

## SAFETY TEST REPORT

On Product Name: Optical module


Prepared for: SHENZHEN YOUTHTON TECHNOLOGY CO.,  
LTD.


Trade Mark:



According to  
IEC 60825-1:2014  
*Safety of laser products — Part 1: Equipment classification and requirements*

Test Report #.....: SHA-1903-11980-IEC

Prepared by.....: Henry Zhang   
(Printed & signature)

Reviewed by.....: Shally Peng   
(Printed & signature)

Approved by .....: Swall Zhang  
(Printed & signature)

Released Date.....: March 18<sup>th</sup>, 2019

# *Table of Contents*

---

<i>COPY OF THE MARKING PLATE AND WARNING LABELS:.....</i>	<i>5</i>
<i>CLASSIFICATION PRINCIPLES .....</i>	<i>6</i>
<i>DETERMINATION OF THE ACCESSIBLE EMISSION LEVEL AND PRODUCT CLASSIFICATION _</i>	<i>6</i>
<i>ENGINEERING SPECIFICATIONS .....</i>	<i>7</i>
<i>LABELING .....</i>	<i>10</i>
<i>OTHER INFORMATIONAL REQUIREMENTS .....</i>	<i>11</i>
<i>ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS .....</i>	<i>11</i>
<i>EQUIPMENT MANUFACTURE INFORMATION (DATA SHEET) ABOUT THE CONTAINING LASER</i>	
<i>COMPONENT/S: .....</i>	<i>12</i>
<i>ATTACHMENT 1 - TEST RECORD .....</i>	<i>13</i>
<i>ATTACHMENT 2 -PHOTO.....</i>	<i>14</i>

### **Disclaimer Notice**

*When government drawing, specification, or other data are used for any purpose other than in connection with a definitely related government procurement operation, China Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawing, specifications, or other data, is not to be regarded by implication or otherwise in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell patented invention that may in any way be related thereto. This report must not be used to claim product endorsement by CNAS or any agency of the China.*

### **Reproduction Clause**


*Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from ECMG Electronic Technical Testing Corp.(Shenzhen).*

### **Opinions and Interpretations**

*This test report relates to the above mentioned equipment under test (EUT). Without the permission of ECMG Electronic Technical Testing Corp.(Shenzhen) this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.*

### **Statement of Measurement Uncertainty**

*The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.*

<b>TEST REPORT</b> <b>IEC 60825-1</b> <b>Safety of laser products</b> <b>Part 1: Equipment classification and requirements</b>	
<b>Administrative Data</b>	
Report Reference No. ....	SHE-1903-11981-LVD
Testing Laboratory.....	ECMG Electronic Technical Testing Corp.(Shenzhen)
Address .....	Room 305-306,3F,Building A,No.30 Hangkong Road(East), Sanwei Village, xi'xiang Town, Bao'an District, Shenzhen, China
Testing location/procedure.....	ECMG Electronic Technical Testing Corp.(Shenzhen)
Address .....	Room 305-306,3F,Building A,No.30 Hangkong Road(East), Sanwei Village, xi'xiang Town, Bao'an District, Shenzhen, China
<b>Applicant's name</b> .....	SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.
Address .....	F4, JINMA BUILDING, JINMA INDUSTRIAL PARK, SHIHUAN ROAD NO.4, SHIYAN STREET, BAOAN DISTRICT, SHENZHEN, CHINA
<b>Test Specification</b> .....	
Standard.....	IEC 60825-1:2014
Test procedure .....	IEC
Non-standard test method .....	N/A
<b>Test item description</b>	: Optical module
Trademark	: 
Model and/or type reference	: Yxxxx-xxxxxx
Main model tested:	YSP12-B5310
Rating(s)	: Vcc: 3.3V, Icc:300mA

<b>Test item particulars:</b>	
Equipment mobility.....	: Transportable
Insulation Class of equipment.....	: Class III
Mass of equipment (kg) .....	: <1kg
<b>Classification of the laser product:</b>	
Laser and/or LED product class for which the equipment is assigned .....	: Class 1
Laser and/or LED product class of the equipment .....	: Class 1
Laser and/or LED product class of the embedded laser/LED .....	: Class 1
<b>Test case verdicts:</b>	
Test case does not apply to the test object ....	: N(/A)
Test item does meet the requirement .....	: P(ass)
Test item does not meet the requirement .....	: F(ail)
<b>Testing:</b>	
Date of receipt of test item .....	: March 8 <sup>th</sup> , 2019
Date(s) of performance of test .....	: March 11 <sup>th</sup> , 2019
<b>General Remarks:</b>	
This report shall not be reproduced except in full without the written approval of the testing laboratory.	
The test results presented in this report relate only to the item(s) tested.	
Clause numbers between brackets refer to clauses in IEC 60825-1.	
"(see remark #)" refers to a remark appended to the report.	
"(see Annex #)" refers to an annex appended to the report.	
Throughout this report a comma is used as the decimal separator.	

**Product Description:**

The product is the SFP transceivers with high performance, cost effective modules supporting data-rate of 1.25Gbps and 10km transmission distance with SMF.  
 The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA and SFF-8472.  
 Laser wavelength: 1270-1610nm.

The application model “Yxxxx-xxxxx” is a series model, and the naming rules for the model are as follows. There are the same function, same laser tube and the same inner structure, but different function/ports, media/interface, application scenario and connector, which not affect laser power.

**SFP Transceiver**

Abbreviation	Speed	Application	Media/Interface	scenario	Notice
xx	xx	x	xx	xx	x

Abbreviation	Symbol	Symbol	Symbol	Symbol	Symbol
SP:SFP	01:155Mbps	C:CWDM	85	M1:1	T:industry-temp
XP:XFP	06:622Mbps	D:DWDM	27~61	03:300	E:extention temp
QS:QSFP+ /QSFP28	12:1.25Gbps	B:BIDI		05:550	blank:Commercial temperature
	24:2.5Gbps	blank: dual sfp		2L:2k	
	32:3Gbps			10:10k	
	42:4.25Gbps			20:20k	
	85:8Gbps			40:40k	
	96:10Gbps			80:80k	
	40:40Gbps			1A:100k	

**Summary of Testing:**

The product complies with Class 1 Laser Product Limit.

**Copy of the Marking Plate and Warning Labels:**

**Optical module**

Model: YSP12-B5310

SHENZHEN YOUTHTON TECHNOLOGY CO., LTD

F4, JINMA BUILDING, JINMA INDUSTRIAL PARK, SHIHUAN ROAD NO.4,

SHIYAN STREET, BAOAN DISTRICT, SHENZHEN, CHINA

CLASS I LASER PRODUCT

COMPLIES WITH DHHS RULES 21 CFR CHAPTER I SUBCHAPTER J

Manufactured date: March 2019 Series No.: 19030600001 made in: CHINA

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
<b>4</b>	<b>CLASSIFICATION PRINCIPLES</b>		<b>P</b>
4.3	Classification rules		P
4.3a	Radiation of a single wavelength		P
4.3b	Radiation of multiple wavelengths		N
	1)Laser product emits at two or more wavelengths		N
	2)Laser product emits at two or more wavelengths		N
4.3c	Radiation from extended sources (see 5.4.3)		N
4.3d	Non-uniform, non-circular or multiple apparent source		N
4.3e	Time base used.....:		P
	1)0.25s		P
	2)100s		P
	3)30000s		P
	Calculations and limits:		P
4.3f	Repetitively pulsed or modulated lasers	Continuous wave	N
	Calculations and limits:		N
	AEL for continued operation used.....:		N
	Total-on-time-pulse (TOTP) method used.....:		N
4.4	Laser products designed to function as conventional lamps.		N
	$\alpha$ measured at 200 mm distance from closest point of human access ( $\alpha > 5$ mrad).		N
	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
	Evaluation of emission according to IEC 62471 series (optional): Standard applied (IEC 62471 series).....: Risk Group.....: Labeling.....: Classification of product based on accessible laser radiation (if no laser radiation accessible: Class 1).		N
<b>5</b>	<b>DETERMINATION OF THE ACCESSIBLE EMISSION LEVEL AND PRODUCT CLASSIFICATION</b>		<b>P</b>
5.1	Tests	See Attachment 1	P

Test Report #: SHE-1903-11980-IEC

Prepared for SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.

Prepared by ECMG Electronic Technical Testing Corp. (Shenzhen)

Page 6 of 14



IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
	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	See Attachment 1	P
5.4.1	General		--
5.4.2	Default (simplified) evaluation		P
	Conditions applied	Condition 3	P
	a) Aperture diameter (mm) .....	7 mm	P
	b) Measurement distance (mm) ..... : (for each condition)	100 mm	P
5.4.3	Evaluation condition for extended sources		N
	Conditions applied .....		N
	Most restrictive position..... : (distance from reference point)		N
	Angular subtense of the apparent source $\alpha$ and $C_6$ .....		N
5.4.3a	Aperture diameters (for each condition) .....		N
5.4.3b	Angle of acceptance (for each condition) .....		N
<p>Measured accessible laser radiation and comparison with AEL:  Measured at normal condition: 0.4nW max  Measured at single fault condition: 1.5nW max.  Class 1 emission limit 390 uW  Calculation of the Class 2 Laser point emission limit :  For Retinal thermal hazard ( extended sources )  AEL : <math>C_6 10^{-3} W = 1 mW</math>  <math>C_6 = 1</math> for <math>\alpha &lt; \alpha_{min}</math>  The product is judged as Class 1 Laser Product.</p>			
<b>6</b>	<b>ENGINEERING SPECIFICATIONS</b>		<b>P</b>
6.1	General remarks		P
6.1.1	Modification	No modification.	N
6.2	Protective housing		P
6.2.1	General	The product's protective housing contains all laser radiation during operation	P

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.2.2	Service	Removal or displacement of parts of the housing requires the use of tools.	P
6.2.3	Removable laser system	No removable laser system.	N
6.3	Access panels and safety interlocks		N
6.3.1	Access panels of protective housing		N
	Product Class .....	Class 3R	N
	Accessible emission during removal of access panel.....	Access panel not intended to be removed during maintenance or operation.	N
	Access panel/s intended to be removed during maintenance or operation		N
	Removal of the panel/s gives access to laser radiation levels designated by “X” in the table	Class 3R	N
	Accessible emissions after removal .....	Class 3R	—
6.3.2	Deliberate override mechanism	Not provided	N
6.4	Remote interlock connector		N
6.5	Manual reset		N
6.6	Key control		N
6.7	Laser radiation emission warning		N
6.7.1	Laser product is a 3R ( $\lambda < 400$ nm; $\lambda > 700$ nm), 1C, 3B or 4 laser systems.		N
6.7.2	Audible or visible warning	Not a Class 3R, 1C, 3B or Class 4 laser product	N
	Warning is failsafe or redundant.		N
	Viewing of the visible warning does not require exposure to emissions > AEL for Class 1M and 2M.		N
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
6.7.4	Visible indication of output aperture if laser emission may be distributed through more than one output.		N
6.7.5	Switch for handheld Class 3R device must be depressed for emission (in lieu of emission indicator).		N
6.8	Beam stop or attenuation	Not a Class 3B or Class 4 laser product	N
6.9	Controls	Not exposed to laser radiation of Class 3R, 3B or 4	N

**Test Report #: SHE-1903-11980-IEC**

**Prepared for SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.**

**Prepared by ECMG Electronic Technical Testing Corp. (Shenzhen)**

**Page 8 of 14**

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.10	Viewing optics	No viewing optics provided.	N
	a) human access to laser radiation in excess of Class 1M prevented when the shutter is opened or attenuation varied		N
	b) opening of the shutter or variation of the attenuation prevented when exposure to laser radiation in excess of Class 1M is possible		N
6.11	Scanning safeguard	Scanned radiation not present.	N
6.12	Safeguard for Class 1C products		N
	a) Human access to laser radiation in excess of AEL for Class 1 measured under Condition 3 is prevented.		N
	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
6.13	Walk-in access		N
	a). Means provided so that any person inside the housing can prevent activation of a Class 3B or 4 laser hazard		N
	b). A warning device providing adequate warning of emission to any person within the housing		N
	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
6.14	Environmental conditions		P
	- climatic conditions	No degradation in the declared operating environment	P
	- vibration and shock	This report covers laser radiation hazards only.	N
6.15	Protection against other hazards		P
6.15.1	Non-optical hazards	See below	P
	- electrical hazards;	SELV circuit used	P
	- excessive temperature;	No excessive temperature hazard.	P
	- spread of fire from the equipment;		P
	- sound and ultrasonic;		N

**Test Report #: SHE-1903-11980-IEC**

**Prepared for SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.**

**Prepared by ECMG Electronic Technical Testing Corp. (Shenzhen)**

**Page 9 of 14**

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
	- harmful substances;		N
	- explosion;		N
6.15.2	Collateral radiation		P
6.16	Power limiting circuit		P
<b>7</b>	<b>LABELING</b>		<b>P</b>
7.1	General	All required labels are permanently fixed, legible, and clearly visible during operation, and maintenance, or service, according to their purpose.	P
	laser product class :	1	P
7.2	Class 1 explanatory label provided on the product	Provided on the enclosure of the product	P
	Optional: Class 1 explanatory label provided in the user manual		N
	Class 1M explanatory label provided on the product		N
	Optional: Class 1M explanatory label provided in the user manual		N
7.3	Class 2 explanatory and warning label		N
7.4	Class 2M explanatory and warning label		N
7.5	Class 3R explanatory and warning label		N
7.6	Class 3B explanatory and warning label		N
7.7	Class 4 explanatory and warning label		N
7.8	Aperture label .....	Class 1 product	N
7.9	Radiation output and standards information		N
	Maximum output of laser radiation .....		—
	Pulse duration .....		—
	Emitted wavelength(s) .....		P
	The name and publication date of the standard ..		P
7.10	Labels for access panels		N
	RADIATION CLASS .....	Class 1	N
7.10.1	Labels for panels		N
	Warning used .....		—
7.10.2	Labels for safety interlocked panels		N
	Warning used .....		—

**Test Report #: SHE-1903-11980-IEC**

**Prepared for SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.**

**Prepared by ECMG Electronic Technical Testing Corp. (Shenzhen)**

**Page 10 of 14**

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
7.11	Warning for invisible laser radiation .....	Class 1	N
7.12	Warning for visible laser radiation .....	Class 1	N
7.13	Warning for potential hazard to the skin or anterior parts of the eye - warning wording used :		N
<b>8</b>	<b>OTHER INFORMATIONAL REQUIREMENTS</b>		<b>P</b>
8.1	Information for the user	The required information is included in the User's Manuals.	P
	a) adequate instructions for proper assembly, maintenance and safe use		N
	b) warning for Class 1M and 2M	Class 1 Laser product	N
	c) laser beam parameters		P
	d) safety instruction for embedded laser products and other incorporated laser products.		N
	e) MPE and NOHD for Class 3B and 4 laser products; For collimated beam Class 1M and 2M lasers the extended NOHD (ENOHD).		N
	f) information for the selection of eye protection.		N
	g) reproduction of all required labels and warnings.		P
	i) list of controls, adjustments of procedures for operation and maintenance - and warning statement.		P
	j) information (compatibility requirements) about laser energy source if not incorporated.		N
	k) additional warning for Class 1, 1M, 2, 2M, and 3R regarding skin or corneal burns.		N
	l) Information for Class 1C products (e.g. warning that repeated application may pose a risk).		N
8.2	Purchasing and service information		P
	a). Safety classification of each laser product stated in descriptive material	Provided.	P
	b). Adequate instructions for servicing available	Adequate instructions are provided upon request.	P
<b>9</b>	<b>ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS</b>		<b>N</b>
9.1	Applicable other parts of the standard series IEC60825		--
	IEC 60825-2 (Safety of optical communication systems)	No applicable additional standards	N
	IEC 60825-4 (Laser guards)		N
	IEC 60825-12 (Safety of free space optical communication systems used for transmission of information)		N

Test Report #: SHE-1903-11980-IEC

Prepared for SHENZHEN YOUTHTON TECHNOLOGY CO., LTD.

Prepared by ECMG Electronic Technical Testing Corp. (Shenzhen)

Page 11 of 14

IEC 60825-1			
Clause	Requirement – Test	Result – Remark	Verdict
9.2	Medical laser products	Not a medical laser product.	N
	Class 3B and Class 4 medical laser products comply with EN 60601-2-22	Not a medical laser product.	N
	Medical laser products provided with instructions for calibration of measurement system	Not a medical laser product.	N
9.2	Laser processing machines: Comply with IEC/ISO 11553 series.		N
9.4	Electric toys: Comply with IEC 62115		N
9.5	Consumer electronic products: Comply with IEC 60950 (IT-equipment) or IEC 60065 (AV equipment)		N

Appended table	EQUIPMENT MANUFACTURE INFORMATION (DATA SHEET) ABOUT THE CONTAINING LASER COMPONENT/S:		P
	Manufacturer .....	Shenzhen source doing co., ltd	P
	Type designation .....	SD-B34321S	P
	Structure .....		N
	Wavelength .....	1270-1610nm	P
	Output power (min. and max.) .....	0.4nm-1.5nm	P
	Radiation is		—
	Continuous .....		—
	Pulsed .....		—
	Pulse time .....		—
	Pulse repetition frequency .....		—
	Others .....		—

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

## ATTACHMENT 1 - TEST RECORD

Laser marking instrument:

For Model: YSP12-B5310

Laser wavelength: 1270-1610nm

Operating voltage: Vcc: 3.3V

Operating current: Icc: 300mA

Output optical power: <390 uW

Optical spot diameter at 10m: <20mm

Test Results	Measured max. power radiation
Normal condition	0.4nm
Fault condition	1.5nm

## ATTACHMENT 2 –PHOTO

Model: YSP12-B5310

