TEST REPORT

Product Name : HOTO Smart Laser Measure
Model Number : QWCJY001

Prepared for	:	Shanghai HOTO Technology Co., Ltd.
Address	:	Room 502, Building 7A, M50 Park,No.50 Moganshan Road, Shanghai
Prepared by	:	EMTEK(Dongguan) CO., LTD.
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Report Number	:	ED201027027L
Date(s) of Tests	:	October 15, 2020
Date of issue	:	November 25, 2020

TEST REPORT

IEC 60825-1
Safety of laser products -
Part 1: Equipment classification and requirements

Report reference No. ..... :	ED201027027L
Tested by..... :	Tim Zhou
Approved by ..... :	June Luo
Date of issue ..... :	November 25, 2020
Contents..... :	14 pages

Testing laboratory

Name ..... :	EMTEK(Dongguan) CO., LTD.
Address ..... :	-1&2F., Building 2, Zone A, Zhongda Marine Biotechnology Research and Development Base, No. 9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China
Testing location ..... :	Same as above

Client

Applicant name ..... :	Shanghai HOTO Technology Co., Ltd.
Address..... :	Room 502, Building 7A, M50 Park,No.50 Moganshan Road, Shanghai
Manufacturer name ..... :	Shanghai HOTO Technology Co., Ltd.
Address..... :	Room 502, Building 7A, M50 Park,No.50 Moganshan Road, Shanghai

Test specification

Standard..... :	EN 60825-1:2014 IEC 60825-1:2014
Test procedure ..... :	Safety

Test item

Product name ..... :	HOTO Smart Laser Measure
Trademark ..... :	N/A
Model and/or type reference ..... :	QWCJY001
Rating(s) ..... :	DC3.7V

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)

Testing:

Date of receipt of test item .....: October 12, 2020

Date (s) of performance of tests .....: October 15, 2020

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 ☐ comma / ☒ point is used as the decimal separator.

Summary of compliance with National Differences:

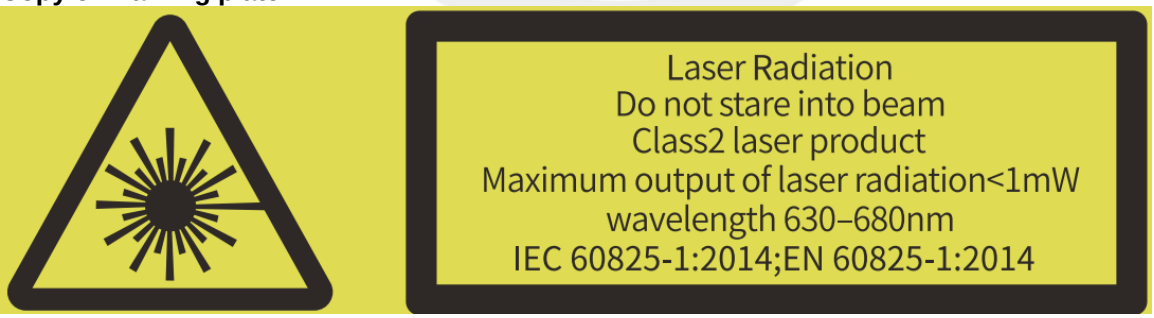
The text of the International Standard IEC 60825-1:2014 was approved by CENELEC as a European Standard without any modification.

General product information:

1. BOSA information:

Object No.	Model	Manufacturer	Technical data
Red Laser Diode	HGLD-650TO5.6-JP-5mW	SHANDONG HUAGUANG OPTOELECTRONICS CO.,LTD.	DC2.1V, 650nm

Copy of marking plate:



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	Class 2	P
	2) 100 s		N/A
	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
	measured at 200 mm distance from closest point of human access (> 5 mrad).		N/A
	Un-weighted radiance L measured at 200 mm distance (comparison with L_T = 1 $MWm^{-2}sr^{-1}$/) under reasonably foreseeable single fault conditions.		N/A
	Evaluation of emission according to EN / IEC 62471 series (optional): Standard applied (EN / IEC 62471 series)……..: Risk Group…….. ... : Labelling…….. : Classification of product based on accessible laser radiation (if no laser radiation accessible: Class 1).		N/A

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, Condition 3	P
	Aperture diameter ..... :	Condition 1: 50 mm Condition 3: 7 mm	P
	Reference point : ..... :	Focal point	P
	Measurement distance ..... : (for each condition)	Condition 1: 2000 mm Condition 3: 100 mm	P
5.4.3	Evaluation condition for extended sources		N/A
	Conditions applied ..... :		N/A
	Most restrictive position ..... : (distance from reference point)		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

6	**ENGINEERING SPECIFICATIONS**		
6.2	Protective housing		---
6.2.1	General		---
	Protective housing prevents access to energy levels in excess of the AEL for Class 1.		N/A
	Protective housing prevents access to energy levels equivalent to Class 4 and withstands exposures under reasonably foreseeable single fault conditions.		N/A
	Maintenance of Class 1, 1C, 1M, 2, 2M, or 3R (access to emissions of Class 3B or 4 is prevented).		--
	Maintenance of Class 3B product (access to emission of Class 4 is prevented).		N/A

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.2.2	Service		N/A
6.2.3	Removable laser system (laser system complies with requirements of Clauses 6 and 7).		N/A
6.3	Access panels and safety interlocks		---
6.3.1	Panel is intended to be removed during operation (or maintenance) and would give access to higher energy levels (see Table 13).		N/A
	Accessible emission (after removal of the panel) corresponds to product Class (designated by "X" in Table 13)		N/A
	Emission through the opening if interlocked panel of Class 1, 1C, 1M, 2, or 2M is removed (Emission < AEL of Class 1M or 2M).		N/A
	Emission through the opening if interlocked panel of Class 3R, 3B, or 4 is removed (Emission < AEL of Class 3R).		N/A
	Requirements regarding reasonably foreseeable single fault condition.		N/A
6.3.2	Override mechanism		N/A
	Behaviour of override in operation when the panel is replaced.		N/A
	Visible or audible warning for override mode.		N/A
6.4	Remote interlock connector		N/A
6.5	Manual reset		N/A
6.6	Key control		N/A
6.7	Laser radiation emission warning		---
6.7.1	Laser product is a 3R (λ<400 nm; λ>700 nm), 1C, 3B or 4 laser systems.		--
6.7.2	Audible or visible warning.		N/A
	Warning is failsafe or redundant.		N/A
	Viewing of the visible warning does not require exposure to emissions > AEL for Class 1M and 2M.		N/A
6.7.3	Operational control and laser aperture are provided with a warning device when they are separated more than 2 m from warning device.		N/A
6.7.4	Visible indication of output aperture if laser emission may be distributed through more than one output.		N/A
6.7.5	Switch for handheld Class 3R device must be depressed for emission (in lieu of emission indicator).		--

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.8	Beam stop or attenuator		N/A
6.9	Controls		--
6.10	Viewing optics		N/A
	a) Human access to laser radiation in excess of Class 1M prevented when the shutter is opened or attenuation varied.		N/A
	b) Opening of the shutter or variation of the attenuation prevented when exposure to laser radiation in excess of Class 1M is possible.		N/A
6.11	Scanning safeguard		N/A
6.12	Safeguard for Class 1C products		N/A
	a) Human access to laser radiation in excess of AEL for Class 1 measured under Condition 3 is prevented.		N/A
	b) Human access to laser radiation in excess of AEL for Class 3B measured through 3,5 mm aperture at 5 mm distance from applicator is prevented.		N/A
6.13	Walk-in access		N/A
	a) Means provided so that any person inside the housing can prevent activation of Class 3B or 4 laser hazards.		N/A
	b) A warning device provides adequate warning of emission to any person within the housing.		N/A
	c) Where “walk-in” access during operation is intended or reasonably foreseeable, emission of laser radiation that is equivalent to Class 3B or 4 while someone is present inside the enclosure of Class 1, Class 2 or Class 3R product is prevented by engineering means.		N/A
6.14	Environmental conditions		---
	- climatic conditions		--
	- vibration and shock		--
6.15	Protection against other hazards		---
6.15.1	Non-optical hazards (product safety standard)		N/A
	- electrical hazards;		N/A
	- excessive temperature;		N/A
	- spread of fire from the equipment;		N/A
	- sound and ultrasonics;		N/A
	- harmful substances;		N/A
	- explosion;		N/A

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.15.2	Collateral radiation		N/A
6.16	Power limiting circuit		N/A

7	LABELLING		
7.1	General		---
	Labels durable, permanently affixed		P
	Labels clearly visible		P
	Reading of labels is possible without exposure to laser radiation in excess of AEL for Class 1.		P
	Colour combination		P
	Labelling impractical due to the size or design of the product.	Affix to product	N/A
	Warning label – Hazard symbol (Figure 3)		P
7.2 - 7.7	Text on explanatory label or pictogram (laser class, warning text)	Class 2 laser product	P
7.8	Aperture label		P
7.9	Radiation output and standards information		---
	Max output of laser radiation ..... :	1mW	P
	Pulse duration ..... :		N/A
	Emitted wavelength(s) ..... :	630-680nm	P
	Name and publication date of the standard..... :		P
7.10	Labels for access panels		---
7.10.1 a) – f)	Labels for panels - warning wording used ..... :		N/A
7.10.2	Labels for safety interlocked panels - Warning wording used ..... :		N/A
7.11	Warning for invisible laser radiation ..... :		N/A
7.12	Warning for visible laser radiation ..... :		P
7.13	Warning for potential hazard to the skin or anterior parts of the eye - warning wording used ..... :	Not exceed AEL of class 3B	N/A

8	OTHER INFORMATIONAL REQUIREMENTS		
8.1	Information for the user		---
	a) adequate instructions for assembly, maintenance and safe use and description of the classification limitations, if appropriate.		N/A
	b) additional warning for Class 1M and 2M		N/A

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) laser beam parameters for radiation above the AEL of Class 1		---
	• Wavelength ..... :		P
	• Beam divergence ..... :		N/A
	• Pulse pattern ..... : (pulse duration, repetition rate, …)		N/A
	• Maximum power or energy output ..... :	1mW	P
	d) safety instruction for embedded laser products and other incorporated laser products.		N/A
	e) MPE and NOHD for Class 3B and 4 laser products; For collimated beam Class 1M and 2M lasers the extended NOHD (ENOHD).		N/A
	f) information for the selection of eye protection.		N/A
	g) reproduction of all required labels and warnings.		N/A
	h) location of laser apertures		P
	i) list of controls, adjustments of procedures for operation and maintenance - and warning statement.		N/A
	j) information (compatibility requirements) about laser energy source if not incorporated.		N/A
	k) additional warning for Class 1, 1M, 2, 2M, and 3R regarding skin or corneal burns.		N/A
	l) Information for Class 1C products (e.g. warning that repeated application may pose a risk).		N/A
8.2	Purchasing and service information		P
	a) safety classification of each laser product stated in all descriptive material (e.g. brochures).		P
	b) adequate instructions for servicing available: • warnings and precautions regarding exposure of laser emission above Class 1 • maintenance schedule • list of controls and procedures that could increase accessible emissions • description of displaceable parts • protective procedures for service personnel • reproduction of labels and hazard warnings		N/A

9	ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS	
9.1	Applicable other parts of the standard series IEC60825	---

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
	IEC 60825-2 (Safety of optical communication systems)		N/A
	IEC 60825-4 (Laser guards)		N/A
	IEC 60825-12 (Safety of free space optical communication systems used for transmission of information)		N/A
9.2	Medical laser products: Class 3B and Class 4 medical laser products comply with IEC 60601-2-22		N/A
9.3	Laser processing machines: Comply with IEC/ISO 11553 series.		N/A
9.4	Electric toys: Comply with IEC 62115		N/A
9.5	Consumer electronic products: Comply with IEC 60950 (IT-equipment) or IEC 60065 (AV equipment)		N/A

Data :

For Condition 1:

Laser type	Red Laser Light
Measurement distance	2000 mm
Wavelength	651 nm
Measured maximum emission power / energy on normal condition	9.21×10^{-4} W
Measured maximum emission power / energy on fault condition (Q4 short circuit)	9.67×10^{-4} W

For Condition 3:

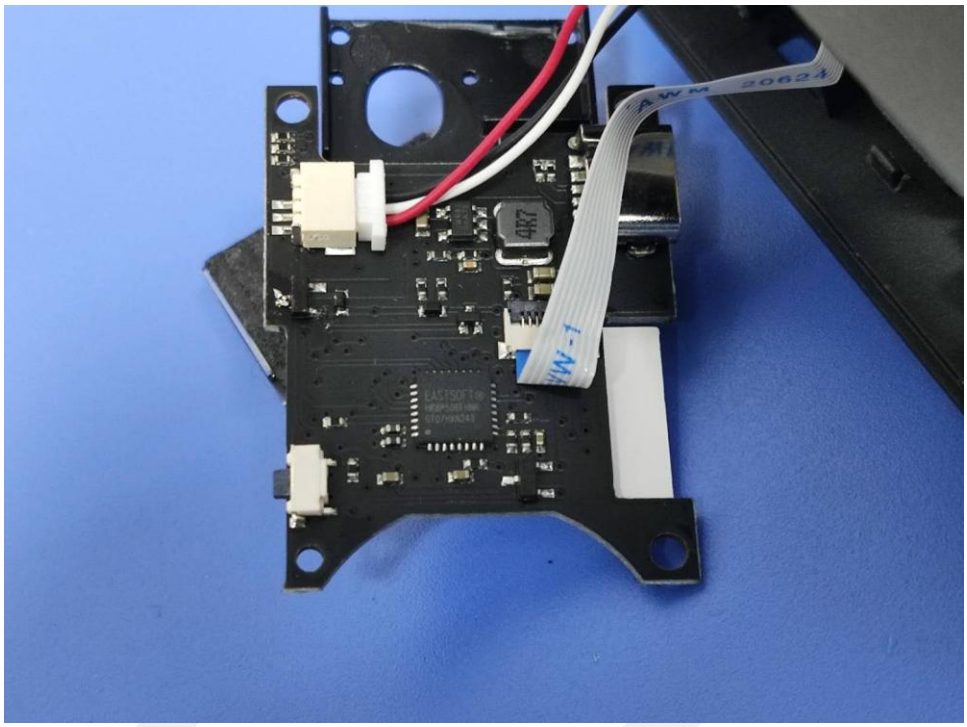
Laser type	Red Laser Light
Measurement distance	100 mm
Wavelength	651 nm
Measured maximum emission power / energy on normal condition	9.34×10^{-4} W
Measured maximum emission power / energy on fault condition (Q4 short circuit)	9.80×10^{-4} W

Summary:
1. Calculated accessible emission limit of Class 2 is 1 mW. The product is Class 2.

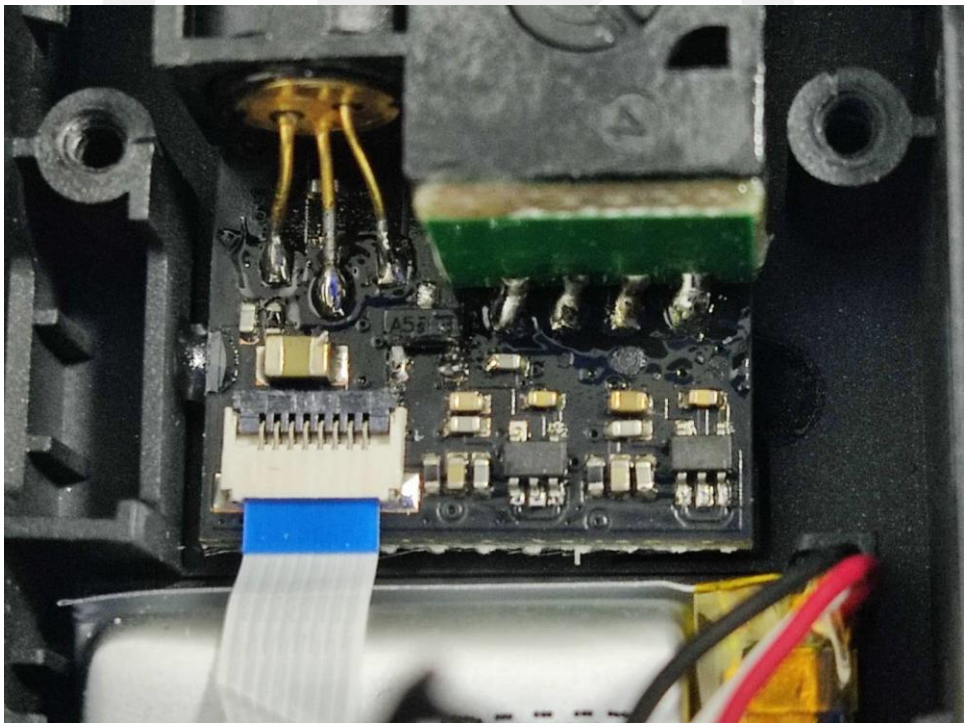
Photo:

Overview

Overview



Internal view 1



Internal view 2

*** End of Report ***

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