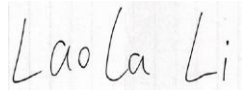






TEST REPORT	
COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019	
laying down ecodesign requirements for light sources and separate control gears pursuant to Directive 2009/125/EC of the European Parliament and of the Council	
Report reference No	LCS210426011ES
Tested by	Laola Li (Project Engineer) 
Check by	Leo Qiu (Director) 
Approved by	Adam Peng (Manager) 
Date of issue	December 13, 2021
Contents	14 pages
Testing laboratory	
Name	Ningbo LCS Standard Technology Service Co., Ltd.
Address	101-106, 202-206, Building 037, No. 166, Jinghua Road, Meixu Street, Ningbo High-tech Zone, Yinzhou District, Ningbo City, Zhejiang Province, China
Testing location	As above
Client	
Name	Hangzhou Shenlan Photoelectric Technology Co., Ltd
Address	Guali street, Xiaoshan District, Hangzhou, China
Manufacturer	
Name	Hangzhou Shenlan Photoelectric Technology Co., Ltd
Address	Guali street, Xiaoshan District, Hangzhou, China
Test specification	
Standard	COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019 COMMISSION DELEGATED REGULATION (EU) 2019/2015 COMMISSION DELEGATED REGULATION (EU) 2021/340 COMMISSION REGULATION (EU) 2021/341
Test procedure	COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019 COMMISSION DELEGATED REGULATION (EU) 2019/2015 COMMISSION DELEGATED REGULATION (EU) 2021/340 COMMISSION REGULATION (EU) 2021/341
Non-standard test method	N/A



Test item Description: LED2835Light belt

Trademark: N/A

Model and/or type reference.....: LED2835Light belt

Rating(s)(V/Hz).....: DC 12V, 5W

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: May 12, 2021

Date(s) of performance of test.....: May 12, 2021 – December 13, 2021

Test item particulars:

Type of light source:

- | | | | | |
|----------------------------------|--|---|--|------------------------------------|
| | <input type="checkbox"/> HL | <input type="checkbox"/> LFLT5HE | <input type="checkbox"/> LFL T5HO | <input type="checkbox"/> CFLni |
| - Lighting technology used | <input type="checkbox"/> other FL | <input type="checkbox"/> HPS | <input type="checkbox"/> MH | <input type="checkbox"/> other HID |
| | <input checked="" type="checkbox"/> LED | <input type="checkbox"/> OLED | <input type="checkbox"/> mixed | <input type="checkbox"/> other |
| - Non-directional or directional | <input checked="" type="checkbox"/> NDLS | <input type="checkbox"/> DLS | | |
| - Mains or non-mains | <input checked="" type="checkbox"/> NMLS | <input type="checkbox"/> MLS | | |
| - Connected light source (CLS) | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | | |
| - Colour-tuneable light source | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | | |
| - Envelope | <input checked="" type="checkbox"/> No | <input type="checkbox"/> Second | <input type="checkbox"/> Non-clear | |
| - High luminance light source | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | | |
| - Anti-glare shield | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | | |
| - Dimmable | <input type="checkbox"/> Yes | <input type="checkbox"/> only with specific dimmers | <input checked="" type="checkbox"/> No | |
| - Control gear | <input checked="" type="checkbox"/> Integrated | <input type="checkbox"/> External | | |
| - Use of light source: | <input checked="" type="checkbox"/> Indoor | <input type="checkbox"/> Outdoor | <input type="checkbox"/> Industry | |

Lamp cap installed: N/A

General product parameters :

Energy consumption in on-mode

5

(kWh/1000 h)

Energy efficiency class

☐ A ☐ B ☐ C ☐ D ☒ E ☐ F ☐ G

Rated useful luminous flux.....(lm): 650

Rated CCT(K): 7000

On-mode power (Pon), expressed in W.....: 5

Standby power (Psb).....(W): N/A

Networked standby power(Pnet)for CLS(W): N/A

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Rated Ra.....: ≥ 80
Outer dimensions.....(mm): 500x8
Spectral power distribution.....: See attachment 2
Claim of equivalent power: ☐ Yes: ☒ N/A
Chromaticity coordinates (x and y).....: x: 0.3032: y: 0.3136
Peak luminous intensity(cd) : N/A
Beam angle in degrees.....(°): N/A
R9 colour rendering index value R9.....: 0
Survival factor: $\geq 90\%$
The lumen maintenance factor.....: $\geq 95.8\%$
Displacement factor ($\cos \phi 1$).....: N/A
Colour consistency in McAdam ellipses.....: ≤ 6
Claims that an LED light source replaces a
fluorescent light source without integrated
ballast of a particular wattage.....: ☐ Yes: ☒ N/A
Flicker metric (Pst LM): N/A
Stroboscopic effect metric (SVM).....: N/A
Rated life time(h): 25000

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 DC 12V and a stable ambient temperature $25 \pm 10^\circ\text{C}$.

General product information:

N/A

**Equipment List:**

Instrument	Equipment ID	Model	Calibration Date	Calibration Due Date
Full-field Speed Goniophotometer	NLCS-S-124	GMS-1800B	2021/5/31	2022/5/30
Digital Power Meter	NLCS-S-006	PF9800	2021/5/31	2022/5/30
AC Testing Power Source	NLCS-S-125	APW-110N	2021/5/31	2022/5/30
Total Spectral Radiant Flux Standard Lamp	NLCS-S-126	BD220V	2021/6/21	2022/6/20
2m Integrating Sphere System	NLCS-S-120	SL-300	2021/5/31	2022/5/30
Digital Power Meter	NLCS-S-122	UI2012	2021/5/31	2022/5/30
AC Testing Power Source	NLCS-S-121	BP6005	2021/5/31	2022/5/30
Standard Lamp	NLCS-S-123	110V/300W	2021/6/21	2022/6/20
Temperature and humidity meter	NLCS-S-076	HTC-1	2021/5/27	2022/5/26
Flicker Photometer	NLCS-S-127	FK-3000	2021/5/31	2022/5/30

General remarks

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

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"(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) 2019/2020			
Clause	Requirement - Test	Result - Remark	Verdict
Annex I (Clause)	Definitions in Regulation (EU) 2019/2020		P
	Number of sample used for test	10 pcs	P
(3)	Directional Light Source		N/A
	at least 80 % of total luminous flux within a solid angle of π sr (corresponding to a cone with angle of 120°)		N/A
(15)	Useful luminous flux Φ_{use}		P
	for non-directional light sources it is the total flux emitted in a solid angle of 4π sr (corresponding to a 360° sphere)		P
	for directional light sources with beam angle $\geq 90^\circ$ it is the flux emitted in a solid angle of π sr (corresponding to a cone with angle of 120°)		N/A
	for directional light sources with beam angle $< 90^\circ$ it is the flux emitted in a solid angle of $0,586\pi$ sr (corresponding to a cone with angle of 90°)		N/A
Annex II (Clause)	Energy Efficiency Requirements in Regulation (EU) 2019/2020		P
1.(a)	Energy Efficiency Requirements – Light Source		P
	On-mode Power P_{on} (W):	$P_{on} = 5 \text{ W}$	P
	Maximum Allowed Power P_{onmax} (W): $P_{onmax} = C \times (L + \Phi_{use}/(F \times \eta)) \times R$	$P_{onmax} = 1.00 \times (1.5 + 650/(1.00 \times 120)) \times 1.00 = 6.92 \text{ W}$	P
	Φ_{use} :	650 lm	P
	Threshold efficacy η (lm/W): η for LED:	120.0	P
	End loss factor L (W) depending on light source: L for LED: 1.5	1.5	P
	End loss factor L (W) for connected light sources: 2.0		N/A
	Efficacy Factor F: 1.00 for non-directional light sources (NDLS, using total flux)	1.00	P
	Efficacy Factor F: 0.85 for directional light sources (DLS, using flux in a cone)		N/A
	CRI Factor R: 0.65 for $CRI \leq 25$		N/A
	CRI Factor R: ($CRI + 80$)/160 for $CRI > 25$, rounded to two decimals	$R = (80 + 80)/160 = 1.00$	P
	Correction Factor C Depending on Light Source Characteristics in Table 2		P

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(EU) 2019/2020			
Clause	Requirement - Test	Result - Remark	Verdict
	Non-directional (NDLS) not operating on mains (NMLS), Basic Value: 1.00	1.00	P
	Non-directional (NDLS) operating on mains (MLS), Basic Value: 1.08		N/A
	Directional (DLS) not operating on mains (NMLS), Basic Value: 1.15		N/A
	Directional (DLS) operating on mains (MLS), Basic Value: 1.23		N/A
	Special Light Source Bonus on C		N/A
1.(a)	Standby power – Light Source		N/A
	The standby power P_{sb} of a light source shall not exceed 0.5 W		N/A
	The networked standby power P_{net} of a connected light source shall not exceed 0.5 W		N/A
	The allowable values for P_{sb} and P_{net} shall not be added together		N/A
1.(b)	Energy Efficiency Requirements – Separate Control Gear (at full-load)		N/A
	Control gear for LED or OLED light sources: $P_{eg}^{0.81} / (1.09 \times P_{eg}^{0.81} + 2.10)$		N/A
	The no-load power P_{no} of a separate control gear shall not exceed 0.5 W		N/A
	The standby power P_{sb} of a separate control gear shall not exceed 0.5 W		N/A
	The networked standby power P_{net} of a connected separate control gear shall not exceed 0.5 W		N/A
	The allowable values for P_{sb} and P_{net} shall not be added together		N/A
2.	Functional Requirements – Light Source (Table 4)		P
	Colour Rendering Index CRI: ≥ 80	81.3	P
	Displacement Factor DF at Power Input P_{on} for LED and OLED MLS:		N/A
	No limit at $P_{on} \leq 5$ W DF ≥ 0.5 at 5 W $< P_{on} \leq 10$ W, DF ≥ 0.7 at 10 W $< P_{on} \leq 25$ W DF ≥ 0.9 at 25 W $< P_{on}$		N/A
	Lumen Maintenance Factor (for LED and OLED): $X_{LMF,MIN}\% = 100 \times e^{\frac{(3000 \times \ln(0.7))}{L_{70}}}$	95.82% > 95.8%	P
	Survival Factor (for LED and OLED): At least 9 light sources of the test sample must be operational after completing the test in Annex V of this Regulation.	100%	P
	Colour consistency for LED and OLED light	5.6	P

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(EU) 2019/2020			
Clause	Requirement - Test	Result - Remark	Verdict
	sources: Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.		
	Flicker for LED and OLED MLS: $P_{st} LM \leq 1.0$ at full-load		N/A
	Stroboscopic effect for LED and OLED MLS: $SVM \leq 0.9$ at full-load		N/A
3.(a)	Information to be displayed on the light source itself		N/A
	Useful luminous flux (lm)		N/A
	Correlated colour temperature (K)		N/A
	Beam angle (°) For directional light sources		N/A
3.(b)	Information to be visibly displayed on the packaging		N/A
3.(b)(1)	Light source placed on the market, not in a containing product		N/A
	(a) Useful luminous flux (lm): - 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°)		N/A
	(b) Correlated Colour Temperature, rounded to the nearest 100 K		N/A
	(c) Beam angle in degrees For directional light sources		N/A
	(d) electrical interface details, e.g. cap- or connector-type, type of power supply (e.g. 230 V AC 50 Hz, 12 V DC)		N/A
	(e) L70B50 lifetime for LED and OLED light sources, expressed in hours		N/A
	(f) on-mode power (P_{on}), expressed in W		N/A
	(g) 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		N/A
	(h) 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		N/A
	(i) Colour Rendering Index, rounded to the nearest integer		N/A
	(j) Clear indication to this effect, if $CRI < 80$, and the light source is intended for use in outdoor applications, industrial applications or other applications where lighting standards allow a $CRI < 80$.		N/A
	(k) Information on non-standard conditions (such		N/A

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(EU) 2019/2020			
Clause	Requirement - Test	Result - Remark	Verdict
	as ambient temperature $T_a \neq 25\text{ }^{\circ}\text{C}$ or specific thermal management is necessary)		
	(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		N/A
	(m) if the light source contains mercury: a warning of this, including the mercury content in mg rounded to the first decimal place		N/A
	(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		N/A
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 in percentage		N/A
	(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		N/A
	(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		N/A
	(f) 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		N/A
	(g) a warning if the control gear is not suitable for		N/A

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

Appendix-Test Data Sheet

1、Initial Lumen Measurement and Energy Efficiency:

Sample No.	Power Pon (W)	Disp. Factor	Luminous Flux Φ_{total} (lm)	Luminous Flux Φ_{use} (lm)	Efficacy (lm/W)	Total mains efficacy η_{TM} (lm/W)	Beam angle (°)
1	4.9	N/A	652.77	652.77	133.22	143.87	N/A
2	5.0	N/A	660.07	660.07	132.01	142.56	N/A
3	4.8	N/A	667.32	667.32	139.03	150.14	N/A
4	4.8	N/A	670.77	670.77	139.74	150.91	N/A
5	5.1	N/A	664.69	664.69	130.33	140.75	N/A
6	5.0	N/A	675.29	675.29	135.06	145.85	N/A
7	4.9	N/A	668.20	668.20	136.37	147.27	N/A
8	4.7	N/A	660.78	660.78	140.59	151.83	N/A
9	5.1	N/A	666.82	666.82	130.75	141.20	N/A
10	4.7	N/A	675.35	675.35	143.69	155.17	N/A
Avg.	4.9	N/A	666.21	666.21	135.96	146.83	N/A

2、Color Measurement:

Sample No.	Color Temp (CCT)	Color rendering (Ra)	R9	SDCM	X	Y
1	7241	81.0	-10	5.7	0.3031	0.3136
2	7260	81.4	-6	5.6	0.3024	0.3137
3	7248	82.1	-7	5.6	0.3041	0.3138
4	7256	81.6	-9	5.5	0.3041	0.3141
5	7268	80.9	-8	5.3	0.3032	0.3144
6	7248	81.0	-7	5.6	0.3024	0.3139
7	7271	81.2	-6	5.3	0.3038	0.3134
8	7230	81.2	-8	5.7	0.3026	0.3133
9	7254	81.1	-9	5.6	0.3030	0.3131
10	7206	81.2	-7	5.8	0.3031	0.3132
Avg.	7248	81.3	-8	5.6	0.3032	0.3136

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

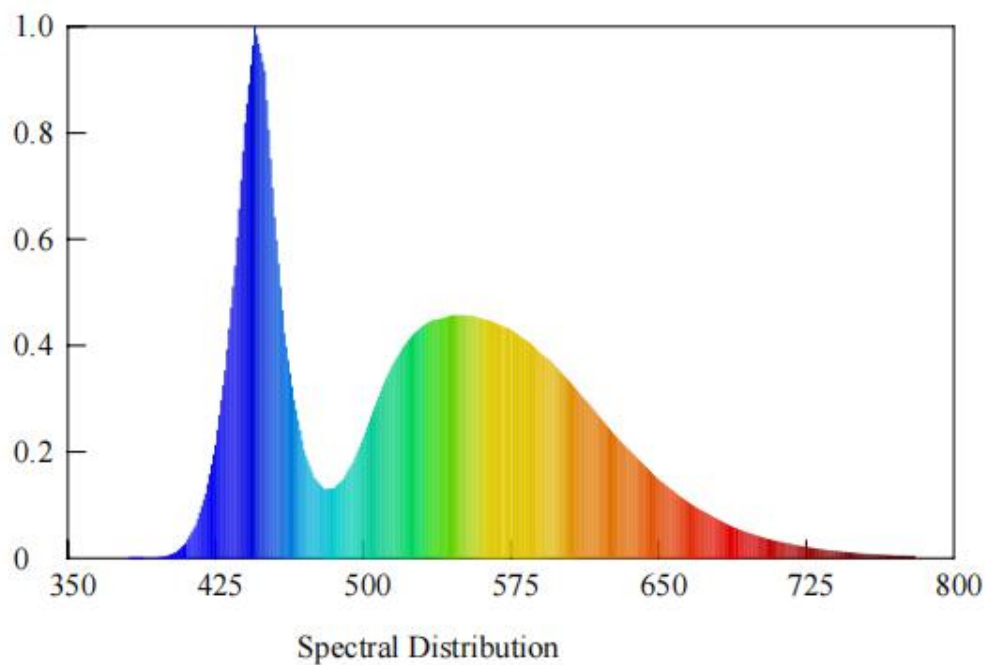
Sample No.	No-Load Power Pno	Standby Power Psb	Network Sb. Power Pnet	Flicker Pst LM	Stroboscopic Effect SVM	Total Luminous flux (lm) After 3600h	Lumen Maintenance at 3600h (%)	Survival factor at 3600h
1	N/A	N/A	N/A	N/A	N/A	626.01	95.90%	P
2	N/A	N/A	N/A	N/A	N/A	633.87	96.03%	P
3	N/A	N/A	N/A	N/A	N/A	639.69	95.86%	P
4	N/A	N/A	N/A	N/A	N/A	647.16	96.48%	P
5	N/A	N/A	N/A	N/A	N/A	637.30	95.88%	P
6	N/A	N/A	N/A	N/A	N/A	649.43	96.17%	P
7	N/A	N/A	N/A	N/A	N/A	641.27	95.97%	P
8	N/A	N/A	N/A	N/A	N/A	635.41	96.16%	P
9	N/A	N/A	N/A	N/A	N/A	643.55	96.51%	P
10	N/A	N/A	N/A	N/A	N/A	647.73	95.91%	P
Avg.	N/A	N/A	N/A	N/A	N/A	638.36	95.82%	P

ATTACHMENT 1(S)

Energy efficiency classes			
Standard	Clause	Model No.	Verdict
(EU) 2019/2015	Energy class	LED2835Light belt	P
Conditions	-Test conditions: -ambition: 25°C/65%R.H. -Test voltage:DC 12V		
Φ_{use}	650 lm		
P_{on}	$P_{on} = 5\text{ W}$		
F_{TM}	0.926		
Total mains efficacy η_{TM} (lm/W)	120.38		
Technical requirements		Test result	
$\eta_{TM} = (\Phi_{use}/P_{on}) \times F_{TM} \text{ (lm/W)}.$	Energy efficiency class	Total mains efficacy η_{TM} (lm/W)	--
	A	$210 \leq \eta_{TM}$	N/A
	B	$185 \leq \eta_{TM} < 210$	N/A
	C	$160 \leq \eta_{TM} < 185$	N/A
	D	$135 \leq \eta_{TM} < 160$	N/A
	E	$110 \leq \eta_{TM} < 135$	P
	F	$85 \leq \eta_{TM} < 110$	N/A
	G	$\eta_{TM} < 85$	N/A
Factors F _{TM} by light source type			
Light source type		Factor F_{TM}	--
Non-directional (NDLS) operating on mains (MLS)		1.000	N/A
Non-directional (NDLS) not operating on mains (NMLS)		0.926	P
Directional (DLS) operating on mains (MLS)		1.176	N/A
Directional (DLS) not operating on mains (NMLS)		1.089	N/A

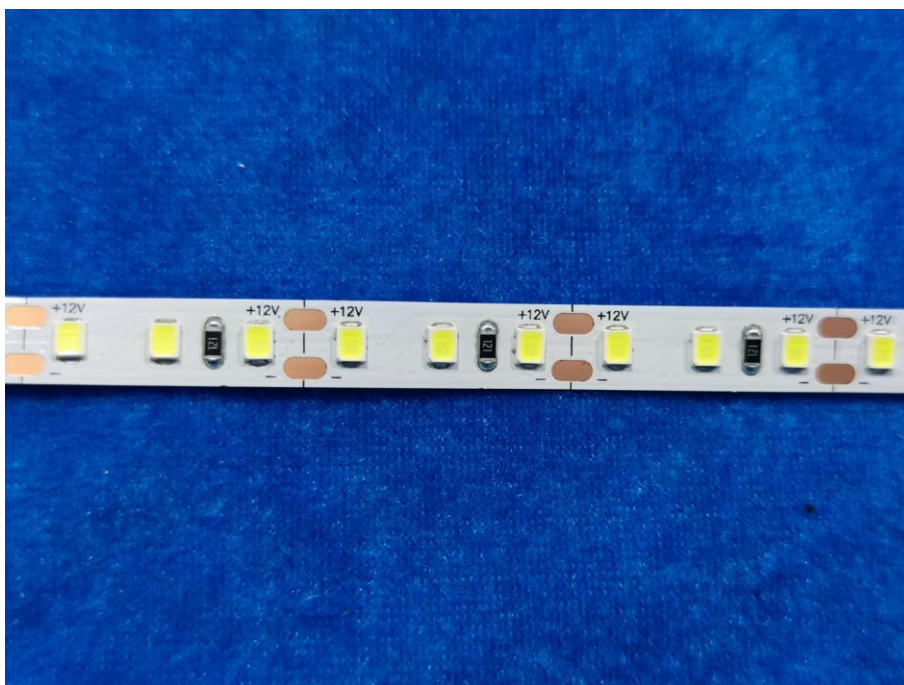
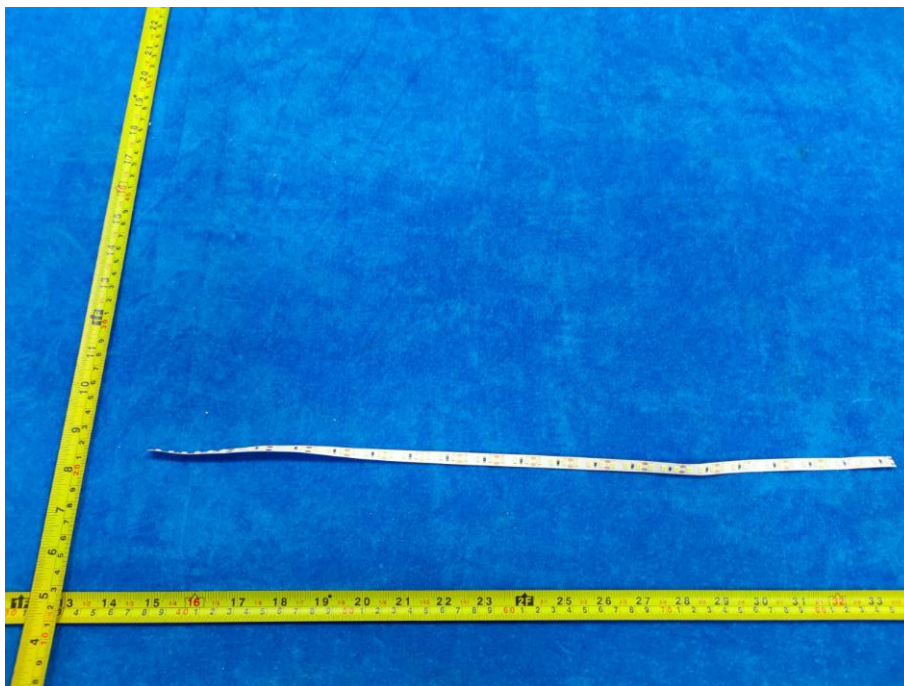
ATTACHMENT 2(S)

Spectral power distribution



ATTACHMENT 3(S)

Photos of LED2835Light belt



----- End of test report-----

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