

Prüfbericht-Nr.: Test Report No.:	CN22CLYR 001	Auftrags-Nr.: Order No.:	244450836	Seite 1 von 101 Page 1 of 101
Kunden-Referenz-Nr.: Client Reference No.:	2438564	Auftragsdatum: Order date:	2022.09.21	
Auftraggeber: Client:	KENDAL ELEKTRİK AYDINLATMA ELEKTRONİK İNŞAAT SAN. VE DIŞ TİC. A.Ş KULEDİBİ BÜYÜKHENDEK CD. NO:28 34421, İSTANBUL, TURKEY			
Prüfgegenstand: Test item:	Self-ballasted LED lamps			
Bezeichnung / Typ-Nr.: Identification / Type No.:	See model list on page 3			
Auftrags-Inhalt: Order content:	Testing report			
Prüfgrundlage: Test specification:	Regulation (EU) 2017/1369 COMMISSION REGULATION (EU) 2019/2020 COMMISSION DELEGATED REGULATION (EU) 2019/2015 COMMISSION DELEGATED REGULATION (EU) 2021/340 and COMMISSION REGULATION (EU) 2021/341 also considered			
Wareneingangsdatum: Date of receipt:	2021.01.15			
Prüfmuster-Nr.: Test sample No.:	Number 1# to 10# for each model			
Prüfzeitraum: Testing period:	2021.01.15 - 2021.06.18			
Ort der Prüfung: Place of testing:	ANHUI SHILIN LIGHTING CO., LTD.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: Test result*:	Siehe Sonstiges / See Other aspects			
geprüft von: tested by: Fernando Dai	genehmigt von: authorized by: Alex Yan			
Datum: Date: 2022.09.21		Ausstellungsdatum: Issue date: 2022.09.21		
Stellung / Position:	PE	Stellung / Position:	Reviewer	
Sonstiges / Other :	This testing report is according to the ecodesign requirements for Light source. this report, initial value and 3600h test result were measured. Energy efficiency class according to COMMISSION DELEGATED REGULATION (EU) 2019/2015 is also considered, and the result is for reference.			
Appendix: Photo of tested samples.				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(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. 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.				

TEST REPORT**COMMISSION REGULATION (EU) 2019/2020**

laying down ecodesign requirements for light sources and separate control gears pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 244/2009, (EC) No 245/2009 and (EU) No 1194/2012

Test item particulars:

Product name Self-ballasted LED lamps

Model name See model list on page 3

Trade Mark


 Manufacturer **KENDAL ELEKTRİK AYDINLATMA ELEKTRONİK İNŞAAT SAN. VE DİŞ TİC. A.Ş**

address KULEDİBİ BÜYÜKHENDEK CD. NO:28 34421, İSTANBUL, TURKEY

Declare value description:

Rated input : 220-240V~, 50/60Hz

Rated wattage : See model list on page 3

Nominal luminous flux Φ : See model list on page 3Declared η_{TM} : See model list on page 3Declared Colour rendering (CRI) : ≥ 80

Declared Displacement factor for LED and OLED MLS (DF) : 0,7

Declared Lumen maintenance factor for LED and OLED : 0,96

Declared Survival factor for LED and OLED. : 0,90

 Declared colour consistency for LED and OLED : < 6

Declared beam angle for DLS : 100 degree for model KES048 and KES049

Declared lamp life : 25000h

Declared color temperature : See model list of light source

Declared Flicker for LED and OLED MLS : $\leq 1,0$
 Declared Stroboscopic effect for LED and OLED MLS : $\leq 0,4$

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)

- **Test Report Form No.** Ver. 2.0
- TRF Originator TÜV Rheinland
- Master TRF Dated 2021-03

General product information:**Light source:**

Type	Rated wattage	Lamp cap	Ponmax	Nominal luminous flux Φ	Declared color temperature	Declared η _{TM}	Declare Energy efficiency class	Energy consumption
KES180 (3000K)	7W	E27	7,29W	630lm	3000K	90,0lm/W	F	7kWh/1000h
KES180 (4000K)	7W	E27	7,29W	630lm	4000K	90,0lm/W	F	7kWh/1000h
KES180 (6500K)	7W	E27	7,29W	630lm	6500K	90,0lm/W	F	7kWh/1000h
KES181 (3000K)	9W	E27	9,00W	820lm	3000K	91,1lm/W	F	9kWh/1000h
KES181 (4000K)	9W	E27	9,00W	820lm	4000K	91,1lm/W	F	9kWh/1000h
KES181 (6500K)	9W	E27	9,00W	820lm	6500K	91,1lm/W	F	9kWh/1000h
KES182 (3000K)	15W	E27	15,12W	1500lm	3000K	100,0lm/W	F	15kWh/1000h
KES182 (4000K)	15W	E27	15,12W	1500lm	4000K	100,0lm/W	F	15kWh/1000h
KES182 (6500K)	15W	E27	15,12W	1500lm	6500K	100,0lm/W	F	15kWh/1000h
KES183 (3000K)	5W	E14	5,49W	430lm	3000K	86,0lm/W	F	5kWh/1000h
KES183 (4000K)	5W	E14	5,49W	430lm	4000K	86,0lm/W	F	5kWh/1000h
KES183 (6500K)	5W	E14	5,49W	430lm	6500K	86,0lm/W	F	5kWh/1000h
KES184 (3000K)	6W	E14	6,30W	520lm	3000K	86,7lm/W	F	6kWh/1000h
KES184 (4000K)	6W	E14	6,30W	520lm	4000K	86,7lm/W	F	6kWh/1000h
KES184 (6500K)	6W	E14	6,30W	520lm	6500K	86,7lm/W	F	6kWh/1000h
KES185 (3000K)	12W	E27	12,02W	1155lm	3000K	96,3lm/W	F	12kWh/1000h
KES185 (4000K)	12W	E27	12,02W	1155lm	4000K	96,3lm/W	F	12kWh/1000h
KES185 (6500K)	12W	E27	12,02W	1155lm	6500K	96,3lm/W	F	12kWh/1000h
KES048 (3000K)	5W	GU10	6,67W	400lm	3000K	94,1lm/W	F	5kWh/1000h
KES048 (4000K)	5W	GU10	6,67W	400lm	4000K	94,1lm/W	F	5kWh/1000h
KES048 (6500K)	5W	GU10	6,67W	400lm	6500K	94,1lm/W	F	5kWh/1000h
KES049 (3000K)	6W	GU10	7,63W	480lm	3000K	94,1lm/W	F	6kWh/1000h
KES049 (4000K)	6W	GU10	7,63W	480lm	4000K	94,1lm/W	F	6kWh/1000h
KES049 (6500K)	6W	GU10	7,63W	480lm	6500K	94,1lm/W	F	6kWh/1000h

Summary of testing:

Type	Testing condition	Testing period
KES180 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES180 (4000K)	230VAC, 50Hz	2021.04.08
KES180 (6000K)	230VAC, 50Hz	2021.04.08
KES181 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES181 (4000K)	230VAC, 50Hz	2021.04.08
KES181 (6500K)	230VAC, 50Hz	2021.04.08
KES182 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES182 (4000K)	230VAC, 50Hz	2021.04.09
KES182 (6500K)	230VAC, 50Hz	2021.04.09
KES183 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES183 (4000K)	230VAC, 50Hz	2021.04.08
KES183 (6500K)	230VAC, 50Hz	2021.04.08
KES184 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES184 (4000K)	230VAC, 50Hz	2021.04.08
KES184 (6500K)	230VAC, 50Hz	2021.04.08
KES185 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES185 (4000K)	230VAC, 50Hz	2021.04.08
KES185 (6500K)	230VAC, 50Hz	2021.04.08
KES048 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES048 (4000K)	230VAC, 50Hz	2021.04.09
KES048 (6500K)	230VAC, 50Hz	2021.04.09
KES049 (3000K)	230VAC, 50Hz	2021.01.15-2021.06.18
KES049 (4000K)	230VAC, 50Hz	2021.04.09
KES049 (6500K)	230VAC, 50Hz	2021.04.09

Full tests performed on all models at 3000K, initial tests also performed on all models at 4000K and 6500K.

Copy of rating label:

N/A

ANNEX II: Ecodesign requirements			
Test item	Requirement	Result	Verdict
1. Energy efficiency requirements:			
(a): Light source	From 1 September 2021, the declared power consumption of a light source P_{on} shall not exceed the maximum allowed power P_{onmax} (in W), defined as a function of the declared useful luminous flux Φ_{use} (in lm) and the declared colour rendering index CRI (-) as follows: $P_{onmax} = C_x(L + \Phi_{use}/(F \times \eta)) \times R$		☒ P ☐ F ☐ N/A ☐ Under testing
	The standby power P_{sb} of a light source shall not exceed 0,5W.		☐ P ☐ F ☒ N/A ☐ Under testing
	The networked standby power P_{net} of a connected light source shall not exceed 0,5W. The allowable values for P_{sb} and P_{net} shall not be added together.		☐ P ☐ F ☒ N/A ☐ Under testing
(b): Control gear	From 1 September 2021, the values set in Table 3 for the minimum energy efficiency requirements of a separate control gear operating at full-load shall apply: Details see Table 3: Minimum energy efficiency for separate control gear at full-load		☐ P ☐ F ☒ N/A ☐ Under testing
	The no-load power P_{no} of a separate control gear shall not exceed 0,5W. This applies only to separate control gear for which the manufacturer or importer has declared in the technical documentation that it has been designed for no-load mode.		☐ P ☐ F ☒ N/A ☐ Under testing
	The standby power P_{sb} of a separate control gear shall not exceed 0,5W.		☐ P ☐ F ☒ N/A ☐ Under testing
	The networked standby power P_{net} of a connected separate control gear shall not exceed 0,5W. The allowable values for P_{sb} and P_{net} shall not be added together.		☐ P ☐ F ☒ N/A ☐ Under testing

2.Functional requirements:			
	From 1 September 2021, the functional requirements specified in Table 4 shall apply for light sources: Table 4: Functional requirements for light sources		☒ P ☐ F ☐ N/A ☐ Under testing
Colour rendering	CRI ≥ 80 (except for HID with $\Phi_{use} > 4klm$ and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI < 80 , when a clear indication to this effect is shown on the light source packaging and in all relevant printed and electronic documentation)	See table 1	☒ P ☐ F ☐ N/A ☐ Under testing
Displacement factor (DF, $\cos \phi_1$) at power input P_{on} for LED and OLED MLS	No limit at $P_{on} \leq 5W$, $DF \geq 0,5$ at $5 W < P_{on} \leq 10W$, $DF \geq 0,7$ at $10 W < P_{on} \leq 25W$ $DF \geq 0,9$ at $25 W < P_{on}$	See table 1	☒ P ☐ F ☐ N/A ☐ Under testing
Lumen maintenance factor (for LED and OLED)	The lumen maintenance factor $XLMF\%$ after endurance testing according to Annex V shall be at least $XLMF_{MIN}\%$ calculated as follows: $XLMF_{MIN}\% = 100 \times e^{(3000 \times \ln(0,7)) L70}$ where L70 is the declared L70B50 lifetime (in hours) If the calculated value for $XLMF_{MIN}$ exceeds 96,0%, an $XLMF_{MIN}$ value of 96,0% shall be used	See table 4	☒ P ☐ F ☐ N/A ☐ Under testing
Survival factor (for LED and OLED)	Light sources should be operational as specified in row 'Survival factor (for LED and OLED)' of Annex IV, Table 6, following the endurance testing given in Annex V.	See table 4	☒ P ☐ F ☐ N/A ☐ Under testing
Colour consistency for LED and OLED light sources	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.	See table 1	☒ P ☐ F ☐ N/A ☐ Under testing
Flicker for LED and OLED MLS	$P_{st} LM \leq 1,0$ at full-load	See table 1	☒ P ☐ F ☐ N/A ☐ Under testing
Stroboscopic effect for LED and OLED MLS	$SVM \leq 0,9$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI < 80); From 1 September 2024: $SVM \leq 0,4$ at full-load (except for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI < 80)	See table 1	☒ P ☐ F ☐ N/A ☐ Under testing

3.Information requirements:

	From 1 September 2021 the following information requirements shall apply: (a) Information to be displayed on the light source itself (b) Information to be visibly displayed on the packaging (c) Information to be visibly displayed on a free-access website of the manufacturer, importer or authorised representative (d) Technical documentation (e) Information for products specified in point 3 of Annex III		☐ P ☐ F ☐ N/A ☒ Not checked
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Appendix I: Test results

Table 1: Initial test results: KES180 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	51,0	6,73	697,0	2893	--	
2#	230,0	51,0	6,71	693,0	2893	--	
3#	230,0	51,0	6,73	700,0	2918	--	
4#	230,0	50,0	6,58	695,0	2924	--	
5#	230,0	52,0	6,65	700,0	2912	--	
6#	230,0	51,0	6,73	697,0	2893	--	
7#	230,0	52,0	6,71	693,0	2893	--	
8#	230,0	50,0	6,73	700,0	2918	--	
9#	230,0	51,0	6,58	699,0	2924	--	
10#	230,0	51,0	6,65	701,0	2912	--	
Average	230,0	51,0	6,68	697,5	2908	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,7	0,792	4,1	0,013	0,016	--	--
2#	82,8	0,788	4,0	0,010	0,024	--	--
3#	82,8	0,789	3,3	0,024	0,018	--	--
4#	82,8	0,793	1,7	0,015	0,026	--	--
5#	82,8	0,786	2,6	0,028	0,019	--	--
6#	82,7	0,788	3,1	0,021	0,020	--	--
7#	82,8	0,786	2,9	0,010	0,024	--	--
8#	82,8	0,780	4,5	0,015	0,018	--	--
9#	82,8	0,790	5,1	0,015	0,021	--	--
10#	82,8	0,786	3,5	0,024	0,021	--	--
Average	82,8	0,788	3,5	0,018	0,021	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES180 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	697,0	1,00	1,02	120	1,5	1,08	8,05
2#	693,0	1,00	1,02	120	1,5	1,08	8,01
3#	700,0	1,00	1,02	120	1,5	1,08	8,08
4#	695,0	1,00	1,02	120	1,5	1,08	8,03
5#	700,0	1,00	1,02	120	1,5	1,08	8,08
6#	697,0	1,00	1,02	120	1,5	1,08	8,05
7#	693,0	1,00	1,02	120	1,5	1,08	8,01
8#	700,0	1,00	1,02	120	1,5	1,08	8,08
9#	699,0	1,00	1,02	120	1,5	1,08	8,07
10#	701,0	1,00	1,02	120	1,5	1,08	8,09
Average	697,5	1,00	1,02	120	1,5	1,08	8,06
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$P_{on} = C_x(L + \Phi_{use}/(F_x \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES180 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	697,0	6,73	1,000	103,6	F	F
2#	693,0	6,71	1,000	103,3	F	F
3#	700,0	6,73	1,000	104,1	F	F
4#	695,0	6,58	1,000	105,6	F	F
5#	700,0	6,65	1,000	105,2	F	F
6#	697,0	6,73	1,000	103,6	F	F
7#	693,0	6,71	1,000	103,3	F	F
8#	700,0	6,73	1,000	104,1	F	F
9#	699,0	6,58	1,000	106,2	F	F
10#	701,0	6,65	1,000	105,4	F	F
Average	697,5	6,68	1,000	104,4	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES180 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	697,0	672,1	96,43%	Survival
2#	693,0	666,6	96,19%	Survival
3#	700,0	672,7	96,10%	Survival
4#	695,0	667,5	96,04%	Survival
5#	700,0	675,6	96,51%	Survival
6#	697,0	678,5	97,35%	Survival
7#	693,0	666,0	96,10%	Survival
8#	700,0	681,4	97,34%	Survival
9#	699,0	673,4	96,34%	Survival
10#	701,0	673,7	96,11%	Survival
Average	697,5	672,8	96,45%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES180 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	51,0	6,79	691,0	3885	--	
2#	230,0	51,0	6,78	689,0	3847	--	
3#	230,0	51,0	6,79	706,0	3853	--	
4#	230,0	50,0	6,71	700,0	3823	--	
5#	230,0	52,0	6,80	706,0	3855	--	
6#	230,0	51,0	6,78	697,0	3840	--	
7#	230,0	52,0	6,79	693,0	3847	--	
8#	230,0	50,0	6,79	700,0	3833	--	
9#	230,0	51,0	6,79	699,0	3863	--	
10#	230,0	51,0	6,78	701,0	3855	--	
Average	230,0	51,0	6,78	698,2	3850	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,2	0,788	4,2	0,021	0,020	--	--
2#	84,1	0,786	4,0	0,010	0,024	--	--
3#	84,2	0,782	4,0	0,024	0,018	--	--
4#	84,3	0,791	5,2	0,016	0,020	--	--
5#	84,3	0,784	4,3	0,021	0,021	--	--
6#	84,1	0,780	4,3	0,020	0,020	--	--
7#	84,0	0,786	4,3	0,010	0,022	--	--
8#	84,2	0,780	4,5	0,024	0,018	--	--
9#	84,1	0,790	5,1	0,015	0,026	--	--
10#	84,2	0,782	3,5	0,028	0,026	--	--
Average	84,2	0,785	4,3	0,019	0,022	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES180 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	691,0	1,00	1,03	120	1,5	1,08	8,07
2#	689,0	1,00	1,03	120	1,5	1,08	8,06
3#	706,0	1,00	1,03	120	1,5	1,08	8,21
4#	700,0	1,00	1,03	120	1,5	1,08	8,16
5#	706,0	1,00	1,03	120	1,5	1,08	8,21
6#	697,0	1,00	1,03	120	1,5	1,08	8,13
7#	693,0	1,00	1,03	120	1,5	1,08	8,09
8#	700,0	1,00	1,03	120	1,5	1,08	8,16
9#	699,0	1,00	1,03	120	1,5	1,08	8,15
10#	701,0	1,00	1,03	120	1,5	1,08	8,17
Average	698,2	1,00	1,03	120	1,5	1,08	8,14
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

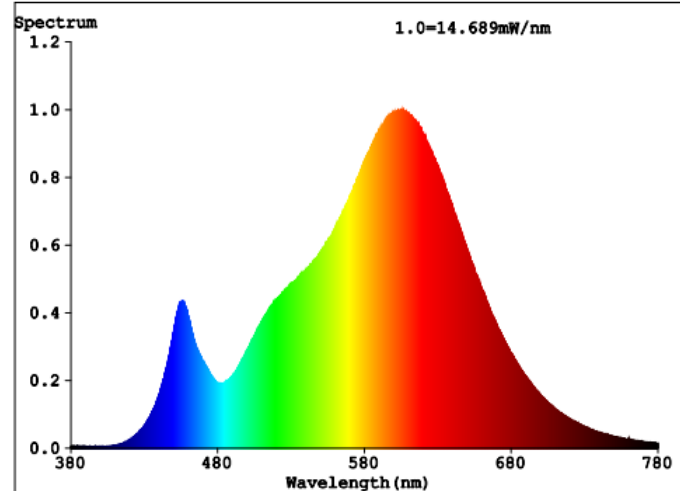
Table 3: Initial test results for Energy efficiency classes: KES180 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	691,0	6,79	1,000	101,7	F	F
2#	689,0	6,78	1,000	101,6	F	F
3#	706,0	6,79	1,000	103,9	F	F
4#	700,0	6,71	1,000	104,3	F	F
5#	706,0	6,80	1,000	103,8	F	F
6#	697,0	6,78	1,000	102,7	F	F
7#	693,0	6,79	1,000	102,0	F	F
8#	700,0	6,79	1,000	103,2	F	F
9#	699,0	6,79	1,000	102,9	F	F
10#	701,0	6,78	1,000	103,4	F	F
Average	698,2	6,78	1,000	103,0	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES180 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	51,0	6,87	720,0	6031	--	
2#	230,0	51,0	6,78	713,0	6100	--	
3#	230,0	51,0	6,79	706,0	6085	--	
4#	230,0	50,0	6,75	700,0	6063	--	
5#	230,0	52,0	6,81	706,0	6070	--	
6#	230,0	51,0	6,78	705,0	6031	--	
7#	230,0	52,0	6,79	693,0	6024	--	
8#	230,0	50,0	6,79	700,0	6114	--	
9#	230,0	50,0	6,79	699,0	6101	--	
10#	230,0	52,0	6,78	701,0	6070	--	
Average	230,0	51,0	6,79	704,3	6069	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,8	0,788	4,1	0,012	0,023	--	--
2#	84,1	0,781	4,0	0,021	0,024	--	--
3#	84,1	0,786	3,3	0,024	0,018	--	--
4#	84,1	0,792	5,2	0,015	0,028	--	--
5#	84,1	0,786	4,6	0,028	0,028	--	--
6#	83,9	0,786	3,1	0,012	0,022	--	--
7#	84,1	0,788	3,5	0,021	0,024	--	--
8#	84,2	0,790	4,5	0,024	0,018	--	--
9#	84,1	0,780	5,1	0,015	0,026	--	--
10#	83,9	0,786	3,5	0,028	0,026	--	--
Average	84,0	0,786	4,1	0,020	0,024	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

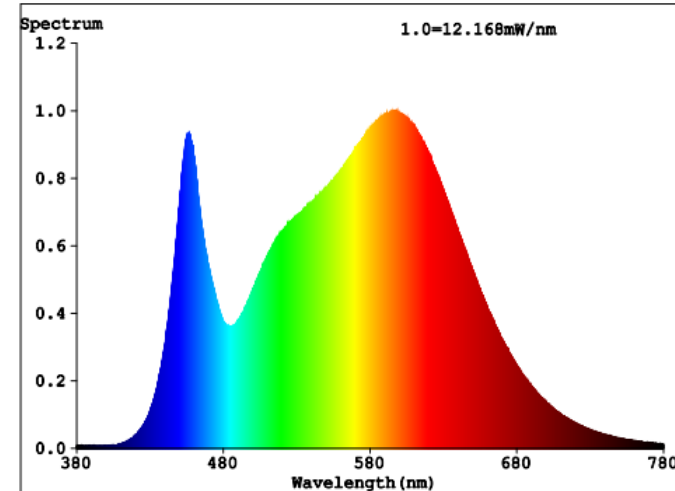
Table 2: Initial test results: KES180 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	720,0	1,00	1,02	120	1,5	1,08	8,26
2#	713,0	1,00	1,03	120	1,5	1,08	8,28
3#	706,0	1,00	1,03	120	1,5	1,08	8,21
4#	700,0	1,00	1,03	120	1,5	1,08	8,16
5#	706,0	1,00	1,03	120	1,5	1,08	8,21
6#	705,0	1,00	1,02	120	1,5	1,08	8,12
7#	693,0	1,00	1,03	120	1,5	1,08	8,09
8#	700,0	1,00	1,03	120	1,5	1,08	8,16
9#	699,0	1,00	1,03	120	1,5	1,08	8,15
10#	701,0	1,00	1,02	120	1,5	1,08	8,09
Average	704,3	1,00	1,03	120	1,5	1,08	8,20
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta))xR$

Table 3: Initial test results for Energy efficiency classes: KES180 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	720,0	6,87	1,000	104,9	F	F
2#	713,0	6,78	1,000	105,2	F	F
3#	706,0	6,79	1,000	103,9	F	F
4#	700,0	6,75	1,000	103,7	F	F
5#	706,0	6,81	1,000	103,7	F	F
6#	705,0	6,78	1,000	103,9	F	F
7#	693,0	6,79	1,000	102,0	F	F
8#	700,0	6,79	1,000	103,2	F	F
9#	699,0	6,79	1,000	102,9	F	F
10#	701,0	6,78	1,000	103,4	F	F
Average	704,3	6,79	1,000	103,7	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

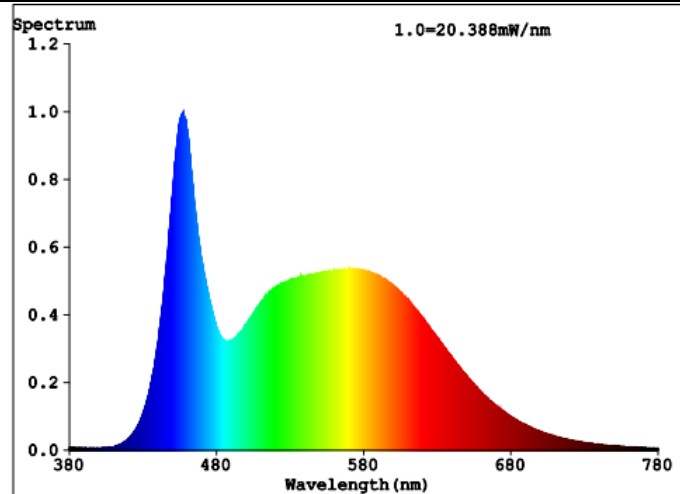
Table 5: Spectrum



KES180 (3000K)



KES180 (4000K)



KES180 (6500K)

Table 1: Initial test results: KES181 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	63,0	8,15	832,0	2893	--	
2#	230,0	64,0	8,43	859,0	2893	--	
3#	230,0	65,0	8,50	860,0	2918	--	
4#	230,0	64,0	8,34	881,0	2924	--	
5#	230,0	65,0	8,35	868,0	2912	--	
6#	230,0	64,0	8,43	832,0	2893	--	
7#	230,0	64,0	8,50	859,0	2893	--	
8#	230,0	65,0	8,34	860,0	2918	--	
9#	230,0	64,0	8,35	881,0	2924	--	
10#	230,0	65,0	8,35	868,0	2912	--	
Average	230,0	64,3	8,37	860,0	2908	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,8	0,825	4,1	0,013	0,016	--	--
2#	82,8	0,815	4,0	0,010	0,024	--	--
3#	82,8	0,826	3,3	0,024	0,018	--	--
4#	82,7	0,820	1,7	0,015	0,026	--	--
5#	82,9	0,811	2,6	0,028	0,019	--	--
6#	82,7	0,826	3,1	0,021	0,020	--	--
7#	82,8	0,825	2,9	0,010	0,024	--	--
8#	82,8	0,811	4,5	0,015	0,018	--	--
9#	82,8	0,826	5,1	0,015	0,021	--	--
10#	82,8	0,825	3,5	0,024	0,021	--	--
Average	82,8	0,821	3,5	0,018	0,021	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES181 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	832,0	1,00	1,02	120	1,5	1,08	9,29
2#	859,0	1,00	1,02	120	1,5	1,08	9,54
3#	860,0	1,00	1,02	120	1,5	1,08	9,55
4#	881,0	1,00	1,02	120	1,5	1,08	9,74
5#	868,0	1,00	1,02	120	1,5	1,08	9,62
6#	832,0	1,00	1,02	120	1,5	1,08	9,29
7#	859,0	1,00	1,02	120	1,5	1,08	9,54
8#	860,0	1,00	1,02	120	1,5	1,08	9,55
9#	881,0	1,00	1,02	120	1,5	1,08	9,74
10#	868,0	1,00	1,02	120	1,5	1,08	9,62
Average	860,0	1,00	1,02	120	1,5	1,08	9,55
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta))xR$

Table 3: Initial test results for Energy efficiency classes: KES181 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	832,0	8,15	1,000	102,1	F	F
2#	859,0	8,43	1,000	101,9	F	F
3#	860,0	8,50	1,000	101,2	F	F
4#	881,0	8,34	1,000	105,7	F	F
5#	868,0	8,35	1,000	104,0	F	F
6#	832,0	8,43	1,000	98,7	F	F
7#	859,0	8,50	1,000	101,1	F	F
8#	860,0	8,34	1,000	103,1	F	F
9#	881,0	8,35	1,000	105,5	F	F
10#	868,0	8,35	1,000	103,9	F	F
Average	860,0	8,37	1,000	102,7	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES181 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	832,0	802,7	96,48%	Survival
2#	859,0	827,1	96,29%	Survival
3#	860,0	836,5	97,27%	Survival
4#	881,0	846,2	96,05%	Survival
5#	868,0	834,0	96,08%	Survival
6#	832,0	815,4	98,00%	Survival
7#	859,0	825,5	96,10%	Survival
8#	860,0	827,3	96,20%	Survival
9#	881,0	848,5	96,31%	Survival
10#	868,0	835,1	96,21%	Survival
Average	860,0	829,8	96,49%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES181 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	64,0	8,32	868,0	3885	--	
2#	230,0	64,0	8,43	865,0	3867	--	
3#	230,0	65,0	8,45	878,0	3873	--	
4#	230,0	64,0	8,34	885,0	3883	--	
5#	230,0	65,0	8,35	868,0	3855	--	
6#	230,0	64,0	8,45	868,0	3870	--	
7#	230,0	64,0	8,44	865,0	3897	--	
8#	230,0	65,0	8,34	878,0	3883	--	
9#	230,0	64,0	8,35	885,0	3863	--	
10#	230,0	65,0	8,35	868,0	3855	--	
Average	230,0	64,4	8,38	872,8	3873	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,2	0,823	4,1	0,013	0,015	--	--
2#	84,1	0,815	4,0	0,010	0,024	--	--
3#	84,1	0,826	3,3	0,020	0,018	--	--
4#	84,2	0,820	1,7	0,015	0,025	--	--
5#	84,3	0,810	2,6	0,021	0,017	--	--
6#	84,2	0,820	3,1	0,021	0,020	--	--
7#	84,1	0,824	2,9	0,018	0,024	--	--
8#	84,2	0,811	4,5	0,020	0,018	--	--
9#	84,1	0,826	5,1	0,022	0,021	--	--
10#	84,2	0,825	3,5	0,024	0,021	--	--
Average	84,2	0,820	3,5	0,018	0,020	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES181 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	868,0	1,00	1,03	120	1,5	1,08	9,71
2#	865,0	1,00	1,03	120	1,5	1,08	9,69
3#	878,0	1,00	1,03	120	1,5	1,08	9,81
4#	885,0	1,00	1,03	120	1,5	1,08	9,87
5#	868,0	1,00	1,03	120	1,5	1,08	9,71
6#	868,0	1,00	1,03	120	1,5	1,08	9,71
7#	865,0	1,00	1,03	120	1,5	1,08	9,69
8#	878,0	1,00	1,03	120	1,5	1,08	9,81
9#	885,0	1,00	1,03	120	1,5	1,08	9,87
10#	868,0	1,00	1,03	120	1,5	1,08	9,71
Average	872,8	1,00	1,03	120	1,5	1,08	9,76
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

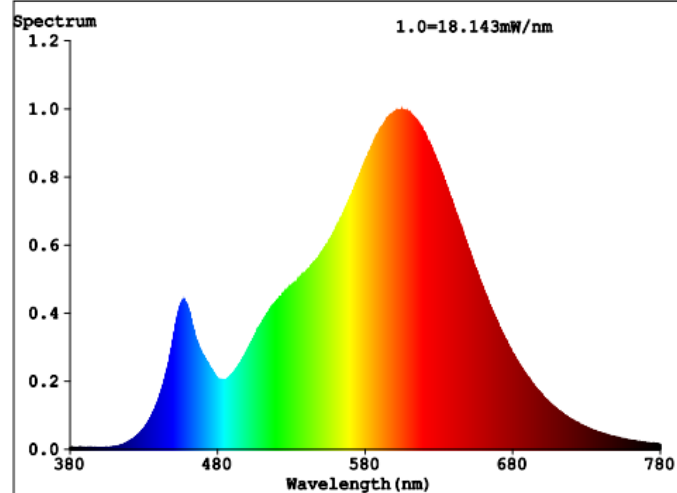
Table 3: Initial test results for Energy efficiency classes: KES181 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	868,0	8,32	1,000	104,4	F	F
2#	865,0	8,43	1,000	102,6	F	F
3#	878,0	8,45	1,000	103,9	F	F
4#	885,0	8,34	1,000	106,1	F	F
5#	868,0	8,35	1,000	104,0	F	F
6#	868,0	8,45	1,000	102,7	F	F
7#	865,0	8,44	1,000	102,5	F	F
8#	878,0	8,34	1,000	105,3	F	F
9#	885,0	8,35	1,000	106,0	F	F
10#	868,0	8,35	1,000	103,9	F	F
Average	872,8	8,38	1,000	104,1	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES181 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	64,0	8,31	886,0	6081	--	
2#	230,0	64,0	8,42	907,0	6100	--	
3#	230,0	65,0	8,21	878,0	6085	--	
4#	230,0	64,0	8,20	881,0	6063	--	
5#	230,0	65,0	8,35	887,0	6070	--	
6#	230,0	64,0	8,40	883,0	6091	--	
7#	230,0	64,0	8,44	865,0	6074	--	
8#	230,0	65,0	8,33	878,0	6114	--	
9#	230,0	64,0	8,35	885,0	6101	--	
10#	230,0	65,0	8,35	898,0	6070	--	
Average	230,0	64,4	8,34	884,8	6085	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,8	0,788	4,2	0,011	0,023	--	--
2#	84,2	0,781	4,1	0,021	0,024	--	--
3#	84,0	0,784	3,3	0,024	0,018	--	--
4#	84,1	0,792	4,5	0,025	0,028	--	--
5#	84,0	0,789	4,6	0,028	0,029	--	--
6#	83,9	0,791	3,1	0,012	0,022	--	--
7#	84,2	0,788	3,5	0,024	0,021	--	--
8#	84,2	0,791	4,5	0,024	0,018	--	--
9#	84,1	0,783	5,1	0,015	0,024	--	--
10#	83,9	0,786	3,8	0,028	0,022	--	--
Average	84,0	0,787	4,1	0,021	0,023	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

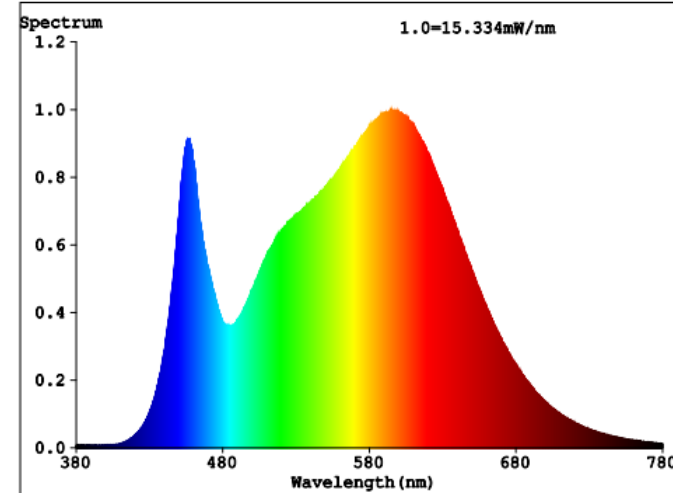
Table 2: Initial test results: KES181 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	886,0	1,00	1,02	120	1,5	1,08	9,79
2#	907,0	1,00	1,03	120	1,5	1,08	10,08
3#	878,0	1,00	1,03	120	1,5	1,08	9,81
4#	881,0	1,00	1,03	120	1,5	1,08	9,84
5#	887,0	1,00	1,03	120	1,5	1,08	9,89
6#	883,0	1,00	1,02	120	1,5	1,08	9,76
7#	865,0	1,00	1,03	120	1,5	1,08	9,69
8#	878,0	1,00	1,03	120	1,5	1,08	9,81
9#	885,0	1,00	1,03	120	1,5	1,08	9,87
10#	898,0	1,00	1,02	120	1,5	1,08	9,90
Average	884,8	1,00	1,03	120	1,5	1,08	9,87
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES181 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	886,0	8,31	1,000	106,6	F	F
2#	907,0	8,42	1,000	107,7	F	F
3#	878,0	8,21	1,000	106,9	F	F
4#	881,0	8,20	1,000	107,4	F	F
5#	887,0	8,35	1,000	106,2	F	F
6#	883,0	8,40	1,000	105,1	F	F
7#	865,0	8,44	1,000	102,5	F	F
8#	878,0	8,33	1,000	105,4	F	F
9#	885,0	8,35	1,000	106,0	F	F
10#	898,0	8,35	1,000	107,5	F	F
Average	884,8	8,34	1,000	106,1	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

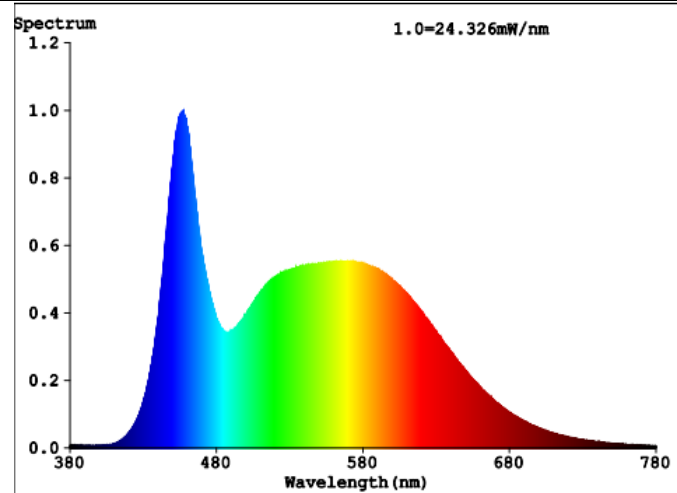
Table 5: Spectrum



KES181 (3000K)



KES181 (4000K)



KES181 (6500K)

Table 1: Initial test results: KES182 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	111,0	13,91	1453,0	2922	--	
2#	230,0	111,0	13,94	1400,0	2937	--	
3#	230,0	112,0	14,06	1456,0	2918	--	
4#	230,0	110,0	14,31	1427,0	2927	--	
5#	230,0	111,0	13,91	1453,0	2912	--	
6#	230,0	111,0	13,94	1400,0	2938	--	
7#	230,0	112,0	14,06	1456,0	2952	--	
8#	230,0	110,0	13,91	1453,0	2948	--	
9#	230,0	111,0	13,94	1400,0	2924	--	
10#	230,0	111,0	14,06	1456,0	2912	--	
Average	230,0	111,0	14,00	1435,4	2929	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,3	0,868	1,0	0,016	0,011	--	--
2#	82,2	0,865	2,0	0,012	0,017	--	--
3#	82,4	0,870	1,3	0,021	0,018	--	--
4#	82,7	0,866	1,7	0,015	0,021	--	--
5#	82,2	0,862	1,6	0,021	0,019	--	--
6#	82,4	0,865	1,0	0,022	0,020	--	--
7#	82,2	0,870	2,0	0,015	0,024	--	--
8#	82,4	0,866	1,3	0,018	0,012	--	--
9#	82,3	0,862	1,7	0,015	0,021	--	--
10#	82,4	0,865	1,6	0,024	0,021	--	--
Average	82,4	0,866	1,5	0,018	0,018	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES182 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1453,0	1,00	1,01	120	1,5	1,08	14,84
2#	1400,0	1,00	1,01	120	1,5	1,08	14,36
3#	1456,0	1,00	1,02	120	1,5	1,08	15,02
4#	1427,0	1,00	1,02	120	1,5	1,08	14,75
5#	1453,0	1,00	1,01	120	1,5	1,08	14,84
6#	1400,0	1,00	1,02	120	1,5	1,08	14,50
7#	1456,0	1,00	1,01	120	1,5	1,08	14,87
8#	1453,0	1,00	1,02	120	1,5	1,08	14,99
9#	1400,0	1,00	1,01	120	1,5	1,08	14,36
10#	1456,0	1,00	1,02	120	1,5	1,08	15,02
Average	1435,4	1,00	1,01	120	1,5	1,08	14,68
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES182 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1453,0	13,91	1,000	104,5	F	F
2#	1400,0	13,94	1,000	100,4	F	F
3#	1456,0	14,06	1,000	103,6	F	F
4#	1427,0	14,31	1,000	99,7	F	F
5#	1453,0	13,91	1,000	104,5	F	F
6#	1400,0	13,94	1,000	100,4	F	F
7#	1456,0	14,06	1,000	103,6	F	F
8#	1453,0	13,91	1,000	104,5	F	F
9#	1400,0	13,94	1,000	100,4	F	F
10#	1456,0	14,06	1,000	103,6	F	F
Average	1435,4	14,00	1,000	102,5	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES182 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	1453,0	1395,9	96,07%	Survival
2#	1400,0	1354,7	96,76%	Survival
3#	1456,0	1399,2	96,10%	Survival
4#	1427,0	1380,6	96,75%	Survival
5#	1453,0	1396,0	96,08%	Survival
6#	1400,0	1360,8	97,20%	Survival
7#	1456,0	1399,2	96,10%	Survival
8#	1453,0	1397,8	96,20%	Survival
9#	1400,0	1356,8	96,91%	Survival
10#	1456,0	1399,2	96,10%	Survival
Average	1435,4	1384,0	96,42%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES182 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	112,0	14,34	1454,0	3913	--	
2#	230,0	111,0	13,94	1414,0	3903	--	
3#	230,0	111,0	14,06	1461,0	3873	--	
4#	230,0	109,0	14,31	1432,0	3883	--	
5#	230,0	110,0	13,91	1455,0	3895	--	
6#	230,0	111,0	13,94	1411,0	3890	--	
7#	230,0	112,0	14,06	1460,0	3897	--	
8#	230,0	110,0	13,91	1454,0	3883	--	
9#	230,0	111,0	13,94	1412,0	3893	--	
10#	230,0	111,0	14,06	1459,0	3885	--	
Average	230,0	110,8	14,05	1441,2	3892	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,2	0,821	2,2	0,023	0,016	--	--
2#	84,1	0,812	2,5	0,012	0,021	--	--
3#	84,1	0,825	3,3	0,022	0,018	--	--
4#	84,2	0,821	2,4	0,015	0,026	--	--
5#	84,0	0,812	1,6	0,022	0,018	--	--
6#	84,2	0,825	3,1	0,021	0,020	--	--
7#	84,1	0,824	2,9	0,019	0,021	--	--
8#	84,2	0,811	2,5	0,021	0,019	--	--
9#	84,1	0,826	2,1	0,022	0,021	--	--
10#	84,0	0,825	2,5	0,024	0,021	--	--
Average	84,1	0,820	2,5	0,020	0,020	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES182 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1454,0	1,00	1,03	120	1,5	1,08	15,15
2#	1414,0	1,00	1,03	120	1,5	1,08	14,78
3#	1461,0	1,00	1,03	120	1,5	1,08	15,21
4#	1432,0	1,00	1,03	120	1,5	1,08	14,94
5#	1455,0	1,00	1,03	120	1,5	1,08	15,16
6#	1411,0	1,00	1,03	120	1,5	1,08	14,75
7#	1460,0	1,00	1,03	120	1,5	1,08	15,20
8#	1454,0	1,00	1,03	120	1,5	1,08	15,15
9#	1412,0	1,00	1,03	120	1,5	1,08	14,76
10#	1459,0	1,00	1,03	120	1,5	1,08	15,19
Average	1441,2	1,00	1,03	120	1,5	1,08	15,03
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

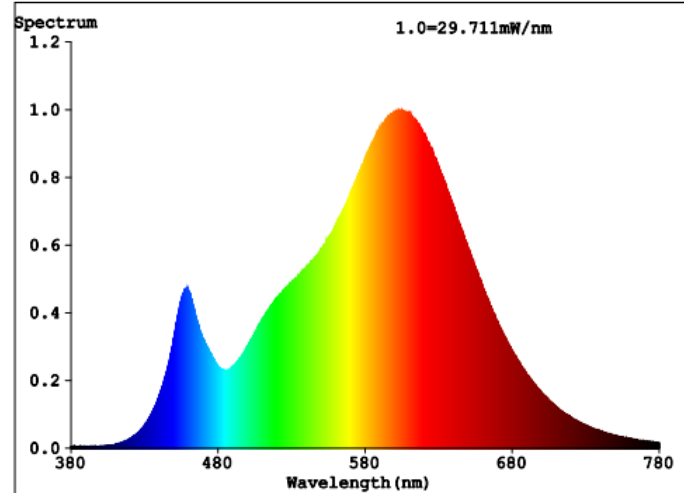
Table 3: Initial test results for Energy efficiency classes: KES182 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1454,0	14,34	1,000	101,4	F	F
2#	1414,0	13,94	1,000	101,4	F	F
3#	1461,0	14,06	1,000	103,9	F	F
4#	1432,0	14,31	1,000	100,1	F	F
5#	1455,0	13,91	1,000	104,6	F	F
6#	1411,0	13,94	1,000	101,2	F	F
7#	1460,0	14,06	1,000	103,8	F	F
8#	1454,0	13,91	1,000	104,5	F	F
9#	1412,0	13,94	1,000	101,3	F	F
10#	1459,0	14,06	1,000	103,8	F	F
Average	1441,2	14,05	1,000	102,6	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES182 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	111,0	14,24	1492,0	6330	--	
2#	230,0	111,0	13,98	1471,0	6300	--	
3#	230,0	111,0	14,14	1467,0	6385	--	
4#	230,0	110,0	14,21	1487,0	6363	--	
5#	230,0	111,0	13,97	1507,0	6370	--	
6#	230,0	111,0	13,99	1488,0	6291	--	
7#	230,0	112,0	14,06	1478,0	6374	--	
8#	230,0	110,0	14,11	1493,0	6314	--	
9#	230,0	112,0	14,14	1470,0	6301	--	
10#	230,0	111,0	14,06	1476,0	6390	--	
Average	230,0	111,0	14,09	1482,9	6342	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,8	0,868	1,1	0,012	0,023	--	--
2#	84,7	0,862	1,6	0,012	0,023	--	--
3#	84,6	0,869	2,5	0,024	0,018	--	--
4#	84,6	0,861	1,5	0,024	0,028	--	--
5#	84,7	0,862	1,6	0,018	0,014	--	--
6#	84,9	0,868	1,2	0,012	0,015	--	--
7#	84,8	0,863	1,5	0,024	0,025	--	--
8#	84,7	0,869	1,5	0,024	0,018	--	--
9#	84,6	0,861	2,1	0,015	0,026	--	--
10#	84,8	0,862	1,8	0,028	0,022	--	--
Average	84,7	0,865	1,6	0,019	0,021	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

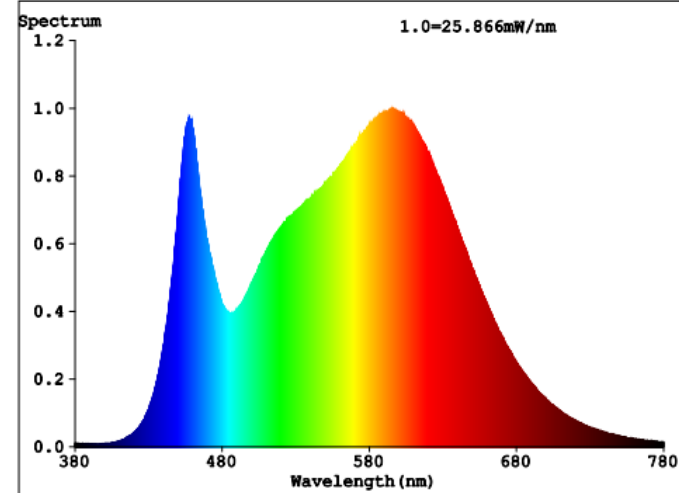
Table 2: Initial test results: KES182 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1492,0	1,00	1,03	120	1,5	1,08	15,50
2#	1471,0	1,00	1,03	120	1,5	1,08	15,30
3#	1467,0	1,00	1,03	120	1,5	1,08	15,27
4#	1487,0	1,00	1,03	120	1,5	1,08	15,45
5#	1507,0	1,00	1,03	120	1,5	1,08	15,64
6#	1488,0	1,00	1,03	120	1,5	1,08	15,46
7#	1478,0	1,00	1,03	120	1,5	1,08	15,37
8#	1493,0	1,00	1,03	120	1,5	1,08	15,51
9#	1470,0	1,00	1,03	120	1,5	1,08	15,30
10#	1476,0	1,00	1,03	120	1,5	1,08	15,35
Average	1482,9	1,00	1,03	120	1,5	1,08	15,42
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES182 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1492,0	14,24	1,000	104,8	F	F
2#	1471,0	13,98	1,000	105,2	F	F
3#	1467,0	14,14	1,000	103,7	F	F
4#	1487,0	14,21	1,000	104,6	F	F
5#	1507,0	13,97	1,000	107,9	F	F
6#	1488,0	13,99	1,000	106,4	F	F
7#	1478,0	14,06	1,000	105,1	F	F
8#	1493,0	14,11	1,000	105,8	F	F
9#	1470,0	14,14	1,000	104,0	F	F
10#	1476,0	14,06	1,000	105,0	F	F
Average	1482,9	14,09	1,000	105,2	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

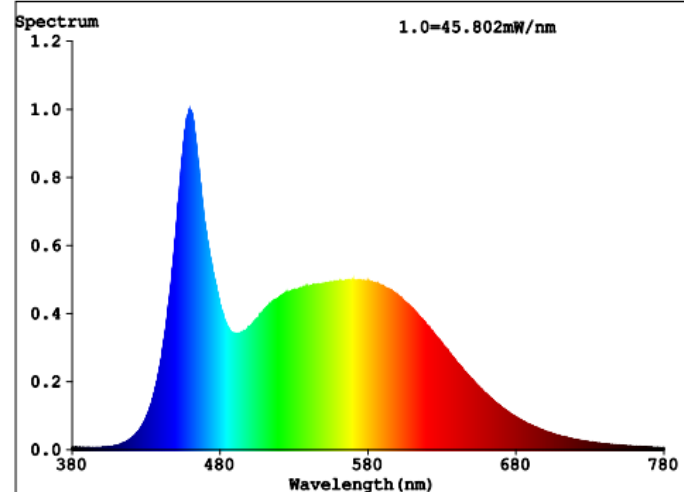
Table 5: Spectrum



KES182 (3000K)



KES182 (4000K)



KES182 (6500K)

Table 1: Initial test results: KES183 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	38,0	4,75	460,0	2883	--	
2#	230,0	38,0	4,79	461,0	2883	--	
3#	230,0	37,0	4,75	464,0	2908	--	
4#	230,0	38,0	4,72	470,0	2924	--	
5#	230,0	38,0	4,75	463,0	2912	--	
6#	230,0	38,0	4,75	460,0	2910	--	
7#	230,0	38,0	4,79	461,0	2900	--	
8#	230,0	37,0	4,75	465,0	2915	--	
9#	230,0	38,0	4,73	470,0	2910	--	
10#	230,0	38,0	4,75	463,0	2912	--	
Average	230,0	37,8	4,75	463,7	2906	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,6	--	4,9	0,050	0,018	--	--
2#	82,8	--	4,0	0,051	0,024	--	--
3#	82,6	--	3,3	0,044	0,018	--	--
4#	82,6	--	3,7	0,045	0,026	--	--
5#	82,6	--	2,6	0,048	0,022	--	--
6#	82,8	--	3,1	0,041	0,021	--	--
7#	82,6	--	2,9	0,041	0,024	--	--
8#	82,8	--	4,5	0,044	0,018	--	--
9#	82,6	--	5,1	0,045	0,026	--	--
10#	82,6	--	3,5	0,048	0,028	--	--
Average	82,7	--	3,8	0,046	0,023	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES183 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	460,0	1,00	1,02	120	1,5	1,08	5,88
2#	461,0	1,00	1,02	120	1,5	1,08	5,88
3#	464,0	1,00	1,02	120	1,5	1,08	5,91
4#	470,0	1,00	1,02	120	1,5	1,08	5,97
5#	463,0	1,00	1,02	120	1,5	1,08	5,90
6#	460,0	1,00	1,02	120	1,5	1,08	5,88
7#	461,0	1,00	1,02	120	1,5	1,08	5,88
8#	465,0	1,00	1,02	120	1,5	1,08	5,92
9#	470,0	1,00	1,02	120	1,5	1,08	5,97
10#	463,0	1,00	1,02	120	1,5	1,08	5,90
Average	463,7	1,00	1,02	120	1,5	1,08	5,91
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES183 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	460,0	4,75	1,000	96,8	F	F
2#	461,0	4,79	1,000	96,3	F	F
3#	464,0	4,75	1,000	97,7	F	F
4#	470,0	4,72	1,000	99,6	F	F
5#	463,0	4,75	1,000	97,4	F	F
6#	460,0	4,75	1,000	96,8	F	F
7#	461,0	4,79	1,000	96,3	F	F
8#	465,0	4,75	1,000	97,9	F	F
9#	470,0	4,73	1,000	99,4	F	F
10#	463,0	4,75	1,000	97,4	F	F
Average	463,7	4,75	1,000	97,5	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES183 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	460,0	445,6	96,87%	Survival
2#	461,0	448,8	97,35%	Survival
3#	464,0	445,9	96,10%	Survival
4#	470,0	453,5	96,49%	Survival
5#	463,0	447,9	96,74%	Survival
6#	460,0	447,5	97,28%	Survival
7#	461,0	453,9	98,46%	Survival
8#	465,0	457,3	98,34%	Survival
9#	470,0	452,8	96,34%	Survival
10#	463,0	450,9	97,39%	Survival
Average	463,7	450,4	97,13%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES183 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	38,0	4,72	463,0	3845	--	
2#	230,0	37,0	4,73	462,0	3847	--	
3#	230,0	38,0	4,75	467,0	3833	--	
4#	230,0	37,0	4,72	463,0	3823	--	
5#	230,0	38,0	4,63	462,0	3855	--	
6#	230,0	37,0	4,74	463,0	3840	--	
7#	230,0	38,0	4,63	462,0	3867	--	
8#	230,0	37,0	4,72	463,0	3833	--	
9#	230,0	38,0	4,72	462,0	3843	--	
10#	230,0	37,0	4,74	467,0	3855	--	
Average	230,0	37,5	4,71	463,4	3844	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,1	--	4,1	0,050	0,020	--	--
2#	84,1	--	4,0	0,041	0,024	--	--
3#	84,0	--	4,0	0,044	0,018	--	--
4#	84,1	--	5,0	0,045	0,026	--	--
5#	84,1	--	4,3	0,048	0,028	--	--
6#	84,1	--	4,3	0,041	0,020	--	--
7#	84,1	--	4,2	0,041	0,024	--	--
8#	84,1	--	4,5	0,044	0,018	--	--
9#	84,1	--	5,1	0,045	0,026	--	--
10#	84,0	--	3,5	0,048	0,028	--	--
Average	84,1	--	4,3	0,045	0,023	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES183 (4000K)							
Sample No.	Initial Φ _{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	463,0	1,00	1,03	120	1,5	1,08	5,96
2#	462,0	1,00	1,03	120	1,5	1,08	5,95
3#	467,0	1,00	1,03	120	1,5	1,08	6,00
4#	463,0	1,00	1,03	120	1,5	1,08	5,96
5#	462,0	1,00	1,03	120	1,5	1,08	5,95
6#	463,0	1,00	1,03	120	1,5	1,08	5,96
7#	462,0	1,00	1,03	120	1,5	1,08	5,95
8#	463,0	1,00	1,03	120	1,5	1,08	5,96
9#	462,0	1,00	1,03	120	1,5	1,08	5,95
10#	467,0	1,00	1,03	120	1,5	1,08	6,00
Average	463,4	1,00	1,03	120	1,5	1,08	5,96
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI≤25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	Pon= Cx(L+ Φ _{use} /(F x η) x R

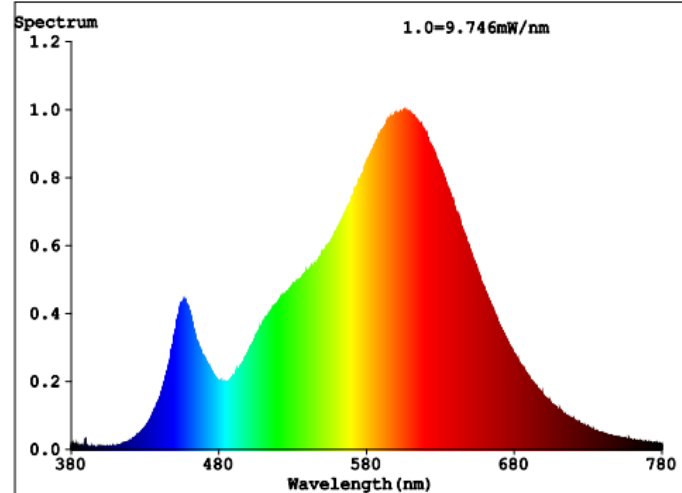
Table 3: Initial test results for Energy efficiency classes: KES183 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	463,0	4,72	1,000	98,0	F	F
2#	462,0	4,73	1,000	97,7	F	F
3#	467,0	4,75	1,000	98,4	F	F
4#	463,0	4,72	1,000	98,1	F	F
5#	462,0	4,63	1,000	99,8	F	F
6#	463,0	4,74	1,000	97,8	F	F
7#	462,0	4,63	1,000	99,8	F	F
8#	463,0	4,72	1,000	98,1	F	F
9#	462,0	4,72	1,000	97,8	F	F
10#	467,0	4,74	1,000	98,6	F	F
Average	463,4	4,71	1,000	98,4	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES183 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	37,0	4,67	473,0	6031	--	
2#	230,0	37,0	4,67	473,0	6024	--	
3#	230,0	38,0	4,75	476,0	6024	--	
4#	230,0	37,0	4,72	463,0	6063	--	
5#	230,0	38,0	4,83	491,0	6070	--	
6#	230,0	37,0	4,74	472,0	6041	--	
7#	230,0	37,0	4,63	472,0	6034	--	
8#	230,0	37,0	4,72	473,0	6024	--	
9#	230,0	38,0	4,72	472,0	6063	--	
10#	230,0	37,0	4,74	477,0	6070	--	
Average	230,0	37,3	4,72	474,2	6044	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,8	--	5,7	0,050	0,025	--	--
2#	83,8	--	5,6	0,041	0,024	--	--
3#	83,3	--	5,5	0,045	0,019	--	--
4#	84,0	--	4,3	0,045	0,026	--	--
5#	83,9	--	4,8	0,048	0,028	--	--
6#	83,8	--	5,7	0,045	0,021	--	--
7#	83,8	--	5,6	0,042	0,025	--	--
8#	83,5	--	5,5	0,044	0,018	--	--
9#	83,3	--	4,3	0,045	0,026	--	--
10#	83,5	--	4,8	0,048	0,028	--	--
Average	83,7	--	5,2	0,045	0,024	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

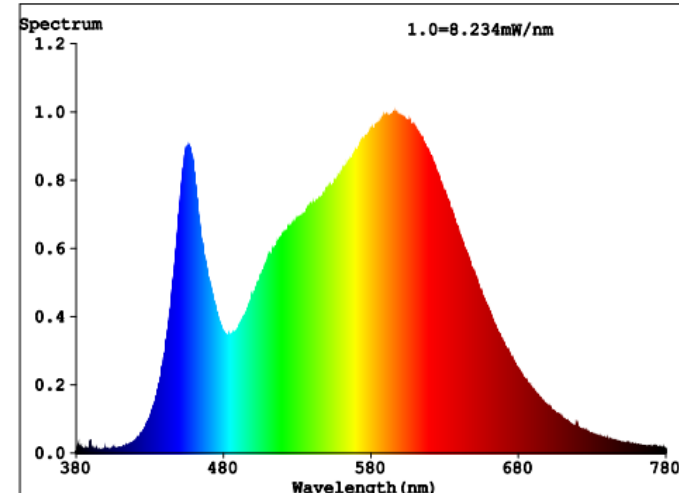
Table 2: Initial test results: KES183 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	473,0	1,00	1,02	120	1,5	1,08	5,99
2#	473,0	1,00	1,02	120	1,5	1,08	5,99
3#	476,0	1,00	1,02	120	1,5	1,08	6,02
4#	463,0	1,00	1,03	120	1,5	1,08	5,96
5#	491,0	1,00	1,02	120	1,5	1,08	6,16
6#	472,0	1,00	1,02	120	1,5	1,08	5,99
7#	472,0	1,00	1,02	120	1,5	1,08	5,99
8#	473,0	1,00	1,02	120	1,5	1,08	5,99
9#	472,0	1,00	1,02	120	1,5	1,08	5,99
10#	477,0	1,00	1,02	120	1,5	1,08	6,03
Average	474,2	1,00	1,02	120	1,5	1,08	6,01
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES183 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	473,0	4,67	1,000	101,3	F	F
2#	473,0	4,67	1,000	101,3	F	F
3#	476,0	4,75	1,000	100,3	F	F
4#	463,0	4,72	1,000	98,1	F	F
5#	491,0	4,83	1,000	101,7	F	F
6#	472,0	4,74	1,000	99,7	F	F
7#	472,0	4,63	1,000	101,9	F	F
8#	473,0	4,72	1,000	100,2	F	F
9#	472,0	4,72	1,000	100,0	F	F
10#	477,0	4,74	1,000	100,7	F	F
Average	474,2	4,72	1,000	100,5	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

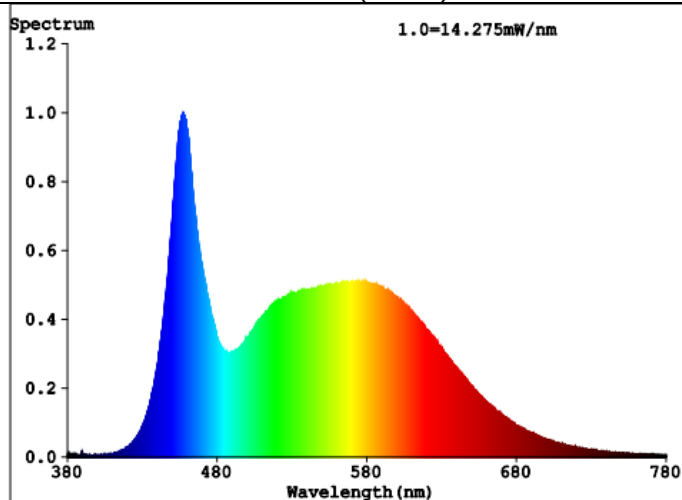
Table 5: Spectrum



KES183 (3000K)



KES183 (4000K)



KES183 (6500K)

Table 1: Initial test results: KES184 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	44,0	5,51	541,0	2914	--	
2#	230,0	43,0	5,52	540,0	2914	--	
3#	230,0	43,0	5,46	530,0	2894	--	
4#	230,0	43,0	5,51	539,0	2921	--	
5#	230,0	45,0	5,51	539,0	2921	--	
6#	230,0	44,0	5,51	543,0	2914	--	
7#	230,0	43,0	5,52	541,0	2914	--	
8#	230,0	43,0	5,47	530,0	2895	--	
9#	230,0	44,0	5,51	539,0	2921	--	
10#	230,0	45,0	5,51	537,0	2921	--	
Average	230,0	43,7	5,50	537,9	2913	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,8	0,794	2,2	0,065	0,016	--	--
2#	82,6	0,795	3,3	0,066	0,022	--	--
3#	82,7	0,791	3,1	0,060	0,019	--	--
4#	82,9	0,795	1,9	0,063	0,015	--	--
5#	82,9	0,793	1,9	0,071	0,014	--	--
6#	82,8	0,790	2,2	0,059	0,019	--	--
7#	82,6	0,792	3,3	0,055	0,017	--	--
8#	82,8	0,796	3,1	0,059	0,018	--	--
9#	82,9	0,791	2,0	0,065	0,023	--	--
10#	82,6	0,792	1,9	0,066	0,024	--	--
Average	82,8	0,793	2,5	0,063	0,019	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES184 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	541,0	1,00	1,02	120	1,5	1,08	6,62
2#	540,0	1,00	1,02	120	1,5	1,08	6,61
3#	530,0	1,00	1,02	120	1,5	1,08	6,52
4#	539,0	1,00	1,02	120	1,5	1,08	6,60
5#	539,0	1,00	1,02	120	1,5	1,08	6,60
6#	543,0	1,00	1,02	120	1,5	1,08	6,64
7#	541,0	1,00	1,02	120	1,5	1,08	6,62
8#	530,0	1,00	1,02	120	1,5	1,08	6,52
9#	539,0	1,00	1,02	120	1,5	1,08	6,60
10#	537,0	1,00	1,02	120	1,5	1,08	6,58
Average	537,9	1,00	1,02	120	1,5	1,08	6,59
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES184 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	541,0	5,51	1,000	98,2	F	F
2#	540,0	5,52	1,000	97,8	F	F
3#	530,0	5,46	1,000	97,0	F	F
4#	539,0	5,51	1,000	97,8	F	F
5#	539,0	5,51	1,000	97,8	F	F
6#	543,0	5,51	1,000	98,5	F	F
7#	541,0	5,52	1,000	98,1	F	F
8#	530,0	5,47	1,000	97,0	F	F
9#	539,0	5,51	1,000	97,8	F	F
10#	537,0	5,51	1,000	97,5	F	F
Average	537,9	5,50	1,000	97,8	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES184 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	541,0	519,9	96,10%	Survival
2#	540,0	518,7	96,06%	Survival
3#	530,0	519,3	97,98%	Survival
4#	539,0	518,7	96,23%	Survival
5#	539,0	519,9	96,46%	Survival
6#	543,0	528,4	97,31%	Survival
7#	541,0	521,9	96,47%	Survival
8#	530,0	515,9	97,34%	Survival
9#	539,0	518,5	96,20%	Survival
10#	537,0	517,5	96,37%	Survival
Average	537,9	519,9	96,65%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES184 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	44,0	5,61	547,0	3877	--	
2#	230,0	44,0	5,60	546,0	3882	--	
3#	230,0	44,0	5,59	555,0	3876	--	
4#	230,0	45,0	5,72	556,0	3848	--	
5#	230,0	44,0	5,61	547,0	3855	--	
6#	230,0	44,0	5,60	546,0	3840	--	
7#	230,0	44,0	5,58	557,0	3869	--	
8#	230,0	44,0	5,76	560,0	3851	--	
9#	230,0	45,0	5,61	547,0	3843	--	
10#	230,0	44,0	5,60	546,0	3855	--	
Average	230,0	44,2	5,63	550,7	3860	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,0	0,794	3,8	0,065	0,016	--	--
2#	84,0	0,796	3,8	0,063	0,022	--	--
3#	84,0	0,795	3,9	0,069	0,018	--	--
4#	83,9	0,791	4,5	0,066	0,027	--	--
5#	84,0	0,786	4,3	0,065	0,028	--	--
6#	83,8	0,789	4,1	0,065	0,020	--	--
7#	84,1	0,796	4,2	0,059	0,024	--	--
8#	84,0	0,783	4,5	0,068	0,015	--	--
9#	84,2	0,795	3,9	0,066	0,023	--	--
10#	84,0	0,789	3,7	0,065	0,014	--	--
Average	84,0	0,791	4,1	0,065	0,021	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES184 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	547,0	1,00	1,03	120	1,5	1,08	6,74
2#	546,0	1,00	1,03	120	1,5	1,08	6,73
3#	555,0	1,00	1,03	120	1,5	1,08	6,81
4#	556,0	1,00	1,02	120	1,5	1,08	6,76
5#	547,0	1,00	1,03	120	1,5	1,08	6,74
6#	546,0	1,00	1,02	120	1,5	1,08	6,66
7#	557,0	1,00	1,03	120	1,5	1,08	6,83
8#	560,0	1,00	1,03	120	1,5	1,08	6,86
9#	547,0	1,00	1,03	120	1,5	1,08	6,74
10#	546,0	1,00	1,03	120	1,5	1,08	6,73
Average	550,7	1,00	1,03	120	1,5	1,08	6,77
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES184 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	547,0	5,61	1,000	97,5	F	F
2#	546,0	5,60	1,000	97,5	F	F
3#	555,0	5,59	1,000	99,3	F	F
4#	556,0	5,72	1,000	97,2	F	F
5#	547,0	5,61	1,000	97,5	F	F
6#	546,0	5,60	1,000	97,5	F	F
7#	557,0	5,58	1,000	99,8	F	F
8#	560,0	5,76	1,000	97,2	F	F
9#	547,0	5,61	1,000	97,5	F	F
10#	546,0	5,60	1,000	97,5	F	F
Average	550,7	5,63	1,000	97,9	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES184 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	44,0	5,54	560,0	6137	--	
2#	230,0	44,0	5,54	560,0	6137	--	
3#	230,0	44,0	5,55	563,0	6100	--	
4#	230,0	44,0	5,50	555,0	6016	--	
5#	230,0	44,0	5,59	569,0	6078	--	
6#	230,0	44,0	5,54	560,0	6041	--	
7#	230,0	44,0	5,54	561,0	6034	--	
8#	230,0	44,0	5,55	563,0	6025	--	
9#	230,0	44,0	5,50	555,0	6063	--	
10#	230,0	44,0	5,59	569,0	6069	--	
Average	230,0	44,0	5,54	561,5	6070	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,3	0,794	4,4	0,065	0,016	--	--
2#	84,3	0,791	4,5	0,061	0,020	--	--
3#	83,5	0,795	4,4	0,058	0,019	--	--
4#	84,0	0,794	5,8	0,069	0,025	--	--
5#	84,1	0,796	5,0	0,071	0,027	--	--
6#	84,3	0,786	4,4	0,059	0,020	--	--
7#	84,3	0,788	4,3	0,066	0,024	--	--
8#	83,5	0,791	4,4	0,065	0,018	--	--
9#	84,4	0,785	5,8	0,063	0,027	--	--
10#	84,1	0,796	5,1	0,070	0,028	--	--
Average	84,1	0,792	4,8	0,065	0,022	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES184 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	560,0	1,00	1,03	120	1,5	1,08	6,86
2#	560,0	1,00	1,03	120	1,5	1,08	6,86
3#	563,0	1,00	1,02	120	1,5	1,08	6,82
4#	555,0	1,00	1,03	120	1,5	1,08	6,81
5#	569,0	1,00	1,03	120	1,5	1,08	6,94
6#	560,0	1,00	1,03	120	1,5	1,08	6,86
7#	561,0	1,00	1,03	120	1,5	1,08	6,87
8#	563,0	1,00	1,02	120	1,5	1,08	6,82
9#	555,0	1,00	1,03	120	1,5	1,08	6,81
10#	569,0	1,00	1,03	120	1,5	1,08	6,94
Average	561,5	1,00	1,03	120	1,5	1,08	6,87
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES184 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	560,0	5,54	1,000	101,1	F	F
2#	560,0	5,54	1,000	101,1	F	F
3#	563,0	5,55	1,000	101,5	F	F
4#	555,0	5,50	1,000	100,8	F	F
5#	569,0	5,59	1,000	101,8	F	F
6#	560,0	5,54	1,000	101,1	F	F
7#	561,0	5,54	1,000	101,2	F	F
8#	563,0	5,55	1,000	101,5	F	F
9#	555,0	5,50	1,000	100,8	F	F
10#	569,0	5,59	1,000	101,8	F	F
Average	561,5	5,54	1,000	101,3	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 5: Spectrum

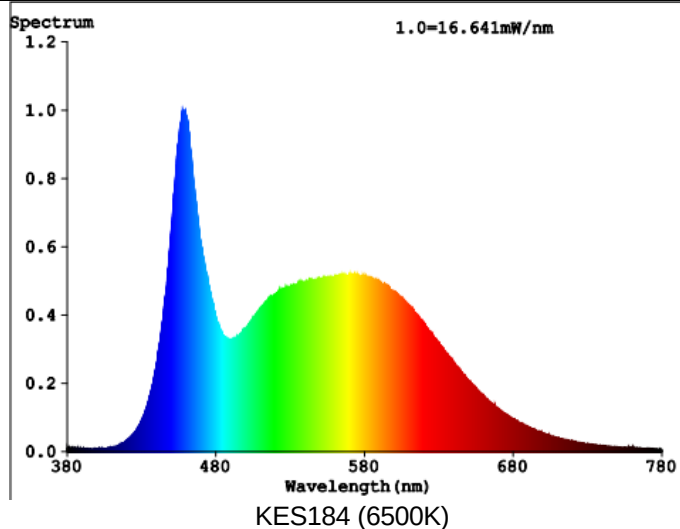
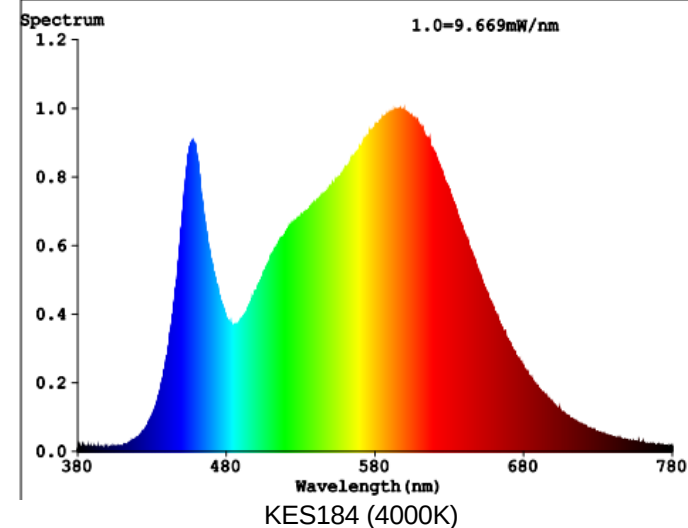
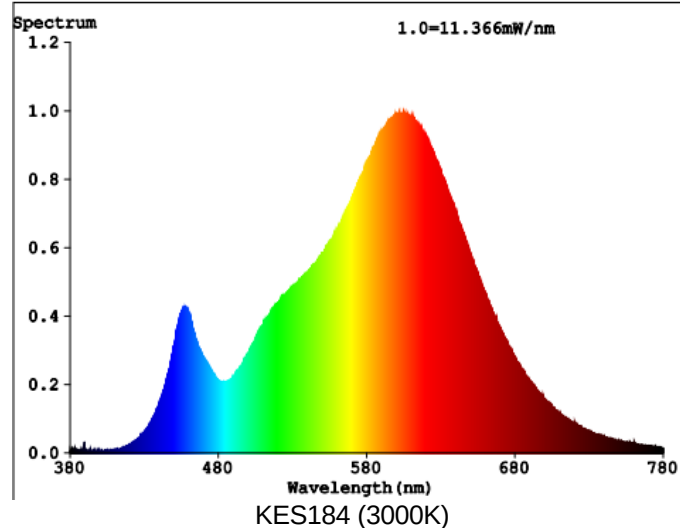


Table 1: Initial test results: KES185 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	91,0	11,78	1239,0	2926	--	
2#	230,0	91,0	11,77	1229,0	2936	--	
3#	230,0	91,0	11,85	1248,0	2918	--	
4#	230,0	91,0	11,81	1250,0	2924	--	
5#	230,0	91,0	11,86	1276,0	2912	--	
6#	230,0	91,0	11,78	1238,0	2930	--	
7#	230,0	92,0	11,75	1225,0	2912	--	
8#	230,0	91,0	11,86	1245,0	2918	--	
9#	230,0	91,0	11,82	1251,0	2924	--	
10#	230,0	91,0	11,86	1271,0	2912	--	
Average	230,0	91,1	11,81	1247,2	2921	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,8	0,851	2,1	0,016	0,013	--	--
2#	82,8	0,855	3,0	0,012	0,014	--	--
3#	82,7	0,848	2,3	0,024	0,018	--	--
4#	82,7	0,856	1,7	0,015	0,026	--	--
5#	82,8	0,848	2,6	0,021	0,019	--	--
6#	82,7	0,850	2,1	0,027	0,020	--	--
7#	82,8	0,854	2,9	0,010	0,024	--	--
8#	82,8	0,854	2,5	0,015	0,018	--	--
9#	82,8	0,849	2,1	0,015	0,021	--	--
10#	82,8	0,848	3,5	0,024	0,021	--	--
Average	82,8	0,851	2,5	0,018	0,019	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES185 (3000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1239,0	1,00	1,02	120	1,5	1,08	13,03
2#	1229,0	1,00	1,02	120	1,5	1,08	12,93
3#	1248,0	1,00	1,02	120	1,5	1,08	13,11
4#	1250,0	1,00	1,02	120	1,5	1,08	13,13
5#	1276,0	1,00	1,02	120	1,5	1,08	13,37
6#	1238,0	1,00	1,02	120	1,5	1,08	13,02
7#	1225,0	1,00	1,02	120	1,5	1,08	12,90
8#	1245,0	1,00	1,02	120	1,5	1,08	13,08
9#	1251,0	1,00	1,02	120	1,5	1,08	13,14
10#	1271,0	1,00	1,02	120	1,5	1,08	13,32
Average	1247,2	1,00	1,02	120	1,5	1,08	13,10
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES185 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1239,0	11,78	1,000	105,2	F	F
2#	1229,0	11,77	1,000	104,4	F	F
3#	1248,0	11,85	1,000	105,3	F	F
4#	1250,0	11,81	1,000	105,8	F	F
5#	1276,0	11,86	1,000	107,6	F	F
6#	1238,0	11,78	1,000	105,1	F	F
7#	1225,0	11,75	1,000	104,3	F	F
8#	1245,0	11,86	1,000	105,0	F	F
9#	1251,0	11,82	1,000	105,8	F	F
10#	1271,0	11,86	1,000	107,2	F	F
Average	1247,2	11,81	1,000	105,6	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES185 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	1239,0	1192,4	96,24%	Survival
2#	1229,0	1198,6	97,53%	Survival
3#	1248,0	1199,3	96,10%	Survival
4#	1250,0	1203,8	96,30%	Survival
5#	1276,0	1227,7	96,21%	Survival
6#	1238,0	1191,0	96,20%	Survival
7#	1225,0	1184,8	96,72%	Survival
8#	1245,0	1197,7	96,20%	Survival
9#	1251,0	1213,5	97,00%	Survival
10#	1271,0	1221,4	96,10%	Survival
Average	1247,2	1203,0	96,46%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES185 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	91,0	11,88	1239,0	3913	--	
2#	230,0	92,0	11,79	1243,0	3903	--	
3#	230,0	91,0	11,85	1259,0	3873	--	
4#	230,0	91,0	11,81	1240,0	3883	--	
5#	230,0	91,0	11,82	1236,0	3895	--	
6#	230,0	91,0	11,78	1248,0	3890	--	
7#	230,0	91,0	11,85	1225,0	3897	--	
8#	230,0	91,0	11,86	1245,0	3883	--	
9#	230,0	91,0	11,80	1251,0	3893	--	
10#	230,0	91,0	11,86	1231,0	3885	--	
Average	230,0	91,1	11,83	1241,7	3892	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,2	0,821	4,2	0,023	0,016	--	--
2#	84,1	0,812	4,5	0,012	0,024	--	--
3#	84,1	0,826	3,3	0,020	0,018	--	--
4#	84,2	0,821	4,6	0,015	0,026	--	--
5#	84,0	0,812	2,6	0,021	0,017	--	--
6#	84,2	0,820	3,1	0,021	0,020	--	--
7#	84,1	0,824	2,9	0,018	0,024	--	--
8#	84,2	0,811	4,5	0,021	0,019	--	--
9#	84,1	0,826	5,1	0,022	0,021	--	--
10#	84,0	0,825	3,5	0,024	0,021	--	--
Average	84,1	0,820	3,8	0,020	0,021	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES185 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1239,0	1,00	1,03	120	1,5	1,08	13,15
2#	1243,0	1,00	1,03	120	1,5	1,08	13,19
3#	1259,0	1,00	1,03	120	1,5	1,08	13,34
4#	1240,0	1,00	1,03	120	1,5	1,08	13,16
5#	1236,0	1,00	1,03	120	1,5	1,08	13,13
6#	1248,0	1,00	1,03	120	1,5	1,08	13,24
7#	1225,0	1,00	1,03	120	1,5	1,08	13,02
8#	1245,0	1,00	1,03	120	1,5	1,08	13,21
9#	1251,0	1,00	1,03	120	1,5	1,08	13,27
10#	1231,0	1,00	1,03	120	1,5	1,08	13,08
Average	1241,7	1,00	1,03	120	1,5	1,08	13,18
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

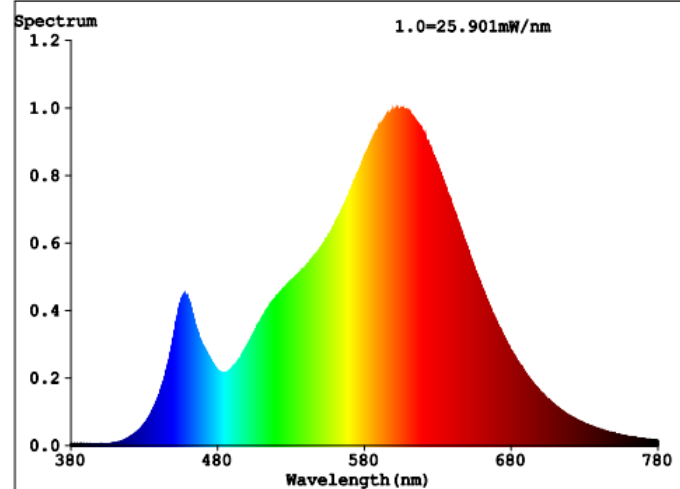
Table 3: Initial test results for Energy efficiency classes: KES185 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1239,0	11,88	1,000	104,3	F	F
2#	1243,0	11,79	1,000	105,4	F	F
3#	1259,0	11,85	1,000	106,2	F	F
4#	1240,0	11,81	1,000	105,0	F	F
5#	1236,0	11,82	1,000	104,6	F	F
6#	1248,0	11,78	1,000	105,9	F	F
7#	1225,0	11,85	1,000	103,4	F	F
8#	1245,0	11,86	1,000	105,0	F	F
9#	1251,0	11,80	1,000	106,0	F	F
10#	1231,0	11,86	1,000	103,8	F	F
Average	1241,7	11,83	1,000	105,0	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES185 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	91,0	11,87	1287,0	6181	--	
2#	230,0	92,0	11,75	1287,0	6100	--	
3#	230,0	91,0	11,84	1292,0	6185	--	
4#	230,0	91,0	11,82	1294,0	6063	--	
5#	230,0	91,0	11,82	1296,0	6170	--	
6#	230,0	91,0	11,78	1289,0	6091	--	
7#	230,0	91,0	11,85	1282,0	6074	--	
8#	230,0	91,0	11,86	1292,0	6114	--	
9#	230,0	91,0	11,82	1295,0	6101	--	
10#	230,0	91,0	11,86	1296,0	6090	--	
Average	230,0	91,1	11,83	1291,0	6117	--	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,8	0,868	4,1	0,011	0,023	--	--
2#	84,1	0,861	4,6	0,011	0,024	--	--
3#	84,2	0,869	3,5	0,024	0,018	--	--
4#	84,2	0,861	4,5	0,025	0,018	--	--
5#	84,1	0,862	4,6	0,018	0,019	--	--
6#	83,9	0,868	3,2	0,012	0,012	--	--
7#	84,2	0,862	3,5	0,024	0,025	--	--
8#	84,2	0,869	4,5	0,024	0,018	--	--
9#	84,2	0,861	5,1	0,015	0,026	--	--
10#	83,9	0,862	3,8	0,028	0,022	--	--
Average	84,1	0,864	4,1	0,019	0,021	--	--
Required	≥80	≥0,7	≤6	≤1,0	≤0,9	--	--

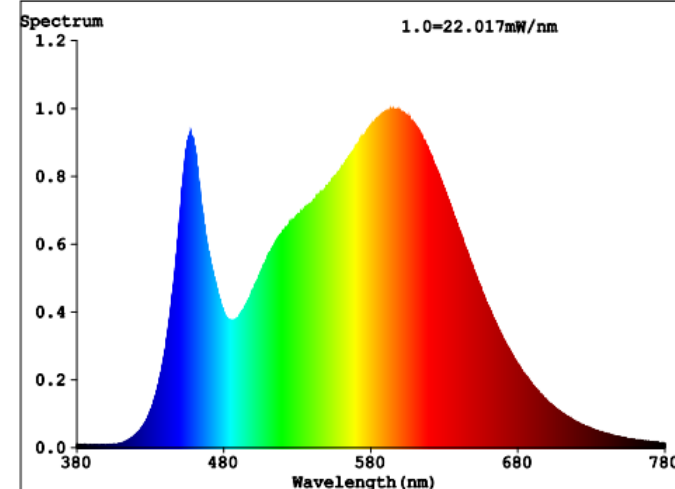
Table 2: Initial test results: KES185 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	1287,0	1,00	1,02	120	1,5	1,08	13,47
2#	1287,0	1,00	1,03	120	1,5	1,08	13,60
3#	1292,0	1,00	1,03	120	1,5	1,08	13,65
4#	1294,0	1,00	1,03	120	1,5	1,08	13,66
5#	1296,0	1,00	1,03	120	1,5	1,08	13,68
6#	1289,0	1,00	1,02	120	1,5	1,08	13,49
7#	1282,0	1,00	1,03	120	1,5	1,08	13,55
8#	1292,0	1,00	1,03	120	1,5	1,08	13,65
9#	1295,0	1,00	1,03	120	1,5	1,08	13,67
10#	1296,0	1,00	1,02	120	1,5	1,08	13,55
Average	1291,0	1,00	1,03	120	1,5	1,08	13,64
Factor	N/A	☒ 1.00 for NDLS ☐ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☒ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☐ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES185 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	1287,0	11,87	1,000	108,4	F	F
2#	1287,0	11,75	1,000	109,5	F	F
3#	1292,0	11,84	1,000	109,1	F	F
4#	1294,0	11,82	1,000	109,5	F	F
5#	1296,0	11,82	1,000	109,6	F	F
6#	1289,0	11,78	1,000	109,4	F	F
7#	1282,0	11,85	1,000	108,2	F	F
8#	1292,0	11,86	1,000	108,9	F	F
9#	1295,0	11,82	1,000	109,6	F	F
10#	1296,0	11,86	1,000	109,3	F	F
Average	1291,0	11,83	1,000	109,2	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors FTM by light source type: ☒ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☐ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

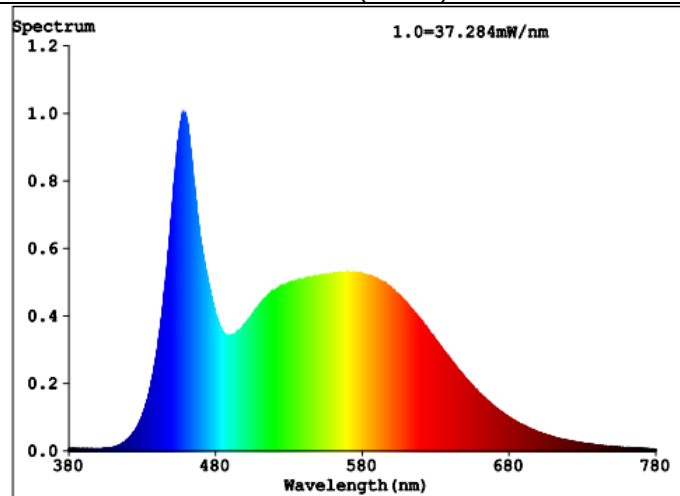
Table 5: Spectrum



KES185 (3000K)



KES185 (4000K)



KES185 (6500K)

Table 1: Initial test results: KES048 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	38,0	4,79	367,0	2995	101,0	
2#	230,0	38,0	4,78	362,0	2950	99,8	
3#	230,0	38,0	4,76	360,0	3005	99,8	
4#	230,0	37,0	4,64	361,0	2992	99,3	
5#	230,0	37,0	4,63	365,0	3002	99,9	
6#	230,0	38,0	4,77	365,0	2995	102,1	
7#	230,0	38,0	4,69	366,0	3008	99,8	
8#	230,0	37,0	4,66	365,0	3002	99,7	
9#	230,0	38,0	4,71	362,0	2997	99,5	
10#	230,0	38,0	4,77	363,0	3009	99,7	
Average	230,0	37,7	4,72	363,6	2996	100,1	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,8	--	4,6	0,050	0,018	--	--
2#	82,9	--	4,4	0,056	0,018	--	--
3#	82,9	--	4,4	0,048	0,021	--	--
4#	82,9	--	4,2	0,052	0,025	--	--
5#	82,9	--	4,2	0,055	0,019	--	--
6#	82,9	--	4,2	0,059	0,024	--	--
7#	82,8	--	4,4	0,047	0,017	--	--
8#	82,7	--	4,3	0,045	0,021	--	--
9#	82,9	--	4,5	0,050	0,026	--	--
10#	82,9	--	4,2	0,051	0,024	--	--
Average	82,9	--	4,3	0,051	0,021	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES048 (3000K)							
Sample No.	Initial Φ _{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	367,0	0,85	1,02	120	1,5	1,23	6,40
2#	362,0	0,85	1,02	120	1,5	1,23	6,33
3#	360,0	0,85	1,02	120	1,5	1,23	6,31
4#	361,0	0,85	1,02	120	1,5	1,23	6,32
5#	365,0	0,85	1,02	120	1,5	1,23	6,37
6#	365,0	0,85	1,02	120	1,5	1,23	6,37
7#	366,0	0,85	1,02	120	1,5	1,23	6,38
8#	365,0	0,85	1,02	120	1,5	1,23	6,37
9#	362,0	0,85	1,02	120	1,5	1,23	6,33
10#	363,0	0,85	1,02	120	1,5	1,23	6,35
Average	363,6	0,85	1,02	120	1,5	1,23	6,35
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI≤25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	Pon= Cx(L+ Φ _{use} /(F _x η)xR

Table 3: Initial test results for Energy efficiency classes: KES048 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	367,0	4,79	1,176	90,1	F	F
2#	362,0	4,78	1,176	89,1	F	F
3#	360,0	4,76	1,176	88,9	F	F
4#	361,0	4,64	1,176	91,5	F	F
5#	365,0	4,63	1,176	92,7	F	F
6#	365,0	4,77	1,176	90,0	F	F
7#	366,0	4,69	1,176	91,8	F	F
8#	365,0	4,66	1,176	92,1	F	F
9#	362,0	4,71	1,176	90,4	F	F
10#	363,0	4,77	1,176	89,5	F	F
Average	363,6	4,72	1,176	90,6	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES048 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	367,0	355,3	96,81%	Survival
2#	362,0	347,9	96,10%	Survival
3#	360,0	349,0	96,94%	Survival
4#	361,0	352,7	97,70%	Survival
5#	365,0	355,7	97,45%	Survival
6#	365,0	354,1	97,01%	Survival
7#	366,0	355,7	97,19%	Survival
8#	365,0	352,1	96,47%	Survival
9#	362,0	350,2	96,74%	Survival
10#	363,0	349,8	96,36%	Survival
Average	363,6	352,3	96,88%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES048 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	38,0	4,78	371,0	3823	100,0	
2#	230,0	38,0	4,77	378,0	3823	99,5	
3#	230,0	38,0	4,75	379,0	3800	99,8	
4#	230,0	38,0	4,82	372,0	3792	99,6	
5#	230,0	38,0	4,74	381,0	3807	99,9	
6#	230,0	38,0	4,78	380,0	3823	100,1	
7#	230,0	38,0	4,77	382,0	3825	99,8	
8#	230,0	38,0	4,77	383,0	3800	99,7	
9#	230,0	38,0	4,82	381,0	3829	99,6	
10#	230,0	38,0	4,74	375,0	3827	99,7	
Average	230,0	38,0	4,77	378,2	3815	99,8	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,0	--	5,0	0,050	0,018	--	--
2#	84,0	--	5,0	0,051	0,022	--	--
3#	84,0	--	5,6	0,049	0,018	--	--
4#	84,0	--	5,7	0,056	0,025	--	--
5#	83,7	--	5,8	0,055	0,019	--	--
6#	84,0	--	5,0	0,048	0,016	--	--
7#	84,1	--	5,6	0,044	0,021	--	--
8#	83,9	--	5,3	0,058	0,017	--	--
9#	84,1	--	5,2	0,045	0,021	--	--
10#	84,0	--	5,1	0,061	0,024	--	--
Average	84,0	--	5,3	0,052	0,020	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES048 (4000K)							
Sample No.	Initial Φuse (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	371,0	0,85	1,03	120	1,5	1,23	6,51
2#	378,0	0,85	1,03	120	1,5	1,23	6,60
3#	379,0	0,85	1,03	120	1,5	1,23	6,61
4#	372,0	0,85	1,03	120	1,5	1,23	6,52
5#	381,0	0,85	1,02	120	1,5	1,23	6,57
6#	380,0	0,85	1,03	120	1,5	1,23	6,62
7#	382,0	0,85	1,03	120	1,5	1,23	6,65
8#	383,0	0,85	1,02	120	1,5	1,23	6,59
9#	381,0	0,85	1,03	120	1,5	1,23	6,63
10#	375,0	0,85	1,03	120	1,5	1,23	6,56
Average	378,2	0,85	1,02	120	1,5	1,23	6,53
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI≤25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	Pon= Cx(L+ Φuse/(Fx η)xR

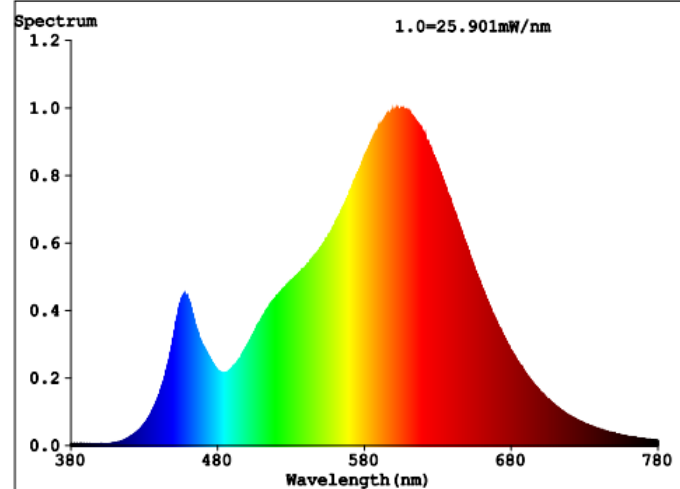
Table 3: Initial test results for Energy efficiency classes: KES048 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	371,0	4,78	1,176	91,3	F	F
2#	378,0	4,77	1,176	93,2	F	F
3#	379,0	4,75	1,176	93,8	F	F
4#	372,0	4,82	1,176	90,8	F	F
5#	381,0	4,74	1,176	94,5	F	F
6#	380,0	4,78	1,176	93,5	F	F
7#	382,0	4,77	1,176	94,2	F	F
8#	383,0	4,77	1,176	94,4	F	F
9#	381,0	4,82	1,176	93,0	F	F
10#	375,0	4,74	1,176	93,0	F	F
Average	378,2	4,77	1,176	93,2	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES048 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	38,0	4,76	386,0	5993	101,3	
2#	230,0	38,0	4,73	389,0	6107	99,1	
3#	230,0	38,0	4,73	391,0	6007	99,3	
4#	230,0	38,0	4,73	392,0	6058	99,4	
5#	230,0	38,0	4,70	386,0	6040	99,9	
6#	230,0	38,0	4,75	382,0	6080	100,5	
7#	230,0	38,0	4,73	383,0	6060	99,7	
8#	230,0	38,0	4,73	381,0	6066	98,3	
9#	230,0	38,0	4,70	393,0	5998	97,6	
10#	230,0	38,0	4,75	390,0	5998	99,9	
Average	230,0	38,0	4,73	387,3	6041	99,5	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,7	--	3,7	0,050	0,018	--	--
2#	83,3	--	3,9	0,051	0,021	--	--
3#	83,4	--	3,7	0,055	0,018	--	--
4#	83,9	--	4,2	0,051	0,014	--	--
5#	83,8	--	3,5	0,061	0,020	--	--
6#	83,7	--	3,3	0,048	0,014	--	--
7#	83,7	--	3,5	0,048	0,016	--	--
8#	83,9	--	3,8	0,058	0,018	--	--
9#	83,7	--	4,2	0,054	0,025	--	--
10#	83,8	--	3,8	0,055	0,022	--	--
Average	83,7	--	3,8	0,053	0,019	--	--
Required	≥80	--	≤6	≤1,0	≤0,9	--	--

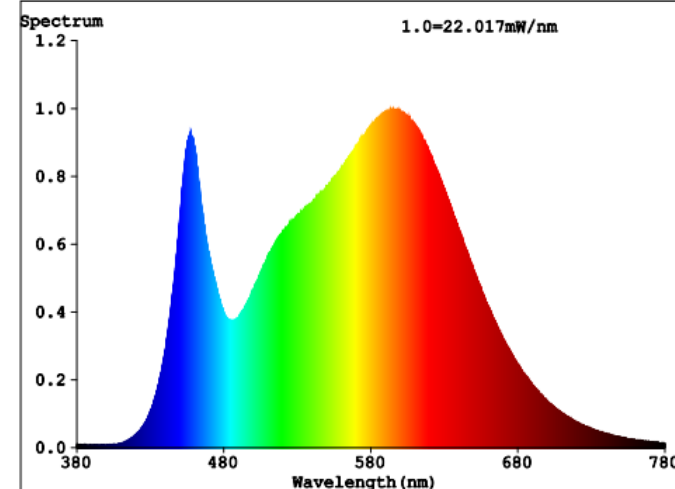
Table 2: Initial test results: KES048 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	386,0	0,85	1,02	120	1,5	1,23	6,63
2#	389,0	0,85	1,02	120	1,5	1,23	6,67
3#	391,0	0,85	1,02	120	1,5	1,23	6,69
4#	392,0	0,85	1,02	120	1,5	1,23	6,70
5#	386,0	0,85	1,02	120	1,5	1,23	6,63
6#	382,0	0,85	1,02	120	1,5	1,23	6,58
7#	383,0	0,85	1,02	120	1,5	1,23	6,59
8#	381,0	0,85	1,02	120	1,5	1,23	6,57
9#	393,0	0,85	1,02	120	1,5	1,23	6,72
10#	390,0	0,85	1,02	120	1,5	1,23	6,68
Average	387,3	0,85	1,02	120	1,5	1,23	6,65
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

Table 3: Initial test results for Energy efficiency classes: KES048 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	386,0	4,76	1,176	95,4	F	F
2#	389,0	4,73	1,176	96,7	F	F
3#	391,0	4,73	1,176	97,2	F	F
4#	392,0	4,73	1,176	97,5	F	F
5#	386,0	4,70	1,176	96,6	F	F
6#	382,0	4,75	1,176	94,6	F	F
7#	383,0	4,73	1,176	95,2	F	F
8#	381,0	4,73	1,176	94,7	F	F
9#	393,0	4,70	1,176	98,3	F	F
10#	390,0	4,75	1,176	96,6	F	F
Average	387,3	4,73	1,176	96,3	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

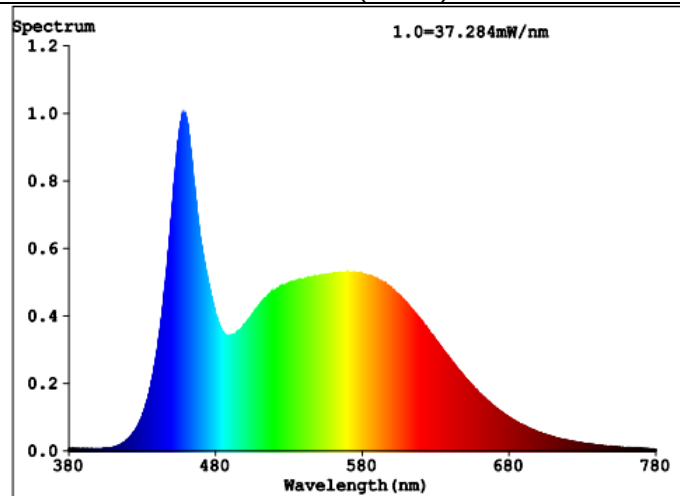
Table 5: Spectrum



KES048 (3000K)



KES048 (4000K)



KES048 (6500K)

Table 1: Initial test results: KES049 (3000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	44,0	5,81	453,0	2861	98,0	
2#	230,0	45,0	5,80	458,0	2864	99,7	
3#	230,0	45,0	5,82	460,0	2874	102,8	
4#	230,0	45,0	5,82	455,0	2877	97,4	
5#	230,0	44,0	5,83	461,0	2872	99,8	
6#	230,0	44,0	5,83	460,0	2869	100,1	
7#	230,0	45,0	5,82	459,0	2864	99,8	
8#	230,0	45,0	5,82	458,0	2875	99,3	
9#	230,0	45,0	5,83	459,0	2877	101,1	
10#	230,0	44,0	5,83	463,0	2872	99,9	
Average	230,0	44,6	5,82	458,6	2871	99,8	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	82,7	0,799	4,5	0,023	0,017	--	--
2#	82,6	0,800	4,4	0,021	0,018	--	--
3#	82,7	0,795	4,3	0,018	0,021	--	--
4#	82,7	0,806	4,1	0,015	0,020	--	--
5#	82,6	0,804	4,2	0,021	0,019	--	--
6#	82,7	0,799	4,5	0,023	0,025	--	--
7#	82,6	0,800	4,4	0,021	0,018	--	--
8#	82,7	0,795	4,3	0,018	0,021	--	--
9#	82,7	0,806	4,1	0,015	0,020	--	--
10#	82,6	0,804	4,2	0,021	0,024	--	--
Average	82,7	0,801	4,3	0,020	0,020	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES049 (3000K)							
Sample No.	Initial Φ _{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	453,0	0,85	1,02	120	1,5	1,23	7,45
2#	458,0	0,85	1,02	120	1,5	1,23	7,52
3#	460,0	0,85	1,02	120	1,5	1,23	7,54
4#	455,0	0,85	1,02	120	1,5	1,23	7,48
5#	461,0	0,85	1,02	120	1,5	1,23	7,55
6#	460,0	0,85	1,02	120	1,5	1,23	7,54
7#	459,0	0,85	1,02	120	1,5	1,23	7,53
8#	458,0	0,85	1,02	120	1,5	1,23	7,52
9#	459,0	0,85	1,02	120	1,5	1,23	7,53
10#	463,0	0,85	1,02	120	1,5	1,23	7,58
Average	458,6	0,85	1,02	120	1,5	1,23	7,52
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI≤25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	Pon= Cx(L+ Φ _{use} /(F x η) x R

Table 3: Initial test results for Energy efficiency classes: KES049 (3000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	453,0	5,81	1,176	91,7	F	F
2#	458,0	5,80	1,176	92,9	F	F
3#	460,0	5,82	1,176	92,9	F	F
4#	455,0	5,82	1,176	91,9	F	F
5#	461,0	5,83	1,176	93,0	F	F
6#	460,0	5,83	1,176	92,8	F	F
7#	459,0	5,82	1,176	92,7	F	F
8#	458,0	5,82	1,176	92,5	F	F
9#	459,0	5,83	1,176	92,6	F	F
10#	463,0	5,83	1,176	93,4	F	F
Average	458,6	5,82	1,176	92,6	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 4: Test results of survival factor and Lumen maintenance: KES049 (3000K)				
Sample No.	Initial Φ use (lm)	3600H Φ use (lm)	XLMF, MIN% at 3600H	survival factor at 3600H
1#	453,0	438,5	96,80%	Survival
2#	458,0	439,9	96,05%	Survival
3#	460,0	443,5	96,41%	Survival
4#	455,0	446,2	98,07%	Survival
5#	461,0	443,9	96,29%	Survival
6#	460,0	450,2	97,87%	Survival
7#	459,0	447,1	97,41%	Survival
8#	458,0	442,6	96,64%	Survival
9#	459,0	443,6	96,64%	Survival
10#	463,0	445,8	96,29%	Survival
Average	458,6	444,1	96,84%	--
Required	--	--	95,81%	90,00%

Table 1: Initial test results: KES049 (4000K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	46,0	6,01	463,0	3827	103,0	
2#	230,0	46,0	6,03	467,0	3794	101,3	
3#	230,0	46,0	6,02	466,0	3798	99,2	
4#	230,0	46,0	5,93	471,0	3837	98,6	
5#	230,0	46,0	5,96	469,0	3816	100,1	
6#	230,0	46,0	6,00	473,0	3827	103,2	
7#	230,0	46,0	6,03	475,0	3794	98,7	
8#	230,0	46,0	5,99	470,0	3798	97,4	
9#	230,0	46,0	5,93	468,0	3836	99,8	
10#	230,0	46,0	5,96	469,0	3816	99,0	
Average	230,0	46,0	5,99	469,1	3814	100,0	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	84,0	0,799	5,0	0,023	0,017	--	--
2#	84,1	0,805	5,6	0,012	0,023	--	--
3#	84,1	0,815	5,5	0,020	0,018	--	--
4#	84,2	0,794	4,6	0,016	0,025	--	--
5#	84,0	0,812	5,1	0,022	0,019	--	--
6#	84,0	0,817	5,0	0,020	0,017	--	--
7#	84,1	0,790	5,6	0,019	0,023	--	--
8#	84,1	0,811	5,3	0,021	0,019	--	--
9#	84,2	0,826	4,8	0,022	0,021	--	--
10#	84,0	0,825	5,1	0,024	0,021	--	--
Average	84,1	0,809	5,2	0,020	0,020	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES049 (4000K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	463,0	0,85	1,03	120	1,5	1,23	7,65
2#	467,0	0,85	1,03	120	1,5	1,23	7,70
3#	466,0	0,85	1,03	120	1,5	1,23	7,69
4#	471,0	0,85	1,03	120	1,5	1,23	7,75
5#	469,0	0,85	1,03	120	1,5	1,23	7,73
6#	473,0	0,85	1,03	120	1,5	1,23	7,78
7#	475,0	0,85	1,03	120	1,5	1,23	7,80
8#	470,0	0,85	1,03	120	1,5	1,23	7,74
9#	468,0	0,85	1,03	120	1,5	1,23	7,71
10#	469,0	0,85	1,03	120	1,5	1,23	7,73
Average	469,1	0,85	1,03	120	1,5	1,23	7,73
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta)) \times R$

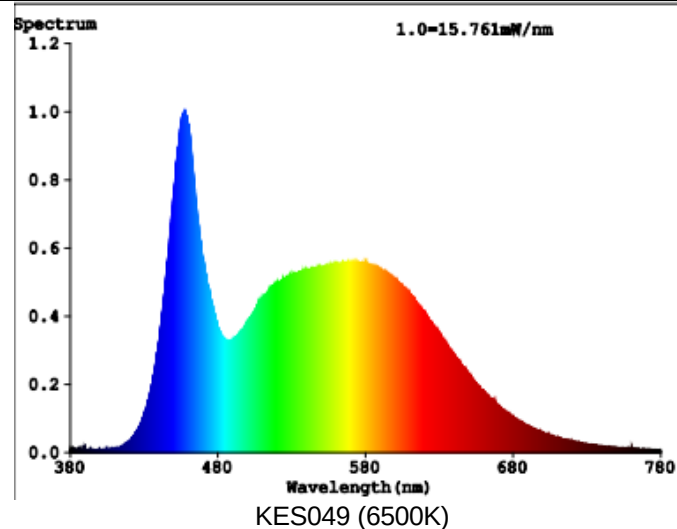
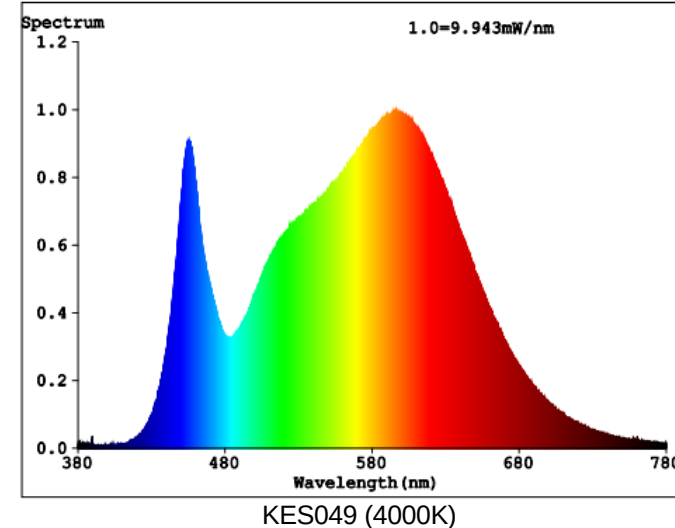
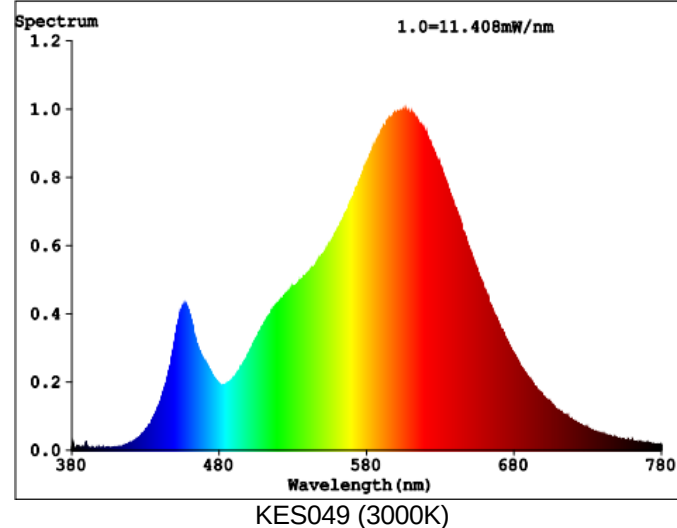
Table 3: Initial test results for Energy efficiency classes: KES049 (4000K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	463,0	6,01	1,176	90,6	F	F
2#	467,0	6,03	1,176	91,1	F	F
3#	466,0	6,02	1,176	91,0	F	F
4#	471,0	5,93	1,176	93,4	F	F
5#	469,0	5,96	1,176	92,5	F	F
6#	473,0	6,00	1,176	92,7	F	F
7#	475,0	6,03	1,176	92,6	F	F
8#	470,0	5,99	1,176	92,3	F	F
9#	468,0	5,93	1,176	92,8	F	F
10#	469,0	5,96	1,176	92,5	F	F
Average	469,1	5,99	1,176	92,2	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 1: Initial test results: KES049 (6500K)							
Sample No.	Measured voltage (V)	Measured current (mA)	Measured power(W)	Initial Φuse (lm)	CCT. (K)	Beam angle (°)	
1#	230,0	46,0	6,01	478,0	6917	99,5	
2#	230,0	46,0	6,00	476,0	5992	98,3	
3#	230,0	46,0	6,00	484,0	5997	99,5	
4#	230,0	46,0	5,98	473,0	5997	98,9	
5#	230,0	46,0	5,98	475,0	6025	101,7	
6#	230,0	46,0	6,01	477,0	6030	99,1	
7#	230,0	46,0	6,00	486,0	6022	103,2	
8#	230,0	46,0	6,01	485,0	6016	99,3	
9#	230,0	46,0	5,98	484,0	6078	98,5	
10#	230,0	46,0	5,98	486,0	6058	99,3	
Average	230,0	46,0	6,00	480,4	6113	99,7	
Sample No.	Colour rendering (CRI)	Displacement factor (DF)	Colour consistency	Flicker (Pst LM)	Stroboscopic effect (SVM)	Psb (W)	Pnet (W)
1#	83,6	0,799	3,3	0,023	0,017	--	--
2#	83,7	0,811	3,9	0,020	0,023	--	--
3#	83,8	0,805	3,7	0,024	0,018	--	--
4#	83,8	0,788	4,0	0,025	0,018	--	--
5#	83,8	0,815	3,4	0,018	0,019	--	--
6#	83,7	0,820	3,1	0,016	0,014	--	--
7#	83,7	0,795	3,5	0,024	0,020	--	--
8#	83,8	0,798	3,6	0,023	0,018	--	--
9#	83,7	0,792	4,2	0,019	0,025	--	--
10#	83,8	0,819	3,8	0,024	0,022	--	--
Average	83,7	0,804	3,7	0,022	0,019	--	--
Required	≥80	≥0,5	≤6	≤1,0	≤0,9	--	--

Table 2: Initial test results: KES049 (6500K)							
Sample No.	Initial Φ_{use} (lm)	Efficacy factor (F)	CRI factor (R)	Threshold efficacy (η)	End loss factor (L)	Correction factor (C)	Ponmax
1#	478,0	0,85	1,02	120	1,5	1,23	7,76
2#	476,0	0,85	1,02	120	1,5	1,23	7,74
3#	484,0	0,85	1,02	120	1,5	1,23	7,84
4#	473,0	0,85	1,02	120	1,5	1,23	7,70
5#	475,0	0,85	1,02	120	1,5	1,23	7,72
6#	477,0	0,85	1,02	120	1,5	1,23	7,75
7#	486,0	0,85	1,02	120	1,5	1,23	7,86
8#	485,0	0,85	1,02	120	1,5	1,23	7,85
9#	484,0	0,85	1,02	120	1,5	1,23	7,84
10#	486,0	0,85	1,02	120	1,5	1,23	7,86
Average	480,4	0,85	1,02	120	1,5	1,23	7,79
Factor	N/A	☐ 1.00 for NDLS ☒ 0.85 for DLS	☐ 0.65 for CRI $\leq$ 25 ☒ (CRI+80)/160 for CRI>25	120.0 for LED	☒ 1.5 for LED ☐ 2.0 for connected light sources	☐ NDLS & NMLS: 1.00 ☐ NDLS & MLS: 1.08 ☐ DLS & NMLS: 1.15 ☒ DLS & MLS: 1.23	$Pon = Cx(L + \Phi_{use}/(Fx \eta) \times R$

Table 3: Initial test results for Energy efficiency classes: KES049 (6500K)						
Sample No.	Initial Φ_{use} (lm)	Initial $P_{on}(W)$	F_{TM}	η_{TM} (lm/W)	Test Energy efficiency class	Declare Energy efficiency class
1#	478,0	6,01	1,176	93,5	F	F
2#	476,0	6,00	1,176	93,3	F	F
3#	484,0	6,00	1,176	94,9	F	F
4#	473,0	5,98	1,176	93,0	F	F
5#	475,0	5,98	1,176	93,4	F	F
6#	477,0	6,01	1,176	93,3	F	F
7#	486,0	6,00	1,176	95,3	F	F
8#	485,0	6,01	1,176	94,9	F	F
9#	484,0	5,98	1,176	95,2	F	F
10#	486,0	5,98	1,176	95,6	F	F
Average	480,4	6,00	1,176	94,2	F	F
Energy efficiency class: A: $210 \leq \eta_{TM}$ B: $185 \leq \eta_{TM} < 210$ C: $160 \leq \eta_{TM} < 185$ D: $135 \leq \eta_{TM} < 160$ E: $110 \leq \eta_{TM} < 135$ F: $85 \leq \eta_{TM} < 110$ G: $\eta_{TM} < 85$				Factors F_{TM} by light source type: ☐ NDLS & MLS: 1.000 ☐ NDLS & NMLS: 0.926 ☒ DLS & MLS: 1.176 ☐ DLS & NMLS: 1.089		

Table 5: Spectrum



COMMISSION REGULATION (EU) 2019/2020:**3. Information requirements**

From 1 September 2021 the following information requirements shall apply:

- (a) Information to be displayed on the light source itself
- For all light sources, except CTLS, LFL, CFLni, other FL, and HID, the value and physical unit of the useful luminous flux (lm) and correlated colour temperature (K) shall be displayed in a legible font on the surface if, after the inclusion of safety-related information, there is sufficient space available for it without unduly obstructing the light emission.
- For directional light sources, the beam angle (°) shall also be indicated.
- If there is room for only two values, the useful luminous flux and the correlated colour temperature shall be displayed. If there is room for only one value, the useful luminous flux shall be displayed.
- (b) Information to be visibly displayed on the packaging
- (1) Light source placed on the market, not in a containing product
- If a light source is placed on the market, not in a containing product, in a packaging containing information to be visibly displayed at a point-of-sale prior to its purchase, the following information shall be clearly and prominently displayed on the packaging:
- (a) the useful luminous flux (Φ_{use}) in a font at least twice as large as the display of the on-mode power (P_{on}), clearly indicating if it refers to the flux in a sphere (360°), in a wide cone (120°) or in a narrow cone (90°);
 - (b) the correlated colour temperature, rounded to the nearest 100 K, also expressed graphically or in words, or the range of correlated colour temperatures that can be set;
 - (c) the beam angle in degrees (for directional light sources), or the range of beam angles that can be set;
 - (d) electrical interface details, e.g. cap- or connector-type, type of power supply (e.g. 230 V AC 50 Hz, 12 V DC);
 - (e) the L70B50 lifetime for LED and OLED light sources, expressed in hours;
 - (f) the on-mode power (P_{on}), expressed in W;
 - (g) the standby power (P_{sb}), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging;
 - (h) the networked standby power (P_{net}) for CLS, expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging;
 - (i) the colour rendering index, rounded to the nearest integer, or the range of CRI-values that can be set;
 - (j) if $\text{CRI} < 80$, and the light source is intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $\text{CRI} < 80$, a clear indication to this effect. For HID light sources with useful luminous flux $> 4\,000\text{ lm}$, this indication is not mandatory;
 - (k) if the light source is designed for optimum use in non-standard conditions (such as ambient temperature $T_{\text{a}} \neq 25\text{ °C}$ or specific thermal management is necessary): information on those conditions;
 - (l) a warning if the light source cannot be dimmed or can be dimmed only with specific dimmers or with specific wired or wireless dimming methods. In the latter cases a list of compatible dimmers and/or methods shall be provided on the manufacturer's website;
 - (m) if the light source contains mercury: a warning of this, including the mercury content in mg rounded to the first decimal place;
 - (n) if the light source is within the scope of Directive 2012/19/EU, without prejudice to marking obligations pursuant to Article 14(4) of Directive 2012/19/EU, or contains mercury: a warning that it

shall not be disposed of as unsorted municipal waste.

Items (a) to (d) shall be displayed on the packaging in the direction meant to face prospective buyer; for other items this is also recommended, if space permits.

For light sources that can be set to emit light with different characteristics, the information shall be reported for the reference control settings. In addition, a range of obtainable values may be indicated.

The information does not need to use the exact wording on the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

(2) Separate control gears:

If a separate control gear is placed on the market as a stand-alone product and not as a part of a containing product, in a packaging containing information to be visibly displayed to potential buyers, prior to their purchase, the following information shall be clearly and prominently displayed on the packaging:

- (a) the maximum output power of the control gear (for HL, LED and OLED) or the power of the light source for which the control gear is intended (for FL and HID);
- (b) the type of light source(s) for which it is intended;
- (c) the efficiency in full-load, expressed in percentage;
- (d) the no-load power (P_{no}), expressed in W and rounded to the second decimal, or the indication that the gear is not intended to operate in no-load mode. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;
- (e) the standby power (P_{sb}), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;
- (f) where applicable, the networked standby power (P_{net}), expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in the technical documentation and on websites;
- (g) a warning if the control gear is not suitable for dimming of light sources or can be used only with specific types of dimmable light sources or using specific wired or wireless dimming methods. In the latter cases, detailed information on the conditions in which the control gear can be used for dimming shall be provided on the manufacturer's or importer's website;
- (h) a QR-code redirecting to a free-access website of the manufacturer, importer or authorised representative, or the internet address for such a website, where full information on the control gear can be found.

The information does not need to use the exact wording on the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

(c) Information to be visibly displayed on a free-access website of the manufacturer, importer or authorised representative

(1) Separate control gears:

For any separate control gear that is placed on the EU market, the following information shall be displayed on at least one free-access website:

- (a) the information specified in point 3(b)(2), except 3(b)(2)(h);
- (b) the outer dimensions in mm;
- (c) the mass in grams of the control gear, without packaging, and without lighting control parts and non-lighting parts, if any and if they can be physically separated from the control gear;

- (d) instructions on how to remove lighting control parts and non-lighting parts, if any, or how to switch them off or minimise their power consumption during control-gear testing for market surveillance purposes;
- (e) if the control gear can be used with dimmable light sources, a list of minimum characteristics that the light sources should have to be fully compatible with the control gear during dimming, and possibly a list of compatible dimmable light sources;
- (f) recommendations on how to dispose of it at the end of its life in line with Directive 2012/19/EU.

The information does not need to use the exact wording in the list above. Alternatively, it may be displayed in the form of graphs, drawings or symbols.

- (d) Technical documentation

- (1) Separate control gears:

The information specified in point 3(c)(1) of this Annex shall also be contained in the technical documentation file drawn up for the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC.;

- (e) Information for products specified in point 3 of Annex III

For the light sources and separate control gears specified in point 3 of Annex III the intended purpose shall be stated in the technical documentation for compliance assessment as per Article 5 of this Regulation and on all forms of packaging, product information and advertisement, together with an explicit indication that the light source or separate control gear is not intended for use in other applications.

The technical documentation file drawn up for the purposes of conformity assessment, in accordance with Article 5 of this Regulation shall list the technical parameters that make the product design specific to qualify for the exemption.

In particular for light sources indicated in point 3(p) of Annex III it shall be stated: 'This light source is only for use by photo sensitive patients. Use of this light source will lead to increased energy cost compared to an equivalent more energy efficient product.'

Article 4 Removal of light sources and separate control gears

- 1. Manufacturers, importers or authorised representatives of containing products shall ensure that light sources and separate control gears can be replaced with the use of common available tools and without permanent damage to the containing product, unless a technical justification related to the functionality of the containing product is provided in the technical documentation explaining why the replacement of light sources and separate control gear is not appropriate.

The technical documentation shall also provide instructions on how light sources and separate control gears can be removed without being permanently damaged for verification purposes by market surveillance authorities.

- 2. Manufacturers, importers or authorised representatives of containing products shall provide information about the replaceability or non-replaceability of light sources and control gears by end-users or qualified persons without permanent damage to the containing product. Such information shall be available on a free-access website. For products sold directly to end-users, this information shall be on the packaging, at least in the form of a pictogram, and in the user instructions.

- 3. Manufacturers, importers or authorised representatives of containing products shall ensure that light sources and separate control gears can be dismantled from containing products at end of life. Dismantling instructions shall be available on a free access website.

COMMISSION DELEGATED REGULATION (EU) 2019/2015:

ANNEX V: Product information

1. Product information sheet

- 1.1. Pursuant to point 1(b) of Article 3, the supplier shall enter into the product database the information as set out in Table 3, including when the light source is a part in a containing product. Details see table 3: Product information sheet.

For light sources that can be tuned to emit light at full-load with different characteristics, the values of parameters that vary with these characteristics shall be reported at the reference control settings.

If the light source is no longer placed on the EU market, the supplier shall put in the product database the date (month, year) when the placing on the EU market stopped.

2. Information to be displayed in the documentation for a containing product

If a light source is placed on the market as a part in a containing product, the technical documentation for the containing product shall clearly identify the contained light source(s), including the energy efficiency class.

If a light source is placed on the market as a part in a containing product, the following text shall be displayed, clearly legible, in the user manual or booklet of instructions:

“This product contains a light source of energy efficiency class <X>”,
where <X> shall be replaced by the energy efficiency class of the contained light source.

If the product contains more than one light source, the sentence can be in the plural, or repeated per light source, as suitable.

3. Information to be displayed on the supplier's free access website:

- (a) The reference control settings, and instructions on how they can be implemented, where applicable;
- (b) Instructions on how to remove lighting control parts and/or non-lighting parts, if any, or how to switch them off or minimize their power consumption;
- (c) If the light source is dimmable: a list of dimmers it is compatible with, and the light source — dimmer compatibility standard(s) it is compliant with, if any;
- (d) If the light source contains mercury: instructions on how to clean up the debris in case of accidental breakage;
- (e) Recommendations on how to dispose of the light source at the end of its life in line with Directive 2012/19/EU of the European Parliament and of the Council (1).

4. Information for products specified in point 3 of Annex IV

For the light sources specified in point 3 of Annex IV, their intended use shall be stated on all forms of packaging, product information and advertisement, together with a clear indication that the light source is not intended for use in other applications.

The technical documentation file drawn up for the purposes of conformity assessment, in accordance with paragraph 3 of Article 3 of Regulation (EU) 2017/1369 shall list the technical parameters that make the product design specific to qualify for the exemption.

Appendix II: Photo of tested samples:

	Overview for KES180, KES181, KES185
	Overview for KES182

	Overview for KES183, KES184
	Overview for KES049, KES049

-- End of report --