



TEST REPORT IEC 60825-1 Safety of laser products - Part 1: Equipment classification and requirements	
Report Number.....	GZEE211100325231
Tested by (name + signature).....	Simon Chen / Project Engineer <i>Simon Chen</i>
Approved by (name + signature)..:	Alex Tan / Reviewer <i>Alex Tan</i>
Date of issue	2021-12-02
Total number of pages.....	11
Name of Testing Laboratory preparing the Report.....	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Address	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Applicant's name	Shanghai Xiyin Technology Co., Ltd.
Address	Building C, No. 888, Huanhu West 2 nd Road, Special Area of China (Shanghai) Pilot Free Trade Zone, Shanghai, China
Manufacturer's name.....	Same as applicant
Address.....	Same as applicant
Test specification:	
Standard	<input type="checkbox"/> IEC 60825-1:2014 <input checked="" type="checkbox"/> EN 60825-1: 2014
Test procedure.....	Test Report
Non-standard test method.....	N/A
Test Report Form No.....	IECEN60825-1A
Test Report Form(s) Originator	SGS-CSTC
Master TRF	Dated 2021-09-02
Copyright @ 2021 SGS-CSTC Standards Technical Services Co., Ltd. (SGS-CSTC), Guangzhou, P. R. China. All rights reserved.	
This publication may be produced in whole or in part for non-commercial purposes as long as SGS-CSTC is acknowledged as copyright owner and source of the material. SGS-CSTC takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context	



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/terms-and-conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd. No.198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663 t (86-20) 82155555 f (86-20) 82075058 www.sgs.com.cn
 Guangzhou branch / 广州分公司 IEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

Test item description	CS20
Trade Mark	—
Factory	Same as applicant
Model/Type reference	CS20
Ratings	DC 5 V; 0,5 A; 1,2 W

<p>Summary of testing: CS20 is tested the laser radiation under normal operation and evaluated to be Class 1 according to EN 60825-1:2014. Only Clause 4 & 5 were taken account. This report is based on report GZEE210900250431 (dated 2021-11-02) issued by SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch, with all test data being copied.</p>	
<p>Test item particulars..... :</p>	
<p>Classification of installation and use..... :</p>	<p>Portable</p>
<p>Supply Connection..... :</p>	<p>DC Connector</p>
<p>Possible test case verdicts:</p> <ul style="list-style-type: none"> - 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) 	
<p>Testing.....:</p>	
<p>Date of receipt of test item..... :</p>	<p>2021-09-30</p>
<p>Date (s) of performance of tests..... :</p>	<p>2021-09-30 to 2021-10-20</p>
<p>General remarks:</p> <p>"(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 <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. This document is issued by the Company subject to its General Conditions of Service, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.</p>	
<p>General product information: The product contains a 940 nm laser diode.</p>	

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict

4	CLASSIFICATION PRINCIPLES		
4.3	Classification rules		---
4.3 a	Radiation of a single wavelength		P
4.3 b	Radiation of multiple wavelengths		N/A
	1) Laser product emits at two or more wavelengths shown as additive in Table 1		N/A
	2) Laser product emits at two or more wavelengths not shown as additive in Table 1		N/A
4.3 c	Radiation from extended sources (see 5.4.3)		N/A
4.3 d	Non-uniform, non-circular or multiple apparent source		N/A
4.3 e	Time bases		---
	1) 0,25 s		N/A
	2) 100 s		P
	3) 30000 s		N/A
4.3 f	Repetitively pulsed or modulated lasers		N/A
	1) Any single pulse		N/A
	2) Average power for pulse trains		N/A
	3) Pulse duration $t \leq T_i$: Number of pulses N and C_5:		N/A
	3) Pulse duration $t > T_i$: Number of pulses N and C_5:		N/A
4.4	Laser products designed to function as conventional lamps.		N/A
	α measured at 200 mm distance from closest point of human access ($\alpha > 5$ mrad).		N/A
	Un-weighted radiance L measured at 200 mm distance (comparison with $L_T = 1 \text{ MWm}^{-2}\text{sr}^{-1}/\alpha$) under reasonably foreseeable single fault conditions.		N/A
	Evaluation of emission according to IEC 62471 series (optional): Standard applied (IEC 62471 series).....: Risk Group.....: Labelling.....:		N/A
	Classification of product based on accessible laser radiation (if no laser radiation accessible: Class 1).		

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	DETERMINATION OF THE ACCESSIBLE EMISSION LEVEL and PRODUCT CLASSIFICATION		
5.1	Tests		---
	Compliance under reasonably foreseeable single fault conditions.		P
5.3	Determination of the class of the laser product ...: For Class 1C: vertical safety standard applied with requirements for Class 1C.		---
5.4	Measurement geometry		---
5.4.1	General		---
5.4.2	Default (simplified) evaluation		P
	Conditions applied	Condition 1 and Condition 3	P
	Aperture diameter	50 mm (for Condition 1) 7 mm (for Condition 3)	P
	Reference point :.....	Surface of diffuser (For condition 3) The closest point to human access (For Condition 1)	P
	Measurement distance	2000 mm (for Condition 1) 100 mm (for Condition 3)	P
5.4.3	Evaluation condition for extended sources		—
	Conditions applied		N/A
	Most restrictive position		N/A
	Angular subtense of the apparent source α and C_6 : (for each condition)		N/A
5.4.3 a	Aperture diameters (for each condition).....		N/A
5.4.3 b	Angle of acceptance (for each condition).....		N/A

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict

Measured laser radiation, calculations and comparison with AEL limits:

1. TEST CONDITIONS

(1) General requirement

Temperature: 20 – 25 °C
 Relative humidity: Max. 75 %

(2) Normal operation

The Laser is simulating normal operation to emit intentional optical power.

(3) Fault condition: Refer to the test result.

2. MEASUREMENT METHOD

(1) Measurement of Peak wavelength

The peak wavelength of Laser is measured under normal operation, used SPR-5000B spectrometer.

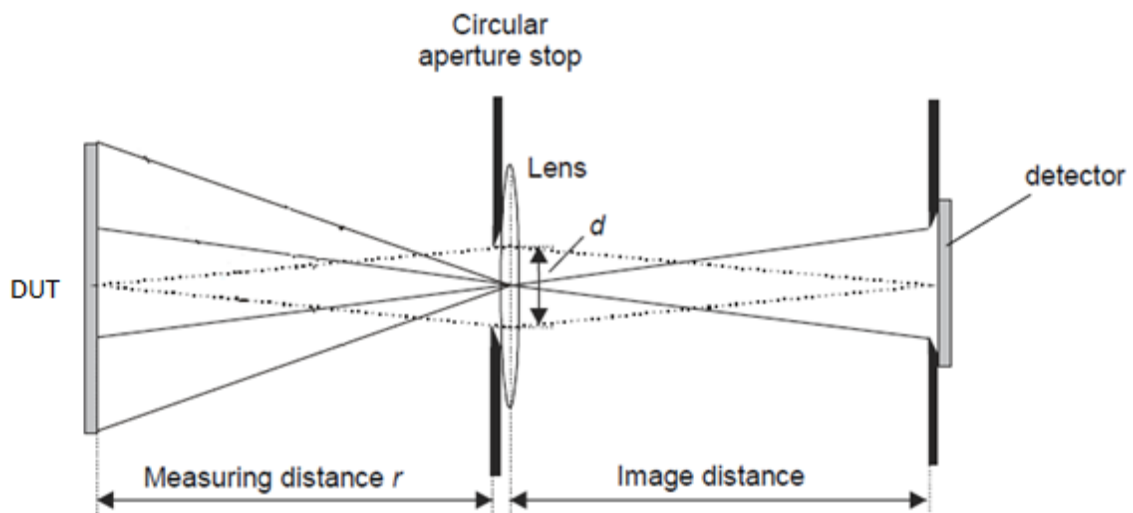
(2) Measuring distance

For condition 1: $r = 2000$ mm.
 For condition 3: $r = 100$ mm.
 For condition Skin Thermal hazard: $r = 0$ mm

(3) Measurement of radiant power (used optical power meter)

The radiant power emitted from Laser of the product is measured under normal operation.

In case of condition 1, the Laser radiation is collected through a circular aperture stop having a diameter 50 mm and its location is 2000 mm away from the closet point of human access, consists of a lens with 150 mm focal length. See below picture.



In case of condition 3, same as condition 1 except the Laser radiation is collected through a circular aperture stop having a diameter 7 mm and its location is 100 mm away from the apparent source, and focal length of the lens is 35 mm.

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict

In case of condition Skin Thermal Hazard, Laser radiation is collected through a circular aperture stop having a diameter 3,5 mm and its location is 0 mm away from the apparent source.

The measurement is performed at a position to detect a maximum radiation emitted from the apparent source.

3. TEST RESULT

All below measurements were performed at dark room with ambient temperature 24,5 ±0,5 °C, Relative humidity 60 ± 5%, the product was powered by DC connector.

(1) Measurement of wavelength
 $\lambda_1 = 940 \text{ nm}$ (infrared)

(2) Measurement of leakage laser radiant power

Normal operation:

For condition 1:
 Obviously, condition 3 was harsher than condition 1 and was not tested.

For condition 3
 $P_{\lambda 1} = 18,75 \mu\text{W}$;

For condition Skin Thermal hazard: $r = 0 \text{ mm}$
 $P_{\lambda 1} = 10,2 \mu\text{W}$;

Single fault condition:
 Condition 3:
 Fault #1: C bridged: not worked, 0 W.
 Fault #2: R bridged: not worked, 0 W.

4. CLASSIFICATION OF LASER RADIATION

(1) Compare the accessible emission level of radiation emitted from Laser of the product with the accessible emission limit of certain class. This comparison is evaluated using the measurement value under each condition. Accessible emission levels are measurement value or calculated from the measurement value if necessary.

(2) Time base
 The time base is 100 s.

(3) Correction factor for Laser

For simplified (default) method: Correction factor $C_4 = 3,02$; $C_7 = 1$

(4) Comparison with AEL

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict

Condition	Evaluation method	Distance (mm)	AE (μ W)	AEL Class 1
Condition 3	Simplified (default) evaluation	100	18,75	1177,8 μ W
Skin Thermal	Simplified (default) evaluation	0	10,2	1177,8 μ W

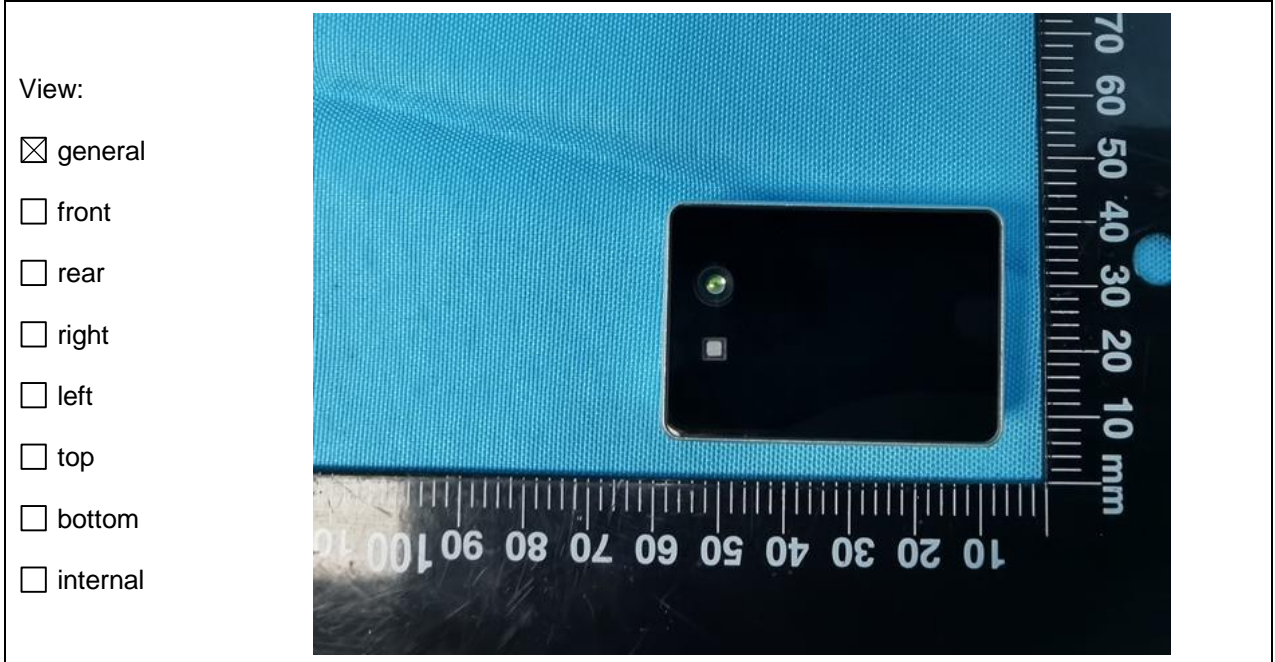
Conclusion:

Measured emission power is not exceeding the AEL for Class 1, therefore the product is classified as Class 1 laser product.

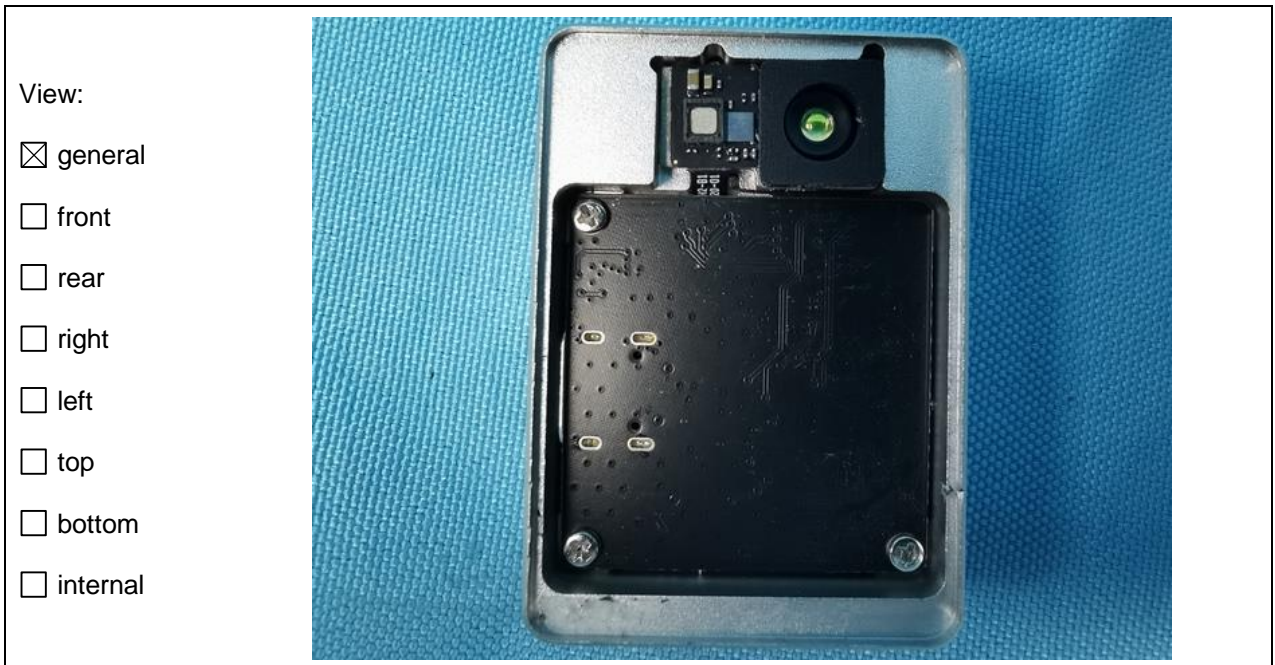
IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
6	ENGINEERING SPECIFICATIONS		—
7	LABELLING		—
8	OTHER INFORMATIONAL REQUIREMENTS		—
9	ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS		—

Attachment 1: Photo documentation

Details of: View for product



Details of: View for product inside

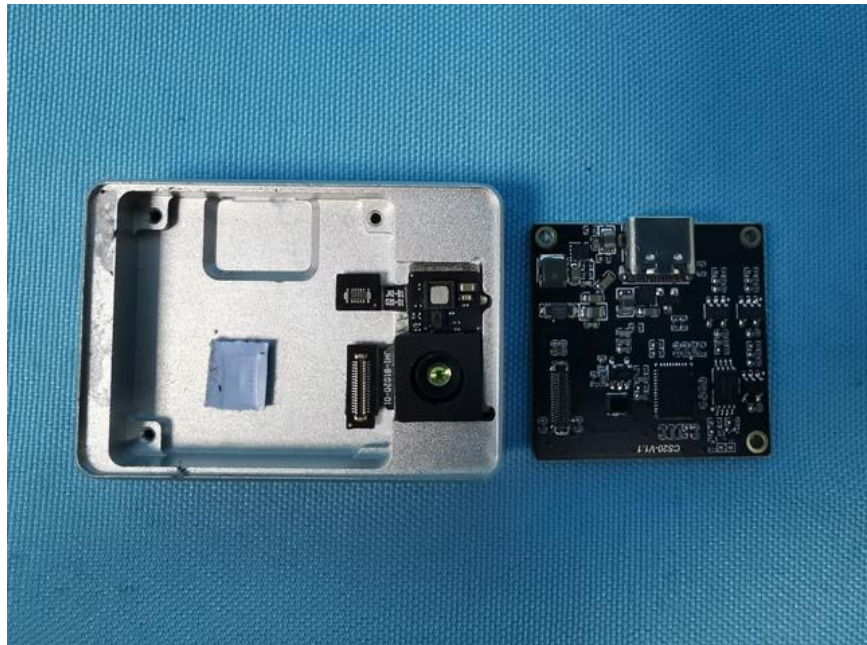


Attachment 1: Photo documentation

Details of: View for product inside

View:

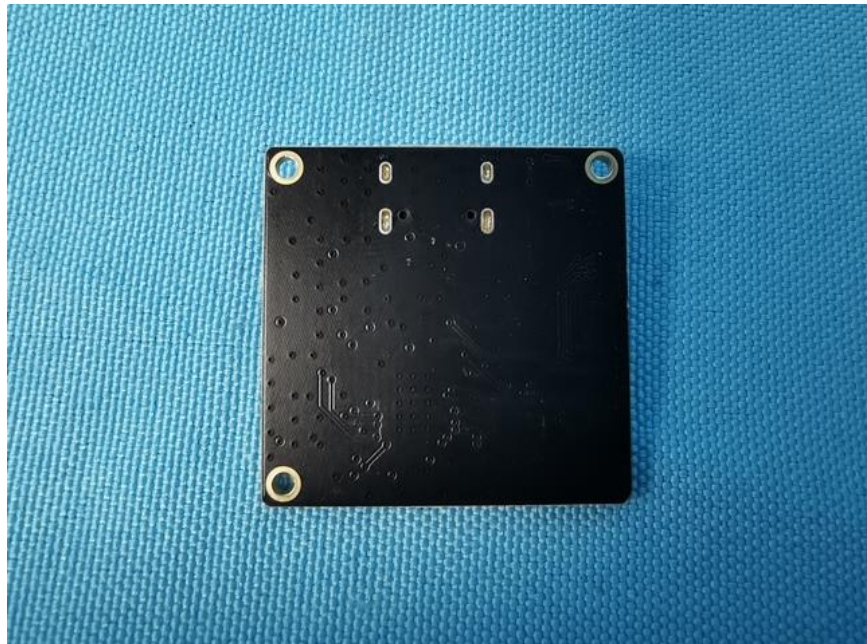
- general
- front
- rear
- right
- left
- top
- bottom
- internal



Details of: PCB

View:

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



--- END OF REPORT ---