



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

**Report Number.** .....: 68.184.21.1364.01  
**Date of issue** .....: 2021-12-07  
**Total number of pages** .....: 17 (including attachments)

**Name of Testing Laboratory preparing the Report** .....: TÜV SÜD Certification and Testing (China) Co., Ltd.  
 Shenzhen Branch

**Applicant's name** .....: Dongguan Olight E-Commerce Technology Co., Ltd  
**Address** .....: 4th Floor Building 4 Kegou Industrial Park No6 Zhongnan Road,  
 Changan Town, Dongguan City ,Guangdong, China

**Test specification:**

**Standard** .....: IEC 60825-1:2014  
**Test procedure** .....: CB Scheme  
**Non-standard test method** .....: N/A

**TRF template used** .....: IECEE OD-2020-F1:2021, Ed.1.4

**Test Report Form No.** .....: IEC60825\_1G

**Test Report Form(s) Originator** .....: OVE

**Master TRF** .....: Dated 2021-10-05

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<b>Test item description</b> ..... :	Weaponlight	
<b>Trade Mark(s)</b> ..... :	OLIGHT	
<b>Manufacturer</b> .....	Same as applicant	
<b>Model/Type reference</b> .....	Valkyrie Turbo	
<b>Ratings</b> .....	6VDC, 1.33A, 8W	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>Testing Laboratory:</b>	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
<b>Testing location/ address</b> ..... :		Building 12&13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District Shenzhen, Guangdong 518052, CHINA
<b>Tested by (name, function, signature)</b> ..... :		Sky Feng Project Handler
<b>Approved by (name, function, signature)</b> .... :		Jake Xu Designated Reviewer
		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name, function, signature)</b> ..... :		
<b>Approved by (name, function, signature)</b> .... :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature)</b> .... :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name, function, signature)</b> ..... :		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature)</b> .... :		

<b>Supervised by (name, function, signature) :</b>		
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<b>List of Attachments (including a total number of pages in each attachment):</b> <b>Attachments No. 1:</b> 3 pages of Photo documentation.	
<b>Summary of testing:</b>	
<b>Tests performed</b> - IEC 60825-1:2014 Based on the test results, the submitted sample was classified as Class 1 Laser product.	<b>Testing location:</b> Building 12&13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District Shenzhen, Guangdong 518052, CHINA
<b>Summary of compliance with National Differences (List of countries addressed):</b> Nil	
<b>Use of uncertainty of measurement for decisions on conformity (decision rule) :</b>  <input checked="" type="checkbox"/> No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").  <input type="checkbox"/> Other:... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)	
<b>Information on uncertainty of measurement:</b> The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE. IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer. Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.	

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



<b>Test item particulars .....</b>																	
<b>Classification of installation and use .....</b> Portable																	
<b>Supply Connection .....</b> Battery																	
<b>Possible test case verdicts:</b>																	
- 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)																	
<b>Testing.....</b>																	
<b>Date of receipt of test item .....</b> 2021-11-29																	
<b>Date (s) of performance of tests .....</b> 2021-11-29 to 2021-12-07																	
<b>General remarks:</b>																	
<p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p><input type="checkbox"/> This Test Report Form contains requirements according to IEC/ISO ..... Standard dated ..... and includes Corrigendum dated .....</p> <p>(Note: The above text maybe removed if not applicable)</p>																	
<b>When differences exist; they shall be identified in the General product information section.</b>																	
<b>Name and address of factory (ies) .....</b> Same as Client																	
<b>General product information and other remarks:</b>																	
<p>The laser flashlight with emit white light complies with the threshold limit <math>L_T</math> as defined in IEC 60825-1:2014 which allows this product to be evaluated under the IEC 62471-1:2006 standard and the Risk Group 2 is determined according to the standard IEC 62471-1:2006.</p> <p>The used Laser component specification is as below:</p> <table border="1"> <thead> <tr> <th>Laser component</th> <th>Manufacturer</th> <th><math>V_F</math> (V)</th> <th><math>I_F</math> (A)</th> <th>Lumen (lm)</th> <th>CCT (K)</th> </tr> </thead> <tbody> <tr> <td>CT1-OL</td> <td>BLUE LAKE</td> <td>4-4.8</td> <td>2.0</td> <td>365</td> <td>6000-7000</td> </tr> </tbody> </table>						Laser component	Manufacturer	$V_F$ (V)	$I_F$ (A)	Lumen (lm)	CCT (K)	CT1-OL	BLUE LAKE	4-4.8	2.0	365	6000-7000
Laser component	Manufacturer	$V_F$ (V)	$I_F$ (A)	Lumen (lm)	CCT (K)												
CT1-OL	BLUE LAKE	4-4.8	2.0	365	6000-7000												
When perform the laser testing, the submitted product emitting CW laser.																	

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>CLASSIFICATION PRINCIPLES</b>		
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.		P
	$\alpha$ measured at 200 mm distance from closest point of human access ( $\alpha > 5$ mrad).		P
	Un-weighted radiance L measured at 200 mm distance (comparison with $L_T = 1 \text{ MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}/\alpha$ ) under reasonably foreseeable single fault conditions.	Normal measured $L_T$ (0.237 $\text{MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$ ) and single fault condition measured $L_T$ (0.250 $\text{MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$ for R3 on the laser power PCB short circuit & 0.250 $\text{MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$ for R4 on the laser power PCB short circuit and 0.213 $\text{MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$ with the lens not installed ) is not exceed the limit value(13 $\text{MW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$ ).	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Evaluation of emission according to IEC 62471 series (optional): Standard applied (IEC 62471 series).....: Risk Group.....: Labelling.....:  Classification of product based on accessible laser radiation (if no laser radiation accessible: Class 1).	IEC 62471-1:2006; Risk Group 2; See "Copy of marking plate"	P

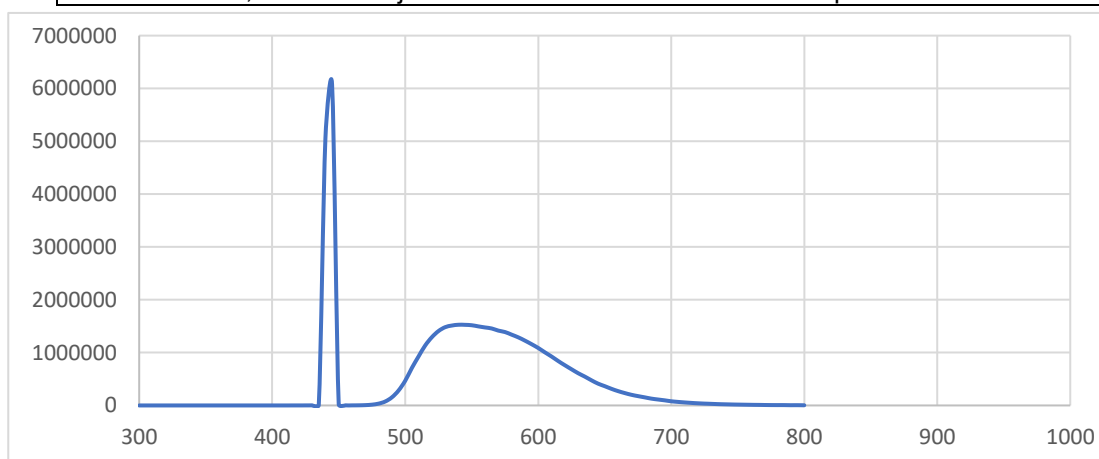
5	DETERMINATION OF THE ACCESSIBLE EMISSION LEVEL and PRODUCT CLASSIFICATION		
5.1	Tests		---
	Compliance under reasonably foreseeable single fault conditions.		P
5.3	Determination of the class of the laser product ...: For Class 1C: vertical safety standard applied with requirements for Class 1C.		---
5.4	Measurement geometry		---
5.4.1	General		---
5.4.2	Default (simplified) evaluation		P
	Conditions applied .....	Condition 3	P
	Aperture diameter .....	7mm	P
	Reference point :.....	Physical location of the emitting clip	P
	Measurement distance .....	100mm	P
	(for each condition)		
5.4.3	Evaluation condition for extended sources		N/A
	Conditions applied .....		N/A
	Most restrictive position .....		N/A
	(distance from reference point)		
	Angular subtense of the apparent source $\alpha$ 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

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Clause	Requirement + Test	Result - Remark	Verdict
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Measured accessible laser radiation and comparison with AEL:

TABLE: Calculation of Accessible emission limit (AEL)			
Class	1	Time base t:	100 s
Wavelength $\lambda$ :	445nm	Beam shape	Point
Angular Subtense $\alpha$ :	$\leq 1.5\text{mrad}$	Position of app. source:	Lens
Distance r (Rth):	100mm	Distance r (Phc):	—
Aperture d (Rth):	7mm	Aperture d (Phc):	—
Angle of acc. $\gamma_p$ (Rth):	—	Angle of acc. $\gamma_p$ (Phc):	—
Breakpoint T1:	—	Pulse width $t_{pw}$ :	—
Breakpoint T2:	—	Period duration:	—
C1:	—	Number of pulses N:	—
C2:	—	C <sub>5</sub> :	—
C3:	—	C <sub>6</sub> :	—
C4:	—	C <sub>7</sub> :	—
AEL limits:	Class 1 laser product limit: 0.39mW		
TABLE: Radiant power under normal and fault condition			
Ambient temperature:	25.2°C		
Ambient radiation:	1.08μW compensated with “zero” function of power meter		
Measurement condition:	Condition 3 according to standard.		
Measurement		Measured radiant power	
Normal condition		0.000 mW	
Fault condition:			
Fault condition: short circuit R2		0.001 mW	
Fault condition: short circuit R6		0.001 mW	
Fault condition: remove the Len		<b>0.001 mW</b>	
Conclusion: The measured emission level of the product did not exceed the accessible emission level of Class 1; the test subject was classified as “Class 1 Laser product”.			





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Clause	Requirement + Test	Result - Remark	Verdict
<b>6</b>	<b>ENGINEERING SPECIFICATIONS</b>		
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).		N/A
	Maintenance of Class 3B product (access to emission of Class 4 is prevented).		N/A
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 ( $\lambda < 400$ nm; $\lambda > 700$ nm), 1C, 3B or 4 laser systems.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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).		N/A
6.8	Beam stop or attenuator		N/A
6.9	Controls		N/A
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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- vibration and shock		N/A
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
6.15.2	Collateral radiation		N/A
6.16	Power limiting circuit		N/A

<b>7</b>	<b>LABELLING</b>		
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.		N/A
	Warning label – Hazard symbol (Figure 3)		P
7.2 - 7.7	Text on explanatory label or pictogram (laser class, warning text)		P
7.8	Aperture label		N/A
7.9	Radiation output and standards information		---
	Max output of laser radiation .....	<0.35mW	P
	Pulse duration .....		N/A
	Emitted wavelength(s) .....	455nm	P
	Name and publication date of the standard .....	IEC 60825-1:2014	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

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Clause	Requirement + Test	Result - Remark	Verdict
7.12	Warning for visible laser radiation .....	LASER RADIATION	P
7.13	Warning for potential hazard to the skin or anterior parts of the eye - warning wording used .....		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.		P
	b) additional warning for Class 1M and 2M		N/A
	c) laser beam parameters for radiation above the AEL of Class 1		---
	• Wavelength .....		N/A
	• Beam divergence .....		N/A
	• Pulse pattern ..... (pulse duration, repetition rate, ...)		N/A
	• Maximum power or energy output .....		N/A
	d) safety instruction for embedded laser products and other incorporated laser products.		P
	e) MPE and NOHD for Class 3B and 4 laser products; For collimated beam Class 1M and 2M lasers the extended NOHD (ENOH).D).		N/A
	f) information for the selection of eye protection.		P
	g) reproduction of all required labels and warnings.		P
	h) location of laser apertures		N/A
	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/A
	k) additional warning for Class 1, 1M, 2, 2M, and 3R regarding skin or corneal burns.		P
	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

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) adequate instructions for servicing available: <ul style="list-style-type: none"> <li>warnings and precautions regarding exposure of laser emission above Class 1</li> <li>maintenance schedule</li> <li>list of controls and procedures that could increase accessible emissions</li> <li>description of displaceable parts</li> <li>protective procedures for service personnel</li> <li>reproduction of labels and hazard warnings</li> </ul>		P

9	ADDITIONAL REQUIREMENTS FOR SPECIFIC LASER PRODUCTS		
9.1	Applicable other parts of the standard series IEC 60825		---
	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

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
Laser component	BLUE LAKE	CT1-OL	Input: DC 4.0-4.8V; 2.0A; Lumen(lm): 365; CCT(K):6000-7000	IEC 60825-1:2014	Tested with appliance
Supplementary information: <sup>1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

Details of: Overview



Details of: Overview





Details of: Overview



Details of: PCB view

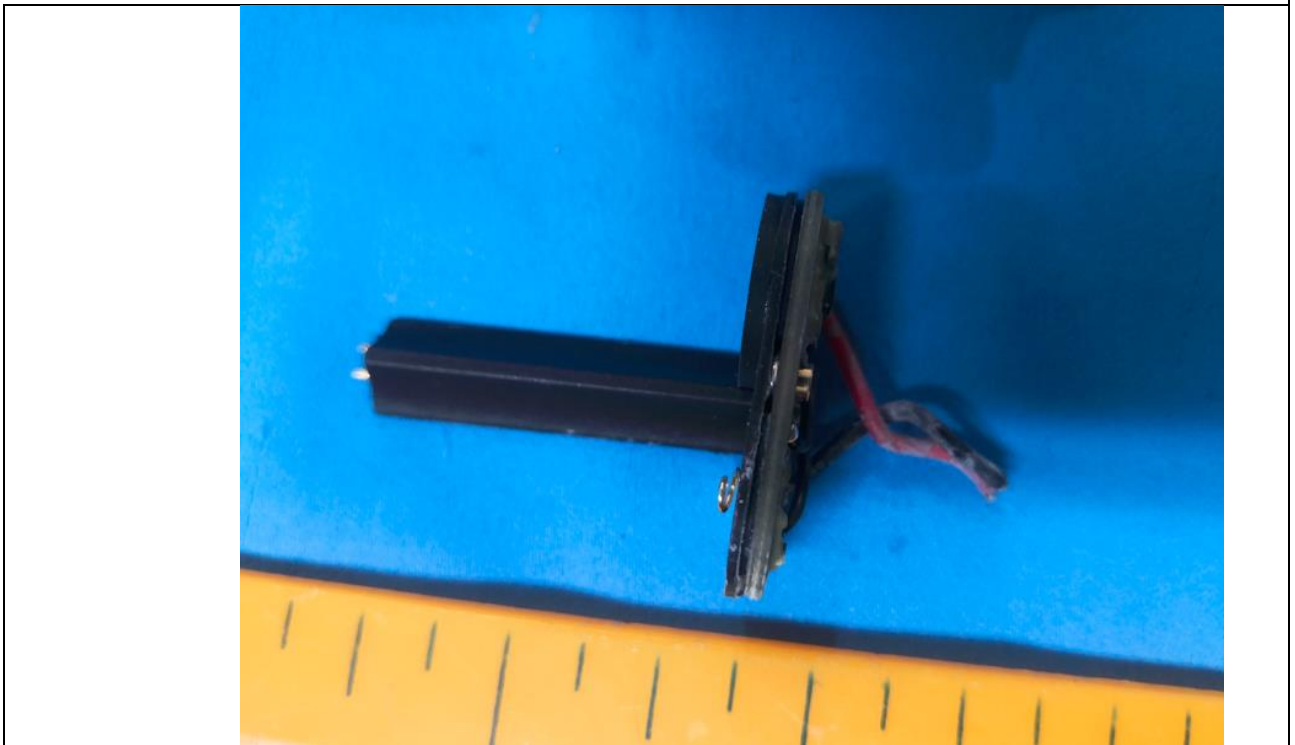




Details of: PCB view



Details of: PCB view



**\*\*\*END OF REPORT\*\*\***