TEST REPORT
EN 60825-1
Part 1: Equipment classification and requirements

Report Number.....:	ZHT-231220022S
Date of issue.....:	Dec. 27, 2023
Total number of pages.....:	17
Testing Laboratory.....:	**Guangdong Zhonghan Testing Technology Co., Ltd.**
Address.....:	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	**Hubei YJT Technology Co.,Ltd.**
Address.....:	Room 1-4, Floor 8, Building 7, Guannan Fuxing Pharmacel Park, No.58, Optics Valley Avenue, East Lake High-tech Development Zone, Wuhan, China (Free Trade Zone,wuhan area)
Test specification	
Standard.....:	EN 60825-1:2014+A11:2021
Test procedure .....:	CE-LVD
Non-standard test method .....:	N/A
Test Report Form	
Test Report Form No.....:	IEC60825_1D
Test Report Form(s) Originator.....:	ZHT
Master TRF.....:	Dated 2022
Test item description.....:	Laser Cap
Trademark.....:	/
Manufacturer.....:	**Hubei YJT Technology Co.,Ltd.**
Address.....:	Room 1-4, Floor 8, Building 7, Guannan Fuxing Pharmacel Park, No.58, Optics Valley Avenue, East Lake High-tech Development Zone, Wuhan, China (Free Trade Zone,wuhan area)
Model/Type reference.....:	Hat-01 Hat-02, Hat-03, Hat-04, Hat-05
Ratings.....:	Class 3B

Testing procedure and testing location:

Testing Laboratory.....:	Guangdong Zhonghan Testing Technology Co., Ltd.
Address..... :	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Date of Test.....:	Dec. 20, 2023 - Dec. 26, 2023
Tested by (name + signature)..... :	Laney Xie
Reviewed by (name + signature).....:	Summer yang
Approved by(name + signature).....:	Levi Lee

List of Attachments (including a total number of pages in each attachment):

-- Attachment I : 6 pages for Photo documentation.

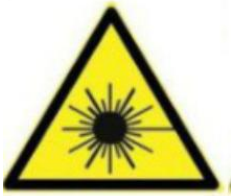
Summary of testing:

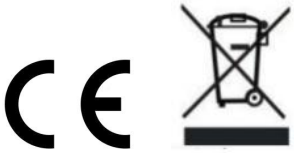
Tests performed (name of test and test clause):	**Testing location:**
-- EN 60825-1:2014+A11:2021 The submitted samples were found to comply with the requirements of above specification.	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Copy of marking plate

The artwork below may be only a draft.

Laser Cap
Model: Hat-01



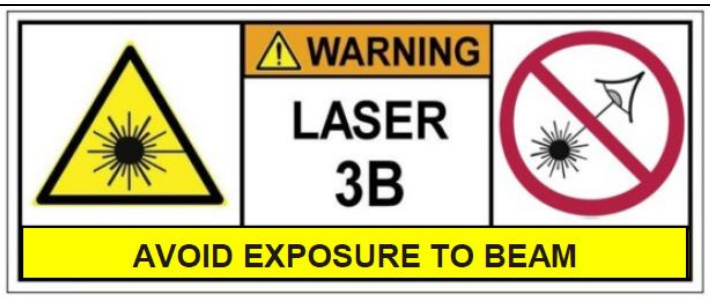


Ningbo Yinzhou Juguang Electronice co.,LTD
Room 1-4, Floor 8, Building 7, Guannan Fuxing Pharmacel Park, No.58, Optics Valley Avenue, East Lake High-tech Development Zone, Wuhan, China (Free Trade Zone,wuhan area)
Made In China

Laser Level
Wavelength: 650nm, Power: 264.24mW
MAXIMUM OUTPUT: < 500 mW.

Remark on above marking:

Class 3B laser product shall have affixed a warning label and an explanatory label. See above. Alternatively, the label may be affixed to the product:


WARNING
LASER
3B
AVOID EXPOSURE TO BEAM

Possible test case verdicts:	
- test case does not apply to the test object.....:	N
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item.....:	Dec. 20, 2023
Date (s) of performance of tests.....:	Dec. 20, 2023 –Dec. 26, 2023

General remarks:

"(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.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

General product information:

1, The equipment is a Laser Cap for general use.
2, All models are same as Hat-01 except model name , all tests are carried out on Hat-01.

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Clause	Requirement + Test	Result - Remark	Verdict
4	**ENGINEERING SPECIFICATIONS**		**P**
4.1	General remarks		P
	Modification		N
4.2	Protective housing		P
4.2.1	General	Class 3B Laser Product	P
4.2.2	Service		P
4.2.3	Removable laser system		P
4.3	Access panels and safety interlocks		P
4.3.1	Access panels of protective housing		P
	Product Class .....:	Class 3B Laser Product	—
	Accessible emission during removal of access panel .....:		P
	The removal of the panel gives access to laser radiation levels designated by “X” in the table		P
	Accessible emissions after removal ..... :		—
4.3.2	Deliberate override mechanism		N
4.4	Remote interlock connector		P
4.5	Manual reset		N
4.6	Key control		P
4.7	Laser radiation emission warning		P
4.7.1	Class 3R (λ<400 nm; λ>700 nm), 3B and 4		P
4.7.2	Audible or visible warning		P
4.7.3	Operational control and laser aperture		P
4.7.4	Laser emission distributed through more than one output		N
4.8	Beam stop or attenuation		P
4.9	Controls		P
4.10	Viewing optics		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
4.11	Scanning safeguard		N
4.12	Walk-in access		N

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Clause	Requirement + Test	Result - Remark	Verdict
	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 provides 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 Class 4 while someone is present inside the enclosure of Class 1, Class 2 or Class 3R product shall be prevented by engineering means		N
4.13	Environmental conditions		P
	- climatic conditions		P
	- vibration and shock		P
4.14	Protection against other hazards		P
4.14.1	Non-optical hazards (product safety standard)		P
	- electrical hazards;		P
	- excessive temperature;		P
	- spread of fire from the equipment;		P
	- sound and ultrasonic;		P
	- harmful substances;		P
	- explosion;		P
4.14.2	Collateral radiation		N

5	**LABELLING**		**P**
5.1	General		P
	LASER PRODUCT CLASS ..... :		—
	Labelling location (Product / User instruction / Package)		P
	Warning label – Hazard symbol (Figure 1)		P
	Explanatory label (Figure 2)		P
5.2-5.6	Text on explanatory label ..... :		P
5.7	Aperture label		P
5.8	Radiation output and standards information		P
	Max output of laser radiation ..... :	See label	—
	Pulse duration ..... :		—
	Emitted wavelength(s) ..... :	See label	—
	The name and publication date of the standard.... :		P
5.9	Labels for access panels		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.9.1 a) – f)	Warning wording used .....:		P
5.9.2	Labels for safety interlocked panels		P
	Warning wording used .....:		P
5.10	Warning for invisible laser radiation .....:		N
5.11	Warning for visible laser radiation .....:		P

6	**OTHER INFORMATIONAL REQUIREMENTS**		P
6.1	Information for the user		P
	a) adequate instructions for proper assembly, maintenance and safe use and description of the classification limitations, if appropriate		P
	b) warning for Class 1M and 2M		N
	c) laser beam parameters for radiation above the AEL of Class 1		N
	• Wavelength .....:		N
	• Beam divergence .....:		N
	• Pulse duration ..... :		N
	• Maximum power or energy output .....:		N
	d) embedded laser products and other incorporated laser products		N
	e) MPE and NOHD for Class 3B and Class 4 laser products For collimated beam Class 1M and 2M lasers the extended NOHD (ENOHD)		N
	f) information for the selection of eye protection		P
	g) reproduction of labels		N
	h) location of laser apertures		P
	i) listing of controls, adjustment of procedures and warning statement		N
	j) information about laser energy source if not incorporated in the manual		N
6.2	Purchasing and service information		P
	a) safety classification of each laser product stated in descriptive material		P
	b) adequate instructions for servicing available		P

7	**ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS**		P
7.1	Applicable other parts of the standard series IEC/EN 60825		N

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Clause	Requirement + Test	Result - Remark	Verdict
	IEC 60825-2 (Safety of optical communication systems)		N
	IEC 60825-4 (Laser guards)		N
	IEC 60825-12 (Safety of free space optical communication systems used for transmission of information)		N
	Further information may be found in:		N
	IEC/TR 60825-3 (Guidance for laser displays and shows)		—
	IEC/TR 60825-5 (Manufacturer's checklist for IEC 60825-1)		—
	IEC/TR 60825-8 (Guidelines for the safe use of laser beams on humans)		—
	IEC/TR 60825-9 (Compilation of maximum permissible exposure to incoherent optical radiation)		—
	IEC/TR 60825-10 (Application guidelines and explanatory notes to IEC 60825-1)		—
	IEC/TR 60825-13 (Measurements for classification of laser products)		—
	IEC/TR 60825-14 (A user's guide)		—
	IEC 62471 (CIE S 009) (Photobiological safety of lamps and lamp system)		—
7.2	Medical laser products		N
	Class 3B and Class 4 medical laser products comply with IEC 60601-2-22		N
7.3	Laser processing machines		N
	Comply with IEC/ISO 11553-1		N
7.4	Electric toys		N
	Comply with IEC 62115		N
7.5	Consumer electronic products		N
	Complying with IEC 60950 or IEC 60065		N
8	**CLASSIFICATION**		**P**
8.2	Classification responsibilities		P
8.3	Classification rules		P
8.3a	Radiation of a single wavelength		P
8.3b	Radiation of multiple wavelengths		N
	1) Laser product emission two or more wavelengths in spectral regions shown as additive in Table 5...:		N
	2) Laser product emission two or more wavelengths in spectral regions not shown as additive in Table 5 .....:		N

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Clause	Requirement + Test	Result - Remark	Verdict
8.3c	Radiation from extended sources..... :	No extended sources	N
	Value of angular subtense α (mrad).....:		N
8.3d	Non-uniform retinal image radiance profile, non-circular and multiple sources		N
8.3e	Time basis		N
	1) 0.25s		N
	2) 100s		N
	3) 30000s		N
8.3f	Repetitively pulsed or modulated lasers		N
	1) Exposure from any single pulse not exceeding the AEL for a single pulse		N
	2) Average power for a pulse train		N
	3a) Constant pulse energy and pulse duration		N
	3b) Varying pulse widths or varying pulse durations		N
9	**DETERMINATION OF ACCESSIBLE EMISSION LEVELS**		**P**
9.1	Tests		P
	Single fault eliminated	Test at single fault condition	P
	Housing material withstanding degradation		N
	Fault detection		N
9.2	Measurement conditions ..... :		P
	Measured laser radiation .....:	See table “measured laser radiation, calculations and comparison with AEL limits”	P
9.3	Measurement geometry		P
9.3.1	General, evaluation scheme		—
	a) Simplified (default) method		P
	b) Increased AEL by parameter C_6		
9.3.2	Default (simplified) evaluation		P
	Condition applied .....:		P
	Aperture stop diameter (mm) .....:		P
	Measurement distance (mm).....:		P
9.3.3	Extended sources		N
	C_6 .....:		N
9.3.3a	Aperture diameters		N
	Condition applied .....:		N
	Aperture stop diameter (mm).....:		N
	Angular subtense of the apparent source α ..... :		N

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Clause	Requirement + Test	Result - Remark	Verdict
9.3.3b	Angle of acceptance		N
	Condition applied .....:		N
	1) Photochemical retinal limits.....:		N
	Angel of acceptance.....:		N
	2) All other retinal limits.....:		N
	Angel of acceptance.....:		N

	MEASUREMENT EQUIPMENT		P
	Type of equipment.....:	Optical Power Meter	—
	Manufacturer .....:	AT LASER TECHNOLOGY COMPANY	—
	Type designation .....:	Laser Projector	—
	Others .....:	Last cal. date: 2023-04-20 Next cal. date: 2024-04-19	—

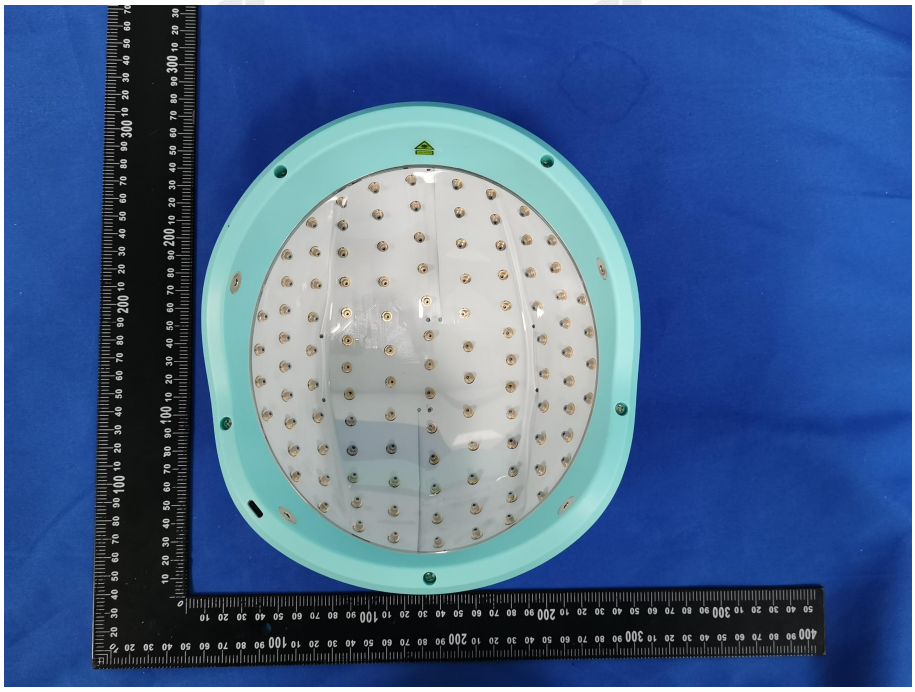
Measured laser radiation, calculations and comparison with limits:				
Wavelength	650nm	Time base t	>0.25s	—
Class	3B	Beam shape	Collimated	—
Ambient temperature	24.3℃	Measurement	Normal condition 3	—
Measurement Condition	Condition 3	Measurement radiant power /energy	264.24 mW	—
Measured power and calculated limit :	Thermal hazard<500 mW			—
Conclusion: the test subject was classified as “Class 3B Laser product”.				

ANNEX A:

Photo-documentation

EUT Photo 1

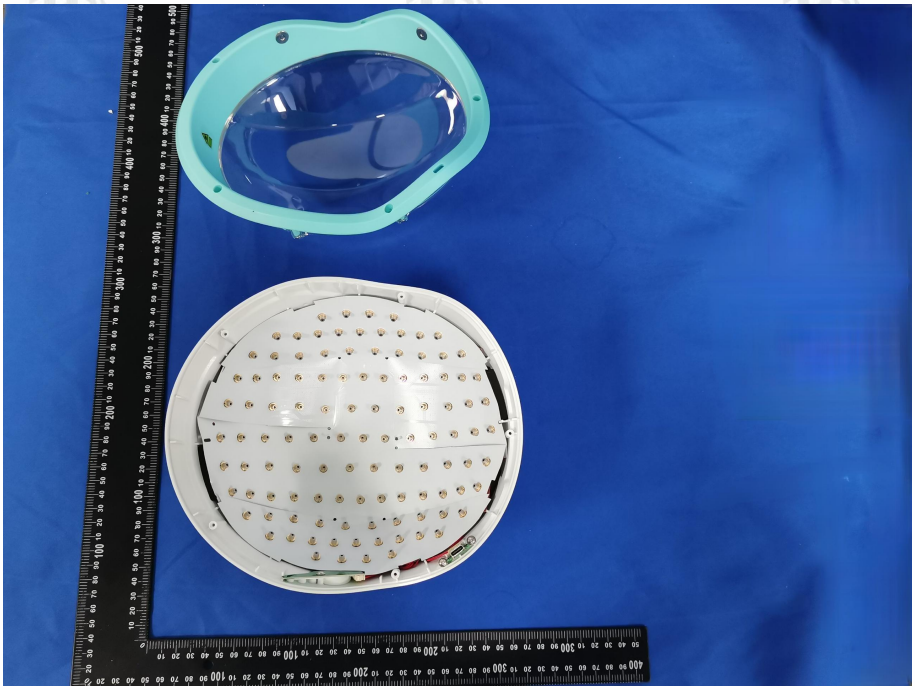
EUT Photo 2



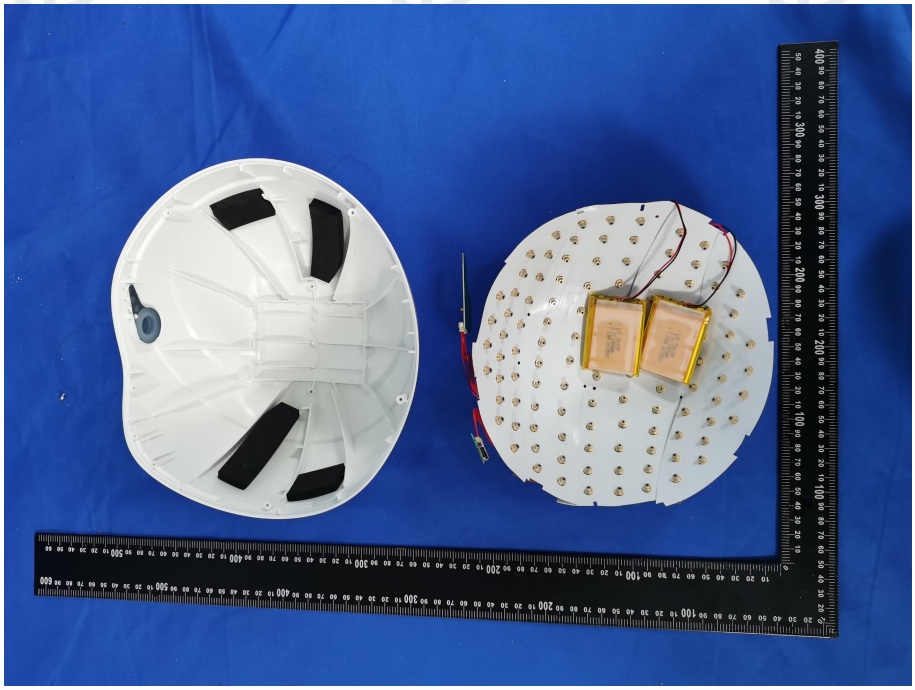
EUT Photo 3

EUT Photo 4

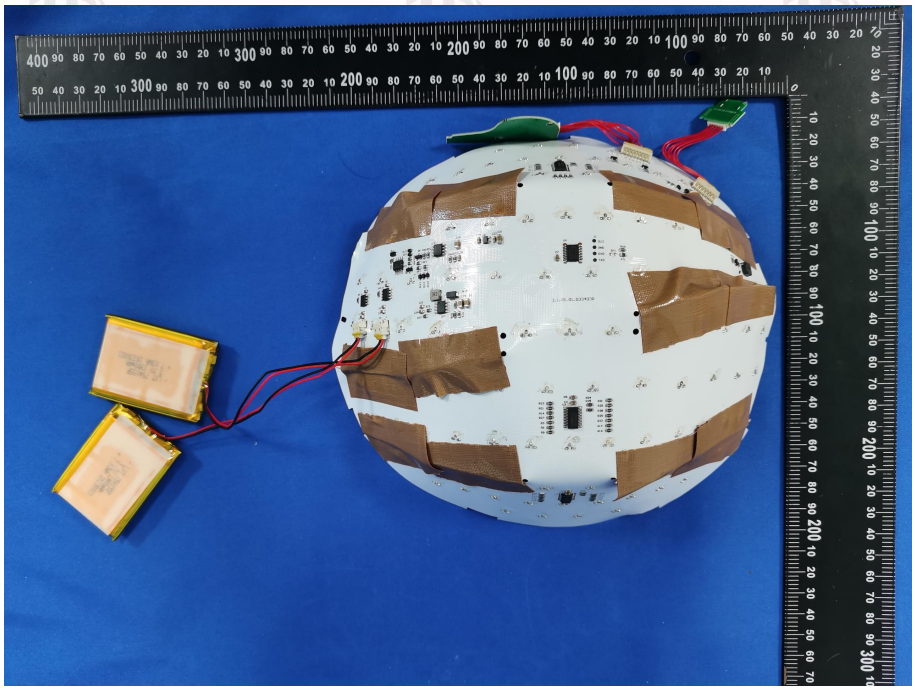
EUT Photo 5



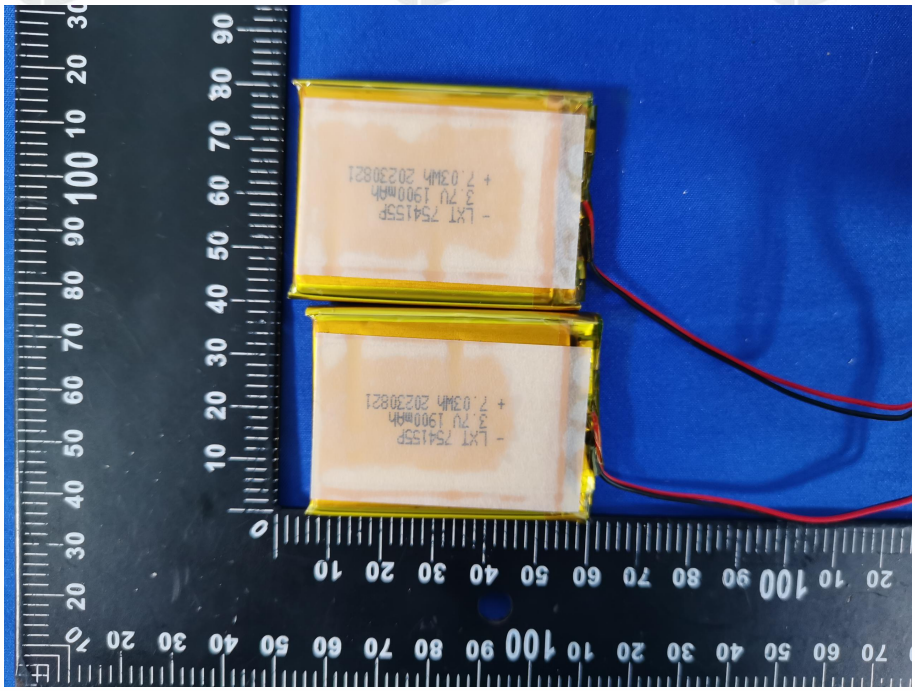
EUT Photo 6



EUT Photo 7

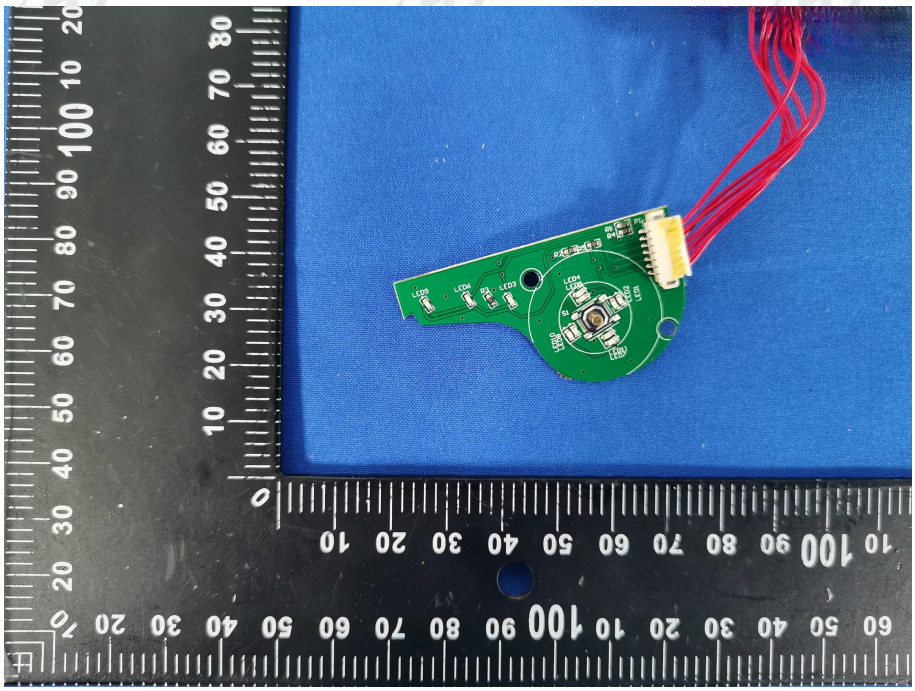


EUT Photo 8

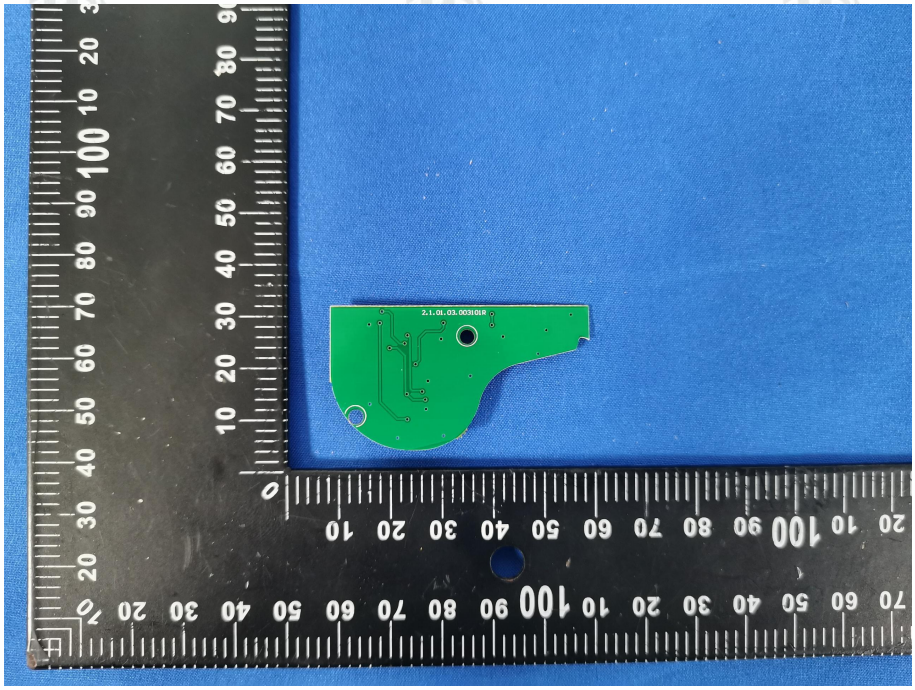


EUT Photo 9

EUT Photo 10



EUT Photo 11



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