Test Report issued under the responsibility of:

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TEST REPORT
(EU) 2019/2020
Ecodesign and Energy labelling requirement ecodesign requirements for light sources and separate control gears
Implementation measure (EU) 2019/2020 and (EU) 2019/2015

Report Reference No.....:	EFSH25090050-IE-01-L01
Tested by.....:	Atile Cong Project Engineer
Approved by.....:	Denis SUN Reviewer
Date of issue.....:	2025-09-22
Total number of pages.....:	21 pages
Testing Laboratory.....:	Eurofins Electrical Testing Service (Shanghai) Co., Ltd.
Address.....:	Building 18, No. 2168 Chenhang Highway, Minhang District, Shanghai, China.
Applicant's name.....:	Astera LED Technology GmbH.
Address.....:	Schatzbogen 60 81829 Munich Germany.
Test specification:	
Standard.....:	☒ COMMISSION REGULATION (EU) 2019/2020 ☐ COMMISSION REGULATION (EU) 2021/341 ☒ COMMISSION DELEGATED REGULATION (EU) 2019/2015 ☐ COMMISSION DELEGATED REGULATION (EU) 2021/340 ☐ COMMISSION DELEGATED REGULATION (EU) 2023/2048
Test procedure.....:	☒type test ☐customer specific ☐verification
Test Report Form No.....:	EU_2019_2020_4A
Test Report Form(s) Originator.....:	Eurofins.
Master TRF.....:	2020-02

Test item description.....:	SolaBulb
Trademark.....:	ASTERA
Manufacturer.....:	Same as applicant
Factory.....:	Same as applicant
Model and/or type reference.....:	AST-BLBSL-E27, AST-BLBSL-B22.
Rating(s) (V; Hz).....:	Details see page 6

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

Attachment 1 – Measured lamp parameters (1 page)

Attachment 2 – Measurement and calculation for separate control gear (1 page)

Attachment 3 – Measured lamp parameters (for whole luminaire) (1 page)

Attachment 4 – Photos (2 page)

Attachment 5 – Luminous Intensity Distribution and Spectral Distribution (1 page)

Tests performed (name of test and test clause):

The test excitation purity meeting the Exemptions of Section 3(n) of Annex III Regulation (EU) 2019/2020, so the product is not in the scope of the Regulation (EU) 2019/2020, but within the scope of the Regulation (EU) 2019/2015.

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

3.1 Colour rendering

3.2 Displacement factor (DF, cos ϕ1) at power input Pon for LED and OLED MLS

3.3 Lumen maintenance factor (for LED and OLED)

3.4 Survival factor (SF) (for LED and OLED)

3.5 Colour consistency for LED and OLED light sources

3.6 Flicker for LED and OLED MLS

3.7 Stroboscopic effect for LED and OLED MLS

7.1 Calculation the total mains efficacy

Testing location:

Eurofins Electrical Testing Service (Shanghai) Co., Ltd.

Building 18, No. 2168 Chenhang Highway, Minhang District, Shanghai, China

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Not provided

Test item particulars:	SolaBulb
EUT type	☐ Lamp ☐ LED Module ☒ luminaires ☐ Controlgear
Light source type:	☒ LED (Light Emitting Diode) ☐ OLED (Organic Light Emitting Diode) ☐ CFLni (Compact Fluorescent Lamp without integrated ballast) ☐ HL (Halogen Lamp) ☐ FL (Fluorescent Lamp, including circular, U-shape, etc.) ☐ LFL (Linear Fluorescent Lamp) ☐ Magnetic induction light source ☐ HID (High-intensity Discharge lamp, including metal halide, high-pressure sodium and mercury vapour type)
Light source construction	☐ User replaceable ☐ Non-user replaceable ☒ Non replaceable
Directionality	☒ Directional ☐ Non-directional
Controlgear	☒ Integral controlgear ☐ External
Containing product	☐ Yes ☒ No
Light source removeable	☐ Yes ☒ No
Control gear removeable	☐ Yes ☒ No
Outdoor use	☒ Yes ☐ No
Nominal power (W)	16.5 W
Nominal luminous flux (lm)	400 lm
Color temperature (CCT)	2700~6500K+RGB
Color rendering (Ra)	96
Nominal beam angle (°)	-
Nominal life time (h)	50000
Displacement factor	0.5
Declared mercury content (mg)	N/A
Lamp dimming	☐Dimming ☒No-dimming

Test method and test conditions for measurements

For the purpose of assessing the conformity of the product with the ecodesign requirements as set in COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019 & COMMISSION REGULATION (EU) 2021/341 of 23 February 2021, the following test methods have been used:

Standard reference	Describe
CIE S 025/E:2015	Test Method for LED Lamps, LED Luminaires and LED Modules
EN 62612: 2013 All amendments up to A2:2018	Self-ballasted LED-lamps for general lighting services – Performance requirements
EN 62717:2017 + A2:2019	LED modules for general lighting - Performance requirements
EN IEC 62722-1:2022	Luminaire performance - Part 1: General requirements
EN IEC 62722-2-1:2023	Luminaire performance – Part 2-1: Particular requirements for LED luminaires
EN 13032-1:2004+A1:2012	Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 1: Measurement and file format
EN 13032-4:2015+A1:2019	Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 4: LED lamps, modules and luminaires
EN IEC 63103:2020	Lighting equipment - Non-active mode power measurement
IEC TR 61547-1:2020	Equipment for general lighting purposes – EMC immunity requirements – Part 1: An objective voltage fluctuation immunity test method
IEC TR 63158:2018	Equipment for general lighting purposes - Objective test method for stroboscopic effects of lighting equipment
EN IEC 62442-3:2022	Energy performance of lamp control gear - Part 3: Control gear for tungsten-halogen lamps and LED light sources - Method of measurement to determine the efficiency of control gear

Possible test case verdicts:
- test case does not apply to the test object ..... N/A (Not applicable)
- test object does not check ..... N/C (Not check)
- test object does meet the requirement ..... P (Pass)
- test object does not meet the requirement ..... F (Fail)
Testing:
Date of receipt of test item 2025-09-03
Date (s) of performance of tests ..... 2025-09-03 to 2025-09-19

Ambient temperature for test:	25±1 °C
Test voltage(s) (V):	230V~
Test Frequency (ies) (Hz):	50Hz

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.
Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.

General product information:

For model AST-BLBSL-E27 and AST-BLBSL-B22, they have the same physical construction, PCB layouts, LED and electronic circuit diagrams, the difference between them is the lamp cap, detail see pictures.
We have chosen the most representative sample (AST-BLBSL-E27) and mode for testing and provided the most unfavorable test results.

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

0	**Measurement methods**		**P**
	Recognised state of art measurement methods incl. the one published in the Official Journal taking into account the measurement methods of (EU) 2019/2020		P
Rated Parameters on representative sample(s)			**—**
	Rated voltage (V) .....:	220-240	—
	Rated wattage at rated voltage (W) .....:	16.5	—
	Rated Lumen output (lm) .....:	400	—
	Rated beam angle (°) .....:	-	—
	Correlated colour temperature (K) .....:	2700~6500K+RGB	—
	Colour consistency (Steps) .....:	-	—
	Colour rendering (Ra) .....:	95	—
	Displacement factor	0.5	—
	Light output at least 80% within solid angle π sr ..	Yes	—
	Total useful luminous flux Φuse	-	—
	Rated luminous flux Φuse measured in a 120° cone (Beam angle ≥ 90°).....:	-	—
	Rated luminous flux Φuse measured in a 90° cone (Beam angle < 90°).....:	-	—
	Rated peak intensity (cd) .....:	-	—
	Spectral power distribution (chart)	See attachment 6	—
1.	**Number of sample used**		**P**
	For light source test ·····:	10	—
	For separate control gear·····:	N/A	—
2.	**Energy efficiency requirements (Annex II, clause 1 of EU 2019/2020)**		**N/A**
2.1	**Energy efficiency requirement for light source**		**N/A**
	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 $P_{onmax} = C \times (L + \Phi_{use}/(F \times \eta)) \times R$		N/A
	Light sources that allow the end-user to adapt the spectrum and/or the beam angle of the emitted light, thus changing the values for useful luminous flux, colour rendering index (CRI) and/or correlated colour temperature (CCT), and/or changing the directional/non-directional status of the light source, shall be evaluated using the reference control settings.		N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

	Standby power P_{sb} and networked standby power P_{net} of light source		N/A
	The standby power P_{sb} of a light source shall not exceed 0,5 W	P_{sb}:	N/A
	The networked standby power P_{net} of a connected light source shall not exceed 0,5 W	P_{net}:	N/A
	The allowable values for P_{sb} and P_{net} shall not be added together		N/A
2.2	**Minimum energy efficiency requirements of a separate control gear**		**N/A**
	From 1 September 2021, the minimum energy efficiency requirements of a separate control gear operating at full-load shall apply (Annex II, cl.1, (b), table 3 of EU 2019/2020) (Based on: Declared output power of the control gear (P_{cg}) or declared power of the light source (P_{ls}) in W, as applicable)	See attached table 3	N/A
	Multi-wattage separate control gears shall comply with the requirements in Table 3 according to the maximum declared power on which they can operate		N/A
	The no-load power P_{no} of a separate control gear shall not exceed 0,5 W. 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_{no}:	N/A
	The standby power P_{sb} of a separate control gear shall not exceed 0,5 W	P_{sb}:	N/A
	The networked standby power P_{net} of a connected separate control gear shall not exceed 0,5 W. The allowable values for P_{sb} and P_{net} shall not be added together	P_{net}:	N/A
3	**Functional requirements (Annex II, clause 2 of EU 2019/2020)**		
	From 1 September 2021, the functional requirements should apply for **light sources** (Annex II, clause 2, table 4 of EU 2019/2020)		N/A
3.1	Colour rendering	See attached table 2	N/A
3.2	Displacement factor (DF, cos Φ_1) at power input P_{on} for LED and OLED MLS	See attached table 2	N/A
3.3	Lumen maintenance factor (for LED and OLED)	See attached table 2	N/A
3.4	Survival factor (SF) (for LED and OLED)	See attached table 2	N/A
3.5	Colour consistency for LED and OLED light sources	See attached table 2	N/A
3.6	Flicker for LED and OLED MLS	See attached table 2	N/A
3.7	Stroboscopic effect for LED and OLED MLS	See attached table 2	N/A
4	**Information requirements (Annex II, clause 3 of EU 2019/2020)**		**N/A**
	From 1 September 2021 the following information requirements shall apply:		N/A
4.1	**Information to be displayed on the light source itself**		**N/A**

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

	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		**N/A**
	For directional light sources, the beam angle (°) shall also be indicated		**N/A**
	If there is room for only two values, the useful luminous flux and the correlated colour temperature shall be displayed		**N/A**
	If there is room for only one value, the useful luminous flux shall be displayed		**N/A**
4.2	**Information to be visibly displayed on the packaging**		**N/A**
4.2.1	Light source placed on the market, not in a containing product		N/A
4.2.2	Separate control gears:		N/A
4.3	**Information to be visibly displayed on a free-access website of the manufacturer, importer or authorized representative**		**N/A**
	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		N/A
(a)	the information specified in point 3.1, except 3.1(h)		N/A
(b)	the outer dimensions in mm		N/A
(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		N/A
(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		N/A
(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		N/A
(f)	recommendations on how to dispose of it at the end of its life in line with Directive 2012/19/EU		N/A
	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		N/A
4.4	**Technical documentation for Separate control gears**		**N/A**

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

	The information specified in point 3.2 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		N/A
4.5	Information for products specified in point 3 of Annex III		N/A
	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		N/A
	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.		N/A
	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.’		N/A

(EU) 2019/2015 - Energy labelling requirement:				
5	Measurement methods			P
	Recognised state of art measurement methods incl. the one published in the Official Journal taking into account the measurement methods of EU 2019/2015			P
6	**Method for calculating the total mains efficacy (Annex II, EU 2019/2015)**			**P**
6.1	Calculation the total mains efficacy			P
	The energy efficiency class of light sources shall be determined as set out in Annex II, Table 1 of EU 2020/2015		See Attachment 1	P
	on the basis of the total mains efficacy η_{TM}, which is calculated by dividing the declared useful luminous flux Φ_{use} (expressed in lm) by the declared on mode power consumption P_{on} (expressed in W) and multiplying by the applicable factor F_{TM} of Annex II, Table 2 of EU 2019/2015 as follow: $\eta_{TM} = (\Phi_{use}/P_{on}) \times F_{TM}$ (lm/W)		See Attachment 1	P
	Light source type	Factor F_{TM}		-

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

(EU) 2019/2015 - Energy labelling requirement:				
	Non-directional (NDLS) operating on mains (MLS)	1,000		N/A
	Non-directional (NDLS) not operating on mains (NMLS)	0,926		N/A
	Directional (DLS) operating on mains (MLS)	1,176		P
	Directional (DLS) not operating on mains (NMLS)	1,089		N/A
6.2	CALCULATION OF THE ENERGY CONSUMPTION			P
	The weighted energy consumption (Ec) is calculated in kWh/1000 h as follows and is rounded to two decimal places: $Ec=P_{on} \times 1000h/1000$		See Attachment 1	P
7	**Evaluation**			**P**
	Declared values are not more favorable then value based on measured data		See Attachment 1	P
8	**Exemptions (Annex IV of EU 2019/2015)**			**P**
8.1	**This Regulation shall not apply to light sources specifically tested and approved to operate**			**N/A**
(a)	in radiological and nuclear medicine installations, as defined in Article 3 of Council Directive 2009/71/Euratom			N/A
(b)	for emergency use			N/A
(c)	in or on military or civil defence establishments, equipment, ground vehicles, marine equipment or aircraft as set out in Member States' regulations or in documents issued by the European Defence Agency			N/A
(d)	in or on motor vehicles, their trailers and systems, interchangeable towed equipment, components and separate technical units, as set out in Regulation (EC) No 661/2009 of the European Parliament and of the Council, Regulation (EU) No 167/2013 of the European Parliament and of the Council and Regulation (EU) No 168/2013 of the European Parliament and of the Council			N/A
(e)	in or on non-road mobile machinery as set out in Regulation (EU) 2016/1628 of the European Parliament and of the Council and in or on their trailers			N/A
(f)	in or on interchangeable equipment as set out in Directive 2006/42/EC of the European Parliament and of the Council intended to be towed or to be mounted and fully raised from the ground or that cannot articulate around a vertical axis when the vehicle to which it is attached is in use on a road by vehicles as set out in Regulation (EU) No 167/2013			N/A
(g)	in or on civil aviation aircraft as set out in Commission Regulation (EU) No 748/2012			N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

(EU) 2019/2015 - Energy labelling requirement:			
(h)	in railway vehicle lighting as set out in Directive 2008/57/EC of the European Parliament and of the Council		N/A
(i)	in marine equipment as set out in Directive 2014/90/EU of the European Parliament and of the Council		N/A
(j)	in medical devices as set out in Council Directive 93/42/EEC or Regulation (EU) 2017/745 of the European Parliament and of the Council and in vitro medical devices as set out in Directive 98/79/EC of the European Parliament and of the Council		N/A
8.2	**In addition, this Regulation shall not apply to**		**N/A**
(a)	electronic displays (e.g. televisions, computer monitors, notebooks, tablets, mobile phones, e-readers, game consoles), including but not limited to displays within the scope of Commission Regulation (EU) 2019/2021 and of Commission Regulation (EU) No 617/2013		N/A
(b)	light sources in range hoods within the scope of Commission Delegated Regulation (EU) No 65/2014		N/A
(c)	light sources in battery-operated products, including but not limited to e.g. torches, mobile phones with an integrated torch light, toys including light sources, desk lamps operating only on batteries, armband lamps for cyclists, solar-powered garden lamps		N/A
(d)	light sources on bicycles and other non-motorised vehicles		N/A
(e)	light sources for spectroscopy and photometric applications, such as for example UV-VIS spectroscopy, molecular spectroscopy, atomic absorption spectroscopy, nondispersive infrared (NDIR), fourier-transform infrared (FTIR), medical analysis, ellipsometry, layer thickness measurement, process monitoring or environmental monitoring		N/A
8.3	Any light source within the scope of this Delegated Regulation shall be exempt from the requirements of this Regulation, with the exception of the requirements set out in point 4 of Annex V, if it is specifically designed and marketed for its intended use in at least one of the following applications		N/A
(a)	signalling (including, but not limited to, road-, railway-, marine- or air traffic- signalling, traffic control or airfield lamps)		N/A
(b)	image capture and image projection (including, but not limited to, photocopying, printing (directly or in preprocessing), lithography, film and video projection, holography);		N/A
(c)	light sources with specific effective ultraviolet power > 2 mW/klm and intended for use in applications requiring high UV-content		N/A
(d)	light sources with a peak radiation around 253,7 nm and intended for germicidal use (destruction of DNA)		N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

(EU) 2019/2015 - Energy labelling requirement:			
(e)	light sources emitting 5 % or more of total radiation power of the range 250-800 nm in the range of 250-315 nm and/or 20 % or more of total radiation power of the range 250-800 nm in the range of 315-400 nm, and intended for disinfection or fly trapping		N/A
(f)	light sources having the primary purpose to emit radiation around 185,1 nm and intended to be used for the generation of ozone		N/A
(g)	light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 400-480 nm, and intended for coral zooxanthellae symbioses		N/A
(h)	FL light sources emitting 80 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning		N/A
(i)	HID light sources emitting 40 % or more of total radiation power of the range 250-800 nm in the range of 250-400 nm, and intended for sun-tanning		N/A
(j)	light sources with a photosynthetic efficacy > 1,2 μmol/J, and/or emitting 25 % or more of total radiation power of the range 250-800 nm in the range of 700-800 nm, and intended for use in horticulture		N/A
(k)	LED or OLED light sources, complying with the definition of ‘original works of art’ as defined in Directive 2001/84/EC of the European Parliament and of the Council, made by the artist him/herself in a limited number below 10 pieces		N/A
Section 3(n) of Annex III	Colourtuneable light sources that can be set to at least the colours listed in this point and which have for each of these colours, measured at the dominant wavelength, a minimum excitation purity of: Blue 440nm — 490nm 90 % Green 520nm — 570nm 65 % Red 610nm — 670nm 95 %	Blue 91.2% Green 66.9% Red 96.3%	P
9	**Product information (Annex V of EU 2019/2015)**		**N/C**
9.1	Product information sheet		N/C
9.2	Information to be displayed in the documentation for a containing product		N/C
9.3	Information to be displayed on the supplier’s free access website:		N/C
10	Technical documentation (Annex VI of EU 2019/2015)		N/C
11	Information to be provided in visual advertisements, in technical promotional material and in distance selling, except distance selling on the internet (Annex VII of EU 2019/2015)		N/C
12	Information to be provided in the case of distance selling on the internet (Annex VIII of EU 2019/2015)		N/C

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 1	Energy efficiency requirements for light source		N/A
Φ_{use} (lm)	declared useful luminous flux	400	N/A
P_{on} (W)	Declared $P_{on} \leqslant P_{onmax}$	16.5	N/A
P_{onmax} (W)	Calculated $P_{onmax} = C \times (L + \Phi_{use}/(F \times \eta)) \times R$	-	

(C) Correction factor	**Light source type** / **Basic C value** Non-directional (NDLS) not operating on mains (NMLS) **1,00** Non-directional (NDLS) operating on mains (MLS) **1,08** Directional (DLS) not operating on mains (NMLS) **1,15** Directional (DLS) operating on mains (MLS) **1,23** **Special light source feature** / **Bonus on C** FL or HID with CCT > 5 000 K **+0,10** FL with CRI > 90 **0,10** HID with second envelope **+0,10** MH NDLS > 405 W with non-clear envelope **+0,10** DLS with anti-glare shield **+0,20** Colour-tuneable light source (CTLS) **+0,10** High luminance light sources (HLLS) **+0,0058 • Luminance-HLLS - 0,0167**	N/A
(η) Threshold efficacy (L) End loss factor	**Light source description** / **η** [lm/W] / **L** [W] LFL T5-HE **98,8** **1,9** LFL T5-HO, 4 000 ≤ Φ ≤ 5 000 lm **83,0** **1,9** LFL T5-HO, other lm output **79,0** **1,9** FL T5 circular **79,0** **1,9** FL T8 (including FL T8 U-shaped) **89,7** **4,5** From 1 September 2023, for FL T8 of 2-, 4- and 5-foot **120,0** **1,5** Magnetic induction light source, any length/flux **70,2** **2,3** CFLni **70,2** **2,3** FL T9 circular **71,5** **6,2** HPS single-ended **88,0** **50,0** HPS double-ended **78,0** **47,7** MH ≤ 405 W single-ended **84,5** **7,7** MH > 405 W single-ended **79,3** **12,3** MH ceramic double-ended **84,5** **7,7** MH quartz double-ended **79,3** **12,3** Organic light-emitting diode (OLED) **65,0** **1,5** Until 1 September 2023: HL G9, G4 and GY6.35 **19,5** **7,7** HL R7s ≤ 2 700 lm **26,0** **13,0** Other light sources in scope not mentioned above **120,0** **1,5** (*1)	N/A
(F) Efficacy factor	1,00 for non-directional light sources (NDLS, using total flux) 0,85 for directional light sources (DLS, using flux in a cone)	N/A
® CRI factor	0,65 for CRI ≤ 25 (CRI+80)/160 for CRI > 25, rounded to two decimals	N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 2	Function requirements for light sources		N/A
Colour rendering	☒ CRI ⩾ 80 ☐ CRI < 80	See Attachment 1	N/A
Displacement factor	For LED and OLED MLS ☐ No limit at Pon ⩽ 5 W ☒ DF ⩾ 0,5 at 5 W < Pon ⩽ 10 W ☐ DF ⩾ 0,7 at 10 W < Pon ⩽ 25 W ☐ DF ⩾ 0,9 at 25 W < Pon	See Attachment 1	N/A
Lumen maintenance factor	For LED and OLED $X_{LMF,MIN}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$ ☐ 10000 h; 89,9% ☐ 15000 h; 93,1% ☒ 25000 h; 95,8% ☐ >26200 h; 96,0% Others:	See Attachment 1	N/A
Survival factor (for LED and OLED)	for LED and OLED ☒ 0,9 after 3600 h	See Attachment 1	N/A
Colour consistency	for LED and OLED Variation of chromaticity coordinates within a six-step MacAdam ellipse or less	See Attachment 1	N/A
Flicker for LED and OLED MLS	for LED and OLED MLS ☒P_{st} LM ⩽ 1,0 at full-load	See Attachment 1	N/A
Stroboscopic effect	for LED and OLED MLS SVM ⩽ 0,9 at full-load (except for HID with Φuse > 4 klm and 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 ⩽ 0,4 at full-load (except for HID with Φuse > 4 klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI< 80)	See Attachment 1	N/A

(EU) 2019/2020			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 3	Minimum energy efficiency requirements of a separate control gear		N/A
Declared output power of the control gear (Pcg) or declared power of the light source (Pls) in W, as applicable			
☐ HL light sources	All wattages P_{cg}		N/A
☐ FL light sources	$P_{ls} \leq 5$: 0,71 $5 < P_{ls} \leq 100$: $P_{ls}/(2 \times \sqrt{(P_{ls}/36)} + 38/36 \times P_{ls} + 1)$ $100 < P_{ls}$: 0,91		N/A
☐ HID light sources	$P_{ls} \leq 30$: 0,78 $30 < P_{ls} \leq 75$: 0,85 $75 < P_{ls} \leq 105$: 0,87 $105 < P_{ls} \leq 405$: 0,90 $405 < P_{ls}$: 0,92		N/A
☐ LED or OLED light sources	All wattages P_{cg} $P_{cg}^{0,81}/(1,09 \times P_{cg}^{0,81} + 2,10)$		N/A
Multi-wattage separate control gears shall comply with the requirements in Table 3 according to the maximum declared power on which they can operate			N/A
P_{no}（W）	no-load power $P_{no} \leqslant$ 0,5 W		N/A
P_{sb}（W）	Standby power $P_{sb} \leqslant$ 0,5 W		N/A
P_{net}（W）	networked standby power $P_{net} \leqslant$0,5 W		N/A

Attachment 1 – Measured lamp parameters for 4000K

Lamp No.	1	2	3	4	5	6	7	8	9	10	Average
Test Voltage(V)	230	230	230	230	230	230	230	230	230	230	230
Lamp wattage(W)	16.8	16.4	15.7	15.5	16.6	16.3	16.4	16.9	16.4	16.7	16.37
Initial useful luminous flux (lm)	426.01	423.19	422.74	421.0	385.55	365.86	364.92	364.26	362.74	361.96	389.82
Useful Lumen after 1200 cycles*(lm)	-	-	-	-	-	-	-	-	-	-	
Colour Rendering(Ra)	92	98.2	98.3	98.3	98.3	97.9	98.3	98.3	98.3	98.2	97.61
Displacement factor	0.5422	0.5430	0.5403	0.5396	0.5316	0.5262	0.5262	0.5260	0.5270	0.5255	0.5327
Survival factor	-	-	-	-	-	-	-	-	-	-	
SDCM	-	-	-	-	-	-	-	-	-	-	
PST	-	-	-	-	-	-	-	-	-	-	
SVM	-	-	-	-	-	-	-	-	-	-	
Beam angle(°)	-	-	-	-	-	-	-	-	-	-	
Correlated colour temperature(K)	4013	3976	3949	3933	3915	4023	3894	3891	3885	3884	3936.3
Lumen Maintenance factor	-	-	-	-	-	-	-	-	-	-	-

Data calculation & comparision				
Item	**Rated value**	**Measured value**	**Deviation**	**Limit**
Beam angel (°)	-	-	-	-
Φuse (lm)	-	-	-	-
Pon (W)	-	-	-	-
ηTM	-	-	-	-
Energy efficiency class		-	-	-

EC (kWh/1000h)	-	-	-	-

Attachment 2	Measurement and calculation for separate control gear					N/A
	Wattage 1	Wattage 2	Wattage 3	No-Load	Standby	Networked standby
	100%	100%	100%	-	-	-
☒ Output #1:						
Current (mA)				-	-	-
Voltage (V)				-	-	-
Power (W)				-	-	-
☒ Output #2:						
Current (mA)	-	-	-	-	-	-
Voltage (V)	-	-	-	-	-	-
Power (W)	-	-	-	-	-	-
Input:						
Input Voltage (V)				-	-	-
Input current (A)				-	-	-
Input Power (W)				-	-	-
Frequency (Hz)				-	-	-
True Power Factor				-	-	-
Energy Efficiency				-	-	-
Supplementary information: - Reference setting: - Settings: - Connections: with provide LED modules						

Attachment 3 – Measured lamp parameters (for whole luminaire) (N/A)

Lamp No.	1	2	3	Average
Test Voltage(V~)				
Displacement factor				
Flicker PstLM				
Stroboscopic Effect SVM				

Attachment 4–Photos

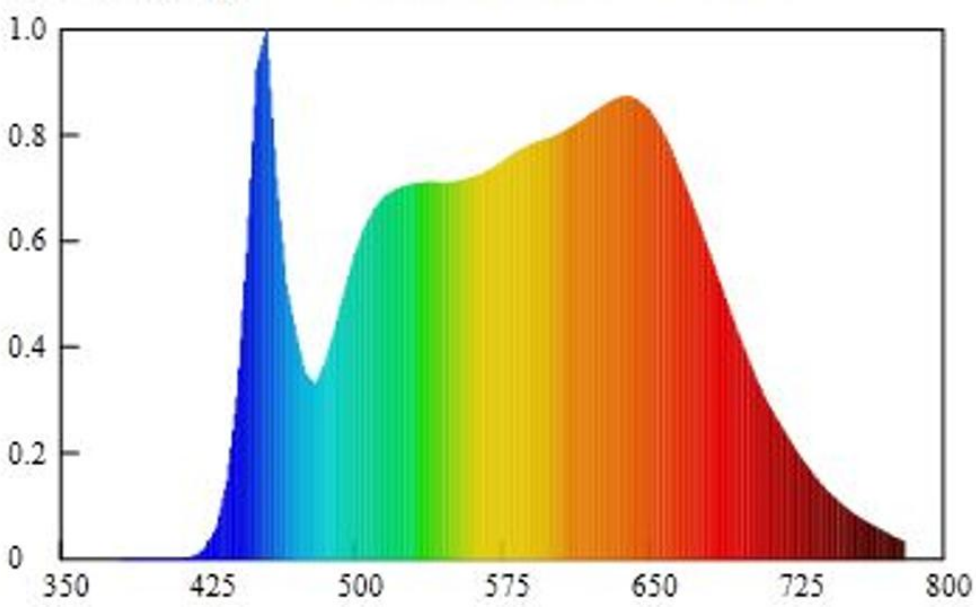
Overview of model AST-BLBSL-E27

Overview of model AST-BLBSL-E27

Overview of model AST-BLBSL-B22

Overview of model AST-BLBSL-B22

Attachment 5 – Luminous Intensity Distribution and Spectral Distribution



4000K

- **End of report -**