



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

Report Number.: **SHES260601200871**

Date of issue: 2026-09-01

Total number of pages.....: 18 Pages

Name of Testing Laboratory
preparing the Report.....: SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Applicant's name.....: Qingdao MicroSense Intelligent Technology Co.,Ltd.

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Wei 1st Road, Laoshan District, Qingdao, Shandong, China

Test specification:

Standard: IEC 60825-1:2014

Test procedure: SGS-CSTC

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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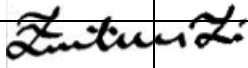
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General disclaimer:

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Test item description..... :	3D TOF CAMERA	
Trade Mark(s) :	Vzense	
Manufacturer :	Same as applicant	
Model/Type reference :	DS63, DS62	
Ratings :	12-24 V d.c.	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	Testing Laboratory:	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing location/ address..... :		588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.
Tested by (name, function, signature)..... :		Abby Yang  PE
Approved by (name, function, signature).... :		Emilien Li  Reviewer
☐	Testing procedure: CTF Stage 1:	
Testing location/ address..... :		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature).... :		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address..... :		
Tested by (name + signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature).... :		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address..... :		
Tested by (name, function, signature)..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature).... :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment): N/A	
Summary of testing: Tested according to measuring geometry of IEC 60825-1:2014. The test performed on normal condition. Fault conditions were assessed by non-physical method according to analyse provided by applicant, and no stronger laser will be emitted. The product is classified as Class 1 laser product. Test temperature: 25°C.	
Tests performed Clause 4 Classification principles Clause 5 Determination of the accessible emission level and product classification	Testing location: SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.
Summary of compliance with National Differences (List of countries addressed): List of countries addressed N/A	
Use of uncertainty of measurement for decisions on conformity (decision rule) : ☒ 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"). ☐ Other:... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)	
Information on uncertainty of measurement: 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.

Label for model DS63



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Label for model DS62



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Test item particulars.....: --	
Classification of installation and use.....: --	
Supply Connection: --	
.....: --	
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: 2026-06-24	
Date (s) of performance of tests: 2026-06-24 to 2026-07-06	
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 IEC60068-2-1:	
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.	
Name and address of factory (ies): Same as applicant	

General product information and other remarks:

The products are 3D TOF CAMERAs.

There are two models covered in this report: DS63 and DS62. They are the same except for number of VCSEL (DS63: 2pcs, DS62: 1pc), RGB sensor, enclosure and camera lens.

Laser source specification:

Manufacturer/Trademark	Model reference	Characteristic/Spec
Shenzhen Jufei Optoelectronics Co., Ltd.	01.JX.QI3532W94NA1	4,96 VDC, 1 A, 940±10 nm, Po:1,58 W

After review, model DS63 was selected to have the full test.

The test performed on normal condition.

Fault conditions were assessed by non-physical method according to analyse provided by applicant, and no stronger laser will be emitted.

The product is classified to a **Class 1** laser product for both above conditions.

Remark:

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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.

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	CLASSIFICATION PRINCIPLES		
4.3	Classification rules		---
4.3 a	Radiation of a single wavelength	940 nm	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)		P
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	Class 1	P
	3) 30000 s		N/A
4.3 f	Repetitively pulsed or modulated lasers		P
	1) Any single pulse		P
	2) Average power for pulse trains		P
	3) Pulse duration $t \leq T_i$: Number of pulses N and C_5	See page 10	P
	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.	Not 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 $L_T = 1 \text{ MWm}^{-2}\text{sr}^{-1}/\square$) 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.....: 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.	Fault conditions were assessed by non-physical method according to analyse provided by applicant, and no stronger laser will be emitted.	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		N/A
	Conditions applied		N/A
	Aperture diameter		N/A
	Reference point :		N/A
	Measurement distance		N/A
	(for each condition)		
5.4.3	Evaluation condition for extended sources		P
	Conditions applied	Condition 3	P
	Most restrictive position	100 mm	P
	(distance from reference point)		
	Angular subtense of the apparent source α and C_6 : (for each condition)	See page 10	P
5.4.3 a	Aperture diameters (for each condition).....	7 mm	P
5.4.3 b	Angle of acceptance (for each condition).....		N/A

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

Measured accessible laser radiation and comparison with AEL:

Compared with condition 1, test result under condition 3 is stricter. Test performed on condition 3.

The product emits four 1,42 ms pulses and four 740 us pulses in each pulse group. The ratio of the heights of 1,42 ms pulse and 740 us pulse is 0,587.

Peak wavelength	938,9 nm
Pulse group duration	19 ms
Pulse group duty cycle	28,36%
Pulse 1 duration	1,42 ms
Pulse 1 duty cycle	49,65%
Pulse 2 duration	740 us
Pulse 2 duty cycle	33,94%
α	7 mrad
C_4	3,005
C_6	4,667
T_2	11,372 s
N	679
$C_{5_pulse\ 1}$	0,4
$C_{5_pulse\ 2}$	0,2

AELs for Class 1:

$$AEL_{single\ 1} = 7 \cdot 10^{-4} t^{0,75} C_4 C_6 J = 7,180 \cdot 10^{-5} J$$

$$AEL_{single\ 2} = 7 \cdot 10^{-4} t^{0,75} C_4 C_6 J = 4,404 \cdot 10^{-5} J$$

$$AEL_T = 7 \cdot 10^{-4} C_4 C_6 T_2^{-0,25} W = 5,345 \cdot 10^{-3} W$$

$$AEL_{s.p.train\ 1} = AEL_{single} \cdot C_5 = 2,872 \cdot 10^{-5} J$$

$$AEL_{s.p.train\ 2} = AEL_{single} \cdot C_5 = 8,808 \cdot 10^{-6} J$$

Test Data:

Normal condition:

Tested average power is $1,095 \cdot 10^{-3} W$, pulsed power 1 is $6,665 \cdot 10^{-3} W$, pulsed power 2 is $1,135 \cdot 10^{-2} W$;

Exposure from single pulse 1 $= 6,665 \cdot 10^{-3} \cdot 1,42 \cdot 10^{-3} J = 9,464 \cdot 10^{-6} J < AEL_{single\ 1} (Class\ 1)$;

Exposure from single pulse 2 $= 1,135 \cdot 10^{-2} \cdot 7,4 \cdot 10^{-4} J = 8,403 \cdot 10^{-6} J < AEL_{single\ 2} (Class\ 1)$;

Average power for a pulse train $= 1,095 \cdot 10^{-3} W < AEL_T (Class\ 1)$;

Accessible emission for energy per pulse 1 $= 9,464 \cdot 10^{-6} J < AEL_{s.p.train\ 1} (Class\ 1)$;

Accessible emission for energy per pulse 2 $= 8,403 \cdot 10^{-6} J < AEL_{s.p.train\ 2} (Class\ 1)$;

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

Additional warning label regrading skin exposure near aperture:

AELs for Class 3B

(0 mm at 3,5mm diameter aperture, potential hazard to the skin or anterior parts of the eye):

AEL =0,5 W

Normal condition: Average power = $7,15 \cdot 10^{-2}$ W < 0,5 W

No additional warning label regrading skin exposure near aperture needed.

Conclusion:

The maximum test data is lower than AEL for Class 1.

Therefore, the product is classified to **Class 1 laser product**.

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
6	ENGINEERING SPECIFICATIONS		P
6.2	Protective housing		---
6.2.1	General		---
	Protective housing prevents access to energy levels in excess of the AEL for Class 1.	Class 1 laser product	P
	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).		P
	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

IEC 60825-1			
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		---

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- climatic conditions		N/A
	- 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

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	Class 1 laser product	N/A
	Labelling impractical due to the size or design of the product.		N/A
	Warning label – Hazard symbol (Figure 3)	Class 1 laser product	N/A
7.2 - 7.7	Text on explanatory label or pictogram (laser class, warning text)		P
7.8	Aperture label	Class 1 laser product	N/A
7.9	Radiation output and standards information	Class 1 laser product	---
	Max output of laser radiation		N/A
	Pulse duration		N/A
	Emitted wavelength(s)		N/A
	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

IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
7.11	Warning for invisible laser radiation		N/A
7.12	Warning for visible laser radiation		N/A
7.13	Warning for potential hazard to the skin or anterior parts of the eye - warning wording used	Test data is lower than 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.		P
	b) additional warning for Class 1M and 2M		N/A
	c) laser beam parameters for radiation above the AEL of Class 1	Class 1 laser product	
	• 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.		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.		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.		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

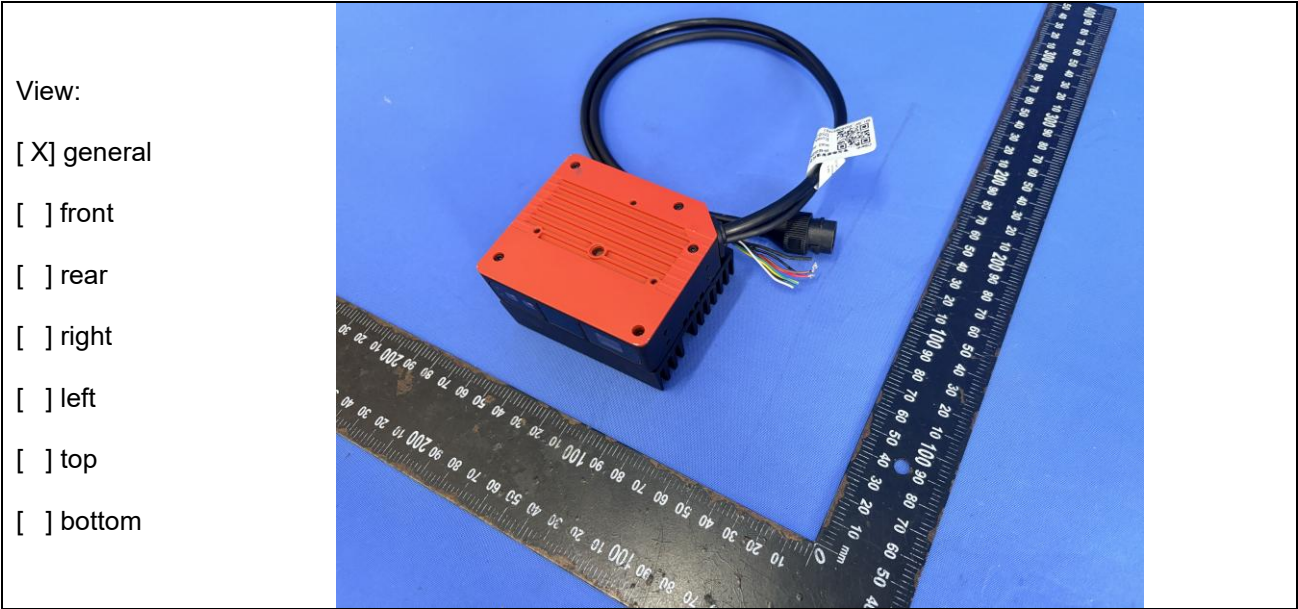
IEC 60825-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) adequate instructions for servicing available: - warnings and precautions regarding exposure of laser emission above Class 1 - maintenance schedule - list of controls and procedures that could increase accessible emissions - description of displaceable parts - protective procedures for service personnel - reproduction of labels and hazard warnings		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

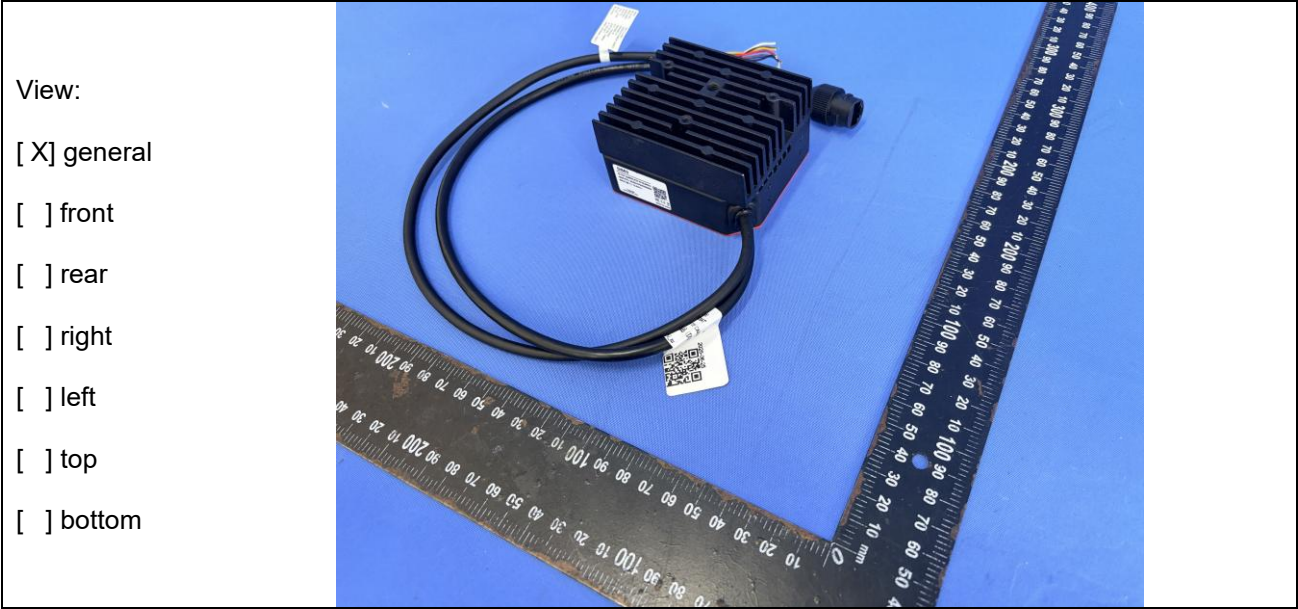
Annex 1: Photo documentation

Type of equipment, model: DS63

Details of: Overview



Details of: Overview



Details of: Laser aperture

View:

☒ general

☐ front

☐ rear

☐ right

☐ left

☐ top

☐ bottom



---End of Report---