TEST REPORT

COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019

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

Report Reference No......:	CstarXE24ERP01
Compiled by (+ signature).....:	Jesse Fu
Approved by (+ signature) .....:	Jasan Zhang
Date of issue .....:	May. 24, 2023
Testing laboratory:	**Shenzhen C-Star Test Co., Ltd.**
Address.....:	Room 208, 2/F., Building A3, No.416, Xuegang North Road, Qinghu Community, Longhua Subdistrict, Longhua District, Shenzhen, Guangdong, China
Testing location.....:	as above
Applicant.....:	LEXON
Address.....:	125 avenue des Champs-Élysées 75008 Paris FRANCE
Standard.....:	COMMISSION REGULATION (EU) 2019/2020 COMMISSION DELEGATED REGULATION (EU) 2019/2015 COMMISSION DELEGATED REGULATION (EU)2021/340 COMMISSION DELEGATED REGULATION (EU) 2021/341
Test Report Form No.....:	TRF (EU) No 2019/2020
TRF originated by.....:	Shenzhen C-Star Test Co., Ltd.
Master TRF (date).....:	Dated 2021-11
Test item description .....:	Bubble lamp
Trade Mark .....:	LEXON
Manufacturer .....:	LEXON
Address.....:	125 avenue des Champs-Élysées 75008 Paris FRANCE
Model /Type reference .....:	LH70
Serial number reference .....:	Pre-production engineering samples without any serial numbers
Ratings.....:	DC3.7V, 3W.

Test case verdicts	
Test case does not apply to the test object.....:	N(N/A)
Test item does meet the requirement .....:	P(Pass)
Test item does not meet the requirement .....:	F(Fail)
Testing	
Date of receipt of test item .....:	Jul. 28, 2022
Date(s) of performance of test.....:	Jul. 28, 2022– May. 24, 2023
Test item particulars:	
Type of light source:	
Lighting technology used	☐ HL ☐ LFLT5HE ☐ LFL T5HO CFLni ☐ HPS ☐ MH ☐ other HID ☒ LED ☐ mixed ☐ OLED ☐ Others: _____
Non-directional or directional	☒ NDLS ☐ DLS
Mains or non-mains	☒ NMLS ☐ MLS
Connected light source (CLS)	☒ Yes ☐ No
Colour-tuneable light source.....:	☐ Yes ☒ No
Envelope	☒ No ☐ second ☐ non-clear
Anti-glare shield	☐ Yes ☒ No
High luminance light source	☐ Yes ☒ No
Dimmable	☒ Yes ☐ only with pecific dimmers ☐ No
Control gear	☐ Integrated ☒ External
Use of light source:	☒ Indoor ☒ Outdoor ☐ Industry
Lamp cap installed:	N/A
General product parameters :	
Energy consumption in on-mode (kWh/1 000 h)...:	3W
Energy efficiency class.....:	☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☒ G
Rated useful luminous flux (lm):.....:	150
Rated CCT (K):.....:	3000-6500K
On-mode power (Pon), expressed in W.....:	3W
Standby power (Psb) (W).....:	N/A
Networked standbypower(Pnet)for CLS (W).....:	N/A
Rated Ra.....:	80.4
Outer dimensions.....(mm):	120x120x120

Spectral power distribution.....:	See attachment 2
Claim of equivalent power .....:	☐ Yes ☒ N/A
Chromaticity coordinates (x and y).....:	x:0.3214, y:0.3342
Peak luminous intensity(cd) .....:	30
Beam angle in degrees(°).....:	N/A
R9 colour rendering index value R9.....:	4
Survival factor .....:	100%
The lumen maintenance factor.....:	96%
Displacement factor (cos φ1).....:	0.9
Colour consistency in McAdam ellipses.....:	3
Claims that an LED light source replaces a fluorescent light source without integrated ballast of a particular wattage.....:	☐ Yes ☐ No
Flicker metric (Pst LM) .....:	0.05
Stroboscopic effect metric (SVM).....:	0.00
Rated life time(h) ……..…..:	20000h

Attachments:

The test report includes: ATTACHMENT 1(S) of Energy efficiency classes

The test report includes: ATTACHMENT 2(S) of Spectral power distribution

The test report includes: ATTACHMENT 3(S) of Photos

Summary of testing:

1. These results are in compliance with the ecodesign requirements of the Commission Regulation (EU) 2019/2020.
2. Measurement was conducted at voltage DC3.7V and a stable ambient temperature 25±10℃.
3. THD≤ 3%

Equipment List:

Instrument	Equipment ID	Model	Calibration Date	Calibration DueDate
Full-field Speed Goniophotometer	SLCS-S-112	GO-R5000	2022/07/02	2023/07/01
Digital Power Meter	SLCS-S-103	PF2010	2022/07/02	2023/07/01
AC Testing Power Source	SLCS-S-115	DPS1060	2022/07/02	2023/07/01
Total SpectralRadiant FluxStandard Lamp	SLCS-S-143	D908S	2022/07/02	2023/07/01
2m IntegratingSphere System	SLCS-S-038	SPR-3000	2022/07/02	2023/07/01
Digital Power Meter	SLCS-S-058	WT310	2022/07/02	2023/07/01
AC Testing Power Source	SLCS-S-111	APW-105N	2022/07/02	2023/07/01
Standard Lamp	SLCS-S-118	S11010017	2022/07/02	2023/07/01
Power Meter	SLCS-S-060	PF9800	2022/07/02	2023/07/01
Flicker Photometer	SLCS-S-119	FP-210	2022/07/02	2023/07/01

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 point is used as the decimal separator.

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
1	**ENERGY EFFICIENCY REQUIREMENTS**		
1.1	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
	$P_{on}<P_{onmax}=C \times (L+\Phi_{use}/(F \times \eta)) \times R$	$P_{on}=3W<P_{onmax}=3.4$	P
	Correction factor(C): The value for correction factor(C) is specified in Table 2 of (EU) No 2019/2020, depending on the light source ty.23	1.15	P
	End loss factor(L): The value for end loss factor is specified in Table 1 of (EU) No 2019/2020, depending on the light source t.pe	1,5	P
	Useful luminous flux (Φ_{use}):	150 lm	P
	Efficacy factor (F):		P
	1,00 for non-directional light sources (NDLC, usingtotal flux)		N/A
	0,85 for directional light sources (DLS, using flux ina c.ne)	0,85	P
	Threshold efficacy(η): The value for threshold efficacy is specified in Table 1 of (EU) No 2019/2020, depending on the light source ty.e	120,0	P
	CRI factor (R):		P
	0,65 for CRI$\leqslant$ 25		N/A
	(CRI+80)/160 for CRI$>$25, rounded to two deci.als	1,01	P
1.1	Standby power		N/A
	The standby power P_{sb} of a light source shall notexceed 0,5 W.		N/A
	The networked standby power P_{net} of a connectedlight source shall not exceed 0,5 W.		N/A
1.2	From 1 September 2021, the minimum energy efficiency requirements of a separate controlgear operating at full-load as follows		N/A
	Declared output power of the control gear (P_{cg}) ordeclared power of the light source (P_{ls}) in W, asapplicable		N/A
	Control gear for HL light sources all wattages P_{cg}:0,91		N/A
	Control gear for FL light sources		N/A

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
	P_{ls} 5: 0,71		N/A
	5 <P_{ls} 100: P_{ls} /(2 x $\sqrt{Pls/36}$ +38/36 x P_{ls} +1)		N/A
	100 P_{ls} : 0,91		N/A
	Control gear for HID light sources		N/A
	P_{ls} 30: 0,78		N/A
	30 <P_{ls} 75: 0,85		N/A
	75 <P_{ls} 105: 0,87		N/A
	105<P_{ls} 405: 0,90		N/A
	405 <P_{ls}: 0,92		N/A
	Control gear for LED or OLED light source all wattages P_{cg}: $P_{cg}^{0,81}$/(1,09 x $P_{cg}^{0,81}$ +2,10)		N/A
1.2.1	No-load power		N/A
	The no-load power P_{no} of a separate control gearshall not exceed 0,5 W.		N/A
1.2.2	Standby power		N/A
	The standby power P_{sb} of a separate control gearshall not exceed 0,5 W.		N/A
1.2.3	Networked standby power		N/A
	The networked standby power P_{net} of a connectedseparate control gear shall not exceed 0,5 W.		N/A
2	**FUNCTIONALITY REQUIREMENTS**		N/A
2.1	**Functional requirements for light sources from 1 September 2021**		N/A
2.1.1	Colour rendering		P
	For HID with $_{use}$> 4 klm and for light sources intended for use in out door applications, industrial applications or other applications: CRI < 80		N/A
	Other light sources:CRI⩾80	80.4	P
2.1.2	Displacement factor (DF, cos 1) at power input $P_{on}$for LED and OLED MLS		N/A
	P_{on} 5 W: No limit		N/A
	5 W <P_{on} 10 W : DF0,5		N/A
	10 W <P_{on} 25 W: DF0,5		N/A
	25 W <P_{on}: DF 0,9		N/A

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
2.1.3	Lumen maintenance factor (for LED and OLED)		N/A
	The lumen maintenance factor XLMF% after endurance testing shall be at least XLMF, MIN% calculated as follows: $X_{LMF,MIN}\%=100 \times e^{\frac{(3000 \times \ln(0.7))}{L70}}$ where L_{70} is the declared $L_{70}B_{50}$ lifetime (in hours)		N/A
	The calculated value for $X_{LMF,MIN}$ exceeds 96,0%, an $X_{LMF,MIN}$ value of 96,0 % shall be used		N/A
2.1.4	Survival factorafter endurance testing (for LED and OLED)		N/A
	>0.9		N/A
2.1.5	Colour consistency for LED and OLED light sources		P
	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.	3.0	P
2.1.6	Flicker for LED and OLED MLS		N/A
	$P_{st}LM \leqslant 1,0$ at full-load		N/A
2.1.7	Stroboscopic effect for LED and LED MLS		P
	SVM≤0,9 at full-load (except for HID with Φ_{use}> 4 klm and for light sources intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI<80)	0,000	P
	From 1 September 2024: SVM⩽0,4 at full-load(except for light sources intended for use in outdoorapplications, industrial applications, or other applications where lighting standards allow a CRI < 80)	0,003	P

3.(a)	**Information to be displayed on the light source itself**		P
	Useful luminous flux (lm)	150lm	P
	Correlated colour temperature (K)	3000-6500K	P
	Beam angle (°) For directional light sources		N/A
3.(b)	**Information to be visibly displayed on the packaging**		P
3.(b)(1)	**Light source placed on the market, not in a containing product**		P

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
	(a) Useful luminous flux (lm): - In a font at least twice as large as the displayof the on-mode power (Pon) - Clearly indicating if it refers to the flux in a sphere (360°), in a wide cone (180°) or in a narrow cone (90°)		P
	(b) Correlated Colour Temperature, rounded tothe nearest 100 K		P
	(c) Beam angle in degrees For directional light sources		P
	(d) electrical interface details, e.g. cap- or connector-type, type of power supply (e.g. 230 VAC 50 Hz, 12 V DC)		P
	(e) L70B50 lifetime for LED and OLED lightsources, expressed in hours		P
	(f) on-mode power (Pon), expressed in W		P
	(g) standby power (Psb), expressed in W and rounded to the second decimal. If the value iszero, it may be omitted from the packaging		P
	(h) networked standby power (Pnet) for CLS, expressed in W and rounded to the second decimal. If the value is zero, it may be omitted from the packaging		P
	(i) Colour Rendering Index, rounded to the nearest integer		P
	(j) Clear indication to this effect, if CRI< 80, andthe light source is intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a CRI< 80.		P
	(k) Information on non-standard conditions (such		P
	as ambient temperature Ta ≠ 25 ° C or specific thermal management is necessary)		
	(l) a warning if the light source cannot be dimmedor 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		P
	(m) if the light source contains mercury: a warning of this, including the mercury content in mg rounded to the first decimal place		P

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
	(n) if the light source is within the scope of Directive 2012/19/EU, without prejudice to marking obligations pursuant to Article 14(4) ofDirective 2012/19/EU, or contains mercury: a warning that it shall not be disposed of as unsorted municipal waste		P
3.(b)(2)	**Separate control gears** For separate control gear placed on the market as a stand-alone product, not as a part of a containing product		N/A
	(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)		N/A
	(b) the type of light source(s) for which it is intended		N/A
	(c) the efficiency in full-load, expressed inpercentage		N/A
	(d) the no-load power (Pno), expressed in W androunded to the second decimal, or the indication that the gear is not intended to operate in no-loadmode. If the value is zero, it may be omitted fromthe packaging but shall nonetheless be declared in the technical documentation and on websites		N/A
	(e) the standby power (Psb), expressed in W androunded to the second decimal. If the value is zero, it may be omitted from the packaging but shall nonetheless be declared in		N/A
	(f) the networked standby power(Pnet), 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		N/A
	(g) a warning if the control gear is not suitable for		N/A

(EU) No 2019/2020			
Clause	**Requirement - Test**	**Result - Remark**	**Verdict**
	dimming of light sources or can be used only withspecific 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 addressfor such a website, where full information on the control gear can be found		N/A
3.(c)	**Information to be visibly displayed on a free-access website of the manufacturer, importer or authorised representative**		N/A
3.(c)(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:		N/A
	(a) the information specified in point 3(b)(2),except 3(b)(2)(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 controlparts 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 dimmablelight 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		N/A

Appendix-Test Data Sheet

1、Initial Lumen Measurement :

Sample No.	Power Pon (W)	Disp. Factor	Luminous Flux Φtotal (lm)	Luminous Flux Φuse (lm)	Efficacy (lm/W)	Beam angle (°)
1	3	0.951	156.54	156.54	52.18	N/A
2	3	0.951	156.54	156.54	52.18	N/A
3	3	0.951	156.50	156.50	52.17	N/A
4	3	0.950	156.54	156.54	52.18	N/A
5	3	0.951	156.52	156.52	52.17	N/A
6	3	0.950	156.53	156.53	52.18	N/A
7	3	0.950	156.50	156.50	52.17	N/A
8	3	0.950	156.50	156.50	52.17	N/A
9	3	0.951	156.59	156.59	52.20	N/A
10	3	0.951	156.51	156.51	52.17	N/A
Avg.	3	0.951	156.52	156.52	52.18	N/A

2、Color Performance：

Color Temp (CCT)	Color rendering (Ra)	R9	SDCM	x	y
6012	80.4	4	3.0	0.3214	0.3342
6004	80.7	4	3.0	0.3214	0.3342
6011	80.4	4	3.0	0.3214	0.3341
6006	80.4	4	3.0	0.3214	0.3343
6000	80.7	4	3.0	0.3212	0.3342
6002	80.5	4	3.0	0.3215	0.3344
6009	80.4	4	3.0	0.3216	0.3341
6004	80.4	4	3.0	0.3214	0.3341
6006	80.5	4	3.0	0.3214	0.3342
6009	80.4	4	3.0	0.3214	0.3342
6009	80.4	4	3.0	0.3214	0.3342

3、Different Mode Power 、Flicker、Stroboscopic Effect and Lumen Maintenance Test:

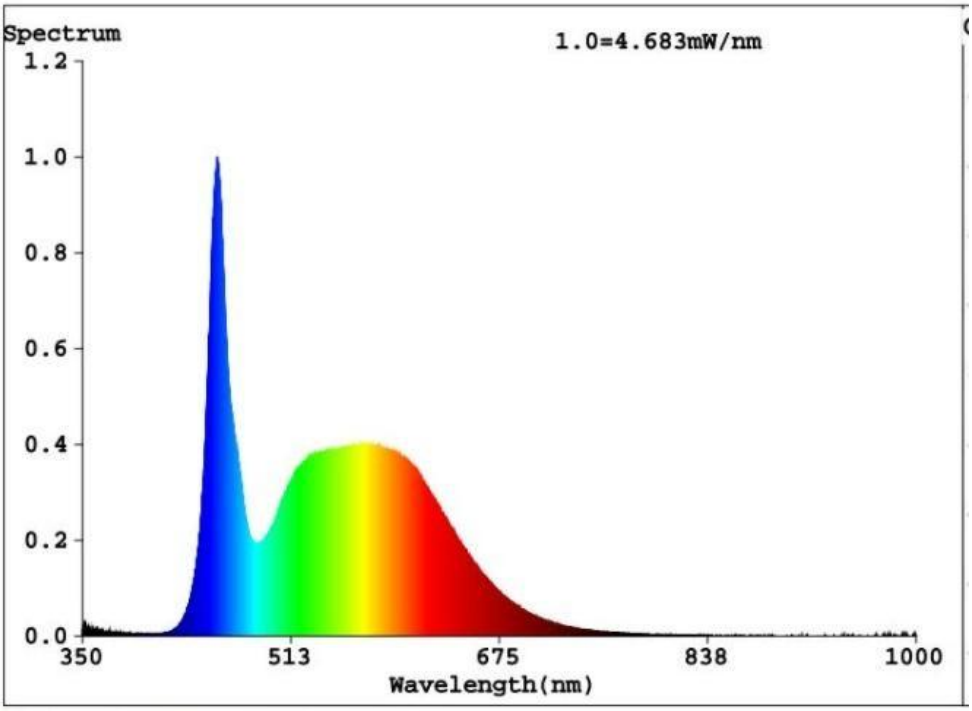
Sampl eNo.	No-Load Power Pno	Standby Power Psb	Network Sb. PowerPnet	licker PstLM	Stroboscopic Effect SVM	Total Luminous flux (lm) After 3600h	Lumen Maintenanceat 3600h (%)	Survival factor at 3600h
1	N/A	N/A	N/A	0.054	0.000	153.69	98.20%	P
2	N/A	N/A	N/A	0.024	0.000	155.26	99.20%	P
3	N/A	N/A	N/A	0.029	0.000	155.12	99.12%	P
4	N/A	N/A	N/A	0.051	0.000	155.08	99.07%	P
5	N/A	N/A	N/A	0.034	0.000	155.72	99.49%	P
6	N/A	N/A	N/A	0.046	0.000	153.54	98.09%	P
7	N/A	N/A	N/A	0.051	0.000	155.89	99.61%	P
8	N/A	N/A	N/A	0.024	0.000	153.76	98.25%	P
9	N/A	N/A	N/A	0.036	0.000	155.38	99.23%	P
10	N/A	N/A	N/A	0.038	0.000	155.04	99.06%	P
Avg .	N/A	N/A	N/A	0.039	0.000	154.85	99.04%	P

ATTACHMENT 1(S) of Energy efficiency classes

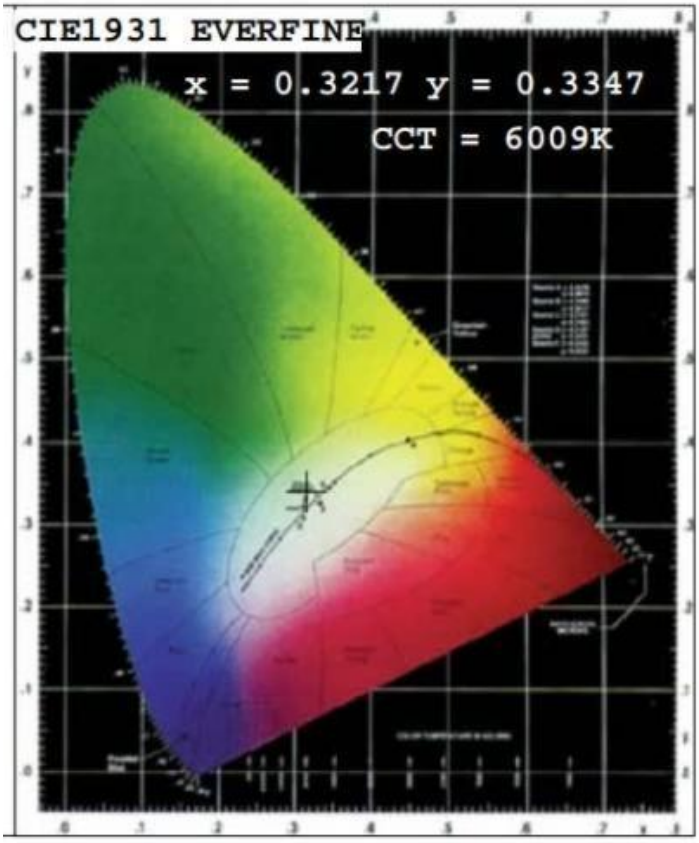
Energy efficiency classes			
Standard	Clause	Model No.	Verdict
(EU) 2019/2015	Energy class	LH70	P
Conditions	-Test conditions: -ambition: 25℃/65%R.H. -Test voltage:DC3.7V		
Φuse	150 lm (Declared)		
P_{on}	Pon = 3W (Declared)		
F_{TM}	0.926		
η_{TM}	46.3 lm/w (Declared)		
Technical requirements	Test result		
$\eta_{TM} = (\Phi_{use}/P_{on}) \times F_{TM}\ (lm/W)$.	Energy efficiency class	Total mains efficacy η_{TM} (lm/W)	--
	A	210 ≤ η_{TM}	N
	B	200 ≤ η_{TM} < 210	N
	C	160 ≤ η_{TM} < 200	N
	D	135 ≤ η_{TM} < 160	N
	E	110 ≤ η_{TM} < 135	N
	F	85 ≤ η_{TM} < 110	N
	G	η_{TM} < 85	P
Factors FTM by light source type			
Light source type		Factor F_{TM}	--
Non-directional (NDLS) operating on mains (MLS)		1.000	N
Non-directional (NDLS) not operating on mains (NMLS)		0.926	P
Directional (DLS) operating on mains (MLS)		1.176	N
Directional (DLS) not operating on mains (NMLS)		1.089	N

ATTACHMENT 2(S) of Spectral power distribution

Luminous Intensity Distribution Diagram

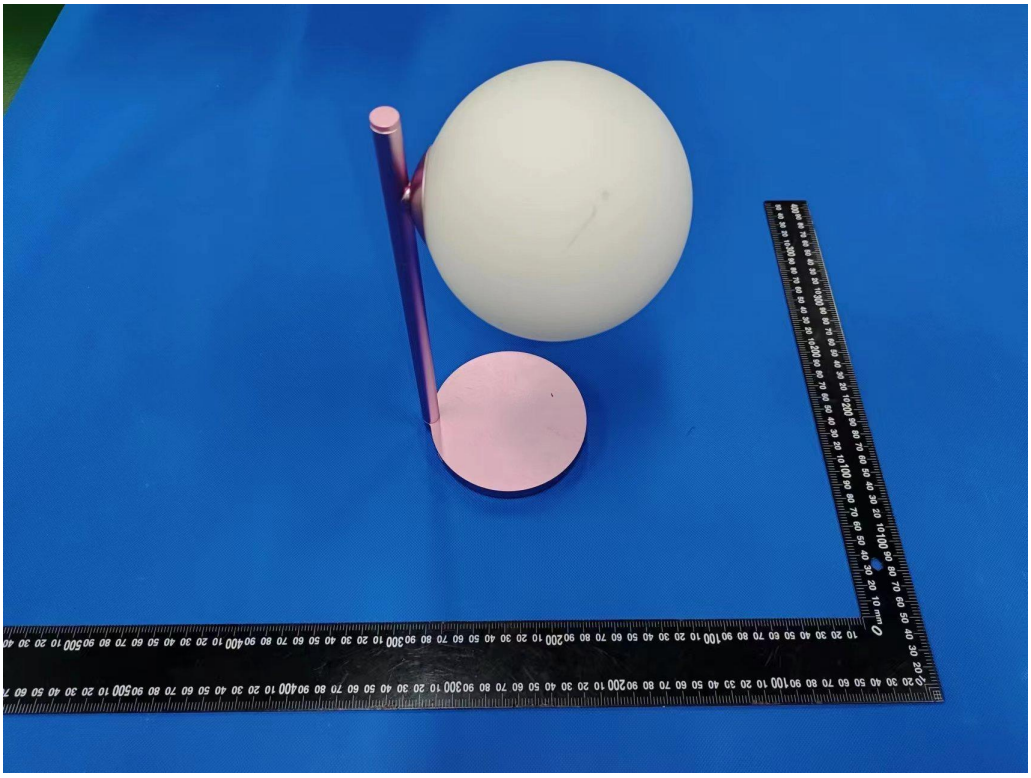


Spectral power distribution



ATTACHMENT 3(S) of Photos

Photo 1:



※※※※※ END OF REPORT ※※※※※