

TEST REPORT	
IEC 60529	
Degrees of protection provided by enclosures (IP Code)	
Report Number	: 2403011
Date of issue	: 2024-03-28
Total number of pages	: 14
Tested by (name, function, signature)	: Leo Chiang / Engineer 
Approved by (name, function, signature).....	: Ellis Yu / Reviewer 
Testing Laboratory	
Name	: Universal Certification Technology Co. Ltd.
Address	: 13F-5, No. 93, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan.  
Test Location	: Same above
Applicant	
Name	: VECOW CO., LTD.
Address	: 3F., No. 10, Jiankang Road, Zhonghe District, New Taipei City 23586
Test item description	
Product name	: Rugged Embedded System
Trade mark(s)	: Vecow
Model /Type reference	: RES-5000
Series model	: RES-5XXXXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Test specification	
Standard	: <input checked="" type="checkbox"/> IEC 60529:2013 <input checked="" type="checkbox"/> EN 60529:1992+A2:2016 <input type="checkbox"/> CNS 14165:2015
Test procedure	: <input type="checkbox"/> IP57 <input checked="" type="checkbox"/> IP67
Test Result	: Compliance
General disclaimer	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing Testing Laboratory.	

Testing :

Dates of receipt of test item : 2024-03-08

Date(s) of performance of tests : 2024-03-11~2024-03-25

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)

General product information and other remarks :

Dimension of test object EUT : 250mm (L) * 200mm (D) * 85mm (H)

1. Weight of test object : 2.734 kg (IPX7)
3.353 kg (IP6X)
2. Test sample :
 Complete enclosure.
 Individually section of enclosure (see below test method)
3. During test the EUT was not operating.

The test sample was a pre-production sample without serial number.

Summary of compliance with standard:

We have tested the submitted sample(s) as requested and the following results were obtained :

Test Required : Test for degrees of protection provided by enclosure

IP Code	<input type="checkbox"/> IP57 <input checked="" type="checkbox"/> IP67
First characteristic numeral	Degrees of protection against access to hazardous parts and against solid foreign objects
Second characteristic numeral	Degrees of protection against ingress of water

The submittals sample(s) comply with the requirement and acceptance conditions for IP67 of IEC 60529 : 2013 Degrees of Protection Provided by Enclosure.

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.
IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECCE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.
- The decisions on conformity of this test report does not take into account uncertainty of measurement.

Test Method / Specification : IEC 60529 : 2013

1. Test for protection against access to hazardous parts IP5X IP6X :

Test method : According to Clause 12.2

The access probe (test wire with 1.0 mm diameter and 100 mm long) is pushed against or insert through any openings of the enclosure with specified force, the test wire shall not penetrate and shall be kept the adequate clearance with the hazardous parts inside the enclosure.

Test force : 1 N \pm 10%

Examine items for Test for protection against access to hazardous parts		Verdict
1	Does the test wire penetrate any openings of the enclosure?	No
2	(follow check item 1) If the test wire penetrates any openings of the enclosure, does the test wire touch any hazardous live parts or any hazardous mechanical parts?	N/A
3	(follow check item 2) Does adequate clearance be kept between the test wire and hazardous live parts or hazardous mechanical parts?	N/A

Test Result : Pass

2. Test for protection against solid foreign objects (Dust test) IP5X IP6X :

Test method : According to Clause 13.4 、 13.5 、 13.6

Test condition :

Category 1 of enclosure :

Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air.

(1) The object of the test is to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. In no event shall the depression exceed 2 kPa (20 mbar) on the manometer.

(2) The total duration test :

An extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.

➤ EUT volume : _____ cm (L) _____ cm (W) _____ cm (H) = _____ cm³

➤ Extraction rate : _____ L/Min = _____ L/hour

With a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.

Category 2 of enclosure :

Enclosures where no pressure difference relative to the surrounding air is present.

(1) The enclosure under test is supported in its normal operating position inside the test chamber, but is not connected to a vacuum pump.

(2) Any drain-hole normally open shall be left open for the duration of the test. The test shall be continued for a period of 8 h.

- If it is impracticable to test the complete enclosure in the test chamber, one of the following procedures shall be applied :
- (1) testing of individually enclosed sections of the enclosure;
 - (2) testing of representative parts of the enclosure, comprising components such as doors, ventilation openings, joints, shaft seals, etc., in position during test;
 - (3) testing of a smaller enclosure having the same full-scale design details
 - (4) In the last two cases, the volume of air to be drawn through the enclosure under test shall be the same as for the whole enclosure in full scale.

Examine items for Test for protection against solid foreign objects		Verdict
1	Does the talcum powder inside the enclosure (for IP5X rating)	N/A
2	(follow check item 1) Dose the the talcum powder inside the enclosure did not contact live parts, did not deposit in the areaof specified electrical spacings nor did it affect operation (for IP5X rating)	N/A
3	Does any dust deposit inside the enclosure (for IP6X rating)	No

Test Result : Pass

3. Test for protection against water (IPX7) :

Test method : According to IEC 60529 : 2013 clause 14.1 & 14.2.7

Test condition : Temporary immersion between 0.15 m or 1 m.

- The EUT was completely imersed the enclosure in water in the intended service position as specified by the manufacturer so that :
- The lowest point of enclosures with a height less than 850 mm is located 1000 mm below the surface of the water;
 - The highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water;
 - Test duration : 30 min.
 - The water temperature does not differ from that of the equipment by more than 5 K.
- After testing in accordance with appropriate requirements of IEC60529 clause 14.2.9, inspected the ingress of water condition as below :

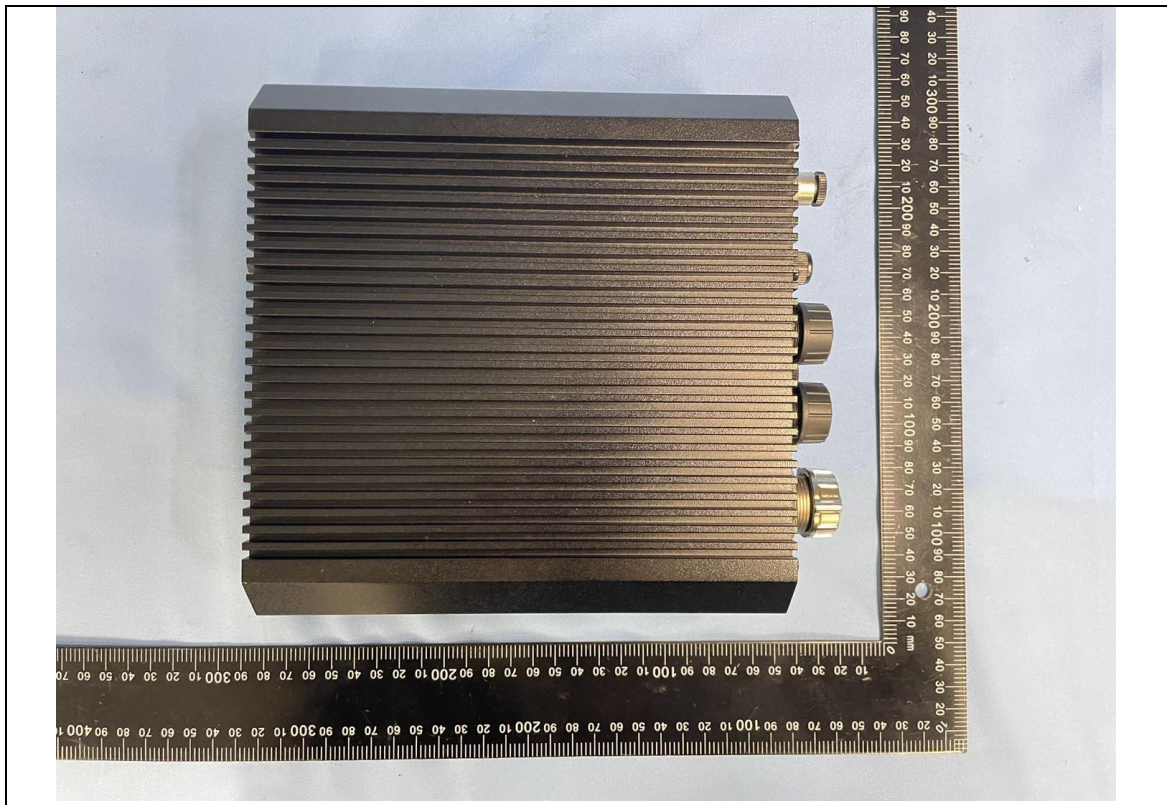
Examine items for Test for protection against water		Verdict
1	Does any water enter the enclosure	No
2	(follow check item 1) Does the water be sufficient to interfere with the correct operation of the equipment or impair safety?	N/A
3	(follow check item 1) Does the water deposit on insulation parts where it could lead to tracking along the crrepage distances?	N/A
4	(follow check item 1) Does the water reach live parts or windings not designed to operate when wet?	N/A
5	(follow check item 1) Does the water accumulate near the cable end or live parts?	N/A

Test Result : Pass

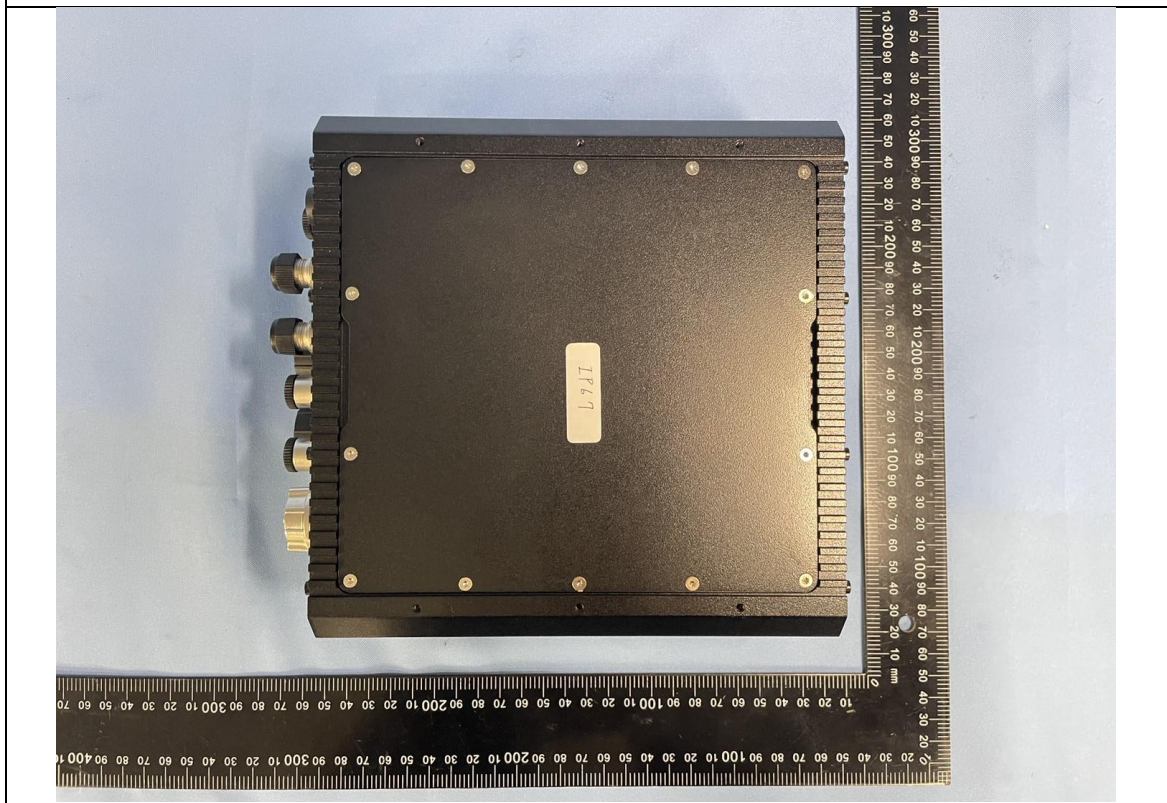
Test Laboratory Environment Condition :		
Temperature (°C)	Relative humidity (%)	Air pressure (kPa)
15 ~ 35	25 ~ 75	86 ~ 106

Test equipment :			
Name	Brand	Model	Serial No.
Dust tester (IP5X~6X)	Chunghung	CH-7139-C	39-C21-0-1
Waterproof tester (IPX7~X8)	JZ	IP-TANK	NA
Stopwatch	CASIO	HS-3	J208Q01
Tape measure	TRENY	5M	NA
D Type test probe	BONAD	BND-DX	BND20221229-03

Photographs



EUT



EUT

Photographs

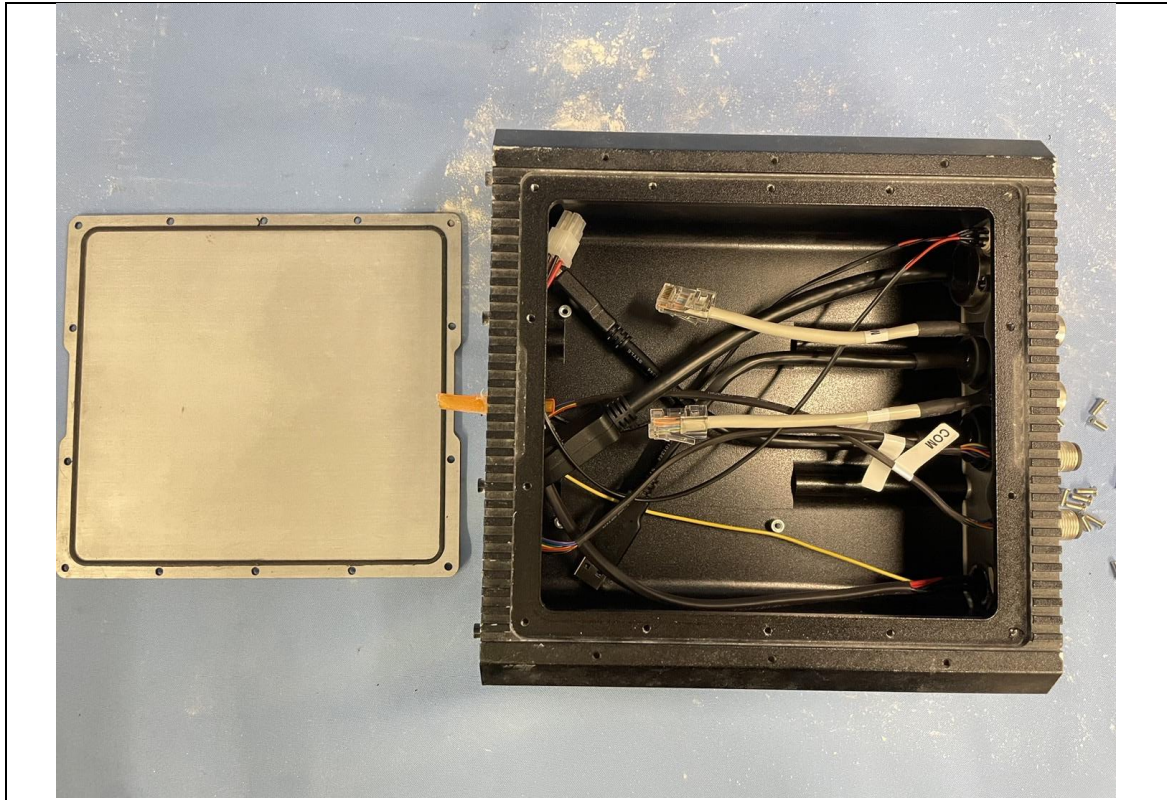


During IP6X dust test

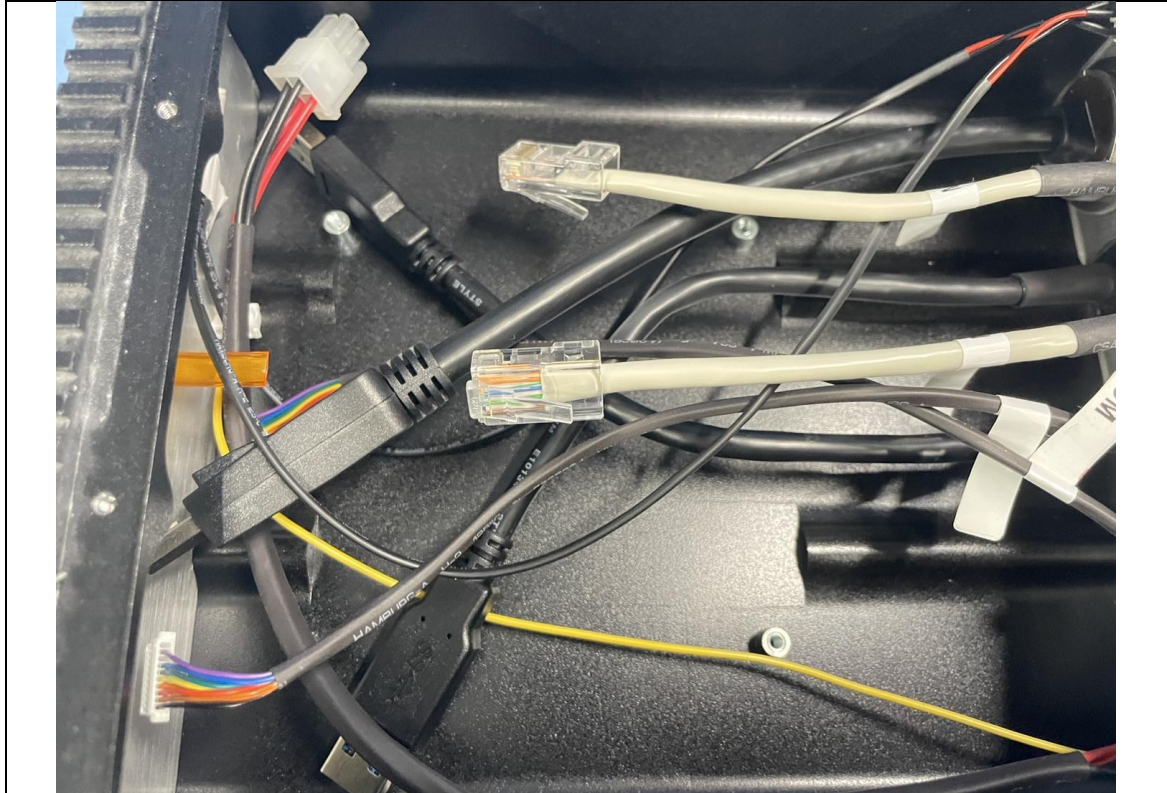


After IP6X dust test

Photographs

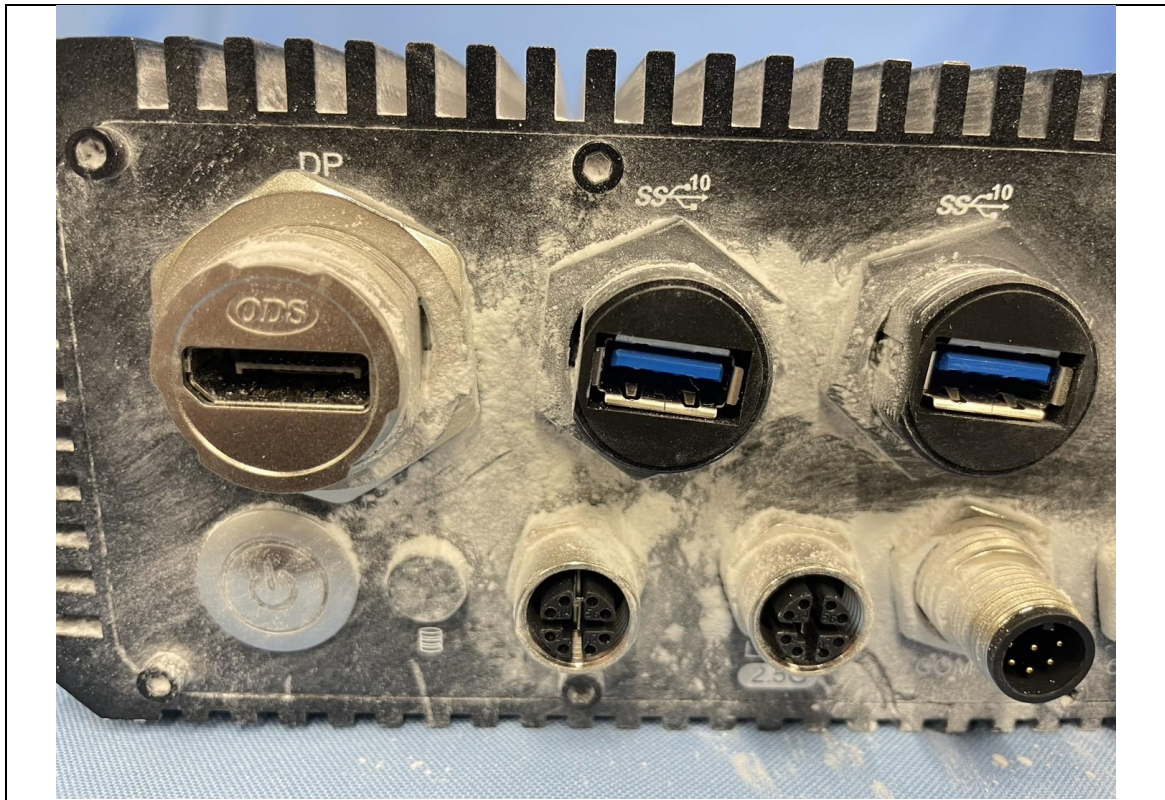


Inside view of enclosure after IP6X dust test (EUT)

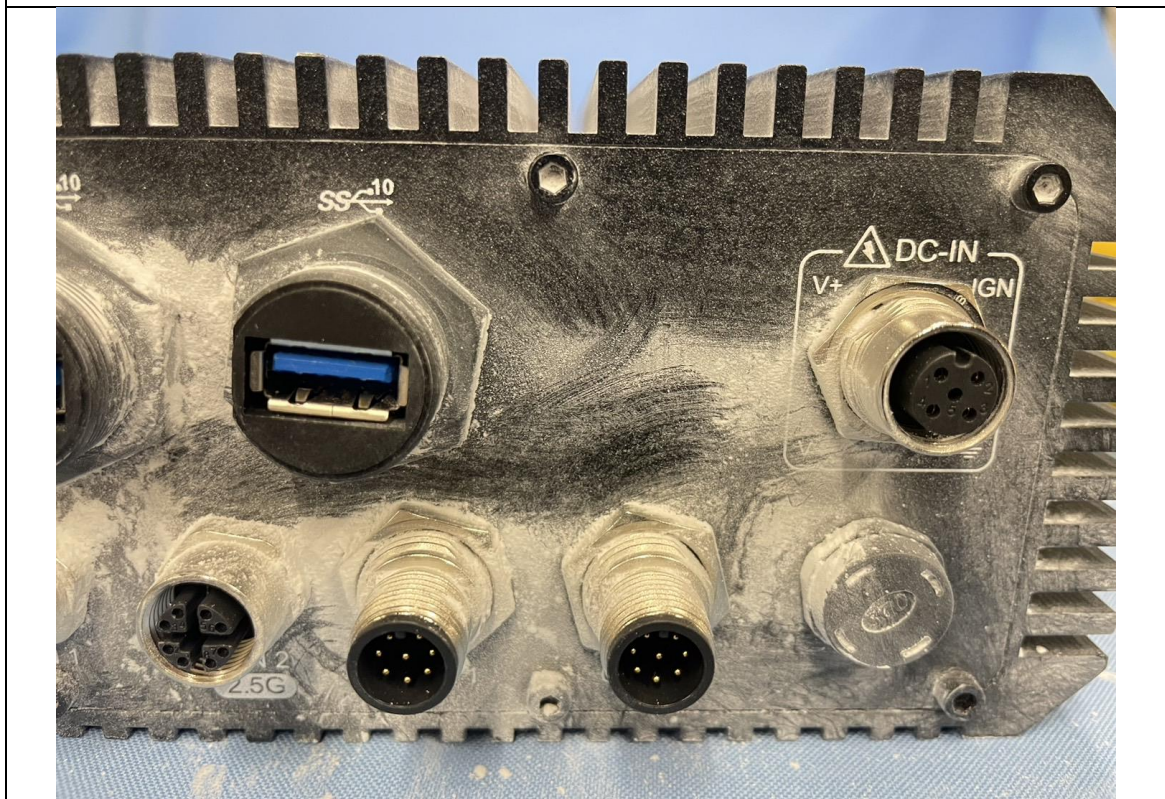


Inside view of enclosure after IP6X dust test (EUT)

Photographs

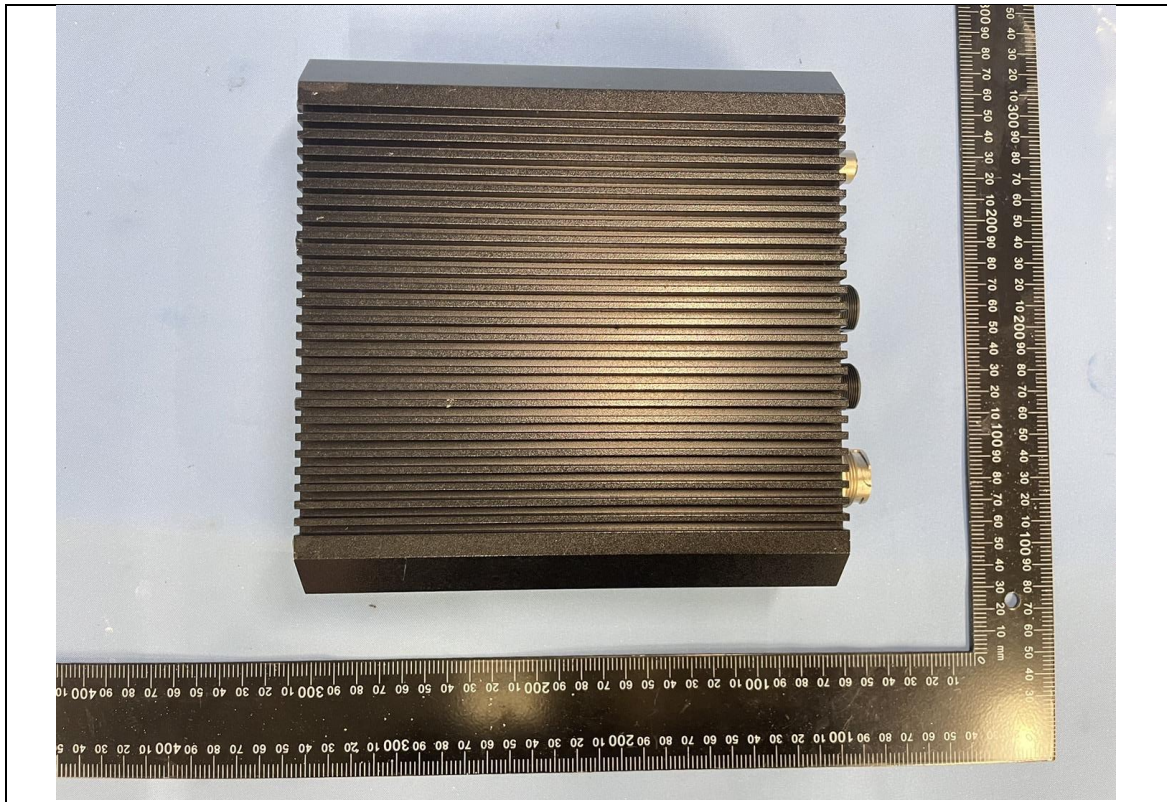


Inside view of enclosure after IP6X dust test (EUT IO)



Inside view of enclosure after IP6X dust test (EUT IO)

Photographs

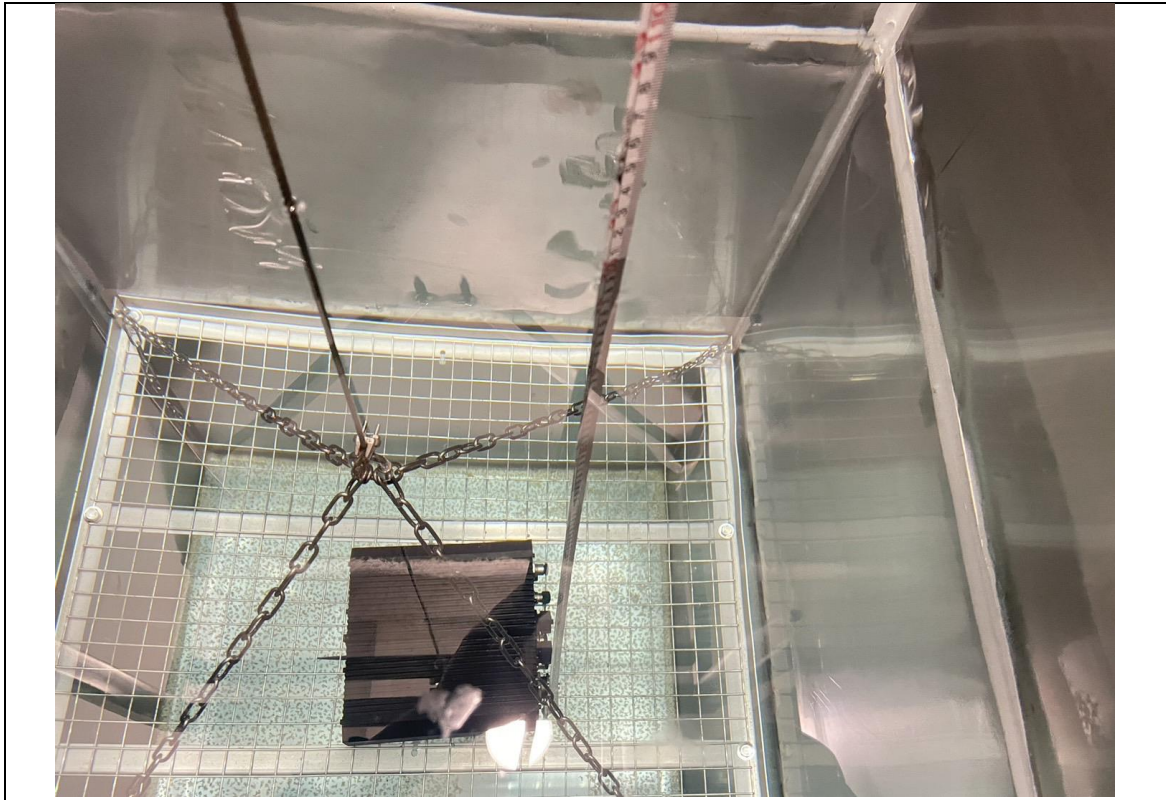


Before IPX7 water test

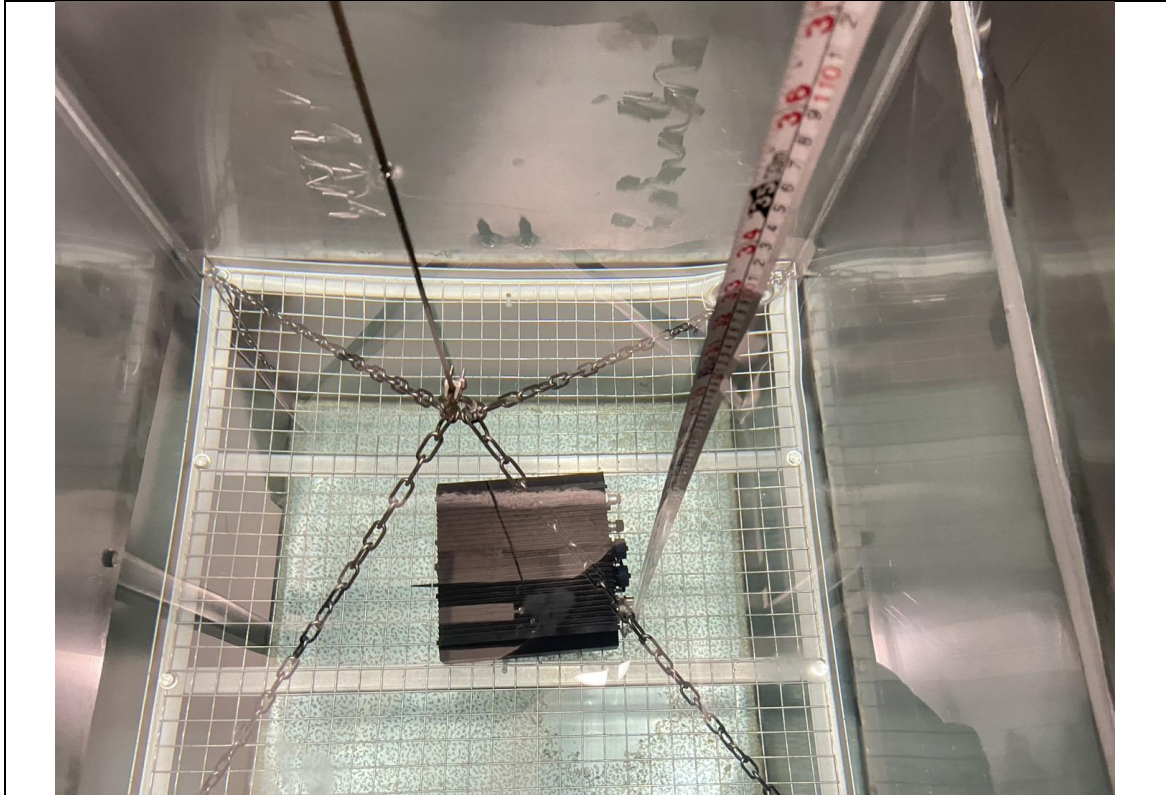


Before IPX7 water test

Photographs

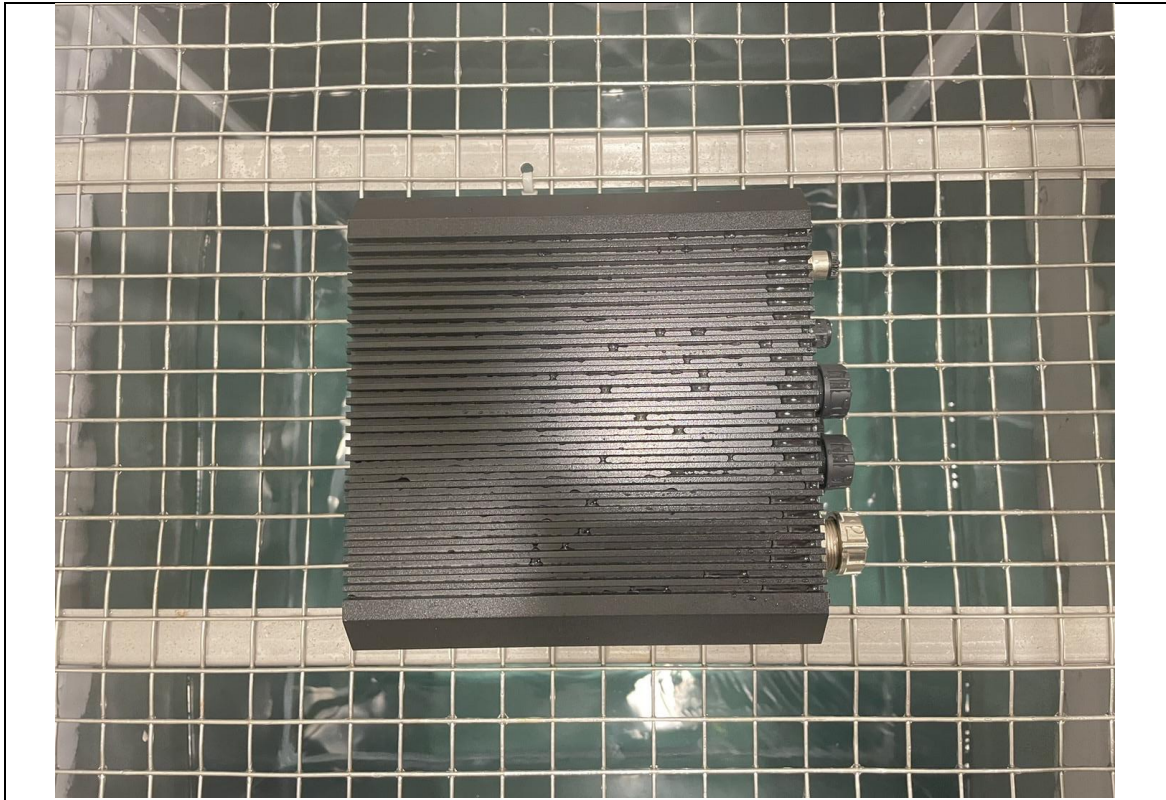


During IPX7 water test

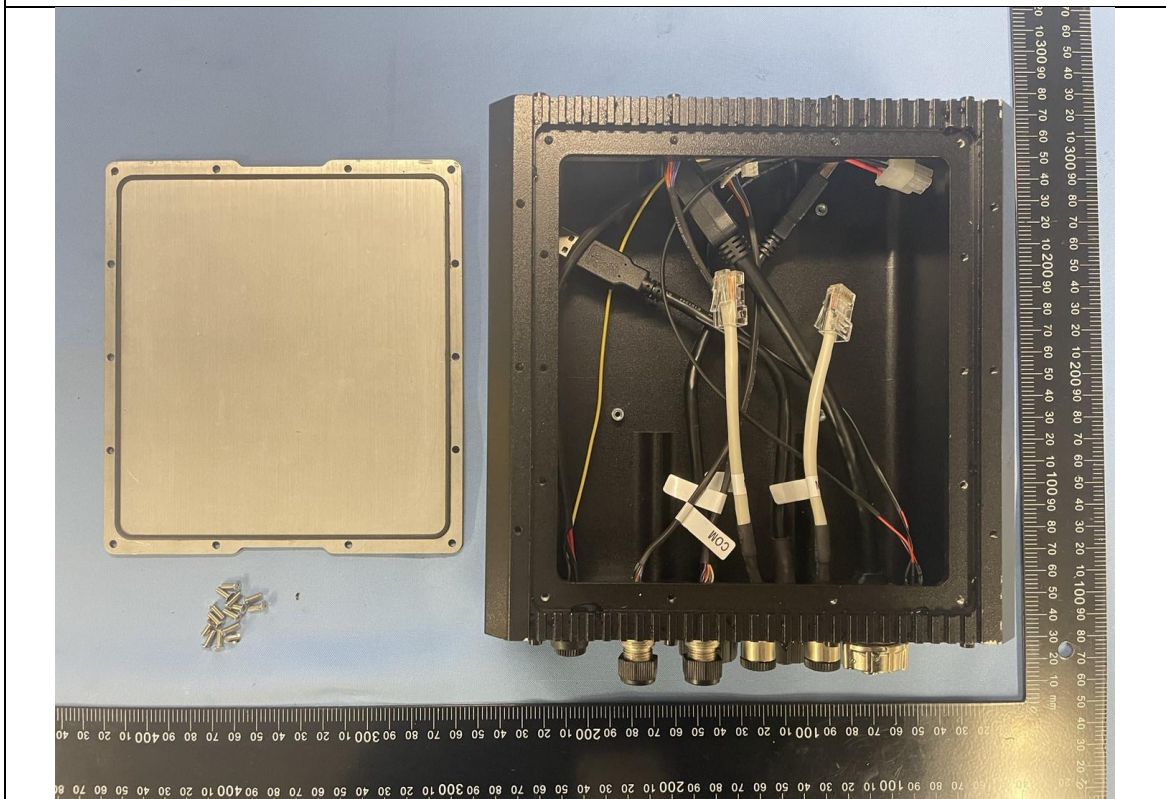


During IPX7 water test

Photographs

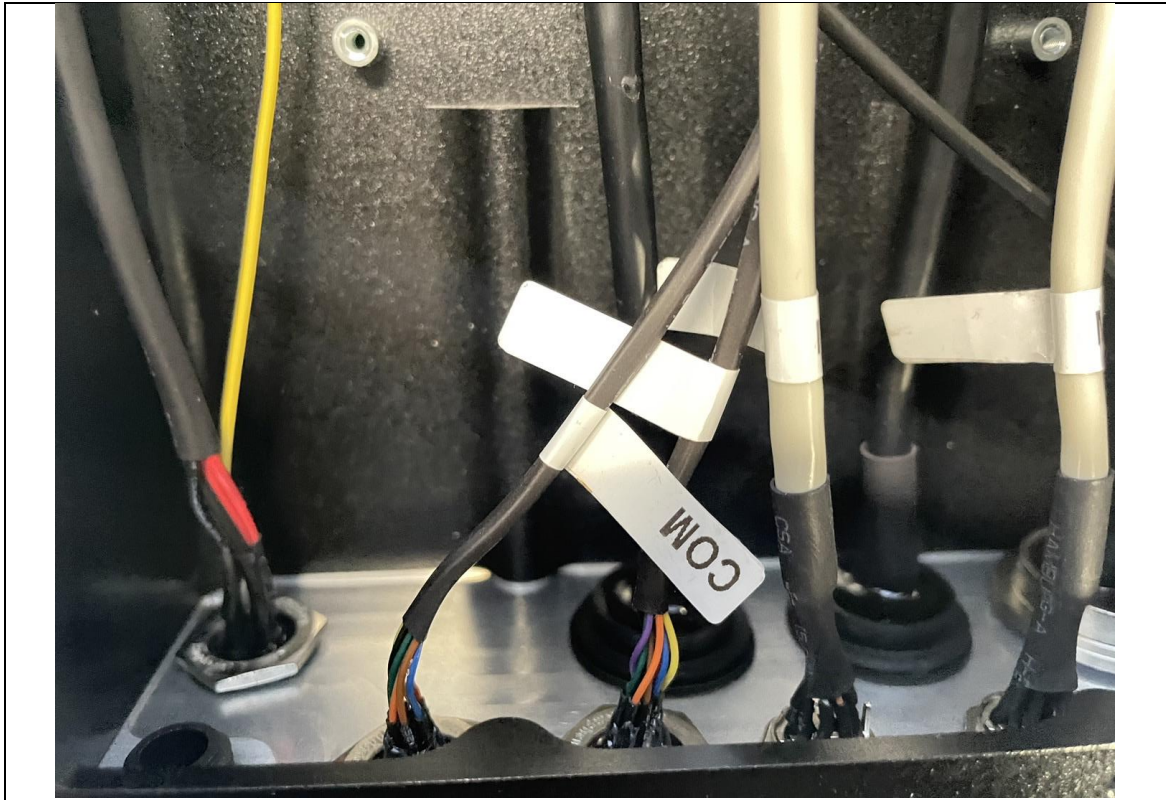


After IPX7 water test



Inside view of enclosure after IPX7 water test (EUT)

Photographs



Inside view of enclosure after IPX7 water test (EUT)



Inside view of enclosure after IPX7 water test (EUT)

Photographs



Inside view of enclosure after IPX7 water test (EUT IO)