.

Avaliado por *Checked by*

V.Zhang




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Certificado número *Certificate number* 6176791.31
Página *Page* 4/5
Emissão *Date of issue* 14/12/2023

Anexo A/ Annex A – Planilha de Especificações Técnicas - PET /Technical Specification Sheet

1 - DENOMINAÇÃO COMERCIAL

MARCA	RAJIX
FORNECEDOR	RAJIX COMERCIAL LTDA
FABRICANTE	

02 - IDENTIFICAÇÃO DA FAMÍLIA

FAMÍLIA (*)	LED Luminária de Iluminação Pública / REFOND / RF-W*HP32DS-AF-I3 / IP66 / 50000h
MARCA / MODELO DO LED	LED Technology
TIPO DE LUMINÁRIA	Street light LED
VIDA DECLARADA (h)	50000h

(*) Composição do Código da Família:

CÓDIGO DE BARRAS	MODELO	TENSÃO DE ENSAIO (V)	FREQ. (HZ)	POTÊNCIA (W)	FATOR DE POTÊNCIA	FLUXO LUMINOSO (lm)	RENDIMENTO ÓTICO (***) (%)	EE (***) (lm/W)	IRC	TCC (K)	Nº RELATÓRIO ENSAIO/ LABORATÓRIO
7898727311775	RLP0305E	110-277	50/60	30	>0.95	4200	/	140	>70	5000	6176790.50P
7898727311782	RLP0505E	110-277	50/60	50	>0.97	7000	/	140	>70	5000	6176790.50P
7898727311799	RLP1005E	110-277	50/60	100	>0.97	14000	/	140	>70	5000	6176790.50P
7898727311805	RLP1505E	110-277	50/60	150	>0.97	21000	/	140	>70	5000	6176790.50P
7898727311812	RLP2005E	110-277	50/60	200	>0.97	28000	/	140	>70	5000	6176790.50P

(**) EE – Eficiência Energética. (***) Aplicável somente para Luminárias com lâmpadas de descarga



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Certificado número Certificate number

6176791.31

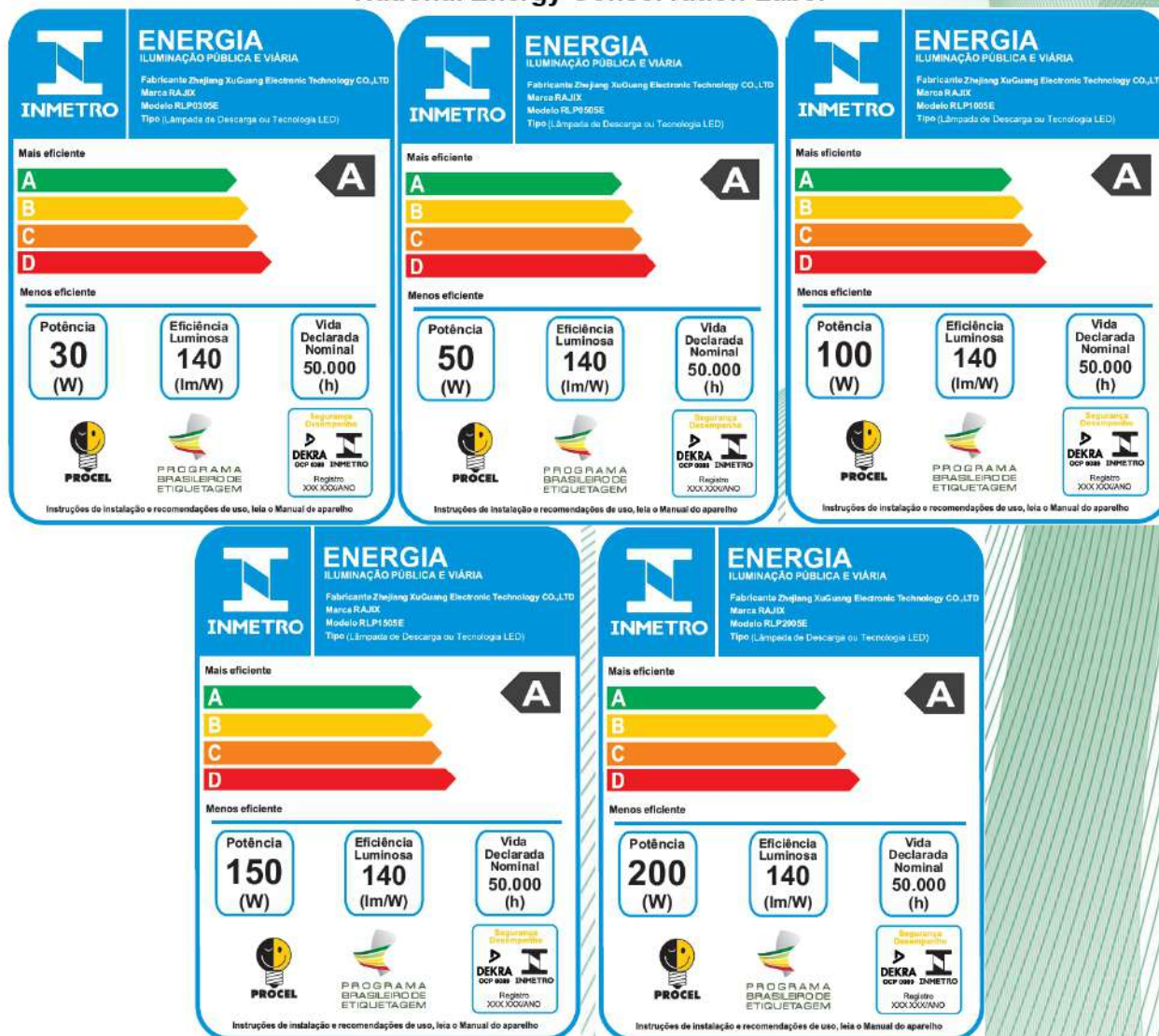
Página Page

5/5

Emissão Date of issue

14/12/2023

Anexo B/ Annex B – Etiqueta Nacional de Conservação de Energia - ENCE. / National Energy Conservation Label



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佛山市顺德区本安电气有限公司
BEN AN Electric co.,Ltd.,Shunde District,Foshan City

产品规格承认书

Products Specification For Approval

Customer/客户名称			
Customer P.N. /客户物料号			
Product Model /产品类型			10KV 浪涌保护器
Product NO. /产品编号			SPD08-D10
VER NO. / 版本			1.0
Date / 日期			2023-03-10
Prepared By / 拟制	Checked By / 审核	Approved By / 批准	
宰清省	蒋昌学		

Customer Authorized Signature /客户承认签核		

备注：请客户确认样品参数，并将规格书签核后回传我司！谢谢！

公司地址：广东省佛山市顺德区均安镇智安北路 2 号

ADD: No.2 Zhian North Road, Junan Town Shunde, Foshan Guangdong, P. R. China

TEL: 0757-22118627 FAX: 0757-25580869 Web: www.zq-benan.com



佛山市顺德区本安电气有限公司
BEN AN Electric co.,Ltd.,Shunde District,Foshan City

一、Product description 产品简述:

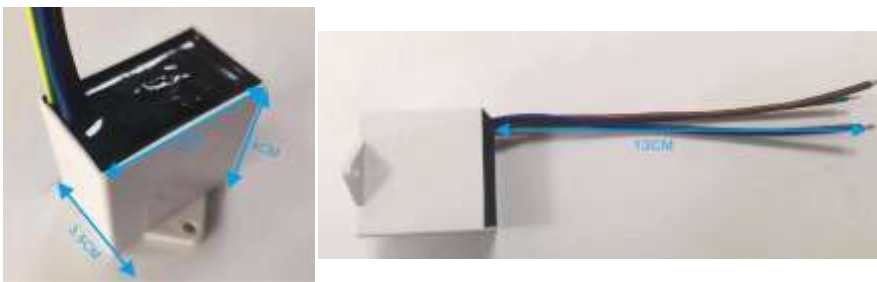
该 SPD 属于三级电源防雷器，提供差模、共模全保护；体积轻薄，采用并联连线方式，安装方便。该产品最大可承受 20KV 电压冲击，残压低于 1.2KV，特别适合LED 路灯电源防浪涌保护配套使用。

The SPD is a belongs to class III power SPD, providing differential mode, common mode full protection; The product size small, using parallel wiring ,convenient in installing. The product can withstand 20KV voltage impact, the level of protection is below 1.2kv, suitable for LED street lamp power supply surge protection.

二、Electrical Characteristics 产品电气特性

	项 目 / Item	特性参数 / Characteristic Parameter
1	额定工作电压 / Vop	85 ~ 277VAC (Rated voltage)
2	最大持续工作电压 / Uc Max	277 VAC (Max.Continuous voltage)
3	标称放电电流 / In	10kA (Norminal discharge current (8/20 μ s))
4	最大通流量 / Imax	10kA (Max. discharge current (8/20 μ s))
5	标称冲击电压 / Vn	10kV (Nominal discharge voltage)
6	最大冲击电压 (1 次) / Vmax	20kV (Maximum discharge voltage)
7	保护水平 / Up	1.2kV (Voltage protection level)
8	响应时间 / tA	25ns (Response time)
9	工作温度范围 / T	-40℃ ~ +70℃ (Operating temperature range)
10	外壳 / Enclosure material	ABS
11	防水等级	IP67 (Outer casing protection grade)
12	产品尺寸 (不含连接线) / Size	40* 35* 40mm
13	产品重量 / Weight	81.2g

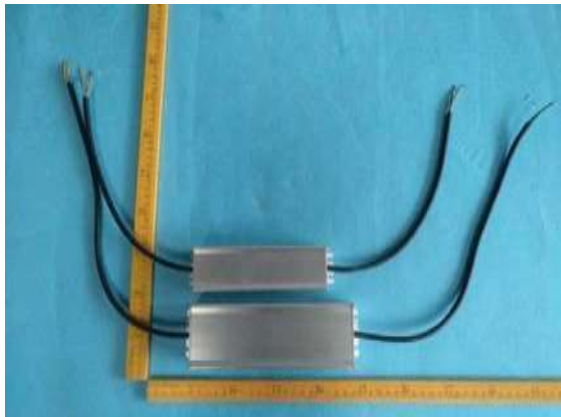
三、Product appearance & structure / 产品外形及结构



Outline size & Wire specification 外形尺寸及引线规格:

Product NO.	SPD08-D10	Remarks/备注
Outline size / 外形尺寸 L x W x H / 长x 宽x 高	40 * 35 * 40 mm	不含连接线
AC Input / 输入线	棕色L / 蓝色N / 黄绿色YG (3 x 1.0mm2 flexible 多芯软线) Length / 线长 130mm	

Tolerance: ±0.5mm for unidentified part, indentified refer to the Marking tolerance.
公差：未标识公差统一±0.5 的公差，标识的以标识公差为准。Unit/单位：mm

Prüfbericht-Nr.: <i>Test Report No.:</i>	16079270 001	Auftrags-Nr.: <i>Order No.:</i>	174056590	Seite 1 von 34 <i>Page 1 of 34</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	650136	Auftragsdatum: <i>Order date.:</i>	11 Oct. 2016	
Auftraggeber: <i>Client:</i>	Zhongshan Xinyu Electronics CO.,LTD No. 4, 5th street, Caoan South Road, Guzhen Town, Zhongshan City, Guangdong Province, 528421, China			
Prüfgegenstand: <i>Test item:</i>	LED Driver			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	EMC70-600, EMC70-900, EMC70-1200, EMC70-1500, EMC70-1800, EMC70-2100, EMC150-3000, EMC150-4500			
Auftrags-Inhalt: <i>Order content:</i>	TUV Rheinland – EMC service			
Prüfgrundlage: <i>Test specification:</i>	EN 55015:2013+A1 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013			
Wareneingangsdatum: <i>Date of receipt:</i>	23 Dec. 2016			
Prüfmuster-Nr.: <i>Test sample No.:</i>	174056590 001~004			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report.			
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 2.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Guangdong) Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by: 		kontrolliert von / reviewed by: 		
03.Jan.2017 Ryan Pang/Assist Project Engineer		05.Jan.2017 Cherry He/TC		
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>
Sonstiges / Other:				
The installation has to be carried out according to the manufacturer's specification.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

5.1.1 HARMONICS CURRENT EMISSION ON AC MAINS*RESULT: Pass***5.1.2 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER***RESULT: Pass***5.1.3 TERMINAL CONTINUOUS DISTURBANCE VOLTAGE***RESULT: Pass***5.1.4 RADIATED ELECTROMAGNETIC DISTURBANCES***RESULT: Pass***5.2.1 RADIATED DISTURBANCE (30 MHz – 300 MHz)***RESULT: Pass***6.2.1 POWER-FREQUENCY MAGNETIC FIELDS***RESULT: N/A***6.2.2 RADIO-FREQUENCY COMMON MODE / CONDUCTED SUSCEPTIBILITY (CS)***RESULT: Pass***6.2.3 RADIO-FREQUENCY ELECTROMAGNETIC FIELDS (RS)***RESULT: Pass***6.3.1 ELECTRICAL FAST TRANSIENTS (EFT)***RESULT: Pass***6.3.2 SURGE***RESULT: Pass***6.3.3 ELECTROSTATIC DISCHARGES (ESD)***RESULT: Pass***6.4.1 VOLTAGE DIPS AND INTERRUPTIONS***RESULT: Pass*

Contents

1.	GENERAL REMARKS.....	5
1.1	COMPLEMENTARY MATERIALS	5
2.	TEST SITES.....	5
2.1	TEST FACILITIES.....	5
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS	6
	RADIATED EMISSION (30MHZ – 300MHZ)	7
3.	GENERAL PRODUCT INFORMATION.....	8
3.1	PRODUCT FUNCTION AND INTENDED USE	8
3.2	RATINGS AND SYSTEM DETAILS.....	9
3.3	INDEPENDENT OPERATION MODES.....	9
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	9
3.5	SUBMITTED DOCUMENTS.....	9
4.	TEST SET-UP AND OPERATION MODES.....	10
4.1	PRINCIPLE OF CONFIGURATION SELECTION	10
4.2	PHYSICAL CONFIGURATION FOR TESTING.....	10
4.3	TEST OPERATION AND TEST SOFTWARE.....	10
4.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	10
4.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	10
5.	TEST RESULTS EMISSION	11
5.1	EMISSION IN THE FREQUENCY RANGE UP TO 30 MHZ.....	11
5.1.1	<i>Harmonics Current Emission on AC Mains</i>	<i>11</i>
5.1.2	<i>Voltage Changes, Voltage Fluctuations and Flicker.....</i>	<i>13</i>
5.1.3	<i>Terminal Continuous Disturbance Voltage.....</i>	<i>14</i>
5.1.4	<i>Radiated Electromagnetic Disturbances</i>	<i>16</i>
5.2	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHZ.....	18
5.2.1	<i>Radiated Disturbance (30 MHz – 300 MHz).....</i>	<i>18</i>
6.	TEST RESULTS IMMUNITY	20
6.1	CLASSIFICATION OF APPARATUS	20
6.2	CONTINUOUS DISTURBANCES.....	21
6.2.1	<i>Power-frequency Magnetic Fields.....</i>	<i>21</i>
6.2.2	<i>Radio-frequency Common Mode / Conducted Susceptibility (CS).....</i>	<i>22</i>
6.2.3	<i>Radio-frequency Electromagnetic Fields (RS)</i>	<i>24</i>
6.3	TRANSIENT DISTURBANCES.....	26
6.3.1	<i>Electrical Fast Transients (EFT).....</i>	<i>26</i>
6.3.2	<i>Surge.....</i>	<i>28</i>

6.3.3	Electrostatic Discharges (ESD)	30
6.4	POWER SUPPLY ALTERATIONS.....	32
6.4.1	Voltage Dips and Interruptions	32
7.	LIST OF TABLES.....	34
8.	LIST OF PHOTOGRAPHS.....	34

1. General Remarks

When applying the basic standards in this test report, please refer to the applied generic or product family standards for edition information:
For dated basic standards, only the edition cited applies. For undated basic standards, the latest edition (including any amendments) applies.

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result.

2. Test Sites

2.1 Test Facilities

1) Zhongshan Bontek Compliance Testing Laboratory Co., Ltd.
Tongyi Industrial Zone Dongxing East Road, Guzhen Town, Zhongshan City, Guangdong Province, China.

Test items: Other tests.

2) LCTECH (Zhongshan) Testing Service Co., Ltd
2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Test items: CS(AC Mains), RE, RS.

3) Dongguan Dongdian Testing Service Co., Ltd
No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Test items: CS(DC Port).

The tests at these test sites have been conducted under the supervision of a TÜV Rheinland engineer.

Prüfbericht - Nr.: **16079270 001**
 Test Report No.

 Seite 6 von 34
 Page 6 of 34

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Test Equipment	Manufacturer	Model	Serial No.	Cal Until
Zhongshan Bontek Compliance Testing Laboratory Co., Ltd.				
Harmonics & Flicker ☐				
Harmonics analyzer with flicker meter	Voltech	PM6000	200006700524	15 Dec, 2016
Power source	EMToni	AFC-150	630642	15 Dec, 2016
Disturbance Voltage ☒				
EMI Test Receiver	R&S	ESCI	100943	15 Dec, 2016
L.I.S.N.	R&S	ENV216	101047	15 Dec, 2016
Voltage Probe	SCHWARZBEC K	TK 9417	9417-215	15 Dec, 2016
RF Cable	HUBER+SUHNER	RG 223/U	/	15 Dec, 2016
Electrostatic Discharge(ESD) ☒				
Electrostatic Generator	KIKUSUI	KES4021A	SF002900	15 Dec, 2016
Electrical Fast Transient(EFT) ☒				
Electrical Fast Transient Generator	3CTEST	EFT-4001G	EC0461221	15 Dec, 2016
Capacitive Coupling Clamp	3CTEST	EFTC	EC0441348	15 Dec, 2016
Surge ☒				
Surge Generator	EVERFINE	EMS61000-5B	712004	15 Dec, 2016
Voltage Dips and Interruptions ☒				
Voltage Dips and Interruptions Generator	EVERFINE	EMS61000-11K	706001	15 Dec, 2016
Radiated Emission ☒				
2m Loop Antenna	SCHWARZBEC K	HXYZ-9170	/	15 Dec, 2016
EMI Test Receiver	R&S	ESCI	100943	15 Dec, 2016

RF Cable Produkte Products	HUBER+SUHN ER	RG 223/U	/	15 Dec, 2016
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Produkte

Products

Prüfbericht - Nr.: 16079270 001

Test Report No.

Seite 7 von 34

Page 7 of 34

Test Equipment	Manufacturer	Model	Serial No.	Cal Until
LCTECH (Zhongshan) Testing Service Co., Ltd				
Conducted Susceptibility (AC Mains)				☒
Conducted Immunity Test System	Frankonia	CIT-10/75	12B1113	29 Aug, 2017
6dB Attenuator	Weinschel	WA59-6-33	2537	29 Aug, 2017
Coupling Decoupling Network	SCHWARZBEC K	L-801M2/M3	2531	29 Aug, 2017
Coupling Decoupling Network	SCHWARZBEC K	L-801AF2	2536	29 Aug, 2017
Radiated Susceptibility				☒
Signal generator	R&S	SMB 100A	102710	28 Aug, 2017
Power amplifier	BONN Elektronik	BLWA 0810-160/100D	149644	24 Jun, 2017
Isotropic Field Probe	Narda	EP-601	511WX30620	25 Jul, 2017
Log-periodic Antenna	SCHWARZBEC K	STLP 9128D	078	24 Jun, 2017
Power Meter	FEANKONIA	PMS 1084	108B1289	24 Jun, 2017
Radiated Emission (30MHz – 300MHz)				☒
EMI Test Receiver	R&S	ESCI 7	100965	03 Jun, 2017
Log-periodic Dipole Antenna	Schwarzbec k	VULB 9162	058	29 May, 2017
RF Cable	R&S	R01	10403	03 Jun, 2017
Dongguan Dongdian Testing Service Co.,Ltd				
Conducted Susceptibility (DC port)				☒
CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10	126B1207	02 Jul, 2017
CDN	FRANKONIA	CDN M2+M3	A2210191	02 Jul, 2017
☒ Attenuation	BIRD	DAM75W (6dB)	1143	02 Jul, 2017
EM lamp	FRANKONIA	EMC	132A1143/2012	02 Jul, 2017

: Not Used
Used
Products
Products

3. General Product Information

The submitted 8 samples as below are LED Driver for indoor and outdoor used.

Model list:

No.	Model	Input current	Output	Transformer	PCB
1	EMC70-600	0.7A	DC 45-88V, 600mA, max.95V, 53W	EE28	1
2	EMC70-900		DC 27-54V, 900mA, max.60V, 49W		
3	EMC70-1200	0.8A	DC 27-54V, 1200mA, max.60V, 65W		
4	EMC70-1500		DC 23-46V, 1500mA, max.50V, 69W		
5	EMC70-1800		DC 20-37V, 1800mA, max.50V, 67W		
6	EMC70-2100		DC 17-34V, 2100mA, max.50V, 71W		
7	EMC150-3000	1.7A	DC 36-52V, 3000mA, max.56V, 156W	PD3225	2

There are 2 series PCB layout and appearance for LED Driver. In each series LED Driver, they have same circuit diagram, PCB layout and appearance, but different in passive component.

According to above information, full EMC tests are performed on model EMC70-2100 and EMC150-4500 with maximum output current, and additional DV and RE tests were performed on model EMC70-600 and EMC150-3000 with maximum output voltage.

For details please refer to the Technical Documentation.

3.1 Product Function and Intended Use

Refer to Technical Documentation.

3.2 Ratings and System Details

Type designation : Refer to section 3
Rated input : AC 100-277V, 50/60Hz
Rated output : Refer to section 3
Protection class : I
Port : AC Mains, DC power

output Refer to Technical Documentation for
further details.

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Full load: the EUT connected to an appropriate load in order to make the output current of the EUT to reach the rated value.
- B. On, Half load: the EUT connected to an appropriate load in order to make the output current of the EUT to reach half of the rated value.
- C. On, No load.
- D. Off

Refer to the Technical Documentation for further information.

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Technical Documentation for further information.

3.5 Submitted Documents

Difference declaration
Circuit Diagram
PCB Layout

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Physical Configuration for Testing

Refer to relative paragraphs of this test report.

4.3 Test Operation and Test Software

Refer to test setup in chapter 5 and chapter 6.

4.4 Special Accessories and Auxiliary Equipment

None.

4.5 Countermeasures to achieve EMC Compliance

No additional countermeasures to the submitted test sample(s) was employed to achieve compliance.

5. Test Results EMISSION

5.1 Emission in the Frequency Range up to 30 MHz

5.1.1 Harmonics Current Emission on AC Mains

RESULT:**Pass****Test Specification**

Basic standard	:	EN 61000-3-2:2014
Measurement equipment requirement	:	IEC 61000-4-7
Measured harmonics	:	1 – 40
Equipment class	:	C
Limits	:	Clause 7.3
Date of testing	:	Refer to appendix 1
Input voltage	:	AC 230V, 50Hz
Operation mode	:	A
Artificial hand	:	N/A
Test configuration	:	Table-top
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

Photograph 1: Set-up for Harmonic Current Emission on AC Mains



For test results, please refer to the attached appendix 1.

5.1.2 Voltage Changes, Voltage Fluctuations and Flicker

RESULT:**Pass****Test Specification**

Basic standard	:	EN 61000-3-3:2013
Measurement equipment requirement	:	IEC 61000-4-15
Limits	:	EN 61000-3-3:2013, Clause 5

According to EN 61000-3-3:2013, clause A.2* the voltage fluctuation and flicker on AC Mains were not measured.

* EN 61000-3-3:2013, clause A.2:

“Pst and Plt evaluations are required only for lighting equipment which is likely to produce flicker; for example: disco lighting and automatically regulated equipment.”

“Incandescent lamp luminaires with ratings less than or equal to 1 000 W and discharge lamp luminaires with ratings less than or equal to 600 W and LED luminaires with ratings less than or equal to 200 W, are deemed to comply with the dmax limits in this standard and are not required to be tested.”

5.1.3 Terminal Continuous Disturbance Voltage

RESULT:**Pass****Test Specification**

Family standard	:	EN 55015:2013, EN 55015:2013+A1
Port	:	AC Mains*
Frequency range of Mains	:	9kHz-30MHz
Test site	:	Shielded Room
Limits	:	Table 2a, Table 2b, Table 2c

Test Setup

Date of testing	:	Refer to appendix 1
Input voltage	:	AC 100V, 60Hz / AC 277V, 50Hz
Operation mode	:	A, B, C
Artificial hand	:	N/A
Test configuration	:	Table-top
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

***note:** The manufacturer gives strict installation instructions for the EUT, so the test on load terminals is not applicable.

Photograph 2: Set-up for Continuous Disturbance Voltage

Test Result

Measurement uncertainty: 2.9 dB ($k=2$, $\sigma=95\%$)

If the result of the measurement with the Quasi Peak detector is below the Average limit, the measurement with Average Detector has been omitted.

Disturbances other than those mentioned are small or not detectable.

Refer to the attached Appendix 1. The measured result for EMC150-4500 is below the specification limit by a margin less than the measurement uncertainty (the minimum margin is 1.19dB and the test lab's measurement uncertainty of this test is 2.9dB); it is therefore not possible to state compliance based on the 95% level of confidence.

However, the result indicates that compliance is more probable than non-compliance with the specification limit. And as the test lab's measurement uncertainty of this test item is less than U_{CISPR} (3.8dB), (U_{CISPR} - the uncertainty recommended by CISPR (3.8dB), therefore the EUT is deemed to comply with the disturbance limit according to Clause 4.1 of CISPR 16-4-2: 2003. Above situation was aware to the client, and it was considered acceptable by the client as well.

The test data in appendix 1 is the worst result after the EUT was tested with full load, halfload and empty load.

5.1.4 Radiated Electromagnetic Disturbances

RESULT: **Pass**

Test Specification

Family standard	:	EN 55015:2013, EN 55015:2013+A1
Port	:	Enclosure
Frequency range	:	9kHz-30MHz
Test site	:	Shielded Room
Limits	:	EN 55015:2013+A1, Clause 4.4, Table 3a

Test Setup

Date of testing	:	Refer to appendix 1
Input voltage	:	AC 277V, 50Hz
Operation mode	:	A, B, C
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

Photograph 3: Set-up for Radiated Electromagnetic Disturbances



Test Result

Measurement uncertainty: 3.6 dB ($k=2$, $\sigma=95\%$)

Refer to the attached Appendix 1. The test data in appendix 1 is the worst result after the EUT was tested with full load, half load and empty load.

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated Disturbance (30 MHz – 300 MHz)

RESULT: **Pass**

Test Specification

Family standard	:	EN 55015:2013, EN 55015:2013+A1
Port	:	AC mains
Frequency range	:	30MHz -300MHz
Test site	:	SAR
Limits	:	Table 3b

Test Setup

Date of testing	:	Refer to appendix 1
Input voltage	:	AC 100V, 60Hz / AC 277V, 50Hz
Operation mode	:	A, B, C
Temperature	:	Refer to appendix 1
Humidity	:	Refer to appendix 1
Air pressure	:	Refer to appendix 1

Photograph 4: Set-up for Radiated Disturbance (30 MHz – 300 MHz)



Test Result

Measurement uncertainty: 3.16 dB ($k=2$, $\sigma=95\%$)

Disturbances other than those mentioned are small or not detectable.

For measurement results, please refer to the attached appendix 1. The test data in appendix 1 is the worst result after the EUT was tested with full load, half load and emptyload.

6. Test Results IMMUNITY

6.1 Classification of Apparatus

According to EN 61547:2009, the appliance shall fulfill the requirements of:

Continuous Disturbances

Power-frequency magnetic field Criterion A

Radio-Frequency Common Mode / Conducted Susceptibility (CS) Criterion A

Radio-frequency Electromagnetic Fields (RS) Criterion A

Transient Disturbances

Electrical Fast Transients (EFT) Criterion B

Surge Criterion C

Electrostatic Discharges (ESD) Criterion B

Power Supply Alterations

Voltage Dips and Interruptions Criterion B + C

6.2 Continuous Disturbances

6.2.1 Power-frequency Magnetic Fields

RESULT:**N/A****Test Specification**

Family Standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-8
Test Level (A/m)	:	3A/m
Frequency	:	50Hz and 60Hz
Performance criterion	:	A

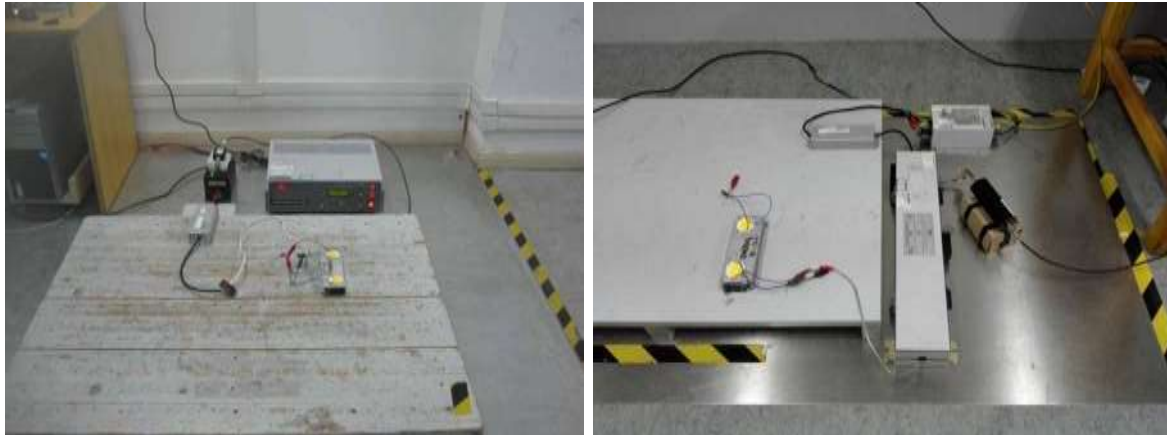
The EUT does not contain devices susceptible to magnetic fields, such as CRT monitors, Hall elements, electrodynamic microphones, magnetic field sensors, etc. Therefore, this test is not applicable and skipped.

6.2.2 Radio-frequency Common Mode / Conducted Susceptibility (CS)**RESULT:** Pass**Test Specification**

Family standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-6
Characteristics of the test generator	:	
Output impedance	:	50 Ω
Harmonics and distortion		Any spurious spectral line at least 15 dB below the carrier level
Amplitude modulation	:	80 % $\pm$ 5 % in depth, 1 kHz $\pm$ 10 % sine wave
Direct injection device		100 Ω impedance
Frequency bandwidth	:	150 kHz to 80 MHz
Frequency step	:	1% with 1 s dwell time
Performance criterion	:	A

Test Setup

Date of testing	:	09 Dec. 2016 & 19 Dec. 2016
Input voltage	:	AC 230V, 50Hz
Operation mode	:	A
Artificial hand	:	N/A
Signal lines and control lines	:	N/A
Output dc power ports	:	3V (rms)
Input ac power ports	:	3V (rms)
Temperature	:	22°C & 25°C
Humidity	:	48% & 56%
Air pressure	:	100.1kPa & 101kPa

Photograph 5: Set-up for Radio-frequency Common Mode / Conducted Susceptibility (CS)

Test Result
Table 2: Immunity against Radio-frequency Common Mode / Conducted Susceptibility (CS)

Coupling point	Application	Level (V(r.m.s))	Remark
Power ports			
AC input port	CDN-M3	3	Applied, *)
DC output port	EM clamp	3	Applied, *)
Signal and control lines			
	Current Clamp	3	N/A
	EM clamp	3	N/A

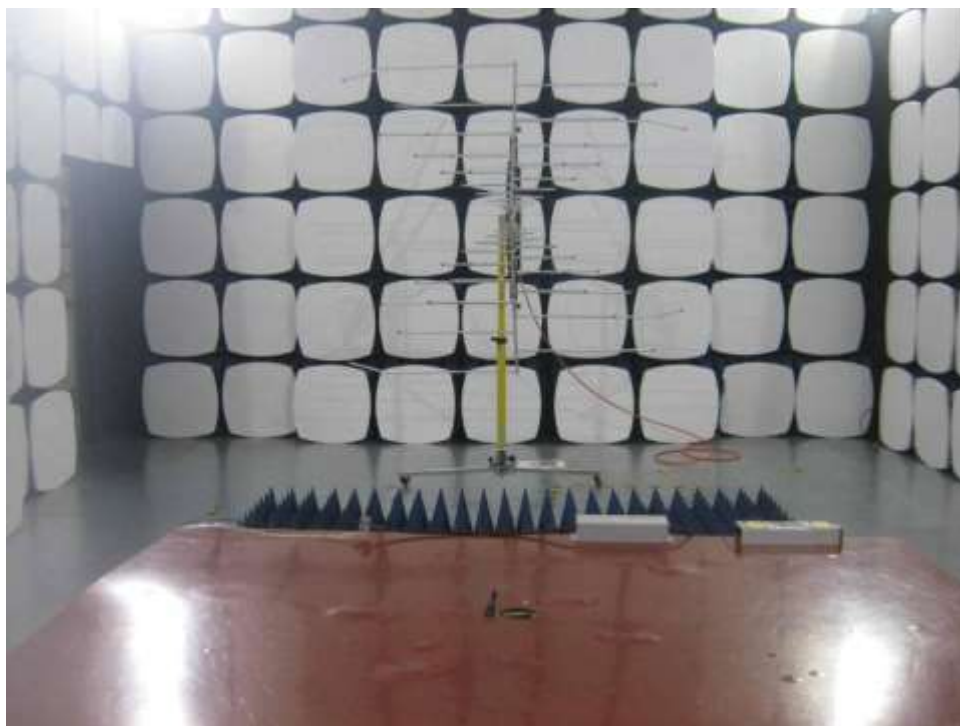
*) Remark: No degradation was found.

6.2.3 Radio-frequency Electromagnetic Fields (RS)**RESULT:****Pass****Test Specification**

Family standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-3
Test site	:	FAC
Uniform field area (UFA)	:	1.5 m x 1.5 m, 16 points with a minimum UFA size 0.5 m x 0.5 m, 75 % of calibration points within specifications if UFA is larger than 0.5 m x 0.5 m . 100 % (all 4 points) in the specifications for 0.5 x 0.5 m UFA
Amplitude modulation	:	80 % ± 5 % in depth, 1 kHz ± 10 % sine
Frequency bandwidth	:	80MHz to 1000MHz
Level	:	3 V/ m (un-modulated)
Frequency step	:	1% with 3 s dwell time
Performance criterion	:	A

Test Setup

Date of testing	:	09.Dec. 2016
Input voltage	:	AC 230V, 50Hz
Operation mode	:	A
Artificial hand	:	N/A
Temperature	:	25°C
Humidity	:	56%
Air pressure	:	101kPa

Photograph 6: Set-up for Radio-frequency Electromagnetic Fields (RS)

Test Result
Table 3: Immunity against Radio-frequency Electromagnetic Fields (RS)

Side of the equipment under test	Frequency (MHz)	Antenna polarization (Vertical/Horizontal)	Remark
Front	80-1000	V and H	Applied, *)
Rear	80-1000	V and H	Applied, *)
Right	80-1000	V and H	Applied, *)
Left	80-1000	V and H	Applied, *)

*) Remark: No degradation was found.

6.3 Transient Disturbances

6.3.1 Electrical Fast Transients (EFT)

RESULT: **Pass**

Test Specification

Family standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-4
Wave shape of the pulse in 50 Ω load	:	
Rise time		5 ns $\pm$ 30 %
Duration		50 ns $\pm$ 30 %
Wave shape into 1 k Ω load	:	
Rise time		5 ns $\pm$ 30 %
Duration		50 ns with a tolerance of -15 ns to +100
nsBurst duration	:	15 ms $\pm$ 20 % at 5 kHz
Burst period	:	300 ms $\pm$ 20 %
Repetition frequency	:	5 kHz
Polarity	:	Positive and negative
Time of application	:	2 minutes
Performance criterion	:	B

Test Setup

Date of testing	:	07 Dec. 2016
Input voltage	:	AC 230V, 50Hz
Operation mode	:	A
Artificial hand	:	N/A
Signal and telecommunication ports	:	N/A
Output dc power ports	:	
		0.5kV
Input ac power ports	:	1kV
Temperature	:	23°C
Humidity	:	46%
Air pressure	:	101kPa

Photograph 7: Set-up for Electrical Fast Transient (EFT)

Test Result
Table 4: Immunity against Electrical Fast Transients (EFT)

Coupling point	Application	Level (kV)	Polarity	Remark
Power ports				
AC power port	Coupling network	1	+	Applied, *)
		1	-	Applied, *)
DC power port	Coupling clamp	0.5	+	Applied, *)
		0.5	-	Applied, *)
Signal lines				
	Coupling clamp	0.5	+	N/A
		0.5	-	N/A
Control lines				
	Coupling clamp	0.5	+	N/A
		0.5	-	N/A

*) Remark: No degradation was found.

6.3.2 Surge**RESULT: Pass****Test Specification**

Family standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-5
Definitions of the waveform parameters:		
Front time		1.2 μs $\pm$ 30 %
Time to half value		50 μs $\pm$ 20
%Source impedance	:	
Power line symmetrical		2 Ω + 18 μF
Power line unsymmetrical		12 Ω + 9 μF
Polarity	:	Positive and negative
Number of surges / polarity /phase angle	:	5
Phase angles	:	90° and 270 °
Repetition rate	:	60 s
Performance criterion	:	C

Test Setup

Date of testing	:	07 Dec 2016
Input voltage	:	AC 230V, 50Hz
Operation mode	:	A
Temperature	:	23°C
Humidity	:	46%
Air pressure	:	101kPa

Photograph 8: Set-up for Surge



Test Result

Table 5: Surge Immunity Tests

Coupling point	Application	Level (kV)	Polarity	Remark
AC power port	Between phase and neutral	0.5, 1	+	Applied, **)
		0.5, 1	-	Applied, **)
AC power port	Between phase and earth	0.5, 1, 2	+	Applied, *)
		0.5, 1, 2	-	Applied, *)
AC power port	Between neutral and earth	0.5, 1, 2	+	Applied, *)
		0.5, 1, 2	-	Applied, *)

*) Remark: No degradation was found.

**) Remark: The LED loaded of EUT was flickering during the test and recovered by itself after the test.

6.3.3 Electrostatic Discharges (ESD)

RESULT: **Pass**

Test Specification

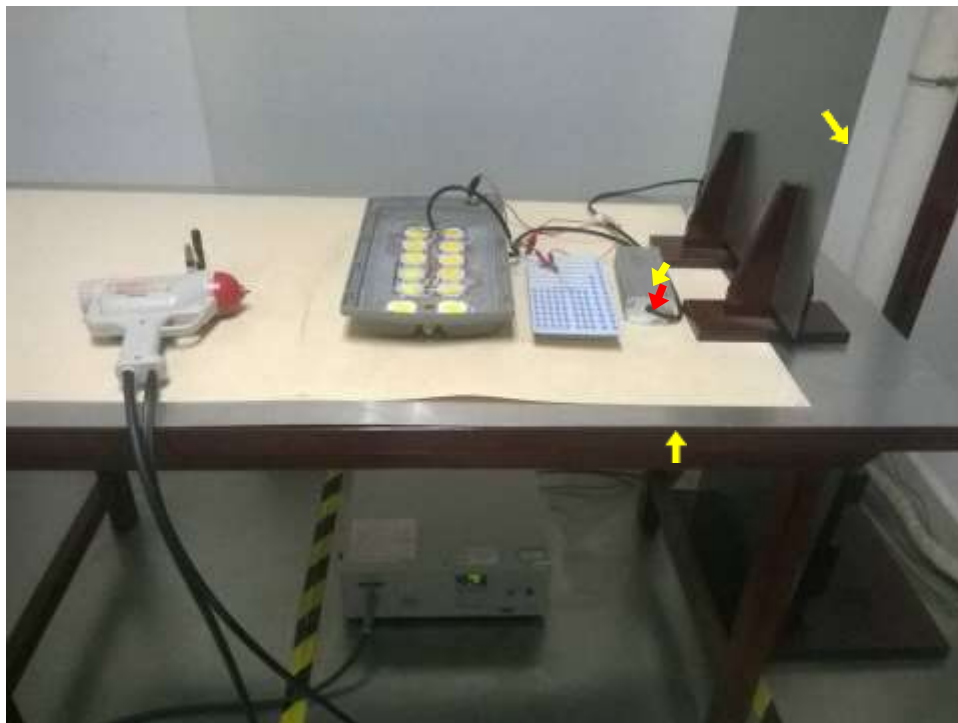
Family standard	: EN 61547:2009
Basic standard	: IEC 61000-4-2
Discharge impedance	: 330 Ω / 150 pF
Number of discharges	: ≥ 10
Type of discharge	: Contact discharge and Air discharge
Polarity	: Positive and negative
Discharge location	: See photo documentation of the test set-up All external locations accessible by hand Horizontal coupling plate (HCP) Vertical coupling plate (VCP)
Performance criterion	: B

Test Setup

Date of testing	: 07 Dec. 2016
Input voltage	: AC 230V, 50Hz
Operation mode	: A
Temperature	: 23°C
Humidity	: 46%
Air pressure	: 101kPa

Photograph 9: Set-up for Electrostatic Discharge

⚡ Contact Discharge $\pm 4\text{kV}$ ⚡ Air Discharge $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$


Test Result
Table 6: Electrostatic Discharge

Direct discharges			
Air discharges Discharge location	Air discharge voltage (kV)	Polarity	Remark
Refer to Photograph of ESD setup	2,4,8	+/-	Applied, *)
Non-conductive parts of enclosure	2,4,8	+/-	Applied, *)
Contact discharges Discharge location	Contact discharge voltage (kV)	Polarity	Remark
Refer to Photograph of ESD setup	4	+/-	Applied, *)
Conductive parts	4	+/-	Applied, *)
Indirect discharges			
Contact discharges Discharge location	Contact discharge voltage (kV)	Polarity	Remark
HCP	4	+/-	Applied, *)
VCP	4	+/-	Applied, *)

***) Remark: No degradation was found.**
Products

6.4 Power Supply Alterations

6.4.1 Voltage Dips and Interruptions

RESULT: **Pass**

Test Specification

Family standard	:	EN 61547:2009
Basic standard	:	IEC 61000-4-11
Test voltage generator characteristics for interruptions	:	
Rise time		Between 1 μ s and 5 μ s
Fall time		Between 1 μ s and 5 μ s
Output impedance of the test voltage generator:		<(0.4 + j 0.25 Ω)
Phase angle	:	0°, 180°
Nominal mains voltage (Ut)	:	AC230V
Rated frequency	:	50/60 Hz
Number of interruptions	:	3
Number of voltage dips	:	3
Interval	:	>10s
Performance criterion	:	B+C

Test Setup

Date of testing	:	07 Dec. 2016
Input	:	AC 230V, 50Hz
Operation mode	:	A
Temperature	:	23°C
Humidity	:	46%
Air pressure	:	101kPa

Photograph 10: Set-up for Voltage Dips and Interruptions



Test Result

Table 7: Voltage Dip and Interruptions Immunity

Interruptions			
Test level (%Ut)	Duration (cycle)	Number of interruptions	Result
0	0.5	3	Applied, *)
Voltage dips			
Test level (%Ut)	Duration (cycle)	Number of voltage dips	Result
70	10	3	Applied, *)

*) Remark: The LED loaded of EUT was flickering during the test and recovered by itself after the test.

7. List of Tables

Table 1: List of Test and Measurement Equipment.....	6
Table 2: Immunity against Radio-frequency Common Mode / Conducted Susceptibility (CS)	23
Table 3: Immunity against Radio-frequency Electromagnetic Fields (RS)	25
Table 4: Immunity against Electrical Fast Transients (EFT)	27
Table 5: Surge Immunity Tests	29
Table 6: Electrostatic Discharge	31
Table 7: Voltage Dip and Interruptions Immunity.....	33

8. List of Photographs

Photograph 1: Set-up for Harmonic Current Emission on AC Mains	12
Photograph 2: Set-up for Continuous Disturbance Voltage.....	15
Photograph 3: Set-up for Radiated Electromagnetic Disturbances	17
Photograph 4: Set-up for Radiated Disturbance (30 MHz – 300 MHz)	19
Photograph 5: Set-up for Radio-frequency Common Mode / Conducted Susceptibility (CS)	23
Photograph 6: Set-up for Radio-frequency Electromagnetic Fields (RS)	25
Photograph 7: Set-up for Electrical Fast Transient (EFT).....	27
Photograph 8: Set-up for Surge	29
Photograph 9: Set-up for Electrostatic Discharge	31
Photograph 10: Set-up for Voltage Dips and Interruptions	33

Prüfbericht - Nr.:**16079270 001****Seite 1 von 44**

Test Report No.

Page 1 of 44

Product: EMC70-2100 Serial no: Description: Test Date: 2016 Dec 7 10:48 Result Name:		2016 Dec 7 10:56 Page 1 of 1
Type of Test: EN61000.2014 Harmonics inc. interharmonics to EN61000-4-7:2002 Limits: Class C > 25W Power Analyzer: Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6 Channel(s): 1. SN: 080015502054, 28 Adjusted Date: 21 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None Shunt(s): 1. SN: 081024301817, 4 Adjusted Date: 27 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None AC Source: Mains / Manual Source		
Harmonic Results Against Chosen Limits: PASS	Notes:	
Test Parameter Details Operating Frequency: Operating Voltage: Specified Power: Fundamental Current: Power Factor: Average Input Current: Maximum POHC: POHC Limit: Maximum THC: Minimum Power: Class Multiplier: Test Duration:	User Entered 50 230 0.0000 0.3500 0.9400 0.3625 0.0153 0.0332 0.1022 75 1.0000 00:02:30	Measured 50.0801 229.6109 70.6165 0.3547 0.9433 0.3625 0.0153 0.0332 0.1022 75 1.0000 00:02:30

Prüfbericht - Nr.:**16079270 001**

Seite 2 von 44

Test Report No.

Page 2 of 44

Product:	EMC70-2100	2016 Dec 7 10:55
Serial no:		Page 1 of 1
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2016 Dec 7 10:48
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2014)	
Power Analyzer:	Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6	
Channel(s):	1. SN: 080015602054, 26 Adjusted Date: 21 JUN 2011. 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	1. SN: 081024301917, 4 Adjusted Date: 27 JUN 2011. 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class C > 25W
Class Multiplier	1

Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FA1	Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FA1
2	12.40mA	18.50mA	0.347mA	N/A	0.438mA	N/A	N/A	3	174.8mA	262.2mA	94.28mA	✓✓	94.36mA	✓	Pass
4	None	None	0.130mA		0.206mA		N/A	5	62.00mA	92.99mA	30.58mA	✓✓	30.75mA	✓	Pass
6	None	None	0.225mA		0.257mA		N/A	7	43.40mA	65.09mA	12.93mA	✓✓	13.00mA	✓	Pass
8	None	None	0.130mA		0.218mA		N/A	9	31.00mA	48.49mA	8.023mA	✓✓	8.108mA	✓	Pass
10	None	None	0.191mA		0.214mA		N/A	11	18.60mA	27.90mA	5.238mA	✓✓	5.228mA	✓	Pass
12	None	None	0.184mA		0.188mA		N/A	13	18.60mA	27.90mA	5.765mA	✓✓	5.820mA	✓	Pass
14	None	None	0.173mA		0.195mA		N/A	15	18.60mA	27.90mA	5.748mA	✓✓	5.825mA	✓	Pass
16	None	None	0.128mA		0.156mA		N/A	17	18.60mA	27.90mA	5.081mA	✓✓	5.149mA	✓	Pass
18	None	None	0.154mA		0.179mA		N/A	19	18.60mA	27.90mA	4.724mA	N/A	4.765mA	N/A	N/A
20	None	None	0.198mA		0.214mA		N/A	21	18.60mA	27.90mA	5.286mA	✓✓	5.333mA	✓	Pass
22	None	None	0.123mA		0.150mA		N/A	23	18.60mA	27.90mA	4.900mA	N/A	4.957mA	N/A	N/A
24	None	None	0.207mA		0.238mA		N/A	25	18.60mA	27.90mA	4.658mA	N/A	4.699mA	N/A	N/A
26	None	None	0.126mA		0.153mA		N/A	27	18.60mA	27.90mA	5.406mA	✓✓	5.519mA	✓	Pass
28	None	None	0.225mA		0.255mA		N/A	29	18.60mA	27.90mA	5.894mA	N/A	5.711mA	N/A	N/A
30	None	None	0.144mA		0.171mA		N/A	31	18.60mA	27.90mA	5.934mA	N/A	5.968mA	N/A	N/A
32	None	None	0.224mA		0.283mA		N/A	33	18.60mA	27.90mA	5.879mA	N/A	5.402mA	N/A	N/A
34	None	None	0.177mA		0.208mA		N/A	35	18.60mA	27.90mA	5.061mA	N/A	5.888mA	N/A	N/A
36	None	None	0.169mA		0.219mA		N/A	37	18.60mA	27.90mA	5.702mA	N/A	5.748mA	N/A	N/A
38	None	None	0.199mA		0.227mA		N/A	39	18.60mA	27.90mA	4.035mA	N/A	4.098mA	N/A	N/A
40	None	None	0.117mA		0.157mA		N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Harmonic current below 0.0% of rated current or 5mA, whichever is greater, are disregarded.

Prüfbericht - Nr.:

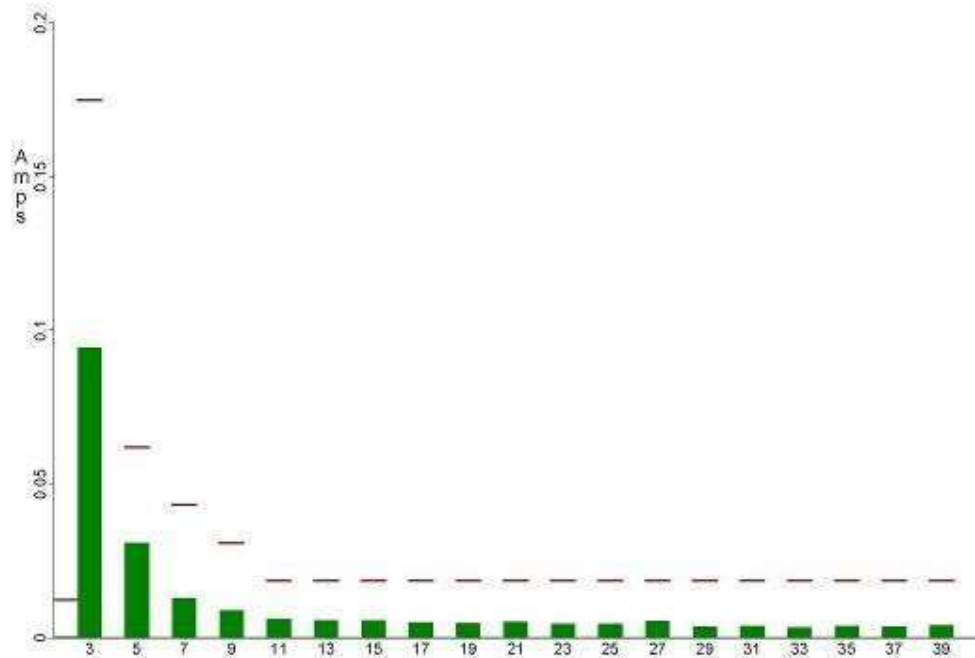
16079270 001

Seite 3 von 44

Test Report No.

Page 3 of 44

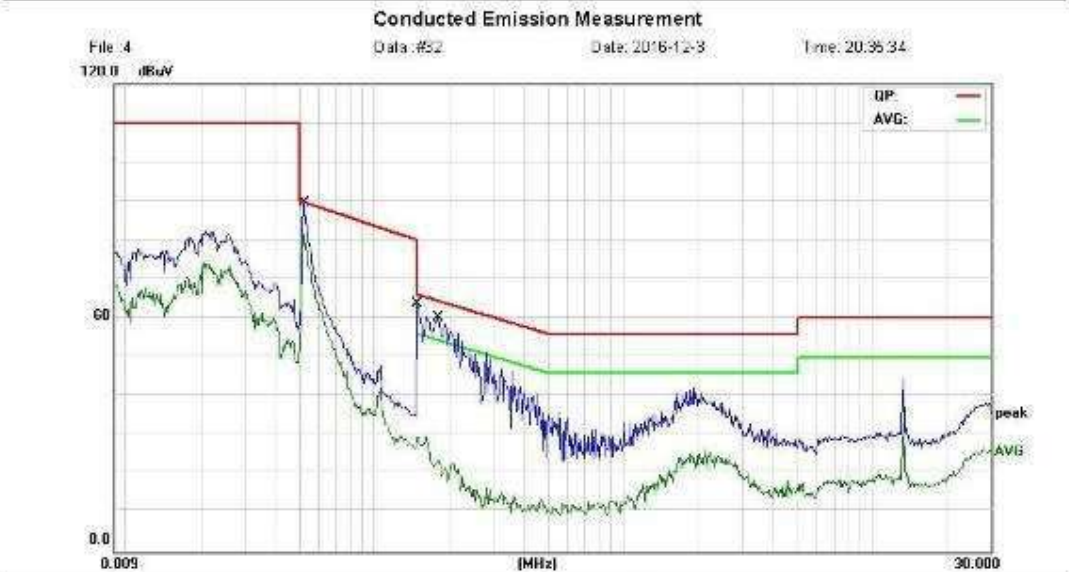
Product: EMC70-2100		2016 Dec 7 10:56
Serial no:		Page 1 of 1
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2016 Dec 7 10:48
Type of Test: Fluctuating Harmonics Test - Average Vs Limit1 Bar Chart (2014)		
Power Analyzer: Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6		
Channel(s):		
1. SN: 080015902054, 26 Adjusted Date: 21 JUN 2011. 2. SN:None Adjusted Date:None		
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None		
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
Shunt(s):		
1. SN: 081024301917, 4 Adjusted Date: 27 JUN 2011. 2. SN:None Adjusted Date:None		
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None		
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
AC Source: Mains / Manual Source		
Overall Result:		
PASS		



Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 4 von 44
Page 4 of 44



Site: EMC Testing Room
Limit: (CE)EN55015_QP
EUT: LED Driver
M/N: EMC70-2100
Mode: Full Load
Note:

Phase: L1 Temperature: 23
Power: AC 100V/60Hz Humidity: 46 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBμV	dB	dBμV	dBμV	dB		
1	*	0.0520	74.06	9.68	83.74	89.64	-5.90	QP	
2		0.1500	47.83	9.51	57.34	65.99	-8.65	QP	
3		0.1500	17.45	9.51	26.96	55.99	-29.03	AVG	
4		0.1819	43.88	9.60	53.48	64.39	-10.91	QP	
5		0.1819	13.49	9.60	23.09	54.39	-31.30	AVG	

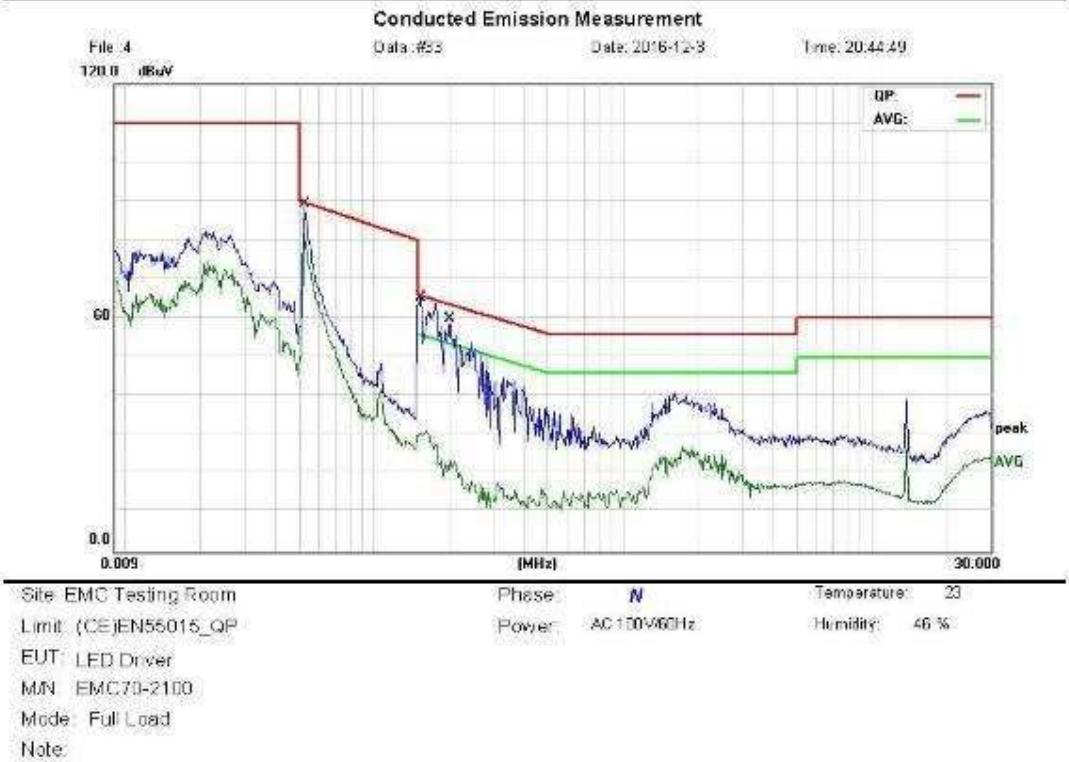
*Maximum data x:Over limit :over margin

(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 5 von 44
Page 5 of 44



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.0524	74.85	9.68	84.53	89.57	-5.04	QP	
2		0.1539	47.66	9.52	57.18	65.78	-8.60	QP	
3		0.1539	21.41	9.52	30.93	55.78	-24.85	AVG	
4		0.2020	40.51	9.65	50.16	63.52	-13.36	QP	
5		0.2020	11.94	9.65	21.59	53.52	-31.93	AVG	

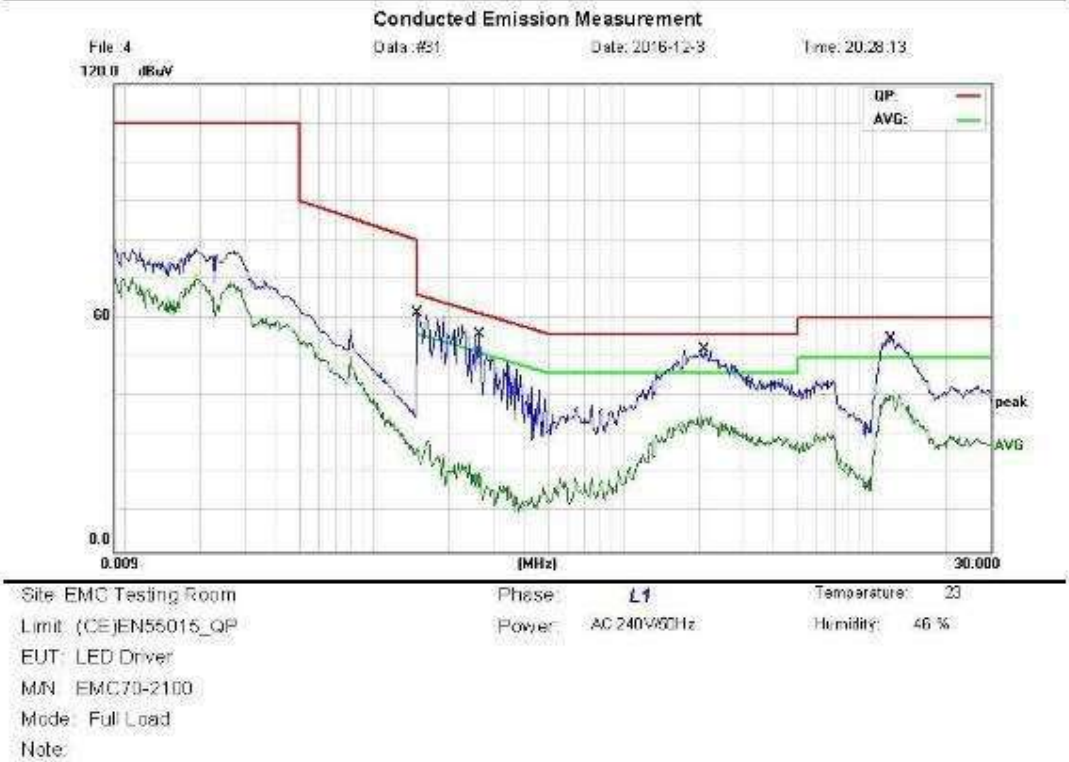
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 6 von 44
Page 6 of 44



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBμV	dB	dBμV	dBμV	dB	Detector	Comment
1 *	0.1500	45.41	9.51	54.92	65.99	-11.07	QP	
2	0.1500	16.44	9.51	25.95	55.99	-30.04	AVG	
3	0.2860	35.06	9.65	44.71	61.24	-16.53	QP	
4	0.2860	7.31	9.65	16.96	51.24	-34.28	AVG	
5	2.1179	34.92	9.69	44.61	56.00	-11.39	QP	
6	2.1179	18.77	9.69	28.46	46.00	-17.54	AVG	
7	11.9260	38.10	9.84	47.94	60.00	-12.06	QP	
8	11.9260	22.49	9.84	32.33	50.00	-17.67	AVG	

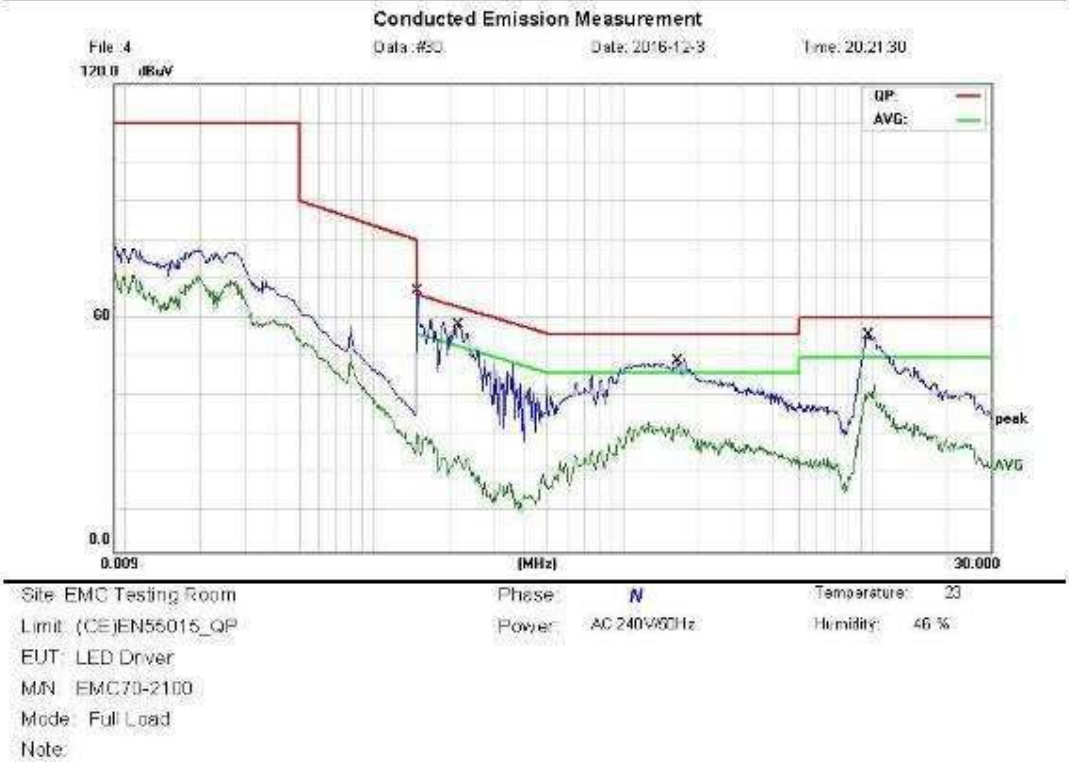
*Maximum data x:Over limit :over margin

(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 7 von 44
Page 7 of 44



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1500	46.98	9.51	56.49	65.99	-9.50	QP	
2		0.1500	17.23	9.51	26.74	55.99	-29.25	AVG	
3		0.2180	40.14	9.65	49.79	62.89	-13.10	QP	
4		0.2180	13.52	9.65	23.17	62.89	-39.72	AVG	
5		1.6459	32.21	9.69	41.90	56.00	-14.10	QP	
6		1.6459	20.87	9.69	30.56	46.00	-15.44	AVG	
7		9.6859	37.59	9.81	47.40	60.00	-12.60	QP	
8		9.6859	24.10	9.81	33.91	50.00	-16.09	AVG	

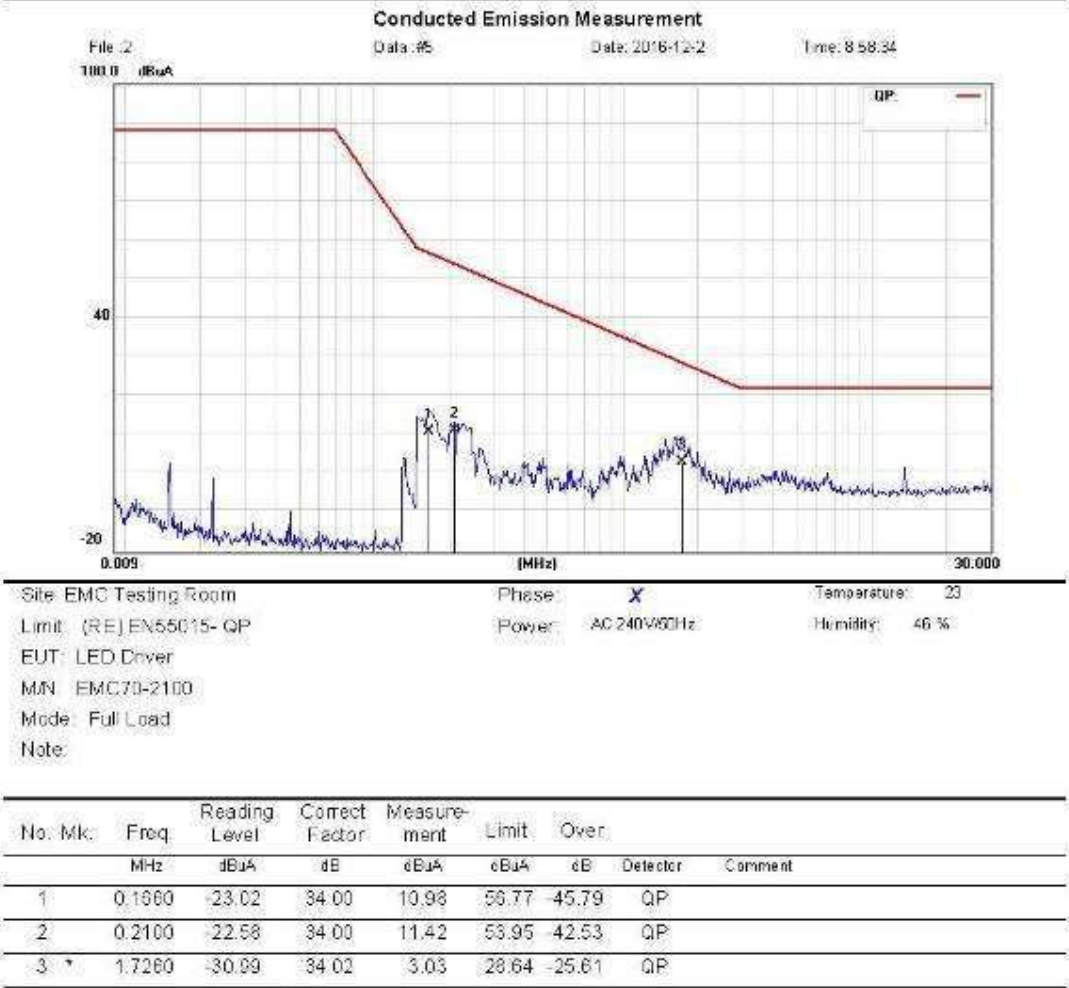
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 8 von 44
Page 8 of 44



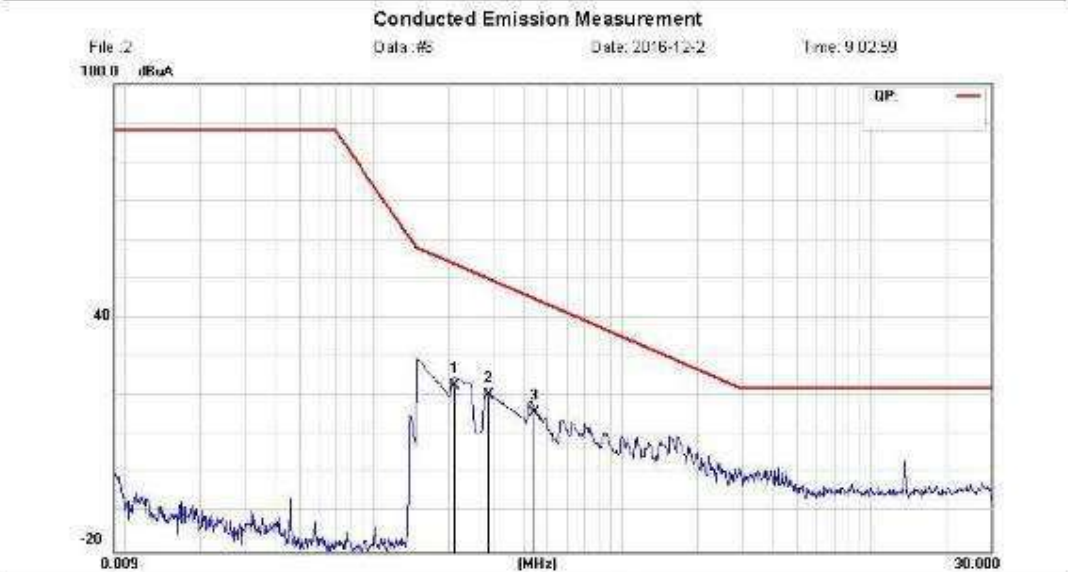
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 9 von 44
Page 9 of 44



Site: EMC Testing Room
Limit: (RE) EN55015- QP
EUT: LED Driver
M/N: EMC70-2100
Mode: Full Load
Note:

Phase: Y Temperature: 23
Power: AC 240V/50Hz Humidity: 46 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuA	dB	dBuA	dBuA	dB		
1		0.2112	-11.28	34.00	22.72	53.88	-31.16	QP	
2		0.2874	-13.69	34.00	20.31	50.18	-29.87	QP	
3	*	0.4382	-18.13	34.00	15.87	45.11	-29.24	QP	

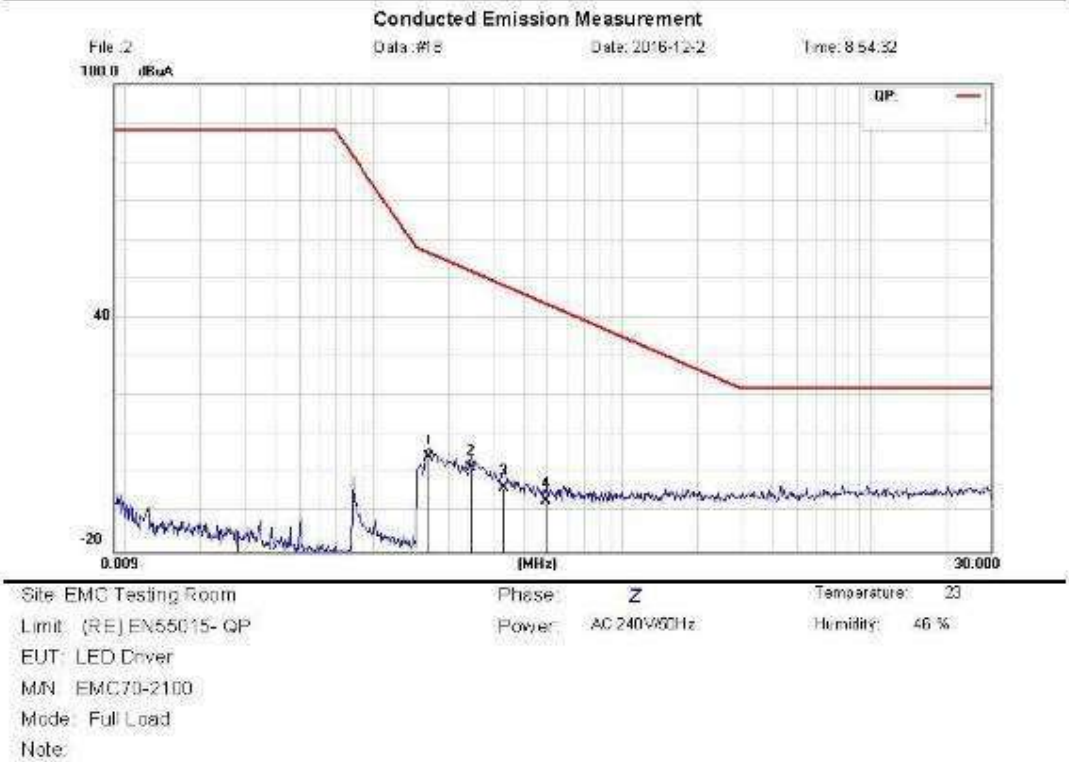
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 10 von 44
Page 10 of 44



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector	Comment
1		0.1000	-29.71	34.00	4.29	56.77	-52.48	QP	
2	*	0.2400	-32.50	34.00	1.50	52.05	-50.55	QP	
3		0.3339	-37.51	34.00	-3.51	49.38	-51.89	QP	
4		0.4940	-41.01	34.00	-7.01	43.67	-50.68	QP	

*Maximum data. x:Over limit. :over margin

(Reference Only)

Prüfbericht - Nr.: 16079270 001
Test Report No.

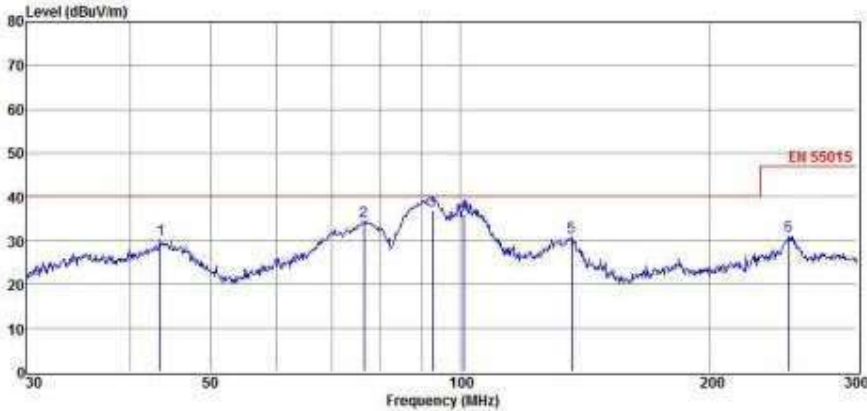
Seite 11 von 44
Page 11 of 44



中山市立创检测技术有限公司
LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber **D:\Test Data\2016 项目\2016-12-12 华标\1.EM6**
Test Date : 2016-12-12 **Tested By** : Ken
EUT : LED DRIVER **Model Number** : EMC70-2100
Power Supply : 100V-60Hz **Test Mode** : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 **Antenna/Distance** : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0003



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	43.56	13.13	16.48	0.00	0.54	30.15	40.00	-9.85	Peak	HORIZONTAL
2	76.58	26.87	6.63	0.00	0.74	34.24	40.00	-5.76	Peak	HORIZONTAL
3	92.50	26.10	9.91	0.00	0.81	36.82	40.00	-3.18	QP	HORIZONTAL
4	100.95	23.50	11.64	0.00	0.85	35.99	40.00	-4.01	QP	HORIZONTAL
5	136.18	21.50	8.20	0.00	1.02	30.72	40.00	-9.28	Peak	HORIZONTAL
6	248.38	17.54	12.11	0.00	1.49	31.14	47.00	-15.86	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

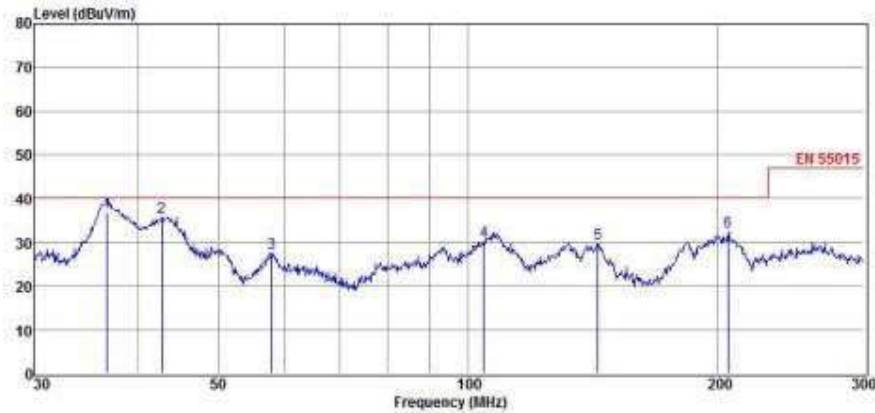
Seite 12 von 44
Page 12 of 44



中山市立创检测技术有限公司
LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-12 Tested By : Ken
EUT : LED DRIVER Model Number : EMC70-2100
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0004



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	36.74	24.30	11.90	0.00	0.58	36.78	40.00	-3.22	QP	VERTICAL
2	42.77	19.12	16.08	0.00	0.63	35.83	40.00	-4.17	Peak	VERTICAL
3	57.96	16.55	10.28	0.00	0.74	27.57	40.00	-12.43	Peak	VERTICAL
4	104.50	17.17	11.98	0.00	1.04	30.19	40.00	-9.81	Peak	VERTICAL
5	143.26	20.86	7.73	0.00	1.23	29.82	40.00	-10.18	Peak	VERTICAL
6	205.65	21.30	9.57	0.00	1.51	32.38	40.00	-7.62	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 13 von 44
Page 13 of 44

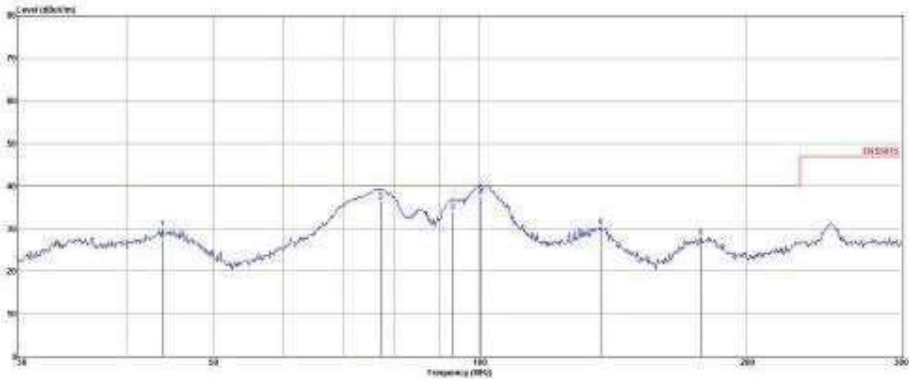


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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-12 Tested By : Ken
EUT : LED DRIVER Model Number : EMC70-2100
Power Supply : 240V-50Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/HORIZONTAL
Memo :

Data : 0002



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	43.76	12.79	16.63	0.00	0.55	29.97	40.00	-10.03	Peak	HORIZONTAL
2	77.29	29.10	6.65	0.00	0.74	36.49	40.00	-3.51	QP	HORIZONTAL
3	93.14	23.09	10.09	0.00	0.82	34.00	40.00	-6.00	QP	HORIZONTAL
4	100.49	25.20	11.57	0.00	0.85	37.62	40.00	-2.38	QP	HORIZONTAL
5	137.13	21.30	8.13	0.00	1.02	30.45	40.00	-9.55	Peak	HORIZONTAL
6	177.88	19.66	7.21	0.00	1.21	28.08	40.00	-11.92	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.: 16079270 001
Test Report No.

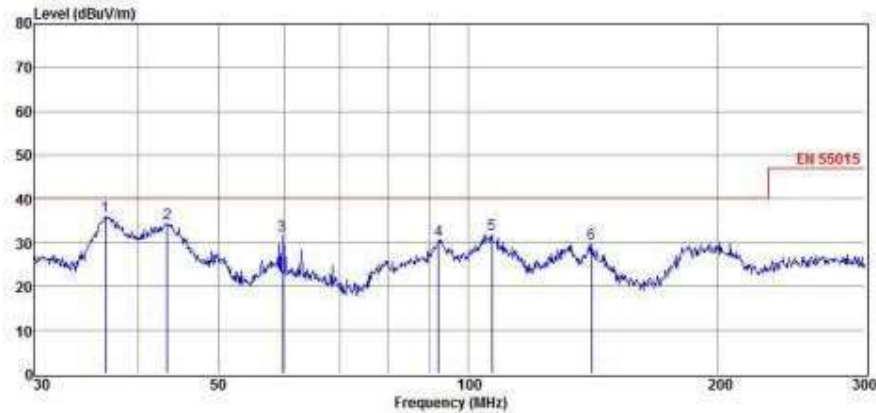
Seite 14 von 44
Page 14 of 44



中山市立创检测技术有限公司
LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber **D:\Test Data\2016 项目\2016-12-12 华标\1.EM6**
Test Date : 2016-12-12 **Tested By** : Ken
EUT : LED DRIVER **Model Number** : EMC70-2100
Power Supply : 240V-50Hz **Test Mode** : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 **Antenna/Distance** : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0001



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	36.57	23.53	11.83	0.00	0.58	35.94	40.00	-4.06	QP	VERTICAL
2	43.36	17.21	16.53	0.00	0.64	34.38	40.00	-5.62	Peak	VERTICAL
3	59.58	19.96	10.86	0.00	0.76	31.58	40.00	-8.42	Peak	VERTICAL
4	92.07	19.75	9.76	0.00	0.97	30.48	40.00	-9.52	Peak	VERTICAL
5	106.69	19.14	11.83	0.00	1.05	32.02	40.00	-7.98	Peak	VERTICAL
6	140.64	20.56	7.79	0.00	1.22	29.57	40.00	-10.43	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:**16079270 001****Seite 15 von 44**

Test Report No.

Page 15 of 44

Product: EMC150-4500 Serial no: Description: Test Date: 2016 Dec 02 19:16 Result Name:		2016 Dec 02 19:21 Page 1 of 1
Type of Test: EN61000:2014 Harmonics inc. interharmonics to EN61000-4-7:2002 Limits: Class C > 25W Power Analyzer: Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6 Channel(s): 1. SN: 080015502054, 28 Adjusted Date: 21 JUN 2011, 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None Shunt(s): 1. SN: 081024301817, 4 Adjusted Date: 27 JUN 2011, 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None AC Source: Mains / Manual Source		
Harmonic Results Against Chosen Limits: PASS	Notes:	
Test Parameter Details Operating Frequency: Operating Voltage: Specified Power: Fundamental Current: Power Factor: Average Input Current: Maximum POHC: POHC Limit: Maximum THC: Minimum Power: Class Multiplier: Test Duration:	User Entered 50 230 0.0000 0.7700 0.9600 75 1.0000 00:02:30	Measured 50.0561 229.8140 178.0483 0.7945 0.9666 0.7962 0.0124 0.0730 0.1072

Prüfbericht - Nr.:**16079270 001****Seite 16 von 44**

Test Report No.

Page 16 of 44

Product:	EMC150-4500	2016 Dec 02 19:22
Serial no:		Page 1 of 1
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2016 Dec 02 19:18
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2014)	
Power Analyzer:	Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6	
Channel(s):	1. SN: 080015502054, 26 Adjusted Date: 21 JUN 2011. 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
Shunt(s):	1. SN: 081024301917, 4 Adjusted Date: 27 JUN 2011. 2. SN: None Adjusted Date: None	
	3. SN: None Adjusted Date: None 4. SN: None Adjusted Date: None	
	5. SN: None Adjusted Date: None 6. SN: None Adjusted Date: None	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class C > 25W
Class Multiplier	1

Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FA1	Harmon	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FA1
2	15.3mA	25.6mA	0.50mA	N/A	0.64mA	N/A	N/A	3	221.7mA	332.6mA	101.0mA	✓✓	101.1mA	✓	Pass
4	None	None	0.165mA		0.220mA		N/A	5	77.00mA	115.5mA	29.83mA	✓✓	29.11mA	✓	Pass
6	None	None	0.274mA		0.315mA		N/A	7	53.89mA	80.64mA	16.63mA	✓✓	10.67mA	✓	Pass
8	None	None	0.127mA		0.216mA		N/A	9	38.50mA	57.75mA	8.59mA	✓✓	8.73mA	✓	Pass
10	None	None	0.158mA		0.210mA		N/A	11	23.03mA	34.64mA	4.72mA	N/A	4.750mA	N/A	N/A
12	None	None	0.163mA		0.206mA		N/A	13	23.69mA	34.64mA	4.05mA	N/A	4.116mA	N/A	N/A
14	None	None	0.194mA		0.228mA		N/A	15	23.03mA	34.64mA	4.89mA	N/A	4.943mA	N/A	N/A
16	None	None	0.157mA		0.161mA		N/A	17	23.03mA	34.64mA	4.05mA	N/A	4.110mA	N/A	N/A
18	None	None	0.147mA		0.166mA		N/A	19	23.03mA	34.64mA	4.54mA	N/A	4.574mA	N/A	N/A
20	None	None	0.169mA		0.213mA		N/A	21	23.03mA	34.64mA	4.43mA	N/A	4.475mA	N/A	N/A
22	None	None	0.133mA		0.159mA		N/A	23	23.03mA	34.64mA	4.17mA	N/A	4.193mA	N/A	N/A
24	None	None	0.200mA		0.235mA		N/A	25	23.03mA	34.64mA	4.02mA	N/A	4.060mA	N/A	N/A
26	None	None	0.118mA		0.155mA		N/A	27	23.03mA	34.64mA	5.10mA	✓✓	5.124mA	✓	Pass
28	None	None	0.245mA		0.267mA		N/A	29	23.03mA	34.64mA	5.170mA	N/A	5.207mA	N/A	N/A
30	None	None	0.158mA		0.183mA		N/A	31	23.03mA	34.64mA	5.86mA	N/A	5.862mA	N/A	N/A
32	None	None	0.138mA		0.226mA		N/A	33	23.03mA	34.64mA	5.08mA	N/A	5.112mA	N/A	N/A
34	None	None	0.194mA		0.222mA		N/A	35	23.03mA	34.64mA	5.710mA	N/A	5.730mA	N/A	N/A
36	None	None	0.198mA		0.227mA		N/A	37	23.03mA	34.64mA	5.37mA	N/A	5.397mA	N/A	N/A
38	None	None	0.215mA		0.249mA		N/A	39	23.03mA	34.64mA	5.943mA	N/A	5.977mA	N/A	N/A
40	None	None	0.132mA		0.172mA		N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

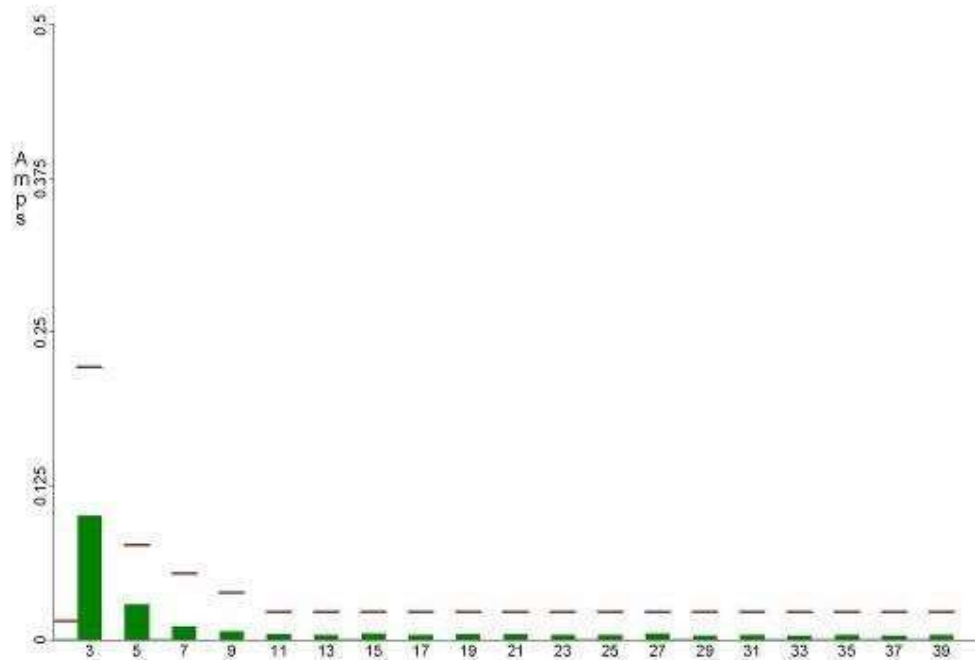
N/A : Harmonic current below 0.0% of rated current or 5mA, whichever is greater, are disregarded.

Prüfbericht - Nr.:**16079270 001****Seite 17 von 44**

Test Report No.

Page 17 of 44

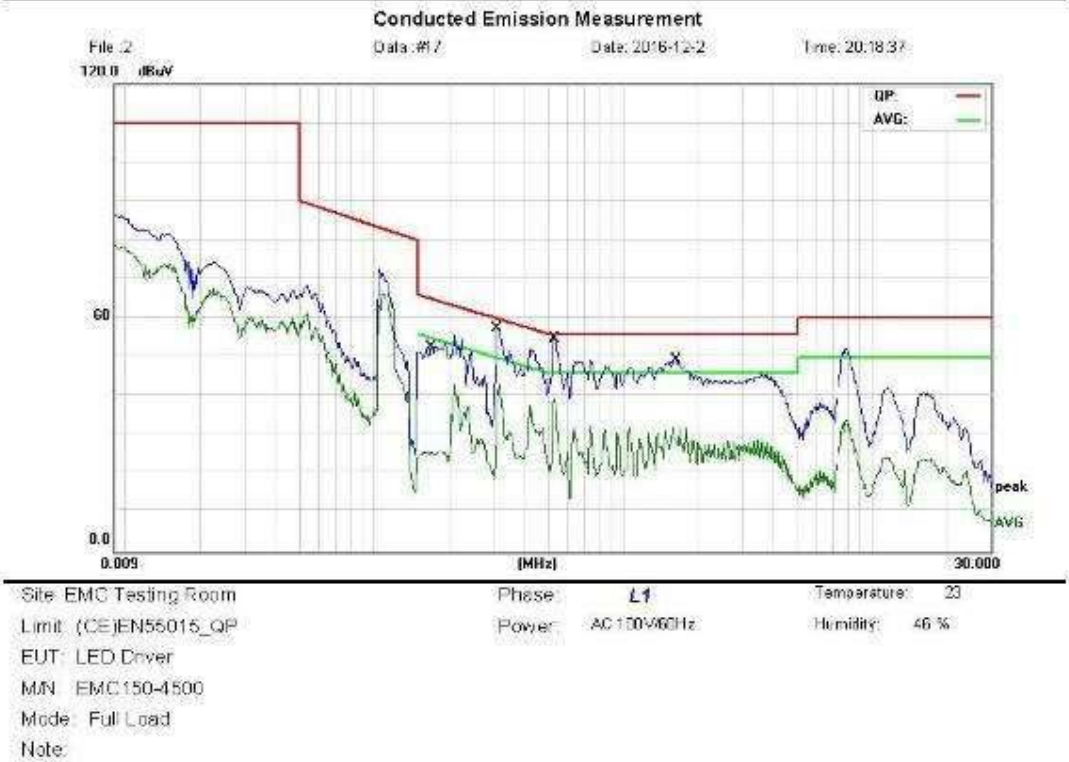
Product:	EMC150-4500		2016 Dec 02 19:23
Serial no.:			Page 1 of 1
Description:			
Result Name:			
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2016 Dec 02 19:18	
Type of Test:	Fluctuating Harmonics Test - Average Vs Limit1 Bar Chart (2014)		
Power Analyzer:	Voltech PM6000 SN: 200006700524 Firmware version: v1.22.07RC6		
Channel(s):	1. SN: 080015602054, 26 Adjusted Date: 21 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
Shunt(s):	1. SN: 081024301917, 4 Adjusted Date: 27 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
AC Source:	Mains / Manual Source		
Overall Result:	PASS		



Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 18 von 44
Page 18 of 44



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBμV	dB	dBμV	dBμV	dB	Detector	Comment
1	0.1700	35.62	9.57	45.19	64.96	-19.77	QP	
2	0.1700	11.56	9.57	21.13	64.96	-33.83	AVG	
3 *	0.5299	44.09	9.64	53.73	56.00	-2.27	QP	
4	0.5299	30.15	9.64	39.79	46.00	-6.21	AVG	
5	1.6180	36.73	9.69	46.42	56.00	-9.58	QP	
6	1.6180	18.65	9.69	28.34	46.00	-17.66	AVG	
7	0.3140	43.46	9.65	53.11	59.86	-6.75	QP	
8	0.3140	24.37	9.65	34.02	49.86	-15.84	AVG	

*Maximum data x:Over limit :Over margin (Reference Only)

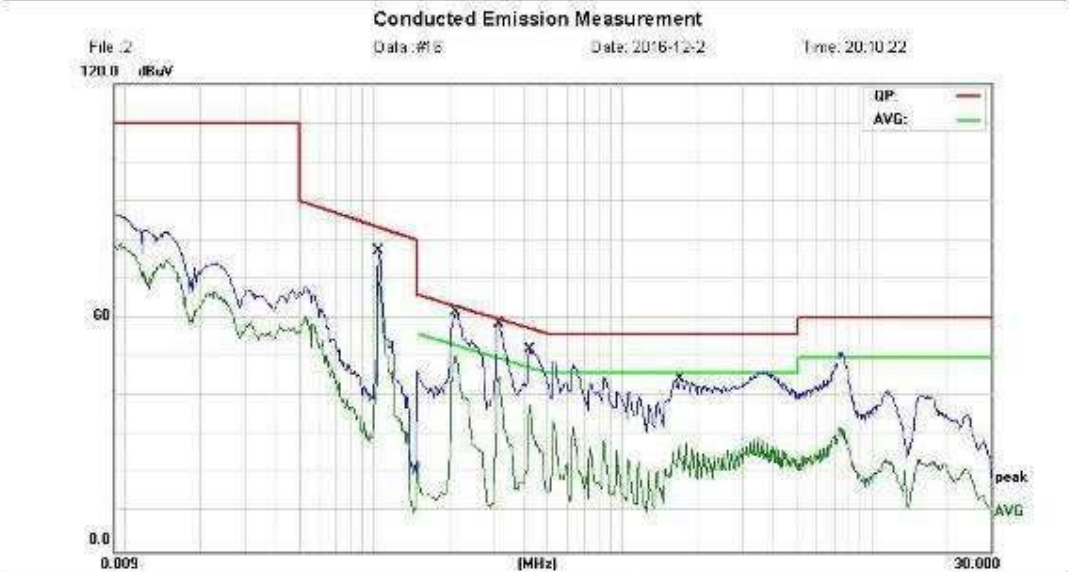
Prüfbericht - Nr.:

16079270 001

Seite 19 von 44

Test Report No.

Page 19 of 44



Site: EMC Testing Room
Limit: (CE)EN55015_QP
EUT: LED Driver
M/N: EMC150-4500
Mode: Full Load
Note:

Phase: N Temperature: 23
Power: AC 100V/60Hz Humidity: 46 %

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1	0.1049	59.69	9.64	69.33	83.25	-13.92	QP	
2 *	0.2139	48.27	9.65	57.92	63.05	-5.13	QP	
3	0.2139	27.88	9.65	37.53	53.05	-15.52	AVG	
4	0.3180	42.42	9.65	52.07	59.78	-7.69	QP	
5	0.3180	23.07	9.65	32.72	49.78	-17.04	AVG	
6	0.4220	41.37	9.64	51.01	57.41	-6.40	QP	
7	0.4220	28.18	9.64	37.82	47.41	-9.59	AVG	
8	1.6740	33.59	9.69	43.28	56.00	-12.72	QP	
9	1.6740	18.32	9.69	28.01	45.00	-17.99	AVG	

*Maximum data: x:Over limit: Over margin:

(Reference Only)

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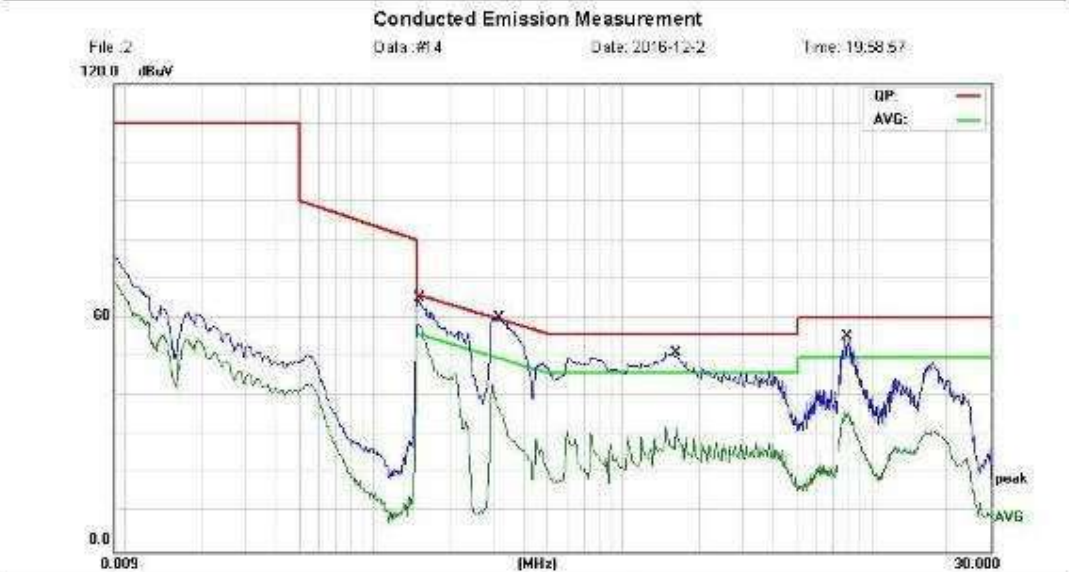
Page: 3

Engineer Signature:

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 20 von 44
Page 20 of 44



Site: EMC Testing Room
Limit: (CE)EN55015_QP
EUT: LED Driver
M/N: EMC150-4500
Mode: Full Load
Note:

Phase: L1
Power: AC 240V/50Hz
Temperature: 23
Humidity: 46 %

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1 *	0.1514	55.22	9.51	64.73	65.92	-1.19	QP	
2	0.1514	41.96	9.51	51.47	55.92	4.45	AVG	
3	0.3180	47.38	9.65	57.03	59.76	-2.73	QP	
4	0.3180	36.77	9.65	46.42	49.76	-3.34	AVG	
5	1.6300	38.91	9.69	48.60	56.00	-7.40	QP	
6	1.6300	21.50	9.69	31.19	46.00	-14.81	AVG	
7	7.9780	37.77	9.77	47.54	60.00	-12.46	QP	
8	7.9780	25.41	9.77	35.18	50.00	-14.82	AVG	

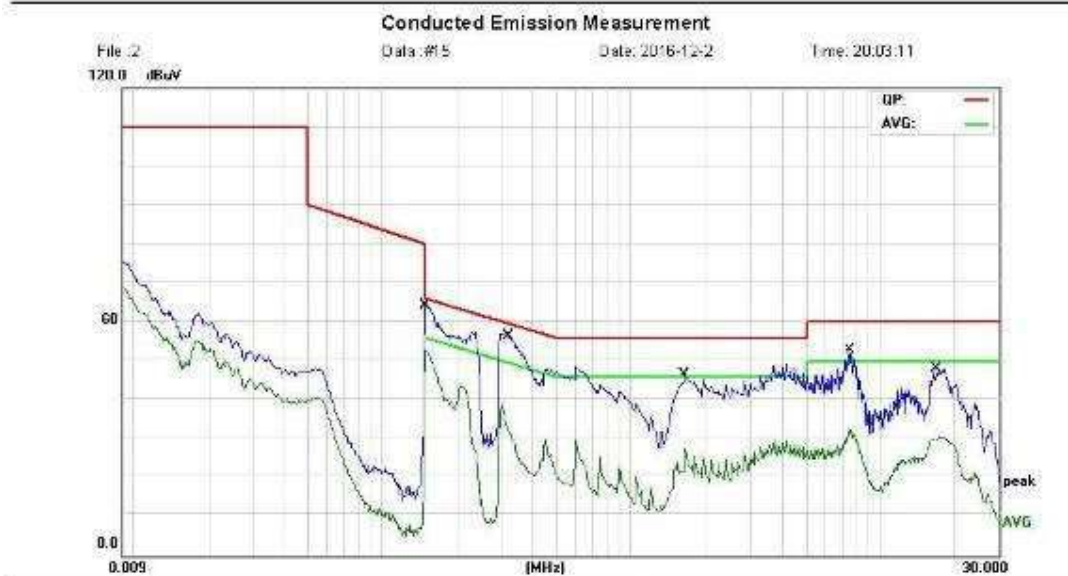
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(Reference Only)

Prüfbericht - Nr.:**16079270 001****Seite 21 von 44**

Test Report No.

Page 21 of 44



Site: EMC Testing Room

Phase: **N**

Temperature: 23

Limit: (CE)EN55015_QP

Power: AC 240V/50Hz

Humidity: 46 %

EUT: LED Driver

M/N: EMC150-4500

Mode: Full Load

Note:

No. Mkt	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1	0.1500	42.36	9.51	51.87	55.99	4.12	AVG	
2	0.3220	44.93	9.65	54.58	59.65	5.07	QP	
3	0.3220	23.59	9.65	33.24	49.65	-16.41	AVG	
4	1.6420	30.46	9.69	40.15	50.00	-15.85	QP	
5	1.6420	12.06	9.69	21.75	40.00	-24.25	AVG	
6	7.6140	31.70	9.77	41.47	60.00	-18.53	QP	
7	7.6140	20.25	9.77	30.02	50.00	-19.98	AVG	
8	16.9020	25.21	9.89	35.10	60.00	-24.90	QP	
9	16.9020	19.23	9.89	29.12	50.00	-20.88	AVG	
10 *	0.1500	55.20	9.51	64.71	65.99	-1.28	QP	

*Maximum data x:Over limit Over margin

(Reference Only)

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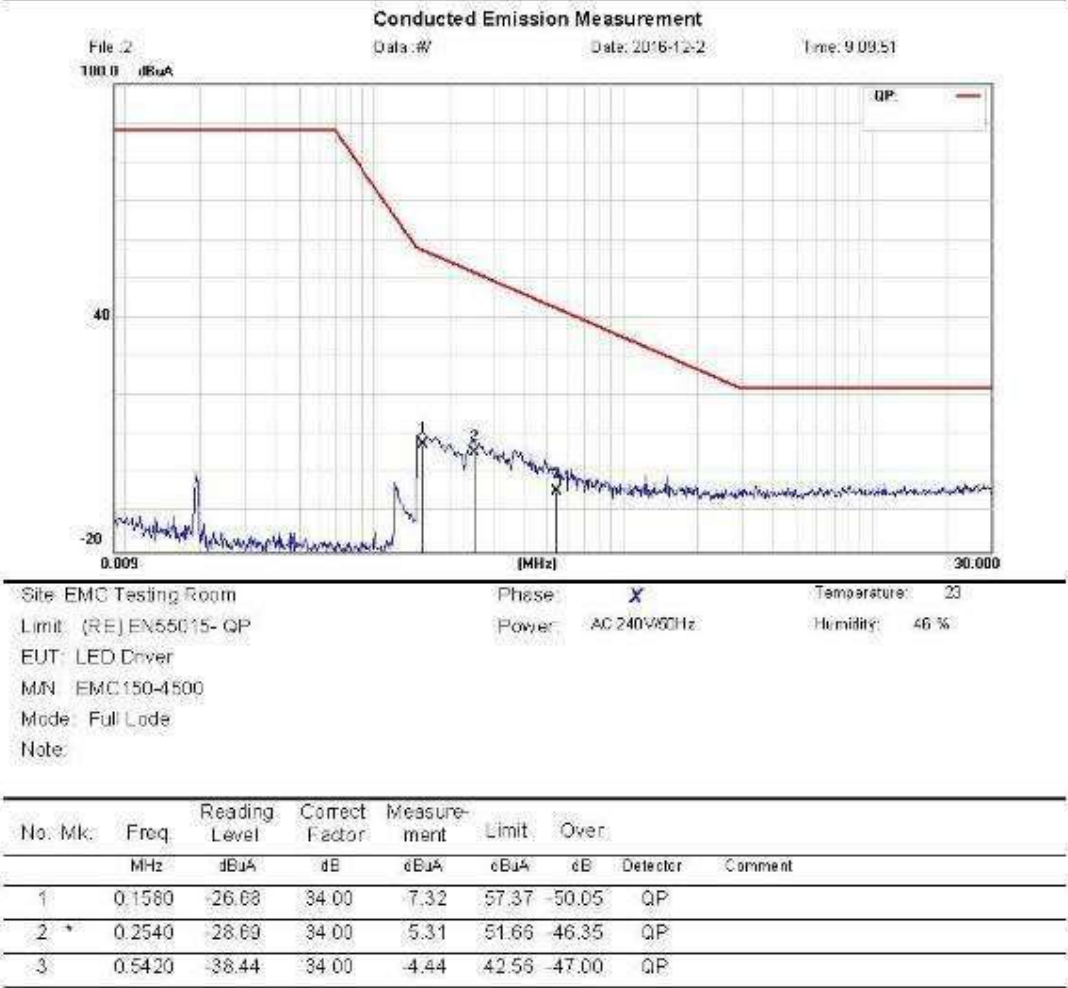
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Engineer Signature:

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 22 von 44
Page 22 of 44



*Maximum data x:Over limit :over margin

(Reference Only)

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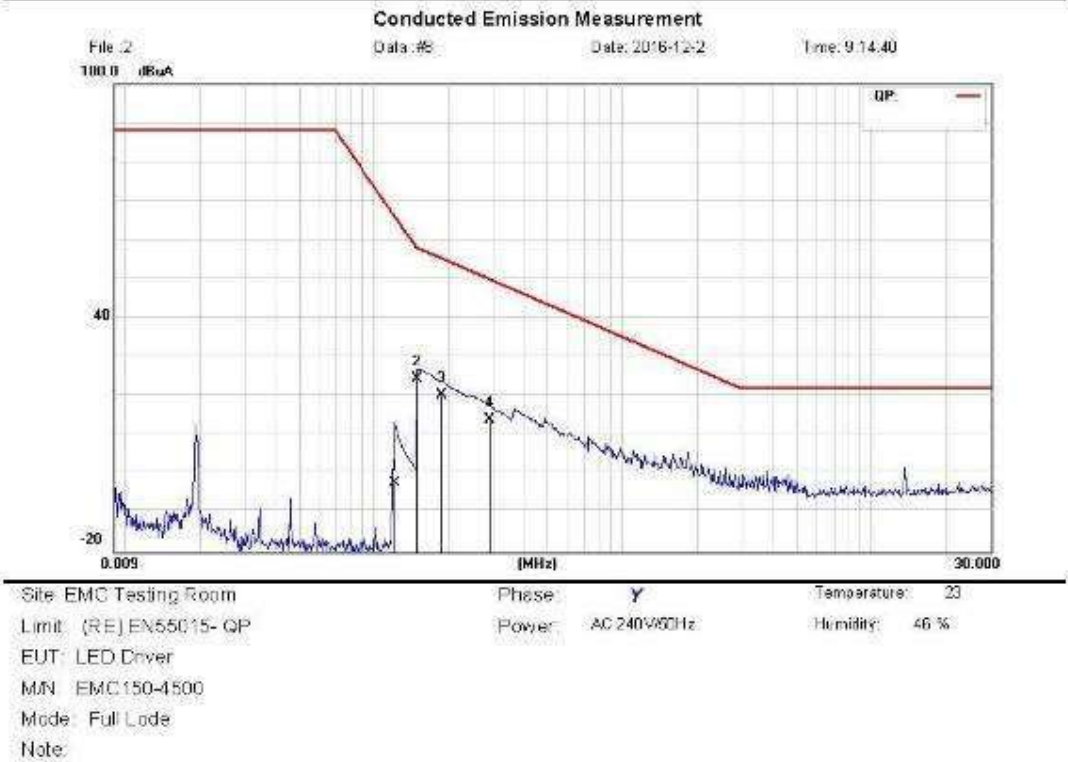
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Engineer Signature:

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 23 von 44
Page 23 of 44



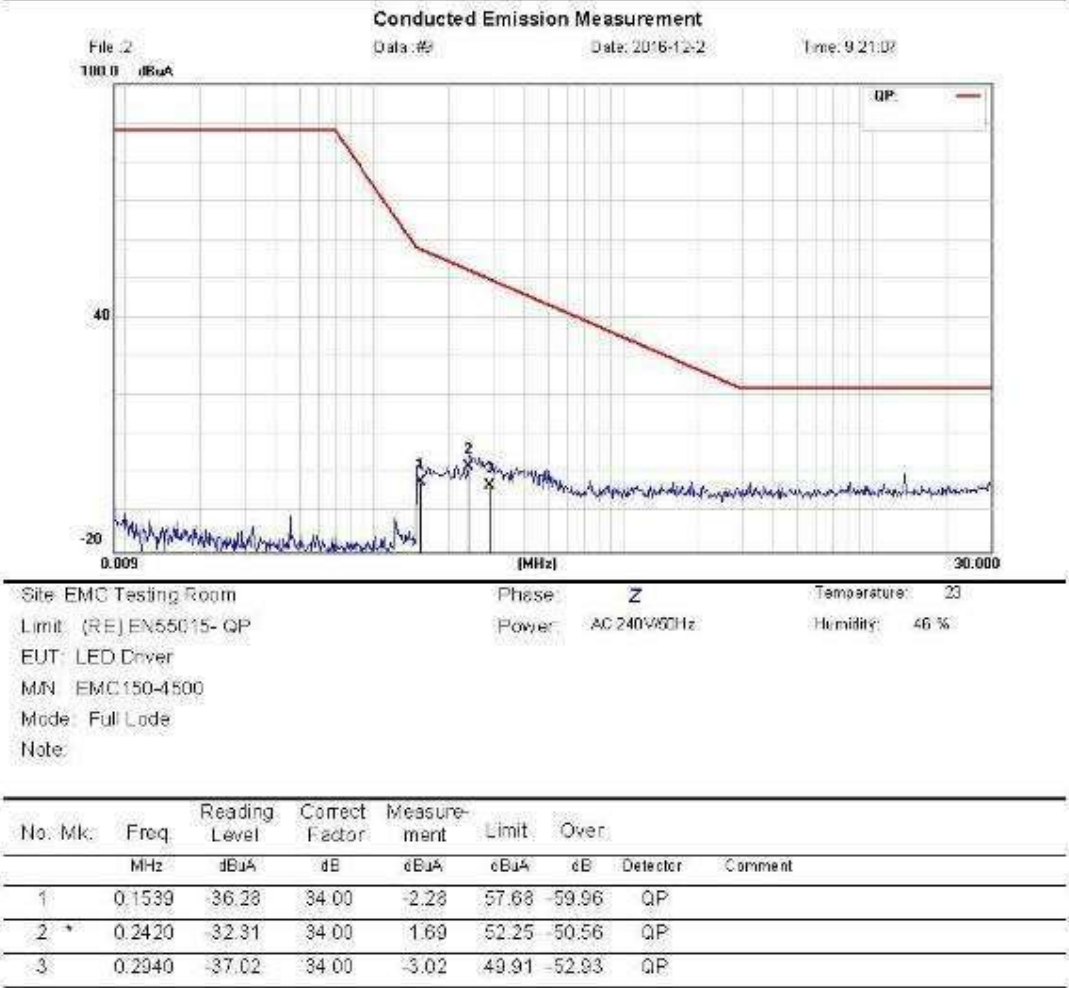
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuA	dB	dBuA	dBuA	dB		
1		0.1226	-36.46	34.00	-2.46	65.92	-68.38	QP	
2	*	0.1500	-9.53	34.00	24.47	57.99	-33.52	QP	
3		0.1864	-13.73	34.00	20.27	55.25	-34.98	QP	
4		0.2300	-19.82	34.00	14.18	50.07	-35.89	QP	

*Maximum data x:Over limit :over margin (Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 24 von 44
Page 24 of 44



*Maximum data x:Over limit :over margin

(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

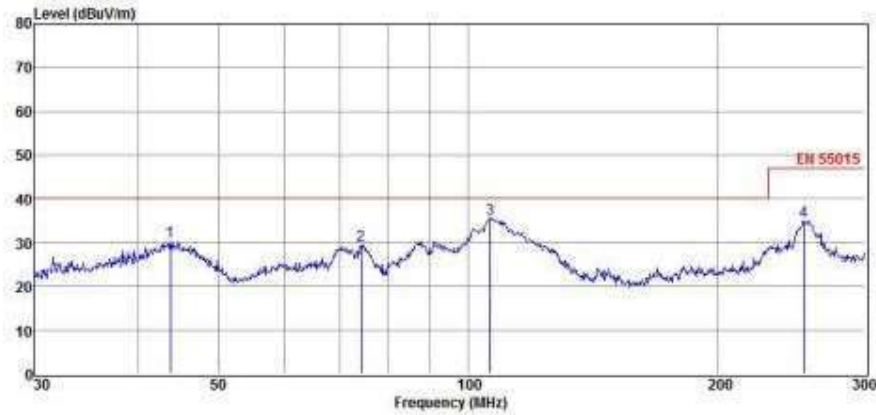
Seite 25 von 44
Page 25 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-4500
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0006



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	43.76	13.05	16.63	0.00	0.55	30.23	40.00	-9.77	Peak	HORIZONTAL
2	74.32	22.05	6.76	0.00	0.73	29.54	40.00	-10.46	Peak	HORIZONTAL
3	106.20	22.61	12.08	0.00	0.88	35.57	40.00	-4.43	Peak	HORIZONTAL
4	253.58	21.12	12.37	0.00	1.52	35.01	47.00	-11.99	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

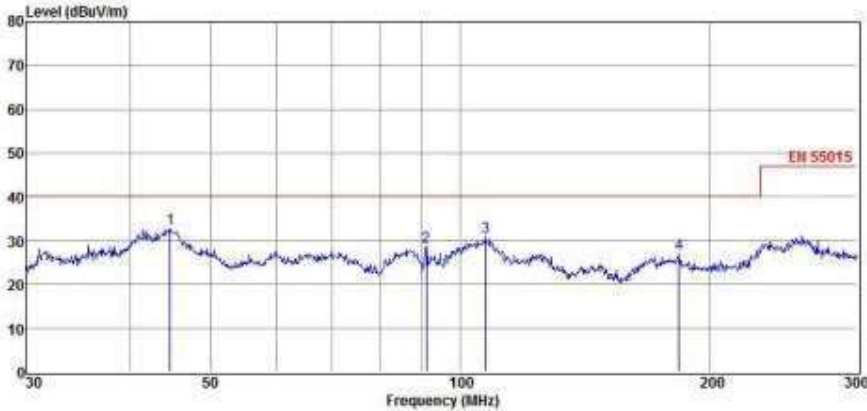
Seite 26 von 44
Page 26 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-4500
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0005



Item (Mark)	Freq (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	44.68	15.75	16.45	0.00	0.55	32.75	40.00	-7.25	Peak	VERTICAL
2	91.02	18.21	9.49	0.00	0.81	28.51	40.00	-11.49	Peak	VERTICAL
3	107.18	18.05	11.98	0.00	0.89	30.92	40.00	-9.08	Peak	VERTICAL
4	183.28	17.47	8.16	0.00	1.23	26.86	40.00	-13.14	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

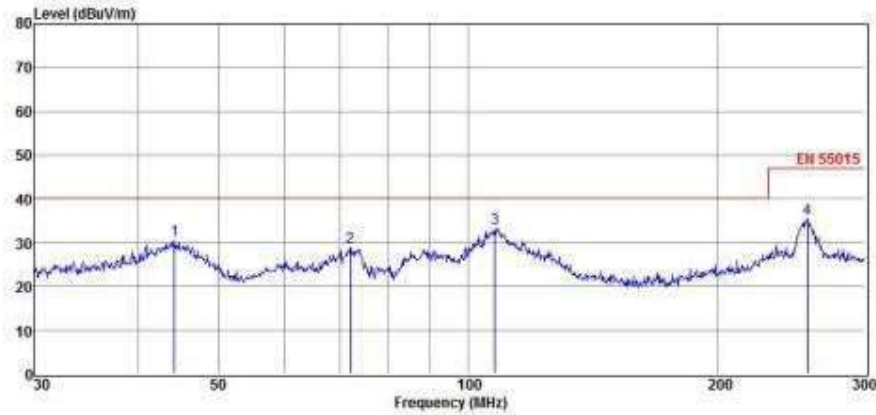
Seite 27 von 44
Page 27 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-4500
Power Supply : 240V-50Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0007



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	44.27	13.27	16.66	0.00	0.55	30.48	40.00	-9.52	Peak	HORIZONTAL
2	72.13	20.97	7.28	0.00	0.71	28.96	40.00	-11.04	Peak	HORIZONTAL
3	107.68	20.46	11.93	0.00	0.89	33.28	40.00	-6.72	Peak	HORIZONTAL
4	255.93	21.53	12.36	0.00	1.53	35.42	47.00	-11.58	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

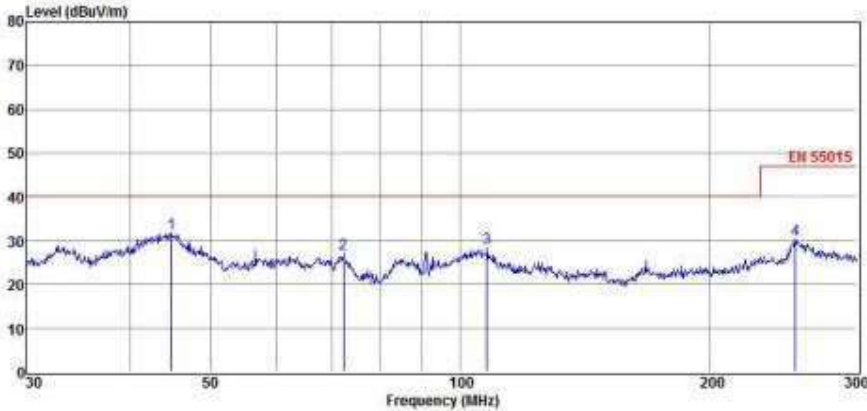
Seite 28 von 44
Page 28 of 44



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Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-4500
Power Supply : 240V-50Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0008



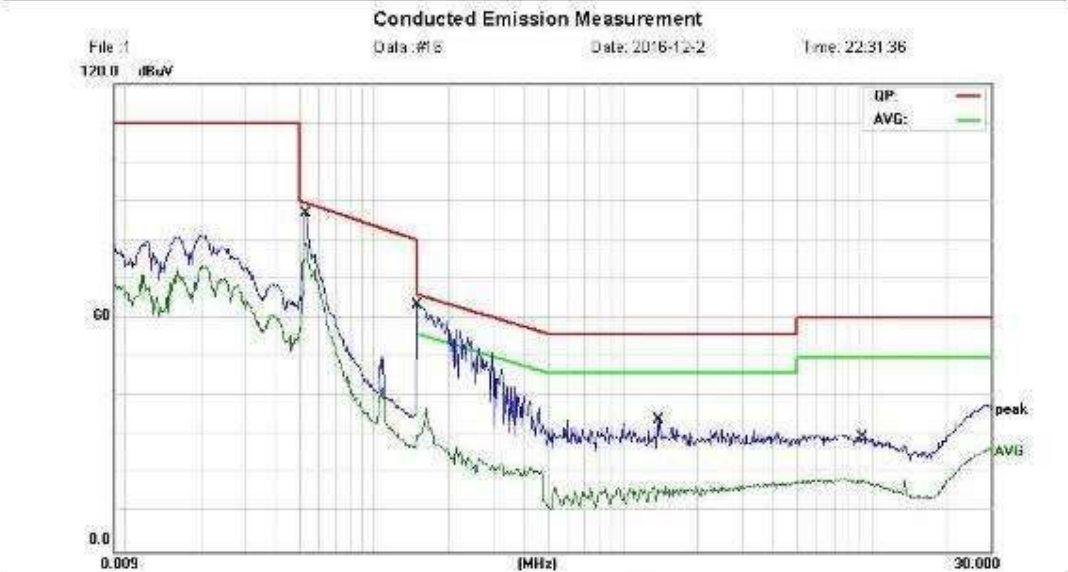
Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	44.89	14.80	16.35	0.00	0.55	31.70	40.00	-8.30	Peak	VERTICAL
2	72.30	19.09	7.24	0.00	0.71	27.04	40.00	-12.96	Peak	VERTICAL
3	107.68	15.45	11.93	0.00	0.89	28.27	40.00	-11.73	Peak	VERTICAL
4	253.00	16.34	12.36	0.00	1.51	30.21	47.00	-16.79	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 29 von 44
Page 29 of 44



Site: EMC Testing Room
Limit: (CE)EN55015_QP
EUT: LED Driver
M/N: EMC70-600
Mode: Full Load
Note:

Phase: L1
Power: AC 100V/60Hz
Temperature: 23
Humidity: 46 %

No. Mk:	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1 *	0.0529	74.24	9.68	83.92	89.49	-5.57	QP	
2	0.1500	47.40	9.51	56.91	65.99	-9.08	QP	
3	0.1500	17.77	9.51	27.28	55.99	-28.71	AVG	
4	1.3779	16.43	9.67	26.10	58.00	-29.90	QP	
5	1.3779	5.53	9.67	15.20	48.00	-30.80	AVG	
6	9.2500	12.98	9.80	22.78	60.00	-37.22	QP	
7	9.2500	7.66	9.80	17.46	60.00	-32.54	AVG	

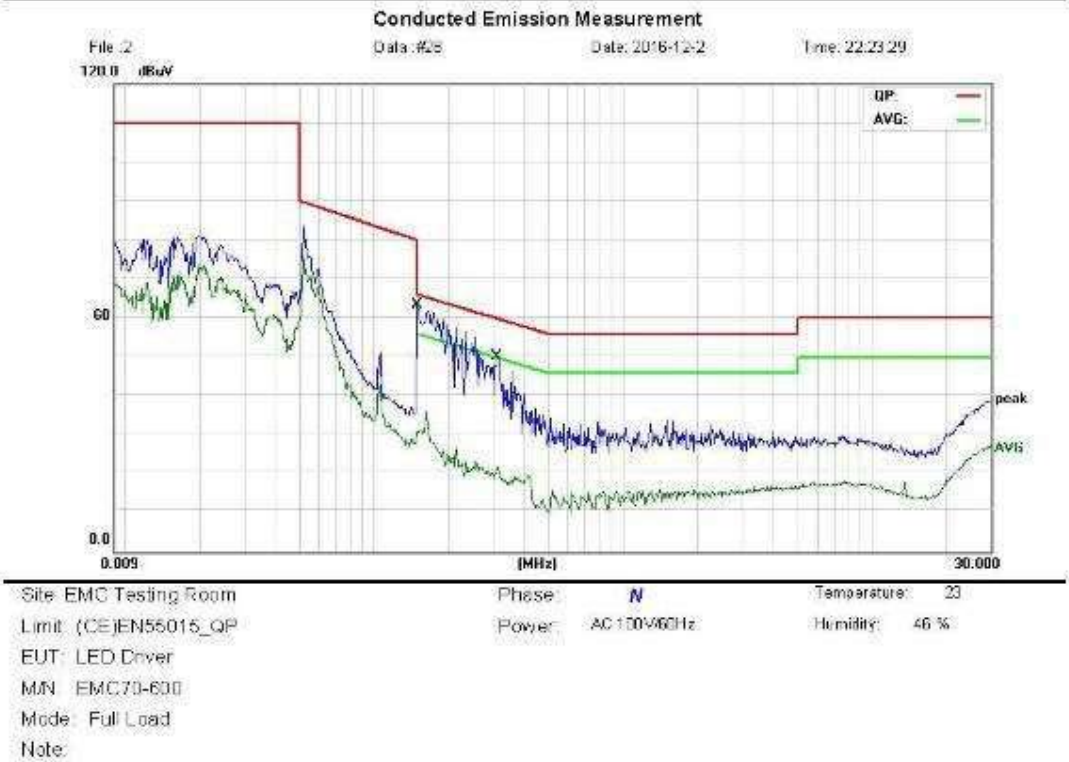
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 30 von 44
Page 30 of 44



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1 *	0.1500	47.97	9.51	57.48	65.99	-8.51	QP	
2	0.1500	19.84	9.51	29.35	55.99	-26.64	AVG	
3	0.3140	29.35	9.65	39.00	59.86	-20.86	QP	
4	0.3140	6.98	9.65	16.63	49.86	-33.23	AVG	

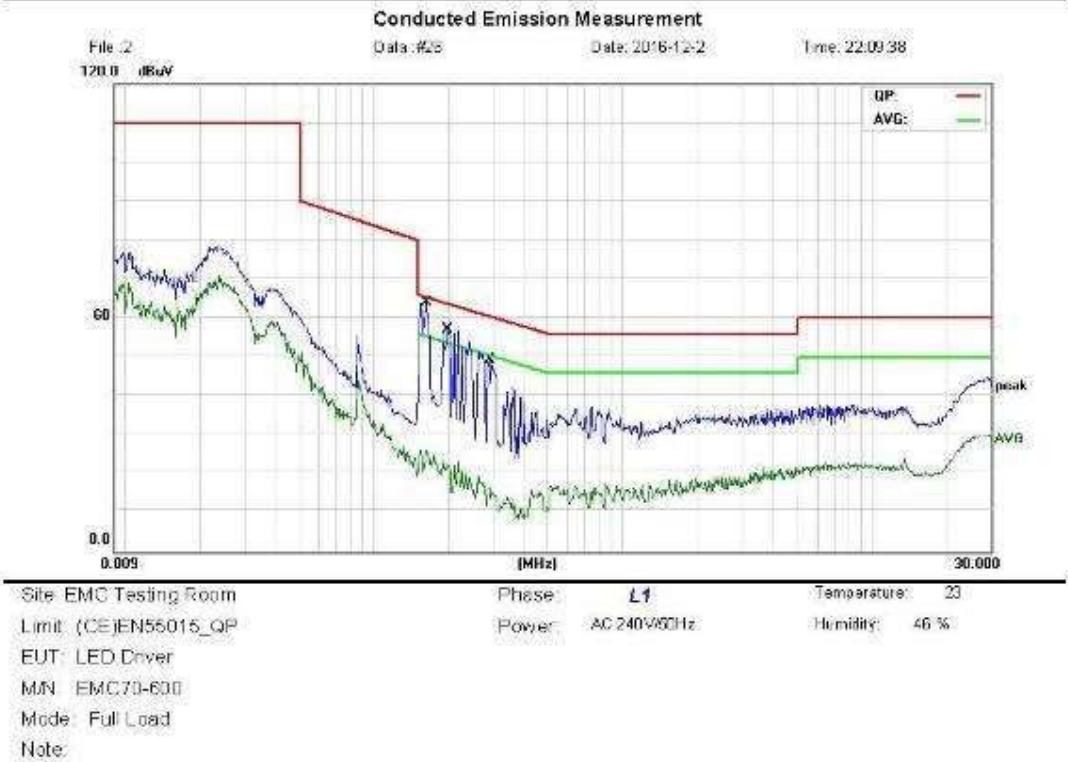
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 31 von 44
Page 31 of 44



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBμV	dB	dBμV	dBμV	dB		
1	*	0.1620	41.67	9.54	51.21	65.36	-14.15	QP	
2		0.1620	9.10	9.54	18.64	55.36	-36.72	AVG	
3		0.1980	37.39	9.64	47.03	63.69	-16.66	QP	
4		0.1980	9.59	9.64	19.23	53.69	-34.46	AVG	
5		0.2900	27.03	9.65	36.68	60.52	-23.84	QP	
6		0.2900	3.29	9.65	12.94	50.52	-37.58	AVG	

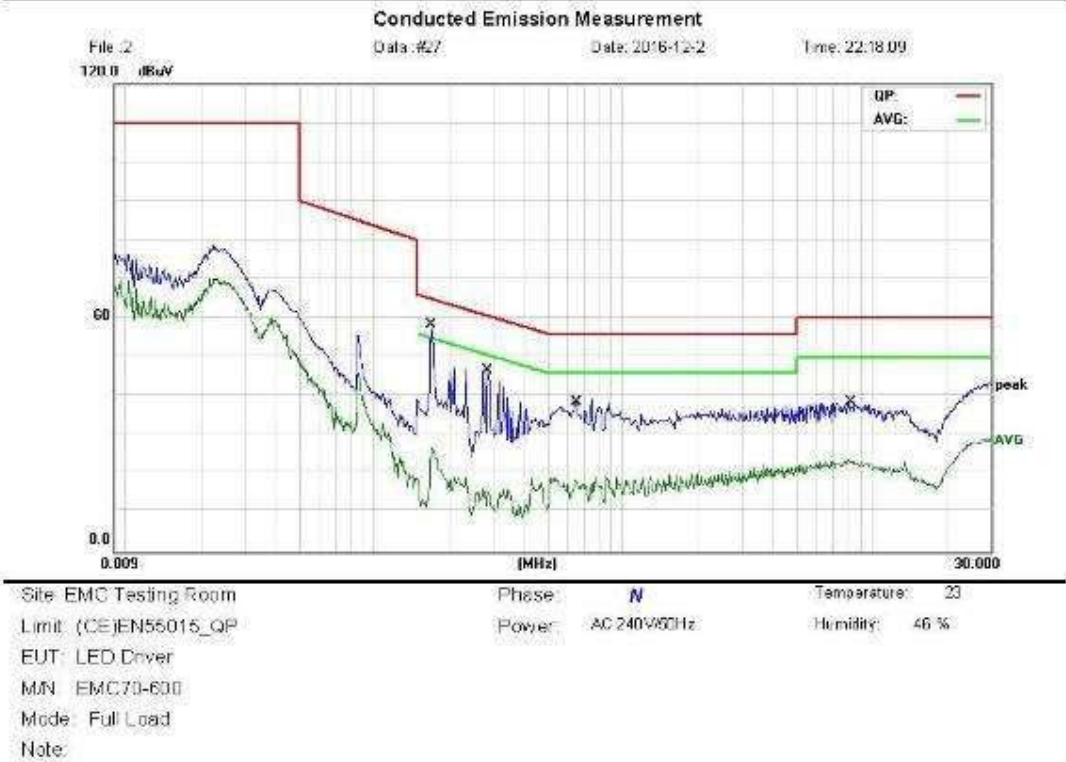
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(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 32 von 44
Page 32 of 44



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV	dBμV	dB		
1 *	0.1700	38.12	9.57	47.69	64.96	-17.27	QP	
2	0.1700	15.14	9.57	24.71	64.96	-30.25	AVG	
3	0.2860	25.46	9.65	35.11	60.64	-25.53	QP	
4	0.2860	4.07	9.65	13.72	60.64	-36.92	AVG	
5	0.6500	24.43	9.66	34.09	56.00	-21.91	QP	
6	0.6500	8.73	9.66	18.39	46.00	-27.61	AVG	
7	8.2140	24.16	9.78	33.94	60.00	-26.06	QP	
8	8.2140	13.10	9.78	22.88	50.00	-27.12	AVG	

*Maximum data x:Over limit :Over margin

(Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

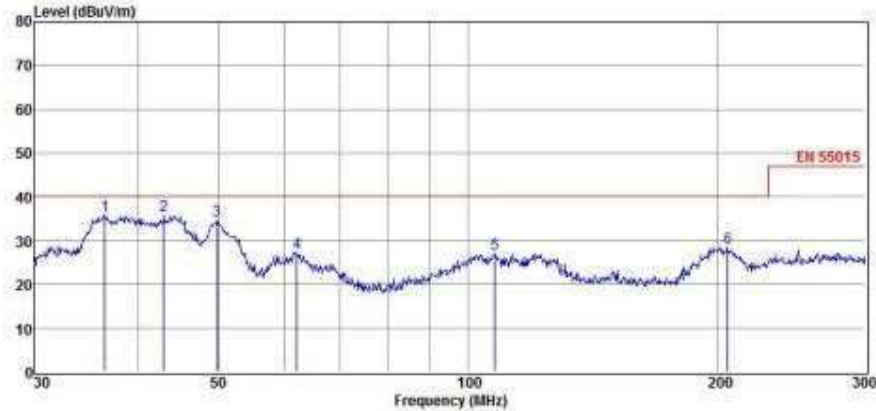
Seite 33 von 44
Page 33 of 44



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Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC70-600
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0010



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	36.49	23.46	11.80	0.00	0.58	35.84	40.00	-4.16	Peak	VERTICAL
2	42.97	18.91	16.23	0.00	0.63	35.77	40.00	-4.23	Peak	VERTICAL
3	49.79	22.82	11.17	0.00	0.68	34.67	40.00	-5.33	Peak	VERTICAL
4	62.10	16.16	10.27	0.00	0.78	27.21	40.00	-12.79	Peak	VERTICAL
5	107.68	14.23	11.73	0.00	1.06	27.02	40.00	-12.98	Peak	VERTICAL
6	205.17	17.25	9.59	0.00	1.51	28.35	40.00	-11.65	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

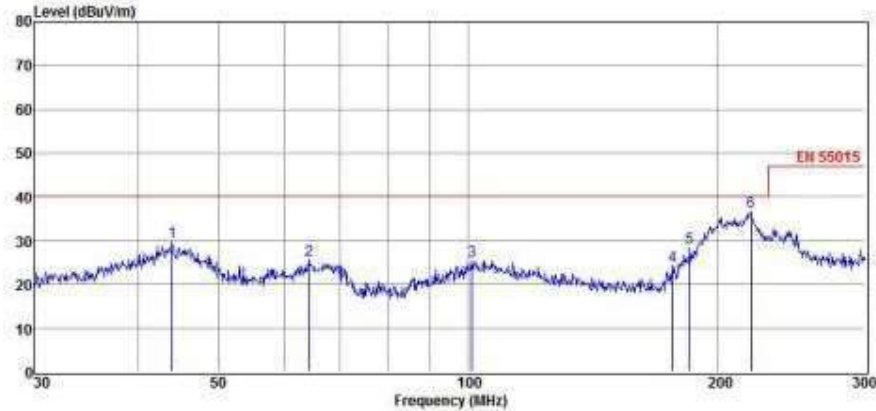
Seite 34 von 44
Page 34 of 44



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Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC70-600
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0009



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	43.97	11.97	16.97	0.00	0.64	29.58	40.00	-10.42	Peak	HORIZONTAL
2	64.29	15.29	9.54	0.00	0.79	25.62	40.00	-14.38	Peak	HORIZONTAL
3	100.95	12.49	11.84	0.00	1.02	25.35	40.00	-14.65	Peak	HORIZONTAL
4	176.25	15.79	7.00	0.00	1.37	24.16	40.00	-15.84	Peak	HORIZONTAL
5	184.55	18.68	8.21	0.00	1.40	28.29	40.00	-11.71	Peak	HORIZONTAL
6	218.84	25.17	9.95	0.00	1.57	36.69	40.00	-3.31	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.: 16079270 001
Test Report No.

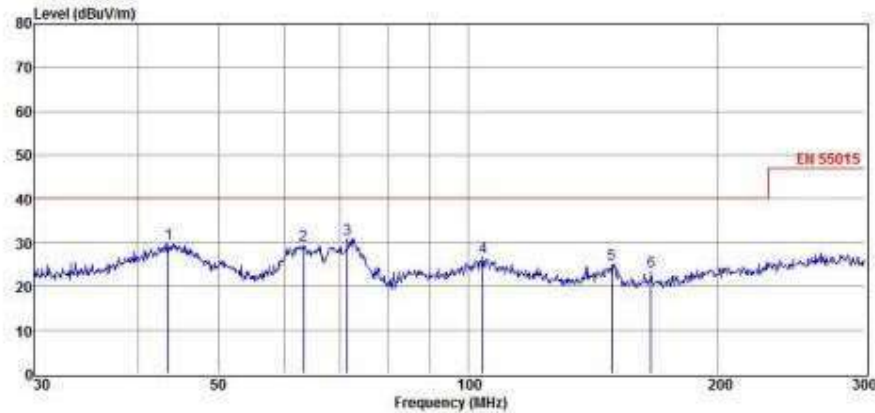
Seite 35 von 44
Page 35 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber **D:\Test Data\2016 项目\2016-12-12 华标\1.EM6**
Test Date : 2016-12-15 **Tested By** : Ken
EUT : LED DRIVER **Model Number** : EMC70-600
Power Supply : 240V-50Hz **Test Mode** : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 **Antenna/Distance** : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0011



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	43.50	12.57	16.62	0.00	0.65	29.84	40.00	-10.16	Peak	VERTICAL
2	63.24	18.86	9.89	0.00	0.79	29.54	40.00	-10.46	Peak	VERTICAL
3	71.48	22.23	7.35	0.00	0.83	30.41	40.00	-9.59	Peak	VERTICAL
4	104.13	13.61	11.97	0.00	1.14	26.72	40.00	-13.28	Peak	VERTICAL
5	148.99	16.27	7.50	0.00	1.28	25.05	40.00	-14.95	Peak	VERTICAL
6	166.10	15.24	7.17	0.00	1.39	23.80	40.00	-16.20	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

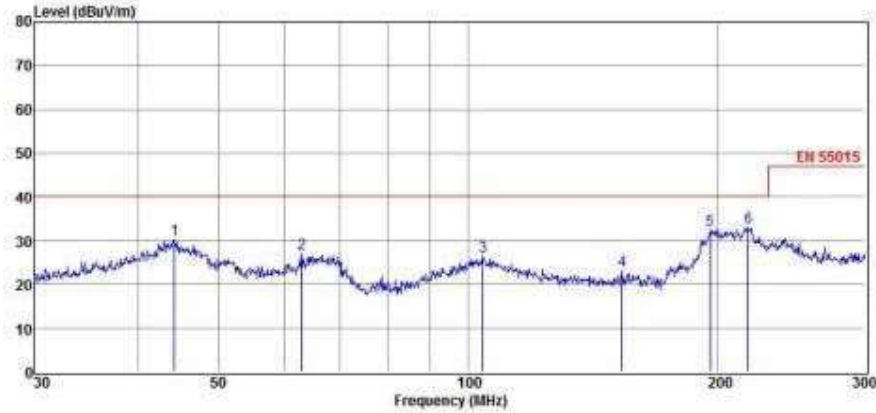
Seite 36 von 44
Page 36 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC70-600
Power Supply : 240V-50Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0012



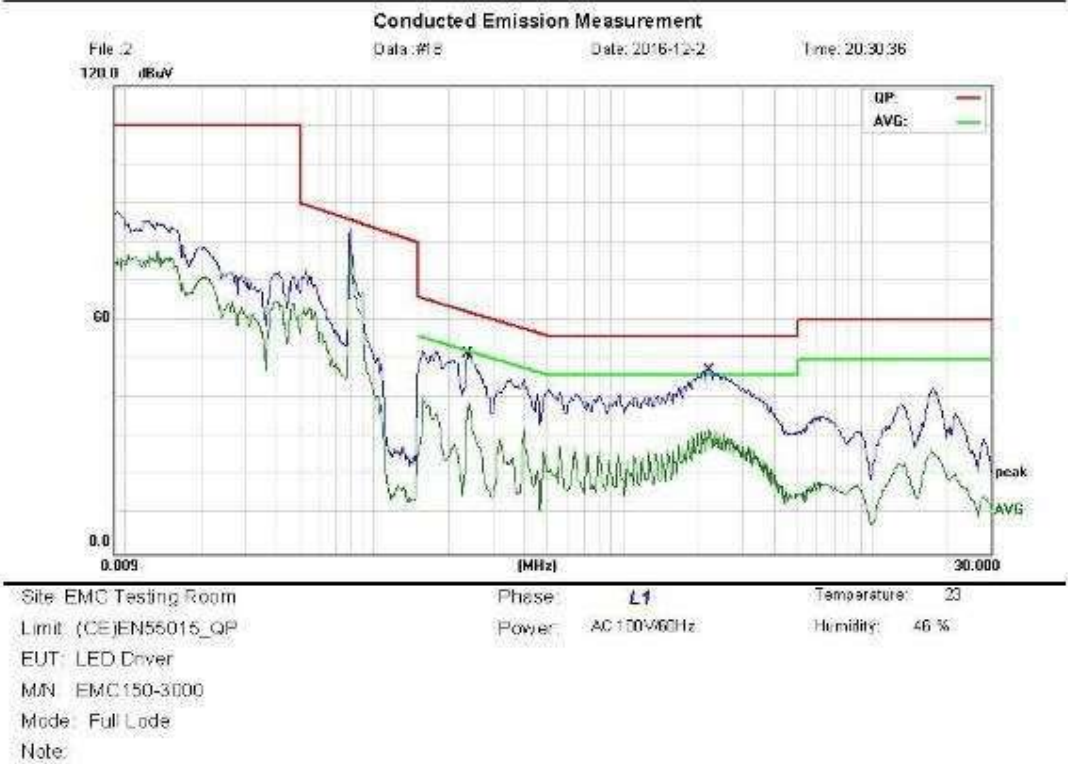
Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	44.27	12.83	16.86	0.00	0.64	30.33	40.00	-9.67	Peak	HORIZONTAL
2	62.97	16.30	9.99	0.00	0.78	27.07	40.00	-12.93	Peak	HORIZONTAL
3	104.02	13.26	11.96	0.00	1.04	26.26	40.00	-13.74	Peak	HORIZONTAL
4	153.15	14.45	7.44	0.00	1.27	23.16	40.00	-16.84	Peak	HORIZONTAL
5	195.49	21.13	9.80	0.00	1.46	32.39	40.00	-7.61	Peak	HORIZONTAL
6	217.33	21.54	9.89	0.00	1.56	32.99	40.00	-7.01	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 37 von 44
Page 37 of 44



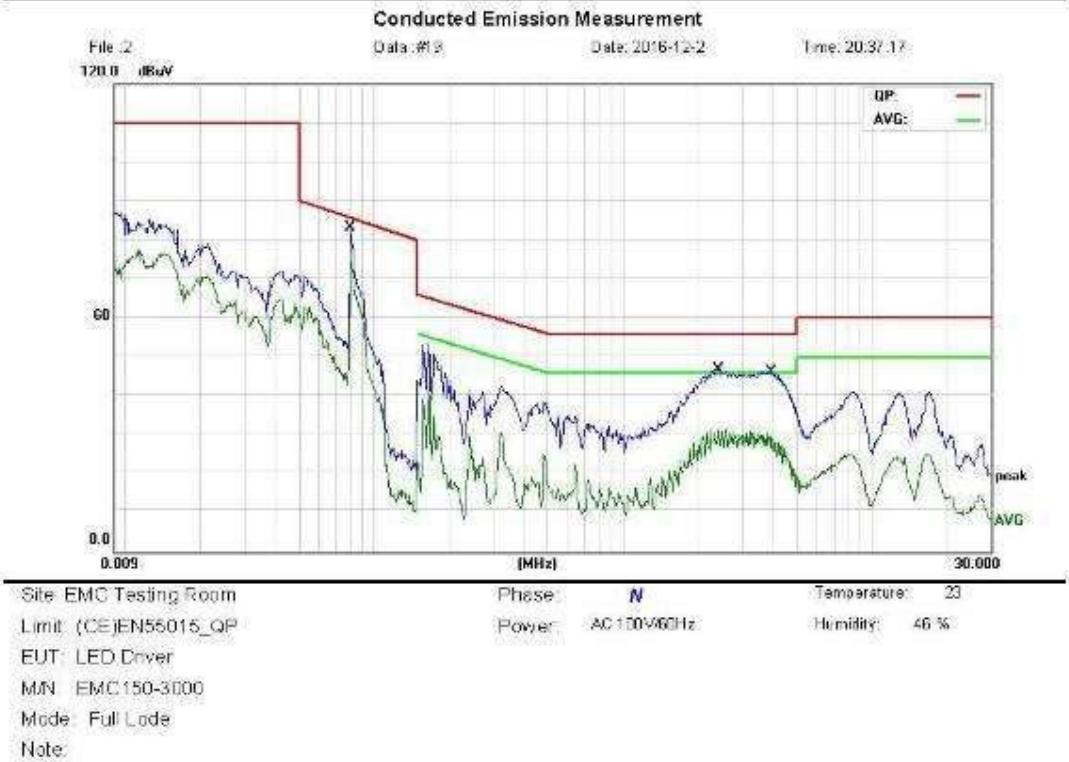
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.2380	41.11	9.65	50.76	62.16	-11.40	QP	
2		0.2380	28.67	9.65	38.32	52.16	-13.84	AVG	
3		2.2180	32.32	9.69	42.01	55.00	-13.99	QP	
4		2.2180	17.13	9.69	26.82	48.00	-19.18	AVG	

*Maximum data x:Over limit :over margin (Reference Only)

Prüfbericht - Nr.:
Test Report No.

16079270 001

Seite 38 von 44
Page 38 of 44



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.0801	41.75	9.66	51.41	85.71	-34.30	QP	
2		2.4060	31.10	9.70	40.80	56.00	-15.20	QP	
3		2.4060	17.49	9.70	27.19	46.00	-18.81	AVG	
4		3.9260	31.79	9.73	41.52	56.00	-14.48	QP	
5		3.9260	16.06	9.73	25.79	46.00	-20.21	AVG	

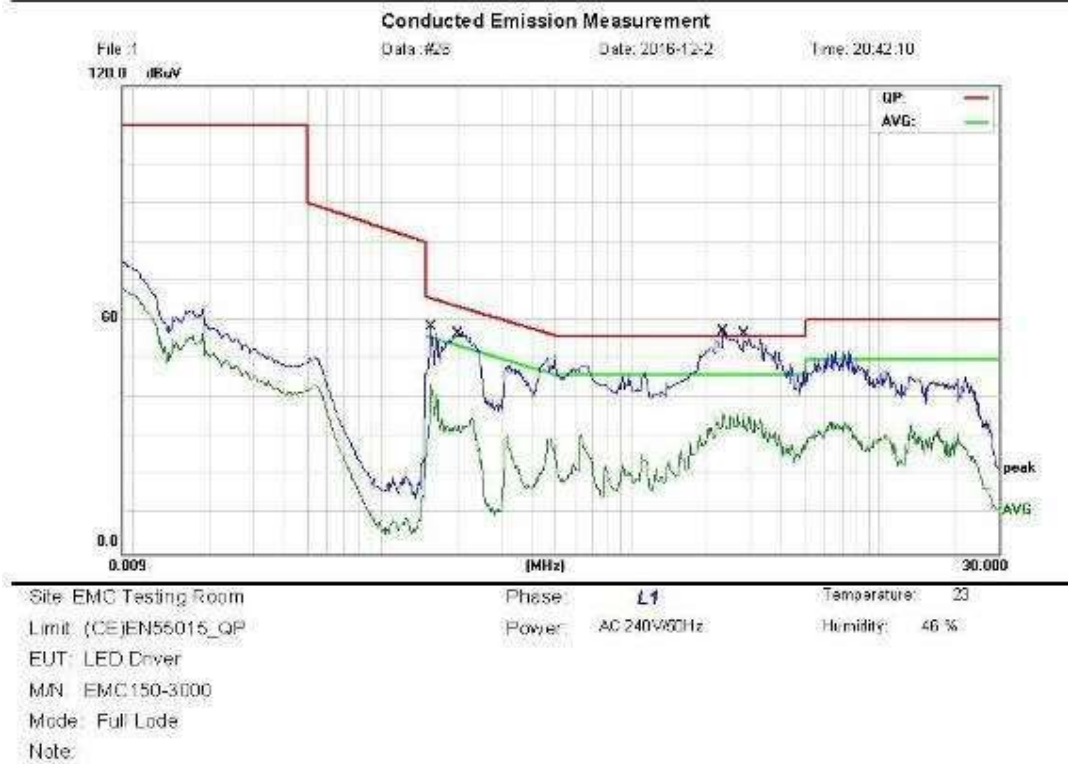
*Maximum data: x:Over limit: Lower margin:

(Reference Only)

Prüfbericht - Nr.:**16079270 001****Seite 39 von 44**

Test Report No.

Page 39 of 44



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	dBμV	Factor	ment	dBμV	dB	Detector	Comment
1		0.1580	40.33	9.53	49.86	65.56	-15.70	QP	
2		0.1580	23.08	9.53	33.51	55.56	-22.05	AVG	
3		0.2020	38.44	9.65	48.09	63.52	-15.43	QP	
4		0.2020	22.01	9.65	31.66	53.52	-21.86	AVG	
5	*	2.3400	41.37	9.69	51.06	56.00	-4.94	QP	
6		2.3400	24.72	9.69	34.41	46.00	-11.59	AVG	
7		2.8179	38.63	9.70	48.33	56.00	-7.47	QP	
8		2.8179	23.40	9.70	33.10	46.00	-12.90	AVG	

*Maximum data x:Over limit Over margin

(Reference Only)

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Page: 1

Engineer Signature:

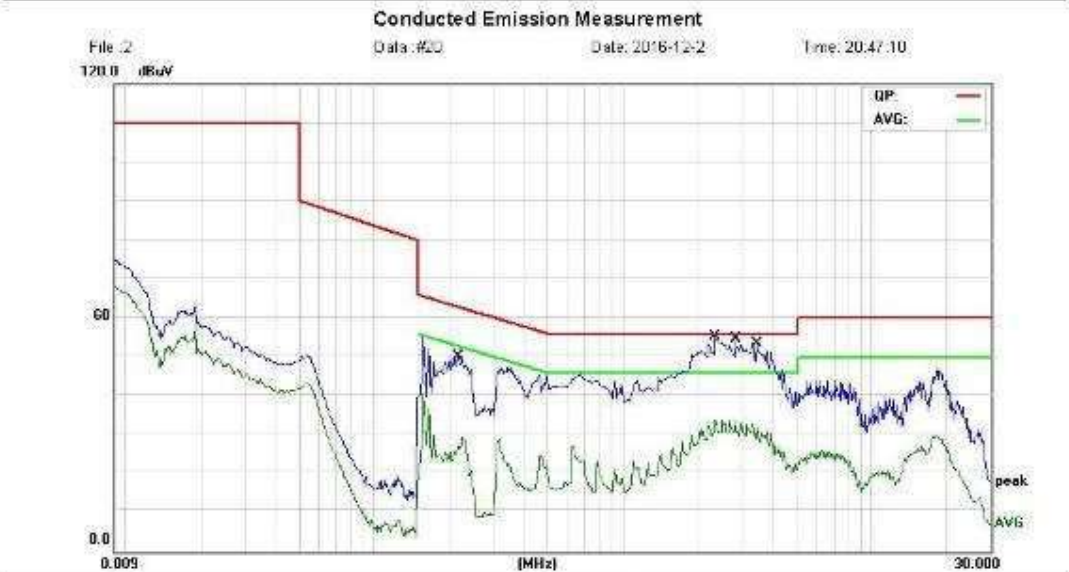
Prüfbericht - Nr.:

16079270 001

Seite 40 von 44

Test Report No.

Page 40 of 44



Site: EMC Testing Room
Limit: (CE)EN55015_QP
EUT: LED Driver
M/N: EMC150-3000
Mode: Full Load
Note:

Phase: N
Power: AC 240V/50Hz

Temperature: 23
Humidity: 46 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBμV	dB	dBμV	dBμV	dB		
1		0.2180	36.24	9.65	45.89	62.89	-17.00	QP	
2		0.2180	15.57	9.65	25.22	62.89	-27.67	AVG	
3	*	2.3460	36.07	9.69	45.76	58.00	-10.24	QP	
4		2.3460	19.09	9.69	28.78	48.00	-17.22	AVG	
5		2.8179	35.76	9.70	45.46	58.00	-10.54	QP	
6		2.8179	19.50	9.70	29.20	48.00	-16.80	AVG	
7		3.4380	33.77	9.71	43.48	58.00	-12.52	QP	
8		3.4380	18.67	9.71	28.38	48.00	-17.62	AVG	

*Maximum data x:Over limit :Over margin

(Reference Only)

Prüfbericht - Nr.: 16079270 001
Test Report No.

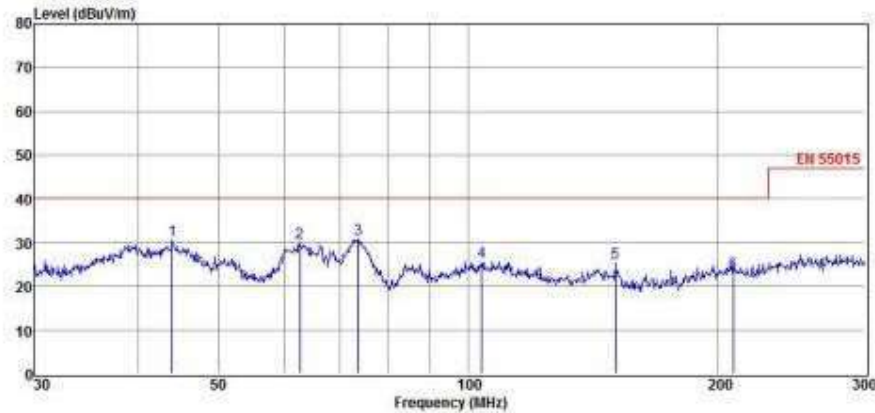
Seite 41 von 44
Page 41 of 44



中山市立创检测技术有限公司
LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber **D:\Test Data\2016 项目\2016-12-12 华标\1.EM6**
Test Date : 2016-12-15 **Tested By** : Ken
EUT : LED DRIVER **Model Number** : EMC150-3000
Power Supply : 100V-60Hz **Test Mode** : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 **Antenna/Distance** : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0014



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	43.95	12.87	16.92	0.00	0.69	30.48	40.00	-9.52	Peak	VERTICAL
2	62.72	19.04	10.13	0.00	0.72	29.89	40.00	-10.11	Peak	VERTICAL
3	73.67	23.06	6.85	0.00	0.87	30.78	40.00	-9.22	Peak	VERTICAL
4	103.79	12.68	11.90	0.00	1.03	25.61	40.00	-14.39	Peak	VERTICAL
5	150.35	16.72	7.62	0.00	1.27	25.61	40.00	-14.39	Peak	VERTICAL
6	208.50	12.11	9.51	0.00	1.50	23.12	40.00	-16.88	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

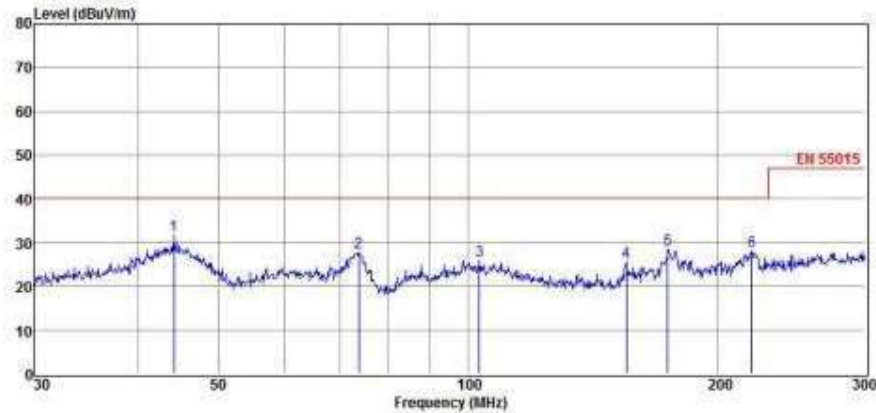
Seite 42 von 44
Page 42 of 44



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LCTECH (Zhongshan) Testing Service Co., Ltd
Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-3000
Power Supply : 100V-60Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0013



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	44.15	14.04	16.93	0.00	0.62	31.59	40.00	-8.41	Peak	HORIZONTAL
2	73.83	20.48	6.82	0.00	0.87	28.17	40.00	-11.83	Peak	HORIZONTAL
3	103.04	12.89	12.04	0.00	1.13	26.06	40.00	-13.94	Peak	HORIZONTAL
4	154.85	16.86	7.47	0.00	1.24	25.57	40.00	-14.43	Peak	HORIZONTAL
5	173.88	20.84	6.82	0.00	1.38	29.04	40.00	-10.96	Peak	HORIZONTAL
6	219.57	16.46	9.97	0.00	1.56	27.99	40.00	-12.01	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.: 16079270 001
Test Report No.

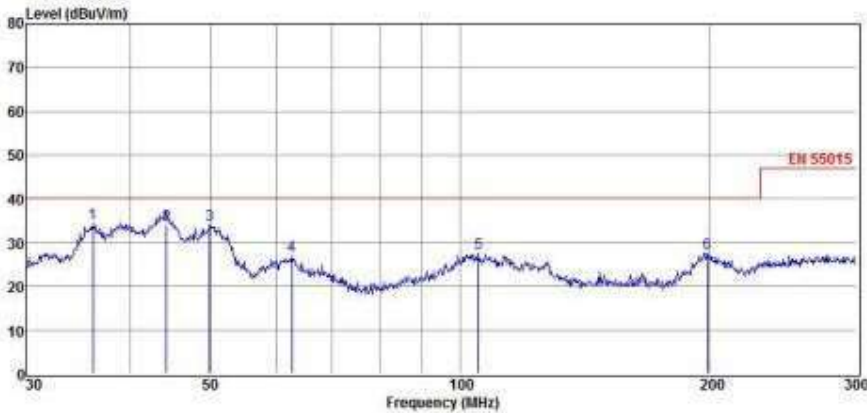
Seite 43 von 44
Page 43 of 44



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Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber **D:\Test Data\2016 项目\2016-12-12 华标\1.EM6**
Test Date : 2016-10-15 **Tested By** : Ken
EUT : LED DRIVER **Model Number** : EMC150-3000
Power Supply : 240V-50Hz **Test Mode** : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 **Antenna/Distance** : VULB9162 2016/3m/HORIZONTAL
Memo :
Data : 0015



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	36.07	22.14	11.63	0.00	0.58	34.35	40.00	-5.65	Peak	VERTICAL
2	44.27	16.70	16.86	0.00	0.64	34.20	40.00	-5.80	QP	VERTICAL
3	49.90	22.29	11.02	0.00	0.68	33.99	40.00	-6.01	Peak	VERTICAL
4	62.68	16.13	10.07	0.00	0.78	26.98	40.00	-13.02	Peak	VERTICAL
5	105.23	14.57	11.98	0.00	1.05	27.60	40.00	-12.40	Peak	VERTICAL
6	198.21	16.22	9.80	0.00	1.47	27.49	40.00	-12.51	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

Prüfbericht - Nr.:
Test Report No.

16079270 001

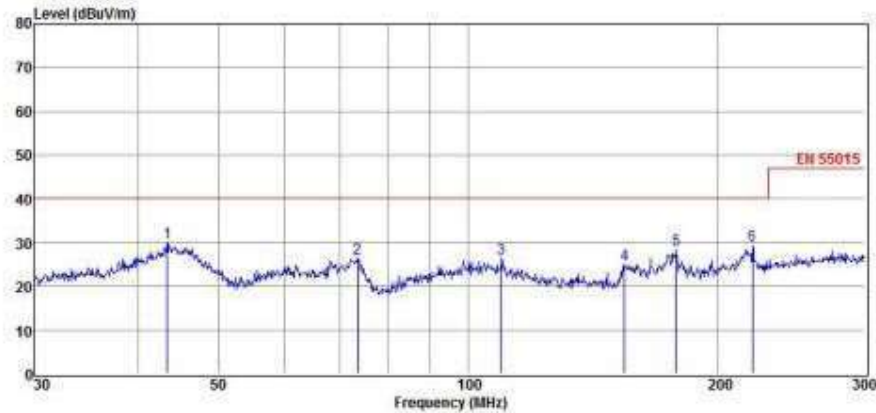
Seite 44 von 44
Page 44 of 44



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Tel: 0760-22833579 http://www.lccert.com

Radiated Emission Test Result

Test Site : chamber D:\Test Data\2016 项目\2016-12-12 华标\1.EM6
Test Date : 2016-12-15 Tested By : Ken
EUT : LED DRIVER Model Number : EMC150-3000
Power Supply : 240V-50Hz Test Mode : Lighting Mode
Condition : Temp:23°C,Humi:55%, Press:10 Antenna/Distance : VULB9162 2016/3m/VERTICAL
Memo :
Data : 0016



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	43.39	12.92	16.50	0.00	0.62	30.04	40.00	-9.96	Peak	HORIZONTAL
2	73.52	18.60	6.89	0.00	0.87	26.36	40.00	-13.64	Peak	HORIZONTAL
3	109.40	13.68	11.54	0.00	1.14	26.36	40.00	-13.64	Peak	HORIZONTAL
4	154.19	16.41	7.58	0.00	1.25	25.24	40.00	-14.76	Peak	HORIZONTAL
5	177.92	19.82	7.24	0.00	1.39	28.45	40.00	-11.55	Peak	HORIZONTAL
6	219.78	17.93	10.01	0.00	1.58	29.52	40.00	-10.48	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit



FOSHAN CITY SHUNDE DISTRICT BEN`AN ELECTRIC CO.,LTD

CE LVD REPORT

Prepared For:	FOSHAN CITY SHUNDE DISTRICT BEN`AN ELECTRIC CO.,LTD FL4,Building 2,No 2,North Zhi`an Road, Jun`an Community Residents Committee ,Jun`an Town,Shunde District, Foshan City
Product Name:	SURGE PROTECTIVE DEVICES FOR POWER SUPPLY
Model :	BA-SPD-10KV-B
Prepared By :	BST Technology(Shenzhen)Co., Ltd. No.7,New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Test Date:	Mar 25, 2019 — Apr 08, 2019
Date of Report :	Apr 09, 2019
Report No.:	BSTXD190311215601SR



TEST REPORT EN 61643-11 Low-voltage SURGE PROTECTIVE DEVICES FOR POWER SUPPLYs Part 11: SURGE PROTECTIVE DEVICES FOR POWER SUPPLYs connected to low-voltage power Systems-Requirements and test	
Testing Laboratory Name	BST Technology(Shenzhen)Co., Ltd.
Address	No.7,New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Testing location	BST Technology(Shenzhen)Co., Ltd.
Applicant's Name	FOSHAN CITY SHUNDE DISTRICT BEN`AN ELECTRIC CO.,LTD
Address	FL4,Building 2,No 2,North Zhi`an Road, Jun`an Community Residents Committee ,Jun`an Town,Shunde District, Foshan City
Manufacturer	FOSHAN CITY SHUNDE DISTRICT BEN`AN ELECTRIC CO.,LTD
Address	FL4,Building 2,No 2,North Zhi`an Road, Jun`an Community Residents Committee ,Jun`an Town,Shunde District, Foshan City
Test specification	
Standard.....	EN 61643-11:2012
Procedure deviation	N/A
Non-standard test method	N/A
Test item description	SURGE PROTECTIVE DEVICES FOR POWER SUPPLY
Trademark	N/A
Model and/or type reference	BA-SPD-10KV-B
Rating(s)	85-277V~,50/60Hz,10KV
Test case verdicts	
Test case does not apply to the test object ..	N/A
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)

**General remarks**

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item(s) tested.

"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Clause numbers between brackets refer to clauses in EN 61643-11:2002+A11:2007

Throughout this report a comma is used as the decimal separator.

Copy of marking plate:

SURGE PROTECTIVE DEVICES FOR POWER
SUPPLY

Model : BA-SPD-10KV-B

Rated : 85-277VAC 50/60Hz 10KV

Ta:-40°C~80°C IP67 In :5KA T3

L-N Uoc:10KV UP:1.2KV

L-L/N-PE Uoc:10KV UP:2KV



FOSHAN CITY SHUNDE DISTRICT BEN'AN
ELECTRIC CO.,LTD



Name and address of the testing laboratory : Shenzhen BST Technology Co.,Ltd.

3F,Weames Technology Building,No. 10 Kefa Road,

Science Park,Nanshan District,Shenzhen,

Guangdong,China

Prepared by :

Jacky Zhang

Engineer

Reviewer :

Sabon

Supervisor

Approved & Authorized Signer :



Christina / Manager



EN 61643-11			
Cl.	Requirement – Test	Result	Verdict
4	Classification		
	The manufacture shall classify the SPDs		
4.1	Number of ports	One	P
4.2	SPD design topology	Combination type	P
4.3	SPD types	types 2	P
4.4	Location	Indoor	P
4.5	Accessibility	Accessible	P
4.6	Mounting method	Fixed	P
4.7	SPD disconnecter		
4.7.1	Location	Internal	P
4.7.2	Protection functions	Overcurrent	P
4.8	Overcurrent protection	Specified	P
4.9	Degree of protection provided by enclosures according to IP codes of IEC 60529	IP20	P
4.10	Temperature range	Extended: -40℃ - 85℃	P
4.11	Multipole SPD (if declared by manufacturer)		N
5	Preferred values		---
5.1	Preferred values of peak impulse current for class I tests I_{peak}		N
5.2	Preferred values of nominal discharge current for class II tests I_n	I_n : 5kA; I_{max} : 10kA	P
5.3	Preferred values of open-circuit voltage for class III tests U_{oc}		N
5.4	Preferred values of voltage protection level U_p	$\leq 1.2kV$	P
5.5	Preferred values of r.m.s. or d.c. maximum continuous operating voltage U_c	85-277VAC	P
5.6	Preferred values for I_{Total}		N
6	Requirements		---
6.1.1	Identification		--
	The following minimum information provided by the manufacturer.		P
	a) Manufacturer's name or trade mark and model number		P
	b) Location category		P
	c) Number of ports		P



	d) Method of mounting		P
	e) Maximum continuous operating voltage U_c (one value for each mode of protection except if all values are equal)		P
	f) SPD type and discharge parameters for each mode of protection declared by the manufacturer		P
	g) Nominal discharge current I_n for Type 1 and Type 2 SPDs (one value for each mode of protection)		P
	h) Voltage protection level U_p (one value for each mode of protection)		P
	i) Rated load current I_L (if required)		P
	j) Degree of protection provided by the enclosure (IP code) (if IP > 20)		N
	k) Short-circuit withstand		P
	l) Maximum recommended ratings of overcurrent protection (if applicable)		P
	m) Indication of disconnector operation (if any)		P
	n) Position of normal use if significant		P
	o) Identification of terminals (if necessary)		P
	p) installation instructions (e.g. type of LV systems: TN, TT, IT etc , connections to LV systems rated system voltages for which the SPD is designed, mechanical dimensions, lead lengths, etc.)and		P
	q) Type of current: a.c. frequency or d.c., or both		P
	r) Specific energy W/R for Type 1 SPDs only (from 7.1.1)		N
	s) Temperature range		P
	t) Follow current interrupting rating (except in the case of voltage limiting SPDs)		N
	u) The external SPD disconnector requirements, if any, shall be defined by the manufacturer		P
	v) Residual current (optional)		N
	w) Temporary overvoltage characteristic		N
	Total discharge current I_{Total} for multipole SPDs (if declared by the manufacturer)		P
6.1.2	Marking		P
	Markings a), e), f), g), h), j), l), o) and q) in 6.1.1 are mandatory on the body, or permanently attached to the body, of the SPD. For some designs of one port SPDs, there may not be a need to provide a rated load current.		P



	Marking shall be indelible and legible and shall not be placed on screws and removable washers. Compliance is in accordance with the test of 7.2.		P
6.2	Electrical requirements		---
6.2.1	Electrical connections		P
	Terminals shall be designed for the connection of cables having a minimum and a maximum cross-sectional area according to the manufacturer declaration.		P
	Each of the tests must be passed by using the most severe configuration (i.e. the maximum or minimum cross-sectional area depending on the test (see clause 7). The SPD shall be equipped with terminals where electrical connection is possible by means of screws, nuts, plugs, sockets or equal effective means. This is checked in 7.3.		P
6.2.2	Voltage protection level U_p		P
	The measured limiting voltage of SPDs shall not exceed the voltage protection level that is specified by the manufacturer. Compliance is in accordance with the test of 7.5.		P
6.2.3	Class I impulse current test(s)		N
	An SPD shall be tested to class I test when the manufacturer declares that it meets those requirements. Compliance is in accordance with the test of 7.6.5.		N
6.2.4	Class II nominal discharge current test(s)		P
	An SPD shall be tested to class II test when the manufacturer declares that it meets those requirements. Compliance is in accordance with 7.6.5.		P
6.2.5	Class III combination wave test(s)		N
	An SPD shall be tested to class III test when the manufacturer declares that it meets those requirements. Compliance is in accordance with the test of 7.6.7.		N
6.2.6	Operating duty test		P
	The SPD shall be capable of withstanding specified discharge currents during application of the maximum continuous operating voltage U_c without unacceptable changes in its characteristics.		P
6.2.7	SPD disconnecter		P



	The SPD may have SPD disconnectors (which can be either internal, external or both). Their operation shall be indicated.		P
	SPD disconnectors shall be tested with the SPD during the sequence of type tests of 7.7 and 7.8.3, except for RCDs which are not tested during the operating duty test according to 7.7.1		P
6.2.8	Air clearances and creepage distances		P
	The SPD shall have sufficient air clearances and creepage distances. Testing is in accordance with 7.9.5.		P
6.2.9	Tracking resistance		P
	Insulating materials necessary to retain live parts in their position shall be composed of nontracking material, or they shall be sufficiently dimensioned. Testing in accordance with 7.9.6.		P
6.2.10	Dielectric withstand		P
	The dielectric withstand of the housing of the SPD shall be sufficient with respect to insulation breakdown and protection against direct contact. Testing in accordance with 7.9.8.		P
6.2.11	Short-circuit withstand capability		P
	An overstressed (short-circuited) SPD shall withstand the power short-circuit currents that may in service. Testing is in accordance with 7.7.3.		P
6.2.12	Status indicator operation		N
6.2.13	Isolation between separate circuits		P
	Where a SPD includes a circuit which is electrically isolated from the main circuit, the manufacturer shall provide information about the isolation and dielectric withstand voltages between the circuits as well as the relevant standards with which the manufacturer is claiming conformity.		P
	Where there are more than two circuits, declarations shall be made with regard to each combination of circuits.		N
	The isolation and dielectric withstand of the separate circuits shall be tested according to the manufacturer's declaration.		P
6.3	Mechanical requirements		P
	SPDs shall be provided with appropriate means for mounting that will ensure mechanical stability. Testing in accordance with 7.9.2.		P
6.3.1	General		---



	The SPD shall be equipped with terminals where electrical connection is possible by means of:	terminal with screw	P
6.3.2	Mechanical connections		P
	Terminals shall be fastened to the SPD in such a way that they will not work loose if the clamping screws or the lock nuts are tightened or loosened.		P
	A tool shall be required to loosen the clamping screws or the lock nuts.		P
	Plugs and socket outlets shall correspond to the relevant national requirements, and those clauses of IEC 60884-1 that may apply.		N
	Screws, current-carrying parts and connections 1) Connections, whether electrical or mechanical, shall withstand the mechanical stresses occurring in normal use.		P
	Screws operated when mounting the SPD during installation shall not be of the threadcutting type. Compliance is checked by inspection and tested in accordance with 7.3.2.1.		P
	2) Electrical connections shall be so designed that contact pressure is not transmitted through insulating material other than ceramic, pure mica or other material with characteristics no less suitable, unless there is sufficient resilience in the metallic parts to compensate for any possible shrinkage or yielding of the insulating material. Compliance is checked by inspection.		P
	The suitability of the material is considered in respect of the stability of the dimensions.		P
	3) Current-carrying parts and connections including parts intended for protective conductors, if any, shall be of either – copper, or – an alloy containing at least 58 % copper for parts worked cold, or at least 50 % copper for other parts, or – other metal or suitably coated metal, no less resistant to corrosion than copper and having mechanical properties no less suitable.		P
	d) Terminals with screw for external conductors		P
	1) Terminals for external conductors shall be such that the conductors may be connected so as to ensure that the necessary contact pressure is maintained permanently.		P
	The terminals shall be readily accessible under the intended conditions of use. Compliance is checked by inspection and tested in accordance with 7.3.2.2.2.		P



	2) The means for clamping the conductors in the terminals shall not serve to fix any other component, although they may hold the terminals in place or prevent them from turning. Compliance is checked by inspection and tested in accordance with 7.3.2.2.2.		P
	3) Terminals shall have adequate mechanical strength. Screws and nuts for clamping the conductors shall have a metric ISO thread or a thread comparable in pitch and mechanical strength. Compliance is checked by inspection and tested in accordance with 7.3.2.1 and 7.3.2.2.		P
	Provisionally, SI, BA and UN threads may be used as they are virtually equivalent in pitch and mechanical strength to metric ISO threads.		N
	4) Terminals shall be so designed that they clamp the conductor without undue damage to the conductor. Compliance is checked by inspection and tested in accordance with 7.3.2.2.2.		P
	5) Terminals shall be so designed that they clamp the conductor reliably and between metal surfaces.		P
	6) Terminals shall be so designed or positioned that neither a rigid solid conductor nor a wire of a stranded conductor can slip out while the clamping screws or nuts are tightened.		N
	This requirement does not apply to lug terminals. Compliance is checked by inspection and tested in accordance with 7.3.2.2.3.		P
	7) Terminals shall be so fixed or located that, when the clamping screws or nuts are tightened or loosened, the terminals shall not work loose from their fixings to the SPDs.		P
	These requirements do not imply that the terminals shall be so designed that their rotation or displacement is prevented, but any movement shall be sufficiently limited so as to prevent non-compliance with the requirements of this standard.		P
	The use of sealing compound or resin is considered to be sufficient for preventing a terminal from working loose, provided that – the sealing compound or resin is not subject to stress during normal use, and		P



	– the effectiveness of the sealing compound or resin is not impaired by temperatures attained by the terminal under the most unfavorable conditions specified in this standard. Compliance is checked by inspection, by measurement and tested in accordance with 7.3.2.1.		P
	8) Clamping screws or nuts of terminals intended for the connection of protective conductors shall be adequately secured against accidental loosening. Compliance is checked by manual test.		P
	e) Screwless terminals for external conductors		N
	1) Terminals shall be so designed and constructed that		---
	– each conductor is clamped individually. During the connection or disconnection the conductors can be connected or disconnected either at the same time or separately;		N
	– it is possible to clamp securely any number of conductors up to the maximum provided. Compliance is checked by inspection and tested in accordance with 7.3.3.		P
	2) Terminals shall be so designed and constructed that they clamp the conductor without undue damage to the conductor. Compliance is checked by inspection.		P
	f) Insulation pierced connections for external conductors		N
	1) The insulation pierced connections shall make a reliable mechanical connection.		P
	2) Screws for making contact-pressure shall not serve to fix any other component, although they may hold the SPD in place or prevent it from turning.		N
	3) Screws shall not be of metal which is soft or liable to creep.		N
6.3.3	Corrosive resistant metals		P
	Clamps, except clamping screws, lock nuts, binding clip thrust washers, wire, and similar, shall consist of corrosion resistant metal such as copper, brass, etc. (see IEC 60999).		P
6.4	Environmental requirements		---



	SPDs shall be designed in such a way that they operate satisfactorily under the environmental conditions given by the normal service conditions. Compliance is tested in accordance with 7.9.9. Outdoor SPDs shall be contained in a weather shield of glass, glazed ceramic or other acceptable material that is resistant to UV radiation, corrosion, erosion, and tracking.		N
	They shall have sufficient surface creepage distance between any two parts of different potential.		P
6.5	Safety requirements		P
	SPDs shall be safe when operated under normal service conditions in accordance with the recommendation.		P
6.5.1	Protection against direct contact		P
	These requirements are valid for accessible SPDs where the maximum continuous operating voltage U_c is above 50 V r.m.s. a.c.		P
	For protection against direct contact (inaccessibility of live parts), SPDs shall be designed in such a way that live parts cannot be touched when the SPD is installed for the intended use. Compliance is verified by standardized test methods of IEC 60529 and to 7.4.		N
	SPDs, except SPDs classified as inaccessible, shall be so designed that, when they are wired and mounted as for normal use, live parts are not accessible, even after removal of parts which can be removed without the use of a tool. Compliance is checked by inspection and, if necessary, by the tests of 7.4.1.		N
	The connection between the earthing terminals and all accessible parts connected there to shall be of low resistance. Compliance is checked by the test according to 7.4.2.		P
6.5.1.1	Mechanical strength		P
	All parts of the SPD relating to the protection against direct contact shall have sufficient mechanical strength. Compliance is tested in accordance with 7.9.2.		P
6.5.1.2	Heat resistance		P
	All parts relating to the protection against direct contact shall be sufficiently heat resistant. Compliance is tested in accordance with 7.9.3.		P
6.5.1.3	Insulation resistance		P



	The insulation resistance of the SPD shall be sufficient. Compliance is tested in accordance with 7.9.7.		P
6.5.2	Fire resistance		P
	Insulating parts of the housing shall be either nonflammable or self-extinguishing. Compliance is tested in accordance with 7.9.4.		P
6.5.3	Standby power consumption P_C		P
	For all SPDs, the P_C shall be measured at the SPD's maximum continuous operating voltage (U_C) when connected according to the manufacturer's instructions without a load.		P
6.5.4	Residual current		N
	For all SPDs with a terminal for the protective conductor, the residual current shall be measured at the SPD's maximum continuous operating voltage (U_C) when connected according to the manufacturer's instructions, without a load.		N
6.5.5	Behaviour under temporary overvoltages		P
	An SPD shall either withstand a TOV without changes in functionality, or fail in a manner described in 7.7.4 and 7.7.6.		P
6.5.5.1	TOVs caused by faults in the high (medium) voltage system		P
	SPDs connected to PE and for use on power distribution systems shall be tested at U_T in accordance with 7.7.4 and Table B.1.		P
6.5.5.2	TOVs caused by faults or disturbances in the low voltage system		P
	If U_C is greater or equal to U_T there is no need to perform this test.		N
	All other SPDs shall be tested using either the TOV voltages U_T given in Table B.1 or the TOV voltages stated by the manufacturer according to 6.1.1 w), whichever values are higher. This test shall be performed in accordance with 7.7.6.		P
6.5.6	Total discharge current I_{Total}		P
	This test is only conducted		P
6.6	Additional test requirements for two-port SPDs and one-port SPDs with separate input/output terminals		N
6.6.1	Percent of voltage regulation		N
6.6.2	Rated load current I_L		N
6.6.3	Load-side surge withstand capability		N
6.6.4	Overload behaviour		N



7	Type tests		---
7.1.1	Class I impulse current test		N
7.1.2	Class I and class II nominal discharge current test		P
7.1.3	Class I and II voltage impulse test		N
7.1.4	Class III combination wave test		N
7.1.5	Testing of SPDs classified outdoor only and for mounting out of reach		N
7.2	Identification and marking		P
7.2.1	Verification of the identification and markings		P
7.2.2	Test of indelibility of markings	After this test, the marking shall be easily legible.	P
7.3	Terminals and connections		P
	Verification of the incorporated terminals and their conformity is met by the requirements of 7.3.1.		P
7.3.2	Terminals with screws		P
7.3.2.1	Test of reliability of screws, current-carrying parts and connections		P
	Compliance is checked by inspection and for screws which are operated when connecting up the SPD by the following test.		P
	The screws are tightened and loosened		P
	ten times for screws in engagement with a thread of insulating material,		P
	five times in all other cases.		P
	Screws or nuts in engagement with a thread of insulating material are completely removed and reinserted each time unless the construction of the screw prevents this.		P
	The test is made by means of a suitable test screwdriver or spanner applying a torque as shown in table 5.	3.4mm ² : 0.8Nm	P
	The screws shall not be tightened in jerks.		P
	The conductor is moved each time the screw is loosened.		P
7.3.2.2	Test of reliability of terminals for external conductors		P
7.3.2.2.1	The terminals are fitted with copper conductors of the smallest or largest crosssectional areas specified in 7.3.1, solid or stranded, whichever is most unfavourable.		P



7.3.2.2.2	The terminals are fitted with copper conductors of the smallest or largest crosssectional areas specified in 7.3.1 solid or stranded, whichever is the most unfavourable and the terminal screws are tightened with a torque equal to two-thirds of that shown in the appropriate column of table 5. The terminal screws are then loosened and the part of the conductor which may have been affected by the terminal is inspected.		P
7.3.2.2.3	The terminals are fitted with a rigid stranded copper conductor conforming to table 8.		P
7.3.3	Screwless terminals		N
	Pull out test		N
7.3.4	Insulation pierced connections		N
7.3.4.1	Pull out test on SPD terminals designed for single core conductors		N
7.3.4.2	Pull out test on SPD terminals designed for multi-core cables or cords		N
7.3.5	Nuts, plug, socket		P
7.4	Testing for protection against direct contact		P
7.4.1	Insulated parts		P
7.4.2	Metal parts		P
7.5	Determination of the measured limiting voltage		P
7.5.5	Alternate test to the combination wave test, without a decoupling network		P
7.6	Operating duty test		P
7.6.2	Preliminary test to determine the magnitude of the follow current		P
7.6.3	Power frequency source characteristics for preconditioning		P
7.6.3.1	SPDs with follow current below 500 A		N
7.6.3.2	SPDs with follow current above 500 A		P
7.6.4	Class I and II preconditioning tests		P
7.6.5	Class I and II operating duty test		P
7.6.6	The SPD has passed the test if thermal stability is achieved after each impulse of the preconditioning and operating duty cycle. Additionally, any follow current has to be selfextinguished.		P
	Both the voltage and current records and visual inspection shall show no indication of puncture or flashover of the samples. Mechanical damage shall not occur during these tests.		P



	One more impulse at I_n or U_{OC} shall be applied to the SPD whilst the SPD is energized at U_c by means of a voltage source having a nominal current capability of at least 5 A. After this impulse, U_c remains applied and thermal stability shall be achieved within 30 min.		P
	Once thermal stability is achieved, either: the current which flows through the test sample is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA.		N
	or in case of this current exceeds 1 mA the stand-by power consumption shall not be greater than 20 % above the value measured in 7.7.5		P
7.6.7	Class III operating duty test		N
7.7	SPD disconnectors and safety performance of overstressed SPDs		P
7.7.1	Operating duty withstand test of SPD disconnectors		P
7.7.2	Test of thermal stability of SPDs		P
7.7.2.1	Temperature withstand test		P
7.7.2.2	Thermal stability test		P
	A disconnector operates, there shall be clear evidence of effective and permanent disconnection by the device. To check this, a power frequency voltage equal to U_c 1) shall be applied for 1 min without current flow in excess of 0,5 mA r.m.s.		P
	Indoor SPDs: The surface temperature rise shall be less than 120 K during the test. The surface temperature shall not exceed 80 K above ambient temperature 5 min after the disconnector has operated.		P
	During the test there shall be no expulsion of solid material.		P
	Outdoor SPDs: There shall be no evidence of burning and there shall be no expulsion of solid material.		N
	Accessible SPDs: After the test, SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N (see EN 60529), except the live parts which were already accessible before the test when the SPD is fitted as in normal use.		N
7.7.3	Short-circuit withstand capability		P



	This test is not applied to SPDs which are either – classified for outdoor use and mounted out of reach, or		N
	– for connection N-PE in TN- and/or TT-systems only.		P
	During the above two short-circuit tests, neither the muslin paper nor the cheese cloth shall catch fire.		N
	In addition, during the test for the short circuit withstand capability, the power short-circuit current shall be interrupted by one of the disconnectors (internal or external) required by the manufacturer.		P
	Internal and/or special disconnectors not covered by another IEC standard: If they operate there shall be clear evidence of effective and permanent disconnection. To check this, a power frequency voltage equal to U_c shall be applied for 1 min to the disconnector(s) having operated. The current flow shall not exceed 0,5 mA r.m.s.		P
	Accessible SPDs: After the test, SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N (see EN 60529), except for those live parts which were already accessible before the test when the SPD is fitted as in normal use.		N
7.7.3.1	Additional test for SPDs with I_{fi} lower than the declared short-circuit withstand capability		N
	The tests according to 7.7.3 are repeated but without voltage switching components being shortcircuited.		N
	The short-circuit is initiated by triggering the SPD with a positive surge current (8/20 or other appropriate waveshape) at 30 to 40 electrical degrees after the zero crossing of the voltage on the positive half wave. The surge current shall be high enough to initiate a follow current but shall in no case exceed I_n .		N
7.7.4	Test under TOVs caused by faults in the high (medium) voltage system		P
	New samples shall be used and fitted as in normal use, according to the manufacturer's instructions, and connected to a test circuit according to Figure 13 or equivalent.		P



	The SPD shall be mounted in a cube-shaped wooden box as described in 7.7.3. The internal surface of the box shall be covered with muslin paper or cheese cloth. One of the box sides (not the bottom) shall remain open in order that the supply cables can be connected according to the manufacturer's instructions.		P
7.7.4.2	The muslin paper or cheese cloth shall not catch fire during the test.		N
	SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N, except for those live parts which were already accessible before the test when the SPD is fitted as in normal use.		N
	SPDs, for which the manufacturer declares in his installation instructions that they may be installed in TT systems between Neutral and PE upstream the main RCD, shall pass the TOV withstand mode criteria given below.		P
	a) TOV failure mode If the manufacturer claims a TOV failure mode, the following additional pass criteria shall be fulfilled:		P
	If a disconnecter has operated, there shall be clear evidence of effective and permanent disconnection by the device. To check this, a power frequenc		P
	b) TOV withstand mode If the manufacturer claims a TOV withstand capability, the following additional pass criteria shall be fulfilled:		P
	The SPD shall maintain thermal stability during the application of UCS (following the application of UT). The SPD is considered to be thermally stable if the current flowing through it or its power dissipation do not continue to increase during the total time of application of UCS		P
	The test sample is then connected to UC. The test transformer shall have a short-circuit current capability of at least 200 mA.		P
	The current which flows through the test sample is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA or		P
	the stand-by power consumption shall not increase by more than 20 % of the value measured in 7.7.5.		P



	After the test sample has cooled down to near ambient temperature, the measured limiting voltage shall be determined, using the tests described in 7.5, in order to check if the voltage protection level specified by the manufacturer has been maintained. However, the test of 7.5.2. is performed only at I_n and the tests of 7.5.4 and 7.5.5 only at U_{oc} . Auxiliary circuits, like status indicators, shall be in working order.		P
	For the purpose of this subclause, 'working order' means that there is no visible damage of the disconnector and that it is still operational. Operation can be checked either manually (where possible) or by a simple electrical test agreed between the manufacturer and the laboratory.		P
	Visual inspection of the test sample shall reveal no evidence of any damage.		P
7.7.5	Standby power consumption and residual current test		N
	The SPD is connected to a voltage source at its maximum continuous operating voltage (U_C) in accordance with the manufacturer's instructions. The apparent power (Volt-Amperes) consumed by the SPD is measured. The current flowing through the PE terminal is called the residual current.		P
7.7.6	Test under TOVs caused by faults in the low voltage system		N
	The muslin paper or cheese cloth shall not catch fire during the test.		N
	SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N, except for those live parts which were already accessible before the test when the SPD is fitted as in normal use.		N
	The SPD shall maintain thermal stability during the application of UCS (following the application of UT). The SPD is considered to be thermally stable if the current flowing through it or its power dissipation do not continue to increase during the total time of application of UCS.		N
	The test sample is then connected to U_C . The test transformer shall have a short-circuit current capability of at least 200 mA.		N



	The current which flows through the test sample is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA or the stand-by power consumption shall not increase by more than 20 % of the value measured in 7.7.5.		N
	After the test sample has cooled down to near ambient temperature, the measured limiting voltage shall be determined, using the tests described in 7.5, in order to check if the voltage protection level specified by the manufacturer has been maintained. However, the test of 7.5.2. is performed only at I_n and the tests of 7.5.4 and 7.5.5 only at U_{oc} . Auxiliary circuits, like status indicators, shall be in working order.		N
	For the purpose of this subclause, 'working order' means that there is no visible damage of the disconnector and that it is still operational. Operation can be checked either manually (where possible) or by a simple electrical test agreed between the manufacturer and the laboratory.		N
	Visual inspection of the test sample shall reveal no evidence of any damage.		N
7.8	Test for two-port SPDs and one-port SPDs with separate input/output terminals		P
7.8.2	Rated load current I_L		P
7.8.3	Load-side short circuit withstand capability test (in conjunction with SPD disconnectors required by the manufacturer, if any).		N
	During the test the power short-circuit current shall be interrupted within 5 s. During the test the muslin paper, or cheesecloth, shall not catch fire. In addition, there shall be no explosion or hazard for either personnel or facility.		N
	<i>Accessible SPDs</i> After the test, SPDs having an IP degree equal or greater than IP 2X shall not have live parts accessible with the standardized test finger applied with a force of 5 N (see IEC 60529). If no internal disconnector has operated, the SPD shall fulfil the requirements according to 7.4.1 and 7.5. If an SPD internal disconnector has operated, there shall be clear evidence of effective and permanent disconnection.		N
	In checking for disconnection: a) confirm that there is no voltage on the output terminals		N



	b) apply a power frequency voltage equal to two times U_C , between the corresponding input and output terminals for 1 minute without current flow in excess of 0,5 mA r.m.s. The test shall include all the auxiliary parts in series with the SPD as declared by the manufacturer.		N
7.8.4	Load-side surge withstand capability		P
	The test sample shall be energized during the whole test sequence. The voltage on the output terminals shall be recorded.		P
	The SPD has passed the test if the criteria according to 7.6.6 are fulfilled.		P
	Overload behaviour		P
	For touchable surfaces, the temperature rise shall always be less than 60 K during the test.	45.1 K	P
	a) No internal disconnecter has operated:		P
	Visual inspection of the test sample shall reveal no evidence of any damage.		P
	SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N, except for those live parts which were already accessible before the test when the SPD is fitted as in normal use.		N
	The current which flows through the test sample is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA. or		P
	the stand-by power consumption shall not increase by more than 20 % of the value measured in 7.7.5.		P
	After the test sample has cooled down to ambient temperature, the measured limiting voltage shall be determined, using the tests described in 7.5, to check, if the voltage protection level specified by the manufacturer has been maintained. The test of 7.5.2. is performed only at I_n and the tests of 7.5.4 and 7.5.5 only at U_{oc} .		P
	Auxiliary circuits, such as status indicators, shall be in working order.		N
	SPDs having an IP degree equal or greater than IP20 shall not have live parts accessible with the standardized test finger applied with a force of 5 N, except for those live parts which were already accessible before the test when the SPD is fitted as in normal use.		N



	There shall be clear evidence of effective and permanent disconnection by the device. To check this, a power frequency voltage equal to <i>UC</i> shall be applied for 1 min without current flow in excess of 0,5 mA r.m.s.		P
	There shall be no evidence of burning and there shall be no expulsion of solid material during and after the test.,		P
7.9	Additional tests		---
	The entire subclause 7.9 is a safety issue. In some countries other national regulations may apply.		P
7.9.1	Portable SPDs with flexible cables and cords and their connection		N
7.9.1.1	Portable SPDs shall be provided with a cord anchorage such that the conductors are relieved from strain, including twisting, where they are connected to the terminals or terminations, and that their covering is protected from abrasion.		N
	The sheath, if any, of the cord shall be clamped within the cord anchorage.		N
	After reassembly of the sample, the component parts shall fit snugly and it shall not be possible to push the cable or cord into the sample to any appreciable extent.		N
	The cable or cord is then subjected 100 times to a pull of – 60 N if the rated current is not more than 16 A and the rated voltage is up to and including 250 V; – 80 N if the rated current is not more than 16 A and the rated voltage is above 250 V; – 100 N if the rated current is more than 16 A.		N
	After the tests, the cable or cord shall not have been displaced by more than 2 mm. For rewirable accessories, the end of the conductors shall not have moved noticeably in the terminals; for non-rewirable accessories, there shall be no break in the electrical connections.		N
	After these tests, the displacement of the mark on the cable or cord in relation to the sample or the cord guard is measured while the cable or cord is subjected to the pull.		N



7.9.1.3	Non-rewireable SPDs shall be provided with a flexible cable or cord complying with IEC 60227 and IEC 60245 with a cross-sectional area of the conductors suitable for the maximum rating of the SPD and associated equipment.		N
7.9.1.4	Non-rewireable SPDs shall be so designed that the flexible cable or cord is protected against excessive bending where it enters the accessory.		N
	Guards provided for this purpose shall be of insulating material and shall be fixed in a reliable manner.		N
	Helical metal springs, whether bare or covered with insulating material, shall not be used as core guards.		N
	The sample is fixed to the oscillating mechanism of the apparatus. Therefore when it is in midposition, the axis of the flexible cable or cord where it enters the sample is vertical; thus passing through the axis of oscillation.		N
	The accessory is, by variation of the distance between the fixed part of the oscillating mechanism and the axis of oscillation, so positioned that the cord makes the minimum lateral movement when the oscillating mechanism of the test apparatus is moved over its full length of travel.		N
	In order to have the possibility of finding easily by experiment the mounting position with the minimum lateral movement of the cord during the test, the flexing apparatus should be built in such a way that the different supports for the accessories mounted on the oscillating mechanism can be readily adjusted.		N
	The cable or cord is loaded with a mass such that the force applied is – 20 N for accessories with cables or cords having a nominal cross-sectional area exceeding 0,75 mm ² ; – 10 N for other accessories.		N
	A current equal to the rated current for the accessory or the following current, whichever is the lower, is passed through the conductors: – 16 A for accessories with cables or cords having a nominal cross-sectional area exceeding 0,75 mm ² ; – 10 A for accessories with cords having a nominal cross-sectional area of 0,75 mm ² ; – 2,5 A for accessories with cords having a nominal cross-sectional area less the 0,75 mm ² .		N



	The voltage between the conductors is equal to the rated voltage of the sample.		N
	The oscillating mechanism is moved through an angle of 90° (45° on either side of the vertical), the number of flexings being 10 000 and the rate of flexing 60 per minute.		N
	A flexing is one movement, either backwards or forwards.		N
	Samples with circular section cables or cords are turned through 90° in the oscillating mechanism after 5 000 flexings, samples with flat cords are only bent in a direction perpendicular to the plane containing the axes of the conductors.		N
	During the flexing test, there shall be – no interruption of the current, – no short-circuit between conductors.		N
	A short-circuit between the conductors of the flexible cable or cord is considered to occur if the current attains a value equal to twice the test current of the accessory.		N
	The voltage drop between each contact and the corresponding conductor, with a test current flowing having a value of the rated current, shall not exceed 10 mV.		N
	After the test the guard, if any, shall not have separated from the body and the insulation of the flexible cable or cord shall show no sign of abrasion or wear; broken strands of the conductor shall not have pierced the insulation so as to become accessible.		N
7.9.2	Mechanical strength		P
7.9.2.1	SPDs shall have adequate mechanical strength so as to withstand the stresses imposed during installation and use.		P
	The samples are subjected to strikes by means of an impact-test apparatus		P
	After the test, the sample shall show no damage within the meaning of the standard. In particular, live parts shall not become accessible with the standard test finger.		P
	Damage to the finish, small dents which do not reduce creepage distances or clearances and small chips which do not adversely affect the protection against electric shock or harmful ingress of water are neglected.		P



	Cracks, not visible with the normal or corrected vision, without additional magnification, and surface cracks in fibre reinforced mouldings and the like, are ignored.		P
7.9.2.2	Portable SPDs are tested in a tumbling barrel		N
	After the test, the samples shall show no damage. In particular		N
	no part shall have become detached or loosened, – it should not be possible to touch any live parts, even if the standard test finger is applied with a force not exceeding 10 N.		N
	During the examination after the test, special attention is paid to the connection of the flexible cable or cord. Small pieces may be broken off without rejection, provided that the protection against electric shock is not affected.		N
	Damage to the finish and small dents which do not reduce the creepage distances or clearances are neglected.		N
7.9.3	Heat resistance		P
7.9.3.1	For 1 h the SPD is kept in a heating cabinet at a temperature of $100\text{ }^{\circ}\text{C} \pm 2\text{ K}$. Any sealing compound used in the internal assembly shall not flow out to any significant extent.		P
	After cooling, it should not be possible to touch any live parts when the test sample is mounted as for normal use even if the standard test finger is applied with a force not exceeding 5 N.		P
	The SPD is deemed to have passed the test even if the SPD disconnecter is open.		P
	The sample to be tested is fastened accordingly, its surface being positioned horizontally; a steel ball having a diameter of 5 mm is pressed against the surface with a force of 20 N.		P
	After 1 h, the steel ball is taken away from the sample; by dipping it into cold water, the temperature of the sample is reduced to ambient temperature within 10 s.		P
	The diameter of the ball indentation is measured and shall not exceed 2 mm.		P
7.9.4	Resistance to abnormal heat and fire		P
	The glow wire test is performed in accordance with clauses 4 to 10 of IEC 60695-2-1/1 under the following conditions:		P



	for external parts of SPDs made of insulating material necessary to retain in position current-carrying parts and parts of the protective circuit, by the test made at a temperature of $850\text{ }^{\circ}\text{C} \pm 15\text{ K}$;	Enclosure and Internal spring fixing pleastic element	P
	for all other external parts made of insulating material, by the test made at a temperature of $650\text{ }^{\circ}\text{C} \pm 10\text{ K}$.		N
7.9.5	Verification of air clearances and creepage distances		P
	The electrode spacing of spark gaps shall not be considered for the determination of air clearances and creepage distances.		P
7.9.5.1	SPDs category outdoor		N
	Between live parts and earth,		N
7.9.5.2	SPDs category indoor		P
	Between live parts and earth,	cl./cr.:1.2/1.8	P
7.9.5.2.2	The casting shall not come over the rim of the deepening, it shall stick strongly to the walls of the cavity and the metal parts in it.		N
7.9.6	Tracking resistance		P
7.9.7	Insulation resistance		P
7.9.7.1	Requirement of the EUT and the reference test condition		---
	Additional entry holes for cables		P
	The moisture treatment is carried out in a humidity cabinet	93 % 25 °C	P
	Time for humidity Test	48h	P
7.9.7.2	After a delay period of between 30 min and 60 min following the humidity treatment, the insulation resistance is measured 60 s after having applied a d.c. voltage of 500 V.		P
	The insulation resistance shall not be lower than 5 ms for the measurements according to a), 2 ms for the measurements according to b).		P
7.9.8	Dielectric withstand		P
	SPDs classified for outdoor use are tested between the terminals with the internal parts removed.	2.2kV	P
	During this test, the SPD is subjected to sprinkling according to 9.1 of IEC 60060-1.		P
	Auxiliary circuits are tested according to IEC 60947-5-1.		N
7.9.9	Resistance to ingress of solid objects and to harmful ingress of water		N

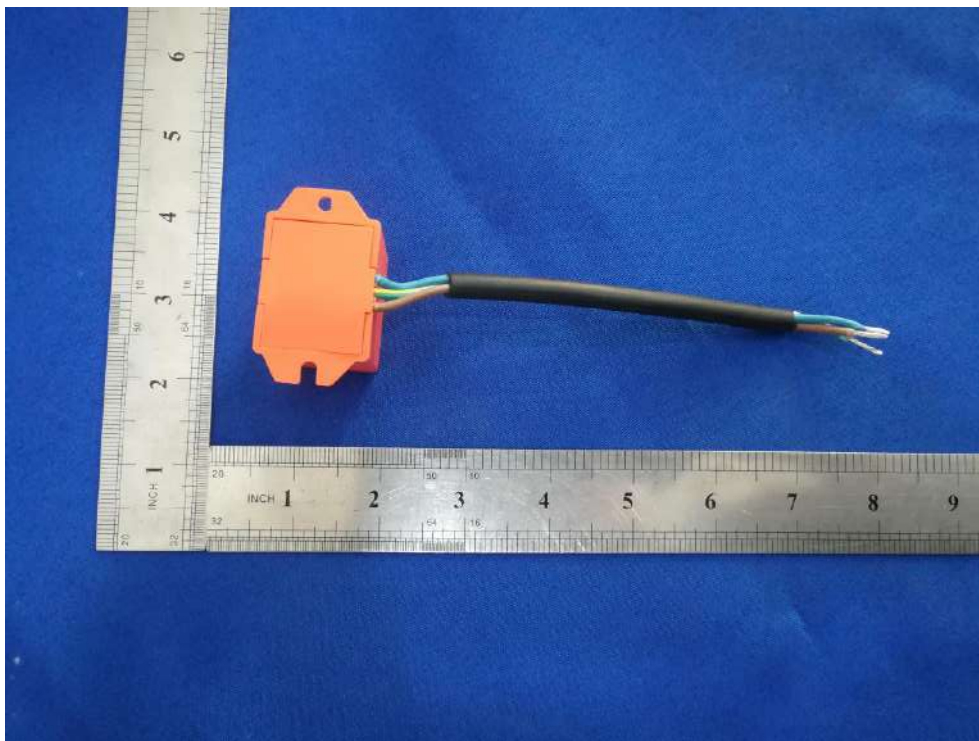


	Testing shall be carried out in accordance with IEC 60529 to check the IP code.		N
7.9.10	Total discharge current test for multipole SPDs		P
	Each mode of the test sample is then connected to U_C . The test transformer shall have a shortcircuit current capability of at least 200 mA.		P
	The current which flows through the test sample is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA or the stand-by power consumption shall not increase by more than 20 % of the value measured in 7.7.5.		P
	After the test sample has cooled down to near ambient temperature, the measured limiting voltage shall be determined using the tests described in 7.5 to check if the voltage protection level specified by the manufacturer has been maintained. The test of 7.5.2. is performed only at I_n .		P
	Auxiliary circuits, like status indicators, shall be in working order.		N
	Visual inspection of the test sample shall reveal no evidence of any damage.		P
7.10	Electromagnetic compatibility		N
7.10.1	Electromagnetic immunity		N
	SPDs either incorporating no electronic circuits or incorporating electronic circuits in which all components are passive (for example diodes, resistors, capacitors, inductors, varistors and other surge protective components) are not sensitive to normal electromagnetic disturbances and therefore no immunity tests are required.		N
	The requirements for SPDs containing electronic circuits are under consideration		N
7.10.2	Electromagnetic emission		N
8	Routine and acceptance tests		P
	Appropriate test(s) shall be conducted to verify that the SPD is capable of meeting its performance. The manufacturer shall declare the test method(s).		N
	Check that I_c is below a specified value determined by the manufacturer at a specified U_c .		P
Annex A	Considerations for SPDs when class I tests are to be applied		N
Annex B	TOV values	1585V	P



ANNEX A:

Photo-documentation

**Photo 1 Overview****Photo 2 Overview**

----End of the report----



Test Report Of ANSI/IES LM-80-15

Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

Report Number : N02A23050461L00901

Client : SHENZHEN ZHONGSHUN SEMICONDUCTOR OPTOELECTRONIC CO., LTD.

Address : Room no. 1015, 10th Floor, Yizhan Business Building, No. 8 Yizhan 4th Road,
Shapu Community, Songgang Street, Bao'an District Shenzhen, Postal code
518105, Guangdong Province, Republic of China

Test Product Family : PCT3030

Test Part Number : S-G3030

Brand Name :  **ZHONG SHUN**

Testing Laboratory : Guangdong Meide Testing Technology Co., Ltd.

Address : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan
Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

Testing Location : As above

Date of receipt : 2021-03-22

Date of test : 2021-04-06 to 2023-06-12

Date of report : 2023-06-12

Tested by:

Jarvis Zhang

Jarvis Zhang/ Test Engineer

Checked by:

Sandy Chen

Sandy Chen/ Project Engineer

Approved by:

Jessie Li

Jessie Li/ Technical Manager

Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TRF No.: 02-N005-1A
Web: www.gtgggroup.com

TRF Originator: GTG
E-mail: info@gtgggroup.com

TRF Date: 2022-07-01
Tel.: 86-400 755 8988

ENERGY STAR® LM-80 Cover Sheet**Administrative Information**

Tested Product Family: PCT3030

Tested Part Number: S-G3030

DUT IdentificationDUT manufacture's name: SHENZHEN ZHONGSHUN SEMICONDUCTOR
OPTOELECTRONIC CO., LTD.

DUT identification, e.g., model number: S-G3030

Description of DUT, including if the DUT is an LED
package or module: LED Package**DUT Characteristics**

Total input power(W): 1.2 W

Average current density per LED die(mA/mm²): 352 mA/mm²Average power density per LED die(W/mm²): 0.2816 W/mm²Representative CRI(Ra) of the tested sample set: 90
(Indicate whether the reported value is the mean or
Median value of the sample set, or per unit)

Minimum die edge to die edge spacing: 0.04mm

Table of Contents

1. General Information	4
1.1 Description of LED Light Sources	4
1.2 Standards Used	5
1.3 Test equipment list	5
1.4 Drive Level	5
1.5 Ambient Conditions for Maintenance Test	5
1.6 Photometric Measurement Method	6
1.7 Sample Set	7
2. Summary of Test Result	9
3. Test Data	21
3.1 Data Set 1, 55°C, 90mA (Lumen Maintenance)	21
3.2 Data Set 1, 55°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))	22
3.3 Data Set 1, 55°C, 90mA (Photon Flux Maintenance, Far-Red (PFMFR))	23
3.4 Data Set 1, 55°C, 90mA (Forward Voltage)	24
3.5 Data Set 1, 55°C, 90mA (Chromaticity Shift)	25
3.6 Data Set 2, 85°C, 90mA (Lumen Maintenance)	26
3.7 Data Set 2, 85°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))	27
3.8 Data Set 2, 85°C, 90mA (Photon Flux Maintenance, Far-Red (PFMFR))	28
3.9 Data Set 2, 85°C, 90mA (Forward Voltage)	29
3.10 Data Set 2, 85°C, 90mA (Chromaticity Shift)	30
3.11 Data Set 3, 105°C, 90mA (Lumen Maintenance)	31
3.12 Data Set 3, 105°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))	32
3.13 Data Set 3, 105°C, 90mA (Photon Flux Maintenance, Far-Red (PFMFR))	33
3.14 Data Set 3, 105°C, 90mA (Forward Voltage)	34
3.15 Data Set 3, 105°C, 90mA (Chromaticity Shift)	35
3.16 Data Set 4, 55°C, 160mA (Lumen Maintenance)	36
3.17 Data Set 4, 55°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))	37
3.18 Data Set 4, 55°C, 160mA (Photon Flux Maintenance, Far-Red (PFMFR))	38
3.19 Data Set 4, 55°C, 160mA (Forward Voltage)	39
3.20 Data Set 4, 55°C, 160mA (Chromaticity Shift)	40
3.21 Data Set 5, 85°C, 160mA (Lumen Maintenance)	41
3.22 Data Set 5, 85°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))	42
3.23 Data Set 5, 85°C, 160mA (Photon Flux Maintenance, Far-Red (PFMFR))	43
3.24 Data Set 5, 85°C, 160mA (Forward Voltage)	44
3.25 Data Set 5, 85°C, 160mA (Chromaticity Shift)	45
3.26 Data Set 6, 105°C, 160mA (Lumen Maintenance)	46
3.27 Data Set 6, 105°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))	47
3.28 Data Set 6, 105°C, 160mA (Photon Flux Maintenance, Far-Red (PFMFR))	48
3.29 Data Set 6, 105°C, 160mA (Forward Voltage)	49
3.30 Data Set 6, 105°C, 160mA (Chromaticity Shift)	50
3.31 Data Set 7, 55°C, 200mA (Lumen Maintenance)	51
3.32 Data Set 7, 55°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))	52
3.33 Data Set 7, 55°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))	53
3.34 Data Set 7, 55°C, 200mA (Forward Voltage)	54
3.35 Data Set 7, 55°C, 200mA (Chromaticity Shift)	55
3.36 Data Set 8, 85°C, 200mA (Lumen Maintenance)	56
3.37 Data Set 8, 85°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))	57
3.38 Data Set 8, 85°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))	58
3.39 Data Set 8, 85°C, 200mA (Forward Voltage)	59
3.40 Data Set 8, 85°C, 200mA (Chromaticity Shift)	60
3.41 Data Set 9, 105°C, 200mA (Lumen Maintenance)	61
3.42 Data Set 9, 105°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))	62
3.43 Data Set 9, 105°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))	63
3.44 Data Set 9, 105°C, 200mA (Forward Voltage)	64
3.45 Data Set 9, 105°C, 200mA (Chromaticity Shift)	65
4. EUT Photo	66
4.1 Mechanical Dimensions	66
4.2 EUT Photo	67

1. General Information

1.1 Description of LED Light Sources

Sample Size:

225 pcs samples were received on 2021-03-22, the samples were numbered from S1 to S25, S26 to S50, S51 to S75, S76 to S100, S101 to S125, S126 to S150, S151 to S175, S176 to S200 and S201 to S225.

Manufacture: SHENZHEN ZHONGSHUN SEMICONDUCTOR OPTOELECTRONIC CO., LTD.

Product Family: PCT3030

Part Number: S-G3030

Part Type: LED Package

Drive Level: DC 90mA/160mA/200mA

Nominal CCT: 2700K

Power: 0.5W/1W/1.2W

CRI: 90

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from 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:

Product Family	Part Number	CCT (K)	Number of dies	Current density per die (mA/mm ²)	Current (mA)	Power density (W/mm ²)	Power (W)	Die Spacing (mm)	Current of die (mA)
PCT3030	Test Model S-G3030	2700	6	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0101XXX	2700	1	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0102XXX	2700	2	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0103XXX	2700	3	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0104XXX	2700	4	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0105XXX	2700	5	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0106XXX	2700	6	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0201XXX	2700	2	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0202XXX	2700	4	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0203XXX	2700	6	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0301XXX	2700	3	352	135	0.0004	1.2	0.04	250
	S-G3030XXXX-0302XXX	2700	6	352	135	0.0004	1.2	0.04	250
	S-G3030XXXX-0401XXX	2700	4	352	100	0.0004	1.2	0.04	250
	S-G3030XXXX-0501XXX	2700	5	352	80	0.0004	1.2	0.04	250
	S-G3030XXXX-0601XXX	2700	6	352	70	0.0004	1.2	0.04	250

Disclaimer:

The truthfulness and accuracy of all the technical information above for the covered LED products is ensured by manufacturer of LED light source. Guangdong Meide Testing Technology Co., Ltd. isn't responsible or gives any guarantees for the truthfulness of the technical information.

1.2 Standards Used

- ANSI/IES LM-80-15 IES Approved Method for Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
- ENERGY STAR® Requirements for the use of LM-80 Data (This standard was not accredited by NVLAP)

1.3 Test equipment list

Test Equipment	Serial No	Model No	Calibration due date
Integrating Sphere System	MD-E033	0.5m	2024/05/17
Standard Light Source	MD-E034	D062	2024/05/17
High Accuracy Array Spectroradio Meter	MD-E011	HAAS-3000	2023/09/17
Digital Power Meter	MD-E008	PF310	2023/09/17
Precision digital stabilized DC power supply	MD-E009	WY305	2023/09/17
Temperature Tester	MD-E038	UFS-D8036	2023/08/28

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd. attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

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 $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ 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 $\pm 3\%$ 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 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, $RH < 65\%$.

1.6 Photometric Measurement Method

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate $u'v'$. 2π measurement was used and sample was driven by DC power supply. The forward current was regulated to within $\pm 0.5\%$ of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe. The uncertainty of the light output (luminous flux) measurements is $U=2.1\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=18\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the temperature is $U=0.5^{\circ}\text{C}$ ($K=2$), at the 95% confidence level.

1.7 Sample Set

Data Set 1:55°C,90mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>53^{\circ}\text{C}$
Ambient Temperature(T_A):	$>50^{\circ}\text{C}$
Life Test Drive Current:	90mA
Measurement Current:	90mA

Data Set 2:85°C,90mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>83^{\circ}\text{C}$
Ambient Temperature(T_A):	$>80^{\circ}\text{C}$
Life Test Drive Current:	90mA
Measurement Current:	90mA

Data Set 3:105°C,90mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>103^{\circ}\text{C}$
Ambient Temperature(T_A):	$>100^{\circ}\text{C}$
Life Test Drive Current:	90mA
Measurement Current:	90mA

Data Set 4:55°C,160mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>53^{\circ}\text{C}$
Ambient Temperature(T_A):	$>50^{\circ}\text{C}$
Life Test Drive Current:	160mA
Measurement Current:	160mA

Data Set 5:85°C,160mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>83^{\circ}\text{C}$
Ambient Temperature(T_A):	$>80^{\circ}\text{C}$
Life Test Drive Current:	160mA
Measurement Current:	160mA

Data Set 6:105°C,160mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>103^{\circ}\text{C}$
Ambient Temperature(T_A):	$>100^{\circ}\text{C}$
Life Test Drive Current:	160mA
Measurement Current:	160mA

Data Set 7:55°C,200mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>53^{\circ}\text{C}$
Ambient Temperature(T_A):	$>50^{\circ}\text{C}$
Life Test Drive Current:	200mA
Measurement Current:	200mA

Data Set 8:85°C,200mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>83^{\circ}\text{C}$
Ambient Temperature(T_A):	$>80^{\circ}\text{C}$
Life Test Drive Current:	200mA
Measurement Current:	200mA

Data Set 9:105°C,200mA	
Part number:	S-G3030
Number of Units:	25
Case Temperature(T_S):	$>103^{\circ}\text{C}$
Ambient Temperature(T_A):	$>100^{\circ}\text{C}$
Life Test Drive Current:	200mA
Measurement Current:	200mA

2. Summary of Test Result

Data Set:	Nominal Case & Ambient Temp.	Drive Current	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L ₇₀ Lifetime	Reported TM-21 L ₈₀ Lifetime	Reported TM-21 L ₉₀ Lifetime
1	55°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
2	85°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
3	105°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	103000hrs
4	55°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
5	85°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	100000hrs
6	105°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	88000hrs
7	55°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	53000hrs
8	85°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	103000hrs	48000hrs
9	105°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	89000hrs	42000hrs

Data Set:	Nominal Case & Ambient Temp.	Drive Current	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 Q ₉₀ Lifetime(400-700nm)	Reported TM-21 Q ₉₀ Lifetime (700-800nm)
1	55°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
2	85°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
3	105°C	90mA	25	0	1000hrs	18000hrs	102000hrs	103000hrs
4	55°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
5	85°C	160mA	25	0	1000hrs	18000hrs	99000hrs	99000hrs
6	105°C	160mA	25	0	1000hrs	18000hrs	87000hrs	86000hrs
7	55°C	200mA	25	0	1000hrs	18000hrs	52000hrs	51000hrs
8	85°C	200mA	25	0	1000hrs	18000hrs	47000hrs	48000hrs
9	105°C	200mA	25	0	1000hrs	18000hrs	41000hrs	42000hrs

Data Set 1:55°C,90mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	531000	537000	549000	556000	568000	576000	605000	618000	692000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	331000	335000	342000	347000	354000	359000	378000	385000	431000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	154000	157000	160000	163000	166000	168000	177000	179000	201000

Data Set 2:85°C,90mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	382000	386000	394000	402000	412000	415000	421000	429000	436000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	238000	240000	246000	250000	257000	258000	262000	267000	272000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	111000	112000	115000	116000	120000	120000	122000	125000	127000

Data Set 3:105°C,90mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	335000	348000	356000	358000	365000	369000	377000	379000	386000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	208000	216000	221000	222000	226000	229000	234000	235000	239000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	97000	99000	101000	102000	104000	105000	107000	108000	110000

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.24%	100.11%	99.98%	99.85%	99.72%	99.59%	99.49%	99.39%	99.29%	99.21%	99.13%	99.06%	99.00%	98.93%	98.87%	98.83%	98.78%	98.73%
2	100.14%	100.02%	99.90%	99.75%	99.59%	99.43%	99.29%	99.14%	99.00%	98.89%	98.78%	98.67%	98.59%	98.51%	98.44%	98.36%	98.29%	98.21%
3	100.05%	99.91%	99.76%	99.57%	99.39%	99.18%	99.01%	98.84%	98.67%	98.53%	98.42%	98.32%	98.25%	98.15%	98.06%	97.98%	97.87%	97.76%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

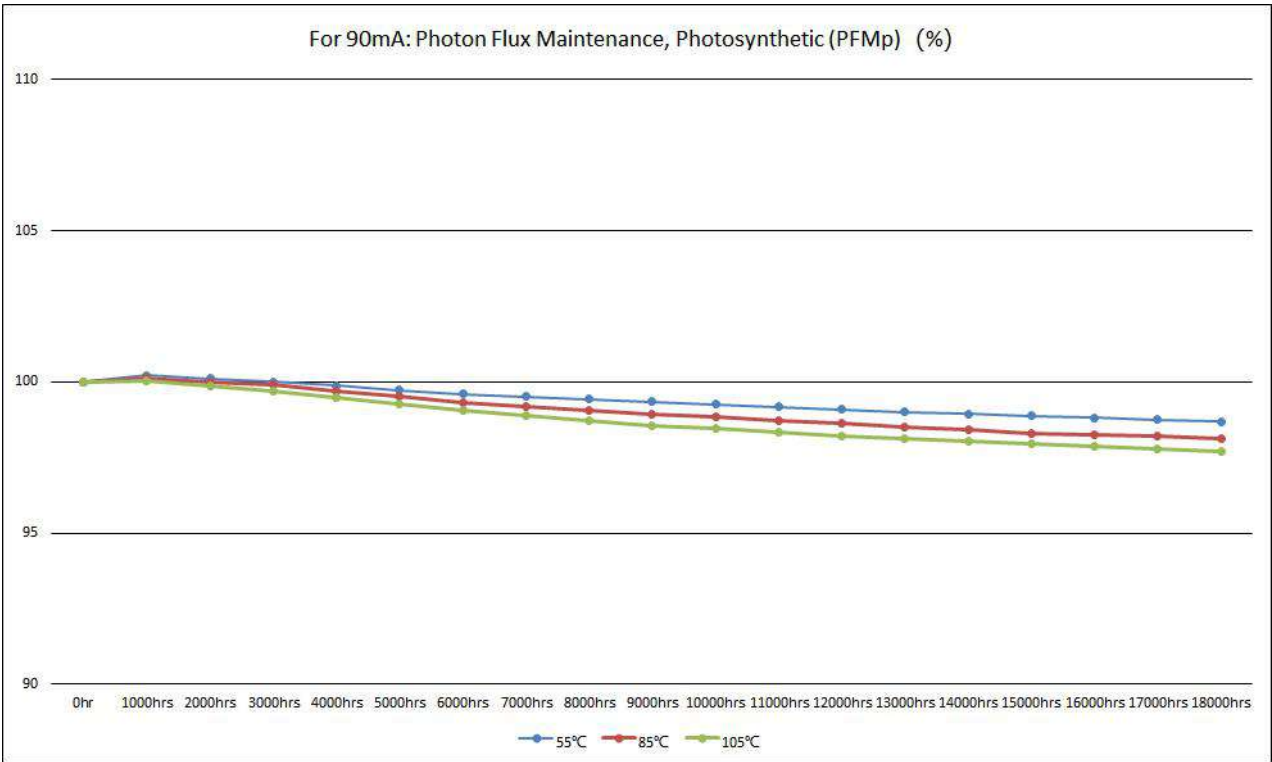
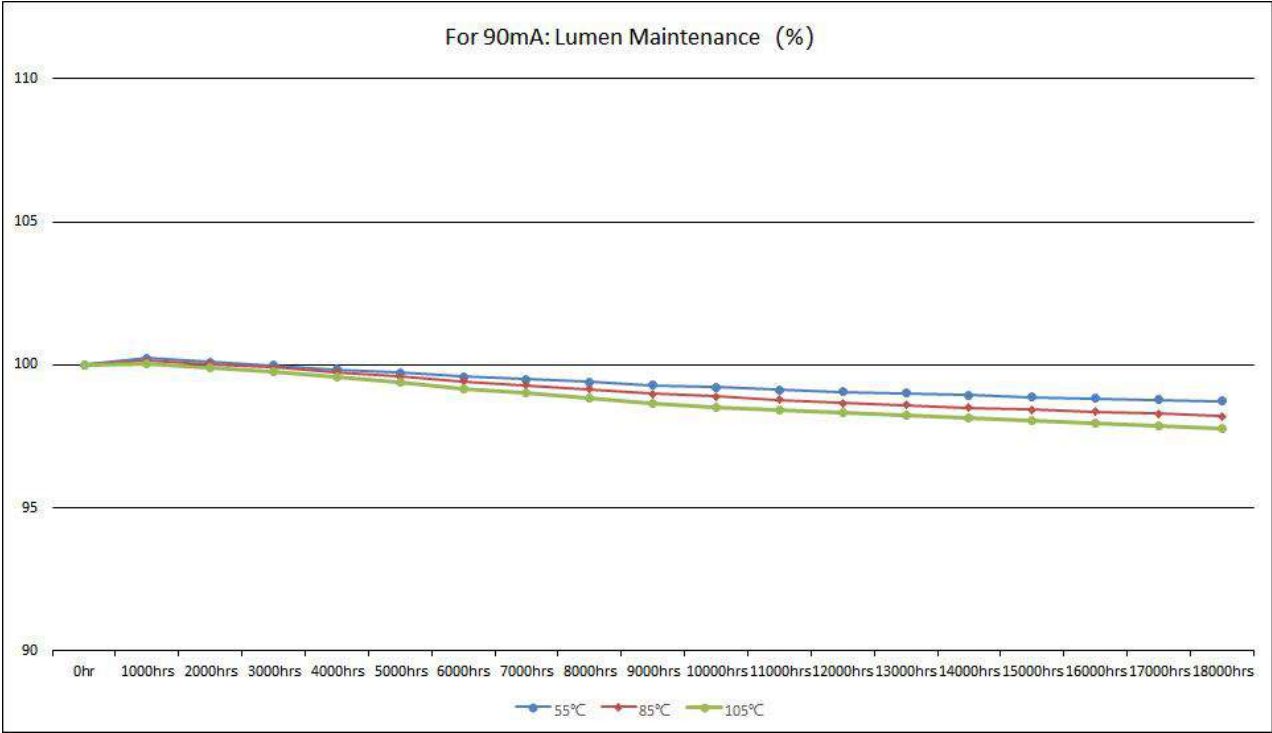
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.22%	100.11%	100.00%	99.86%	99.73%	99.60%	99.51%	99.42%	99.33%	99.25%	99.16%	99.08%	99.01%	98.94%	98.87%	98.80%	98.75%	98.68%
2	100.12%	100.00%	99.89%	99.70%	99.51%	99.32%	99.19%	99.07%	98.94%	98.83%	98.72%	98.61%	98.51%	98.41%	98.31%	98.25%	98.19%	98.13%
3	100.02%	99.85%	99.69%	99.47%	99.26%	99.05%	98.87%	98.72%	98.56%	98.45%	98.34%	98.22%	98.11%	98.02%	97.93%	97.85%	97.76%	97.68%

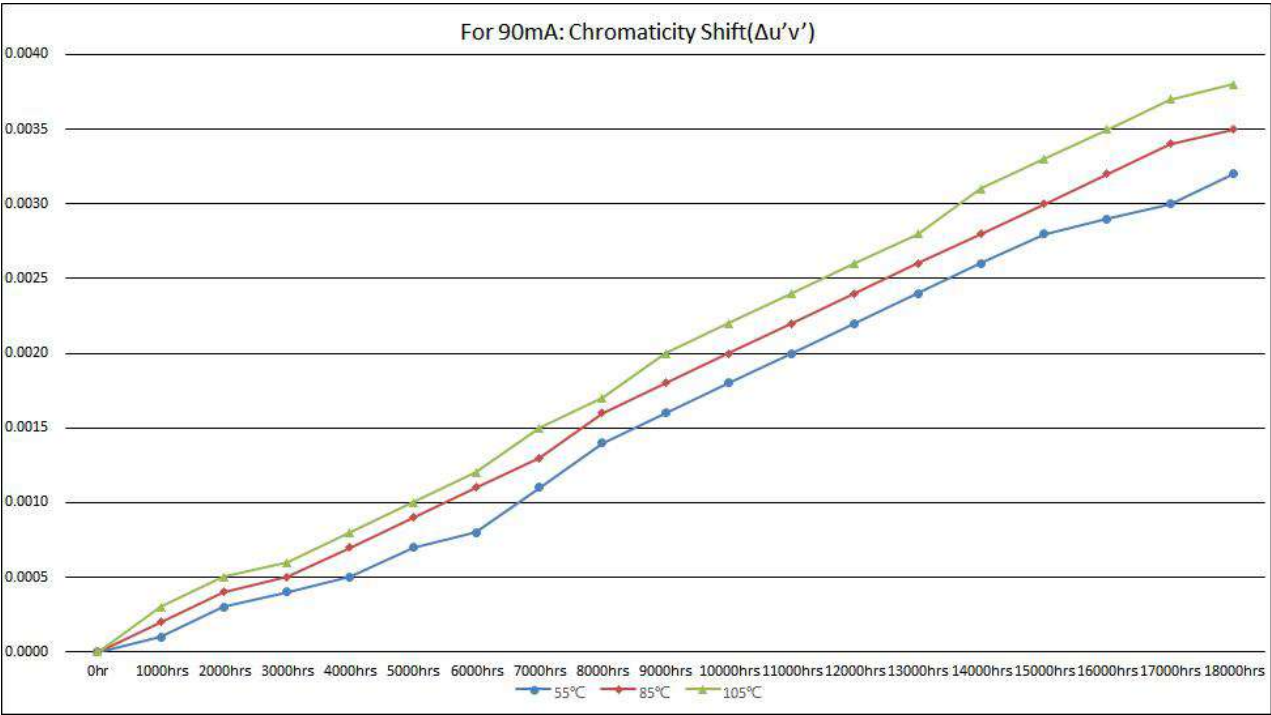
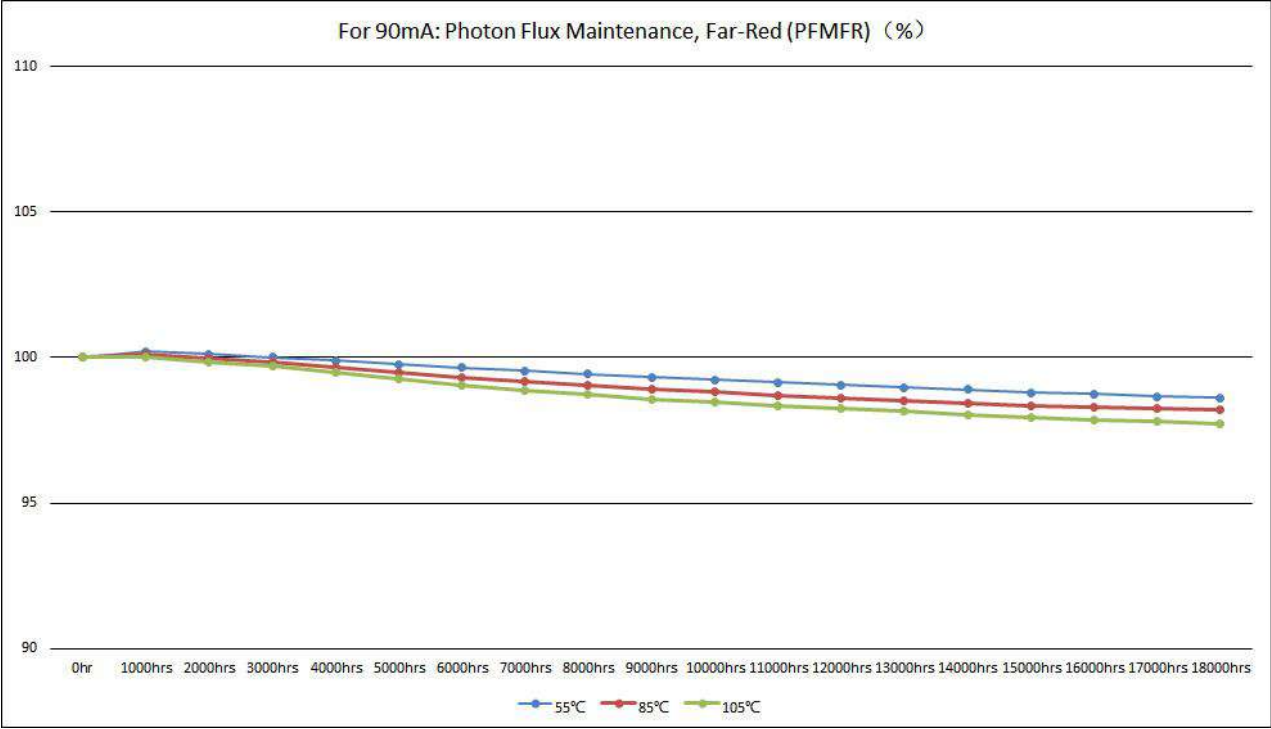
Average Photon Flux Maintenance, Far-Red (PFMFR) (Percentage of Initial Far-Red Photon Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.20%	100.11%	100.02%	99.89%	99.77%	99.65%	99.54%	99.43%	99.33%	99.24%	99.15%	99.06%	98.98%	98.90%	98.80%	98.74%	98.67%	98.61%
2	100.09%	99.98%	99.85%	99.67%	99.49%	99.30%	99.17%	99.05%	98.93%	98.82%	98.71%	98.59%	98.51%	98.43%	98.36%	98.31%	98.25%	98.19%
3	100.01%	99.85%	99.70%	99.50%	99.28%	99.06%	98.89%	98.74%	98.58%	98.46%	98.36%	98.26%	98.15%	98.06%	97.96%	97.88%	97.80%	97.72%

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
2	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
3	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038





Data Set 4:55°C,160mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	408000	413000	424000	426000	428000	434000	444000	446000	456000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	255000	258000	265000	266000	267000	271000	277000	278000	284000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	120000	121000	124000	125000	126000	127000	129000	130000	133000

Data Set 5:85°C,160mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	328000	335000	341000	344000	349000	356000	363000	366000	370000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	204000	209000	211000	214000	217000	221000	225000	228000	230000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	95000	97000	98000	100000	101000	102000	104000	105000	106000

Data Set 6:105°C,160mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	295000	296000	303000	309000	315000	317000	322000	322000	324000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	183000	184000	188000	191000	195000	196000	199000	199000	201000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	84000	85000	87000	87000	89000	90000	91000	91000	92000

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.20%	100.09%	99.96%	99.82%	99.67%	99.53%	99.39%	99.25%	99.12%	99.02%	98.92%	98.82%	98.74%	98.66%	98.59%	98.52%	98.44%	98.36%
2	100.08%	99.96%	99.84%	99.64%	99.44%	99.25%	99.09%	98.93%	98.77%	98.65%	98.54%	98.45%	98.34%	98.24%	98.13%	98.04%	97.95%	97.88%
3	99.99%	99.82%	99.62%	99.42%	99.22%	99.02%	98.84%	98.66%	98.48%	98.35%	98.22%	98.08%	97.97%	97.85%	97.74%	97.65%	97.57%	97.49%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

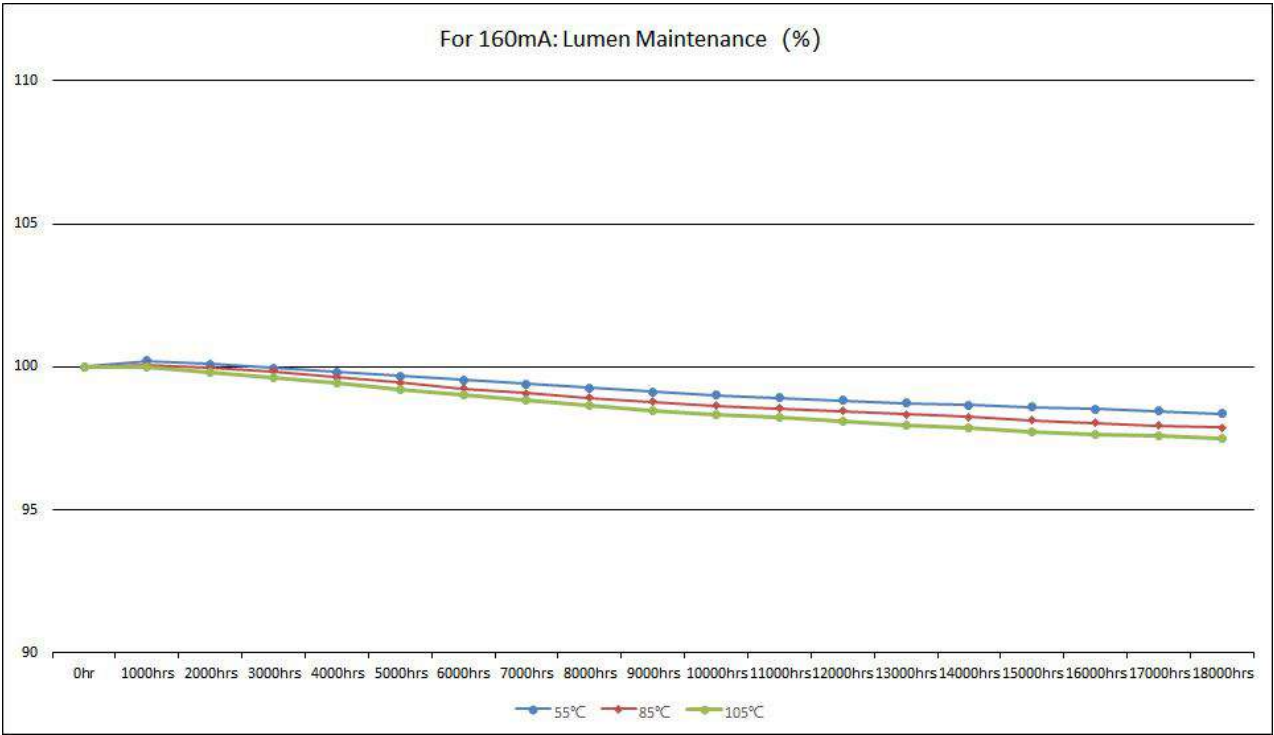
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.18%	100.07%	99.95%	99.79%	99.63%	99.48%	99.36%	99.24%	99.13%	99.01%	98.90%	98.79%	98.70%	98.62%	98.54%	98.46%	98.39%	98.31%
2	100.06%	99.89%	99.73%	99.55%	99.38%	99.21%	99.04%	98.90%	98.74%	98.59%	98.48%	98.36%	98.26%	98.19%	98.08%	97.99%	97.90%	97.81%
3	99.98%	99.78%	99.56%	99.33%	99.10%	98.90%	98.71%	98.54%	98.39%	98.24%	98.10%	97.96%	97.86%	97.76%	97.66%	97.54%	97.45%	97.38%

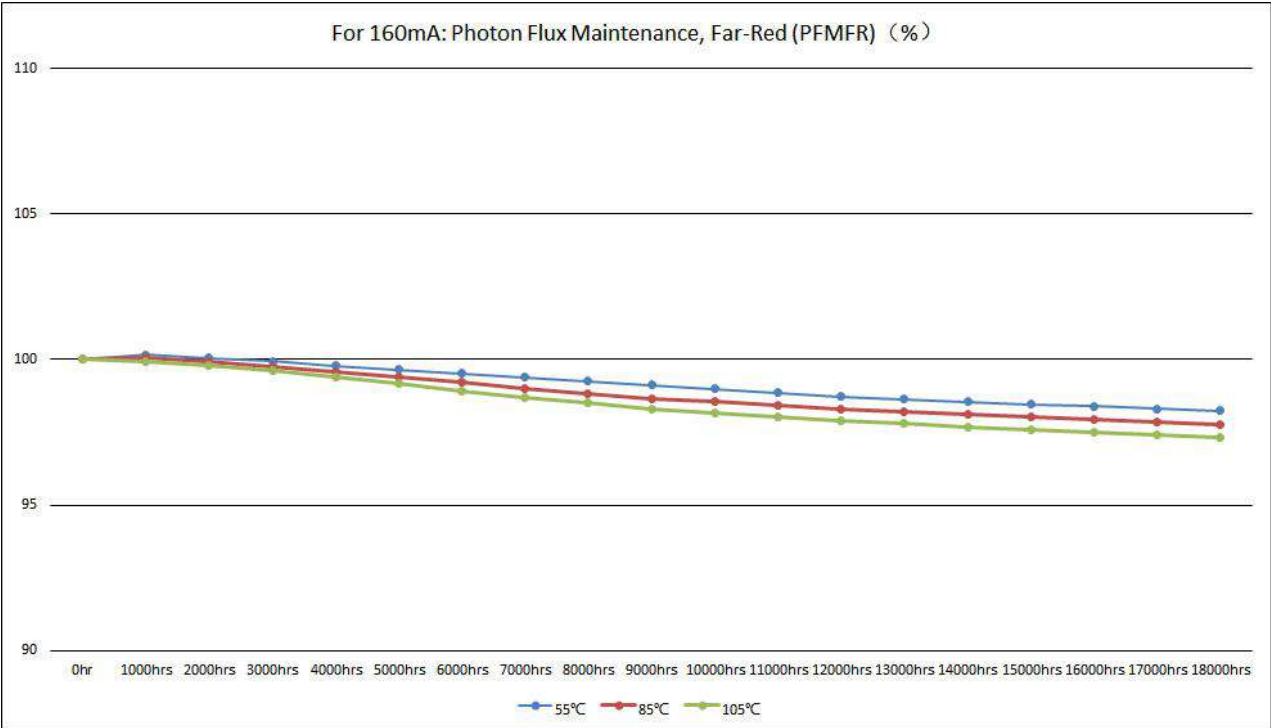
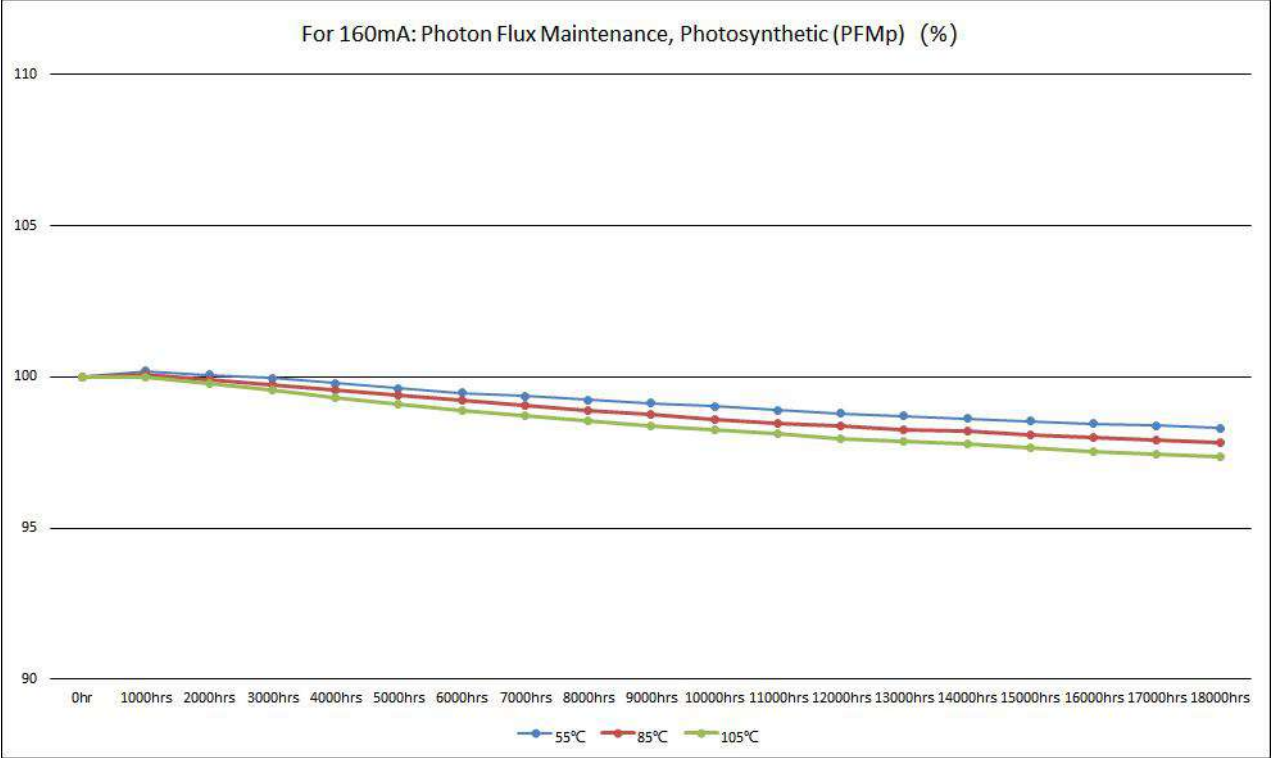
Average Photon Flux Maintenance,Far-Red (PFMR) (Percentage of Initial Far-Red Photon Flux)

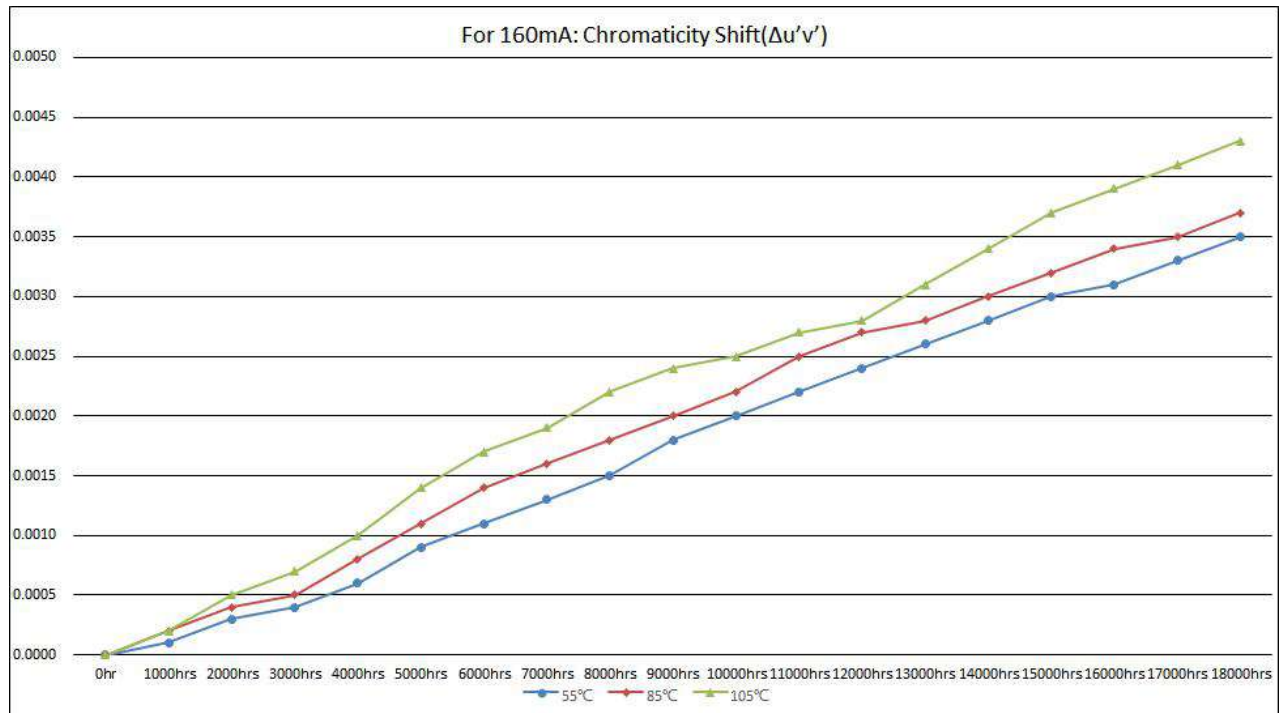
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.16%	100.05%	99.94%	99.80%	99.66%	99.52%	99.39%	99.26%	99.12%	98.99%	98.86%	98.74%	98.65%	98.56%	98.47%	98.39%	98.31%	98.25%
2	100.05%	99.92%	99.75%	99.57%	99.40%	99.22%	99.02%	98.81%	98.67%	98.55%	98.43%	98.31%	98.23%	98.11%	98.03%	97.94%	97.86%	97.76%
3	99.95%	99.79%	99.60%	99.38%	99.17%	98.92%	98.70%	98.51%	98.32%	98.17%	98.03%	97.92%	97.81%	97.69%	97.58%	97.49%	97.40%	97.31%

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
2	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035	0.0037
3	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043







Data Set 7:55°C,200mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	166000	172000	175000	176000	178000	179000	183000	185000	193000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	104000	108000	110000	110000	111000	112000	115000	116000	121000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	50000	51000	52000	53000	53000	54000	54000	55000	57000

Data Set 8:85°C,200mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	152000	157000	165000	165000	167000	169000	176000	177000	183000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	95000	98000	103000	103000	104000	105000	109000	110000	114000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	45000	46000	48000	48000	49000	49000	50000	50000	53000

Data Set 9:105°C,200mA:

Metric	L ₇₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	135000	136000	141000	144000	145000	146000	147000	150000	152000
Metric	L ₈₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	84000	85000	88000	89000	90000	91000	92000	93000	94000
Metric	L ₉₀ B _y								
y	10	20	30	40	50	60	70	80	90
hour	39000	40000	41000	42000	42000	42000	43000	43000	44000

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.16%	99.97%	99.80%	99.58%	99.36%	99.13%	98.87%	98.63%	98.38%	98.15%	97.94%	97.72%	97.53%	97.34%	97.13%	96.96%	96.78%	96.59%
2	100.05%	99.85%	99.63%	99.37%	99.11%	98.84%	98.55%	98.24%	97.94%	97.64%	97.40%	97.17%	96.97%	96.75%	96.54%	96.35%	96.20%	96.07%
3	99.94%	99.73%	99.51%	99.20%	98.89%	98.59%	98.26%	97.94%	97.61%	97.33%	97.07%	96.80%	96.56%	96.33%	96.09%	95.87%	95.66%	95.47%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

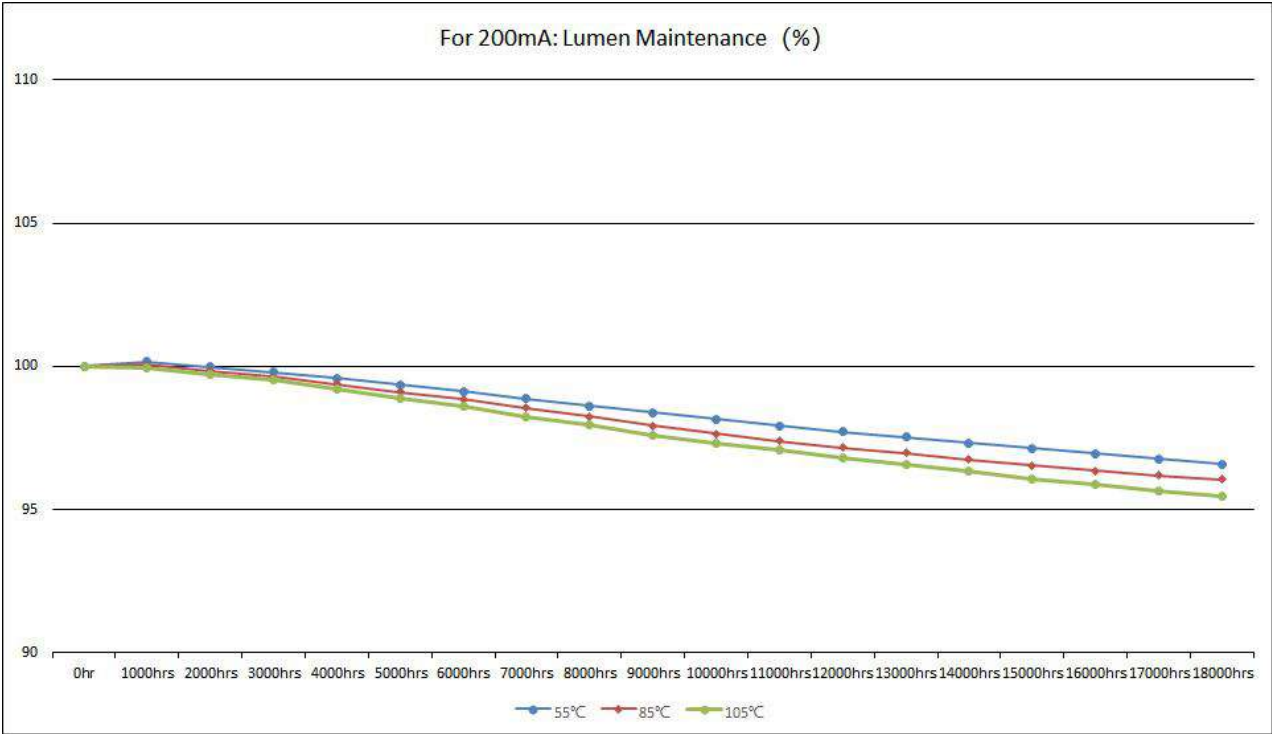
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.12%	99.96%	99.80%	99.58%	99.35%	99.12%	98.85%	98.58%	98.30%	98.04%	97.78%	97.52%	97.34%	97.16%	96.98%	96.82%	96.66%	96.52%
2	100.03%	99.85%	99.66%	99.36%	99.08%	98.79%	98.49%	98.19%	97.88%	97.61%	97.34%	97.08%	96.87%	96.67%	96.46%	96.29%	96.13%	95.96%
3	99.93%	99.70%	99.48%	99.16%	98.85%	98.54%	98.20%	97.86%	97.52%	97.27%	97.02%	96.77%	96.52%	96.28%	96.03%	95.80%	95.57%	95.34%

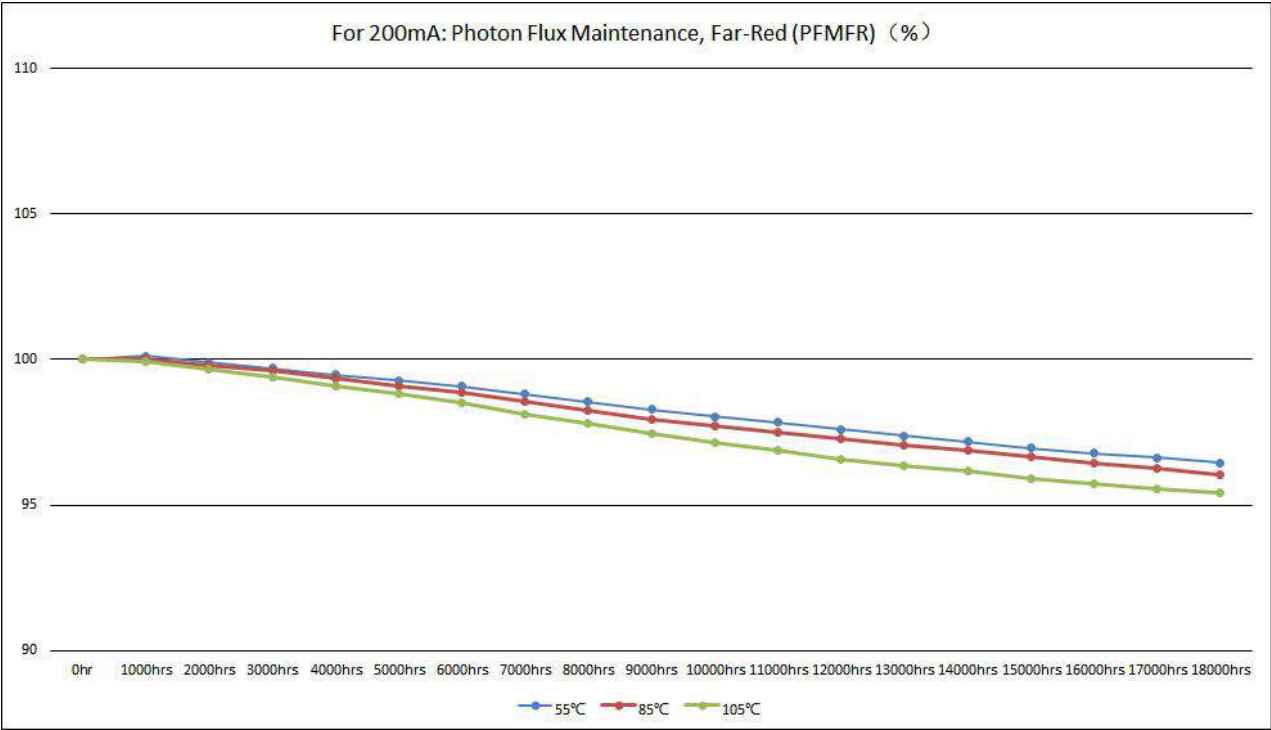
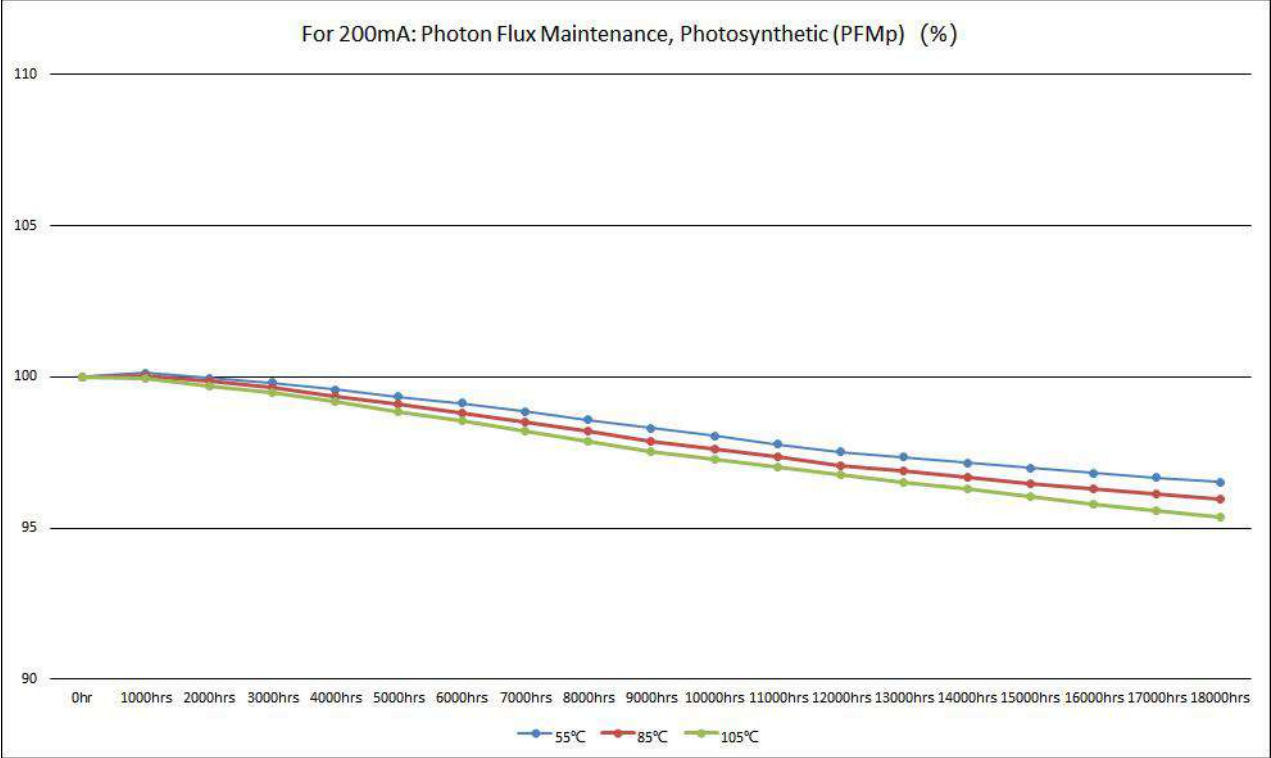
Average Photon Flux Maintenance,Far-Red (PFMFR) (Percentage of Initial Far-Red Photon Flux)

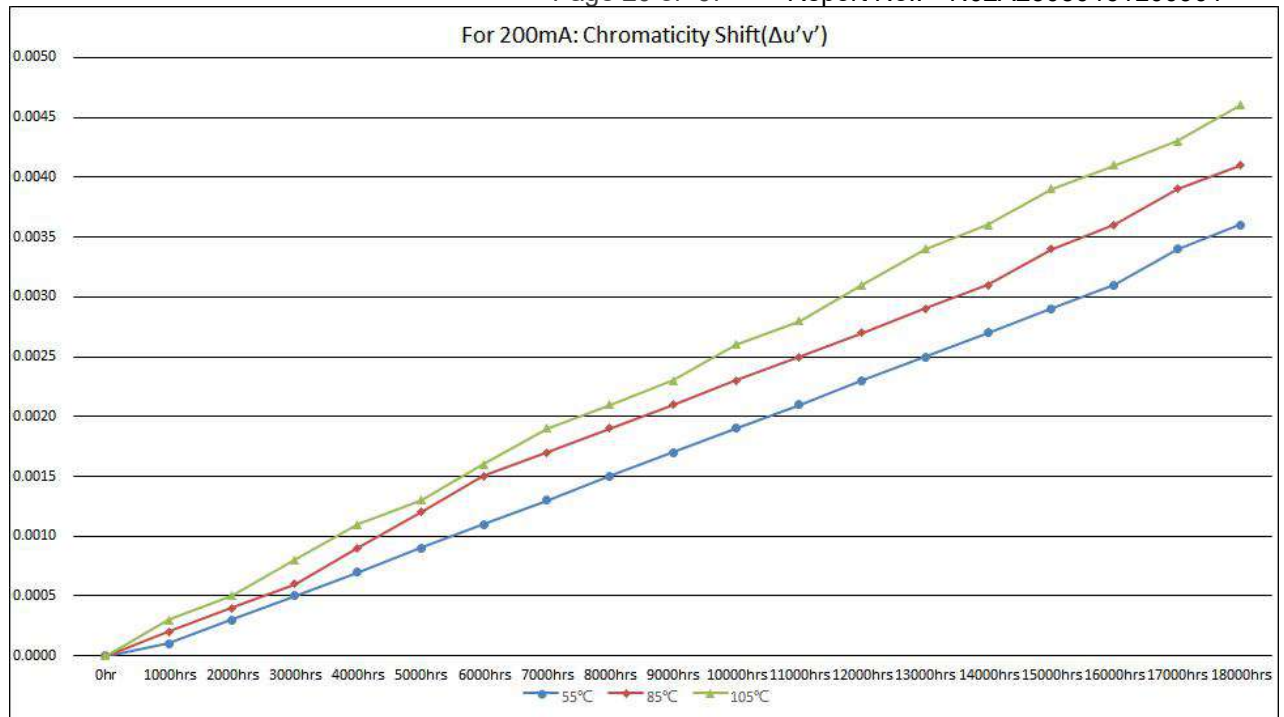
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.13%	99.91%	99.69%	99.49%	99.28%	99.08%	98.81%	98.55%	98.29%	98.05%	97.84%	97.59%	97.39%	97.17%	96.96%	96.80%	96.64%	96.46%
2	100.04%	99.81%	99.60%	99.36%	99.11%	98.87%	98.56%	98.26%	97.96%	97.73%	97.51%	97.28%	97.08%	96.88%	96.67%	96.46%	96.25%	96.03%
3	99.92%	99.67%	99.42%	99.11%	98.81%	98.50%	98.14%	97.81%	97.45%	97.17%	96.88%	96.58%	96.37%	96.16%	95.91%	95.75%	95.58%	95.41%

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
2	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041
3	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0036	0.0039	0.0041	0.0043	0.0046







3. Test Data

3.1 Data Set 1, 55°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	82.10	100.28	100.15	100.02	99.91	99.77	99.64	99.56	99.45	99.37	99.28	99.21	99.14	99.09	99.00	98.96	98.93	98.89	98.86
S2	81.87	100.20	100.07	99.94	99.82	99.69	99.57	99.50	99.38	99.27	99.20	99.11	99.02	98.98	98.89	98.84	98.80	98.75	98.69
S3	81.84	100.26	100.13	100.01	99.89	99.75	99.62	99.54	99.43	99.32	99.23	99.14	99.07	99.02	98.93	98.89	98.82	98.77	98.74
S4	81.59	100.29	100.16	100.03	99.92	99.78	99.66	99.55	99.44	99.36	99.27	99.20	99.13	99.08	99.03	98.99	98.95	98.92	98.89
S5	81.59	100.26	100.14	100.01	99.89	99.75	99.62	99.54	99.43	99.32	99.25	99.18	99.10	99.05	98.96	98.87	98.84	98.81	98.77
S6	81.69	100.26	100.13	100.00	99.87	99.73	99.60	99.48	99.40	99.33	99.26	99.17	99.08	99.03	98.99	98.90	98.87	98.83	98.79
S7	81.95	100.24	100.11	99.97	99.84	99.70	99.57	99.49	99.38	99.30	99.21	99.13	99.06	99.00	98.95	98.90	98.83	98.78	98.73
S8	82.03	100.23	100.10	99.98	99.86	99.74	99.60	99.49	99.38	99.26	99.17	99.10	99.03	98.99	98.95	98.90	98.87	98.84	98.80
S9	81.74	100.27	100.14	100.01	99.88	99.74	99.61	99.53	99.42	99.30	99.21	99.14	99.07	98.98	98.89	98.84	98.77	98.71	98.66
S10	81.54	100.19	100.07	99.94	99.80	99.67	99.53	99.42	99.30	99.19	99.12	99.05	98.96	98.87	98.83	98.74	98.69	98.66	98.62
S11	81.93	100.21	100.08	99.95	99.82	99.68	99.54	99.47	99.39	99.28	99.19	99.12	99.05	99.00	98.91	98.82	98.79	98.74	98.69
S12	82.09	100.20	100.07	99.94	99.83	99.69	99.57	99.46	99.35	99.23	99.16	99.09	99.02	98.97	98.92	98.87	98.80	98.73	98.67
S13	81.75	100.23	100.10	99.97	99.86	99.72	99.60	99.49	99.41	99.34	99.27	99.20	99.11	99.06	98.97	98.92	98.89	98.82	98.77
S14	82.19	100.19	100.06	99.93	99.80	99.68	99.54	99.43	99.32	99.20	99.12	99.03	98.96	98.91	98.82	98.78	98.71	98.68	98.63
S15	81.94	100.18	100.05	99.92	99.79	99.65	99.52	99.44	99.33	99.21	99.13	99.06	98.98	98.93	98.84	98.79	98.76	98.69	98.66
S16	81.72	100.21	100.08	99.95	99.83	99.72	99.58	99.50	99.39	99.31	99.22	99.14	99.06	99.01	98.92	98.83	98.76	98.70	98.65
S17	82.27	100.19	100.06	99.94	99.80	99.66	99.55	99.43	99.36	99.24	99.17	99.08	98.99	98.95	98.86	98.81	98.76	98.71	98.66
S18	81.99	100.29	100.16	100.03	99.90	99.76	99.63	99.55	99.47	99.36	99.27	99.20	99.13	99.09	99.03	98.98	98.93	98.86	98.82
S19	81.87	100.25	100.12	100.00	99.86	99.73	99.59	99.48	99.40	99.29	99.22	99.14	99.07	98.98	98.94	98.89	98.84	98.79	98.72
S20	82.05	100.28	100.15	100.02	99.89	99.77	99.64	99.52	99.45	99.33	99.26	99.19	99.12	99.07	99.03	98.94	98.89	98.86	98.81
S21	81.94	100.21	100.08	99.95	99.83	99.70	99.56	99.45	99.37	99.26	99.19	99.10	99.03	98.98	98.94	98.89	98.84	98.78	98.73
S22	82.25	100.21	100.08	99.95	99.84	99.70	99.58	99.51	99.43	99.32	99.23	99.16	99.09	99.00	98.91	98.82	98.75	98.70	98.63
S23	81.93	100.27	100.15	100.02	99.89	99.77	99.63	99.52	99.41	99.33	99.24	99.17	99.10	99.05	99.00	98.96	98.93	98.89	98.84
S24	82.34	100.21	100.08	99.95	99.81	99.68	99.54	99.43	99.31	99.24	99.15	99.08	99.01	98.92	98.83	98.77	98.74	98.71	98.64
S25	82.03	100.28	100.15	100.02	99.91	99.77	99.64	99.52	99.41	99.33	99.26	99.17	99.10	99.05	99.00	98.95	98.90	98.85	98.79
Ave.	81.93	100.24	100.11	99.98	99.85	99.72	99.59	99.49	99.39	99.29	99.21	99.13	99.06	99.00	98.93	98.87	98.83	98.78	98.73
Med.	81.94	100.23	100.10	99.97	99.86	99.72	99.59	99.49	99.40	99.30	99.22	99.14	99.07	99.00	98.94	98.89	98.83	98.78	98.73
St dev	0.2156	0.0354	0.0362	0.0369	0.0387	0.0394	0.0390	0.0427	0.0448	0.0504	0.0499	0.0513	0.0527	0.0580	0.0658	0.0689	0.0736	0.0766	0.0799
Min.	81.54	100.18	100.05	99.92	99.79	99.65	99.52	99.42	99.30	99.19	99.12	99.03	98.96	98.87	98.82	98.74	98.69	98.66	98.62
Max.	82.34	100.29	100.16	100.03	99.92	99.78	99.66	99.56	99.47	99.37	99.28	99.21	99.14	99.09	99.03	98.99	98.95	98.92	98.89

3.2 Data Set 1, 55°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	1.292	100.19	100.06	99.98	99.83	99.74	99.64	99.57	99.48	99.40	99.30	99.20	99.13	99.04	98.95	98.88	98.79	98.75	98.69
S2	1.291	100.24	100.11	100.03	99.89	99.74	99.60	99.51	99.40	99.33	99.23	99.15	99.08	98.99	98.92	98.85	98.81	98.75	98.70
S3	1.285	100.24	100.11	99.97	99.83	99.66	99.56	99.47	99.38	99.29	99.22	99.14	99.04	98.97	98.91	98.84	98.79	98.73	98.64
S4	1.285	100.24	100.11	100.03	99.93	99.76	99.62	99.51	99.41	99.32	99.21	99.15	99.08	99.00	98.93	98.88	98.82	98.73	98.68
S5	1.286	100.22	100.14	100.06	99.91	99.75	99.65	99.56	99.49	99.40	99.32	99.24	99.13	99.08	99.02	98.95	98.89	98.80	98.75
S6	1.286	100.21	100.13	100.05	99.91	99.81	99.66	99.57	99.48	99.41	99.33	99.25	99.17	99.10	99.01	98.94	98.90	98.85	98.80
S7	1.286	100.26	100.13	100.05	99.95	99.78	99.64	99.55	99.44	99.37	99.27	99.20	99.13	99.06	98.97	98.88	98.84	98.78	98.74
S8	1.286	100.17	100.09	100.01	99.91	99.77	99.67	99.57	99.50	99.39	99.32	99.22	99.14	99.08	99.03	98.95	98.91	98.82	98.73
S9	1.286	100.16	100.03	99.89	99.75	99.61	99.46	99.37	99.28	99.19	99.11	99.03	98.96	98.89	98.84	98.77	98.67	98.63	98.59
S10	1.287	100.27	100.19	100.06	99.91	99.74	99.57	99.50	99.40	99.31	99.20	99.12	99.06	99.00	98.94	98.85	98.81	98.77	98.72
S11	1.285	100.26	100.18	100.05	99.88	99.78	99.68	99.58	99.51	99.44	99.36	99.28	99.21	99.15	99.06	98.97	98.88	98.84	98.79
S12	1.285	100.20	100.12	100.04	99.87	99.77	99.63	99.52	99.42	99.34	99.27	99.20	99.13	99.07	99.01	98.96	98.91	98.87	98.78
S13	1.285	100.17	100.09	100.01	99.91	99.74	99.64	99.54	99.47	99.36	99.29	99.21	99.14	99.07	98.98	98.91	98.87	98.82	98.78
S14	1.285	100.22	100.14	100.06	99.96	99.86	99.69	99.59	99.50	99.43	99.32	99.22	99.14	99.05	99.00	98.94	98.85	98.79	98.75
S15	1.285	100.21	100.08	99.95	99.81	99.64	99.47	99.36	99.29	99.20	99.12	99.04	98.94	98.88	98.81	98.75	98.66	98.62	98.58
S16	1.285	100.23	100.10	99.97	99.82	99.65	99.48	99.39	99.29	99.20	99.13	99.03	98.92	98.83	98.75	98.69	98.63	98.54	98.49
S17	1.285	100.23	100.10	99.97	99.82	99.72	99.63	99.55	99.46	99.37	99.27	99.17	99.09	99.00	98.93	98.84	98.75	98.70	98.61
S18	1.285	100.25	100.12	99.99	99.84	99.75	99.58	99.49	99.38	99.28	99.21	99.14	99.03	98.95	98.87	98.80	98.71	98.66	98.57
S19	1.285	100.24	100.10	99.97	99.80	99.70	99.61	99.52	99.42	99.32	99.24	99.17	99.07	99.01	98.92	98.87	98.78	98.73	98.64
S20	1.286	100.21	100.13	100.00	99.86	99.72	99.55	99.48	99.41	99.30	99.23	99.16	99.06	98.99	98.90	98.83	98.77	98.73	98.64
S21	1.286	100.19	100.06	99.93	99.83	99.69	99.52	99.45	99.38	99.29	99.21	99.14	99.06	98.99	98.93	98.87	98.78	98.73	98.67
S22	1.286	100.24	100.16	100.03	99.88	99.74	99.60	99.49	99.42	99.33	99.26	99.16	99.09	99.03	98.96	98.90	98.81	98.72	98.63
S23	1.286	100.16	100.08	99.94	99.85	99.75	99.65	99.56	99.45	99.38	99.28	99.18	99.10	99.01	98.95	98.89	98.85	98.80	98.74
S24	1.286	100.17	100.09	100.01	99.84	99.75	99.60	99.53	99.43	99.36	99.29	99.18	99.10	99.02	98.94	98.89	98.84	98.80	98.74
S25	1.286	100.22	100.09	99.96	99.79	99.69	99.52	99.45	99.36	99.29	99.21	99.14	99.04	98.98	98.91	98.86	98.76	98.67	98.63
Ave.	1.286	100.22	100.11	100.00	99.86	99.73	99.60	99.51	99.42	99.33	99.25	99.16	99.08	99.01	98.94	98.87	98.80	98.75	98.68
Med.	1.286	100.22	100.11	100.01	99.86	99.74	99.61	99.52	99.42	99.33	99.26	99.17	99.09	99.01	98.94	98.88	98.81	98.75	98.69
St dev	0.0017	0.0327	0.0368	0.0455	0.0528	0.0552	0.0654	0.0628	0.0639	0.0682	0.0648	0.0626	0.0684	0.0708	0.0706	0.0682	0.0760	0.0781	0.0804
Min.	1.285	100.16	100.03	99.89	99.75	99.61	99.46	99.36	99.28	99.19	99.11	99.03	98.92	98.83	98.75	98.69	98.63	98.54	98.49
Max.	1.292	100.27	100.19	100.06	99.96	99.86	99.69	99.59	99.51	99.44	99.36	99.28	99.21	99.15	99.06	98.97	98.91	98.87	98.80

3.3 Data Set 1, 55°C, 90mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	0.0946	100.16	100.06	99.97	99.86	99.76	99.65	99.50	99.43	99.36	99.28	99.19	99.10	98.99	98.94	98.89	98.84	98.79	98.75
S2	0.0945	100.15	100.06	99.97	99.80	99.64	99.47	99.32	99.18	99.08	98.98	98.90	98.79	98.74	98.69	98.59	98.54	98.48	98.43
S3	0.0941	100.21	100.12	100.03	99.87	99.70	99.59	99.50	99.43	99.35	99.24	99.15	99.08	99.03	98.92	98.81	98.72	98.63	98.53
S4	0.0941	100.25	100.16	100.06	99.96	99.85	99.68	99.59	99.52	99.37	99.26	99.19	99.10	99.05	98.95	98.84	98.75	98.70	98.61
S5	0.0941	100.22	100.13	100.04	99.93	99.83	99.73	99.65	99.56	99.41	99.32	99.21	99.12	99.07	98.97	98.87	98.78	98.72	98.67
S6	0.0941	100.19	100.10	100.00	99.84	99.73	99.56	99.41	99.27	99.19	99.12	99.03	98.96	98.91	98.86	98.76	98.71	98.62	98.57
S7	0.0942	100.13	100.04	99.95	99.78	99.67	99.51	99.36	99.29	99.21	99.14	99.05	98.96	98.86	98.81	98.70	98.65	98.60	98.55
S8	0.0942	100.26	100.17	100.08	99.97	99.80	99.64	99.55	99.45	99.36	99.29	99.22	99.14	99.09	99.04	98.94	98.89	98.84	98.78
S9	0.0942	100.17	100.07	99.98	99.81	99.71	99.60	99.51	99.37	99.29	99.18	99.07	98.98	98.87	98.77	98.67	98.61	98.52	98.47
S10	0.0943	100.20	100.11	100.01	99.91	99.74	99.64	99.49	99.40	99.32	99.21	99.12	99.05	98.94	98.89	98.79	98.74	98.65	98.59
S11	0.0939	100.27	100.18	100.08	99.92	99.75	99.64	99.55	99.40	99.33	99.22	99.13	99.02	98.91	98.86	98.76	98.71	98.66	98.61
S12	0.0939	100.24	100.15	100.06	99.95	99.85	99.68	99.53	99.46	99.37	99.28	99.17	99.08	98.97	98.87	98.76	98.71	98.61	98.56
S13	0.0939	100.24	100.14	100.05	99.94	99.84	99.73	99.66	99.59	99.44	99.37	99.28	99.21	99.10	99.00	98.90	98.85	98.76	98.71
S14	0.0940	100.22	100.13	100.03	99.93	99.76	99.65	99.51	99.41	99.27	99.18	99.07	99.00	98.89	98.84	98.73	98.67	98.63	98.58
S15	0.0939	100.16	100.07	99.97	99.87	99.76	99.66	99.51	99.44	99.34	99.27	99.18	99.09	98.98	98.88	98.77	98.68	98.59	98.49
S16	0.0940	100.26	100.17	100.07	99.96	99.86	99.75	99.66	99.51	99.44	99.34	99.24	99.14	99.04	98.99	98.89	98.83	98.79	98.74
S17	0.0940	100.23	100.13	100.04	99.93	99.83	99.73	99.58	99.43	99.36	99.29	99.18	99.07	99.02	98.97	98.87	98.78	98.68	98.64
S18	0.0941	100.12	100.03	99.94	99.83	99.72	99.55	99.40	99.33	99.24	99.17	99.08	98.97	98.86	98.81	98.71	98.65	98.61	98.55
S19	0.0939	100.23	100.14	100.04	99.93	99.83	99.72	99.57	99.50	99.41	99.30	99.19	99.12	99.07	98.97	98.87	98.81	98.72	98.67
S20	0.0941	100.24	100.15	100.06	99.95	99.84	99.74	99.67	99.57	99.48	99.37	99.26	99.19	99.08	98.98	98.92	98.88	98.79	98.69
S21	0.0940	100.14	100.05	99.95	99.78	99.62	99.51	99.44	99.34	99.20	99.13	99.02	98.92	98.82	98.71	98.60	98.55	98.50	98.41
S22	0.0939	100.21	100.12	100.03	99.92	99.81	99.70	99.61	99.54	99.46	99.37	99.30	99.19	99.14	99.03	98.93	98.89	98.83	98.78
S23	0.0940	100.14	100.04	99.95	99.84	99.74	99.63	99.55	99.41	99.32	99.22	99.15	99.06	99.01	98.96	98.86	98.80	98.75	98.70
S24	0.0940	100.26	100.17	100.08	99.97	99.86	99.75	99.66	99.59	99.44	99.33	99.26	99.17	99.07	98.97	98.86	98.77	98.68	98.63
S25	0.0940	100.16	100.07	99.98	99.88	99.77	99.67	99.60	99.45	99.30	99.20	99.10	99.03	98.93	98.83	98.73	98.69	98.59	98.50
Ave.	0.0941	100.20	100.11	100.02	99.89	99.77	99.65	99.54	99.43	99.33	99.24	99.15	99.06	98.98	98.90	98.80	98.74	98.67	98.61
Med.	0.0940	100.21	100.12	100.03	99.92	99.76	99.65	99.55	99.43	99.35	99.26	99.17	99.08	98.99	98.92	98.81	98.74	98.66	98.61
St dev	0.0002	0.0474	0.0471	0.0468	0.0609	0.0702	0.0801	0.0953	0.1030	0.0958	0.0943	0.0938	0.0967	0.1010	0.0947	0.0993	0.0972	0.0987	0.1052
Min.	0.0939	100.12	100.03	99.94	99.78	99.62	99.47	99.32	99.18	99.08	98.98	98.90	98.79	98.74	98.69	98.59	98.54	98.48	98.41
Max.	0.0946	100.27	100.18	100.08	99.97	99.86	99.75	99.67	99.59	99.48	99.37	99.30	99.21	99.14	99.04	98.94	98.89	98.84	98.78

3.4 Data Set 1, 55°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	5.493	5.482	5.478	5.482	5.478	5.469	5.473	5.464	5.466	5.467	5.461	5.463	5.459	5.462	5.454	5.462	5.457	5.451	5.451
S2	5.503	5.470	5.470	5.468	5.467	5.470	5.470	5.456	5.461	5.451	5.461	5.457	5.455	5.454	5.454	5.446	5.445	5.442	5.446
S3	5.454	5.489	5.485	5.484	5.488	5.478	5.485	5.471	5.479	5.472	5.468	5.466	5.463	5.469	5.463	5.458	5.457	5.454	5.455
S4	5.490	5.481	5.478	5.473	5.476	5.477	5.469	5.471	5.463	5.463	5.462	5.459	5.456	5.461	5.455	5.452	5.446	5.455	5.452
S5	5.497	5.479	5.475	5.471	5.471	5.468	5.475	5.468	5.461	5.459	5.462	5.451	5.457	5.459	5.453	5.448	5.450	5.455	5.445
S6	5.490	5.476	5.477	5.471	5.471	5.470	5.470	5.467	5.463	5.464	5.460	5.452	5.459	5.446	5.451	5.446	5.442	5.442	5.449
S7	5.482	5.443	5.445	5.441	5.436	5.435	5.434	5.429	5.427	5.428	5.423	5.420	5.417	5.425	5.425	5.414	5.415	5.414	5.414
S8	5.487	5.475	5.472	5.469	5.475	5.462	5.466	5.457	5.456	5.456	5.454	5.457	5.449	5.447	5.444	5.443	5.446	5.446	5.441
S9	5.486	5.495	5.490	5.494	5.489	5.490	5.481	5.484	5.476	5.474	5.471	5.476	5.470	5.467	5.463	5.465	5.460	5.465	5.460
S10	5.503	5.483	5.482	5.481	5.479	5.476	5.474	5.467	5.468	5.465	5.464	5.462	5.466	5.456	5.458	5.457	5.461	5.451	5.447
S11	5.498	5.476	5.474	5.478	5.474	5.469	5.472	5.469	5.466	5.466	5.458	5.455	5.451	5.448	5.448	5.448	5.444	5.449	5.446
S12	5.458	5.505	5.505	5.498	5.501	5.494	5.495	5.491	5.486	5.491	5.487	5.485	5.478	5.473	5.473	5.484	5.472	5.473	5.466
S13	5.502	5.491	5.495	5.491	5.488	5.481	5.490	5.483	5.478	5.481	5.474	5.477	5.468	5.474	5.468	5.465	5.470	5.463	5.463
S14	5.487	5.464	5.464	5.457	5.455	5.459	5.452	5.453	5.446	5.451	5.451	5.447	5.440	5.444	5.438	5.437	5.435	5.429	5.438
S15	5.490	5.502	5.501	5.494	5.496	5.496	5.487	5.488	5.482	5.485	5.487	5.475	5.475	5.474	5.474	5.469	5.476	5.465	5.466
S16	5.507	5.508	5.508	5.507	5.502	5.501	5.495	5.498	5.497	5.495	5.487	5.484	5.486	5.479	5.488	5.477	5.474	5.483	5.482
S17	5.492	5.497	5.500	5.497	5.494	5.496	5.492	5.489	5.488	5.482	5.479	5.479	5.480	5.475	5.481	5.472	5.469	5.466	5.470
S18	5.495	5.493	5.494	5.493	5.488	5.488	5.489	5.482	5.480	5.480	5.475	5.467	5.470	5.461	5.464	5.473	5.461	5.463	5.455
S19	5.494	5.494	5.494	5.497	5.494	5.491	5.485	5.487	5.487	5.485	5.481	5.473	5.479	5.467	5.469	5.471	5.469	5.463	5.463
S20	5.488	5.496	5.493	5.496	5.491	5.484	5.485	5.484	5.478	5.474	5.479	5.477	5.470	5.469	5.468	5.476	5.467	5.462	5.460
S21	5.498	5.514	5.514	5.513	5.505	5.508	5.499	5.499	5.500	5.495	5.498	5.494	5.490	5.481	5.485	5.482	5.478	5.479	5.482
S22	5.487	5.501	5.501	5.495	5.496	5.492	5.492	5.485	5.490	5.487	5.484	5.481	5.487	5.484	5.472	5.478	5.481	5.469	5.468
S23	5.494	5.497	5.495	5.496	5.492	5.487	5.488	5.481	5.482	5.480	5.480	5.482	5.478	5.469	5.469	5.473	5.474	5.468	5.464
S24	5.492	5.495	5.495	5.488	5.489	5.487	5.481	5.480	5.482	5.474	5.471	5.469	5.475	5.463	5.468	5.463	5.460	5.465	5.458
S25	5.495	5.499	5.496	5.494	5.493	5.489	5.488	5.483	5.492	5.484	5.481	5.484	5.483	5.470	5.475	5.472	5.466	5.467	5.466
Ave.	5.490	5.488	5.487	5.485	5.484	5.481	5.479	5.476	5.474	5.473	5.470	5.468	5.466	5.463	5.462	5.461	5.459	5.458	5.456
Med.	5.492	5.493	5.493	5.491	5.488	5.484	5.485	5.481	5.478	5.474	5.471	5.469	5.470	5.467	5.464	5.465	5.461	5.463	5.458
St dev	0.0120	0.0155	0.0156	0.0161	0.0156	0.0158	0.0146	0.0158	0.0166	0.0158	0.0155	0.0159	0.0165	0.0136	0.0147	0.0164	0.0156	0.0152	0.0144
Min.	5.454	5.443	5.445	5.441	5.436	5.435	5.434	5.429	5.427	5.428	5.423	5.420	5.417	5.425	5.425	5.414	5.415	5.414	5.414
Max.	5.507	5.514	5.514	5.513	5.505	5.508	5.499	5.499	5.500	5.495	5.498	5.494	5.490	5.484	5.488	5.484	5.481	5.483	5.482

3.5 Data Set 1, 55°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	12000hrs s	18000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S1	0.2560	0.5271	2840	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0012	0.0015	0.0016	0.0018	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027	0.0028
S2	0.2557	0.5268	2850	0.0001	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0025	0.0026	0.0028	0.0029	0.0030	0.0032
S3	0.2562	0.5268	2839	0.0002	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0019	0.0020	0.0023	0.0025	0.0026	0.0027	0.0028	0.0030
S4	0.2562	0.5273	2836	0.0001	0.0002	0.0004	0.0005	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027
S5	0.2564	0.5276	2831	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0024	0.0027	0.0028	0.0029	0.0031	0.0032	0.0033
S6	0.2560	0.5266	2843	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0021	0.0023	0.0026	0.0027	0.0029	0.0030	0.0031	0.0032
S7	0.2568	0.5279	2819	0.0001	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0021	0.0024	0.0027	0.0028	0.0029	0.0031	0.0032
S8	0.2562	0.5283	2830	0.0001	0.0003	0.0004	0.0006	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0026	0.0029	0.0031	0.0032	0.0033
S9	0.2565	0.5284	2824	0.0001	0.0002	0.0004	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0018	0.0019	0.0020	0.0023	0.0026	0.0028	0.0029	0.0030	0.0032
S10	0.2559	0.5267	2846	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0016	0.0018	0.0019	0.0021	0.0024	0.0025	0.0028	0.0030	0.0031	0.0033
S11	0.2567	0.5280	2821	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030	0.0031
S12	0.2568	0.5278	2820	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0014	0.0017	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0029	0.0030
S13	0.2569	0.5285	2814	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0036
S14	0.2574	0.5291	2802	0.0001	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0018	0.0019	0.0020	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030
S15	0.2570	0.5294	2807	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0032	0.0033	0.0034
S16	0.2564	0.5277	2829	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0032	0.0033	0.0034
S17	0.2568	0.5293	2814	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0027	0.0028	0.0030	0.0031	0.0033
S18	0.2565	0.5275	2828	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0026	0.0029	0.0032	0.0033	0.0035	0.0036
S19	0.2567	0.5282	2819	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0027	0.0029	0.0030	0.0032
S20	0.2564	0.5278	2828	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0016	0.0017	0.0019	0.0021	0.0022	0.0023	0.0025	0.0026	0.0027
S21	0.2567	0.5280	2820	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023	0.0024	0.0027	0.0028	0.0030	0.0031
S22	0.2573	0.5291	2803	0.0001	0.0002	0.0004	0.0005	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0022	0.0023	0.0024	0.0027	0.0029	0.0030	0.0031
S23	0.2567	0.5283	2821	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0024	0.0026	0.0027	0.0028	0.0029	0.0031
S24	0.2567	0.5293	2814	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0015	0.0016	0.0019	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030
S25	0.2565	0.5276	2827	0.0001	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0031	0.0033	0.0034
Ave.	0.2565	0.5280	2825	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
Med.	0.2565	0.5279	2824	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
St dev	0.0004	0.0008	12.7246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2557	0.5266	2802	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027
Max.	0.2574	0.5294	2850	0.0002	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0036

3.6 Data Set 2, 85°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	81.60	100.14	100.01	99.87	99.70	99.58	99.45	99.32	99.16	98.99	98.91	98.77	98.64	98.58	98.52	98.41	98.35	98.29	98.18
S27	81.87	100.18	100.07	99.94	99.81	99.64	99.46	99.32	99.19	99.05	98.92	98.78	98.70	98.63	98.52	98.45	98.38	98.32	98.21
S28	81.48	100.12	99.99	99.86	99.68	99.50	99.33	99.16	99.00	98.85	98.77	98.66	98.53	98.43	98.35	98.29	98.18	98.11	98.04
S29	81.57	100.13	100.00	99.89	99.77	99.59	99.41	99.27	99.14	98.97	98.86	98.75	98.61	98.54	98.46	98.40	98.33	98.27	98.21
S30	81.92	100.17	100.04	99.93	99.75	99.59	99.41	99.27	99.10	98.96	98.85	98.76	98.63	98.55	98.45	98.37	98.27	98.20	98.10
S31	81.64	100.18	100.07	99.94	99.76	99.64	99.46	99.33	99.19	99.05	98.97	98.86	98.74	98.68	98.58	98.50	98.39	98.33	98.26
S32	81.78	100.12	100.01	99.91	99.78	99.66	99.49	99.32	99.15	98.98	98.90	98.82	98.69	98.61	98.55	98.48	98.42	98.31	98.25
S33	81.73	100.19	100.08	99.97	99.80	99.62	99.45	99.31	99.14	98.97	98.84	98.71	98.59	98.53	98.45	98.39	98.32	98.26	98.19
S34	81.40	100.17	100.04	99.93	99.81	99.64	99.46	99.32	99.19	99.06	98.92	98.81	98.70	98.64	98.57	98.50	98.43	98.32	98.26
S35	81.64	100.17	100.03	99.90	99.78	99.60	99.48	99.34	99.21	99.06	98.93	98.82	98.74	98.68	98.57	98.50	98.39	98.28	98.22
S36	81.97	100.10	100.00	99.89	99.71	99.59	99.47	99.33	99.20	99.05	98.97	98.89	98.76	98.68	98.58	98.52	98.45	98.38	98.32
S37	81.89	100.19	100.08	99.95	99.83	99.70	99.53	99.38	99.22	99.07	98.96	98.85	98.72	98.64	98.58	98.51	98.45	98.39	98.32
S38	82.13	100.13	99.99	99.88	99.71	99.53	99.35	99.19	99.06	98.91	98.81	98.73	98.60	98.53	98.43	98.37	98.26	98.15	98.09
S39	82.25	100.14	100.01	99.88	99.76	99.58	99.41	99.24	99.07	98.91	98.79	98.71	98.58	98.52	98.42	98.31	98.25	98.18	98.08
S40	82.02	100.18	100.08	99.97	99.79	99.67	99.49	99.35	99.21	99.04	98.93	98.85	98.77	98.67	98.60	98.53	98.46	98.40	98.29
S41	81.95	100.11	99.98	99.85	99.68	99.50	99.38	99.21	99.08	98.94	98.86	98.74	98.63	98.56	98.49	98.39	98.33	98.27	98.16
S42	82.10	100.12	99.98	99.88	99.70	99.53	99.41	99.26	99.13	98.99	98.88	98.75	98.64	98.57	98.47	98.39	98.29	98.22	98.15
S43	82.36	100.11	99.98	99.87	99.70	99.52	99.34	99.21	99.08	98.95	98.82	98.74	98.61	98.53	98.45	98.37	98.31	98.24	98.18
S44	82.40	100.13	100.00	99.87	99.69	99.52	99.35	99.18	99.05	98.91	98.82	98.69	98.58	98.52	98.44	98.37	98.26	98.19	98.13
S45	82.12	100.11	100.00	99.87	99.75	99.57	99.44	99.28	99.11	98.94	98.81	98.67	98.59	98.52	98.44	98.38	98.31	98.24	98.13
S46	81.93	100.17	100.04	99.93	99.81	99.63	99.51	99.37	99.23	99.10	98.99	98.90	98.77	98.69	98.63	98.55	98.49	98.43	98.36
S47	82.19	100.19	100.06	99.95	99.78	99.60	99.48	99.35	99.22	99.08	99.00	98.92	98.84	98.73	98.63	98.57	98.46	98.39	98.33
S48	82.05	100.09	99.99	99.86	99.73	99.61	99.44	99.31	99.18	99.05	98.96	98.85	98.77	98.71	98.65	98.57	98.46	98.39	98.33
S49	82.26	100.15	100.04	99.91	99.79	99.66	99.49	99.36	99.23	99.06	98.92	98.84	98.73	98.63	98.55	98.49	98.43	98.36	98.29
S50	82.16	100.10	99.99	99.86	99.68	99.56	99.39	99.22	99.09	98.95	98.83	98.72	98.61	98.51	98.41	98.34	98.28	98.22	98.11
Ave.	81.94	100.14	100.02	99.90	99.75	99.59	99.43	99.29	99.14	99.00	98.89	98.78	98.67	98.59	98.51	98.44	98.36	98.29	98.21
Med.	81.95	100.14	100.01	99.89	99.76	99.59	99.45	99.31	99.15	98.99	98.90	98.77	98.64	98.58	98.52	98.41	98.35	98.28	98.21
St dev	0.2757	0.0323	0.0347	0.0375	0.0474	0.0552	0.0550	0.0638	0.0651	0.0664	0.0665	0.0737	0.0802	0.0790	0.0816	0.0822	0.0855	0.0853	0.0915
Min.	81.40	100.09	99.98	99.85	99.68	99.50	99.33	99.16	99.00	98.85	98.77	98.66	98.53	98.43	98.35	98.29	98.18	98.11	98.04
Max.	82.40	100.19	100.08	99.97	99.83	99.70	99.53	99.38	99.23	99.10	99.00	98.92	98.84	98.73	98.65	98.57	98.49	98.43	98.36

3.7 Data Set 2, 85°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	1.296	100.12	100.02	99.93	99.72	99.56	99.35	99.24	99.11	98.97	98.88	98.79	98.68	98.59	98.50	98.39	98.31	98.26	98.18
S27	1.296	100.07	99.98	99.84	99.68	99.52	99.32	99.18	99.04	98.93	98.80	98.69	98.57	98.47	98.38	98.27	98.23	98.18	98.10
S28	1.296	100.14	100.00	99.87	99.66	99.50	99.34	99.23	99.12	99.01	98.92	98.82	98.70	98.59	98.48	98.37	98.33	98.28	98.20
S29	1.296	100.15	100.06	99.92	99.76	99.56	99.40	99.26	99.12	99.01	98.89	98.78	98.68	98.59	98.50	98.40	98.35	98.27	98.19
S30	1.296	100.11	100.02	99.92	99.71	99.55	99.35	99.24	99.10	98.99	98.86	98.75	98.62	98.52	98.41	98.30	98.25	98.20	98.12
S31	1.297	100.15	100.01	99.92	99.71	99.50	99.29	99.16	99.02	98.89	98.78	98.66	98.55	98.45	98.36	98.25	98.17	98.12	98.08
S32	1.296	100.13	99.99	99.90	99.74	99.53	99.37	99.26	99.12	98.99	98.87	98.78	98.67	98.57	98.46	98.36	98.32	98.27	98.23
S33	1.297	100.09	100.00	99.90	99.74	99.53	99.32	99.19	99.05	98.92	98.80	98.68	98.59	98.49	98.38	98.28	98.23	98.19	98.14
S34	1.297	100.14	100.00	99.86	99.70	99.54	99.34	99.23	99.12	99.01	98.90	98.79	98.69	98.60	98.51	98.42	98.34	98.26	98.21
S35	1.297	100.12	99.98	99.89	99.73	99.52	99.36	99.25	99.14	99.03	98.94	98.81	98.68	98.57	98.48	98.37	98.33	98.24	98.16
S36	1.297	100.08	99.99	99.85	99.65	99.44	99.23	99.10	98.96	98.82	98.71	98.62	98.49	98.39	98.28	98.17	98.12	98.08	97.99
S37	1.294	100.10	100.00	99.86	99.70	99.49	99.29	99.15	99.04	98.91	98.82	98.73	98.63	98.54	98.43	98.34	98.26	98.22	98.17
S38	1.297	100.13	100.04	99.94	99.74	99.53	99.37	99.23	99.12	98.99	98.88	98.79	98.66	98.57	98.48	98.37	98.32	98.28	98.23
S39	1.297	100.07	99.94	99.84	99.63	99.42	99.22	99.08	98.95	98.81	98.68	98.57	98.44	98.35	98.25	98.14	98.06	98.01	97.93
S40	1.298	100.12	99.98	99.85	99.64	99.43	99.23	99.12	98.98	98.87	98.78	98.69	98.56	98.45	98.34	98.25	98.20	98.16	98.11
S41	1.298	100.11	100.02	99.93	99.72	99.56	99.40	99.26	99.15	99.02	98.91	98.78	98.65	98.56	98.45	98.34	98.30	98.26	98.21
S42	1.298	100.12	100.03	99.89	99.68	99.48	99.32	99.18	99.07	98.94	98.81	98.70	98.57	98.48	98.37	98.26	98.18	98.14	98.09
S43	1.298	100.13	100.04	99.94	99.73	99.57	99.37	99.23	99.10	98.99	98.86	98.75	98.66	98.55	98.46	98.35	98.27	98.22	98.18
S44	1.298	100.08	99.98	99.84	99.64	99.48	99.27	99.14	99.00	98.89	98.78	98.69	98.56	98.47	98.38	98.27	98.23	98.14	98.10
S45	1.298	100.12	100.03	99.93	99.73	99.57	99.36	99.22	99.09	98.95	98.82	98.73	98.60	98.51	98.40	98.30	98.21	98.13	98.09
S46	1.298	100.14	100.00	99.90	99.74	99.53	99.33	99.19	99.08	98.97	98.86	98.75	98.66	98.55	98.45	98.34	98.29	98.21	98.13
S47	1.298	100.14	100.00	99.86	99.70	99.49	99.33	99.19	99.06	98.95	98.82	98.69	98.60	98.49	98.40	98.31	98.26	98.22	98.17
S48	1.298	100.16	100.02	99.88	99.72	99.52	99.31	99.20	99.07	98.96	98.83	98.70	98.61	98.50	98.39	98.28	98.24	98.16	98.11
S49	1.299	100.11	99.97	99.83	99.62	99.46	99.26	99.12	98.99	98.85	98.72	98.63	98.54	98.43	98.32	98.22	98.17	98.09	98.04
S50	1.299	100.08	99.99	99.85	99.69	99.48	99.27	99.14	99.03	98.92	98.83	98.70	98.59	98.48	98.39	98.30	98.25	98.21	98.16
Ave.	1.297	100.12	100.00	99.89	99.70	99.51	99.32	99.19	99.07	98.94	98.83	98.72	98.61	98.51	98.41	98.31	98.25	98.19	98.13
Med.	1.297	100.12	100.00	99.89	99.71	99.52	99.33	99.19	99.07	98.95	98.83	98.73	98.61	98.51	98.40	98.30	98.25	98.21	98.14
St dev	0.0011	0.0253	0.0259	0.0361	0.0393	0.0425	0.0502	0.0532	0.0575	0.0611	0.0641	0.0627	0.0652	0.0659	0.0687	0.0700	0.0721	0.0708	0.0726
Min.	1.294	100.07	99.94	99.83	99.62	99.42	99.22	99.08	98.95	98.81	98.68	98.57	98.44	98.35	98.25	98.14	98.06	98.01	97.93
Max.	1.299	100.16	100.06	99.94	99.76	99.57	99.40	99.26	99.15	99.03	98.94	98.82	98.70	98.60	98.51	98.42	98.35	98.28	98.23

3.8 Data Set 2, 85°C, 90mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	0.0944	100.14	99.99	99.85	99.67	99.49	99.31	99.18	99.03	98.93	98.80	98.71	98.58	98.51	98.45	98.34	98.28	98.23	98.17
S27	0.0944	100.08	100.00	99.86	99.67	99.49	99.31	99.16	99.06	98.91	98.81	98.68	98.59	98.52	98.42	98.31	98.25	98.19	98.13
S28	0.0944	100.08	99.99	99.85	99.67	99.49	99.31	99.21	99.05	98.93	98.83	98.74	98.61	98.51	98.44	98.37	98.32	98.27	98.21
S29	0.0944	100.10	99.96	99.88	99.69	99.51	99.32	99.20	99.10	99.00	98.88	98.79	98.67	98.60	98.50	98.44	98.37	98.32	98.26
S30	0.0943	100.06	99.92	99.78	99.60	99.42	99.24	99.09	98.99	98.86	98.77	98.68	98.56	98.49	98.43	98.36	98.32	98.27	98.20
S31	0.0944	100.06	99.98	99.83	99.65	99.46	99.28	99.15	99.05	98.90	98.81	98.71	98.62	98.51	98.45	98.39	98.34	98.29	98.23
S32	0.0944	100.08	99.94	99.86	99.67	99.49	99.31	99.16	99.03	98.93	98.84	98.71	98.59	98.49	98.38	98.32	98.26	98.20	98.14
S33	0.0944	100.14	100.05	99.97	99.79	99.60	99.41	99.29	99.13	99.04	98.92	98.82	98.73	98.67	98.61	98.55	98.49	98.43	98.38
S34	0.0944	100.13	99.99	99.85	99.66	99.48	99.29	99.20	99.04	98.94	98.82	98.72	98.63	98.57	98.46	98.36	98.31	98.24	98.18
S35	0.0944	100.08	99.94	99.85	99.67	99.48	99.29	99.19	99.04	98.89	98.80	98.67	98.54	98.47	98.41	98.30	98.24	98.18	98.12
S36	0.0944	100.04	99.89	99.81	99.63	99.45	99.27	99.15	99.00	98.90	98.77	98.64	98.51	98.40	98.34	98.27	98.21	98.15	98.09
S37	0.0929	100.10	99.96	99.81	99.63	99.45	99.27	99.14	98.99	98.84	98.71	98.62	98.50	98.39	98.33	98.27	98.21	98.16	98.09
S38	0.0930	100.06	99.98	99.89	99.71	99.52	99.34	99.24	99.14	99.02	98.92	98.83	98.71	98.65	98.58	98.52	98.47	98.40	98.34
S39	0.0930	100.08	99.94	99.86	99.67	99.48	99.30	99.17	99.07	98.97	98.86	98.73	98.60	98.53	98.43	98.36	98.30	98.25	98.20
S40	0.0930	100.14	100.06	99.91	99.73	99.54	99.36	99.21	99.06	98.96	98.83	98.74	98.62	98.51	98.45	98.39	98.33	98.26	98.20
S41	0.0930	100.13	99.99	99.85	99.66	99.48	99.30	99.14	99.02	98.89	98.80	98.71	98.61	98.51	98.40	98.33	98.27	98.21	98.15
S42	0.0931	100.09	100.01	99.87	99.69	99.50	99.33	99.20	99.10	99.00	98.88	98.75	98.64	98.57	98.50	98.44	98.38	98.32	98.26
S43	0.0931	100.11	99.97	99.83	99.64	99.46	99.28	99.16	99.06	98.96	98.83	98.71	98.59	98.53	98.43	98.37	98.31	98.26	98.19
S44	0.0930	100.07	99.93	99.85	99.67	99.48	99.30	99.15	98.99	98.90	98.77	98.64	98.51	98.40	98.30	98.23	98.18	98.12	98.07
S45	0.0931	100.08	99.94	99.79	99.61	99.43	99.25	99.12	99.02	98.87	98.74	98.61	98.49	98.43	98.36	98.30	98.24	98.18	98.12
S46	0.0931	100.13	100.04	99.90	99.72	99.54	99.35	99.20	99.10	98.95	98.83	98.71	98.59	98.53	98.47	98.40	98.35	98.29	98.23
S47	0.0931	100.14	100.00	99.85	99.67	99.48	99.30	99.15	99.05	98.92	98.80	98.71	98.58	98.52	98.45	98.38	98.32	98.26	98.21
S48	0.0931	100.09	100.01	99.86	99.68	99.50	99.32	99.22	99.10	99.00	98.90	98.78	98.67	98.61	98.54	98.43	98.38	98.33	98.28
S49	0.0931	100.05	99.97	99.83	99.64	99.46	99.28	99.15	99.05	98.93	98.81	98.69	98.57	98.47	98.40	98.33	98.28	98.22	98.17
S50	0.0931	100.04	99.96	99.82	99.63	99.45	99.26	99.14	99.01	98.89	98.77	98.65	98.52	98.41	98.35	98.29	98.23	98.18	98.12
Ave.	0.0936	100.09	99.98	99.85	99.67	99.49	99.30	99.17	99.05	98.93	98.82	98.71	98.59	98.51	98.43	98.36	98.31	98.25	98.19
Med.	0.0931	100.08	99.98	99.85	99.67	99.48	99.30	99.16	99.05	98.93	98.81	98.71	98.59	98.51	98.43	98.36	98.31	98.25	98.19
St dev	0.0007	0.0319	0.0405	0.0396	0.0395	0.0384	0.0373	0.0419	0.0424	0.0509	0.0534	0.0576	0.0622	0.0730	0.0743	0.0748	0.0756	0.0759	0.0761
Min.	0.0929	100.04	99.89	99.78	99.60	99.42	99.24	99.09	98.99	98.84	98.71	98.61	98.49	98.39	98.30	98.23	98.18	98.12	98.07
Max.	0.0944	100.14	100.06	99.97	99.79	99.60	99.41	99.29	99.14	99.04	98.92	98.83	98.73	98.67	98.61	98.55	98.49	98.43	98.38

3.9 Data Set 2, 85°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	5.487	5.483	5.480	5.478	5.484	5.481	5.469	5.469	5.470	5.465	5.469	5.461	5.455	5.455	5.451	5.456	5.454	5.458	5.455
S27	5.479	5.475	5.474	5.476	5.473	5.473	5.463	5.467	5.456	5.456	5.454	5.452	5.454	5.447	5.447	5.443	5.440	5.448	5.438
S28	5.494	5.492	5.494	5.491	5.488	5.483	5.476	5.484	5.481	5.477	5.475	5.474	5.469	5.462	5.458	5.458	5.466	5.459	5.453
S29	5.486	5.481	5.484	5.480	5.477	5.476	5.473	5.476	5.471	5.472	5.459	5.467	5.465	5.453	5.453	5.454	5.449	5.445	5.444
S30	5.484	5.483	5.482	5.478	5.474	5.477	5.474	5.473	5.464	5.471	5.466	5.459	5.459	5.452	5.456	5.456	5.449	5.455	5.440
S31	5.482	5.480	5.480	5.473	5.479	5.476	5.472	5.464	5.468	5.459	5.455	5.457	5.450	5.450	5.458	5.453	5.443	5.447	5.439
S32	5.450	5.450	5.450	5.444	5.445	5.443	5.440	5.432	5.434	5.427	5.425	5.424	5.417	5.418	5.420	5.417	5.413	5.414	5.417
S33	5.480	5.476	5.476	5.474	5.475	5.469	5.470	5.470	5.458	5.463	5.453	5.462	5.456	5.452	5.454	5.450	5.445	5.444	5.444
S34	5.499	5.500	5.495	5.493	5.496	5.491	5.487	5.485	5.483	5.476	5.482	5.480	5.467	5.467	5.475	5.466	5.468	5.464	5.455
S35	5.490	5.488	5.485	5.488	5.485	5.483	5.474	5.472	5.476	5.475	5.464	5.463	5.465	5.464	5.460	5.454	5.450	5.454	5.448
S36	5.484	5.482	5.480	5.481	5.481	5.477	5.475	5.468	5.470	5.462	5.465	5.458	5.460	5.459	5.456	5.451	5.444	5.444	5.452
S37	5.509	5.507	5.504	5.506	5.504	5.496	5.500	5.499	5.493	5.487	5.483	5.490	5.479	5.480	5.481	5.478	5.469	5.470	5.467
S38	5.499	5.497	5.494	5.491	5.490	5.492	5.489	5.489	5.477	5.486	5.472	5.474	5.472	5.466	5.475	5.471	5.471	5.466	5.458
S39	5.469	5.467	5.464	5.466	5.463	5.463	5.456	5.460	5.452	5.447	5.443	5.444	5.440	5.442	5.445	5.433	5.433	5.428	5.427
S40	5.505	5.500	5.500	5.499	5.496	5.494	5.495	5.487	5.492	5.483	5.487	5.479	5.480	5.479	5.481	5.469	5.465	5.466	5.473
S41	5.513	5.508	5.514	5.507	5.505	5.500	5.495	5.501	5.499	5.491	5.486	5.488	5.487	5.481	5.477	5.480	5.476	5.474	5.481
S42	5.506	5.504	5.505	5.503	5.498	5.494	5.496	5.488	5.490	5.483	5.479	5.481	5.481	5.479	5.470	5.470	5.478	5.465	5.474
S43	5.498	5.493	5.494	5.491	5.491	5.485	5.488	5.480	5.481	5.476	5.480	5.471	5.466	5.470	5.469	5.466	5.461	5.461	5.454
S44	5.503	5.498	5.498	5.496	5.498	5.494	5.491	5.493	5.486	5.487	5.478	5.484	5.473	5.479	5.470	5.468	5.470	5.466	5.460
S45	5.501	5.499	5.496	5.496	5.498	5.488	5.491	5.491	5.486	5.479	5.481	5.474	5.474	5.473	5.472	5.475	5.464	5.462	5.469
S46	5.518	5.513	5.516	5.511	5.512	5.505	5.505	5.507	5.501	5.496	5.498	5.492	5.493	5.490	5.482	5.482	5.487	5.487	5.476
S47	5.509	5.510	5.507	5.506	5.503	5.499	5.498	5.497	5.492	5.486	5.489	5.491	5.482	5.476	5.473	5.473	5.476	5.469	5.467
S48	5.505	5.506	5.503	5.500	5.497	5.496	5.491	5.495	5.485	5.482	5.486	5.478	5.484	5.475	5.481	5.476	5.470	5.464	5.464
S49	5.499	5.497	5.495	5.496	5.493	5.490	5.485	5.487	5.486	5.482	5.480	5.472	5.471	5.467	5.468	5.467	5.464	5.458	5.456
S50	5.506	5.501	5.501	5.501	5.503	5.495	5.494	5.492	5.486	5.489	5.486	5.479	5.473	5.482	5.477	5.470	5.473	5.466	5.470
Ave.	5.494	5.492	5.491	5.489	5.488	5.485	5.482	5.481	5.477	5.474	5.472	5.470	5.467	5.465	5.464	5.461	5.459	5.457	5.455
Med.	5.499	5.497	5.494	5.491	5.491	5.488	5.487	5.485	5.481	5.477	5.478	5.474	5.469	5.467	5.469	5.466	5.464	5.461	5.455
St dev	0.0153	0.0151	0.0154	0.0154	0.0151	0.0137	0.0153	0.0164	0.0159	0.0155	0.0165	0.0159	0.0162	0.0161	0.0148	0.0153	0.0167	0.0149	0.0158
Min.	5.450	5.450	5.450	5.444	5.445	5.443	5.440	5.432	5.434	5.427	5.425	5.424	5.417	5.418	5.420	5.417	5.413	5.414	5.417
Max.	5.518	5.513	5.516	5.511	5.512	5.505	5.505	5.507	5.501	5.496	5.498	5.492	5.493	5.490	5.482	5.482	5.487	5.487	5.481

3.10 Data Set 2, 85°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
S26	0.2571	0.5231	2836	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0028	0.0031	0.0033	0.0036	0.0037
S27	0.2579	0.5245	2811	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0028	0.0030	0.0031	0.0033
S28	0.2575	0.5240	2823	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0033	0.0034	0.0036
S29	0.2572	0.5238	2830	0.0002	0.0004	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
S30	0.2573	0.5248	2823	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S31	0.2576	0.5250	2815	0.0001	0.0004	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0028	0.0029	0.0031	0.0032	0.0034
S32	0.2572	0.5233	2832	0.0002	0.0004	0.0007	0.0008	0.0011	0.0012	0.0015	0.0017	0.0020	0.0022	0.0023	0.0026	0.0027	0.0030	0.0032	0.0035	0.0037	0.0038
S33	0.2570	0.5232	2838	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0033	0.0034	0.0036
S34	0.2570	0.5232	2837	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0029	0.0031	0.0034	0.0035	0.0038	0.0040
S35	0.2573	0.5235	2830	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0025	0.0026	0.0028	0.0031	0.0033	0.0034	0.0035	0.0038
S36	0.2573	0.5248	2822	0.0002	0.0004	0.0007	0.0008	0.0011	0.0012	0.0015	0.0017	0.0020	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034	0.0036
S37	0.2574	0.5235	2827	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027	0.0028	0.0030	0.0031	0.0034	0.0035
S38	0.2571	0.5232	2835	0.0001	0.0003	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S39	0.2574	0.5232	2828	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0032	0.0033	0.0034
S40	0.2573	0.5237	2828	0.0001	0.0002	0.0003	0.0006	0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0033	0.0034
S41	0.2575	0.5240	2822	0.0003	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0035	0.0037
S42	0.2571	0.5229	2837	0.0002	0.0003	0.0005	0.0006	0.0009	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0034	0.0036
S43	0.2579	0.5244	2811	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037
S44	0.2575	0.5247	2820	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027	0.0030	0.0031	0.0032
S45	0.2577	0.5249	2814	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0037	0.0039
S46	0.2570	0.5232	2837	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0032	0.0033
S47	0.2573	0.5235	2829	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S48	0.2574	0.5237	2827	0.0002	0.0003	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0032	0.0033	0.0034	0.0036
S49	0.2570	0.5232	2837	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
S50	0.2572	0.5230	2835	0.0002	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034
Ave.	0.2573	0.5238	2827	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
Med.	0.2573	0.5235	2828	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
St dev	0.0003	0.0007	8.4945	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Min.	0.2570	0.5229	2811	0.0001	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0027	0.0030	0.0031	0.0032
Max.	0.2579	0.5250	2838	0.0003	0.0005	0.0007	0.0008	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0025	0.0026	0.0029	0.0031	0.0034	0.0035	0.0038	0.0040

3.11 Data Set 3, 105°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	81.80	100.07	99.91	99.76	99.58	99.39	99.15	99.01	98.83	98.69	98.57	98.48	98.39	98.29	98.21	98.13	98.06	97.96	97.86
S52	81.60	100.07	99.92	99.77	99.58	99.39	99.20	99.01	98.83	98.69	98.54	98.41	98.31	98.22	98.14	98.06	97.99	97.87	97.77
S53	82.14	100.02	99.87	99.72	99.53	99.34	99.11	98.92	98.74	98.56	98.43	98.35	98.22	98.17	98.05	97.97	97.88	97.78	97.66
S54	81.85	100.05	99.90	99.75	99.54	99.34	99.15	98.96	98.82	98.64	98.52	98.43	98.30	98.20	98.08	98.00	97.91	97.81	97.70
S55	81.77	100.08	99.93	99.78	99.57	99.38	99.16	98.98	98.80	98.61	98.50	98.40	98.28	98.23	98.10	98.02	97.95	97.85	97.74
S56	81.96	100.10	99.95	99.80	99.60	99.41	99.19	99.05	98.91	98.73	98.57	98.48	98.39	98.34	98.22	98.14	98.06	97.96	97.86
S57	82.05	100.06	99.91	99.76	99.60	99.44	99.25	99.07	98.93	98.79	98.66	98.54	98.41	98.32	98.24	98.11	98.04	97.94	97.83
S58	81.72	100.09	99.94	99.79	99.59	99.38	99.15	98.97	98.79	98.60	98.48	98.35	98.26	98.17	98.09	97.97	97.89	97.79	97.69
S59	82.15	100.08	99.93	99.78	99.62	99.43	99.21	99.03	98.89	98.70	98.59	98.46	98.37	98.28	98.16	98.08	97.99	97.89	97.79
S60	81.87	100.04	99.90	99.75	99.57	99.38	99.19	99.01	98.82	98.68	98.57	98.44	98.31	98.26	98.18	98.10	98.01	97.91	97.79
S61	81.72	100.01	99.87	99.72	99.55	99.37	99.18	98.99	98.81	98.63	98.47	98.34	98.25	98.16	98.04	97.96	97.87	97.75	97.64
S62	82.23	100.01	99.87	99.72	99.52	99.36	99.17	99.03	98.89	98.75	98.59	98.50	98.41	98.32	98.19	98.11	98.02	97.92	97.82
S63	81.90	100.10	99.95	99.81	99.65	99.44	99.21	99.07	98.89	98.70	98.54	98.42	98.32	98.27	98.19	98.12	98.03	97.92	97.81
S64	82.57	100.01	99.86	99.71	99.52	99.32	99.08	98.90	98.76	98.58	98.46	98.33	98.20	98.11	98.03	97.95	97.88	97.76	97.66
S65	82.43	100.00	99.86	99.71	99.52	99.36	99.17	98.99	98.81	98.63	98.47	98.37	98.28	98.23	98.15	98.07	97.98	97.86	97.76
S66	82.07	100.06	99.92	99.77	99.57	99.38	99.19	99.05	98.86	98.68	98.52	98.40	98.31	98.26	98.13	98.05	97.98	97.88	97.78
S67	82.02	100.05	99.91	99.76	99.57	99.38	99.19	99.01	98.83	98.64	98.52	98.43	98.35	98.30	98.17	98.09	98.02	97.90	97.78
S68	82.38	100.09	99.95	99.80	99.64	99.45	99.26	99.12	98.94	98.75	98.60	98.47	98.34	98.29	98.21	98.13	98.04	97.94	97.83
S69	82.18	100.10	99.95	99.80	99.61	99.41	99.19	99.01	98.83	98.65	98.53	98.44	98.36	98.26	98.19	98.11	98.03	97.93	97.81
S70	82.23	100.04	99.90	99.75	99.55	99.39	99.17	98.99	98.80	98.62	98.50	98.40	98.27	98.22	98.14	98.02	97.95	97.83	97.71
S71	82.49	100.08	99.93	99.78	99.62	99.46	99.24	99.06	98.92	98.74	98.58	98.49	98.40	98.30	98.18	98.06	97.98	97.86	97.76
S72	82.27	100.00	99.85	99.70	99.51	99.35	99.12	98.93	98.75	98.57	98.45	98.37	98.27	98.22	98.10	98.02	97.93	97.83	97.73
S73	82.27	100.05	99.91	99.76	99.55	99.39	99.17	98.99	98.81	98.67	98.51	98.42	98.29	98.24	98.16	98.03	97.96	97.86	97.74
S74	82.23	99.99	99.85	99.70	99.51	99.35	99.12	98.94	98.80	98.61	98.49	98.40	98.28	98.18	98.10	98.02	97.95	97.85	97.75
S75	82.49	100.08	99.94	99.79	99.59	99.40	99.18	99.04	98.86	98.72	98.60	98.51	98.41	98.36	98.24	98.16	98.08	97.97	97.85
Ave.	82.10	100.05	99.91	99.76	99.57	99.39	99.18	99.01	98.84	98.67	98.53	98.42	98.32	98.25	98.15	98.06	97.98	97.87	97.76
Med.	82.14	100.06	99.91	99.76	99.57	99.38	99.18	99.01	98.83	98.67	98.52	98.42	98.31	98.26	98.16	98.06	97.98	97.87	97.77
St dev	0.2703	0.0350	0.0337	0.0336	0.0392	0.0366	0.0424	0.0507	0.0544	0.0616	0.0568	0.0561	0.0606	0.0613	0.0605	0.0613	0.0614	0.0628	0.0626
Min.	81.60	99.99	99.85	99.70	99.51	99.32	99.08	98.90	98.74	98.56	98.43	98.33	98.20	98.11	98.03	97.95	97.87	97.75	97.64
Max.	82.57	100.10	99.95	99.81	99.65	99.46	99.26	99.12	98.94	98.79	98.66	98.54	98.41	98.36	98.24	98.16	98.08	97.97	97.86

3.12 Data Set 3, 105°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	1.295	100.00	99.83	99.66	99.47	99.28	99.07	98.91	98.77	98.62	98.52	98.40	98.29	98.22	98.16	98.04	97.92	97.87	97.80
S52	1.296	100.03	99.86	99.69	99.50	99.29	99.10	98.92	98.75	98.60	98.49	98.38	98.26	98.12	98.06	97.95	97.83	97.71	97.64
S53	1.296	99.97	99.80	99.63	99.44	99.23	99.04	98.86	98.72	98.54	98.42	98.31	98.21	98.07	98.00	97.90	97.85	97.78	97.66
S54	1.296	100.02	99.85	99.68	99.45	99.21	99.00	98.82	98.69	98.56	98.44	98.33	98.23	98.16	98.03	97.93	97.86	97.73	97.61
S55	1.296	100.03	99.86	99.69	99.48	99.29	99.10	98.94	98.80	98.63	98.52	98.40	98.28	98.15	98.01	97.91	97.84	97.72	97.65
S56	1.296	100.01	99.84	99.67	99.48	99.25	99.03	98.86	98.72	98.58	98.47	98.35	98.25	98.11	98.04	98.00	97.93	97.81	97.74
S57	1.296	100.05	99.88	99.72	99.48	99.25	99.01	98.81	98.67	98.49	98.38	98.27	98.17	98.10	98.03	98.00	97.93	97.86	97.80
S58	1.296	100.00	99.83	99.66	99.47	99.28	99.09	98.88	98.73	98.56	98.45	98.34	98.22	98.16	98.09	97.97	97.90	97.78	97.66
S59	1.296	100.04	99.88	99.71	99.47	99.28	99.09	98.93	98.80	98.65	98.54	98.42	98.32	98.25	98.18	98.07	98.01	97.96	97.91
S60	1.296	100.01	99.84	99.67	99.48	99.27	99.03	98.87	98.72	98.59	98.47	98.36	98.24	98.11	98.04	98.00	97.93	97.81	97.76
S61	1.296	100.02	99.84	99.68	99.47	99.23	99.02	98.86	98.68	98.55	98.44	98.34	98.23	98.16	98.09	97.98	97.85	97.73	97.66
S62	1.297	100.07	99.90	99.74	99.50	99.27	99.05	98.85	98.70	98.55	98.45	98.33	98.21	98.08	98.01	97.91	97.86	97.80	97.73
S63	1.290	99.99	99.82	99.66	99.42	99.23	99.02	98.86	98.68	98.53	98.42	98.31	98.19	98.06	97.93	97.89	97.82	97.70	97.63
S64	1.295	100.08	99.90	99.73	99.50	99.29	99.08	98.91	98.77	98.59	98.47	98.35	98.23	98.09	97.94	97.83	97.78	97.66	97.60
S65	1.294	99.99	99.83	99.66	99.43	99.24	99.03	98.82	98.68	98.51	98.40	98.28	98.17	98.03	97.89	97.85	97.73	97.68	97.55
S66	1.294	100.05	99.88	99.72	99.53	99.34	99.10	98.93	98.78	98.60	98.50	98.38	98.26	98.19	98.13	98.09	98.02	97.95	97.88
S67	1.295	100.07	99.90	99.73	99.49	99.26	99.07	98.90	98.77	98.64	98.52	98.41	98.31	98.24	98.11	97.99	97.87	97.82	97.77
S68	1.295	100.03	99.86	99.69	99.48	99.27	99.04	98.83	98.65	98.50	98.39	98.27	98.16	98.09	97.94	97.83	97.78	97.65	97.53
S69	1.295	99.98	99.81	99.64	99.45	99.24	99.03	98.82	98.65	98.50	98.38	98.27	98.15	98.01	97.94	97.82	97.75	97.69	97.56
S70	1.295	100.07	99.90	99.73	99.52	99.30	99.07	98.86	98.68	98.54	98.42	98.31	98.19	98.04	97.98	97.87	97.75	97.63	97.51
S71	1.295	100.01	99.83	99.67	99.46	99.22	99.03	98.82	98.69	98.51	98.39	98.28	98.17	98.03	97.88	97.85	97.79	97.72	97.67
S72	1.295	100.00	99.84	99.66	99.45	99.24	99.05	98.84	98.71	98.58	98.46	98.35	98.25	98.11	97.97	97.87	97.80	97.75	97.63
S73	1.295	99.97	99.81	99.64	99.40	99.21	99.00	98.84	98.66	98.51	98.41	98.30	98.19	98.04	97.97	97.86	97.74	97.67	97.62
S74	1.295	100.08	99.91	99.74	99.55	99.32	99.11	98.90	98.72	98.57	98.46	98.34	98.23	98.16	98.02	97.91	97.84	97.77	97.70
S75	1.295	99.99	99.83	99.66	99.47	99.28	99.07	98.91	98.73	98.55	98.45	98.33	98.22	98.08	98.02	97.98	97.93	97.87	97.75
Ave.	1.295	100.02	99.85	99.69	99.47	99.26	99.05	98.87	98.72	98.56	98.45	98.34	98.22	98.11	98.02	97.93	97.85	97.76	97.68
Med.	1.295	100.02	99.84	99.68	99.47	99.27	99.05	98.86	98.72	98.56	98.45	98.34	98.23	98.11	98.02	97.91	97.85	97.75	97.66
St dev	0.0013	0.0334	0.0330	0.0326	0.0332	0.0328	0.0331	0.0401	0.0452	0.0451	0.0466	0.0453	0.0462	0.0666	0.0776	0.0769	0.0797	0.0893	0.1024
Min.	1.290	99.97	99.80	99.63	99.40	99.21	99.00	98.81	98.65	98.49	98.38	98.27	98.15	98.01	97.88	97.82	97.73	97.63	97.51
Max.	1.297	100.08	99.91	99.74	99.55	99.34	99.11	98.94	98.80	98.65	98.54	98.42	98.32	98.25	98.18	98.09	98.02	97.96	97.91

3.13 Data Set 3, 105°C, 90mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	0.0948	100.04	99.91	99.77	99.59	99.37	99.16	98.97	98.83	98.65	98.52	98.42	98.31	98.23	98.16	98.04	97.93	97.84	97.80
S52	0.0948	99.96	99.83	99.65	99.45	99.23	99.01	98.86	98.68	98.49	98.37	98.27	98.16	98.02	97.89	97.83	97.77	97.68	97.64
S53	0.0949	99.99	99.81	99.68	99.49	99.27	99.04	98.90	98.75	98.57	98.45	98.34	98.24	98.15	98.08	97.96	97.91	97.81	97.78
S54	0.0948	100.03	99.85	99.72	99.51	99.30	99.08	98.90	98.72	98.57	98.45	98.34	98.26	98.17	98.10	98.05	97.93	97.84	97.75
S55	0.0949	99.98	99.80	99.67	99.48	99.27	99.05	98.87	98.68	98.53	98.43	98.32	98.21	98.12	98.00	97.94	97.88	97.84	97.75
S56	0.0949	100.02	99.84	99.70	99.52	99.29	99.05	98.87	98.69	98.50	98.38	98.28	98.19	98.04	97.98	97.86	97.75	97.65	97.56
S57	0.0949	100.03	99.85	99.71	99.51	99.27	99.06	98.91	98.77	98.58	98.48	98.39	98.29	98.14	98.07	98.01	97.90	97.81	97.71
S58	0.0949	100.02	99.89	99.71	99.53	99.31	99.09	98.94	98.76	98.61	98.50	98.39	98.29	98.14	98.08	98.02	97.90	97.87	97.77
S59	0.0948	99.96	99.82	99.65	99.44	99.21	98.99	98.84	98.70	98.52	98.41	98.31	98.21	98.12	97.99	97.87	97.82	97.72	97.63
S60	0.0950	100.03	99.85	99.71	99.51	99.27	99.06	98.92	98.78	98.62	98.50	98.39	98.29	98.14	98.07	97.96	97.90	97.81	97.77
S61	0.0949	100.03	99.85	99.68	99.47	99.26	99.05	98.86	98.72	98.54	98.43	98.33	98.24	98.10	98.03	97.96	97.85	97.76	97.67
S62	0.0949	100.02	99.89	99.71	99.51	99.29	99.05	98.91	98.73	98.59	98.46	98.35	98.27	98.18	98.11	98.05	97.99	97.96	97.87
S63	0.0936	100.00	99.83	99.69	99.50	99.27	99.06	98.90	98.76	98.58	98.47	98.37	98.27	98.12	98.05	97.94	97.82	97.73	97.69
S64	0.0937	99.98	99.80	99.67	99.48	99.24	99.03	98.84	98.66	98.51	98.40	98.30	98.22	98.13	98.00	97.94	97.88	97.79	97.70
S65	0.0938	99.98	99.84	99.67	99.48	99.27	99.05	98.91	98.76	98.61	98.49	98.38	98.28	98.19	98.12	98.00	97.95	97.85	97.76
S66	0.0937	100.04	99.86	99.68	99.50	99.29	99.07	98.89	98.74	98.59	98.49	98.38	98.28	98.19	98.06	97.94	97.89	97.85	97.82
S67	0.0937	100.04	99.90	99.77	99.58	99.35	99.11	98.93	98.75	98.60	98.49	98.40	98.30	98.21	98.08	98.02	97.91	97.82	97.73
S68	0.0936	99.99	99.86	99.72	99.54	99.31	99.09	98.94	98.80	98.66	98.53	98.43	98.34	98.20	98.07	97.95	97.84	97.75	97.65
S69	0.0938	100.04	99.87	99.73	99.55	99.31	99.08	98.90	98.74	98.60	98.48	98.37	98.28	98.19	98.07	97.95	97.84	97.80	97.71
S70	0.0937	100.02	99.84	99.66	99.47	99.24	99.00	98.82	98.67	98.52	98.41	98.32	98.22	98.13	98.06	98.00	97.89	97.80	97.71
S71	0.0937	100.03	99.85	99.67	99.49	99.26	99.02	98.88	98.74	98.59	98.47	98.37	98.27	98.18	98.05	97.99	97.88	97.79	97.75
S72	0.0937	100.01	99.83	99.69	99.51	99.29	99.07	98.93	98.79	98.60	98.50	98.39	98.28	98.20	98.13	98.01	97.95	97.86	97.77
S73	0.0937	100.03	99.90	99.72	99.54	99.32	99.11	98.96	98.82	98.64	98.52	98.43	98.32	98.18	98.11	97.99	97.94	97.84	97.75
S74	0.0937	100.01	99.87	99.69	99.51	99.29	99.06	98.88	98.69	98.55	98.43	98.34	98.23	98.14	98.07	97.96	97.84	97.75	97.66
S75	0.0937	100.01	99.84	99.66	99.45	99.22	98.98	98.83	98.68	98.54	98.43	98.35	98.24	98.09	97.97	97.85	97.74	97.70	97.61
Ave.	0.0943	100.01	99.85	99.70	99.50	99.28	99.06	98.89	98.74	98.58	98.46	98.36	98.26	98.15	98.06	97.96	97.88	97.80	97.72
Med.	0.0938	100.02	99.85	99.69	99.51	99.27	99.06	98.90	98.74	98.58	98.47	98.37	98.27	98.14	98.07	97.96	97.89	97.81	97.73
St dev	0.0006	0.0248	0.0297	0.0333	0.0363	0.0374	0.0393	0.0397	0.0471	0.0460	0.0437	0.0444	0.0433	0.0502	0.0593	0.0610	0.0636	0.0676	0.0700
Min.	0.0936	99.96	99.80	99.65	99.44	99.21	98.98	98.82	98.66	98.49	98.37	98.27	98.16	98.02	97.89	97.83	97.74	97.65	97.56
Max.	0.0950	100.04	99.91	99.77	99.59	99.37	99.16	98.97	98.83	98.66	98.53	98.43	98.34	98.23	98.16	98.05	97.99	97.96	97.87

3.14 Data Set 3, 105°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	5.495	5.478	5.481	5.471	5.476	5.471	5.464	5.466	5.462	5.455	5.457	5.457	5.458	5.456	5.453	5.458	5.454	5.456	5.446
S52	5.504	5.467	5.466	5.465	5.463	5.460	5.465	5.459	5.454	5.458	5.457	5.444	5.448	5.444	5.450	5.440	5.439	5.444	5.438
S53	5.489	5.487	5.486	5.479	5.476	5.473	5.477	5.474	5.473	5.470	5.464	5.469	5.470	5.464	5.466	5.464	5.461	5.450	5.458
S54	5.492	5.480	5.480	5.470	5.471	5.473	5.467	5.464	5.465	5.453	5.465	5.455	5.456	5.451	5.450	5.447	5.442	5.442	5.446
S55	5.491	5.478	5.471	5.474	5.474	5.467	5.465	5.462	5.459	5.456	5.462	5.455	5.453	5.449	5.448	5.455	5.451	5.445	5.443
S56	5.485	5.476	5.472	5.465	5.472	5.467	5.458	5.460	5.457	5.457	5.456	5.458	5.447	5.450	5.446	5.442	5.443	5.438	5.436
S57	5.455	5.439	5.440	5.440	5.440	5.433	5.431	5.429	5.429	5.425	5.424	5.421	5.426	5.421	5.410	5.409	5.406	5.418	5.410
S58	5.499	5.471	5.467	5.469	5.468	5.463	5.466	5.462	5.459	5.456	5.459	5.449	5.448	5.445	5.441	5.448	5.441	5.436	5.444
S59	5.484	5.493	5.493	5.481	5.485	5.478	5.481	5.479	5.481	5.469	5.473	5.468	5.469	5.468	5.459	5.459	5.460	5.461	5.453
S60	5.487	5.482	5.478	5.476	5.474	5.474	5.469	5.468	5.469	5.460	5.458	5.461	5.458	5.455	5.461	5.454	5.455	5.457	5.453
S61	5.499	5.472	5.477	5.474	5.468	5.470	5.461	5.463	5.466	5.459	5.458	5.453	5.449	5.453	5.445	5.444	5.448	5.448	5.445
S62	5.489	5.500	5.496	5.499	5.493	5.496	5.495	5.488	5.488	5.479	5.484	5.485	5.481	5.481	5.479	5.477	5.474	5.472	5.476
S63	5.500	5.490	5.486	5.487	5.481	5.485	5.478	5.479	5.479	5.478	5.470	5.471	5.475	5.470	5.470	5.465	5.466	5.459	5.455
S64	5.494	5.460	5.456	5.453	5.453	5.446	5.446	5.446	5.448	5.444	5.437	5.434	5.438	5.445	5.440	5.441	5.438	5.437	5.433
S65	5.460	5.499	5.498	5.494	5.487	5.492	5.486	5.483	5.482	5.475	5.481	5.474	5.473	5.475	5.469	5.465	5.473	5.465	5.465
S66	5.504	5.501	5.501	5.496	5.496	5.495	5.496	5.495	5.490	5.492	5.483	5.478	5.488	5.478	5.480	5.472	5.477	5.469	5.467
S67	5.509	5.501	5.498	5.496	5.490	5.489	5.490	5.483	5.486	5.481	5.473	5.481	5.482	5.471	5.474	5.471	5.467	5.471	5.461
S68	5.490	5.487	5.485	5.484	5.483	5.475	5.481	5.476	5.477	5.472	5.465	5.463	5.467	5.468	5.458	5.465	5.456	5.459	5.458
S69	5.496	5.494	5.490	5.492	5.488	5.486	5.490	5.478	5.483	5.471	5.479	5.474	5.468	5.474	5.473	5.475	5.468	5.472	5.458
S70	5.497	5.492	5.489	5.486	5.483	5.483	5.478	5.477	5.480	5.471	5.473	5.470	5.473	5.466	5.470	5.461	5.470	5.466	5.459
S71	5.489	5.507	5.505	5.502	5.507	5.497	5.495	5.498	5.495	5.494	5.494	5.490	5.487	5.487	5.486	5.489	5.487	5.485	5.482
S72	5.492	5.497	5.496	5.498	5.499	5.488	5.492	5.486	5.484	5.476	5.483	5.485	5.474	5.474	5.478	5.478	5.478	5.465	5.463
S73	5.500	5.498	5.496	5.494	5.489	5.491	5.489	5.485	5.482	5.480	5.475	5.474	5.473	5.473	5.477	5.464	5.472	5.469	5.464
S74	5.497	5.493	5.487	5.483	5.489	5.476	5.483	5.481	5.475	5.474	5.473	5.471	5.471	5.469	5.467	5.467	5.467	5.461	5.467
S75	5.460	5.500	5.497	5.492	5.488	5.493	5.485	5.485	5.488	5.484	5.476	5.474	5.481	5.481	5.476	5.473	5.468	5.462	5.474
Ave.	5.490	5.486	5.484	5.481	5.480	5.477	5.475	5.473	5.472	5.468	5.467	5.465	5.464	5.463	5.461	5.459	5.458	5.456	5.454
Med.	5.492	5.490	5.486	5.483	5.483	5.476	5.478	5.477	5.477	5.471	5.470	5.469	5.469	5.468	5.466	5.464	5.461	5.459	5.458
St dev	0.0135	0.0156	0.0154	0.0153	0.0146	0.0157	0.0162	0.0155	0.0155	0.0154	0.0151	0.0162	0.0158	0.0153	0.0174	0.0166	0.0173	0.0150	0.0157
Min.	5.455	5.439	5.440	5.440	5.440	5.433	5.431	5.429	5.429	5.425	5.424	5.421	5.426	5.421	5.410	5.409	5.406	5.418	5.410
Max.	5.509	5.507	5.505	5.502	5.507	5.497	5.496	5.498	5.495	5.494	5.494	5.490	5.488	5.487	5.486	5.489	5.487	5.485	5.482

3.15 Data Set 3, 105°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S51	0.2575	0.5244	2821	0.0002	0.0004	0.0006	0.0007	0.0009	0.0012	0.0015	0.0017	0.0020	0.0022	0.0025	0.0027	0.0029	0.0032	0.0034	0.0036	0.0037	0.0038
S52	0.2572	0.5241	2830	0.0003	0.0004	0.0006	0.0008	0.0011	0.0012	0.0013	0.0017	0.0019	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0038	0.0039
S53	0.2576	0.5256	2814	0.0003	0.0006	0.0007	0.0010	0.0013	0.0014	0.0018	0.0021	0.0024	0.0026	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0044	0.0043
S54	0.2572	0.5239	2829	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0016	0.0017	0.0020	0.0021	0.0022	0.0025	0.0027	0.0030	0.0031	0.0032	0.0033
S55	0.2575	0.5247	2820	0.0002	0.0005	0.0006	0.0008	0.0009	0.0010	0.0012	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0033	0.0033
S56	0.2571	0.5241	2831	0.0002	0.0005	0.0006	0.0008	0.0009	0.0012	0.0015	0.0017	0.0020	0.0023	0.0024	0.0027	0.0030	0.0032	0.0034	0.0036	0.0037	0.0038
S57	0.2575	0.5242	2822	0.0003	0.0006	0.0007	0.0010	0.0011	0.0014	0.0017	0.0018	0.0020	0.0022	0.0023	0.0026	0.0028	0.0031	0.0034	0.0035	0.0037	0.0038
S58	0.2576	0.5249	2816	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0021	0.0022	0.0024	0.0026	0.0029	0.0031	0.0033	0.0036	0.0038	0.0038
S59	0.2581	0.5254	2803	0.0003	0.0006	0.0007	0.0010	0.0011	0.0014	0.0016	0.0019	0.0020	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
S60	0.2578	0.5258	2808	0.0002	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	0.0014	0.0015	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0035
S61	0.2576	0.5248	2816	0.0003	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0022	0.0025	0.0027	0.0029	0.0031	0.0034	0.0037	0.0039	0.0041	0.0041
S62	0.2574	0.5256	2816	0.0003	0.0004	0.0007	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0023	0.0025	0.0027	0.0030	0.0032	0.0034	0.0036	0.0036
S63	0.2570	0.5262	2823	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0037	0.0038
S64	0.2567	0.5274	2824	0.0002	0.0006	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0018	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0034
S65	0.2566	0.5259	2832	0.0003	0.0004	0.0006	0.0008	0.0010	0.0011	0.0014	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0030	0.0032	0.0034	0.0035
S66	0.2568	0.5266	2824	0.0002	0.0005	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0023	0.0025	0.0028	0.0030	0.0032	0.0035	0.0037	0.0040	0.0039
S67	0.2563	0.5258	2840	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0020	0.0024	0.0027	0.0029	0.0031	0.0033	0.0035	0.0038	0.0040	0.0041	0.0042
S68	0.2563	0.5259	2841	0.0003	0.0005	0.0007	0.0010	0.0011	0.0014	0.0017	0.0020	0.0022	0.0024	0.0027	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0042
S69	0.2566	0.5264	2831	0.0003	0.0005	0.0007	0.0008	0.0011	0.0013	0.0014	0.0017	0.0020	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0035	0.0037	0.0037
S70	0.2564	0.5257	2838	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0022	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0039
S71	0.2572	0.5271	2814	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0025	0.0028	0.0030	0.0033	0.0035	0.0036	0.0037
S72	0.2570	0.5275	2818	0.0003	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0031	0.0033	0.0033
S73	0.2567	0.5261	2830	0.0002	0.0005	0.0006	0.0008	0.0011	0.0014	0.0017	0.0020	0.0021	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0039
S74	0.2565	0.5257	2837	0.0003	0.0004	0.0006	0.0009	0.0012	0.0013	0.0014	0.0016	0.0019	0.0021	0.0024	0.0026	0.0029	0.0031	0.0034	0.0036	0.0038	0.0039
S75	0.2566	0.5260	2834	0.0003	0.0005	0.0006	0.0009	0.0010	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0025	0.0028	0.0030	0.0033	0.0034	0.0036	0.0037
Ave.	0.2571	0.5256	2824	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
Med.	0.2571	0.5257	2824	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
St dev	0.0005	0.0010	10.0379	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.2563	0.5239	2803	0.0002	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	0.0013	0.0015	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0032	0.0033
Max.	0.2581	0.5275	2841	0.0003	0.0006	0.0007	0.0010	0.0013	0.0014	0.0018	0.0021	0.0024	0.0027	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0044	0.0043

3.16 Data Set 4, 55°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	141.1	100.23	100.13	99.98	99.85	99.71	99.56	99.41	99.30	99.15	99.03	98.95	98.84	98.76	98.68	98.59	98.54	98.48	98.42
S77	141.5	100.17	100.06	99.96	99.81	99.66	99.51	99.37	99.22	99.07	98.96	98.86	98.74	98.68	98.60	98.51	98.40	98.34	98.27
S78	141.3	100.15	100.05	99.90	99.76	99.61	99.46	99.31	99.17	99.02	98.94	98.83	98.75	98.66	98.57	98.51	98.44	98.39	98.32
S79	141.4	100.20	100.09	99.99	99.84	99.69	99.54	99.40	99.26	99.14	99.04	98.92	98.84	98.78	98.69	98.63	98.56	98.45	98.39
S80	141.8	100.21	100.10	100.00	99.85	99.70	99.55	99.40	99.26	99.11	99.00	98.92	98.84	98.77	98.71	98.62	98.55	98.49	98.38
S81	140.9	100.21	100.11	99.96	99.81	99.67	99.54	99.39	99.24	99.09	98.99	98.87	98.77	98.69	98.62	98.53	98.48	98.43	98.32
S82	141.2	100.24	100.14	99.99	99.84	99.69	99.56	99.42	99.27	99.13	99.01	98.93	98.85	98.76	98.70	98.63	98.52	98.47	98.42
S83	141.1	100.22	100.12	100.02	99.89	99.74	99.61	99.46	99.31	99.20	99.10	98.99	98.89	98.80	98.74	98.65	98.59	98.53	98.47
S84	140.8	100.21	100.06	99.92	99.77	99.62	99.48	99.36	99.21	99.06	98.98	98.87	98.76	98.68	98.61	98.53	98.48	98.37	98.26
S85	141.6	100.21	100.06	99.92	99.79	99.64	99.49	99.34	99.23	99.08	99.00	98.92	98.81	98.75	98.66	98.59	98.49	98.43	98.38
S86	141.2	100.25	100.15	100.04	99.91	99.77	99.62	99.48	99.36	99.22	99.14	99.03	98.93	98.84	98.78	98.71	98.66	98.55	98.45
S87	141.0	100.16	100.06	99.92	99.79	99.64	99.49	99.38	99.26	99.15	99.05	98.97	98.85	98.76	98.68	98.59	98.54	98.47	98.42
S88	140.4	100.25	100.14	100.00	99.85	99.70	99.57	99.43	99.31	99.17	99.05	98.94	98.82	98.73	98.67	98.60	98.54	98.47	98.36
S89	140.7	100.24	100.10	100.00	99.85	99.70	99.55	99.43	99.32	99.20	99.10	99.02	98.91	98.83	98.75	98.66	98.55	98.50	98.44
S90	140.3	100.24	100.14	99.99	99.85	99.70	99.55	99.43	99.29	99.18	99.07	98.97	98.85	98.79	98.72	98.63	98.57	98.51	98.41
S91	140.0	100.20	100.09	99.95	99.82	99.67	99.52	99.40	99.29	99.15	99.07	98.98	98.90	98.82	98.73	98.66	98.59	98.53	98.42
S92	140.8	100.22	100.08	99.93	99.78	99.64	99.49	99.34	99.20	99.05	98.93	98.85	98.77	98.70	98.64	98.55	98.50	98.45	98.34
S93	140.4	100.19	100.08	99.98	99.85	99.72	99.57	99.43	99.28	99.13	99.02	98.90	98.82	98.73	98.67	98.60	98.53	98.47	98.40
S94	140.2	100.15	100.00	99.86	99.71	99.58	99.45	99.30	99.15	99.00	98.92	98.81	98.71	98.62	98.56	98.49	98.44	98.33	98.22
S95	140.3	100.24	100.13	100.03	99.88	99.75	99.60	99.46	99.32	99.17	99.06	98.94	98.86	98.80	98.71	98.62	98.57	98.46	98.41
S96	140.8	100.21	100.11	100.00	99.86	99.73	99.60	99.48	99.33	99.22	99.14	99.03	98.93	98.86	98.77	98.71	98.64	98.53	98.47
S97	139.9	100.19	100.04	99.90	99.75	99.62	99.49	99.34	99.19	99.05	98.96	98.88	98.80	98.72	98.64	98.55	98.44	98.39	98.28
S98	139.3	100.16	100.06	99.92	99.77	99.62	99.49	99.34	99.19	99.05	98.93	98.82	98.74	98.65	98.57	98.50	98.45	98.39	98.34
S99	139.9	100.17	100.07	99.97	99.82	99.67	99.52	99.37	99.22	99.11	99.00	98.88	98.77	98.68	98.61	98.55	98.44	98.33	98.22
S100	140.4	100.16	100.01	99.87	99.74	99.59	99.44	99.29	99.15	99.01	98.92	98.84	98.74	98.65	98.56	98.48	98.41	98.34	98.29
Ave.	140.7	100.20	100.09	99.96	99.82	99.67	99.53	99.39	99.25	99.12	99.02	98.92	98.82	98.74	98.66	98.59	98.52	98.44	98.36
Med.	140.8	100.21	100.09	99.97	99.82	99.67	99.54	99.40	99.26	99.13	99.01	98.92	98.82	98.75	98.67	98.59	98.53	98.46	98.38
St dev	0.6135	0.0322	0.0395	0.0500	0.0507	0.0505	0.0505	0.0537	0.0589	0.0660	0.0639	0.0653	0.0637	0.0660	0.0657	0.0662	0.0692	0.0679	0.0731
Min.	139.3	100.15	100.00	99.86	99.71	99.58	99.44	99.29	99.15	99.00	98.92	98.81	98.71	98.62	98.56	98.48	98.40	98.33	98.22
Max.	141.8	100.25	100.15	100.04	99.91	99.77	99.62	99.48	99.36	99.22	99.14	99.03	98.93	98.86	98.78	98.71	98.66	98.55	98.47

3.17 Data Set 4, 55°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	2.194	100.16	100.03	99.89	99.74	99.58	99.43	99.30	99.17	99.06	98.93	98.79	98.67	98.59	98.51	98.43	98.34	98.28	98.20
S77	2.194	100.21	100.08	99.94	99.79	99.59	99.45	99.32	99.22	99.10	99.02	98.93	98.84	98.76	98.67	98.59	98.51	98.42	98.36
S78	2.194	100.14	100.01	99.91	99.77	99.58	99.43	99.30	99.19	99.08	98.94	98.82	98.70	98.62	98.54	98.46	98.40	98.35	98.26
S79	2.193	100.19	100.05	99.92	99.73	99.59	99.43	99.32	99.21	99.08	98.96	98.85	98.73	98.64	98.56	98.48	98.39	98.30	98.21
S80	2.194	100.23	100.14	100.04	99.90	99.75	99.61	99.48	99.35	99.24	99.15	99.03	98.91	98.83	98.75	98.67	98.58	98.52	98.44
S81	2.194	100.21	100.08	99.94	99.75	99.61	99.47	99.36	99.25	99.12	99.03	98.90	98.78	98.70	98.62	98.53	98.44	98.39	98.30
S82	2.194	100.11	99.98	99.88	99.74	99.60	99.46	99.35	99.24	99.11	99.02	98.91	98.82	98.73	98.65	98.57	98.51	98.45	98.37
S83	2.194	100.15	100.05	99.91	99.77	99.62	99.47	99.34	99.21	99.10	98.98	98.86	98.74	98.66	98.58	98.50	98.42	98.36	98.27
S84	2.194	100.15	100.06	99.96	99.76	99.61	99.47	99.36	99.25	99.12	98.99	98.90	98.78	98.70	98.62	98.54	98.45	98.36	98.31
S85	2.194	100.19	100.10	100.00	99.85	99.65	99.50	99.39	99.28	99.17	99.08	98.94	98.83	98.74	98.66	98.58	98.52	98.47	98.41
S86	2.194	100.22	100.09	99.95	99.81	99.62	99.47	99.36	99.25	99.12	99.03	98.91	98.79	98.71	98.62	98.54	98.45	98.39	98.34
S87	2.195	100.20	100.06	99.92	99.77	99.63	99.44	99.31	99.20	99.09	98.95	98.87	98.75	98.67	98.58	98.50	98.41	98.32	98.24
S88	2.186	100.21	100.11	99.98	99.82	99.63	99.48	99.35	99.22	99.11	98.99	98.90	98.76	98.68	98.60	98.52	98.43	98.35	98.26
S89	2.185	100.14	100.04	99.94	99.79	99.60	99.46	99.35	99.24	99.11	98.97	98.84	98.72	98.64	98.56	98.48	98.39	98.30	98.22
S90	2.184	100.22	100.08	99.99	99.79	99.64	99.50	99.39	99.28	99.17	99.04	98.92	98.78	98.70	98.62	98.54	98.45	98.37	98.28
S91	2.184	100.11	100.01	99.88	99.72	99.57	99.38	99.27	99.14	99.03	98.89	98.80	98.72	98.63	98.55	98.47	98.38	98.32	98.23
S92	2.185	100.21	100.11	99.98	99.82	99.63	99.44	99.31	99.18	99.07	98.95	98.81	98.73	98.64	98.56	98.48	98.39	98.30	98.24
S93	2.185	100.17	100.08	99.94	99.79	99.63	99.49	99.36	99.25	99.14	99.05	98.94	98.82	98.73	98.65	98.57	98.48	98.42	98.37
S94	2.185	100.19	100.09	99.96	99.80	99.65	99.51	99.38	99.27	99.16	99.07	98.95	98.86	98.78	98.70	98.62	98.53	98.44	98.35
S95	2.185	100.20	100.10	99.97	99.83	99.68	99.48	99.37	99.26	99.15	99.02	98.93	98.79	98.71	98.63	98.55	98.49	98.43	98.34
S96	2.184	100.24	100.14	100.04	99.89	99.69	99.54	99.43	99.32	99.21	99.08	98.94	98.85	98.77	98.69	98.60	98.52	98.46	98.38
S97	2.185	100.19	100.05	99.96	99.76	99.62	99.49	99.38	99.27	99.14	99.02	98.88	98.76	98.68	98.60	98.52	98.43	98.38	98.32
S98	2.175	100.24	100.14	100.01	99.85	99.70	99.56	99.45	99.34	99.23	99.11	99.02	98.90	98.82	98.73	98.65	98.57	98.48	98.40
S99	2.179	100.17	100.04	99.90	99.76	99.61	99.47	99.36	99.25	99.14	99.05	98.91	98.80	98.72	98.63	98.55	98.49	98.44	98.35
S100	2.180	100.15	100.01	99.92	99.78	99.62	99.47	99.36	99.25	99.14	99.05	98.93	98.81	98.73	98.65	98.56	98.48	98.39	98.31
Ave.	2.188	100.18	100.07	99.95	99.79	99.63	99.48	99.36	99.24	99.13	99.01	98.90	98.79	98.70	98.62	98.54	98.46	98.39	98.31
Med.	2.186	100.19	100.08	99.94	99.79	99.62	99.47	99.36	99.25	99.12	99.02	98.91	98.78	98.70	98.62	98.54	98.45	98.39	98.31
St dev	0.0060	0.0371	0.0432	0.0442	0.0463	0.0409	0.0464	0.0477	0.0500	0.0507	0.0600	0.0600	0.0603	0.0603	0.0597	0.0599	0.0618	0.0646	0.0673
Min.	2.175	100.11	99.98	99.88	99.72	99.57	99.38	99.27	99.14	99.03	98.89	98.79	98.67	98.59	98.51	98.43	98.34	98.28	98.20
Max.	2.195	100.24	100.14	100.04	99.90	99.75	99.61	99.48	99.35	99.24	99.15	99.03	98.91	98.83	98.75	98.67	98.58	98.52	98.44

3.18 Data Set 4, 55°C, 160mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	0.1564	100.16	100.04	99.93	99.81	99.69	99.53	99.40	99.25	99.12	99.00	98.86	98.74	98.66	98.54	98.47	98.41	98.36	98.30
S77	0.1564	100.15	100.04	99.93	99.78	99.66	99.50	99.35	99.22	99.07	98.96	98.82	98.68	98.61	98.54	98.42	98.37	98.31	98.24
S78	0.1565	100.18	100.07	99.96	99.80	99.68	99.53	99.38	99.25	99.10	98.96	98.85	98.72	98.60	98.53	98.45	98.35	98.30	98.24
S79	0.1566	100.15	100.04	99.92	99.77	99.62	99.46	99.33	99.22	99.07	98.95	98.82	98.71	98.63	98.51	98.43	98.33	98.23	98.20
S80	0.1565	100.20	100.09	99.98	99.86	99.71	99.57	99.44	99.31	99.17	99.06	98.92	98.80	98.72	98.65	98.58	98.53	98.44	98.41
S81	0.1565	100.17	100.06	99.95	99.83	99.67	99.55	99.40	99.28	99.13	99.01	98.89	98.78	98.66	98.53	98.46	98.36	98.27	98.20
S82	0.1566	100.18	100.07	99.96	99.84	99.71	99.59	99.44	99.33	99.18	99.04	98.92	98.78	98.66	98.58	98.46	98.37	98.27	98.20
S83	0.1565	100.20	100.09	99.97	99.82	99.66	99.51	99.40	99.27	99.12	99.00	98.86	98.75	98.67	98.55	98.47	98.38	98.32	98.30
S84	0.1566	100.17	100.06	99.95	99.81	99.68	99.56	99.45	99.34	99.19	99.06	98.94	98.83	98.70	98.63	98.56	98.47	98.38	98.35
S85	0.1565	100.10	99.99	99.88	99.73	99.58	99.46	99.34	99.23	99.12	99.00	98.86	98.74	98.67	98.59	98.47	98.41	98.32	98.26
S86	0.1565	100.15	100.04	99.93	99.81	99.65	99.53	99.42	99.31	99.19	99.06	98.92	98.80	98.67	98.55	98.48	98.38	98.28	98.22
S87	0.1566	100.19	100.07	99.96	99.82	99.66	99.54	99.43	99.28	99.15	99.01	98.87	98.75	98.63	98.55	98.47	98.42	98.33	98.26
S88	0.1595	100.22	100.11	100.00	99.85	99.69	99.57	99.44	99.33	99.20	99.08	98.96	98.84	98.71	98.64	98.52	98.42	98.36	98.29
S89	0.1593	100.13	100.02	99.91	99.79	99.67	99.51	99.38	99.27	99.15	99.03	98.89	98.76	98.68	98.60	98.48	98.39	98.34	98.26
S90	0.1594	100.16	100.05	99.94	99.78	99.62	99.46	99.31	99.16	99.05	98.93	98.80	98.66	98.54	98.47	98.34	98.29	98.19	98.13
S91	0.1595	100.19	100.08	99.97	99.82	99.70	99.58	99.43	99.30	99.15	99.03	98.90	98.79	98.72	98.64	98.52	98.46	98.36	98.30
S92	0.1595	100.15	100.04	99.93	99.77	99.63	99.48	99.33	99.20	99.05	98.93	98.79	98.67	98.54	98.42	98.30	98.21	98.15	98.08
S93	0.1595	100.22	100.11	99.99	99.84	99.68	99.52	99.41	99.26	99.13	98.99	98.87	98.75	98.68	98.61	98.54	98.45	98.35	98.27
S94	0.1594	100.14	100.03	99.92	99.76	99.64	99.52	99.40	99.25	99.10	98.96	98.85	98.73	98.66	98.53	98.46	98.35	98.25	98.18
S95	0.1594	100.14	100.03	99.92	99.80	99.68	99.53	99.42	99.27	99.14	99.00	98.86	98.73	98.66	98.58	98.50	98.41	98.32	98.25
S96	0.1594	100.13	100.02	99.91	99.76	99.62	99.47	99.36	99.21	99.08	98.96	98.84	98.73	98.65	98.58	98.46	98.40	98.30	98.24
S97	0.1594	100.14	100.02	99.91	99.77	99.61	99.45	99.30	99.17	99.02	98.91	98.77	98.63	98.56	98.48	98.41	98.35	98.26	98.20
S98	0.1587	100.14	100.03	99.92	99.76	99.64	99.52	99.37	99.22	99.09	98.98	98.85	98.73	98.66	98.54	98.46	98.37	98.31	98.25
S99	0.1590	100.15	100.04	99.93	99.78	99.62	99.47	99.32	99.20	99.09	98.95	98.84	98.70	98.62	98.55	98.48	98.37	98.32	98.25
S100	0.1590	100.17	100.05	99.94	99.80	99.65	99.50	99.38	99.25	99.10	98.97	98.83	98.69	98.62	98.55	98.47	98.42	98.36	98.30
Ave.	0.1580	100.16	100.05	99.94	99.80	99.66	99.52	99.39	99.26	99.12	98.99	98.86	98.74	98.65	98.56	98.47	98.39	98.31	98.25
Med.	0.1587	100.16	100.04	99.93	99.80	99.66	99.52	99.40	99.25	99.12	99.00	98.86	98.74	98.66	98.55	98.47	98.38	98.32	98.25
St dev	0.0014	0.0280	0.0284	0.0284	0.0310	0.0343	0.0408	0.0444	0.0476	0.0478	0.0469	0.0471	0.0505	0.0485	0.0551	0.0592	0.0613	0.0611	0.0673
Min.	0.1564	100.10	99.99	99.88	99.73	99.58	99.45	99.30	99.16	99.02	98.91	98.77	98.63	98.54	98.42	98.30	98.21	98.15	98.08
Max.	0.1595	100.22	100.11	100.00	99.86	99.71	99.59	99.45	99.34	99.20	99.08	98.96	98.84	98.72	98.65	98.58	98.53	98.44	98.41

3.19 Data Set 4, 55°C, 160mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	5.677	5.678	5.671	5.675	5.673	5.665	5.664	5.668	5.661	5.657	5.664	5.646	5.659	5.648	5.653	5.637	5.646	5.644	5.650
S77	5.666	5.659	5.660	5.663	5.657	5.654	5.656	5.655	5.650	5.655	5.649	5.635	5.641	5.648	5.636	5.626	5.635	5.628	5.628
S78	5.667	5.668	5.668	5.665	5.660	5.653	5.656	5.649	5.656	5.646	5.644	5.637	5.646	5.649	5.631	5.636	5.644	5.641	5.634
S79	5.637	5.640	5.631	5.630	5.633	5.624	5.627	5.626	5.622	5.618	5.619	5.612	5.616	5.605	5.614	5.607	5.597	5.596	5.596
S80	5.671	5.666	5.664	5.664	5.663	5.657	5.658	5.653	5.660	5.657	5.658	5.640	5.644	5.638	5.647	5.631	5.641	5.639	5.637
S81	5.681	5.676	5.679	5.675	5.674	5.674	5.672	5.666	5.668	5.654	5.660	5.666	5.663	5.649	5.645	5.658	5.641	5.654	5.643
S82	5.669	5.670	5.670	5.667	5.665	5.656	5.658	5.654	5.658	5.646	5.641	5.655	5.640	5.637	5.639	5.639	5.629	5.636	5.625
S83	5.672	5.669	5.669	5.670	5.665	5.662	5.659	5.661	5.656	5.655	5.659	5.646	5.651	5.650	5.639	5.639	5.632	5.631	5.631
S84	5.686	5.679	5.680	5.684	5.678	5.676	5.680	5.671	5.670	5.669	5.663	5.656	5.665	5.665	5.646	5.656	5.646	5.659	5.645
S85	5.666	5.660	5.659	5.659	5.659	5.653	5.653	5.651	5.655	5.647	5.653	5.638	5.645	5.633	5.635	5.630	5.631	5.632	5.628
S86	5.676	5.674	5.677	5.669	5.669	5.666	5.668	5.663	5.667	5.653	5.658	5.648	5.643	5.658	5.645	5.652	5.653	5.643	5.637
S87	5.673	5.674	5.674	5.669	5.667	5.662	5.660	5.662	5.655	5.657	5.642	5.643	5.651	5.655	5.650	5.640	5.637	5.634	5.634
S88	5.667	5.669	5.662	5.665	5.660	5.657	5.654	5.654	5.649	5.655	5.654	5.654	5.647	5.635	5.636	5.634	5.636	5.633	5.633
S89	5.627	5.620	5.620	5.626	5.619	5.617	5.615	5.612	5.612	5.613	5.604	5.606	5.594	5.606	5.604	5.604	5.587	5.589	5.595
S90	5.658	5.659	5.653	5.655	5.648	5.652	5.645	5.647	5.649	5.641	5.630	5.641	5.629	5.622	5.634	5.622	5.628	5.624	5.620
S91	5.670	5.663	5.664	5.663	5.663	5.663	5.658	5.659	5.654	5.650	5.652	5.644	5.649	5.643	5.639	5.647	5.640	5.636	5.643
S92	5.655	5.656	5.650	5.651	5.646	5.646	5.643	5.642	5.644	5.629	5.629	5.638	5.630	5.619	5.632	5.624	5.615	5.611	5.617
S93	5.657	5.655	5.655	5.650	5.648	5.645	5.645	5.642	5.644	5.637	5.632	5.644	5.621	5.639	5.626	5.632	5.627	5.619	5.630
S94	5.662	5.660	5.657	5.654	5.654	5.652	5.649	5.651	5.651	5.640	5.645	5.636	5.640	5.630	5.632	5.639	5.622	5.629	5.623
S95	5.663	5.665	5.660	5.655	5.656	5.649	5.657	5.648	5.648	5.636	5.648	5.638	5.642	5.643	5.630	5.632	5.627	5.631	5.619
S96	5.660	5.654	5.654	5.656	5.654	5.652	5.653	5.651	5.645	5.643	5.643	5.634	5.638	5.638	5.637	5.625	5.620	5.636	5.616
S97	5.675	5.676	5.676	5.665	5.667	5.663	5.663	5.664	5.660	5.663	5.650	5.658	5.642	5.644	5.652	5.645	5.642	5.637	5.637
S98	5.675	5.673	5.673	5.673	5.668	5.667	5.663	5.666	5.657	5.658	5.645	5.662	5.654	5.654	5.645	5.650	5.652	5.637	5.637
S99	5.662	5.656	5.656	5.658	5.656	5.656	5.651	5.647	5.646	5.645	5.644	5.637	5.626	5.641	5.632	5.639	5.632	5.624	5.628
S100	5.655	5.653	5.657	5.648	5.646	5.646	5.648	5.639	5.640	5.641	5.638	5.627	5.637	5.634	5.624	5.632	5.630	5.617	5.624
Ave.	5.665	5.663	5.661	5.660	5.658	5.655	5.654	5.652	5.651	5.647	5.645	5.642	5.641	5.639	5.636	5.635	5.632	5.630	5.628
Med.	5.667	5.665	5.662	5.663	5.660	5.656	5.656	5.653	5.654	5.647	5.645	5.641	5.642	5.641	5.636	5.636	5.632	5.633	5.630
St dev	0.0128	0.0130	0.0139	0.0132	0.0130	0.0132	0.0133	0.0133	0.0130	0.0132	0.0141	0.0137	0.0153	0.0147	0.0114	0.0131	0.0152	0.0155	0.0133
Min.	5.627	5.620	5.620	5.626	5.619	5.617	5.615	5.612	5.612	5.613	5.604	5.606	5.594	5.605	5.604	5.604	5.587	5.589	5.595
Max.	5.686	5.679	5.680	5.684	5.678	5.676	5.680	5.671	5.670	5.669	5.664	5.666	5.665	5.665	5.653	5.658	5.653	5.659	5.650

3.20 Data Set 4, 55°C, 160mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	12000hrs s	18000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S76	0.2554	0.5270	2855	0.0001	0.0004	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0023	0.0025	0.0026	0.0028	0.0031	0.0032	0.0034	0.0035
S77	0.2559	0.5279	2838	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0020	0.0021	0.0023	0.0025	0.0027	0.0028	0.0029	0.0031
S78	0.2551	0.5266	2864	0.0001	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0032	0.0033	0.0035	0.0036
S79	0.2554	0.5268	2857	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035
S80	0.2553	0.5282	2851	0.0001	0.0003	0.0004	0.0005	0.0008	0.0010	0.0011	0.0014	0.0017	0.0020	0.0022	0.0023	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
S81	0.2554	0.5275	2851	0.0001	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0033	0.0035
S82	0.2557	0.5284	2842	0.0001	0.0003	0.0004	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0030	0.0032	0.0033	0.0034	0.0037
S83	0.2553	0.5271	2856	0.0002	0.0004	0.0004	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0022	0.0023	0.0025	0.0026	0.0029	0.0031	0.0032	0.0035
S84	0.2550	0.5266	2866	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0032	0.0035
S85	0.2559	0.5280	2838	0.0001	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038
S86	0.2553	0.5270	2857	0.0002	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0019	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0032	0.0034	0.0037
S87	0.2553	0.5272	2856	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0021	0.0024	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S88	0.2561	0.5294	2828	0.0002	0.0005	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0017	0.0019	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037
S89	0.2561	0.5292	2828	0.0001	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S90	0.2565	0.5307	2811	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
S91	0.2563	0.5299	2822	0.0002	0.0005	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033	0.0036	0.0037
S92	0.2566	0.5303	2812	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016	0.0019	0.0020	0.0023	0.0025	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
S93	0.2558	0.5291	2836	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0032	0.0033	0.0035
S94	0.2560	0.5295	2828	0.0002	0.0005	0.0006	0.0009	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036
S95	0.2559	0.5289	2835	0.0001	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S96	0.2561	0.5306	2821	0.0001	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0022	0.0024	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035
S97	0.2558	0.5291	2836	0.0001	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
S98	0.2556	0.5290	2840	0.0001	0.0003	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
S99	0.2559	0.5295	2831	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0021	0.0023	0.0025	0.0027	0.0030	0.0031	0.0032	0.0035	0.0036
S100	0.2565	0.5302	2815	0.0001	0.0003	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0024	0.0027	0.0028	0.0029	0.0031	0.0033
Ave.	0.2558	0.5285	2839	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
Med.	0.2558	0.5289	2838	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
St dev	0.0004	0.0013	16.2005	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2550	0.5266	2811	0.0001	0.0003	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0029	0.0031
Max.	0.2566	0.5307	2866	0.0002	0.0005	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038

3.21 Data Set 5, 85°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	140.8	100.10	99.98	99.86	99.65	99.44	99.28	99.11	98.97	98.83	98.72	98.61	98.49	98.38	98.28	98.19	98.12	98.02	97.93
S102	140.2	100.12	100.00	99.88	99.67	99.47	99.27	99.10	98.93	98.76	98.65	98.56	98.50	98.37	98.29	98.16	98.09	97.99	97.90
S103	140.8	100.12	100.01	99.88	99.72	99.50	99.34	99.17	99.00	98.83	98.68	98.57	98.45	98.33	98.24	98.14	98.04	97.96	97.88
S104	141.0	100.08	99.95	99.83	99.61	99.41	99.25	99.11	98.94	98.77	98.62	98.53	98.46	98.38	98.26	98.15	98.08	97.97	97.89
S105	140.8	100.08	99.97	99.84	99.67	99.47	99.26	99.12	98.95	98.78	98.67	98.58	98.50	98.38	98.29	98.19	98.09	97.98	97.93
S106	141.3	100.08	99.97	99.85	99.65	99.48	99.31	99.15	99.01	98.84	98.69	98.58	98.46	98.33	98.25	98.15	98.07	98.00	97.94
S107	140.6	100.04	99.92	99.80	99.64	99.42	99.22	99.08	98.91	98.75	98.60	98.49	98.42	98.30	98.22	98.13	98.06	97.96	97.87
S108	140.5	100.05	99.94	99.81	99.61	99.40	99.18	99.02	98.88	98.71	98.61	98.52	98.40	98.32	98.24	98.15	98.05	97.95	97.87
S109	140.7	100.12	99.99	99.87	99.66	99.46	99.25	99.08	98.91	98.77	98.62	98.51	98.39	98.29	98.18	98.08	97.98	97.87	97.79
S110	141.1	100.04	99.92	99.79	99.59	99.43	99.22	99.08	98.92	98.75	98.65	98.56	98.44	98.34	98.23	98.11	98.03	97.93	97.88
S111	140.3	100.08	99.95	99.83	99.62	99.42	99.22	99.05	98.88	98.72	98.62	98.47	98.39	98.27	98.16	98.08	97.98	97.88	97.79
S112	140.4	100.09	99.97	99.86	99.69	99.49	99.29	99.12	98.98	98.84	98.69	98.59	98.47	98.37	98.26	98.14	98.04	97.94	97.88
S113	140.6	100.04	99.91	99.79	99.58	99.42	99.20	99.04	98.87	98.73	98.62	98.47	98.35	98.24	98.12	98.04	97.96	97.89	97.80
S114	140.2	100.08	99.96	99.84	99.67	99.47	99.27	99.10	98.93	98.79	98.70	98.59	98.52	98.44	98.34	98.23	98.13	98.06	97.97
S115	140.0	100.13	100.00	99.89	99.68	99.48	99.28	99.14	98.97	98.80	98.69	98.60	98.54	98.41	98.31	98.18	98.08	97.98	97.92
S116	140.3	100.09	99.97	99.84	99.63	99.43	99.22	99.08	98.91	98.74	98.63	98.52	98.44	98.31	98.21	98.13	98.02	97.92	97.84
S117	140.8	100.04	99.92	99.79	99.58	99.41	99.25	99.08	98.91	98.74	98.65	98.54	98.48	98.39	98.27	98.17	98.09	97.99	97.91
S118	140.9	100.09	99.97	99.85	99.64	99.44	99.23	99.06	98.89	98.75	98.64	98.55	98.43	98.31	98.20	98.08	98.00	97.93	97.84
S119	140.3	100.03	99.91	99.78	99.57	99.36	99.15	98.98	98.81	98.64	98.53	98.42	98.36	98.23	98.13	98.01	97.90	97.83	97.75
S120	139.9	100.12	99.99	99.87	99.71	99.50	99.29	99.12	98.96	98.82	98.71	98.60	98.48	98.39	98.31	98.21	98.10	98.03	97.95
S121	140.3	100.06	99.94	99.82	99.65	99.45	99.28	99.11	98.95	98.78	98.69	98.58	98.46	98.35	98.25	98.12	98.02	97.92	97.86
S122	140.0	100.12	100.01	99.88	99.67	99.47	99.25	99.09	98.92	98.75	98.60	98.51	98.44	98.36	98.24	98.11	98.01	97.94	97.88
S123	140.3	100.07	99.94	99.81	99.61	99.40	99.20	99.06	98.92	98.78	98.63	98.52	98.45	98.35	98.27	98.16	98.06	97.98	97.90
S124	140.6	100.06	99.95	99.82	99.62	99.41	99.20	99.04	98.90	98.73	98.62	98.51	98.44	98.36	98.24	98.11	98.01	97.91	97.85
S125	140.5	100.12	99.99	99.87	99.66	99.44	99.28	99.14	99.00	98.83	98.72	98.57	98.45	98.34	98.22	98.12	98.01	97.94	97.86
Ave.	140.5	100.08	99.96	99.84	99.64	99.44	99.25	99.09	98.93	98.77	98.65	98.54	98.45	98.34	98.24	98.13	98.04	97.95	97.88
Med.	140.5	100.08	99.97	99.84	99.65	99.44	99.25	99.09	98.92	98.77	98.65	98.55	98.45	98.35	98.24	98.14	98.04	97.95	97.88
St dev	0.3577	0.0311	0.0314	0.0324	0.0396	0.0356	0.0434	0.0437	0.0456	0.0475	0.0450	0.0477	0.0459	0.0507	0.0532	0.0521	0.0533	0.0526	0.0540
Min.	139.9	100.03	99.91	99.78	99.57	99.36	99.15	98.98	98.81	98.64	98.53	98.42	98.35	98.23	98.12	98.01	97.90	97.83	97.75
Max.	141.3	100.13	100.01	99.89	99.72	99.50	99.34	99.17	99.01	98.84	98.72	98.61	98.54	98.44	98.34	98.23	98.13	98.06	97.97

3.22 Data Set 5, 85°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	2.222	100.02	99.86	99.70	99.52	99.33	99.14	98.98	98.84	98.68	98.52	98.41	98.28	98.20	98.12	98.01	97.92	97.81	97.70
S102	2.222	100.02	99.86	99.69	99.54	99.38	99.19	99.02	98.88	98.72	98.55	98.42	98.29	98.17	98.09	98.00	97.92	97.83	97.72
S103	2.221	100.09	99.92	99.76	99.57	99.39	99.23	99.07	98.93	98.76	98.63	98.50	98.37	98.27	98.18	98.08	97.99	97.88	97.79
S104	2.222	100.09	99.93	99.76	99.57	99.38	99.19	99.02	98.88	98.72	98.58	98.48	98.35	98.23	98.16	98.07	97.96	97.87	97.78
S105	2.222	100.02	99.86	99.69	99.52	99.36	99.20	99.03	98.90	98.73	98.59	98.49	98.36	98.26	98.19	98.07	97.96	97.89	97.78
S106	2.221	100.03	99.88	99.71	99.53	99.35	99.17	99.01	98.87	98.70	98.57	98.47	98.36	98.26	98.20	98.10	98.03	97.95	97.86
S107	2.221	100.05	99.90	99.73	99.57	99.41	99.23	99.07	98.93	98.76	98.63	98.50	98.37	98.28	98.19	98.07	97.98	97.91	97.82
S108	2.221	100.01	99.85	99.69	99.51	99.32	99.14	98.97	98.84	98.67	98.54	98.44	98.34	98.23	98.15	98.05	97.94	97.86	97.77
S109	2.221	100.09	99.92	99.75	99.58	99.42	99.23	99.06	98.93	98.76	98.63	98.52	98.41	98.31	98.23	98.11	98.02	97.93	97.84
S110	2.221	100.04	99.88	99.72	99.56	99.41	99.25	99.08	98.95	98.78	98.65	98.55	98.44	98.32	98.25	98.13	98.06	97.97	97.88
S111	2.197	100.09	99.92	99.75	99.56	99.40	99.24	99.08	98.94	98.77	98.61	98.51	98.38	98.28	98.22	98.12	98.01	97.93	97.82
S112	2.197	100.11	99.94	99.78	99.59	99.43	99.24	99.08	98.94	98.78	98.64	98.54	98.43	98.33	98.27	98.15	98.06	97.95	97.88
S113	2.197	100.06	99.90	99.74	99.55	99.36	99.20	99.03	98.89	98.73	98.56	98.43	98.33	98.21	98.15	98.05	97.96	97.88	97.77
S114	2.198	100.02	99.85	99.70	99.54	99.35	99.16	98.99	98.86	98.70	98.57	98.47	98.34	98.23	98.16	98.08	97.97	97.89	97.80
S115	2.198	100.05	99.88	99.72	99.53	99.37	99.19	99.02	98.89	98.73	98.60	98.49	98.36	98.27	98.20	98.08	97.97	97.88	97.77
S116	2.198	100.07	99.90	99.74	99.55	99.36	99.20	99.04	98.90	98.73	98.60	98.47	98.37	98.28	98.21	98.09	98.02	97.94	97.83
S117	2.198	100.05	99.88	99.71	99.53	99.37	99.21	99.05	98.91	98.74	98.61	98.50	98.39	98.30	98.22	98.10	98.01	97.92	97.81
S118	2.198	100.07	99.91	99.74	99.55	99.37	99.19	99.02	98.89	98.72	98.59	98.46	98.33	98.21	98.12	98.01	97.93	97.82	97.75
S119	2.197	100.04	99.88	99.71	99.55	99.36	99.17	99.01	98.87	98.70	98.57	98.44	98.30	98.22	98.15	98.06	97.95	97.86	97.78
S120	2.198	100.06	99.89	99.72	99.54	99.35	99.19	99.03	98.89	98.72	98.56	98.43	98.33	98.23	98.16	98.04	97.96	97.87	97.78
S121	2.197	100.11	99.94	99.78	99.59	99.41	99.24	99.07	98.93	98.77	98.63	98.50	98.40	98.31	98.25	98.13	98.04	97.95	97.88
S122	2.198	100.07	99.91	99.74	99.56	99.41	99.22	99.05	98.92	98.75	98.59	98.46	98.33	98.24	98.18	98.08	97.97	97.90	97.82
S123	2.198	100.07	99.90	99.73	99.56	99.37	99.21	99.04	98.91	98.75	98.59	98.46	98.35	98.26	98.19	98.10	98.03	97.95	97.86
S124	2.198	100.09	99.93	99.77	99.61	99.46	99.30	99.13	98.99	98.82	98.66	98.53	98.40	98.31	98.24	98.14	98.07	97.99	97.88
S125	2.198	100.05	99.88	99.71	99.56	99.40	99.22	99.06	98.92	98.76	98.59	98.49	98.39	98.28	98.20	98.10	98.01	97.94	97.86
Ave.	2.207	100.06	99.89	99.73	99.55	99.38	99.21	99.04	98.90	98.74	98.59	98.48	98.36	98.26	98.19	98.08	97.99	97.90	97.81
Med.	2.198	100.06	99.90	99.73	99.55	99.37	99.20	99.04	98.90	98.73	98.59	98.48	98.36	98.26	98.19	98.08	97.98	97.90	97.81
St dev	0.0119	0.0288	0.0271	0.0278	0.0250	0.0325	0.0355	0.0354	0.0352	0.0347	0.0358	0.0373	0.0406	0.0421	0.0448	0.0415	0.0443	0.0479	0.0508
Min.	2.197	100.01	99.85	99.69	99.51	99.32	99.14	98.97	98.84	98.67	98.52	98.41	98.28	98.17	98.09	98.00	97.92	97.81	97.70
Max.	2.222	100.11	99.94	99.78	99.61	99.46	99.30	99.13	98.99	98.82	98.66	98.55	98.44	98.33	98.27	98.15	98.07	97.99	97.88

3.23 Data Set 5, 85°C, 160mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	0.1624	100.02	99.91	99.77	99.57	99.38	99.19	99.00	98.79	98.65	98.53	98.40	98.28	98.17	98.04	97.99	97.92	97.82	97.71
S102	0.1623	100.07	99.96	99.77	99.58	99.44	99.29	99.10	98.90	98.75	98.63	98.53	98.44	98.38	98.26	98.14	98.05	97.98	97.90
S103	0.1624	100.02	99.91	99.72	99.53	99.39	99.19	98.98	98.77	98.62	98.50	98.37	98.25	98.14	98.01	97.90	97.80	97.73	97.62
S104	0.1624	100.03	99.87	99.73	99.54	99.40	99.20	99.01	98.81	98.66	98.54	98.41	98.29	98.24	98.17	98.12	98.02	97.93	97.85
S105	0.1623	100.05	99.89	99.75	99.56	99.38	99.19	98.98	98.77	98.61	98.49	98.36	98.27	98.15	98.02	97.91	97.84	97.74	97.64
S106	0.1624	100.00	99.84	99.65	99.51	99.36	99.18	98.97	98.76	98.62	98.50	98.40	98.30	98.25	98.13	98.08	98.00	97.91	97.80
S107	0.1624	100.03	99.92	99.73	99.58	99.44	99.25	99.04	98.84	98.71	98.58	98.46	98.33	98.22	98.09	97.97	97.87	97.80	97.69
S108	0.1624	100.08	99.96	99.82	99.68	99.53	99.39	99.20	98.98	98.85	98.73	98.63	98.50	98.38	98.26	98.14	98.05	97.96	97.85
S109	0.1625	100.06	99.90	99.76	99.56	99.38	99.18	98.97	98.76	98.61	98.52	98.39	98.27	98.21	98.09	97.97	97.90	97.81	97.73
S110	0.1624	100.03	99.92	99.73	99.58	99.39	99.19	98.98	98.77	98.62	98.50	98.37	98.24	98.19	98.13	98.08	98.01	97.94	97.84
S111	0.1586	100.06	99.90	99.75	99.57	99.43	99.24	99.03	98.83	98.68	98.56	98.43	98.34	98.23	98.10	98.04	97.95	97.88	97.77
S112	0.1585	100.10	99.99	99.80	99.61	99.47	99.28	99.07	98.87	98.72	98.59	98.50	98.37	98.25	98.13	98.01	97.94	97.85	97.75
S113	0.1585	100.00	99.89	99.70	99.50	99.36	99.21	99.02	98.81	98.66	98.56	98.44	98.31	98.19	98.13	98.08	98.01	97.94	97.85
S114	0.1586	100.04	99.93	99.74	99.55	99.36	99.17	98.96	98.75	98.60	98.47	98.35	98.22	98.11	97.99	97.94	97.85	97.78	97.67
S115	0.1585	100.04	99.88	99.69	99.50	99.30	99.11	98.90	98.69	98.54	98.41	98.29	98.16	98.05	97.93	97.82	97.75	97.65	97.54
S116	0.1586	100.11	100.00	99.81	99.62	99.44	99.25	99.03	98.84	98.69	98.56	98.44	98.31	98.20	98.08	97.96	97.89	97.83	97.73
S117	0.1586	100.06	99.90	99.76	99.58	99.39	99.21	99.01	98.80	98.65	98.53	98.43	98.34	98.22	98.10	98.05	97.96	97.89	97.81
S118	0.1585	100.04	99.93	99.74	99.55	99.40	99.21	99.00	98.81	98.67	98.58	98.48	98.39	98.33	98.20	98.09	98.01	97.91	97.81
S119	0.1585	100.04	99.93	99.74	99.60	99.40	99.26	99.05	98.84	98.70	98.61	98.48	98.39	98.33	98.20	98.09	98.01	97.94	97.83
S120	0.1586	99.99	99.83	99.69	99.55	99.36	99.16	98.97	98.76	98.61	98.48	98.39	98.26	98.15	98.02	97.91	97.83	97.74	97.66
S121	0.1586	100.10	99.94	99.74	99.55	99.36	99.21	99.02	98.82	98.67	98.55	98.43	98.30	98.25	98.12	98.01	97.92	97.84	97.74
S122	0.1587	100.09	99.98	99.84	99.65	99.50	99.36	99.15	98.95	98.80	98.68	98.58	98.45	98.34	98.28	98.23	98.16	98.06	97.96
S123	0.1586	100.04	99.93	99.79	99.60	99.41	99.21	99.00	98.79	98.66	98.53	98.44	98.31	98.26	98.13	98.01	97.93	97.84	97.76
S124	0.1586	100.01	99.90	99.76	99.62	99.42	99.23	99.02	98.82	98.67	98.55	98.42	98.30	98.24	98.12	98.07	97.99	97.92	97.81
S125	0.1586	100.07	99.91	99.72	99.53	99.34	99.16	98.95	98.75	98.60	98.48	98.35	98.26	98.20	98.08	98.03	97.95	97.85	97.77
Ave.	0.1601	100.05	99.92	99.75	99.57	99.40	99.22	99.02	98.81	98.67	98.55	98.43	98.31	98.23	98.11	98.03	97.94	97.86	97.76
Med.	0.1586	100.04	99.91	99.74	99.57	99.39	99.21	99.01	98.81	98.66	98.54	98.43	98.30	98.22	98.12	98.03	97.95	97.85	97.77
St dev	0.0019	0.0322	0.0410	0.0430	0.0439	0.0506	0.0605	0.0622	0.0652	0.0669	0.0674	0.0749	0.0763	0.0821	0.0874	0.0931	0.0914	0.0922	0.0927
Min.	0.1585	99.99	99.83	99.65	99.50	99.30	99.11	98.90	98.69	98.54	98.41	98.29	98.16	98.05	97.93	97.82	97.75	97.65	97.54
Max.	0.1625	100.11	100.00	99.84	99.68	99.53	99.39	99.20	98.98	98.85	98.73	98.63	98.50	98.38	98.28	98.23	98.16	98.06	97.96

3.24 Data Set 5, 85°C, 160mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	5.671	5.663	5.667	5.661	5.669	5.662	5.656	5.662	5.660	5.654	5.653	5.650	5.646	5.646	5.644	5.648	5.645	5.646	5.639
S102	5.680	5.678	5.677	5.677	5.672	5.670	5.672	5.668	5.667	5.665	5.665	5.657	5.662	5.657	5.659	5.647	5.654	5.653	5.645
S103	5.661	5.657	5.661	5.651	5.651	5.651	5.647	5.647	5.644	5.644	5.645	5.647	5.636	5.639	5.634	5.630	5.632	5.636	5.636
S104	5.631	5.626	5.623	5.627	5.622	5.617	5.623	5.617	5.617	5.615	5.614	5.610	5.614	5.606	5.604	5.607	5.606	5.604	5.604
S105	5.663	5.660	5.658	5.655	5.655	5.657	5.651	5.654	5.644	5.647	5.650	5.642	5.637	5.640	5.636	5.632	5.637	5.636	5.637
S106	5.664	5.660	5.659	5.656	5.656	5.651	5.656	5.650	5.654	5.650	5.650	5.646	5.638	5.647	5.641	5.635	5.631	5.628	5.632
S107	5.666	5.663	5.663	5.658	5.659	5.659	5.654	5.656	5.648	5.646	5.652	5.650	5.643	5.643	5.639	5.642	5.633	5.640	5.629
S108	5.674	5.669	5.672	5.672	5.664	5.667	5.659	5.659	5.655	5.654	5.651	5.652	5.649	5.649	5.650	5.648	5.651	5.645	5.637
S109	5.667	5.666	5.661	5.657	5.659	5.661	5.657	5.653	5.647	5.654	5.644	5.644	5.650	5.643	5.640	5.641	5.642	5.632	5.640
S110	5.659	5.659	5.659	5.657	5.649	5.644	5.647	5.647	5.641	5.641	5.638	5.644	5.641	5.636	5.635	5.630	5.626	5.632	5.633
S111	5.656	5.655	5.656	5.648	5.646	5.647	5.648	5.642	5.642	5.638	5.638	5.635	5.639	5.639	5.628	5.633	5.630	5.622	5.619
S112	5.646	5.638	5.643	5.636	5.638	5.638	5.632	5.634	5.634	5.627	5.633	5.624	5.623	5.621	5.619	5.621	5.616	5.614	5.617
S113	5.616	5.609	5.610	5.608	5.608	5.602	5.608	5.608	5.597	5.598	5.601	5.594	5.593	5.590	5.589	5.586	5.590	5.582	5.587
S114	5.652	5.652	5.644	5.648	5.647	5.644	5.640	5.640	5.638	5.633	5.631	5.639	5.627	5.629	5.628	5.628	5.626	5.623	5.618
S115	5.660	5.658	5.656	5.652	5.651	5.651	5.646	5.650	5.648	5.643	5.637	5.639	5.635	5.635	5.633	5.634	5.635	5.623	5.623
S116	5.653	5.653	5.653	5.651	5.643	5.644	5.641	5.639	5.642	5.635	5.636	5.630	5.636	5.631	5.632	5.627	5.624	5.621	5.619
S117	5.645	5.639	5.642	5.643	5.640	5.638	5.631	5.637	5.633	5.630	5.622	5.630	5.619	5.619	5.622	5.612	5.616	5.618	5.609
S118	5.650	5.647	5.642	5.648	5.642	5.643	5.642	5.636	5.636	5.632	5.627	5.627	5.632	5.633	5.623	5.617	5.617	5.622	5.623
S119	5.648	5.644	5.640	5.640	5.640	5.641	5.636	5.636	5.637	5.634	5.633	5.631	5.627	5.622	5.627	5.619	5.622	5.621	5.616
S120	5.665	5.662	5.658	5.655	5.658	5.658	5.656	5.657	5.653	5.648	5.642	5.644	5.640	5.640	5.642	5.633	5.632	5.628	5.633
S121	5.656	5.648	5.656	5.654	5.654	5.642	5.646	5.646	5.636	5.636	5.638	5.640	5.631	5.633	5.629	5.632	5.627	5.621	5.628
S122	5.660	5.656	5.660	5.652	5.650	5.653	5.651	5.648	5.650	5.643	5.644	5.636	5.643	5.634	5.639	5.636	5.629	5.625	5.624
S123	5.653	5.648	5.649	5.649	5.649	5.647	5.645	5.641	5.640	5.633	5.632	5.630	5.631	5.628	5.629	5.630	5.620	5.628	5.626
S124	5.616	5.616	5.608	5.606	5.608	5.610	5.606	5.602	5.602	5.601	5.601	5.601	5.598	5.594	5.598	5.590	5.593	5.590	5.587
S125	5.646	5.644	5.643	5.636	5.644	5.640	5.638	5.637	5.634	5.635	5.632	5.623	5.629	5.620	5.619	5.616	5.620	5.618	5.611
Ave.	5.654	5.651	5.650	5.648	5.647	5.645	5.643	5.642	5.640	5.638	5.636	5.635	5.633	5.631	5.629	5.627	5.626	5.624	5.623
Med.	5.656	5.655	5.656	5.651	5.649	5.647	5.646	5.646	5.642	5.638	5.638	5.639	5.636	5.634	5.632	5.630	5.627	5.623	5.624
St dev	0.0156	0.0160	0.0168	0.0162	0.0157	0.0163	0.0152	0.0157	0.0159	0.0156	0.0152	0.0155	0.0152	0.0162	0.0156	0.0159	0.0153	0.0158	0.0150
Min.	5.616	5.609	5.608	5.606	5.608	5.602	5.606	5.602	5.597	5.598	5.601	5.594	5.593	5.590	5.589	5.586	5.590	5.582	5.587
Max.	5.680	5.678	5.677	5.677	5.672	5.670	5.672	5.668	5.667	5.665	5.665	5.657	5.662	5.657	5.659	5.648	5.654	5.653	5.645

3.25 Data Set 5, 85°C, 160mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
S101	0.2560	0.5243	2856	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0016	0.0019	0.0020	0.0023	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S102	0.2557	0.5239	2864	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035	0.0037
S103	0.2557	0.5239	2864	0.0001	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0021	0.0022	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034	0.0036	0.0038
S104	0.2559	0.5240	2858	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037	0.0039
S105	0.2563	0.5256	2842	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0022	0.0025	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S106	0.2560	0.5255	2849	0.0002	0.0003	0.0005	0.0009	0.0012	0.0015	0.0016	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028	0.0029	0.0031	0.0033	0.0035	0.0037
S107	0.2559	0.5244	2857	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0018	0.0021	0.0023	0.0025	0.0026	0.0028	0.0029	0.0031	0.0033	0.0034	0.0036
S108	0.2560	0.5247	2852	0.0001	0.0003	0.0005	0.0008	0.0011	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
S109	0.2558	0.5237	2862	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0028	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038
S110	0.2566	0.5252	2838	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
S111	0.2561	0.5261	2844	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0034	0.0036
S112	0.2557	0.5257	2854	0.0001	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0037	0.0039	0.0041
S113	0.2560	0.5259	2846	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0015	0.0016	0.0018	0.0021	0.0023	0.0025	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035
S114	0.2560	0.5263	2845	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
S115	0.2562	0.5265	2840	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0019	0.0021	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037
S116	0.2558	0.5256	2853	0.0001	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030	0.0032	0.0033	0.0035
S117	0.2566	0.5270	2828	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S118	0.2561	0.5273	2838	0.0002	0.0004	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0022	0.0025	0.0027	0.0030	0.0031	0.0033	0.0035	0.0036	0.0038	0.0040
S119	0.2564	0.5275	2830	0.0001	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037
S120	0.2557	0.5257	2854	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0015	0.0018	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0036
S121	0.2559	0.5260	2848	0.0002	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0016	0.0017	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0036
S122	0.2562	0.5265	2839	0.0002	0.0004	0.0005	0.0009	0.0012	0.0014	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0034	0.0036	0.0038
S123	0.2559	0.5255	2852	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0017	0.0018	0.0020	0.0023	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035	0.0037	0.0038
S124	0.2561	0.5258	2846	0.0001	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0029	0.0031	0.0033	0.0035
S125	0.2557	0.5258	2854	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0022	0.0025	0.0028	0.0031	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041
Ave.	0.2560	0.5255	2849	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035	0.0037
Med.	0.2560	0.5257	2849	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0021	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
St dev	0.0003	0.0011	9.6830	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2557	0.5237	2828	0.0001	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0016	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
Max.	0.2566	0.5275	2864	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0020	0.0022	0.0025	0.0028	0.0031	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041

3.26 Data Set 6, 105°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	139.6	100.02	99.84	99.66	99.48	99.27	99.07	98.88	98.73	98.54	98.37	98.21	98.09	97.97	97.85	97.73	97.63	97.56	97.49
S127	141.0	99.98	99.79	99.56	99.35	99.14	98.93	98.78	98.59	98.41	98.29	98.17	98.05	97.94	97.83	97.72	97.62	97.53	97.43
S128	141.5	100.04	99.91	99.73	99.52	99.32	99.14	98.95	98.80	98.61	98.49	98.37	98.25	98.14	98.03	97.92	97.83	97.75	97.65
S129	141.2	99.95	99.82	99.59	99.40	99.19	98.98	98.79	98.60	98.41	98.29	98.17	98.06	97.93	97.82	97.71	97.61	97.54	97.47
S130	141.4	99.94	99.81	99.59	99.39	99.20	99.00	98.81	98.62	98.43	98.31	98.20	98.08	97.96	97.83	97.72	97.64	97.54	97.47
S131	140.7	100.03	99.85	99.62	99.43	99.23	99.02	98.83	98.64	98.45	98.28	98.17	98.05	97.94	97.83	97.71	97.61	97.53	97.44
S132	140.9	100.03	99.84	99.62	99.43	99.23	99.03	98.88	98.73	98.54	98.42	98.31	98.19	98.06	97.95	97.82	97.75	97.67	97.60
S133	141.6	99.98	99.85	99.68	99.46	99.28	99.08	98.89	98.74	98.55	98.43	98.31	98.19	98.07	97.96	97.85	97.77	97.69	97.60
S134	140.8	100.02	99.83	99.66	99.46	99.27	99.07	98.88	98.73	98.54	98.38	98.26	98.14	98.01	97.90	97.79	97.72	97.65	97.55
S135	141.1	100.02	99.83	99.61	99.42	99.23	99.02	98.83	98.65	98.46	98.34	98.22	98.10	97.98	97.85	97.74	97.67	97.59	97.52
S136	141.1	99.94	99.81	99.64	99.43	99.25	99.06	98.87	98.68	98.50	98.38	98.21	98.05	97.94	97.83	97.72	97.62	97.53	97.45
S137	141.5	99.99	99.80	99.63	99.42	99.21	99.01	98.82	98.67	98.48	98.36	98.19	98.02	97.91	97.79	97.68	97.61	97.53	97.43
S138	141.5	99.95	99.76	99.59	99.38	99.18	98.99	98.80	98.61	98.46	98.29	98.13	97.96	97.83	97.72	97.61	97.52	97.42	97.35
S139	141.6	99.98	99.79	99.62	99.41	99.21	99.01	98.86	98.71	98.52	98.35	98.23	98.12	98.01	97.88	97.75	97.68	97.61	97.53
S140	141.8	99.99	99.85	99.63	99.43	99.22	99.00	98.82	98.67	98.52	98.35	98.18	98.01	97.91	97.78	97.65	97.58	97.51	97.44
S141	141.2	99.98	99.85	99.62	99.41	99.23	99.04	98.85	98.66	98.51	98.39	98.27	98.15	98.04	97.93	97.82	97.75	97.65	97.55
S142	141.9	100.01	99.82	99.59	99.41	99.21	99.00	98.85	98.67	98.48	98.36	98.25	98.08	97.97	97.84	97.73	97.66	97.56	97.49
S143	141.5	99.96	99.78	99.55	99.35	99.14	98.93	98.74	98.59	98.41	98.29	98.12	98.01	97.88	97.77	97.66	97.56	97.47	97.40
S144	141.4	99.94	99.75	99.53	99.32	99.11	98.91	98.73	98.54	98.39	98.22	98.10	97.94	97.83	97.72	97.61	97.54	97.46	97.39
S145	141.4	99.98	99.85	99.63	99.44	99.23	99.03	98.84	98.65	98.46	98.34	98.23	98.11	98.00	97.88	97.77	97.67	97.59	97.50
S146	142.0	99.93	99.79	99.57	99.36	99.15	98.95	98.77	98.58	98.39	98.27	98.15	97.98	97.87	97.75	97.62	97.54	97.47	97.40
S147	141.1	100.01	99.82	99.65	99.45	99.24	99.03	98.84	98.65	98.50	98.33	98.22	98.10	97.99	97.88	97.77	97.70	97.60	97.53
S148	141.3	99.95	99.76	99.53	99.33	99.14	98.94	98.75	98.56	98.37	98.26	98.14	98.02	97.91	97.80	97.68	97.61	97.51	97.43
S149	141.6	100.04	99.90	99.68	99.49	99.29	99.08	98.89	98.74	98.59	98.42	98.25	98.14	98.01	97.89	97.76	97.69	97.62	97.52
S150	141.9	99.99	99.86	99.69	99.50	99.30	99.10	98.95	98.76	98.62	98.50	98.33	98.21	98.10	97.98	97.85	97.76	97.68	97.61
Ave.	141.3	99.99	99.82	99.62	99.42	99.22	99.02	98.84	98.66	98.48	98.35	98.22	98.08	97.97	97.85	97.74	97.65	97.57	97.49
Med.	141.4	99.98	99.82	99.62	99.42	99.23	99.02	98.84	98.66	98.48	98.35	98.21	98.08	97.97	97.84	97.73	97.64	97.56	97.49
St dev	0.4920	0.0347	0.0398	0.0503	0.0531	0.0540	0.0555	0.0574	0.0672	0.0693	0.0685	0.0676	0.0796	0.0790	0.0789	0.0787	0.0785	0.0812	0.0767
Min.	139.6	99.93	99.75	99.53	99.32	99.11	98.91	98.73	98.54	98.37	98.22	98.10	97.94	97.83	97.72	97.61	97.52	97.42	97.35
Max.	142.0	100.04	99.91	99.73	99.52	99.32	99.14	98.95	98.80	98.62	98.50	98.37	98.25	98.14	98.03	97.92	97.83	97.75	97.65

3.27 Data Set 6, 105°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	2.191	100.01	99.83	99.61	99.42	99.19	98.99	98.81	98.63	98.48	98.31	98.22	98.13	98.02	97.93	97.83	97.71	97.62	97.54
S127	2.214	99.97	99.77	99.56	99.32	99.09	98.86	98.68	98.50	98.35	98.19	98.02	97.86	97.75	97.64	97.54	97.42	97.32	97.25
S128	2.215	99.99	99.81	99.60	99.33	99.10	98.90	98.72	98.51	98.33	98.17	98.07	97.91	97.80	97.70	97.59	97.47	97.38	97.30
S129	2.214	99.97	99.78	99.55	99.32	99.06	98.86	98.68	98.47	98.34	98.25	98.08	97.99	97.90	97.81	97.71	97.59	97.50	97.42
S130	2.214	99.92	99.74	99.51	99.28	99.01	98.85	98.70	98.52	98.37	98.28	98.18	98.02	97.91	97.82	97.72	97.60	97.51	97.43
S131	2.215	99.91	99.73	99.52	99.28	99.09	98.92	98.71	98.56	98.38	98.22	98.05	97.96	97.85	97.75	97.66	97.54	97.45	97.37
S132	2.214	99.95	99.77	99.54	99.28	99.09	98.85	98.68	98.50	98.35	98.25	98.16	98.00	97.89	97.79	97.70	97.58	97.49	97.41
S133	2.214	100.01	99.81	99.58	99.32	99.12	98.92	98.74	98.53	98.35	98.19	98.02	97.85	97.75	97.66	97.57	97.45	97.37	97.29
S134	2.214	99.99	99.79	99.57	99.31	99.05	98.89	98.68	98.50	98.32	98.22	98.13	98.04	97.95	97.84	97.75	97.63	97.54	97.46
S135	2.215	99.97	99.77	99.54	99.35	99.09	98.92	98.71	98.50	98.38	98.29	98.12	97.95	97.85	97.74	97.63	97.52	97.43	97.35
S136	2.214	100.01	99.81	99.57	99.34	99.11	98.95	98.77	98.61	98.49	98.32	98.23	98.07	97.96	97.85	97.76	97.65	97.55	97.47
S137	2.216	100.00	99.82	99.60	99.41	99.15	98.95	98.74	98.58	98.46	98.29	98.13	97.96	97.86	97.77	97.66	97.54	97.46	97.37
S138	2.223	99.99	99.79	99.56	99.30	99.07	98.84	98.66	98.48	98.33	98.16	98.07	97.91	97.80	97.69	97.59	97.46	97.38	97.29
S139	2.223	99.95	99.76	99.55	99.32	99.12	98.96	98.75	98.54	98.36	98.19	98.03	97.93	97.84	97.74	97.63	97.51	97.42	97.34
S140	2.223	100.00	99.80	99.59	99.39	99.13	98.97	98.76	98.61	98.48	98.32	98.15	98.06	97.97	97.87	97.78	97.66	97.57	97.49
S141	2.223	99.99	99.79	99.55	99.32	99.13	98.90	98.72	98.56	98.38	98.22	98.05	97.96	97.85	97.76	97.66	97.54	97.44	97.37
S142	2.223	100.02	99.84	99.61	99.38	99.12	98.89	98.68	98.50	98.37	98.21	98.11	97.95	97.84	97.74	97.63	97.51	97.42	97.34
S143	2.223	99.95	99.75	99.54	99.31	99.07	98.87	98.69	98.54	98.41	98.25	98.08	97.99	97.88	97.78	97.67	97.55	97.47	97.39
S144	2.223	99.91	99.73	99.51	99.28	99.05	98.85	98.69	98.51	98.33	98.17	98.00	97.84	97.73	97.64	97.55	97.44	97.35	97.27
S145	2.222	99.95	99.77	99.54	99.34	99.11	98.88	98.73	98.52	98.34	98.17	98.01	97.84	97.74	97.63	97.52	97.40	97.32	97.24
S146	2.223	100.00	99.80	99.57	99.30	99.07	98.84	98.66	98.51	98.36	98.20	98.10	98.01	97.90	97.82	97.71	97.59	97.50	97.42
S147	2.223	99.95	99.75	99.54	99.31	99.11	98.95	98.74	98.58	98.40	98.24	98.15	97.98	97.89	97.80	97.70	97.58	97.48	97.40
S148	2.223	99.98	99.78	99.54	99.31	99.08	98.92	98.70	98.55	98.37	98.21	98.04	97.88	97.77	97.67	97.56	97.45	97.36	97.27
S149	2.223	99.99	99.80	99.59	99.36	99.16	98.93	98.72	98.57	98.45	98.35	98.19	98.02	97.92	97.83	97.72	97.60	97.51	97.44
S150	2.224	99.98	99.78	99.57	99.34	99.10	98.90	98.72	98.57	98.44	98.35	98.18	98.02	97.93	97.82	97.74	97.62	97.53	97.44
Ave.	2.218	99.98	99.78	99.56	99.33	99.10	98.90	98.71	98.54	98.39	98.24	98.10	97.96	97.86	97.76	97.66	97.54	97.45	97.38
Med.	2.222	99.98	99.78	99.56	99.32	99.10	98.90	98.71	98.53	98.37	98.22	98.10	97.96	97.86	97.77	97.66	97.54	97.46	97.37
St dev	0.0071	0.0308	0.0292	0.0293	0.0390	0.0385	0.0434	0.0358	0.0433	0.0524	0.0593	0.0676	0.0750	0.0774	0.0789	0.0801	0.0807	0.0795	0.0795
Min.	2.191	99.91	99.73	99.51	99.28	99.01	98.84	98.66	98.47	98.32	98.16	98.00	97.84	97.73	97.63	97.52	97.40	97.32	97.24
Max.	2.224	100.02	99.84	99.61	99.42	99.19	98.99	98.81	98.63	98.49	98.35	98.23	98.13	98.02	97.93	97.83	97.71	97.62	97.54

3.28 Data Set 6, 105°C, 160mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	0.1598	99.93	99.76	99.58	99.35	99.14	98.91	98.66	98.45	98.24	98.11	97.97	97.88	97.74	97.61	97.48	97.39	97.29	97.20
S127	0.1615	100.01	99.86	99.68	99.48	99.26	99.00	98.75	98.54	98.33	98.20	98.08	97.93	97.79	97.70	97.60	97.51	97.42	97.33
S128	0.1614	99.91	99.77	99.57	99.33	99.12	98.88	98.64	98.44	98.24	98.12	97.97	97.82	97.76	97.66	97.60	97.51	97.42	97.33
S129	0.1613	99.94	99.77	99.60	99.36	99.16	98.89	98.66	98.45	98.29	98.15	98.02	97.93	97.86	97.70	97.56	97.47	97.38	97.29
S130	0.1615	99.92	99.75	99.55	99.34	99.13	98.89	98.70	98.49	98.27	98.13	97.99	97.84	97.78	97.68	97.58	97.49	97.40	97.30
S131	0.1615	99.94	99.77	99.59	99.38	99.18	98.94	98.75	98.59	98.37	98.19	98.05	97.94	97.84	97.71	97.65	97.56	97.47	97.37
S132	0.1615	99.99	99.82	99.64	99.44	99.23	98.97	98.72	98.56	98.36	98.22	98.04	97.89	97.75	97.66	97.56	97.46	97.37	97.27
S133	0.1616	100.00	99.83	99.65	99.44	99.21	98.97	98.73	98.57	98.41	98.26	98.12	98.03	97.96	97.84	97.70	97.60	97.51	97.42
S134	0.1614	99.89	99.72	99.54	99.33	99.12	98.88	98.65	98.46	98.24	98.10	97.92	97.82	97.76	97.67	97.60	97.51	97.42	97.32
S135	0.1616	99.90	99.73	99.55	99.32	99.11	98.88	98.68	98.47	98.27	98.13	98.01	97.91	97.78	97.68	97.55	97.45	97.36	97.27
S136	0.1614	99.97	99.82	99.62	99.41	99.20	98.94	98.69	98.53	98.32	98.19	98.01	97.90	97.76	97.67	97.57	97.48	97.39	97.30
S137	0.1615	99.90	99.73	99.54	99.33	99.10	98.83	98.59	98.39	98.23	98.05	97.90	97.81	97.75	97.58	97.44	97.36	97.27	97.18
S138	0.1630	99.95	99.80	99.60	99.38	99.15	98.90	98.71	98.55	98.38	98.24	98.10	98.01	97.87	97.71	97.57	97.48	97.39	97.30
S139	0.1630	99.97	99.80	99.63	99.41	99.20	98.97	98.78	98.56	98.35	98.21	98.07	97.92	97.78	97.62	97.52	97.42	97.34	97.25
S140	0.1630	99.96	99.81	99.63	99.42	99.21	98.98	98.75	98.58	98.42	98.28	98.10	97.99	97.92	97.79	97.73	97.64	97.55	97.46
S141	0.1630	99.96	99.79	99.59	99.37	99.16	98.91	98.67	98.47	98.26	98.13	97.99	97.88	97.82	97.65	97.59	97.50	97.41	97.32
S142	0.1629	99.94	99.79	99.59	99.36	99.12	98.86	98.67	98.50	98.34	98.21	98.09	97.99	97.90	97.73	97.67	97.57	97.48	97.39
S143	0.1629	100.00	99.85	99.65	99.42	99.18	98.95	98.72	98.50	98.31	98.12	97.98	97.87	97.77	97.64	97.51	97.42	97.33	97.24
S144	0.1630	99.99	99.85	99.67	99.44	99.22	98.95	98.76	98.55	98.39	98.26	98.12	98.02	97.93	97.83	97.73	97.64	97.55	97.46
S145	0.1629	99.95	99.78	99.60	99.38	99.17	98.92	98.73	98.52	98.32	98.18	98.05	97.96	97.82	97.66	97.52	97.43	97.35	97.25
S146	0.1629	99.93	99.76	99.58	99.37	99.13	98.89	98.65	98.48	98.28	98.10	97.96	97.85	97.71	97.55	97.41	97.32	97.22	97.14
S147	0.1631	99.89	99.74	99.56	99.36	99.12	98.88	98.68	98.47	98.26	98.13	97.99	97.88	97.74	97.65	97.52	97.42	97.33	97.24
S148	0.1630	99.98	99.81	99.61	99.39	99.18	98.94	98.75	98.59	98.42	98.24	98.12	98.00	97.94	97.85	97.78	97.69	97.60	97.51
S149	0.1630	99.96	99.79	99.59	99.38	99.16	98.90	98.67	98.45	98.26	98.11	97.97	97.88	97.74	97.61	97.52	97.42	97.33	97.24
S150	0.1630	99.97	99.80	99.62	99.39	99.18	98.92	98.69	98.53	98.36	98.18	98.06	97.96	97.83	97.73	97.67	97.58	97.49	97.40
Ave.	0.1622	99.95	99.79	99.60	99.38	99.17	98.92	98.70	98.51	98.32	98.17	98.03	97.92	97.81	97.69	97.58	97.49	97.40	97.31
Med.	0.1629	99.95	99.79	99.60	99.38	99.16	98.91	98.69	98.50	98.32	98.18	98.02	97.91	97.78	97.67	97.57	97.48	97.39	97.30
St dev	0.0009	0.0353	0.0385	0.0395	0.0403	0.0426	0.0418	0.0459	0.0536	0.0614	0.0614	0.0623	0.0658	0.0721	0.0762	0.0917	0.0911	0.0918	0.0916
Min.	0.1598	99.89	99.72	99.54	99.32	99.10	98.83	98.59	98.39	98.23	98.05	97.90	97.81	97.71	97.55	97.41	97.32	97.22	97.14
Max.	0.1631	100.01	99.86	99.68	99.48	99.26	99.00	98.78	98.59	98.42	98.28	98.12	98.03	97.96	97.85	97.78	97.69	97.60	97.51

3.29 Data Set 6, 105°C, 160mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	5.688	5.688	5.681	5.681	5.681	5.681	5.677	5.677	5.671	5.671	5.666	5.667	5.660	5.663	5.661	5.654	5.660	5.653	5.651
S127	5.688	5.686	5.687	5.682	5.680	5.681	5.677	5.674	5.677	5.670	5.666	5.663	5.666	5.664	5.662	5.660	5.653	5.653	5.654
S128	5.677	5.677	5.677	5.669	5.673	5.669	5.664	5.663	5.665	5.660	5.659	5.656	5.657	5.652	5.651	5.642	5.643	5.645	5.637
S129	5.678	5.678	5.671	5.672	5.672	5.670	5.667	5.661	5.666	5.660	5.662	5.658	5.656	5.653	5.652	5.649	5.648	5.646	5.642
S130	5.648	5.641	5.641	5.640	5.642	5.640	5.635	5.632	5.631	5.630	5.626	5.624	5.620	5.623	5.618	5.621	5.620	5.613	5.614
S131	5.697	5.696	5.693	5.693	5.689	5.690	5.687	5.682	5.684	5.680	5.680	5.677	5.671	5.672	5.672	5.663	5.669	5.661	5.666
S132	5.683	5.683	5.683	5.679	5.680	5.671	5.676	5.672	5.667	5.668	5.660	5.662	5.661	5.657	5.657	5.653	5.655	5.648	5.645
S133	5.681	5.681	5.676	5.673	5.673	5.674	5.668	5.665	5.665	5.665	5.663	5.659	5.657	5.655	5.657	5.651	5.653	5.647	5.647
S134	5.691	5.684	5.685	5.684	5.683	5.684	5.679	5.680	5.676	5.670	5.669	5.664	5.663	5.665	5.666	5.660	5.654	5.656	5.654
S135	5.679	5.672	5.679	5.673	5.670	5.672	5.667	5.663	5.662	5.657	5.658	5.653	5.659	5.655	5.648	5.649	5.642	5.647	5.640
S136	5.684	5.683	5.681	5.681	5.681	5.671	5.672	5.667	5.672	5.669	5.668	5.664	5.657	5.656	5.660	5.653	5.654	5.649	5.650
S137	5.648	5.643	5.646	5.643	5.645	5.639	5.636	5.634	5.635	5.625	5.627	5.628	5.621	5.622	5.622	5.615	5.620	5.612	5.618
S138	5.678	5.674	5.672	5.671	5.670	5.669	5.671	5.666	5.661	5.661	5.657	5.652	5.658	5.652	5.648	5.650	5.643	5.646	5.644
S139	5.668	5.666	5.666	5.660	5.660	5.658	5.660	5.652	5.651	5.647	5.652	5.642	5.646	5.643	5.642	5.639	5.638	5.635	5.634
S140	5.638	5.632	5.636	5.634	5.630	5.625	5.626	5.625	5.624	5.622	5.620	5.618	5.611	5.612	5.612	5.613	5.611	5.610	5.602
S141	5.682	5.675	5.682	5.679	5.674	5.670	5.669	5.670	5.669	5.659	5.659	5.660	5.655	5.656	5.651	5.654	5.655	5.647	5.647
S142	5.667	5.666	5.660	5.663	5.659	5.659	5.659	5.654	5.651	5.651	5.651	5.647	5.645	5.636	5.642	5.638	5.637	5.632	5.636
S143	5.670	5.670	5.667	5.662	5.664	5.657	5.659	5.654	5.654	5.654	5.654	5.650	5.643	5.643	5.646	5.642	5.637	5.638	5.641
S144	5.674	5.667	5.674	5.669	5.667	5.661	5.664	5.663	5.661	5.651	5.658	5.654	5.654	5.648	5.649	5.646	5.645	5.641	5.640
S145	5.675	5.674	5.669	5.669	5.667	5.663	5.664	5.660	5.661	5.659	5.657	5.653	5.655	5.647	5.650	5.648	5.640	5.650	5.635
S146	5.672	5.672	5.672	5.664	5.667	5.665	5.660	5.659	5.656	5.656	5.651	5.651	5.650	5.646	5.646	5.647	5.644	5.644	5.635
S147	5.687	5.681	5.683	5.683	5.680	5.676	5.678	5.673	5.670	5.670	5.664	5.665	5.667	5.662	5.659	5.659	5.659	5.656	5.659
S148	5.682	5.680	5.675	5.678	5.674	5.675	5.674	5.666	5.670	5.667	5.659	5.655	5.655	5.656	5.651	5.649	5.652	5.646	5.646
S149	5.675	5.668	5.669	5.672	5.667	5.668	5.668	5.664	5.660	5.659	5.659	5.653	5.654	5.644	5.644	5.640	5.645	5.646	5.640
S150	5.638	5.633	5.635	5.630	5.631	5.631	5.626	5.626	5.621	5.621	5.615	5.612	5.617	5.607	5.614	5.601	5.604	5.610	5.604
Ave.	5.674	5.671	5.670	5.668	5.667	5.665	5.663	5.660	5.659	5.656	5.654	5.651	5.650	5.648	5.647	5.644	5.643	5.641	5.639
Med.	5.678	5.674	5.674	5.672	5.670	5.669	5.667	5.663	5.662	5.659	5.659	5.654	5.655	5.652	5.650	5.649	5.645	5.646	5.641
St dev	0.0156	0.0167	0.0157	0.0162	0.0155	0.0161	0.0162	0.0156	0.0162	0.0159	0.0158	0.0157	0.0161	0.0165	0.0156	0.0159	0.0156	0.0149	0.0156
Min.	5.638	5.632	5.635	5.630	5.630	5.625	5.626	5.625	5.621	5.621	5.615	5.612	5.611	5.607	5.612	5.601	5.604	5.610	5.602
Max.	5.697	5.696	5.693	5.693	5.689	5.690	5.687	5.682	5.684	5.680	5.680	5.677	5.671	5.672	5.672	5.663	5.669	5.661	5.666

3.30 Data Set 6, 105°C, 160mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S126	0.2561	0.5262	2843	0.0002	0.0004	0.0005	0.0009	0.0012	0.0016	0.0018	0.0020	0.0024	0.0025	0.0026	0.0028	0.0031	0.0033	0.0036	0.0039	0.0042	0.0044
S127	0.2562	0.5261	2842	0.0003	0.0006	0.0008	0.0011	0.0014	0.0018	0.0020	0.0021	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0042
S128	0.2568	0.5271	2824	0.0003	0.0005	0.0008	0.0011	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0041
S129	0.2559	0.5257	2851	0.0002	0.0004	0.0006	0.0010	0.0013	0.0017	0.0021	0.0023	0.0024	0.0026	0.0027	0.0029	0.0032	0.0035	0.0037	0.0039	0.0040	0.0042
S130	0.2562	0.5259	2843	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0019	0.0023	0.0025	0.0027	0.0028	0.0032	0.0034	0.0038	0.0041	0.0042	0.0045
S131	0.2559	0.5259	2850	0.0003	0.0005	0.0008	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0032	0.0034	0.0037	0.0040	0.0043
S132	0.2562	0.5264	2841	0.0002	0.0004	0.0005	0.0009	0.0013	0.0017	0.0018	0.0020	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0044
S133	0.2563	0.5273	2834	0.0002	0.0004	0.0006	0.0009	0.0012	0.0016	0.0020	0.0024	0.0026	0.0027	0.0029	0.0030	0.0033	0.0036	0.0039	0.0041	0.0043	0.0045
S134	0.2563	0.5267	2835	0.0003	0.0005	0.0008	0.0010	0.0014	0.0018	0.0019	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0036	0.0039	0.0041	0.0044	0.0046
S135	0.2565	0.5275	2829	0.0002	0.0003	0.0006	0.0010	0.0014	0.0017	0.0019	0.0021	0.0022	0.0024	0.0025	0.0027	0.0029	0.0032	0.0034	0.0036	0.0038	0.0040
S136	0.2560	0.5257	2849	0.0002	0.0004	0.0008	0.0010	0.0014	0.0017	0.0019	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0036	0.0039	0.0042	0.0044	0.0047
S137	0.2561	0.5259	2844	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0040
S138	0.2561	0.5266	2842	0.0003	0.0005	0.0007	0.0010	0.0014	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0027	0.0031	0.0034	0.0037	0.0038	0.0041	0.0043
S139	0.2556	0.5262	2853	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0022	0.0026	0.0028	0.0029	0.0031	0.0033	0.0037	0.0039	0.0042	0.0045	0.0048
S140	0.2560	0.5264	2844	0.0002	0.0006	0.0008	0.0010	0.0014	0.0017	0.0019	0.0023	0.0024	0.0026	0.0028	0.0029	0.0032	0.0035	0.0038	0.0041	0.0043	0.0045
S141	0.2562	0.5271	2837	0.0003	0.0005	0.0007	0.0011	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0031	0.0034	0.0037	0.0040	0.0043	0.0045
S142	0.2567	0.5275	2824	0.0002	0.0005	0.0007	0.0010	0.0014	0.0018	0.0022	0.0024	0.0026	0.0027	0.0028	0.0030	0.0032	0.0035	0.0038	0.0039	0.0042	0.0044
S143	0.2564	0.5280	2828	0.0002	0.0004	0.0006	0.0009	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0039
S144	0.2560	0.5268	2842	0.0002	0.0004	0.0006	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0031	0.0034	0.0035	0.0038	0.0040
S145	0.2559	0.5260	2849	0.0003	0.0005	0.0008	0.0012	0.0015	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0034	0.0037	0.0040	0.0042	0.0044	0.0046
S146	0.2561	0.5278	2835	0.0002	0.0004	0.0006	0.0009	0.0013	0.0017	0.0021	0.0023	0.0027	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046
S147	0.2558	0.5262	2851	0.0003	0.0006	0.0007	0.0011	0.0014	0.0018	0.0020	0.0021	0.0025	0.0027	0.0029	0.0030	0.0033	0.0037	0.0039	0.0041	0.0043	0.0044
S148	0.2562	0.5270	2837	0.0002	0.0005	0.0006	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0030	0.0033	0.0035	0.0037	0.0039	0.0041
S149	0.2558	0.5261	2850	0.0003	0.0005	0.0008	0.0010	0.0014	0.0017	0.0019	0.0020	0.0024	0.0026	0.0027	0.0029	0.0032	0.0034	0.0037	0.0039	0.0042	0.0043
S150	0.2561	0.5263	2843	0.0003	0.0006	0.0007	0.0010	0.0014	0.0017	0.0021	0.0023	0.0025	0.0026	0.0027	0.0029	0.0031	0.0034	0.0037	0.0039	0.0040	0.0042
Ave.	0.2561	0.5266	2841	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043
Med.	0.2561	0.5264	2842	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0021	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044
St dev	0.0003	0.0007	8.4410	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2556	0.5257	2824	0.0002	0.0003	0.0005	0.0009	0.0012	0.0016	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0039
Max.	0.2568	0.5280	2853	0.0003	0.0006	0.0008	0.0012	0.0015	0.0019	0.0022	0.0024	0.0027	0.0028	0.0030	0.0031	0.0034	0.0037	0.0040	0.0042	0.0045	0.0048

3.31 Data Set 7, 55°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	172.6	100.17	99.97	99.81	99.57	99.36	99.15	98.91	98.67	98.43	98.14	97.95	97.74	97.58	97.40	97.17	96.98	96.75	96.53
S152	173.0	100.18	100.02	99.87	99.67	99.42	99.18	98.97	98.75	98.45	98.26	98.08	97.87	97.71	97.47	97.23	97.10	96.91	96.73
S153	172.3	100.16	100.00	99.85	99.64	99.39	99.15	98.91	98.70	98.45	98.16	97.98	97.77	97.60	97.36	97.19	97.05	96.87	96.74
S154	173.0	100.12	99.92	99.76	99.55	99.35	99.14	98.90	98.69	98.44	98.24	97.95	97.74	97.58	97.41	97.24	97.01	96.82	96.60
S155	172.6	100.17	100.02	99.82	99.61	99.36	99.16	98.94	98.73	98.52	98.23	98.04	97.75	97.58	97.41	97.24	97.11	96.88	96.65
S156	172.3	100.18	100.02	99.82	99.58	99.38	99.10	98.85	98.61	98.36	98.17	97.97	97.73	97.49	97.26	97.02	96.83	96.64	96.41
S157	173.3	100.13	99.98	99.78	99.58	99.38	99.17	98.95	98.71	98.41	98.22	98.04	97.83	97.65	97.42	97.25	97.07	96.84	96.65
S158	171.2	100.18	99.98	99.78	99.58	99.34	99.11	98.87	98.62	98.32	98.09	97.88	97.68	97.51	97.35	97.11	96.89	96.75	96.53
S159	171.8	100.14	99.99	99.76	99.51	99.22	98.96	98.69	98.44	98.21	97.96	97.75	97.55	97.34	97.14	96.97	96.78	96.63	96.46
S160	171.7	100.14	99.94	99.78	99.54	99.29	99.09	98.85	98.64	98.33	98.13	97.84	97.63	97.46	97.28	97.05	96.91	96.73	96.50
S161	172.5	100.12	99.96	99.80	99.60	99.36	99.15	98.91	98.70	98.39	98.19	98.00	97.81	97.58	97.34	97.17	96.94	96.72	96.49
S162	173.6	100.14	99.94	99.74	99.54	99.29	99.08	98.78	98.57	98.32	98.12	97.93	97.75	97.57	97.33	97.10	96.87	96.74	96.61
S163	173.8	100.18	100.02	99.86	99.62	99.42	99.21	98.97	98.76	98.45	98.25	98.04	97.83	97.67	97.49	97.33	97.10	96.97	96.84
S164	173.9	100.20	99.99	99.84	99.59	99.39	99.15	98.85	98.54	98.33	98.12	97.92	97.63	97.45	97.28	97.04	96.91	96.68	96.46
S165	173.6	100.13	99.93	99.73	99.53	99.32	99.11	98.87	98.66	98.44	98.15	97.95	97.74	97.50	97.34	97.16	97.03	96.90	96.77
S166	173.4	100.19	99.99	99.83	99.59	99.39	99.18	98.97	98.72	98.51	98.33	98.14	97.95	97.79	97.61	97.44	97.31	97.12	96.89
S167	173.2	100.12	99.97	99.81	99.57	99.37	99.12	98.82	98.51	98.30	98.01	97.72	97.53	97.36	97.19	96.96	96.83	96.60	96.47
S168	174.2	100.18	100.02	99.82	99.62	99.42	99.17	98.87	98.63	98.32	98.14	97.85	97.66	97.42	97.26	97.08	96.95	96.73	96.60
S169	174.0	100.20	99.99	99.79	99.59	99.35	99.11	98.89	98.65	98.41	98.22	98.02	97.83	97.65	97.42	97.18	97.05	96.92	96.69
S170	173.6	100.17	99.97	99.77	99.53	99.33	99.08	98.84	98.60	98.39	98.18	97.89	97.68	97.45	97.28	97.12	96.93	96.74	96.52
S171	174.0	100.11	99.91	99.75	99.55	99.34	99.09	98.79	98.58	98.36	98.18	97.97	97.78	97.62	97.38	97.22	97.03	96.90	96.67
S172	172.7	100.10	99.90	99.75	99.54	99.34	99.09	98.80	98.50	98.25	97.96	97.76	97.51	97.31	97.14	96.96	96.74	96.55	96.42
S173	173.3	100.17	99.97	99.81	99.61	99.40	99.16	98.85	98.61	98.40	98.19	97.90	97.61	97.44	97.26	97.03	96.90	96.67	96.44
S174	173.1	100.15	99.95	99.79	99.55	99.31	99.11	98.89	98.59	98.34	98.16	97.95	97.75	97.51	97.27	97.04	96.85	96.62	96.44
S175	173.7	100.16	100.00	99.80	99.59	99.35	99.11	98.86	98.56	98.26	98.07	97.88	97.68	97.50	97.27	97.03	96.90	96.77	96.58
Ave.	173.1	100.16	99.97	99.80	99.58	99.36	99.13	98.87	98.63	98.38	98.15	97.94	97.72	97.53	97.34	97.13	96.96	96.78	96.59
Med.	173.2	100.16	99.98	99.80	99.58	99.36	99.12	98.87	98.63	98.39	98.16	97.95	97.74	97.51	97.34	97.12	96.94	96.75	96.58
St dev	0.7848	0.0281	0.0366	0.0379	0.0389	0.0466	0.0496	0.0662	0.0824	0.0782	0.0878	0.1017	0.1076	0.1163	0.1089	0.1196	0.1256	0.1336	0.1352
Min.	171.2	100.10	99.90	99.73	99.51	99.22	98.96	98.69	98.44	98.21	97.96	97.72	97.51	97.31	97.14	96.96	96.74	96.55	96.41
Max.	174.2	100.20	100.02	99.87	99.67	99.42	99.21	98.97	98.76	98.52	98.33	98.14	97.95	97.79	97.61	97.44	97.31	97.12	96.89

3.32 Data Set 7, 55°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	2.708	100.09	99.94	99.78	99.55	99.29	99.09	98.85	98.61	98.32	98.08	97.80	97.57	97.39	97.21	97.01	96.83	96.65	96.48
S152	2.707	100.10	99.94	99.78	99.56	99.37	99.18	98.88	98.64	98.40	98.13	97.86	97.62	97.44	97.24	97.06	96.91	96.78	96.63
S153	2.708	100.09	99.93	99.76	99.57	99.35	99.16	98.92	98.62	98.34	98.07	97.80	97.53	97.35	97.15	96.97	96.84	96.66	96.51
S154	2.707	100.13	99.96	99.80	99.53	99.31	99.12	98.82	98.52	98.28	98.02	97.74	97.47	97.26	97.08	96.92	96.77	96.64	96.51
S155	2.708	100.19	100.02	99.86	99.67	99.48	99.29	99.01	98.73	98.43	98.20	97.92	97.66	97.49	97.29	97.11	96.93	96.76	96.63
S156	2.707	100.11	99.95	99.79	99.57	99.30	99.08	98.78	98.54	98.24	97.97	97.73	97.46	97.26	97.10	96.89	96.71	96.58	96.45
S157	2.709	100.11	99.95	99.79	99.57	99.35	99.12	98.83	98.53	98.25	97.98	97.71	97.43	97.25	97.05	96.89	96.74	96.56	96.41
S158	2.698	100.08	99.92	99.77	99.55	99.32	99.13	98.89	98.59	98.35	98.12	97.88	97.61	97.45	97.29	97.11	96.96	96.81	96.68
S159	2.699	100.10	99.94	99.78	99.56	99.37	99.18	98.94	98.64	98.36	98.09	97.82	97.58	97.40	97.20	97.02	96.87	96.72	96.59
S160	2.698	100.13	99.97	99.82	99.60	99.37	99.10	98.86	98.59	98.35	98.07	97.81	97.54	97.33	97.17	96.99	96.86	96.71	96.56
S161	2.699	100.08	99.92	99.76	99.49	99.30	99.03	98.79	98.55	98.25	97.99	97.71	97.45	97.27	97.09	96.88	96.71	96.56	96.43
S162	2.716	100.13	99.97	99.81	99.62	99.40	99.17	98.87	98.64	98.34	98.07	97.80	97.53	97.37	97.19	97.03	96.88	96.75	96.62
S163	2.716	100.08	99.92	99.77	99.58	99.39	99.12	98.82	98.58	98.30	98.06	97.80	97.52	97.34	97.14	96.96	96.83	96.68	96.55
S164	2.715	100.09	99.94	99.78	99.52	99.25	99.02	98.73	98.45	98.17	97.89	97.66	97.42	97.24	97.08	96.88	96.73	96.55	96.42
S165	2.716	100.11	99.96	99.80	99.61	99.38	99.16	98.88	98.60	98.33	98.06	97.79	97.52	97.34	97.16	96.98	96.81	96.66	96.53
S166	2.716	100.09	99.93	99.77	99.58	99.31	99.04	98.74	98.47	98.23	97.95	97.68	97.41	97.21	97.00	96.84	96.66	96.48	96.35
S167	2.715	100.13	99.98	99.83	99.56	99.33	99.11	98.87	98.63	98.35	98.09	97.85	97.61	97.45	97.29	97.13	96.98	96.80	96.67
S168	2.715	100.14	99.98	99.82	99.63	99.44	99.17	98.93	98.65	98.36	98.12	97.88	97.65	97.47	97.31	97.10	96.97	96.82	96.69
S169	2.715	100.18	100.02	99.85	99.59	99.32	99.05	98.77	98.47	98.19	97.96	97.68	97.42	97.24	97.08	96.90	96.72	96.54	96.37
S170	2.715	100.14	99.98	99.83	99.56	99.34	99.15	98.85	98.57	98.27	98.00	97.77	97.50	97.34	97.16	96.98	96.81	96.68	96.50
S171	2.717	100.18	100.03	99.87	99.60	99.38	99.11	98.83	98.55	98.25	98.02	97.74	97.48	97.30	97.14	96.93	96.75	96.58	96.45
S172	2.706	100.18	100.02	99.86	99.67	99.45	99.18	98.88	98.60	98.30	98.04	97.77	97.49	97.29	97.13	96.92	96.79	96.61	96.48
S173	2.707	100.07	99.91	99.75	99.53	99.30	99.11	98.87	98.59	98.30	98.03	97.79	97.56	97.38	97.20	97.02	96.84	96.67	96.54
S174	2.706	100.14	99.98	99.82	99.63	99.41	99.18	98.89	98.59	98.31	98.04	97.77	97.54	97.33	97.17	97.01	96.88	96.73	96.60
S175	2.706	100.08	99.92	99.77	99.50	99.28	99.01	98.71	98.47	98.17	97.94	97.66	97.39	97.21	97.05	96.84	96.67	96.54	96.41
Ave.	2.709	100.12	99.96	99.80	99.58	99.35	99.12	98.85	98.58	98.30	98.04	97.78	97.52	97.34	97.16	96.98	96.82	96.66	96.52
Med.	2.708	100.11	99.95	99.79	99.57	99.35	99.12	98.86	98.59	98.30	98.04	97.79	97.52	97.34	97.16	96.98	96.83	96.66	96.51
St dev	0.0062	0.0356	0.0358	0.0347	0.0461	0.0564	0.0627	0.0693	0.0672	0.0669	0.0697	0.0709	0.0773	0.0841	0.0831	0.0857	0.0932	0.0961	0.0990
Min.	2.698	100.07	99.91	99.75	99.49	99.25	99.01	98.71	98.45	98.17	97.89	97.66	97.39	97.21	97.00	96.84	96.66	96.48	96.35
Max.	2.717	100.19	100.03	99.87	99.67	99.48	99.29	99.01	98.73	98.43	98.20	97.92	97.66	97.49	97.31	97.13	96.98	96.82	96.69

3.33 Data Set 7, 55°C, 200mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	0.1923	100.15	99.93	99.71	99.53	99.30	99.09	98.84	98.55	98.30	98.11	97.86	97.66	97.43	97.22	97.01	96.79	96.67	96.45
S152	0.1923	100.12	99.90	99.68	99.46	99.28	99.05	98.80	98.56	98.31	98.03	97.81	97.56	97.35	97.12	96.89	96.67	96.45	96.31
S153	0.1922	100.14	99.92	99.70	99.48	99.30	99.07	98.83	98.58	98.33	98.05	97.83	97.56	97.34	97.16	96.98	96.84	96.72	96.58
S154	0.1921	100.07	99.86	99.63	99.45	99.23	99.02	98.73	98.48	98.23	98.04	97.79	97.54	97.36	97.18	96.95	96.74	96.61	96.49
S155	0.1923	100.18	99.96	99.73	99.51	99.30	99.08	98.80	98.51	98.23	97.95	97.78	97.51	97.29	97.06	96.85	96.63	96.49	96.27
S156	0.1925	100.09	99.88	99.65	99.47	99.25	99.07	98.78	98.50	98.25	97.97	97.73	97.53	97.30	97.07	96.84	96.62	96.48	96.34
S157	0.1922	100.17	99.95	99.73	99.55	99.36	99.18	98.93	98.68	98.43	98.15	97.91	97.63	97.42	97.19	97.01	96.79	96.57	96.36
S158	0.1921	100.19	99.96	99.75	99.52	99.34	99.15	98.90	98.65	98.40	98.13	97.91	97.66	97.48	97.30	97.07	96.95	96.82	96.61
S159	0.1922	100.08	99.87	99.65	99.43	99.22	99.03	98.78	98.53	98.25	98.00	97.83	97.55	97.34	97.11	96.88	96.66	96.45	96.23
S160	0.1922	100.15	99.93	99.71	99.52	99.30	99.09	98.84	98.58	98.33	98.08	97.92	97.72	97.54	97.33	97.11	96.97	96.85	96.73
S161	0.1921	100.18	99.95	99.74	99.52	99.30	99.09	98.80	98.55	98.30	98.05	97.83	97.64	97.42	97.21	96.98	96.86	96.74	96.52
S162	0.1974	100.12	99.91	99.69	99.51	99.32	99.10	98.81	98.53	98.24	98.04	97.80	97.52	97.34	97.13	96.95	96.83	96.61	96.39
S163	0.1973	100.15	99.92	99.70	99.51	99.29	99.10	98.82	98.53	98.29	98.04	97.87	97.67	97.49	97.28	97.10	96.96	96.83	96.69
S164	0.1975	100.10	99.88	99.66	99.44	99.23	99.01	98.73	98.48	98.19	97.94	97.70	97.50	97.27	97.09	96.91	96.79	96.57	96.35
S165	0.1974	100.15	99.94	99.72	99.51	99.29	99.11	98.82	98.57	98.32	98.13	97.96	97.68	97.47	97.26	97.03	96.88	96.74	96.60
S166	0.1974	100.09	99.87	99.66	99.43	99.25	99.02	98.77	98.49	98.24	97.99	97.77	97.52	97.29	97.06	96.83	96.70	96.49	96.34
S167	0.1974	100.07	99.86	99.63	99.45	99.23	99.05	98.76	98.51	98.26	97.99	97.82	97.54	97.37	97.15	96.92	96.78	96.66	96.44
S168	0.1974	100.14	99.91	99.70	99.51	99.33	99.10	98.82	98.57	98.32	98.07	97.85	97.57	97.36	97.18	97.00	96.78	96.66	96.54
S169	0.1973	100.12	99.90	99.68	99.46	99.27	99.09	98.84	98.59	98.30	98.10	97.88	97.69	97.51	97.28	97.06	96.85	96.72	96.51
S170	0.1972	100.11	99.88	99.66	99.47	99.25	99.04	98.79	98.54	98.25	98.00	97.84	97.56	97.35	97.12	96.89	96.77	96.55	96.41
S171	0.1981	100.07	99.86	99.64	99.45	99.23	99.02	98.77	98.52	98.27	98.02	97.85	97.60	97.37	97.16	96.98	96.86	96.64	96.50
S172	0.1971	100.16	99.94	99.72	99.51	99.32	99.11	98.86	98.58	98.33	98.13	97.91	97.66	97.48	97.27	97.04	96.89	96.68	96.46
S173	0.1973	100.16	99.95	99.73	99.54	99.36	99.14	98.89	98.65	98.40	98.15	97.90	97.63	97.39	97.16	96.95	96.73	96.61	96.49
S174	0.1972	100.09	99.87	99.65	99.42	99.20	98.98	98.69	98.44	98.19	97.94	97.70	97.45	97.24	97.01	96.78	96.65	96.51	96.29
S175	0.1972	100.17	99.94	99.72	99.51	99.32	99.13	98.88	98.63	98.38	98.19	97.94	97.69	97.48	97.26	97.03	96.89	96.77	96.55
Ave.	0.1951	100.13	99.91	99.69	99.49	99.28	99.08	98.81	98.55	98.29	98.05	97.84	97.59	97.39	97.17	96.96	96.80	96.64	96.46
Med.	0.1972	100.14	99.91	99.70	99.51	99.29	99.09	98.81	98.55	98.30	98.04	97.84	97.57	97.37	97.16	96.98	96.79	96.64	96.46
St dev	0.0026	0.0367	0.0352	0.0367	0.0375	0.0445	0.0483	0.0555	0.0580	0.0631	0.0697	0.0700	0.0730	0.0814	0.0851	0.0887	0.1017	0.1208	0.1294
Min.	0.1921	100.07	99.86	99.63	99.42	99.20	98.98	98.69	98.44	98.19	97.94	97.70	97.45	97.24	97.01	96.78	96.62	96.45	96.23
Max.	0.1981	100.19	99.96	99.75	99.55	99.36	99.18	98.93	98.68	98.43	98.19	97.96	97.72	97.54	97.33	97.11	96.97	96.85	96.73

3.34 Data Set 7, 55°C, 200mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	5.764	5.768	5.768	5.761	5.766	5.762	5.763	5.761	5.749	5.754	5.749	5.752	5.753	5.750	5.739	5.744	5.735	5.746	5.735
S152	5.723	5.763	5.763	5.763	5.758	5.753	5.751	5.756	5.752	5.753	5.753	5.749	5.740	5.736	5.747	5.743	5.736	5.743	5.733
S153	5.767	5.771	5.767	5.769	5.762	5.761	5.764	5.762	5.757	5.756	5.750	5.754	5.747	5.752	5.743	5.738	5.747	5.747	5.740
S154	5.752	5.759	5.754	5.757	5.753	5.747	5.752	5.749	5.750	5.737	5.741	5.741	5.741	5.728	5.733	5.735	5.735	5.724	5.723
S155	5.755	5.760	5.755	5.755	5.760	5.757	5.751	5.747	5.752	5.742	5.743	5.746	5.747	5.738	5.737	5.728	5.737	5.728	5.729
S156	5.758	5.763	5.761	5.760	5.762	5.758	5.759	5.745	5.749	5.752	5.742	5.748	5.741	5.743	5.734	5.742	5.730	5.730	5.732
S157	5.756	5.755	5.755	5.751	5.753	5.747	5.752	5.751	5.741	5.747	5.745	5.740	5.745	5.742	5.736	5.726	5.738	5.737	5.735
S158	5.771	5.730	5.722	5.725	5.725	5.719	5.723	5.717	5.717	5.714	5.709	5.713	5.712	5.703	5.704	5.695	5.706	5.704	5.702
S159	5.762	5.752	5.757	5.751	5.749	5.750	5.748	5.751	5.743	5.745	5.745	5.743	5.743	5.733	5.740	5.724	5.736	5.733	5.726
S160	5.759	5.772	5.770	5.767	5.768	5.767	5.763	5.762	5.758	5.764	5.757	5.756	5.760	5.747	5.753	5.754	5.754	5.743	5.745
S161	5.756	5.769	5.764	5.762	5.760	5.762	5.758	5.755	5.755	5.753	5.753	5.742	5.746	5.750	5.743	5.742	5.733	5.744	5.735
S162	5.764	5.769	5.765	5.755	5.755	5.754	5.751	5.750	5.752	5.751	5.751	5.750	5.740	5.740	5.748	5.740	5.741	5.743	5.729
S163	5.754	5.765	5.761	5.754	5.761	5.759	5.757	5.751	5.745	5.740	5.750	5.748	5.741	5.746	5.734	5.741	5.731	5.742	5.732
S164	5.724	5.755	5.756	5.753	5.746	5.749	5.741	5.745	5.747	5.734	5.740	5.731	5.741	5.731	5.732	5.727	5.733	5.722	5.722
S165	5.756	5.710	5.713	5.712	5.713	5.704	5.708	5.707	5.703	5.703	5.702	5.701	5.690	5.691	5.698	5.693	5.682	5.682	5.684
S166	5.759	5.757	5.757	5.756	5.749	5.754	5.747	5.747	5.750	5.746	5.746	5.744	5.734	5.735	5.729	5.737	5.725	5.725	5.734
S167	5.767	5.746	5.739	5.734	5.741	5.736	5.735	5.734	5.734	5.725	5.732	5.728	5.726	5.724	5.720	5.715	5.722	5.722	5.711
S168	5.757	5.748	5.745	5.746	5.743	5.735	5.743	5.735	5.737	5.727	5.727	5.729	5.730	5.722	5.721	5.724	5.717	5.713	5.714
S169	5.752	5.746	5.743	5.737	5.735	5.730	5.733	5.729	5.731	5.725	5.722	5.719	5.719	5.715	5.720	5.721	5.722	5.721	5.711
S170	5.760	5.745	5.750	5.740	5.743	5.741	5.738	5.739	5.736	5.736	5.731	5.724	5.724	5.732	5.721	5.725	5.716	5.716	5.717
S171	5.759	5.755	5.744	5.746	5.741	5.748	5.741	5.739	5.740	5.731	5.739	5.733	5.735	5.727	5.730	5.729	5.718	5.718	5.728
S172	5.768	5.750	5.748	5.748	5.746	5.743	5.734	5.739	5.736	5.733	5.729	5.723	5.731	5.724	5.724	5.719	5.724	5.714	5.716
S173	5.756	5.758	5.758	5.754	5.756	5.750	5.751	5.752	5.751	5.751	5.750	5.742	5.737	5.739	5.745	5.738	5.738	5.739	5.737
S174	5.755	5.750	5.746	5.748	5.749	5.748	5.740	5.739	5.742	5.737	5.739	5.733	5.733	5.733	5.727	5.728	5.718	5.729	5.720
S175	5.748	5.739	5.739	5.734	5.738	5.732	5.735	5.736	5.729	5.731	5.721	5.729	5.723	5.720	5.715	5.711	5.715	5.722	5.719
Ave.	5.756	5.754	5.752	5.750	5.749	5.747	5.746	5.744	5.742	5.740	5.739	5.737	5.735	5.732	5.731	5.729	5.728	5.727	5.724
Med.	5.757	5.755	5.755	5.753	5.749	5.749	5.748	5.747	5.745	5.740	5.742	5.741	5.740	5.733	5.733	5.728	5.731	5.728	5.728
St dev	0.0113	0.0138	0.0138	0.0133	0.0130	0.0146	0.0132	0.0132	0.0127	0.0141	0.0140	0.0137	0.0144	0.0145	0.0134	0.0147	0.0146	0.0152	0.0133
Min.	5.723	5.710	5.713	5.712	5.713	5.704	5.708	5.707	5.703	5.703	5.702	5.701	5.690	5.691	5.698	5.693	5.682	5.682	5.684
Max.	5.771	5.772	5.770	5.769	5.768	5.767	5.764	5.762	5.758	5.764	5.757	5.756	5.760	5.752	5.753	5.754	5.754	5.747	5.745

3.35 Data Set 7, 55°C, 200mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	12000hrs	18000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
S151	0.2558	0.5233	2866	0.0001	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0021	0.0024	0.0025	0.0027	0.0029	0.0031	0.0032	0.0036	0.0037
S152	0.2558	0.5230	2867	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0032	0.0034
S153	0.2559	0.5237	2859	0.0001	0.0002	0.0003	0.0006	0.0008	0.0011	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0029	0.0033	0.0034
S154	0.2564	0.5242	2846	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0027	0.0028	0.0030	0.0034	0.0036
S155	0.2561	0.5247	2852	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0029	0.0031	0.0032	0.0035	0.0036
S156	0.2557	0.5235	2865	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0022	0.0023	0.0025	0.0026	0.0028	0.0031	0.0033	0.0036	0.0038
S157	0.2559	0.5245	2856	0.0001	0.0003	0.0005	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0021	0.0023	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035
S158	0.2560	0.5228	2863	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0013	0.0015	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0029	0.0031	0.0035	0.0036
S159	0.2563	0.5233	2854	0.0001	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0015	0.0019	0.0020	0.0023	0.0026	0.0029	0.0030	0.0032	0.0034	0.0037	0.0039
S160	0.2562	0.5228	2859	0.0001	0.0003	0.0005	0.0007	0.0010	0.0012	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0025	0.0028	0.0031	0.0033	0.0036	0.0038
S161	0.2563	0.5245	2847	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0021	0.0024	0.0025	0.0027	0.0030	0.0032	0.0035	0.0037
S162	0.2559	0.5264	2845	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0034	0.0036
S163	0.2556	0.5262	2854	0.0001	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0025	0.0028	0.0030	0.0031	0.0034	0.0036
S164	0.2560	0.5262	2846	0.0001	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0020	0.0022	0.0023	0.0025	0.0028	0.0030	0.0031	0.0035	0.0037
S165	0.2563	0.5278	2832	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0018	0.0020	0.0021	0.0023	0.0026	0.0028	0.0029	0.0032	0.0034
S166	0.2559	0.5267	2845	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0019	0.0020	0.0023	0.0024	0.0026	0.0029	0.0030	0.0033	0.0035
S167	0.2561	0.5269	2839	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0020	0.0023	0.0026	0.0028	0.0031	0.0033	0.0036	0.0038
S168	0.2560	0.5277	2837	0.0002	0.0003	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0032	0.0033	0.0036	0.0038
S169	0.2565	0.5274	2827	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0020	0.0023	0.0026	0.0027	0.0030	0.0032	0.0035	0.0036
S170	0.2557	0.5260	2854	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0029	0.0030	0.0034	0.0036
S171	0.2558	0.5282	2840	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0021	0.0023	0.0025	0.0026	0.0030	0.0031
S172	0.2554	0.5278	2851	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0028	0.0032	0.0033
S173	0.2555	0.5276	2849	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0025	0.0027	0.0030	0.0032
S174	0.2557	0.5283	2842	0.0001	0.0003	0.0004	0.0006	0.0009	0.0010	0.0012	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0031	0.0034	0.0036
S175	0.2563	0.5290	2825	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0018	0.0020	0.0021	0.0022	0.0024	0.0026	0.0028	0.0029	0.0033	0.0035
Ave.	0.2560	0.5257	2849	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
Med.	0.2559	0.5262	2849	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
St dev	0.0003	0.0020	11.5072	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2554	0.5228	2825	0.0001	0.0002	0.0003	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0021	0.0023	0.0025	0.0026	0.0030	0.0031
Max.	0.2565	0.5290	2867	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0024	0.0026	0.0029	0.0030	0.0032	0.0034	0.0037	0.0039

3.36 Data Set 8, 85°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	172.5	100.03	99.86	99.62	99.40	99.17	98.90	98.61	98.34	98.04	97.78	97.58	97.26	97.09	96.90	96.64	96.47	96.34	96.16
S177	172.7	100.02	99.85	99.61	99.33	99.06	98.76	98.49	98.19	97.92	97.54	97.34	97.14	96.91	96.71	96.52	96.35	96.22	96.04
S178	172.9	100.07	99.83	99.59	99.37	99.14	98.92	98.65	98.38	98.11	97.85	97.65	97.44	97.28	97.01	96.75	96.52	96.40	96.28
S179	172.3	100.10	99.93	99.75	99.45	99.23	98.95	98.68	98.34	98.00	97.74	97.42	97.22	97.06	96.80	96.60	96.44	96.31	96.13
S180	172.1	100.00	99.83	99.59	99.36	99.14	98.84	98.55	98.21	97.91	97.65	97.45	97.24	97.01	96.82	96.55	96.39	96.20	96.09
S181	172.5	100.03	99.79	99.61	99.39	99.12	98.89	98.62	98.35	98.01	97.75	97.43	97.23	97.00	96.73	96.54	96.31	96.19	96.07
S182	173.1	100.06	99.89	99.72	99.44	99.22	98.92	98.65	98.38	98.09	97.82	97.62	97.30	97.07	96.87	96.68	96.51	96.39	96.21
S183	173.2	100.03	99.79	99.56	99.26	98.95	98.65	98.38	98.09	97.75	97.49	97.17	96.96	96.80	96.61	96.41	96.24	96.11	96.00
S184	172.5	100.00	99.83	99.59	99.29	99.01	98.74	98.40	98.06	97.76	97.50	97.30	97.09	96.93	96.67	96.47	96.31	96.18	96.06
S185	172.0	100.09	99.85	99.68	99.45	99.15	98.85	98.58	98.29	97.95	97.68	97.48	97.28	97.12	96.85	96.66	96.43	96.30	96.12
S186	172.2	100.04	99.80	99.56	99.29	99.01	98.71	98.42	98.15	97.81	97.43	97.23	96.91	96.68	96.41	96.15	95.99	95.80	95.62
S187	172.9	100.01	99.78	99.60	99.30	99.00	98.73	98.46	98.16	97.89	97.63	97.42	97.22	97.02	96.83	96.63	96.43	96.27	96.15
S188	172.5	100.02	99.85	99.68	99.46	99.23	98.96	98.66	98.32	97.98	97.72	97.52	97.31	97.15	96.96	96.76	96.60	96.47	96.35
S189	171.9	100.06	99.82	99.65	99.38	99.15	98.85	98.56	98.27	97.97	97.59	97.39	97.07	96.84	96.58	96.39	96.15	96.03	95.91
S190	172.5	100.10	99.93	99.69	99.41	99.14	98.86	98.52	98.18	97.85	97.47	97.15	96.83	96.60	96.33	96.14	95.98	95.85	95.73
S191	173.1	100.09	99.92	99.75	99.48	99.25	98.95	98.68	98.41	98.12	97.85	97.65	97.45	97.28	97.09	96.89	96.72	96.53	96.42
S192	172.8	100.09	99.85	99.61	99.34	99.11	98.81	98.52	98.22	97.88	97.62	97.42	97.10	96.87	96.61	96.42	96.19	96.06	95.94
S193	172.3	100.07	99.89	99.66	99.38	99.11	98.88	98.59	98.25	97.98	97.71	97.40	97.19	97.03	96.83	96.57	96.41	96.28	96.10
S194	172.0	100.03	99.85	99.68	99.38	99.08	98.80	98.51	98.17	97.88	97.61	97.41	97.21	97.04	96.85	96.65	96.42	96.30	96.18
S195	172.1	100.07	99.83	99.61	99.39	99.11	98.89	98.55	98.21	97.91	97.60	97.36	97.11	96.89	96.70	96.51	96.34	96.19	96.07
S196	172.7	100.09	99.85	99.61	99.31	99.09	98.86	98.52	98.18	97.89	97.63	97.31	97.10	96.87	96.68	96.49	96.26	96.13	96.02
S197	172.4	100.02	99.85	99.67	99.45	99.23	98.93	98.59	98.29	97.95	97.57	97.37	97.17	96.94	96.74	96.55	96.32	96.20	96.08
S198	173.1	100.01	99.77	99.53	99.26	98.95	98.68	98.34	98.07	97.80	97.42	97.22	97.01	96.78	96.59	96.40	96.16	95.97	95.79
S199	172.4	100.08	99.84	99.60	99.30	99.03	98.80	98.53	98.24	97.95	97.57	97.36	97.04	96.88	96.68	96.42	96.19	96.00	95.89
S200	172.4	100.05	99.88	99.64	99.36	99.14	98.87	98.57	98.28	97.98	97.72	97.48	97.28	97.07	96.88	96.69	96.52	96.39	96.21
Ave.	172.5	100.05	99.85	99.63	99.37	99.11	98.84	98.55	98.24	97.94	97.64	97.40	97.17	96.97	96.75	96.54	96.35	96.20	96.07
Med.	172.5	100.05	99.85	99.61	99.38	99.12	98.86	98.55	98.24	97.95	97.63	97.41	97.19	97.00	96.74	96.55	96.35	96.20	96.08
St dev	0.3778	0.0333	0.0436	0.0577	0.0657	0.0859	0.0873	0.0936	0.0980	0.0990	0.1252	0.1356	0.1493	0.1647	0.1737	0.1729	0.1764	0.1820	0.1821
Min.	171.9	100.00	99.77	99.53	99.26	98.95	98.65	98.34	98.06	97.75	97.42	97.15	96.83	96.60	96.33	96.14	95.98	95.80	95.62
Max.	173.2	100.10	99.93	99.75	99.48	99.25	98.96	98.68	98.41	98.12	97.85	97.65	97.45	97.28	97.09	96.89	96.72	96.53	96.42

3.37 Data Set 8, 85°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	2.707	99.99	99.78	99.57	99.26	98.95	98.64	98.38	98.12	97.85	97.60	97.35	97.03	96.83	96.64	96.44	96.28	96.11	95.94
S177	2.708	100.04	99.83	99.63	99.33	99.07	98.76	98.46	98.12	97.86	97.54	97.29	97.06	96.87	96.67	96.48	96.31	96.14	95.97
S178	2.710	100.06	99.90	99.69	99.39	99.08	98.78	98.44	98.09	97.83	97.58	97.26	96.94	96.75	96.57	96.31	96.16	95.98	95.83
S179	2.708	99.98	99.77	99.61	99.35	99.09	98.79	98.52	98.18	97.84	97.52	97.30	97.07	96.88	96.70	96.53	96.36	96.21	96.03
S180	2.708	100.06	99.89	99.73	99.47	99.17	98.87	98.60	98.31	98.01	97.69	97.47	97.15	96.96	96.78	96.52	96.34	96.19	96.02
S181	2.708	100.02	99.85	99.64	99.34	99.09	98.78	98.48	98.19	97.85	97.59	97.37	97.15	96.95	96.69	96.44	96.28	96.12	95.93
S182	2.709	99.99	99.83	99.67	99.36	99.10	98.84	98.50	98.20	97.86	97.64	97.32	97.00	96.80	96.55	96.37	96.19	96.01	95.86
S183	2.710	100.02	99.86	99.65	99.35	99.04	98.74	98.45	98.15	97.81	97.56	97.33	97.01	96.76	96.56	96.30	96.13	95.95	95.77
S184	2.709	100.02	99.81	99.61	99.35	99.05	98.79	98.49	98.15	97.81	97.49	97.27	97.04	96.78	96.61	96.44	96.29	96.12	95.94
S185	2.709	99.99	99.83	99.62	99.32	99.06	98.80	98.54	98.27	97.93	97.71	97.39	97.07	96.81	96.62	96.36	96.19	96.04	95.87
S186	2.711	100.04	99.88	99.72	99.42	99.16	98.86	98.57	98.30	97.96	97.64	97.39	97.07	96.90	96.73	96.53	96.38	96.21	96.03
S187	2.711	100.02	99.81	99.65	99.35	99.05	98.75	98.40	98.06	97.80	97.55	97.30	97.04	96.79	96.61	96.44	96.29	96.12	95.95
S188	2.704	100.06	99.85	99.64	99.34	99.03	98.72	98.38	98.04	97.74	97.49	97.17	96.92	96.75	96.49	96.32	96.15	95.97	95.80
S189	2.705	100.03	99.82	99.66	99.36	99.06	98.76	98.47	98.17	97.83	97.51	97.26	97.04	96.86	96.61	96.41	96.26	96.09	95.94
S190	2.704	99.99	99.83	99.67	99.36	99.05	98.79	98.45	98.19	97.92	97.61	97.29	97.04	96.78	96.60	96.41	96.26	96.10	95.92
S191	2.704	100.02	99.86	99.65	99.35	99.04	98.74	98.48	98.21	97.87	97.65	97.33	97.10	96.93	96.73	96.48	96.31	96.14	95.99
S192	2.702	100.00	99.83	99.63	99.33	99.02	98.76	98.49	98.20	97.86	97.61	97.35	97.13	96.87	96.68	96.48	96.31	96.15	95.98
S193	2.703	100.08	99.92	99.71	99.41	99.15	98.89	98.55	98.28	98.02	97.70	97.48	97.25	97.06	96.89	96.63	96.47	96.32	96.17
S194	2.704	100.07	99.90	99.74	99.43	99.18	98.87	98.53	98.23	97.94	97.62	97.39	97.07	96.82	96.62	96.43	96.24	96.09	95.91
S195	2.703	100.07	99.86	99.65	99.34	99.03	98.73	98.39	98.05	97.71	97.46	97.23	97.01	96.81	96.64	96.38	96.21	96.03	95.88
S196	2.704	100.02	99.81	99.64	99.39	99.13	98.87	98.53	98.26	97.92	97.60	97.35	97.10	96.92	96.75	96.55	96.39	96.23	96.08
S197	2.703	100.01	99.80	99.59	99.28	99.02	98.76	98.50	98.16	97.82	97.59	97.27	97.05	96.86	96.66	96.46	96.30	96.14	95.99
S198	2.704	100.03	99.87	99.66	99.36	99.10	98.84	98.55	98.28	97.99	97.74	97.42	97.10	96.90	96.64	96.45	96.27	96.10	95.95
S199	2.704	100.06	99.85	99.69	99.43	99.17	98.86	98.60	98.30	98.01	97.78	97.56	97.31	97.14	96.96	96.77	96.60	96.45	96.26
S200	2.704	100.05	99.89	99.68	99.38	99.07	98.76	98.47	98.20	97.91	97.68	97.43	97.18	97.01	96.75	96.55	96.40	96.22	96.07
Ave.	2.706	100.03	99.85	99.66	99.36	99.08	98.79	98.49	98.19	97.88	97.61	97.34	97.08	96.87	96.67	96.46	96.29	96.13	95.96
Med.	2.705	100.02	99.85	99.65	99.35	99.07	98.78	98.49	98.19	97.86	97.60	97.33	97.07	96.86	96.64	96.44	96.29	96.12	95.95
St dev	0.0029	0.0286	0.0377	0.0425	0.0467	0.0561	0.0591	0.0620	0.0802	0.0819	0.0823	0.0867	0.0859	0.0977	0.1039	0.1029	0.1040	0.1104	0.1099
Min.	2.702	99.98	99.77	99.57	99.26	98.95	98.64	98.38	98.04	97.71	97.46	97.17	96.92	96.75	96.49	96.30	96.13	95.95	95.77
Max.	2.711	100.08	99.92	99.74	99.47	99.18	98.89	98.60	98.31	98.02	97.78	97.56	97.31	97.14	96.96	96.77	96.60	96.45	96.26

3.38 Data Set 8, 85°C, 200mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	0.1936	100.07	99.83	99.63	99.39	99.13	98.89	98.58	98.24	97.97	97.77	97.57	97.37	97.11	96.94	96.77	96.56	96.35	96.15
S177	0.1938	100.09	99.88	99.68	99.45	99.22	98.97	98.67	98.36	98.05	97.78	97.57	97.30	97.13	96.96	96.70	96.47	96.26	96.04
S178	0.1937	100.05	99.81	99.58	99.35	99.12	98.88	98.61	98.35	98.04	97.76	97.48	97.29	97.03	96.77	96.60	96.39	96.16	95.94
S179	0.1937	99.99	99.76	99.56	99.30	99.06	98.80	98.53	98.27	98.00	97.80	97.52	97.32	97.15	96.89	96.72	96.52	96.31	96.11
S180	0.1936	100.08	99.84	99.65	99.40	99.14	98.91	98.65	98.30	97.96	97.68	97.48	97.28	97.11	96.85	96.60	96.37	96.17	95.94
S181	0.1936	100.00	99.76	99.54	99.30	99.07	98.84	98.57	98.31	97.96	97.77	97.49	97.29	97.12	96.95	96.78	96.55	96.35	96.14
S182	0.1936	100.08	99.88	99.65	99.42	99.19	98.93	98.62	98.35	98.01	97.81	97.61	97.41	97.15	96.98	96.81	96.59	96.38	96.16
S183	0.1937	100.02	99.81	99.58	99.32	99.09	98.85	98.54	98.28	98.01	97.81	97.54	97.34	97.17	97.00	96.74	96.53	96.32	96.10
S184	0.1935	100.03	99.79	99.56	99.32	99.06	98.83	98.48	98.18	97.87	97.67	97.48	97.27	97.10	96.93	96.76	96.54	96.31	96.11
S185	0.1935	100.01	99.77	99.57	99.31	99.07	98.83	98.57	98.26	97.92	97.72	97.44	97.25	96.99	96.82	96.56	96.36	96.13	95.92
S186	0.1937	100.07	99.86	99.64	99.38	99.12	98.87	98.53	98.26	97.92	97.72	97.52	97.32	97.06	96.89	96.72	96.51	96.30	96.10
S187	0.1938	100.00	99.76	99.53	99.29	99.05	98.80	98.54	98.27	97.93	97.73	97.53	97.25	97.08	96.82	96.57	96.36	96.16	95.94
S188	0.1968	100.01	99.78	99.58	99.32	99.09	98.83	98.48	98.18	97.87	97.67	97.47	97.27	97.01	96.75	96.49	96.29	96.08	95.86
S189	0.1969	100.04	99.80	99.57	99.33	99.10	98.86	98.60	98.25	97.99	97.79	97.51	97.31	97.14	96.97	96.80	96.60	96.38	96.18
S190	0.1969	100.01	99.81	99.58	99.34	99.10	98.84	98.50	98.19	97.93	97.73	97.53	97.25	97.08	96.83	96.57	96.34	96.12	95.91
S191	0.1968	100.03	99.79	99.60	99.35	99.09	98.86	98.52	98.25	97.95	97.75	97.54	97.35	97.09	96.92	96.75	96.52	96.32	96.09
S192	0.1968	100.08	99.87	99.64	99.38	99.12	98.86	98.52	98.25	97.99	97.71	97.51	97.30	97.13	96.96	96.71	96.50	96.30	96.09
S193	0.1968	100.09	99.88	99.68	99.44	99.21	98.95	98.60	98.26	98.00	97.72	97.44	97.16	96.99	96.82	96.65	96.45	96.25	96.03
S194	0.1968	99.99	99.76	99.56	99.33	99.07	98.83	98.57	98.26	97.96	97.75	97.55	97.35	97.18	97.01	96.84	96.63	96.42	96.20
S195	0.1968	100.06	99.85	99.63	99.37	99.12	98.89	98.55	98.24	97.93	97.73	97.53	97.25	97.08	96.91	96.74	96.53	96.31	96.10
S196	0.1969	100.02	99.81	99.62	99.38	99.14	98.91	98.56	98.22	97.91	97.64	97.44	97.24	97.07	96.90	96.64	96.44	96.23	96.02
S197	0.1967	100.06	99.85	99.65	99.42	99.18	98.93	98.63	98.29	97.94	97.66	97.39	97.11	96.94	96.68	96.51	96.30	96.08	95.87
S198	0.1969	100.04	99.81	99.58	99.32	99.09	98.84	98.58	98.27	98.01	97.73	97.53	97.25	96.99	96.82	96.56	96.34	96.13	95.91
S199	0.1969	99.99	99.79	99.56	99.32	99.07	98.84	98.57	98.23	97.96	97.69	97.48	97.29	97.03	96.77	96.60	96.39	96.16	95.94
S200	0.1969	100.04	99.80	99.60	99.36	99.10	98.87	98.53	98.22	97.95	97.68	97.47	97.20	96.94	96.77	96.60	96.37	96.16	95.94
Ave.	0.1953	100.04	99.81	99.60	99.36	99.11	98.87	98.56	98.26	97.96	97.73	97.51	97.28	97.08	96.88	96.67	96.46	96.25	96.03
Med.	0.1967	100.04	99.81	99.58	99.35	99.10	98.86	98.57	98.26	97.96	97.73	97.51	97.29	97.08	96.89	96.70	96.47	96.26	96.04
St dev	0.0016	0.0326	0.0409	0.0432	0.0458	0.0466	0.0446	0.0485	0.0476	0.0462	0.0479	0.0491	0.0639	0.0690	0.0882	0.1007	0.1000	0.1023	0.1052
Min.	0.1935	99.99	99.76	99.53	99.29	99.05	98.80	98.48	98.18	97.87	97.64	97.39	97.11	96.94	96.68	96.49	96.29	96.08	95.86
Max.	0.1969	100.09	99.88	99.68	99.45	99.22	98.97	98.67	98.36	98.05	97.81	97.61	97.41	97.18	97.01	96.84	96.63	96.42	96.20

3.39 Data Set 8, 85°C, 200mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	5.763	5.762	5.765	5.757	5.758	5.758	5.761	5.753	5.755	5.751	5.745	5.749	5.742	5.748	5.744	5.746	5.734	5.738	5.732
S177	5.753	5.759	5.760	5.758	5.755	5.755	5.753	5.752	5.750	5.747	5.742	5.740	5.739	5.741	5.745	5.735	5.740	5.739	5.735
S178	5.723	5.773	5.771	5.765	5.762	5.762	5.769	5.754	5.754	5.760	5.752	5.755	5.751	5.752	5.742	5.744	5.743	5.736	5.738
S179	5.758	5.757	5.751	5.751	5.754	5.749	5.743	5.748	5.750	5.744	5.745	5.735	5.730	5.738	5.725	5.729	5.723	5.721	5.731
S180	5.766	5.763	5.755	5.752	5.757	5.754	5.749	5.755	5.743	5.745	5.739	5.742	5.744	5.739	5.738	5.740	5.727	5.724	5.732
S181	5.759	5.758	5.758	5.756	5.759	5.754	5.752	5.754	5.749	5.750	5.753	5.742	5.738	5.737	5.744	5.739	5.737	5.729	5.738
S182	5.751	5.761	5.754	5.755	5.755	5.750	5.752	5.746	5.746	5.740	5.740	5.738	5.733	5.740	5.734	5.724	5.725	5.724	5.727
S183	5.756	5.722	5.724	5.726	5.722	5.721	5.720	5.718	5.714	5.714	5.708	5.701	5.707	5.709	5.705	5.700	5.700	5.690	5.693
S184	5.754	5.752	5.752	5.748	5.748	5.752	5.751	5.743	5.740	5.744	5.740	5.738	5.738	5.736	5.738	5.728	5.735	5.732	5.728
S185	5.771	5.773	5.774	5.772	5.767	5.764	5.764	5.759	5.758	5.765	5.757	5.759	5.755	5.748	5.757	5.755	5.741	5.751	5.741
S186	5.766	5.763	5.762	5.767	5.762	5.757	5.761	5.754	5.749	5.744	5.750	5.746	5.740	5.747	5.738	5.732	5.745	5.732	5.732
S187	5.723	5.761	5.766	5.760	5.754	5.755	5.751	5.756	5.751	5.745	5.750	5.742	5.746	5.735	5.735	5.736	5.730	5.735	5.735
S188	5.763	5.762	5.760	5.759	5.758	5.751	5.758	5.755	5.745	5.747	5.747	5.746	5.744	5.740	5.740	5.734	5.737	5.729	5.727
S189	5.772	5.750	5.750	5.754	5.754	5.744	5.751	5.743	5.738	5.743	5.742	5.730	5.735	5.730	5.734	5.733	5.728	5.725	5.718
S190	5.755	5.717	5.712	5.708	5.708	5.703	5.702	5.701	5.707	5.696	5.696	5.691	5.689	5.692	5.692	5.694	5.680	5.686	5.681
S191	5.756	5.760	5.755	5.748	5.749	5.752	5.744	5.744	5.750	5.745	5.747	5.739	5.744	5.733	5.730	5.734	5.734	5.728	5.723
S192	5.751	5.742	5.738	5.734	5.739	5.731	5.732	5.730	5.731	5.733	5.725	5.721	5.729	5.720	5.724	5.717	5.715	5.719	5.714
S193	5.759	5.740	5.742	5.736	5.744	5.739	5.739	5.737	5.737	5.732	5.723	5.726	5.727	5.723	5.720	5.712	5.716	5.716	5.708
S194	5.766	5.745	5.745	5.736	5.736	5.738	5.729	5.734	5.735	5.724	5.726	5.722	5.718	5.717	5.722	5.708	5.712	5.719	5.707
S195	5.758	5.749	5.743	5.743	5.740	5.737	5.738	5.735	5.735	5.727	5.739	5.733	5.727	5.724	5.723	5.722	5.722	5.714	5.720
S196	5.722	5.745	5.745	5.749	5.741	5.739	5.737	5.733	5.733	5.739	5.728	5.732	5.728	5.722	5.725	5.715	5.722	5.726	5.716
S197	5.751	5.742	5.745	5.741	5.742	5.745	5.745	5.738	5.733	5.734	5.725	5.733	5.727	5.729	5.724	5.719	5.721	5.713	5.710
S198	5.756	5.757	5.757	5.761	5.757	5.751	5.749	5.756	5.754	5.748	5.748	5.741	5.737	5.737	5.739	5.740	5.729	5.737	5.733
S199	5.754	5.745	5.747	5.741	5.744	5.745	5.739	5.737	5.738	5.731	5.734	5.725	5.728	5.725	5.728	5.722	5.724	5.714	5.721
S200	5.759	5.744	5.743	5.739	5.739	5.738	5.736	5.734	5.735	5.730	5.731	5.721	5.717	5.724	5.714	5.722	5.717	5.711	5.706
Ave.	5.755	5.752	5.751	5.749	5.748	5.746	5.745	5.743	5.741	5.739	5.737	5.734	5.733	5.731	5.730	5.727	5.725	5.724	5.722
Med.	5.756	5.757	5.752	5.751	5.754	5.750	5.749	5.744	5.743	5.744	5.740	5.738	5.735	5.735	5.734	5.729	5.727	5.725	5.727
St dev	0.0134	0.0136	0.0136	0.0141	0.0132	0.0134	0.0146	0.0135	0.0122	0.0144	0.0145	0.0152	0.0142	0.0135	0.0138	0.0144	0.0143	0.0143	0.0148
Min.	5.722	5.717	5.712	5.708	5.708	5.703	5.702	5.701	5.707	5.696	5.696	5.691	5.689	5.692	5.692	5.694	5.680	5.686	5.681
Max.	5.772	5.773	5.774	5.772	5.767	5.764	5.769	5.759	5.758	5.765	5.757	5.759	5.755	5.752	5.757	5.755	5.745	5.751	5.741

3.40 Data Set 8, 85°C, 200mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S176	0.2562	0.5233	2856	0.0002	0.0005	0.0007	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0026	0.0028	0.0030	0.0034	0.0037	0.0039	0.0041	0.0043
S177	0.2559	0.5230	2864	0.0002	0.0004	0.0006	0.0009	0.0012	0.0016	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0033	0.0037	0.0038	0.0041	0.0043
S178	0.2562	0.5231	2857	0.0001	0.0003	0.0006	0.0010	0.0012	0.0015	0.0017	0.0018	0.0020	0.0024	0.0027	0.0028	0.0032	0.0035	0.0037	0.0039	0.0041	0.0043
S179	0.2561	0.5235	2856	0.0002	0.0004	0.0006	0.0009	0.0010	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0026	0.0029	0.0033	0.0035	0.0037	0.0039
S180	0.2564	0.5237	2848	0.0002	0.0004	0.0006	0.0010	0.0011	0.0015	0.0017	0.0019	0.0021	0.0024	0.0026	0.0028	0.0032	0.0033	0.0036	0.0038	0.0040	0.0042
S181	0.2561	0.5228	2862	0.0001	0.0003	0.0006	0.0010	0.0012	0.0016	0.0019	0.0020	0.0023	0.0025	0.0027	0.0028	0.0031	0.0032	0.0035	0.0037	0.0039	0.0041
S182	0.2568	0.5243	2836	0.0002	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0018	0.0021	0.0022	0.0023	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
S183	0.2562	0.5246	2848	0.0002	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0027	0.0031	0.0035	0.0037	0.0039	0.0041	0.0043
S184	0.2566	0.5246	2840	0.0002	0.0005	0.0006	0.0010	0.0012	0.0016	0.0017	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030	0.0034	0.0036	0.0038	0.0040
S185	0.2558	0.5229	2866	0.0001	0.0004	0.0007	0.0009	0.0012	0.0015	0.0018	0.0020	0.0022	0.0026	0.0027	0.0030	0.0032	0.0036	0.0038	0.0040	0.0042	0.0044
S186	0.2564	0.5238	2849	0.0002	0.0004	0.0006	0.0009	0.0011	0.0015	0.0016	0.0019	0.0021	0.0024	0.0025	0.0027	0.0031	0.0032	0.0033	0.0035	0.0037	0.0039
S187	0.2562	0.5229	2859	0.0002	0.0004	0.0006	0.0010	0.0012	0.0016	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0032	0.0035	0.0039	0.0041	0.0043	0.0046
S188	0.2553	0.5261	2861	0.0001	0.0003	0.0006	0.0009	0.0012	0.0015	0.0017	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0029	0.0033	0.0035	0.0037	0.0039
S189	0.2551	0.5259	2868	0.0002	0.0004	0.0006	0.0008	0.0010	0.0014	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0030	0.0031	0.0035	0.0037	0.0039	0.0041
S190	0.2557	0.5275	2847	0.0002	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0025	0.0026	0.0028	0.0029	0.0030	0.0034	0.0036	0.0038	0.0040
S191	0.2555	0.5274	2851	0.0001	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0027	0.0029	0.0030	0.0033	0.0035	0.0037	0.0039
S192	0.2560	0.5270	2842	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0033	0.0035	0.0037
S193	0.2552	0.5256	2867	0.0002	0.0004	0.0006	0.0009	0.0010	0.0013	0.0014	0.0017	0.0019	0.0022	0.0023	0.0026	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
S194	0.2555	0.5266	2853	0.0001	0.0003	0.0006	0.0010	0.0012	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0029	0.0031	0.0032	0.0036	0.0038	0.0040	0.0042
S195	0.2554	0.5263	2859	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
S196	0.2553	0.5259	2862	0.0002	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0022	0.0024	0.0026	0.0027	0.0030	0.0034	0.0036	0.0038	0.0041	0.0043
S197	0.2551	0.5258	2868	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0015	0.0017	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027	0.0030	0.0031	0.0033	0.0035
S198	0.2555	0.5274	2852	0.0001	0.0004	0.0006	0.0010	0.0012	0.0016	0.0017	0.0018	0.0020	0.0022	0.0024	0.0025	0.0026	0.0030	0.0034	0.0036	0.0038	0.0040
S199	0.2558	0.5275	2844	0.0002	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0022	0.0024	0.0025	0.0028	0.0029	0.0030	0.0032	0.0035	0.0037
S200	0.2551	0.5256	2868	0.0002	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0018	0.0020	0.0022	0.0024	0.0027	0.0031	0.0032	0.0036	0.0038	0.0040	0.0042
Ave.	0.2558	0.5251	2855	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041
Med.	0.2558	0.5256	2856	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
St dev	0.0005	0.0017	9.4106	0.0000	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2551	0.5228	2836	0.0001	0.0003	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
Max.	0.2568	0.5275	2868	0.0002	0.0005	0.0007	0.0011	0.0013	0.0016	0.0019	0.0020	0.0023	0.0026	0.0028	0.0030	0.0032	0.0036	0.0039	0.0041	0.0043	0.0046

3.41 Data Set 9, 105°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	172.9	99.99	99.76	99.52	99.23	98.93	98.64	98.34	98.02	97.72	97.50	97.29	97.07	96.88	96.59	96.36	96.10	95.89	95.73
S202	172.9	99.93	99.70	99.50	99.20	98.87	98.57	98.25	97.95	97.65	97.35	97.07	96.77	96.48	96.29	96.10	95.91	95.75	95.59
S203	172.6	99.88	99.65	99.45	99.15	98.86	98.56	98.19	97.81	97.51	97.21	96.90	96.60	96.31	96.03	95.84	95.64	95.44	95.23
S204	173.5	99.89	99.66	99.46	99.16	98.87	98.57	98.19	97.87	97.49	97.27	97.05	96.84	96.60	96.31	96.03	95.77	95.56	95.34
S205	174.7	99.98	99.75	99.54	99.25	98.95	98.62	98.24	97.91	97.59	97.28	97.01	96.73	96.54	96.25	96.06	95.81	95.60	95.39
S206	173.8	99.96	99.76	99.55	99.25	98.96	98.66	98.34	98.04	97.72	97.44	97.22	96.95	96.66	96.42	96.13	95.90	95.69	95.48
S207	173.9	99.93	99.73	99.49	99.19	98.90	98.61	98.28	97.99	97.69	97.41	97.20	96.92	96.68	96.49	96.20	96.01	95.79	95.56
S208	174.2	99.92	99.69	99.46	99.12	98.78	98.44	98.07	97.77	97.47	97.25	97.04	96.76	96.57	96.33	96.14	95.95	95.73	95.50
S209	174.1	99.94	99.73	99.50	99.21	98.87	98.58	98.28	97.96	97.66	97.35	97.08	96.86	96.57	96.38	96.14	95.89	95.73	95.52
S210	173.3	99.89	99.69	99.49	99.20	98.86	98.57	98.19	97.89	97.59	97.38	97.07	96.80	96.61	96.41	96.13	95.89	95.68	95.47
S211	173.9	99.92	99.71	99.51	99.21	98.92	98.63	98.33	98.03	97.66	97.35	97.05	96.74	96.46	96.17	95.93	95.74	95.58	95.37
S212	173.9	99.97	99.77	99.56	99.27	98.97	98.67	98.30	97.97	97.59	97.32	97.01	96.71	96.47	96.18	95.95	95.75	95.53	95.31
S213	173.7	99.92	99.71	99.51	99.17	98.88	98.58	98.20	97.91	97.53	97.23	97.01	96.73	96.54	96.35	96.11	95.86	95.63	95.47
S214	172.5	99.98	99.78	99.55	99.21	98.87	98.53	98.24	97.94	97.61	97.34	97.06	96.75	96.52	96.28	96.04	95.85	95.69	95.46
S215	172.8	99.95	99.75	99.54	99.25	98.95	98.66	98.33	97.95	97.58	97.30	97.00	96.72	96.48	96.24	96.05	95.86	95.64	95.43
S216	172.0	99.90	99.67	99.43	99.13	98.84	98.55	98.17	97.85	97.52	97.22	97.00	96.73	96.49	96.25	96.06	95.82	95.61	95.45
S217	172.9	99.99	99.79	99.55	99.25	98.92	98.58	98.28	97.98	97.66	97.44	97.14	96.86	96.67	96.48	96.24	96.05	95.83	95.62
S218	172.3	99.98	99.78	99.54	99.21	98.87	98.57	98.25	97.87	97.54	97.24	97.02	96.72	96.43	96.19	95.91	95.65	95.45	95.22
S219	172.4	99.99	99.76	99.55	99.26	98.97	98.68	98.35	98.05	97.76	97.45	97.18	96.90	96.66	96.42	96.18	95.99	95.83	95.67
S220	172.2	99.90	99.70	99.46	99.13	98.83	98.54	98.24	97.91	97.59	97.31	97.01	96.73	96.44	96.21	95.97	95.71	95.51	95.34
S221	172.3	99.96	99.76	99.55	99.26	98.92	98.58	98.26	97.96	97.58	97.28	97.00	96.78	96.59	96.35	96.16	95.93	95.72	95.51
S222	173.0	99.94	99.73	99.50	99.21	98.91	98.61	98.24	97.94	97.64	97.36	97.06	96.75	96.56	96.37	96.09	95.83	95.61	95.45
S223	171.8	99.97	99.74	99.51	99.17	98.88	98.59	98.26	97.94	97.56	97.34	97.13	96.82	96.58	96.39	96.11	95.85	95.64	95.48
S224	172.3	99.88	99.68	99.48	99.18	98.89	98.59	98.29	97.91	97.62	97.31	97.09	96.88	96.69	96.40	96.16	95.92	95.72	95.51
S225	173.0	99.93	99.73	99.53	99.19	98.89	98.60	98.30	98.00	97.68	97.37	97.10	96.79	96.60	96.36	96.13	95.93	95.73	95.56
Ave.	173.1	99.94	99.73	99.51	99.20	98.89	98.59	98.26	97.94	97.61	97.33	97.07	96.80	96.56	96.33	96.09	95.87	95.66	95.47
Med.	172.9	99.94	99.73	99.51	99.21	98.89	98.58	98.26	97.94	97.59	97.34	97.06	96.77	96.57	96.35	96.11	95.86	95.68	95.47
St dev	0.7822	0.0361	0.0389	0.0386	0.0443	0.0468	0.0508	0.0653	0.0704	0.0747	0.0778	0.0838	0.0968	0.1122	0.1215	0.1127	0.1137	0.1153	0.1235
Min.	171.8	99.88	99.65	99.43	99.12	98.78	98.44	98.07	97.77	97.47	97.21	96.90	96.60	96.31	96.03	95.84	95.64	95.44	95.22
Max.	174.7	99.99	99.79	99.56	99.27	98.97	98.68	98.35	98.05	97.76	97.50	97.29	97.07	96.88	96.59	96.36	96.10	95.89	95.73

3.42 Data Set 9, 105°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	2.692	99.93	99.69	99.44	99.10	98.81	98.52	98.19	97.87	97.54	97.27	97.00	96.74	96.48	96.23	95.98	95.72	95.51	95.25
S202	2.691	99.92	99.68	99.43	99.09	98.74	98.45	98.14	97.74	97.41	97.14	96.88	96.66	96.43	96.18	95.93	95.72	95.46	95.26
S203	2.692	99.87	99.66	99.42	99.07	98.73	98.44	98.12	97.80	97.47	97.20	96.98	96.71	96.46	96.21	95.96	95.70	95.47	95.26
S204	2.693	99.95	99.70	99.50	99.21	98.92	98.63	98.30	97.96	97.65	97.42	97.16	96.94	96.68	96.43	96.18	95.95	95.75	95.49
S205	2.703	99.91	99.66	99.46	99.17	98.83	98.53	98.14	97.82	97.49	97.22	96.96	96.73	96.48	96.22	95.97	95.71	95.50	95.24
S206	2.702	99.95	99.75	99.50	99.21	98.92	98.63	98.31	97.98	97.65	97.43	97.16	96.89	96.66	96.41	96.16	95.93	95.72	95.52
S207	2.702	99.92	99.72	99.47	99.13	98.84	98.49	98.17	97.78	97.45	97.23	96.96	96.69	96.44	96.19	95.94	95.69	95.45	95.25
S208	2.701	99.91	99.71	99.51	99.21	98.87	98.52	98.13	97.81	97.49	97.27	97.01	96.78	96.53	96.27	96.04	95.81	95.55	95.29
S209	2.702	99.91	99.66	99.46	99.17	98.83	98.54	98.14	97.81	97.49	97.23	97.00	96.74	96.51	96.26	96.00	95.74	95.54	95.33
S210	2.702	99.93	99.73	99.49	99.20	98.91	98.56	98.23	97.91	97.52	97.25	96.99	96.77	96.54	96.28	96.03	95.83	95.62	95.39
S211	2.701	99.94	99.69	99.45	99.16	98.86	98.58	98.26	97.94	97.61	97.38	97.12	96.90	96.65	96.40	96.14	95.91	95.71	95.48
S212	2.701	99.96	99.71	99.47	99.12	98.83	98.49	98.15	97.84	97.44	97.22	96.95	96.69	96.43	96.21	95.98	95.77	95.54	95.31
S213	2.702	99.91	99.71	99.47	99.12	98.83	98.53	98.14	97.81	97.49	97.27	97.00	96.74	96.48	96.23	95.97	95.76	95.56	95.30
S214	2.672	99.95	99.75	99.50	99.16	98.86	98.52	98.20	97.88	97.55	97.28	97.06	96.80	96.57	96.34	96.08	95.88	95.62	95.41
S215	2.672	99.97	99.72	99.48	99.18	98.89	98.59	98.20	97.80	97.41	97.14	96.92	96.65	96.42	96.18	95.95	95.74	95.51	95.31
S216	2.670	99.88	99.63	99.43	99.14	98.85	98.56	98.22	97.83	97.51	97.29	97.02	96.75	96.50	96.27	96.04	95.84	95.58	95.37
S217	2.670	99.95	99.70	99.45	99.16	98.82	98.47	98.08	97.76	97.36	97.10	96.83	96.57	96.34	96.08	95.83	95.57	95.31	95.11
S218	2.669	99.97	99.72	99.48	99.19	98.84	98.55	98.22	97.89	97.57	97.30	97.04	96.77	96.51	96.27	96.01	95.78	95.52	95.31
S219	2.670	99.95	99.75	99.55	99.26	98.96	98.67	98.35	98.02	97.63	97.41	97.18	96.92	96.69	96.44	96.18	95.95	95.69	95.49
S220	2.670	99.91	99.67	99.42	99.13	98.83	98.49	98.17	97.84	97.52	97.25	96.99	96.72	96.49	96.24	95.99	95.76	95.52	95.29
S221	2.669	99.93	99.73	99.53	99.23	98.89	98.54	98.21	97.88	97.56	97.34	97.07	96.85	96.60	96.37	96.12	95.89	95.63	95.40
S222	2.669	99.96	99.72	99.47	99.18	98.83	98.54	98.22	97.89	97.57	97.35	97.13	96.91	96.65	96.42	96.17	95.94	95.73	95.53
S223	2.669	99.95	99.71	99.51	99.16	98.87	98.58	98.25	97.92	97.52	97.26	96.99	96.73	96.47	96.22	95.99	95.73	95.53	95.30
S224	2.670	99.94	99.69	99.49	99.20	98.86	98.51	98.19	97.80	97.41	97.18	96.92	96.69	96.44	96.22	95.99	95.73	95.52	95.29
S225	2.671	99.92	99.72	99.52	99.18	98.89	98.59	98.27	97.94	97.61	97.39	97.12	96.86	96.60	96.35	96.12	95.89	95.63	95.37
Ave.	2.685	99.93	99.70	99.48	99.16	98.85	98.54	98.20	97.86	97.52	97.27	97.02	96.77	96.52	96.28	96.03	95.80	95.57	95.34
Med.	2.691	99.93	99.71	99.47	99.17	98.85	98.54	98.20	97.84	97.52	97.27	97.00	96.74	96.50	96.26	96.00	95.77	95.54	95.31
St dev	0.0150	0.0254	0.0295	0.0335	0.0450	0.0510	0.0560	0.0660	0.0723	0.0781	0.0886	0.0902	0.0943	0.0926	0.0942	0.0917	0.0988	0.1019	0.1012
Min.	2.669	99.87	99.63	99.42	99.07	98.73	98.44	98.08	97.74	97.36	97.10	96.83	96.57	96.34	96.08	95.83	95.57	95.31	95.11
Max.	2.703	99.97	99.75	99.55	99.26	98.96	98.67	98.35	98.02	97.65	97.43	97.18	96.94	96.69	96.44	96.18	95.95	95.75	95.53

3.43 Data Set 9, 105°C, 200mA (Photon Flux Maintenance,Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance,Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	0.1961	99.91	99.68	99.40	99.10	98.81	98.48	98.10	97.75	97.44	97.15	96.90	96.62	96.42	96.21	95.97	95.77	95.61	95.45
S202	0.1961	99.88	99.65	99.41	99.12	98.82	98.49	98.17	97.83	97.44	97.11	96.82	96.54	96.31	96.09	95.85	95.69	95.53	95.38
S203	0.1960	99.89	99.65	99.38	99.05	98.75	98.43	98.04	97.70	97.31	97.06	96.78	96.45	96.24	96.02	95.76	95.56	95.40	95.25
S204	0.1960	99.92	99.68	99.45	99.15	98.86	98.57	98.25	97.91	97.53	97.20	96.91	96.63	96.43	96.22	95.96	95.81	95.65	95.49
S205	0.1962	99.94	99.71	99.44	99.15	98.85	98.55	98.17	97.83	97.44	97.19	96.91	96.58	96.35	96.13	95.89	95.73	95.57	95.38
S206	0.1962	99.95	99.72	99.44	99.12	98.79	98.49	98.10	97.82	97.51	97.26	97.01	96.67	96.48	96.27	96.03	95.87	95.72	95.57
S207	0.1961	99.90	99.67	99.43	99.10	98.81	98.51	98.12	97.78	97.39	97.06	96.81	96.56	96.36	96.16	95.90	95.75	95.56	95.36
S208	0.1961	99.92	99.65	99.38	99.05	98.76	98.46	98.15	97.87	97.55	97.30	96.97	96.64	96.42	96.21	95.95	95.79	95.63	95.48
S209	0.1960	99.94	99.71	99.43	99.13	98.81	98.48	98.09	97.81	97.43	97.18	96.89	96.65	96.42	96.20	95.96	95.80	95.64	95.48
S210	0.1961	99.89	99.66	99.42	99.10	98.80	98.48	98.16	97.81	97.49	97.16	96.83	96.58	96.38	96.15	95.91	95.76	95.60	95.44
S211	0.1961	99.90	99.63	99.36	99.03	98.70	98.41	98.03	97.68	97.36	97.03	96.70	96.37	96.15	95.92	95.68	95.53	95.33	95.18
S212	0.1960	99.89	99.66	99.42	99.13	98.84	98.51	98.13	97.78	97.40	97.11	96.78	96.45	96.25	96.05	95.79	95.63	95.44	95.25
S213	0.1962	99.95	99.72	99.48	99.15	98.85	98.56	98.18	97.90	97.58	97.33	97.05	96.80	96.57	96.37	96.13	95.97	95.81	95.65
S214	0.1915	99.94	99.70	99.47	99.18	98.89	98.59	98.21	97.93	97.55	97.26	96.93	96.60	96.39	96.19	95.96	95.80	95.60	95.41
S215	0.1918	99.88	99.65	99.41	99.08	98.79	98.50	98.18	97.84	97.45	97.17	96.88	96.60	96.40	96.17	95.93	95.78	95.58	95.42
S216	0.1916	99.90	99.62	99.39	99.09	98.80	98.47	98.15	97.87	97.56	97.31	96.98	96.73	96.50	96.30	96.04	95.88	95.73	95.58
S217	0.1916	99.93	99.69	99.42	99.09	98.80	98.50	98.11	97.77	97.38	97.05	96.77	96.52	96.32	96.11	95.87	95.68	95.48	95.33
S218	0.1915	99.97	99.70	99.42	99.09	98.80	98.50	98.11	97.77	97.38	97.05	96.80	96.47	96.25	96.05	95.78	95.59	95.44	95.29
S219	0.1915	99.95	99.68	99.44	99.14	98.85	98.52	98.14	97.80	97.41	97.16	96.91	96.58	96.36	96.13	95.89	95.70	95.51	95.31
S220	0.1915	99.87	99.64	99.36	99.04	98.74	98.45	98.06	97.71	97.33	97.05	96.80	96.55	96.32	96.13	95.86	95.67	95.52	95.36
S221	0.1915	99.94	99.70	99.43	99.10	98.80	98.47	98.09	97.81	97.43	97.14	96.81	96.52	96.32	96.10	95.86	95.67	95.51	95.35
S222	0.1914	99.91	99.68	99.44	99.11	98.82	98.49	98.18	97.83	97.45	97.20	96.87	96.53	96.33	96.13	95.89	95.73	95.57	95.37
S223	0.1916	99.87	99.64	99.40	99.08	98.78	98.48	98.16	97.81	97.43	97.14	96.86	96.53	96.33	96.13	95.88	95.73	95.58	95.39
S224	0.1917	99.96	99.72	99.49	99.19	98.90	98.57	98.18	97.83	97.52	97.23	96.98	96.73	96.53	96.31	96.05	95.90	95.74	95.58
S225	0.1916	99.94	99.67	99.43	99.13	98.83	98.54	98.15	97.81	97.49	97.24	96.99	96.70	96.48	96.28	96.02	95.86	95.70	95.55
Ave.	0.1939	99.92	99.67	99.42	99.11	98.81	98.50	98.14	97.81	97.45	97.17	96.88	96.58	96.37	96.16	95.91	95.75	95.58	95.41
Med.	0.1960	99.92	99.68	99.42	99.10	98.81	98.49	98.15	97.81	97.44	97.16	96.88	96.58	96.36	96.15	95.90	95.75	95.58	95.39
St dev	0.0023	0.0288	0.0296	0.0327	0.0411	0.0445	0.0452	0.0523	0.0610	0.0718	0.0871	0.0872	0.0987	0.0980	0.1008	0.0998	0.1071	0.1133	0.1166
Min.	0.1914	99.87	99.62	99.36	99.03	98.70	98.41	98.03	97.68	97.31	97.03	96.70	96.37	96.15	95.92	95.68	95.53	95.33	95.18
Max.	0.1962	99.97	99.72	99.49	99.19	98.90	98.59	98.25	97.93	97.58	97.33	97.05	96.80	96.57	96.37	96.13	95.97	95.81	95.65

3.44 Data Set 9, 105°C, 200mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	5.770	5.763	5.762	5.758	5.762	5.755	5.758	5.748	5.751	5.750	5.746	5.743	5.746	5.739	5.741	5.735	5.737	5.743	5.741
S202	5.767	5.760	5.767	5.764	5.760	5.754	5.754	5.758	5.752	5.746	5.743	5.737	5.740	5.735	5.734	5.735	5.733	5.729	5.729
S203	5.774	5.770	5.770	5.766	5.772	5.769	5.762	5.755	5.764	5.751	5.752	5.754	5.749	5.743	5.742	5.741	5.746	5.745	5.735
S204	5.759	5.755	5.751	5.756	5.750	5.749	5.750	5.748	5.740	5.744	5.734	5.732	5.732	5.730	5.728	5.727	5.725	5.719	5.721
S205	5.764	5.765	5.760	5.762	5.755	5.758	5.752	5.745	5.747	5.746	5.739	5.748	5.744	5.737	5.731	5.732	5.731	5.737	5.728
S206	5.766	5.762	5.762	5.760	5.754	5.755	5.756	5.751	5.753	5.745	5.742	5.742	5.742	5.735	5.735	5.729	5.733	5.730	5.737
S207	5.762	5.758	5.755	5.754	5.750	5.747	5.749	5.747	5.751	5.741	5.741	5.737	5.738	5.741	5.743	5.730	5.729	5.728	5.722
S208	5.730	5.731	5.725	5.721	5.717	5.725	5.717	5.719	5.717	5.708	5.714	5.703	5.705	5.703	5.699	5.701	5.695	5.701	5.694
S209	5.760	5.756	5.757	5.752	5.748	5.755	5.752	5.744	5.738	5.741	5.745	5.736	5.739	5.741	5.729	5.729	5.728	5.724	5.720
S210	5.779	5.780	5.774	5.770	5.771	5.767	5.764	5.766	5.764	5.763	5.763	5.749	5.751	5.746	5.746	5.746	5.746	5.743	5.743
S211	5.769	5.770	5.761	5.763	5.763	5.760	5.754	5.747	5.758	5.753	5.745	5.742	5.744	5.738	5.737	5.733	5.734	5.729	5.740
S212	5.767	5.759	5.763	5.765	5.755	5.756	5.754	5.756	5.750	5.742	5.751	5.748	5.740	5.738	5.745	5.741	5.736	5.738	5.733
S213	5.766	5.761	5.762	5.758	5.763	5.756	5.753	5.750	5.745	5.745	5.751	5.736	5.737	5.742	5.738	5.737	5.730	5.736	5.730
S214	5.758	5.753	5.754	5.749	5.745	5.749	5.747	5.739	5.736	5.742	5.737	5.737	5.734	5.737	5.731	5.729	5.724	5.719	5.718
S215	5.718	5.719	5.719	5.705	5.712	5.710	5.707	5.702	5.699	5.697	5.694	5.698	5.690	5.690	5.687	5.685	5.688	5.682	5.678
S216	5.761	5.758	5.757	5.759	5.753	5.756	5.751	5.740	5.740	5.746	5.739	5.742	5.737	5.730	5.740	5.728	5.728	5.727	5.731
S217	5.746	5.742	5.738	5.744	5.740	5.741	5.741	5.735	5.733	5.731	5.728	5.727	5.719	5.715	5.715	5.718	5.717	5.710	5.712
S218	5.748	5.743	5.743	5.744	5.740	5.739	5.733	5.731	5.729	5.725	5.730	5.728	5.719	5.729	5.716	5.714	5.712	5.708	5.708
S219	5.746	5.747	5.742	5.742	5.739	5.739	5.735	5.733	5.733	5.731	5.730	5.730	5.730	5.715	5.718	5.718	5.711	5.710	5.710
S220	5.752	5.745	5.753	5.739	5.745	5.745	5.743	5.730	5.735	5.736	5.734	5.736	5.728	5.720	5.721	5.719	5.726	5.718	5.714
S221	5.753	5.750	5.753	5.746	5.751	5.746	5.745	5.738	5.738	5.737	5.734	5.729	5.725	5.722	5.731	5.722	5.721	5.719	5.715
S222	5.750	5.746	5.745	5.742	5.741	5.742	5.735	5.728	5.735	5.726	5.729	5.722	5.723	5.721	5.717	5.722	5.713	5.720	5.714
S223	5.765	5.761	5.766	5.756	5.763	5.756	5.753	5.755	5.749	5.743	5.741	5.745	5.735	5.743	5.737	5.739	5.730	5.727	5.729
S224	5.753	5.746	5.749	5.749	5.744	5.745	5.738	5.743	5.742	5.731	5.728	5.732	5.728	5.731	5.720	5.723	5.723	5.719	5.719
S225	5.746	5.738	5.747	5.744	5.733	5.737	5.733	5.727	5.724	5.725	5.725	5.727	5.725	5.725	5.718	5.717	5.713	5.716	5.708
Ave.	5.757	5.754	5.753	5.751	5.749	5.748	5.745	5.742	5.741	5.738	5.736	5.734	5.732	5.730	5.728	5.726	5.725	5.723	5.721
Med.	5.760	5.756	5.755	5.754	5.750	5.749	5.750	5.744	5.740	5.742	5.739	5.736	5.735	5.735	5.731	5.729	5.728	5.724	5.721
St dev	0.0136	0.0133	0.0131	0.0144	0.0145	0.0127	0.0134	0.0138	0.0145	0.0141	0.0136	0.0130	0.0139	0.0136	0.0143	0.0133	0.0136	0.0142	0.0151
Min.	5.718	5.719	5.719	5.705	5.712	5.710	5.707	5.702	5.699	5.697	5.694	5.698	5.690	5.690	5.687	5.685	5.688	5.682	5.678
Max.	5.779	5.780	5.774	5.770	5.772	5.769	5.764	5.766	5.764	5.763	5.763	5.754	5.751	5.746	5.746	5.746	5.746	5.745	5.743

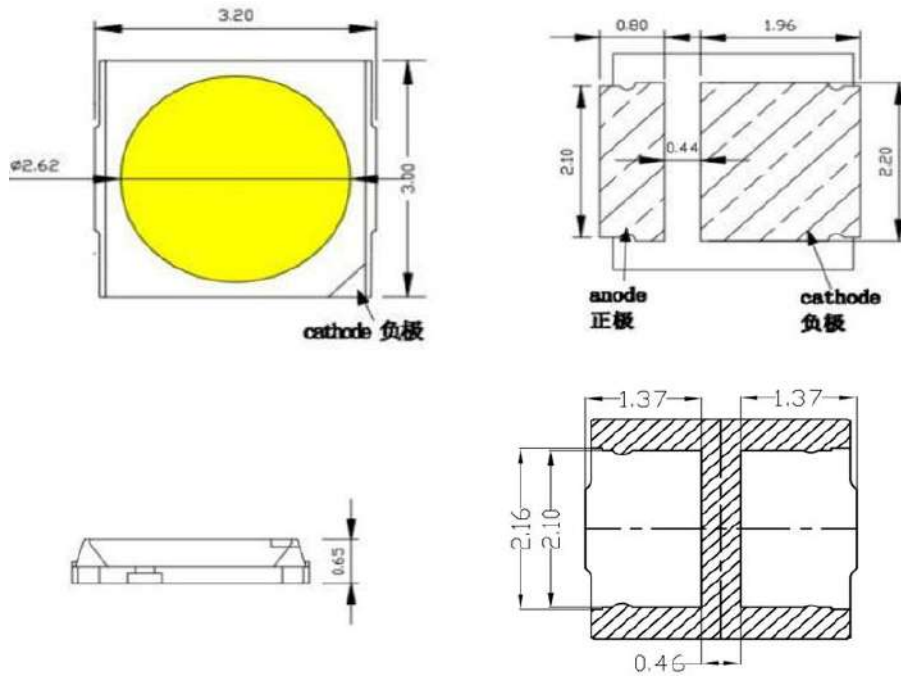
3.45 Data Set 9, 105°C, 200mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)																	
	0hr (Initial)			1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s	18000hrs s
S201	0.2555	0.5283	2846	0.0002	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0041	0.0044	0.0046
S202	0.2553	0.5278	2852	0.0002	0.0004	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019	0.0021	0.0024	0.0027	0.0029	0.0031	0.0033	0.0035	0.0038	0.0041	0.0044
S203	0.2556	0.5288	2841	0.0003	0.0005	0.0007	0.0009	0.0012	0.0016	0.0019	0.0020	0.0024	0.0026	0.0029	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043	0.0046
S204	0.2561	0.5292	2828	0.0003	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0024	0.0027	0.0030	0.0032	0.0034	0.0036	0.0039	0.0041	0.0044
S205	0.2550	0.5295	2852	0.0003	0.0005	0.0007	0.0010	0.0013	0.0016	0.0019	0.0020	0.0024	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037	0.0039	0.0041	0.0043
S206	0.2548	0.5286	2859	0.0002	0.0005	0.0008	0.0010	0.0012	0.0016	0.0018	0.0019	0.0023	0.0024	0.0027	0.0030	0.0032	0.0035	0.0038	0.0040	0.0042	0.0044
S207	0.2553	0.5297	2844	0.0003	0.0005	0.0007	0.0011	0.0014	0.0017	0.0020	0.0022	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0044	0.0047	0.0049
S208	0.2549	0.5281	2860	0.0002	0.0005	0.0007	0.0009	0.0013	0.0016	0.0017	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0036	0.0039	0.0042	0.0045	0.0047
S209	0.2546	0.5280	2867	0.0003	0.0006	0.0009	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0026	0.0029	0.0032	0.0034	0.0036	0.0039	0.0042	0.0045	0.0048
S210	0.2546	0.5280	2867	0.0003	0.0006	0.0009	0.0011	0.0013	0.0016	0.0019	0.0022	0.0023	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0045	0.0048
S211	0.2549	0.5283	2860	0.0003	0.0005	0.0007	0.0009	0.0013	0.0017	0.0019	0.0022	0.0025	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0047
S212	0.2547	0.5279	2865	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0036	0.0038	0.0040	0.0043
S213	0.2549	0.5285	2859	0.0003	0.0006	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0024	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037	0.0039	0.0041	0.0044
S214	0.2548	0.5285	2860	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0038	0.0040	0.0043
S215	0.2548	0.5283	2861	0.0003	0.0005	0.0007	0.0011	0.0013	0.0017	0.0020	0.0023	0.0025	0.0028	0.0030	0.0033	0.0036	0.0039	0.0042	0.0045	0.0047	0.0050
S216	0.2551	0.5289	2853	0.0002	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0021	0.0024	0.0026	0.0029	0.0031	0.0033	0.0035	0.0038	0.0040	0.0043
S217	0.2554	0.5294	2843	0.0003	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0027	0.0030	0.0033	0.0035	0.0037	0.0040	0.0042	0.0044
S218	0.2552	0.5298	2846	0.0003	0.0006	0.0008	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0029	0.0032	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046
S219	0.2546	0.5281	2868	0.0003	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0040	0.0043	0.0045	0.0048
S220	0.2548	0.5287	2859	0.0003	0.0006	0.0009	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0029	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046	0.0048
S221	0.2546	0.5280	2868	0.0002	0.0005	0.0008	0.0012	0.0014	0.0016	0.0019	0.0023	0.0026	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041	0.0044	0.0046	0.0049
S222	0.2548	0.5296	2854	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0041	0.0044	0.0046
S223	0.2545	0.5281	2869	0.0002	0.0005	0.0008	0.0011	0.0015	0.0018	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0036	0.0039	0.0042	0.0044	0.0047
S224	0.2547	0.5279	2867	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0019	0.0023	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0040	0.0043	0.0045
S225	0.2555	0.5294	2841	0.0003	0.0006	0.0009	0.0011	0.0015	0.0017	0.0020	0.0023	0.0025	0.0028	0.0031	0.0034	0.0036	0.0039	0.0042	0.0044	0.0046	0.0048
Ave.	0.2550	0.5286	2856	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0036	0.0039	0.0041	0.0043	0.0046
Med.	0.2549	0.5285	2859	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041	0.0044	0.0046
St dev	0.0004	0.0006	10.7784	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2545	0.5278	2828	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0035	0.0038	0.0040	0.0043
Max.	0.2561	0.5298	2869	0.0003	0.0006	0.0009	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0045	0.0047	0.0050

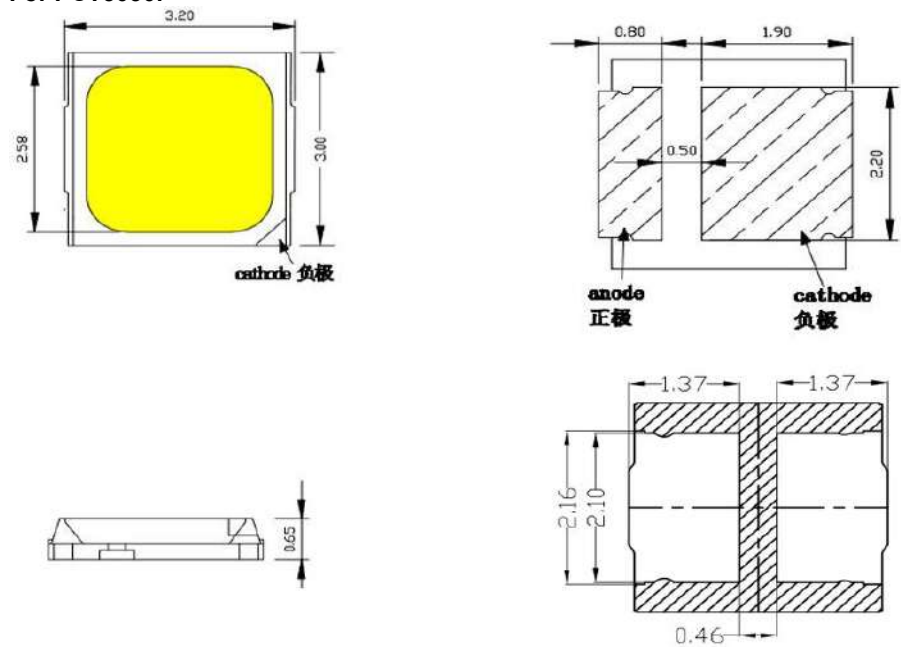
4. EUT Photo

4.1 Mechanical Dimensions

For PCT3030:



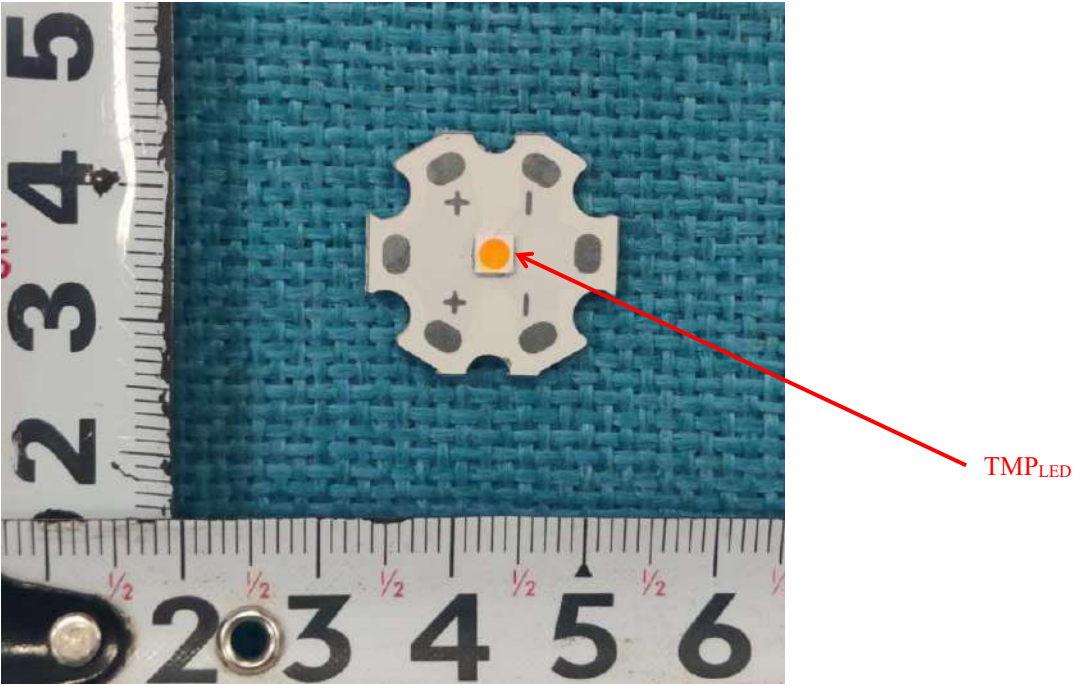
For PCT3030:



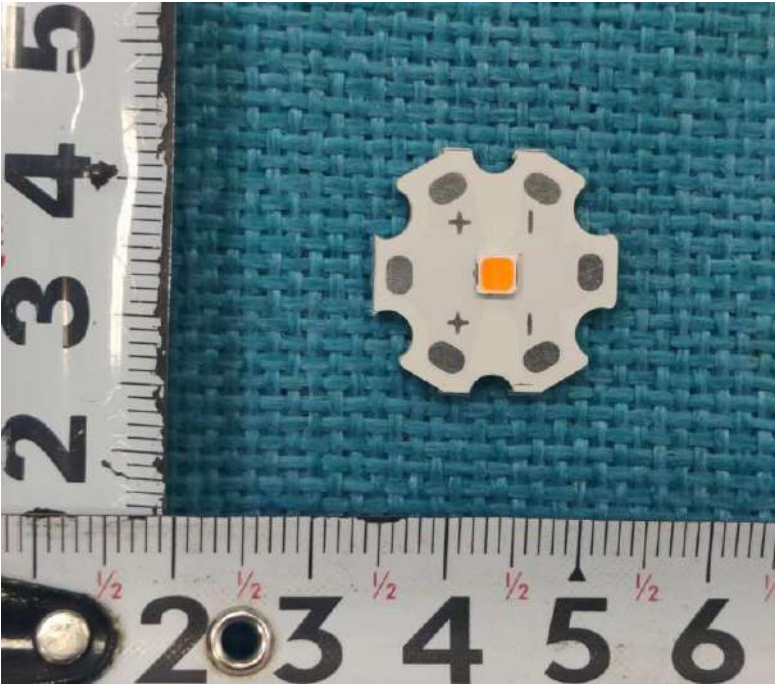
All dimensions are in millimeter

4.2 EUT Photo

For PCT3030 (Test Model):



For PCT3030:



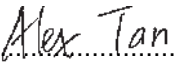
---End of Report---



Test Report issued under the responsibility of

**TEST REPORT****Ordinance no. 62 - February 17, 2022**

**Technical Quality Regulation And The Compliance Assessment
Requirement For Luminaires For Road – Consolidated Street Lighting**

Report Reference No	GZEE240300111201
Tested by (name + signature)	Simon Chen 
Approved by (name + signature)	Alex Tan 
Date of issue	2024-10-18
Total number of pages	116
Testing Laboratory	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Address	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Applicant's name	RAJIX COMERCIAL LTDA
Address	AV REPUBLICA ARGENTINA, 1505, SALA 2012, AGUA VERDE, CURITIBA, PARANA, BRASIL
Manufacturer's name	
Address	
Test specification:	
Standard	Ordinance no. 62 – February 17, 2022
Test procedure	INMETRO
Non-standard test method	None
Test Report Form No	62/2022_A
Test Report Form(s) Originator	SGS-CSTC
Master TRF	2022-03-24
Test item description	LED ROAD LIGHTING
Trade Mark	—
Factory	
Model/Type reference	Detail see “General product information”
Ratings	Detail see “General product information”

**Summary of testing:**

The samples tested comply with the requirements of Ordinance no. 62 – February 17, 2022.

Models YR24045-60-L, YR24045-60-H, YR20045-40-L, YR15045-50-L, YR05045-60-L, YR15045-40-H, YR20045-50-H and YR10045-30-H were selected for the full tests at 127 V & 220 V because they have the Max. wattage and CCT. For the other models, tests were conducted according to clause 4.2.1 – 4.2.7 & 4.2.9 - 4.2.11.

Test item particulars.....:

Luminaire type: ☒ LED Luminaires / ☐ Discharge Luminaires

Mass of the equipment: Max. 2.84 kg for YR24045-60-H

Possible test case verdicts:

- test case does not apply to the test object.....: N/A

- test object does meet the requirement: P (Pass)

- test object does not meet the requirement.....: F (Fail)

Testing.....:

Date of receipt of test item.....: 2024-03-22

Date (s) of performance of tests.....: 2024-03-22 to 2024-08-27

General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

When determining for test conclusion, measurement uncertainty of tests has been considered.

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General product information:

Product information table:

No.	Model number	Ratings	Luminous intensity distributions
1.	YR24045-40-L	100 – 260 VAC, 50/60 Hz, 2.4 A, 240 W, 31200 lm, 130 lm/W, FP: ≥ 0.92 , 4000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
2.	YR20045-40-L	100 – 260 VAC, 50/60 Hz, 2 A, 200 W, 26000 lm, 130 lm/W, FP: ≥ 0.92 , 4000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
3.	YR15045-40-L	100 – 260 VAC, 50/60 Hz, 1.5 A, 150 W, 19500 lm, 130 lm/W, FP: ≥ 0.92 , 4000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
4.	YR10045-40-L	100 – 260 VAC, 50/60 Hz, 0.9 A, 100 W, 13000 lm, 130 lm/W, FP: ≥ 0.92 , 4000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
5.	YR05045-40-L	100 – 260 VAC, 50/60 Hz, 0.46 A, 50 W, 6500 lm, 130 lm/W, FP: ≥ 0.92 , 4000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
6.	YR24045-50-L	100 – 260 VAC, 50/60 Hz, 2.4 A, 240 W, 31200 lm, 130 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
7.	YR20045-50-L	100 – 260 VAC, 50/60 Hz, 2 A, 200 W, 26000 lm, 130 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
8.	YR15045-50-L	100 – 260 VAC, 50/60 Hz, 1.5 A, 150 W, 19500 lm, 130 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
9.	YR10045-50-L	100 – 260 VAC, 50/60 Hz, 0.9 A, 100 W, 13000 lm, 130 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
10.	YR05045-50-L	100 – 260 VAC, 50/60 Hz, 0.46 A, 50 W, 6500 lm, 130 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
11.	YR24045-60-L	100 – 260 VAC, 50/60 Hz, 2.4 A, 240 W, 31200 lm, 130 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
12.	YR20045-60-L	100 – 260 VAC, 50/60 Hz, 2 A, 200 W, 26000 lm, 130 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
13.	YR15045-60-L	100 – 260 VAC, 50/60 Hz, 1.5 A, 150 W, 19500 lm, 130 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
14.	YR10045-60-L	100 – 260 VAC, 50/60 Hz, 0.9 A, 100 W, 13000 lm, 130 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited

No.	Model number	Ratings	Luminous intensity distributions
		IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Control of luminous intensity distribution: Limited
15.	YR05045-60-L	100 – 260 VAC, 50/60 Hz, 0.46 A, 50 W, 6500 lm, 130 lm/W, FP: $\geq$ 0.92, 6500 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
16.	YR24045-30-L	100 – 260 VAC, 50/60 Hz, 2.4 A, 240 W, 31200 lm, 130 lm/W, FP: $\geq$ 0.92, 3000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
17.	YR20045-30-L	100 – 260 VAC, 50/60 Hz, 2 A, 200 W, 26000 lm, 130 lm/W, FP: $\geq$ 0.92, 3000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
18.	YR15045-30-L	100 – 260 VAC, 50/60 Hz, 1.5 A, 150 W, 19500 lm, 130 lm/W, FP: $\geq$ 0.92, 3000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
19.	YR10045-30-L	100 – 260 VAC, 50/60 Hz, 0.9 A, 100 W, 13000 lm, 130 lm/W, FP: $\geq$ 0.92, 3000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
20.	YR05045-30-L	100 – 260 VAC, 50/60 Hz, 0.46 A, 50 W, 6500 lm, 130 lm/W, FP: $\geq$ 0.92, 3000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
21.	YR24045-40-H	100 – 260 VAC, 50/60 Hz, 2.65 A, 240 W, 36000 lm, 150 lm/W, FP: $\geq$ 0.92, 4000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
22.	YR20045-40-H	100 – 260 VAC, 50/60 Hz, 2.3 A, 200 W, 30000 lm, 150 lm/W, FP: $\geq$ 0.92, 4000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
23.	YR15045-40-H	100 – 260 VAC, 50/60 Hz, 1.8 A, 150 W, 22500 lm, 150 lm/W, FP: $\geq$ 0.92, 4000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
24.	YR10045-40-H	100 – 260 VAC, 50/60 Hz, 1.3 A, 100 W, 15000 lm, 150 lm/W, FP: $\geq$ 0.92, 4000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
25.	YR05045-40-H	100 – 260 VAC, 50/60 Hz, 0.53 A, 50 W, 7500 lm, 150 lm/W, FP: $\geq$ 0.92, 4000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
26.	YR24045-50-H	100 – 260 VAC, 50/60 Hz, 2.65 A, 240 W, 36000 lm, 150 lm/W, FP: $\geq$ 0.92, 5000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
27.	YR20045-50-H	100 – 260 VAC, 50/60 Hz, 2.3 A, 200 W, 30000 lm, 150 lm/W, FP: $\geq$ 0.92, 5000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
28.	YR15045-50-H	100 – 260 VAC, 50/60 Hz, 1.8 A, 150 W, 22500 lm, 150 lm/W, FP: $\geq$ 0.92, 5000 K, IRC $\geq$ 70, Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited

No.	Model number	Ratings	Luminous intensity distributions
			distribution: Limited
29.	YR10045-50-H	100 – 260 VAC, 50/60 Hz, 1.3 A, 100 W, 15000 lm, 150 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
30.	YR05045-50-H	100 – 260 VAC, 50/60 Hz, 0.53 A, 50 W, 7500 lm, 150 lm/W, FP: ≥ 0.92 , 5000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
31.	YR24045-60-H	100 – 260 VAC, 50/60 Hz, 2.65 A, 240 W, 36000 lm, 150 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
32.	YR20045-60-H	100 – 260 VAC, 50/60 Hz, 2.3 A, 200 W, 30000 lm, 150 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
33.	YR15045-60-H	100 – 260 VAC, 50/60 Hz, 1.8 A, 150 W, 22500 lm, 150 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
34.	YR10045-60-H	100 – 260 VAC, 50/60 Hz, 1.3 A, 100 W, 15000 lm, 150 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
35.	YR05045-60-H	100 – 260 VAC, 50/60 Hz, 0.53 A, 50 W, 7500 lm, 150 lm/W, FP: ≥ 0.92 , 6500 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
36.	YR24045-30-H	100 – 260 VAC, 50/60 Hz, 2.65 A, 240 W, 36000 lm, 150 lm/W, FP: ≥ 0.92 , 3000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
37.	YR20045-30-H	100 – 260 VAC, 50/60 Hz, 2.3 A, 200 W, 30000 lm, 150 lm/W, FP: ≥ 0.92 , 3000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
38.	YR15045-30-H	100 – 260 VAC, 50/60 Hz, 1.8 A, 150 W, 22500 lm, 150 lm/W, FP: ≥ 0.92 , 3000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
39.	YR10045-30-H	100 – 260 VAC, 50/60 Hz, 1.3 A, 100 W, 15000 lm, 150 lm/W, FP: ≥ 0.92 , 3000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited
40.	YR05045-30-H	100 – 260 VAC, 50/60 Hz, 0.53 A, 50 W, 7500 lm, 150 lm/W, FP: ≥ 0.92 , 3000 K, IRC ≥ 70 , Life: 100 kh, IP66, IK08	Cross-sectional distribution: Type II; Longitudinal distribution: Short; Control of luminous intensity distribution: Limited

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
Annex I - Regulation Technician of Quality Towards Fixtures Towards The Lighting Public Road			
3	Technical requirement Towards Fixtures Used Discharge Lamps		N/A
3.1	Requirements from safety Electric		N/A
3.1.1	The body of the door lamps should be porcelain; the conductive parts must be nickel-plated brass with Threads E-27/27 or E-40/40, central contact, with spring effect and wetting device; the terminals and screws for fixing the conductors must be nickel-nickel-nickeled brass, according to ABNT NBR IEC 60238:2005 (Edison Screw Lamp Holder).		N/A
3.1.2	The lamp holder or adjustable optical parts must contain the appropriate reference marks, according to ABNT NBR IEC 60238:2005 (Edison Screw Lamp Holder).		N/A
3.1.3	The luminaire must be provided with adequate anchorage, so that the conductors of the power cables are relieved of mechanical request at the points where they are connected to the terminals, when, without the anchorage, the weight of the power cables would exert a request on the connections.		N/A
3.1.3.1	The luminaire must already have the internal wiring necessary for its connection, identifying the cable corresponding to the central contact of the lamp		N/A
3.1.4	The photoelectric circuit socket (where applicable) must be electrically insulating material and its contacts must be tinned brass and suitable to support rated current of 10 A.		N/A
3.1.5	The luminaire enclosure shall ensure the degree of protection against the penetration of dust, solid objects and moisture, according to the classification of the luminaire and the IP code marked on the luminaire.		N/A
3.1.5.1	Luminaires must have the following minimum degrees of protection, according to ABNT NBR IEC 60598-1:2010 (Luminaires - Part 1: General requirements and tests):		N/A
	- IP-65 for optical compartment		N/A
	- IP-44 to reactor compartment		N/A
3.1.6	The insulation resistance and dielectric stiffness must be adequate, so that the luminaire is free of electrical insulation failures so that, at the operating temperature, the leakage current of the appliance is not excessive		N/A
3.1.7	Filters should be provided for the suppression of electromagnetic interference and radio frequency		N/A
3.1.7.1	Electromagnetic reactors for discharge lamps must meet the requirements according to the current Inmetro Ordinance.		N/A
3.1.8	The voltage increase of the reference sodium vapor lamp, when installed in the luminaire fed at		N/A

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	the rated voltage, shall not exceed the maximum values specified in Table 1 below		
3.1.9	Luminaires must have resistance to the external mechanical impacts to which they are subjected in the conditions of use.		N/A
3.1.9.1	Luminaires must have at least the degree of protection IK08, according to ABNT NBR IEC 62262:2015 (Degrees of protection ensured by electrical equipment enclosures against external mechanical impacts (IK Code)).		N/A
3.2	Requirements from performance		N/A
3.2.1	The luminaires must meet the minimum energy efficiency (EE) of 70 lm/W, as well as be classified in the Energy Efficiency classes of Table 2		N/A
3.2.1.1	The measured energy efficiency may not be lower than the acceptable minimum values defined in Table 2, nor less than 90% of the declared energy efficiency value		N/A
3.2.2	The luminaire should be classified according to the distributions of transverse and longitudinal illuminous intensity, according to the categories listed in Table 3		N/A
3.2.3	The luminaire should be classified as light distribution control (CDL) for each elevation angle declared as possible for installation (0°, 5°, 10°, 15°), in the categories specified in Table 4		N/A
3.2.4	The luminaire must have the following resistances to ultraviolet radiation		N/A
	(a) thermoplastic or polymeric components subject to time exposure shall not present premature degradation that compromises the operational performance of luminaires;		N/A
	(b) the transparency of polymer lenses and refractors shall not be less than 90% of the initial value; and		N/A
	(c) Refractors shall be designed against UV rays and with uniform thickness in order to avoid distortions in the photometric curve		N/A
3.2.5	The luminaire must not become unsafe or have premature failure under cyclic cooling and cooling conditions in service.		N/A
3.2.6	In conditions that represent abnormal operating conditions, parts of the luminaire and its mounting surface cannot reach excessive temperatures and wiring inside the luminaire cannot become unsafe.		N/A
4	Requirements Technical Towards Fixtures With Technology LED		P
4.1	Requirements from safety Electric		P
4.1.1	Luminaires must be designed to work under the following conditions of use:		P
	a) altitude not exceeding 1500 m		P
	(b) average ambient air temperature over a period of 24 h, not exceeding + 35 °C		P

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	c) ambient air temperature between - 5 °C and + 50 °C; and		P
	d) Relative humidity up to 100%.		P
4.1.2	Luminaires must be individually packed in packages suitable for the type of transport (where applied) and the normal loading, unloading, handling and storage operations		P
4.1.3	The luminaire must be provided with adequate anchorage, so that the conductors of the power cables are relieved of mechanical request at the points where they are connected to the terminals.		P
4.1.4	The photoelectric circuit socket (where applicable) must have insulation resistance, dielectric stiffness, the ability to conduct currents of the appropriate contacts and mechanical fixation of the appropriate conductors, in order to avoid the risk of electric shock, overheating and undue unlocking of pins and cables:		N/A
4.1.5	The luminaire enclosure shall ensure the degree of protection against the penetration of dust, solid objects and moisture, according to the classification of the luminaire and the IP code marked on the luminaire		P
4.1.5.1	The housings of vital parts (LED, secondary optical system and controller) must have at least IP66 protection, according to ABNT NBR IEC 60598-1:2010 (Luminaires - Part 1: General requirements and tests).	IP66	P
4.1.5.2	If the controller is IP-65 or higher, the controller housing on the luminaire must be at least IP-44.		P
4.1.6	The insulation resistance and dielectric stiffness must be adequate, so that the luminaire is free of electrical insulation failures so that, at the operating temperature, the leakage current of the appliance is not excessive		P
	Right after the moisture test of item 9.3 of ABNT NBR IEC 60598-1, the luminaire shall be subject to the insulation resistance test as per ABNT NBR IEC 60598-1.		P
	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (M)		—
	SELV		P
	- between current-carrying parts of different polarity	> 20 M	P
	- between current-carrying parts and mounting surface	> 20 M	P
	- between current-carrying parts and metal parts of the luminaire	> 20 M	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage		N/A

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	and accessible metal parts.....:		
	- Insulation bushings		N/A
	Other than SELV		P
	- between live parts of different polarity	> 20 M	P
	- between live parts and mounting surface	> 20 M	P
	- between live parts and metal parts.....:	> 20 M	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:		N/A
	- Insulation bushings		N/A
	Electric strength test		P
	Test voltage (V)		P
	SELV		P
	- between current-carrying parts of different polarity	500 V	P
	- between current-carrying parts and mounting surface	500 V	P
	- between current-carrying parts and metal parts of the luminaire.....:	500 V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:		N/A
	- Insulation bushings		N/A
	Other than SELV		P
	- between live parts of different polarity	1520 V	P
	- between live parts and mounting surface	1520 V	P
	- between live parts and metal parts.....:	1520 V	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:		N/A
	- Insulation bushings.....:		N/A
4.1.7	Leakage current that may occur during normal use of the luminaire may not cause a risk of electric shock		P
	The luminaire shall be subjected to the leakage current test according to ABNT		P

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	NBR IEC 60598-1.		
	Touch current or protective conductor current (mA):	1.2 mA	P
4.1.8	Luminaires must be constructed in such a way that their living parts are not accessible when the luminaire is electrically installed and connected for normal use.		P
ABNT NBR IEC 60598-1	The luminaire shall be subjected to the leakage current test according to ABNT NBR IEC 60598-1.		P
8.2.3 c)	For ordinary class III luminaires, the voltage under no-load exceeds 25 V r.m.s. or 60 V d.c., the touch current measured (mA):		N/A
	If the voltages or currents exceed the values given above, at least one of the conductive parts in the SELV circuit shall be insulated by insulation, withstanding:		N/A
8.2.5	Standard test finger and with force of 10 N test against electric shock		P
8.2.6	A force is applied to covers whose fixing is not dependent on screws:	☐ 20 N ☐ 80 N	N/A
8.2.7	Capacitor discharge test, Max. discharged voltage (V):	4 V	P
4.1.9	Filters should be provided on the controller (driver) for suppression of electromagnetic interference and radio frequency.		P
	Conformity is verified by submitting the controller to one of the following standards: EN 55015 or CISPR 15.		P
4.1.10	Luminaires must have a resistance to external mechanical impacts to which they are subject under the conditions of use		P
4.1.10.1	Luminaires must have at least the degree of protection IK08, according to ABNT NBR IEC 62262:2015 (Degrees of protection ensured by electrical equipment enclosures against external mechanical impacts (IK Code)).	IK08	P
4.1.11	The screws used in the luminaires and connections intended for the installation of the luminaires shall not show any deformation during tightening and untightening or causing deformation or breakage of the luminaire		P
ABNT NBR IEC 60598-1	The screws used to make the luminaires and the connections for installation of the luminaires shall be tested according to standard ABNT NBR IEC 60598-1 and shall not show any deformation during tightening or untightening or cause deformations and/or break the luminaires.		P
	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :	0.5; enclosure	P

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
	Locked connections:		N/A
	- fixed arms; torque (Nm):		N/A
	- lampholder; torque (Nm):		N/A
	- push-button switches; torque 0,8 Nm:		N/A
	Screwed glands; force (Nm):		N/A
4.1.12	Must be resistant to the force of the wind to which they are subject when in normal use.		P
ABNT NBR 15129	The luminaires must withstand the wind forces, as per standard ABNT NBR 15129.		P
7.3	Static load test (10 min)		P
4.1.13	Luminaires must continue to function in vibration situations to which they are subject when in normal use, and may not present any electrical or mechanical failures such as cracks, breaks, warps, opening of the fasteners and others that may compromise their performance.		P
ABNT NBR IEC 60598-1	The luminaires must be resistant to vibration, according to ABNT NBR IEC 60598-1. The test must be made with the luminaire completely mounted with all the components.		P
	To be considered approved in the test, in addition to the evaluations provided in ABNT NBR IEC 60598-1, the luminaires must operate after the test the same way as before the test and shall present any electric or mechanic failures such as cracks, breaks, warp, locks opening, and others that may impair their performance.		P
4.2	Requirements from performance		P
4.2.1	The total power of the circuit, at the rated voltage, shall not exceed 110% of the declared value		P
4.2.2	The power factor of the luminaires must meet the following requirements		P
4.2.2.1	The measured power factor of the circuit cannot be lower than the value declared by more than 0.05, when the luminaire is fed with nominal voltage and frequency	See table 1 & 2	P
4.2.2.2	The power factor must be equal to or greater than 0.92.	See table 1 & 2	P
4.2.3	The voltage and output current conditions of the control device during operation must be as follows.		P
4.2.3.1	For control devices with unstabilized output voltage, when powered with the rated voltage, the output voltage may not differ more than $\pm 10\%$ from the rated voltage of the LED modules.		N/A
4.2.3.2	For control devices with a stabilized output voltage, when powered at any voltage between		N/A

Page 12 of 16

Report No. 0222 10000 1120

Ordinance no. 62/2022																																				
Clause	Requirement + Test	Result - Remark	Verdict																																	
	92% and 106% of the rated voltage, the output voltage may not differ more than $\pm 10\%$ from the rated voltage of the LED modules																																			
4.2.3.3	For control devices with unstabilized output current, when powered with the rated voltage, the output current may not differ more than $\pm 10\%$ from the rated current of the LED modules.		N/A																																	
4.2.3.4	For control devices with stabilized output current, when fed at any voltage between 92% and 106% of the rated voltage, the output current may not present superfluous variation to $\pm 10\%$ of the rated current of the LED modules	See table 1	P																																	
4.2.3.5	The Luminaire with LED technology must have a voltage surge protection device		P																																	
4.2.4	The power current, in the rated voltage, may not differ by more than 10% from the declared value in the control device or in the supplier's literature		P																																	
4.2.4.1	The harmonics of the power supply current must comply with IEC 61000-3-2:2014 ((Electromagnetic compatibility (EMC) - Limits Is harmonic Current emissions (equipment input Current 16 The Per phase))).		P																																	
4.2.5	The luminaires must meet the minimum energy efficiency (EE) of 68 lm/W, as well as be classified in the Energy Efficiency classes of Table 5.		P																																	
4.2.5.1	The average measured energy efficiency may not be lower than the minimum acceptable values defined in Table 5, nor less than 90% of the declared energy efficiency value.		P																																	
4.2.6	The nominal color temperature (CBT) of a lamp should be between 2700 K and 6500 K, following the variations established in Table 6. <table><tr><th colspan="3">Color temperature (K)</th></tr><tr><th>Minimum Value</th><th>Declared Value</th><th>Maximum Value</th></tr><tr><td>2 580</td><td>2 700</td><td>2 870</td></tr><tr><td>2 870</td><td>3 000</td><td>3 220</td></tr><tr><td>3 220</td><td>3 500</td><td>3 710</td></tr><tr><td>3 710</td><td>4 000</td><td>4 260</td></tr><tr><td>4 260</td><td>4 500</td><td>4 746</td></tr><tr><td>4 746</td><td>5 000</td><td>5 312</td></tr><tr><td>5 312</td><td>5 700</td><td>6 022</td></tr><tr><td>6 022</td><td>6 500</td><td>7 042</td></tr><tr><td>TCC Flexible (2800 – 5600K)</td><td colspan="2">$TF^2 = \Delta T^2$</td></tr></table> 1) TF shall be selected in steps of 100 K (2 800, 2 900, 6 400 K), excluding the nominal TCC values listed above. 2) ΔT shall be calculated by $\Delta T = 1.1900 \times 10^{-8} \times T^3 - 1.5454 \times 10^{-4} \times T^2 + 0.7168 \times T - 902.55$	Color temperature (K)			Minimum Value	Declared Value	Maximum Value	2 580	2 700	2 870	2 870	3 000	3 220	3 220	3 500	3 710	3 710	4 000	4 260	4 260	4 500	4 746	4 746	5 000	5 312	5 312	5 700	6 022	6 022	6 500	7 042	TCC Flexible (2800 – 5600K)	$TF^2 = \Delta T^2$		See table 1	P
Color temperature (K)																																				
Minimum Value	Declared Value	Maximum Value																																		
2 580	2 700	2 870																																		
2 870	3 000	3 220																																		
3 220	3 500	3 710																																		
3 710	4 000	4 260																																		
4 260	4 500	4 746																																		
4 746	5 000	5 312																																		
5 312	5 700	6 022																																		
6 022	6 500	7 042																																		
TCC Flexible (2800 – 5600K)	$TF^2 = \Delta T^2$																																			
4.2.7	The luminaire must be able to properly reproduce the actual colors of an object or surface when compared to natural light.		P																																	
4.2.7.1	The General Color Reproduction Index (Ra), which characterizes the Color Reproduction Index (IRC), must be greater than or equal to 70 ($Ra \geq 70$).		P																																	
4.2.8	The minimum life expectancy for maintaining the luminous flux of 70% (L70) is 50,000 hours.		P																																	
4.2.9	The built-in control device must have durability compatible with the rated life of the lamp.		P																																	
4.2.10	The luminaire should be classified according to the distributions of transverse and longitudinal illuminous intensity, according to the categories listed in Table 7, for an		P																																	

Page 16 of 16

Report No. 0222/2022-123

Ordinance no. 62/2022																						
Clause	Requirement + Test	Result - Remark	Verdict																			
	installation with an elevation angle of 0°).																					
	Classification of the luminous intensity distributions (3 samples)		P																			
	The luminaires are classifiable, based on ABNT NBR 5101, as to the cross-sectional distribution, longitudinal distribution and distribution control, as per Table 3.		P																			
	Cross-sectional distribution	Type II	P																			
	Longitudinal distribution	Short	P																			
	Control of luminous intensity distribution	Limited	P																			
4.2.11	The luminaire should be classified as for the control of light distribution (CDL), for an installation with an elevation angle of 0°, in the categories specified in Table 8.		P																			
	The luminous distribution control is defined by standard ABNT NBR 5101 and its values shown in below Table. (3 samples)		P																			
	Inform the CDL classification corresponding to the possible angles of elevation at installation, from the following: 0°, 5°, 10°, 15°, as well as meet the requirements according to their classification, as per the limits specified in below Table. (3 samples)		P																			
	<table><tr><th colspan="3">LUMINOUS DISTRIBUTION CONTROL - CDL</th></tr><tr><th>Type of luminaire</th><th colspan="2">CDL(%) = (Cd x 100) / luminaire flux</th></tr><tr><th></th><th colspan="2">ENCE</th></tr><tr><td rowspan="2">Totally limited</td><td>above 90°</td><td>0</td></tr><tr><td>above 80° & to 90°</td><td>≤ 10</td></tr><tr><td rowspan="2">Limited</td><td>above 90°</td><td>≤ 2.5</td></tr><tr><td>above 80° & to 90°</td><td>≤ 10</td></tr></table>	LUMINOUS DISTRIBUTION CONTROL - CDL			Type of luminaire	CDL(%) = (Cd x 100) / luminaire flux			ENCE		Totally limited	above 90°	0	above 80° & to 90°	≤ 10	Limited	above 90°	≤ 2.5	above 80° & to 90°	≤ 10	Limited	P
LUMINOUS DISTRIBUTION CONTROL - CDL																						
Type of luminaire	CDL(%) = (Cd x 100) / luminaire flux																					
	ENCE																					
Totally limited	above 90°	0																				
	above 80° & to 90°	≤ 10																				
Limited	above 90°	≤ 2.5																				
	above 80° & to 90°	≤ 10																				
4.2.12	The luminaire must have the following resistances to ultraviolet radiation:		P																			
	(a) lenses and polymer refractors subject to time exposure shall not have premature degradation that compromises the operational performance of luminaires;		P																			
	(b) the transparency of polymer lenses and refractors shall not be less than 90% of the initial value; and	91.24%	P																			
	(c) Refractors shall be designed against UV rays and with uniform thickness in order to avoid distortions in the photometric curve		P																			
	The thermoplastic components subject to exposure to the weather must be submitted to weather tests based on standard ASTM G154, cycle 3, in UV chamber with exposure time of 2016 hours. After the test, the parts shall not show degradation that impairs the operational performance of the luminaires.	See Annex 2	P																			
5	Requirements from markings and instructions		P																			
5.1	Markings must be indicated legibly and indelible on the luminaire, by means of adhesive, engraving or other method that guarantees readability and indelebility. Additionally, the luminaires must present the following information, in addition to those established in the ABNT NBR 15129:2012 standard (Lighting Fixtures - Particular Requirements):		P																			
	(a) number of luminaire manufacturing serials; and		P																			

Ordinance no. 62/2022			
Clause	Requirement + Test	Result - Remark	Verdict
	b) Luminaire model		P
5.2	The instruction leaflet must provide the following information, in addition to those set out in ABNT NBR 15129:2012 (Lighting Fixtures - Particular Requirements):		P
	a) name and or brand of the supplier		P
	b) supplier model or code;		P
	c) photometric classification, with indication of the corresponding elevation angle;		P
	d) rated power, in watts;		P
	e) rated voltage range, in volts;		P
	f) nominal frequency, in hertz;		P
	(g) the country of origin of the product;		P
	h) instructions to the user regarding electrical installation, handling and recommended care		P
	(i) information on the importer or distributor		P
	j) product warranty, from the date of the note of sale to the consumer, being at least 60 months;		P
	k) expiration date for storage: undetermined;		P
	l) type of protection against electric shock; and		P
	m) guidelines for obtaining the IES file of photometry.		P
5.3	For LED luminaires, the following additional marking requirements apply:		
	(a) The instruction leaflet shall also contain information on the controller (make, model, power, rated electric current) and life expectancy (h) corresponding to the maintenance of the luminous flux of 70 % (L70) or 80 % (L80).		P
	b) The controller must be marked according to ABNT NBR IEC 61347-2-13:2012 (Lamp Control Device - Part 2-13: Particular electronic control requirements fed in c.c. or c.a. for LED modules) and ABNT NBR 16026:2012 (Electronic control device c.c. or c.a. for LED modules - Performance requirements).		P
	(c) Packaging shall be identified externally with the following minimum information, marked legibly and indelibly, by means of adhesive, engraving or other method ensuring readability and indelebility:		P
	- name and/or brand of the manufacturer;		P
	- model or type of luminaire;		P
	- CNPJ and supplier address;		P
	- Gross weight; and		P
	- Stacking capacity and position.		P

Ordinance no. 62/2022																				
Clause	Requirement + Test		Result - Remark	Verdict																
Annex B	Method From Measurement And Calculation Of Maintenance From Flow Bright Of LEDs (Based On In Norm Iesna Lm-80-08 And Tm-21)			P																
	Performance Characteristics			P																
	Maintenance of the luminous flux of the luminaire			P																
	The useful life span estimated for the LED products is normally given in terms of the expectancy in hours of operation until the luminous flux of the luminaire falls to 70 % of its initial value (shown as L70). There are two (2) options to show with luminous flux maintenance of the luminaire.	☒ option 1: Component Performance ☐ option 2: Luminaire Performance		P																
	Option 1: LED Component Performance			P																
	ISTMT measurement			P																
	To evaluate the conformity by the LED component performance, the following conditions shall be met:			P																
	a) The highest temperature measured on the ISTMT shall stay below the highest value of temperature of the component measured on LM-80.	Temperature measured on the ISTMT (C): Max. 90.1 C Temperature measured on measured on LM-80 (C): 105 C		P																
	b) The location of the temperature measuring point (TMP) is defined by the manufacturer, both for the tests relative to the LM-80 for the ISTMT.			P																
	c) The LED current supplied by the LED controller on the luminaire, shall be lower than or equal to the LED current measured for the LM-80 report.	LED current supplied by the LED controller on the luminaire (mA): Max. 110 mA LED current measured for the LM-80 report (mA): 150 mA		P																
	d) The luminous flux maintenance in time (t), estimated as per TM-21, shall be higher than or equal to the flux maintenance percent corresponding to the final projected point, listed in Table 1 in Attachment D.			P																
	<table><tr><th>Final projected point</th><th>Flux maintenance required for products of 50 000 h</th></tr><tr><td>36 000 h</td><td>≥ 77.35 %</td></tr><tr><td>38 500 h</td><td>≥ 75.98 %</td></tr><tr><td>42 000 h</td><td>≥ 74.11 %</td></tr><tr><td>44 000 h</td><td>≥ 73.06 %</td></tr><tr><td>48 000 h</td><td>≥ 71.01 %</td></tr><tr><td>49 500 h</td><td>≥ 70.25 %</td></tr><tr><td>50 000 h</td><td>≥ 70.00 %</td></tr></table>	Final projected point	Flux maintenance required for products of 50 000 h	36 000 h	≥ 77.35 %	38 500 h	≥ 75.98 %	42 000 h	≥ 74.11 %	44 000 h	≥ 73.06 %	48 000 h	≥ 71.01 %	49 500 h	≥ 70.25 %	50 000 h	≥ 70.00 %		Time (t) at which to estimate lumen maintenance (hours): >120000 h; The luminous flux maintenance: 91.47%	P
Final projected point	Flux maintenance required for products of 50 000 h																			
36 000 h	≥ 77.35 %																			
38 500 h	≥ 75.98 %																			
42 000 h	≥ 74.11 %																			
44 000 h	≥ 73.06 %																			
48 000 h	≥ 71.01 %																			
49 500 h	≥ 70.25 %																			
50 000 h	≥ 70.00 %																			
	Option 2: Luminaire Performance			N/A																
	The luminaire performance conformity for the luminous flux maintenance is verified by submitting the complete luminaire to the photometric tests of LM-79, by comparing the initial luminous flux (time = 0 h) with the luminous flux after 6 000 h of operation (time ≥ 6000 h).			N/A																
	The test report shall demonstrate a minimum percent of the luminous flux maintenance, as below Table.			N/A																
	Nominal life declared	Maintenance of the minimum luminous flux at 6	Initial luminous flux (lm): luminous flux at at 6000 h (lm):	N/A																

Ordinance no. 62/2022					
Clause	Requirement + Test			Result - Remark	Verdict
		000 h		Maintenance at 6000 h:	
	50000 h	95,8 %			
	Qualification of the electronic control device CC or CA for LED modules				P
	The electronic control device for the LED, independent or embedded type, shall be tested at the situation of application in nominal operation conditions (nominal voltage and ambient temperature), by measuring the controller housing temperature at the indicated point (tc). For the test, the luminaire shall operate at an ambient temperature of 35 °C.			Rated tc (°C): 90 °C; Measured tc (°C): 72.8 °C	P

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR24045-60-L		Rated wattage (W):	240			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	236.7	1882	30112	127.22	N/A	0.9954	6226	73.7	Input voltage: at 116.84 V; Output current: 1.8159 A; Input voltage: at 134.62 V; Output current:1.8266 A	
2#:	237.6	1885	30042	126.44	N/A	0.9948	6229	73.3	Input voltage: at 116.84 V; Output current: 1.8186 A; Input voltage: at 134.62 V; Output current:1.8242 A	
3#:	237.1	1880	30207	127.4	N/A	0.9962	6236	73.9	Input voltage: at 116.84 V; Output current:1.8134 A; Input voltage: at 134.62 V; Output current: 1.8279 A	
Arithmetic mean	237.1	1882	30120	127.02	N/A	0.9955	6230	73.6	—	
Rating	240	2400	31200	130	N/A	0.92	6500	70	Program set max. output current 1.8 A	
Limit	264	< 2640	28080	90	N/A	0.92	6022 to 7042	70	1.62 to 1.98 A	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR24045-60-L		Rated wattage (W):	240		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	237.1	1100	30749	129.69	N/A	0.9739	6237	74.0	Input voltage: at 202.4 V; Output current:1.8369 A; Input voltage: at 233.2 V; Output current: 1.8596 A
2#:	237.3	1107	30746	129.57	N/A	0.9746	6228	73.5	Input voltage: at 202.4 V; Output current: 1.8347 A; Input voltage: at 233.2 V; Output current: 1.8579 A
3#:	237.2	1102	30765	129.7	N/A	0.9753	6233	73.9	Input voltage: at 202.4 V; Output current: 1.8317 A; Input voltage: at 233.2 V; Output current: 1.8609 A
Arithmetic mean	237.2	1103	30753	129.65	N/A	0.9746	6233	73.8	—
Rating	240	2400	31200	130	N/A	0.92	6500	70	Program set max. output current 1.8 A
Limit	264	< 2640	28080	90	N/A	0.92	6022 to 7042	70	1.62 to 1.98 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	1.	2.	3.	1.	2.	3.	—
voltage	127 V			220 V			
30 :	29.89	29.86	29.93	29.28	29.25	29.32	—
2	0.069	0.068	0.068	0.121	0.126	0.123	2
3	1.701	1.706	1.709	2.162	2.166	2.167	30
5	1.264	1.266	1.268	2.501	2.506	2.507	10
7	1.889	1.886	1.889	3.140	3.146	3.150	7
9	1.454	1.456	1.461	2.447	2.446	2.447	5
11 < n < 39 (Only odd harmonics)	0.869	0.866	0.869	1.645	1.665	1.650	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR24045-60-H		Rated wattage (W):	240		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	246.4	1946	38055	154.44	N/A	0.9941	6715	75.0	Input voltage: at 116.84 V; Output current: 0.9192 A; Input voltage: at 134.62 V; Output current:0.9206 A
2#:	246.7	1943	38007	154.06	N/A	0.9941	6726	74.2	Input voltage: at 116.84 V; Output current: 0.9191 A; Input voltage: at 134.62 V; Output current:0.9236 A
3#:	246.1	1944	37974	154.3	N/A	0.9933	6715	73.8	Input voltage: at 116.84 V; Output current:0.9275 A; Input voltage: at 134.62 V; Output current: 0.9283 A
Arithmetic mean	246.4	1944	38012	154.27	N/A	0.9938	6719	74.3	—
Rating	240	2650	36000	150	N/A	0.92	6500	70	Program set max. output current 0.92 A
Limit	264	< 2915	32400	90	N/A	0.92	6022 to 7042	70	0.828 to 1.012 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR24045-60-H		Rated wattage (W):	240			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	234.6	1114	37444	159.61	N/A	0.9608	6753	75.1	Input voltage: at 202.4 V; Output current:0.9195 A; Input voltage: at 233.2 V; Output current: 0.9243 A	
2#:	234.4	1114	37413	159.61	N/A	0.9608	6744	74.6	Input voltage: at 202.4 V; Output current: 0.9197 A; Input voltage: at 233.2 V; Output current: 0.9215A	
3#:	234.9	1104	37456	159.46	N/A	0.9606	6746	74.2	Input voltage: at 202.4 V; Output current: 0.9223 A; Input voltage: at 233.2 V; Output current: 0.9257 A	
Arithmetic mean	234.8	1111	37443	159.49	N/A	0.9611	6747	74.3	—	
Rating	240	2650	36000	150	N/A	0.92	6500	70	Program set max. output current 0.92 A	
Limit	264	< 2915	32400	90	N/A	0.92	6022 to 7042	70	0.828 to 1.012 A	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	4.	5.	6.	4.	5.	6.	—
voltage	127 V			220 V			
30 :	29.82	29.79	29.81	28.89	28.91	28.84	—
2	0.052	0.056	0.053	0.134	0.136	0.134	2
3	3.811	3.821	3.806	6.574	6.575	6.578	30
5	2.150	2.156	2.151	2.891	2.896	2.893	10
7	1.572	1.572	1.570	2.295	2.296	2.295	7
9	1.211	1.212	1.211	1.965	1.966	1.968	5
11 < n < 39 (Only odd harmonics)	0.966	0.967	0.971	1.635	1.636	1.639	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR20045-40-L		Rated wattage (W):	200		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	198.7	1564	25269	127.17	N/A	0.9943	4134	84.8	Input voltage: at 116.84 V; Output current: 1.5304 A; Input voltage: at 134.62 V; Output current:1.5365 A
2#:	198.7	1558	25367	127.66	N/A	0.9932	4121	84.9	Input voltage: at 116.84 V; Output current: 1.5320 A; Input voltage: at 134.62 V; Output current:1.5378 A
3#:	197.3	1562	25268	128.07	N/A	0.9937	4124	85.2	Input voltage: at 116.84 V; Output current:1.5296 A; Input voltage: at 134.62 V; Output current: 1.5351 A
Arithmetic mean	198.2	1561	25301	127.63	N/A	0.9937	4126	85	—
Rating	200	2000	26000	130	N/A	0.92	4000	70	Program set max. output current 1.5 A
Limit	220	< 2200	23400	90	N/A	0.92	3710 to 4260	70	1.35 to 1.65 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR20045-40-L		Rated wattage (W):	200		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	198.2	941	25597	129.15	N/A	0.9636	4131	84.3	Input voltage: at 202.4 V; Output current:1.5484 A; Input voltage: at 233.2 V; Output current: 1.5548 A
2#:	198.5	937	25648	129.21	N/A	0.962	4123	85.4	Input voltage: at 202.4 V; Output current: 1.5473 A; Input voltage: at 233.2 V; Output current: 1.5539 A
3#:	197.8	933	25544	129.14	N/A	0.9641	4130	84.1	Input voltage: at 202.4 V; Output current: 1.5489 A; Input voltage: at 233.2 V; Output current: 1.5586 A
Arithmetic mean	198.2	937	25596	129.17	N/A	0.9632	4128	84.6	—
Rating	200	2000	26000	130	N/A	0.92	4000	70	Program set max. output current 1.5 A
Limit	220	< 2200	23400	90	N/A	0.92	3710 to 4260	70	1.35 to 1.65 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	7.	8.	9.	7.	8.	9.	—
voltage	127 V			220 V			
30 :	29.88	29.85	29.81	29.01	28.95	29.06	—
2	0.16	0.14	0.12	0.20	0.19	0.26	2
3	0.35	0.39	0.31	4.29	4.37	4.43	30
5	3.16	3.09	3.11	4.80	4.63	4.76	10
7	2.40	2.27	2.39	3.32	3.37	3.21	7
9	0.74	0.83	0.71	1.75	1.72	1.63	5
11 < n < 39 (Only odd harmonics)	0.76	0.71	0.74	1.87	1.81	1.72	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR15045-50-L		Rated wattage (W):	150			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	141.7	1118	19080	134.65	N/A	0.9921	5087	83.0	Input voltage: at 116.84 V; Output current: 1.1059 A; Input voltage: at 134.62 V; Output current: 1.1149 A	
2#:	141.1	1125	19124	135.54	N/A	0.9928	5097	84.0	Input voltage: at 116.84 V; Output current: 1.1041 A; Input voltage: at 134.62 V; Output current: 1.1134 A	
3#:	142.4	1121	19114	134.23	N/A	0.9917	5082	83.6	Input voltage: at 116.84 V; Output current: 1.1062 A; Input voltage: at 134.62 V; Output current: 1.1159 A	
Arithmetic mean	141.7	1121	19106	134.81	N/A	0.9922	5089	83.5	—	
Rating	150	1500	19500	130	N/A	0.92	5000	70	Program set max. output current 1.1 A	
Limit	165	< 1650	17550	90	N/A	0.92	4746 to 5312	70	0.99 to 1.21 A	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR15045-50-L		Rated wattage (W):	150			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	146.8	664	19727	134.38	N/A	0.9566	5101	83.0	Input voltage: at 202.4 V; Output current: 1.1541 A; Input voltage: at 233.2 V; Output current: 1.1729 A	
2#:	146.9	664	19688	134.02	N/A	0.9553	5108	83.7	Input voltage: at 202.4 V; Output current: 1.1549 A; Input voltage: at 233.2 V; Output current: 1.1732 A	
3#:	146.5	653	19616	133.9	N/A	0.9573	5100	83.6	Input voltage: at 202.4 V; Output current: 1.1534 A; Input voltage: at 233.2 V; Output current: 1.1747 A	
Arithmetic mean	146.7	660	19677	134.1	N/A	0.9564	5103	83.4	—	
Rating	150	1500	19500	130	N/A	0.92	5000	70	Program set max. output current 1.1 A	
Limit	165	< 1650	17550	90	N/A	0.92	4746 to 5312	70	0.99 to 1.21 A	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	10.	11.	12.	10.	11.	12.	—
voltage	127 V			220 V			
30 :	29.83	29.89	29.87	28.86	28.92	28.81	—
2	0.10	0.16	0.20	0.17	0.23	0.19	2
3	2.71	2.62	2.79	4.09	4.25	4.16	30
5	1.72	1.66	1.83	3.17	3.23	3.11	10
7	2.29	2.23	2.25	3.72	3.87	3.85	7
9	1.60	1.51	1.62	2.92	3.03	2.87	5
11 < n < 39 (Only odd harmonics)	1.44	1.49	1.59	2.08	2.01	2.06	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR05045-60-L		Rated wattage (W):	50			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	49.7	402	7293	146.74	N/A	0.9803	6031	71.8	Input voltage: at 116.84 V; Output current: 0.3781 A; Input voltage: at 134.62 V; Output current: 0.3790 A	
2#:	49.7	402	7286	146.6	N/A	0.9811	6039	71.6	Input voltage: at 116.84 V; Output current: 0.3796 A; Input voltage: at 134.62 V; Output current: 0.3799 A	
3#:	50.8	408	7285	143.41	N/A	0.9798	6036	71.4	Input voltage: at 116.84 V; Output current: 0.3789 A; Input voltage: at 134.62 V; Output current: 0.3793 A	
Arithmetic mean	50.1	404	7288	145.58	N/A	0.9804	6035	71.6	—	
Rating	50	460	6500	130	N/A	0.92	6500	70	Program set max. output current 0.38 A	
Limit	55	< 506	5850	90	N/A	0.92	6022 to 7042	70	0.342 to 0.418	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR05045-60-L			Rated wattage (W):	50			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277				LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device		
1#:	49.2	246	7369	149.78	N/A	0.9204	6031	72.0	Input voltage: at 202.4 V; Output current: 0.3818 A; Input voltage: at 233.2 V; Output current: 0.3826 A		
2#:	48.8	255	7311	149.82	N/A	0.9197	6032	71.9	Input voltage: at 202.4 V; Output current: 0.3806 A; Input voltage: at 233.2 V; Output current: 0.3812 A		
3#:	50.8	236	7377	145.22	N/A	0.922	6038	72.0	Input voltage: at 202.4 V; Output current: 0.3815 A; Input voltage: at 233.2 V; Output current: 0.3829 A		
Arithmetic mean	49.6	246	7352	148.27	N/A	0.9207	6034	72.0	—		
Rating	50	460	6500	130	N/A	0.92	6500	70	Program set max. output current 0.38 A		
Limit	55	< 506	5850	90	N/A	0.92	6022 to 7042	70	0.342 to 0.418		
Verdict	P	P	P	P	N/A	P	P	P	P		

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	13.	14.	15.	13.	14.	15.	—
voltage	127 V			220 V			
30 :	29.74	29.79	29.71	28.16	28.29	28.21	—
2	0.14	0.19	0.26	0.16	0.19	0.24	2
3	2.30	2.39	3.06	8.23	8.69	8.97	30
5	3.82	3.93	4.11	5.73	5.98	6.23	10
7	2.52	2.84	2.51	2.87	3.61	2.93	7
9	0.51	0.92	1.06	1.38	1.56	1.74	5
11 < n < 39 (Only odd harmonics)	1.23	1.51	1.48	2.39	2.55	2.43	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR15045-40-H		Rated wattage (W):	150		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	146.8	1162	22341	152.19	N/A	0.9897	4096	83.8	Input voltage: at 116.84 V; Output current: 0.6162 A; Input voltage: at 134.62 V; Output current: 0.6163 A
2#:	147.3	1162	22268	151.17	N/A	0.9889	4097	82.6	Input voltage: at 116.84 V; Output current: 0.6159 A; Input voltage: at 134.62 V; Output current: 0.6155 A
3#:	145.9	1160	22263	152.59	N/A	0.9892	4092	83.8	Input voltage: at 116.84 V; Output current: 0.6169 A; Input voltage: at 134.62 V; Output current: 0.6175 A
Arithmetic mean	146.7	1161	22291	151.98	N/A	0.9893	4095	83.4	—
Rating	150	1800	22500	150	N/A	0.92	4000	70	Program set max. output current 0.61 A
Limit	165	< 1980	20250	90	N/A	0.92	3710 to 4260	70	0.549 to 0.671
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR15045-40-H		Rated wattage (W):	150		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	144.2	682	22292	154.59	N/A	0.9344	4106	84	Input voltage: at 202.4 V; Output current: 0.6161 A; Input voltage: at 233.2 V; Output current: 0.6161 A
2#:	142.3	679	22261	156.44	N/A	0.9346	4108	83.6	Input voltage: at 202.4 V; Output current: 0.6155 A; Input voltage: at 233.2 V; Output current: 0.6157 A
3#:	143.5	684	22192	154.65	N/A	0.9345	4098	83.2	Input voltage: at 202.4 V; Output current: 0.6151 A; Input voltage: at 233.2 V; Output current: 0.6153 A
Arithmetic mean	143.3	682	22248	155.23	N/A	0.9345	4104	83.6	—
Rating	150	1800	22500	150	N/A	0.92	4000	70	Program set max. output current 0.61 A
Limit	165	< 1980	20250	90	N/A	0.92	3710 to 4260	70	0.549 to 0.671
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	16.	17.	18.	16.	17.	18.	—
voltage	127 V			220 V			
30 :	29.74	29.79	29.71	28.20	28.25	28.19	—
2	0.14	0.16	0.11	0.18	0.25	0.22	2
3	5.69	5.76	5.78	11.66	11.26	11.39	30
5	3.37	3.42	3.36	6.21	5.98	6.15	10
7	2.42	2.54	2.55	4.48	4.53	4.36	7
9	1.80	1.82	1.74	2.71	2.98	2.79	5
11 < n < 39 (Only odd harmonics)	1.29	1.22	1.25	1.79	1.56	1.63	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR20045-50-H		Rated wattage (W):	200		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	204.9	1627	28306	138.15	N/A	0.9926	5192	83.7	Input voltage: at 116.84 V; Output current: 0.8082 A; Input voltage: at 134.62 V; Output current: 0.8053 A
2#:	205.2	1627	28360	138.21	N/A	0.9927	5191	83.5	Input voltage: at 116.84 V; Output current: 0.8079 A; Input voltage: at 134.62 V; Output current: 0.8063 A
3#:	206.1	1628	28235	137	N/A	0.9934	5182	83.2	Input voltage: at 116.84 V; Output current: 0.8062 A; Input voltage: at 134.62 V; Output current: 0.8044 A
Arithmetic mean	205.4	1627	28300	137.79	N/A	0.9929	5188	83.5	—
Rating	200	2300	30000	150	N/A	0.92	5000	70	Program set max. output current 0.8 A
Limit	220	< 2530	27000	90	N/A	0.92	4746 to 5312	70	0.72 to 0.88 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR20045-50-H		Rated wattage (W):	200		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current					
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device
1#:	201.5	961	28263	140.26	N/A	0.9509	5184	82.8	Input voltage: at 202.4 V; Output current: 0.8097 A; Input voltage: at 233.2 V; Output current: 0.8093 A
2#:	200.3	960	28241	140.99	N/A	0.951	5200	82.4	Input voltage: at 202.4 V; Output current: 0.8085 A; Input voltage: at 233.2 V; Output current: 0.8078 A
3#:	199.8	956	28327	141.78	N/A	0.9512	5182	83.5	Input voltage: at 202.4 V; Output current: 0.8096 A; Input voltage: at 233.2 V; Output current: 0.8089 A
Arithmetic mean	200.5	959	28277	141.01	N/A	0.951	5189	82.9	—
Rating	200	2300	30000	150	N/A	0.92	5000	70	Program set max. output current 0.8 A
Limit	220	< 2530	27000	90	N/A	0.92	4746 to 5312	70	0.72 to 0.88 A
Verdict	P	P	P	P	N/A	P	P	P	P

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	19.	20.	21.	19.	20.	21.	—
voltage	127 V			220 V			
30 :	29.83	29.89	29.87	28.58	28.51	28.55	—
2	0.11	0.16	0.19	0.15	0.19	0.17	2
3	4.05	4.12	4.23	7.41	7.49	7.45	30
5	2.43	2.59	2.67	3.73	3.91	3.79	10
7	1.83	1.93	1.96	3.08	3.15	3.11	7
9	1.38	1.24	1.28	2.31	2.36	2.32	5
11 < n < 39 (Only odd harmonics)	1.22	1.12	1.19	1.85	1.93	1.81	3

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR10045-30-H		Rated wattage (W):	100			Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☒ 127 ☐ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	97.9	783	14028	143.29	N/A	0.9897	2904	80.9	Input voltage: at 116.84 V; Output current: 0.7847 A; Input voltage: at 134.62 V; Output current: 0.7886 A	
2#:	97.6	792	14128	144.75	N/A	0.9892	2920	81.5	Input voltage: at 116.84 V; Output current: 0.7859 A; Input voltage: at 134.62 V; Output current: 0.7875 A	
3#:	97.9	777	13986	142.86	N/A	0.9912	2903	80.5	Input voltage: at 116.84 V; Output current: 0.7859 A; Input voltage: at 134.62 V; Output current: 0.7873 A	
Arithmetic mean	97.8	784	14047	143.63	N/A	0.99	2909	81.0	—	
Rating	100	1300	15000	150	N/A	0.92	3000	70	Program set max. output current 0.78 A	
Limit	110	< 1430	13500	90	N/A	0.92	2870 to 3220	70	0.702 to 0.858	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Table 1 – Energy efficiency test for full test model

Model No.:	YR10045-30-H			Rated wattage (W):	100		Frequency (Hz):	60	Stabilization time (h):	1
Test voltage for Supply current (V):	☐ 127 ☒ 220 ☐ 277			LED Control device: ☐ Control devices with non-stabilized output voltage ☐ Control devices with a stabilized output voltage ☐ Control devices with non-stabilized output current, ☒ Control devices having a stabilized output current						
Test items Sample No.	Lamp power (W)	Supply current (mA)	Initial luminous flux (lm)	Energy efficiency (lm/W)	luminous flux at 6000 h (lm)	Power factor ()	TCC (K)	Ra	Voltage and output current from the control device	
1#:	96.9	465	14174	146.27	N/A	0.9546	2916	81	Input voltage: at 202.4 V; Output current: 0.7946 A; Input voltage: at 233.2 V; Output current: 0.8003 A	
2#:	96.9	464	14189	146.43	N/A	0.9556	2908	80.7	Input voltage: at 202.4 V; Output current: 0.7953 A; Input voltage: at 233.2 V; Output current: 0.8012 A	
3#:	99.2	459	14139	142.53	N/A	0.9548	2908	80.4	Input voltage: at 202.4 V; Output current: 0.7963 A; Input voltage: at 233.2 V; Output current: 0.8025 A	
Arithmetic mean	97.7	463	14167	145.08	N/A	0.955	2911	80.7	—	
Rating	100	1300	15000	150	N/A	0.92	3000	70	Program set max. output current 0.78 A	
Limit	110	< 1430	13500	90	N/A	0.92	2870 to 3220	70	0.702 to 0.858	
Verdict	P	P	P	P	N/A	P	P	P	P	

Ordinance no. 62/2022

Continued Table 1

Harmonic current							
Harmonic Order (n)	Maximum harmonic measured (%)						Maximum harmonic currents limit (%)
Sample No.	22.	23.	24.	22.	23.	24.	—
voltage	127 V			220 V			
30 :	29.86	29.82	29.85	28.92	28.95	28.99	—
2	0.12	0.16	0.20	0.16	0.19	0.25	2
3	0.62	0.74	0.82	5.19	5.63	5.89	30
5	3.45	3.87	3.59	4.83	4.96	5.26	10
7	2.02	2.16	2.19	1.50	1.79	1.93	7
9	0.24	0.36	0.42	1.07	1.22	1.49	5
11 < n < 39 (Only odd harmonics)	1.09	1.11	1.26	1.66	1.89	1.98	3

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-30-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	250.1	28110	112.4	0.9965	
2#:	248.7	28079	112.9	0.9952	
3#:	249.2	28202	113.17	0.9971	
Arithmetic mean	249.3	28130	112.82	0.9963	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-30-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	245.2	28108	114.63	0.9763	
2#:	245.9	28098	114.27	0.9753	
3#:	245.1	28201	115.06	0.9769	
Arithmetic mean	245.4	28136	114.65	0.9762	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-30-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	202.4	24132	119.23	0.9944	
2#:	203.9	24095	118.17	0.9947	
3#:	203.1	24222	119.26	0.9948	
Arithmetic mean	203.1	24150	118.89	0.9946	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-30-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	202.1	24310	120.29	0.9656	
2#:	200.7	24240	120.78	0.9647	
3#:	201.0	24237	120.58	0.9656	
Arithmetic mean	201.3	24262	120.55	0.9653	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-30-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	144.3	17584	121.86	0.9932	
2#:	144.6	17499	121.02	0.993	
3#:	145.7	17618	120.92	0.993	
Arithmetic mean	144.9	17567	121.27	0.9931	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-30-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	149.4	18133	121.37	0.9598	
2#:	150.2	18093	120.46	0.9590	
3#:	149.6	18204	121.68	0.9593	
Arithmetic mean	149.7	18143	121.17	0.9594	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-30-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	97.4	12130	124.54	0.9878	
2#:	97.7	12212	124.99	0.9879	
3#:	96.9	12043	124.28	0.9883	
Arithmetic mean	97.3	12128	124.6	0.988	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-30-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	99.7	12267	123.04	0.9378	
2#:	98.2	12230	124.54	0.939	
3#:	99.7	12340	123.77	0.9378	
Arithmetic mean	99.2	12279	123.78	0.9382	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-30-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.5	5974	128.47	0.9783	
2#:	46.2	5969	129.2	0.9787	
3#:	48.0	6001	125.02	0.9786	
Arithmetic mean	46.9	5981	127.56	0.9785	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-30-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	47.5	5994	126.19	0.925	
2#:	46.9	5933	126.5	0.9255	
3#:	47.7	6019	126.18	0.9246	
Arithmetic mean	47.4	5982	126.29	0.925	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-40-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	233.0	28075	120.49	0.9962	
2#:	233.9	28071	120.01	0.9957	
3#:	233.4	28088	120.34	0.9955	
Arithmetic mean	233.4	28078	120.28	0.9958	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-40-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	231.6	28249	121.97	0.9723	
2#:	232.3	28227	121.51	0.9732	
3#:	233.0	28313	121.52	0.9716	
Arithmetic mean	232.3	28263	121.67	0.9724	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-40-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	144.9	18998	131.11	0.9928	
2#:	145.7	19028	130.6	0.9925	
3#:	146.1	19009	130.11	0.9933	
Arithmetic mean	145.6	19012	130.61	0.9929	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-40-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	148.4	19561	131.81	0.9595	
2#:	150.4	19573	130.14	0.9587	
3#:	149.8	19542	130.45	0.9598	
Arithmetic mean	149.5	19559	130.8	0.9593	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-40-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	94.1	14262	151.56	0.988	
2#:	94.9	14200	149.63	0.9874	
3#:	95.1	14278	150.14	0.9879	
Arithmetic mean	94.7	14247	150.44	0.9878	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-40-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	96.3	14585	151.45	0.938	
2#:	96.2	14540	151.14	0.9388	
3#:	96.4	14608	151.54	0.9386	
Arithmetic mean	96.3	14578	151.38	0.9385	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-40-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	48.4	6549	135.31	0.9816	
2#:	48.8	6552	134.26	0.9827	
3#:	47.9	6507	135.85	0.9804	
Arithmetic mean	48.4	6536	135.14	0.9816	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-40-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	47.4	6636	140.00	0.930	
2#:	49.2	6651	135.18	0.931	
3#:	48.8	6581	134.86	0.9308	
Arithmetic mean	48.5	6623	136.68	0.9306	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-50-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	245.1	29226	119.24	0.9958	
2#:	246.0	29145	118.48	0.9963	
3#:	245.9	29234	118.89	0.9959	
Arithmetic mean	245.7	29202	118.87	0.996	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-50-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	242.3	29514	121.81	0.9762	
2#:	242.1	29503	121.86	0.9762	
3#:	243.2	29552	121.51	0.9747	
Arithmetic mean	242.5	29523	121.73	0.9757	
Rating	240	31200	130	0.92	
Limit	264	28080	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-50-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	202.7	25811	127.34	0.9949	
2#:	200.9	25762	128.23	0.9954	
3#:	201.4	25904	128.62	0.9954	
Arithmetic mean	201.7	25826	128.06	0.9952	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-50-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	200.2	26019	129.97	0.9651	
2#:	201.4	26110	129.64	0.9652	
3#:	201.7	25973	128.77	0.9654	
Arithmetic mean	201.1	26034	129.46	0.9652	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-50-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	97.7	13231	135.42	0.9881	
2#:	97.4	13243	135.97	0.9876	
3#:	96.3	13221	137.29	0.9893	
Arithmetic mean	97.1	13232	136.23	0.9883	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-50-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	97.8	13453	137.56	0.9379	
2#:	97.4	13503	138.63	0.9372	
3#:	99.4	13388	134.69	0.9372	
Arithmetic mean	98.2	13448	136.96	0.9374	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-50-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	45.2	6714	148.54	0.9847	
2#:	44.9	6690	149.0	0.9852	
3#:	45.5	6690	147.03	0.9839	
Arithmetic mean	45.2	6698	148.19	0.9846	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-50-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.3	6753	145.85	0.9289	
2#:	45.3	6667	147.17	0.9295	
3#:	45.3	6821	150.57	0.9282	
Arithmetic mean	45.6	6747	147.86	0.9289	
Rating	50	6500	130	0.92	
Limit	55	5850	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-60-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	196.9	26810	136.16	0.9945	
2#:	195.7	26788	136.88	0.9935	
3#:	195.9	26785	136.73	0.9944	
Arithmetic mean	196.2	26794	136.59	0.9941	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-60-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	196.4	27178	138.38	0.9623	
2#:	196.2	27213	138.7	0.9629	
3#:	196.6	27260	138.66	0.9623	
Arithmetic mean	196.4	27217	138.58	0.9625	
Rating	200	26000	130	0.92	
Limit	220	23400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-60-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	146.8	20954	142.74	0.9922	
2#:	145.6	21007	144.28	0.9921	
3#:	146.0	21055	144.21	0.9918	
Arithmetic mean	146.1	21005	143.74	0.992	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-60-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	149.1	21516	144.31	0.9592	
2#:	150.3	21475	142.88	0.9587	
3#:	148.8	21456	144.19	0.959	
Arithmetic mean	149.4	21482	143.79	0.959	
Rating	150	19500	130	0.92	
Limit	165	17550	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-60-L	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	99.8	13908	139.36	0.9891	
2#:	100.9	13963	138.38	0.9895	
3#:	99.8	13844	138.72	0.9882	
Arithmetic mean	100.2	13905	138.82	0.9889	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-60-L	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	101.1	14051	138.98	0.9427	
2#:	100.2	14024	139.96	0.9438	
3#:	100.7	14146	140.48	0.9426	
Arithmetic mean	100.7	14074	139.81	0.943	
Rating	100	13000	130	0.92	
Limit	110	11700	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-30-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	249.9	33326	133.36	0.9962	
2#:	248.5	33281	133.93	0.9963	
3#:	250.8	33400	133.17	0.9974	
Arithmetic mean	249.7	33336	133.49	0.9966	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-30-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	223.7	33979	151.9	0.9598	
2#:	223.3	34003	152.27	0.9594	
3#:	224.5	33919	151.09	0.9586	
Arithmetic mean	223.8	33967	151.75	0.9593	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-30-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	190.6	28524	149.65	0.9915	
2#:	189.4	28453	150.23	0.9914	
3#:	189.9	28454	149.84	0.9908	
Arithmetic mean	190.0	28477	149.91	0.9912	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-30-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	186.0	28517	153.32	0.9437	
2#:	187.1	28605	152.89	0.9448	
3#:	185.5	28572	154.03	0.9434	
Arithmetic mean	186.2	28565	153.41	0.944	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-30-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	146.3	21465	146.72	0.9877	
2#:	145.2	21384	147.27	0.988	
3#:	146.2	21473	146.87	0.9886	
Arithmetic mean	145.9	21441	146.95	0.9881	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-30-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	144.7	21543	148.88	0.9332	
2#:	143.8	21504	149.54	0.9325	
3#:	143.0	21498	150.34	0.9342	
Arithmetic mean	143.8	21515	149.59	0.9333	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-30-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.8	6869	146.77	0.9774	
2#:	46.1	6870	149.02	0.9782	
3#:	46.3	6902	149.07	0.9765	
Arithmetic mean	46.4	6880	148.29	0.9774	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-30-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.1	6897	149.61	0.9208	
2#:	47.9	6946	145.01	0.9207	
3#:	46.3	6876	148.51	0.921	
Arithmetic mean	46.8	6906	147.71	0.9208	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-40-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	233.0	32573	139.8	0.9942	
2#:	233.3	32578	139.64	0.9933	
3#:	234.3	32652	139.36	0.9927	
Arithmetic mean	233.5	32601	139.6	0.9934	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-40-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	234.2	32498	138.76	0.9607	
2#:	233.3	32495	139.28	0.961	
3#:	234.4	32433	138.37	0.9614	
Arithmetic mean	234.0	32475	138.8	0.961	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-40-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	201.4	30649	152.18	0.9922	
2#:	199.6	30705	153.83	0.9921	
3#:	200.7	30715	153.04	0.9921	
Arithmetic mean	200.6	30690	153.02	0.9921	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-40-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	196.6	30731	156.31	0.9494	
2#:	197.8	30804	155.73	0.9487	
3#:	198.3	30780	155.22	0.9491	
Arithmetic mean	197.6	30772	155.75	0.9491	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-40-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	95.0	14271	150.22	0.989	
2#:	96.5	14319	148.38	0.9903	
3#:	95.9	14324	149.36	0.991	
Arithmetic mean	95.8	14305	149.32	0.9901	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-40-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	96.7	14445	149.38	0.9518	
2#:	97.1	14442	148.73	0.9509	
3#:	97.2	14350	147.63	0.952	
Arithmetic mean	97.0	14412	148.58	0.9516	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-40-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	47.7	7555	158.39	0.9798	
2#:	49.3	7482	151.76	0.9801	
3#:	48.8	7450	152.66	0.9797	
Arithmetic mean	48.6	7496	154.27	0.9799	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-40-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	49.2	7647	155.43	0.9197	
2#:	48.6	7624	156.87	0.9206	
3#:	48.6	7657	157.55	0.9207	
Arithmetic mean	48.8	7643	156.62	0.9203	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-50-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	237.6	32641	137.38	0.9931	
2#:	238.8	32557	136.34	0.9932	
3#:	239.7	32574	135.89	0.9938	
Arithmetic mean	238.7	32591	136.54	0.9934	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR24045-50-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	240		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	238.7	32723	137.09	0.9638	
2#:	237.9	32796	137.86	0.9629	
3#:	239.2	32655	136.52	0.9639	
Arithmetic mean	238.6	32725	137.16	0.9635	
Rating	240	36000	150	0.92	
Limit	264	32400	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-50-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	148.2	22594	152.46	0.9881	
2#:	147.9	22702	153.5	0.9878	
3#:	148.4	22551	151.96	0.9872	
Arithmetic mean	148.2	22616	152.64	0.9877	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-50-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	145.8	22662	155.43	0.9348	
2#:	145.9	22691	155.52	0.9341	
3#:	145.9	22656	155.28	0.9350	
Arithmetic mean	145.9	22670	155.41	0.9346	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-50-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	100.7	14792	146.89	0.9904	
2#:	100.4	14776	147.17	0.9896	
3#:	100.2	14826	147.96	0.9897	
Arithmetic mean	100.4	14798	147.34	0.9899	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-50-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	99.4	15124	152.15	0.9549	
2#:	100.2	15160	151.3	0.9555	
3#:	100.1	15193	151.78	0.9556	
Arithmetic mean	99.9	15159	151.74	0.9553	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-50-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.4	7258	156.42	0.9853	
2#:	44.9	7179	159.89	0.9841	
3#:	46.4	7272	156.72	0.9854	
Arithmetic mean	45.9	7236	157.68	0.9849	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-50-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	46.5	7314	157.29	0.9275	
2#:	46.3	7388	159.57	0.9284	
3#:	46.0	7272	158.09	0.9279	
Arithmetic mean	46.3	7325	158.32	0.9279	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-60-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	200.9	31548	157.03	0.9932	
2#:	201.6	31544	156.47	0.9936	
3#:	201.8	31630	156.74	0.9932	
Arithmetic mean	201.4	31574	156.75	0.9933	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR20045-60-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	200		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	198.3	31747	160.1	0.949	
2#:	197.8	31757	160.55	0.9487	
3#:	196.9	31647	160.73	0.949	
Arithmetic mean	197.7	31717	160.46	0.9489	
Rating	200	30000	150	0.92	
Limit	220	27000	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-60-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	150	Stabilization time (h):	1		
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	140.8	22706	161.26	0.9877	
2#:	140.8	22679	161.07	0.9873	
3#:	141.5	22668	160.2	0.9874	
Arithmetic mean	141.0	22684	160.84	0.9875	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR15045-60-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	150		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	138.9	22704	163.46	0.9302	
2#:	139.1	22681	163.06	0.9296	
3#:	139.5	22779	163.29	0.9285	
Arithmetic mean	139.2	22721	163.27	0.9294	
Rating	150	22500	150	0.92	
Limit	165	20250	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-60-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	93.9	14582	155.29	0.9903	
2#:	94.7	14554	153.69	0.9919	
3#:	93.3	14566	156.12	0.9895	
Arithmetic mean	94.0	14567	155.03	0.9906	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR10045-60-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	100		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	92.9	14504	156.12	0.9514	
2#:	92.9	14579	156.93	0.952	
3#:	92.6	14579	157.44	0.951	
Arithmetic mean	92.8	14554	156.83	0.9515	
Rating	100	15000	150	0.92	
Limit	110	13500	90	0.92	
Verdict	P	P	P	P	

Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-60-H	Test voltage (V):	127	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	51.7	6928	134.00	0.9829	
2#:	52.8	6888	130.45	0.9845	
3#:	52.6	6957	132.26	0.9837	
Arithmetic mean	52.4	6924	132.24	0.9837	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

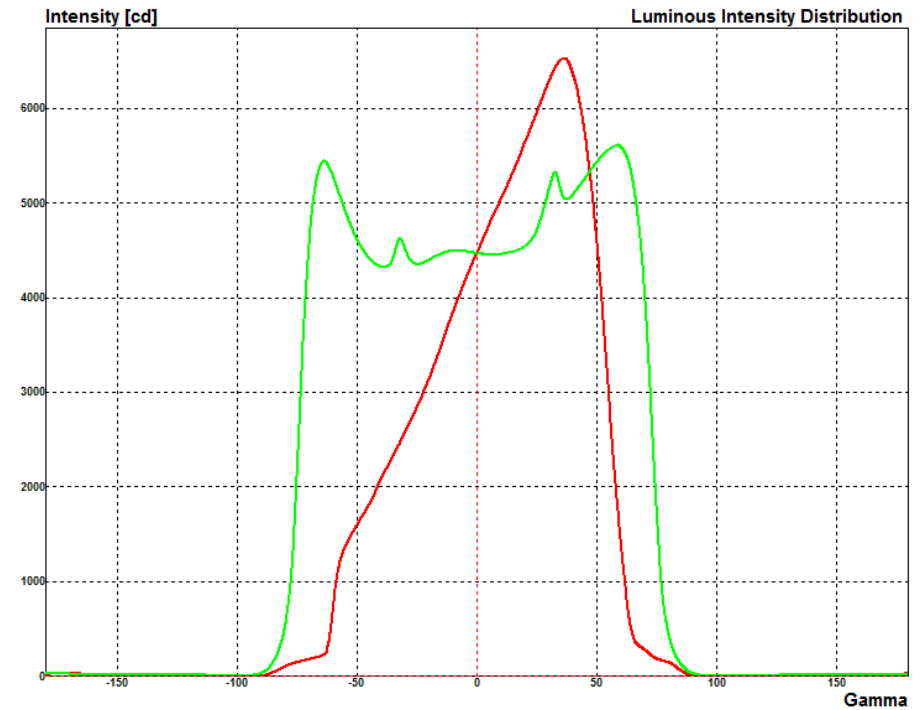
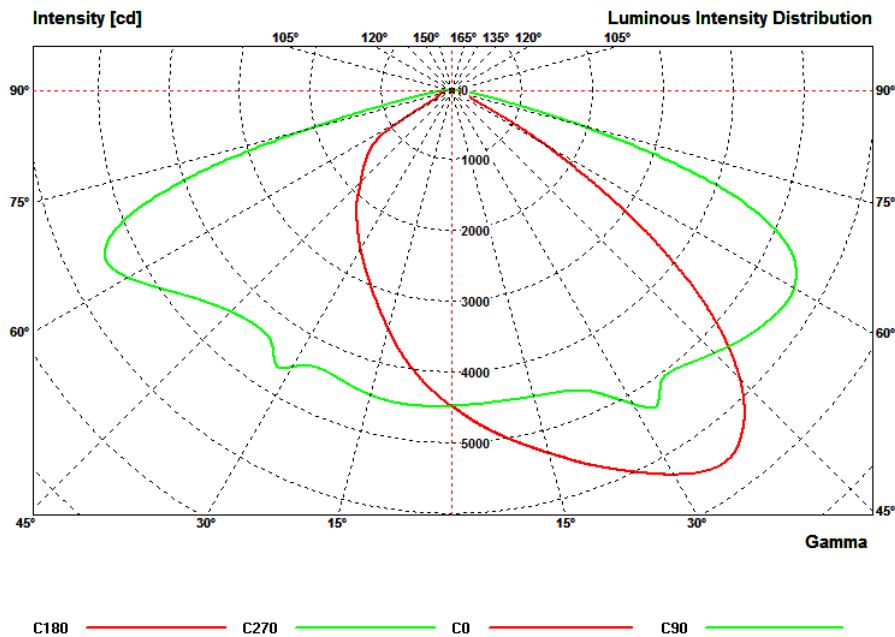
Ordinance no. 62/2022

Table 2 – Energy efficiency test for partly test model

Model No.:	YR05045-60-H	Test voltage (V):	220	Frequency (Hz):	60
Rated wattage (W):	50		Stabilization time (h):	1	
Test items Sample No.	Lamp power (W)	Initial luminous flux (lm)	Initial efficiency (lm/W)	Power factor ()	
1#:	51.7	7030	135.98	0.9355	
2#:	51.5	6944	134.83	0.9359	
3#:	51.3	7087	138.15	0.9353	
Arithmetic mean	51.5	7020	136.32	0.9356	
Rating	50	7500	150	0.92	
Limit	55	6750	90	0.92	
Verdict	P	P	P	P	

Annex 1:

The luminous distribution for YR24045-60-H



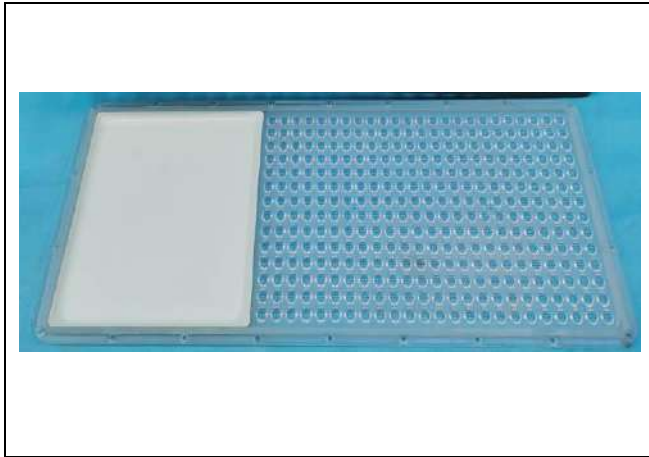
Ordinance no. 62/2022

Annex 2:

Summary of Results:

No.	Test Item	Test Method
1	Light Ageing Test- UV Exposure	ASTM G154-16 Cycle 3

Original Sample Photo:



Test Item: Light Ageing Test-UV Exposure

Sample Description: Plastic part

Test Method: ASTM G154-16 Cycle 3

Test Condition:

Exposure cycle:

ASTM G154-16 Cycle 3

Lamp type: UVB-313

8h UV at $(70 \pm 3)^\circ\text{C}$ BPT, $0.49\text{W}/(\text{m}^2 \cdot \text{nm})@310\text{nm}$

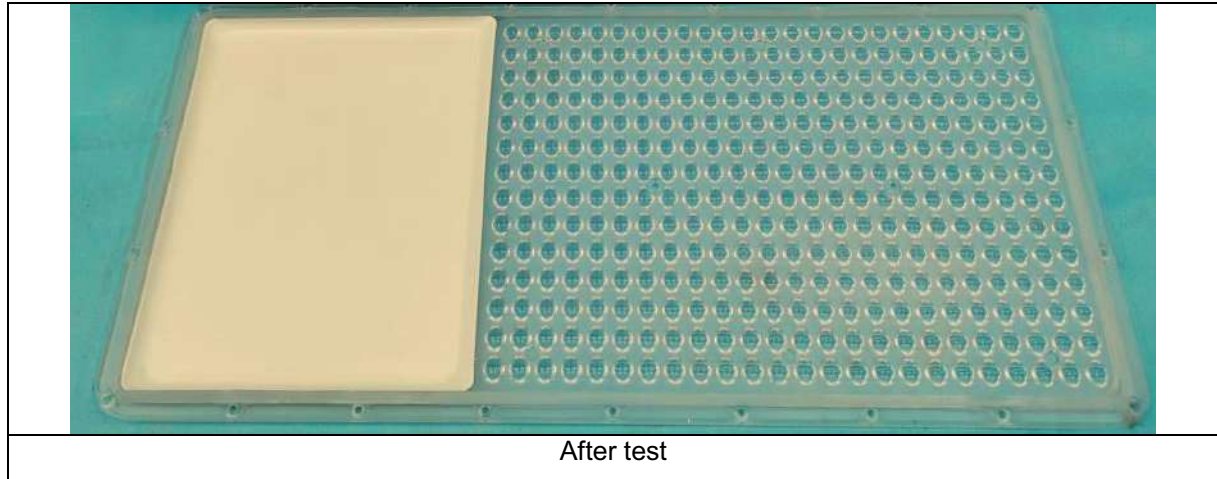
4h condensation at $(50 \pm 3)^\circ\text{C}$ BPT

Exposure duration: 2016 h

Test Date: 2024-05-10~2024-08-02

Ordinance no. 62/2022

Test Photo:



Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
UV Accelerated Weathering Tester	QUV/SE	GZMR-AG-E207	2023-12-14	2024-12-13

Attachment 1: Equipment list and measurement uncertainty

Equipment list of Safety and PF:

Equipment No.	Equipment Name	Model No.	Manufacturer	Next calibration
GZE006-24	Digital power analyzer	8776A	Qingzhi	2024/11/10
GZE010-3	Insulation tester	1508	Fluke	2025/3/5
GZE014-10	Oven	QYOV-100L	QiYa	2025/7/21
GZE015-1	Temp.& Humidity chamber	MHG-800RR	Terchy	2025/9/22
GZE016-41	Digital calipers	0-150mm/0.01mm	Guanglu	2025/4/12
GZE018-49	Test probe B (Jointed)	ZX-11	Zhilitong	2025/8/31
GZE020-45	Thermo-hygrometer	608-H1	testo	2025/7/11
GZE022-3	Glow-wire test apparatus(IEC60695-2-10:2013)	ZLT-GTR	ZLT	2025/1/15
GZE027-22	Digital stopwatch	PC894	Tianfu	2025/3/13
GZE068-21	Frequency power supply	AN97015TS	Ainuo	2025/8/29
GZE100-44	Data acquisition/switch unit	34972A	Agilent	2025/2/16
GZE120-2	Lamp cap torque tester	NJ210	Everfine	2025/9/19
GZE126-8	High accuracy array spectro-radiometer	HAAS-2000-VIS-V2	Everfine	2025/9/19
GZE126-9	Integrating sphere	AIS-2 2.0m R98	Everfine	2026/1/5
GZE126-22	Standard light source	D204H	Everfine	2025/8/7
GZE126-12	Digital CC&CV DC power supply	WY305	Everfine	2025/9/22
GZE126-14	AC Testing power source	DPS1010	Everfine	2025/9/22
GZE129-1	Goniophotometric system	GMS-1980	SENSING	2025/6/23
GZE126-39	Digital power analyzer	PF310A	Everfine	2025/4/19
GZE129-3	AC power source	APW-105N	ALL POWER	2025/7/7
GZE129-4	Total luminous flux standard lamp	110V/200W	SENSING	2025/4/17

Attachment 1: Equipment list and measurement uncertainty

For a 95% confidence level, the test result includes consideration of measurement uncertainty from the test equipment and methods, see below table:

Test Discipline	Frequency / Parameter	MU
Voltage	Up to 1000 V/ up to 1 kHz	±1,5 %
Current	Up to 5 A/ dc up to 60 Hz	±1,5 %
Power	(50/60 Hz) up to 3 kW	±3 %
Power Factor (50/60 Hz)	—	±0,05
Frequency	up to 10 kHz	±0,2 %
Temperature	- 35°C to below 100°C	±2
Timer	10 ms up to 200 ms	±5 %
	200 ms up to 1 s	±10 ms
	1 s and above	±1 %
Force	For all value	±6 %
Torque	For all value	±10 %
Angles	For all value	±1 degree
Relative humidity	30% to 95% RH	±6 % RH
Insulation resistance	For all value	±0.016MΩ
Spectro-radiometer	For all value	±3 %
High-accuracy Digital Photometer Head	For all value	±8.2 %

Attachment 2: Photo documentation

 Details of: General view of all 240 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom


 Details of: General view of all 240 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Attachment 2: Photo documentation

Details of: General view of all 200 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Details of: General view of all 200 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Attachment 2: Photo documentation

 Details of: General view of all 150 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom


 Details of: General view of all 150 W models

View:

- ☒ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Attachment 2: Photo documentation

Details of: General view of all 100 W models

View:

- ☐ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Details of: General view of all 100 W models

View:

- ☐ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Attachment 2: Photo documentation

Details of: General view of all 50 W models

View:

- ☐ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom



Details of: General view of all 50 W models

View:

- ☐ general
☐ front
☐ rear
☐ right
☐ left
☐ top
☐ bottom

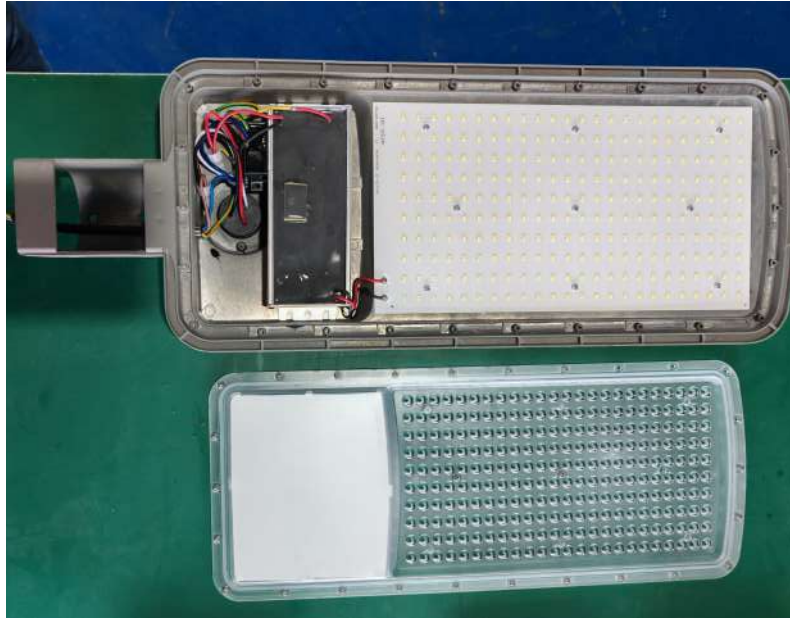


Attachment 2: Photo documentation

Details of: Internal view of YR24045-60-H, same as other models

View:

- ☐ general
- ☐ front
- ☐ rear
- ☐ right
- ☐ left
- ☐ top
- ☐ bottom



Details of: LED driver for 240 W models, similar to other driver

View:

- ☒ general
- ☐ front
- ☐ rear
- ☐ right
- ☐ left
- ☐ top
- ☐ bottom

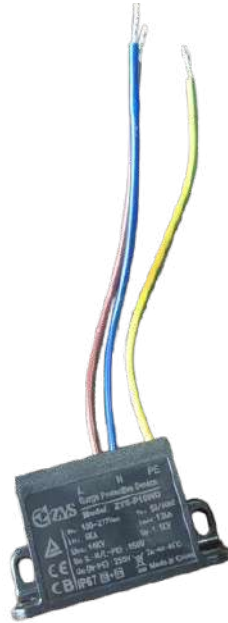


Attachment 2: Photo documentation

Details of: voltage surge protection device (ZP-LED-P10D) for each model

View:

- ☐ general
- ☐ front
- ☐ rear
- ☐ right
- ☐ left
- ☐ top
- ☐ bottom



--- End of Report ---