


Certificate of Compliance

Marine applications

Product : Industrial Marine Computer
Applicant : AVALUE TECHNOLOGY INCORPORATION.
Rating(s) : 24Vdc, 3A
Model/Type : EMS-TGLXXXXXXXXXXXX (where "X" may be any alphanumeric character, blank or "-")
Trademark : Avalue or 
Test Report No. : T230926-01-08-A0
Standard(s) Applied : IEC 60945 : 2002 , clause 5.2.2, 5.2.3, 7.1, 7.2, 8.1, 8.2, 8.3, 8.4, and 12.1.2;
IACS E10 1991Rev.8, 2021 NO.9 and 10

Verification Report No.:

Based on tested results detailed in Report No. T230926-01-08-A0 (dated 2024-01-05), we declare that the above listed module types are in compliance with the standards listed above.



David Peng / R&D & QA Det. Manager

2024-01-05



Prodigy Technology Consultant Co.Ltd.

No. 12, Gong 7th Rd., Linkou District, New Taipei City 24450, Taiwan Chinese Taipei
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Test Report issued under the responsibility of:



Prodigy Technology Consultant Co., Ltd.

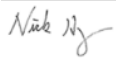


Test Report No.: T230926-01-08-A0		Page 1 of 28
Client		
Name :	AVALUE TECHNOLOGY INCORPORATION.	
Address :	7F., No.228, Lian-cheng Rd., Zhonghe Dist., New Taipei City 23553, TAIWAN	
Product Name :	Industrial Marine Computer	
Model Name :	EMS-TGLXXXXXXXXXXXX (where "X" may be any alphanumeric character, blank or "-")	
Testing laboratory		
Name :	Prodigy Technology Consultant Co., Ltd.	
Address :	No. 12, Gong 7th Rd., Linkou Dist., New Taipei City 24450, Taiwan Chinese Taipei	
Test specification Standard : IEC 60945 : 2002 , clause 5.2.2, 5.2.3, 7.1, 7.2, 8.1, 8.2, 8.3, 8.4, and 12.1.2; IACS E10 1991Rev.8, 2021 NO.9 and 10		
Report Form No:	DTL-135-A5	
Test Report Form(s) Originator:	Prodigy Technology Consultant Co., Ltd.	
Master TRF:	Dated 2020-08-07	
Approved By :	<u>Nick Huang</u> Signature  Senior Engineer	<u>2023-11-20</u> Date
Reviewed By :	<u>David Peng</u> Signature  General Manager	<u>2023-11-30</u> Date
Other Aspects:		
The completed test report includes the following documents:		
■ 28 pages		
Testing		
Date of receipt of test item(s)	2023-09-26	
Date of test	2023-10-23 ~ 2023-11-08	
Date of issue	2023-11-30	
Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.		

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Attachment--IEC 60945 C.1 11.2 Compass Safe Distance Test Report	

2. General Information

2.1 Description of Equipment Under Test

2.1 Test item particulars	
Equipment Under Test.....	EMS-TGLXXXXXXXXXXXX
Power Input Rating.....	24Vdc, 3A
Test sample identification.....	Sample 01: S/N 0036AJ00201
Trade mark.....	Avalue or 
Watertightness	IP20
Mass of equipment (kg)	Approx. 2.45 Kg
<p>General Remarks:</p> <p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the testing laboratory.</p> <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>2.2 Variation for Multiple Listing</p> <p>1. EMS-TGLXXXXXXXXXXXX model difference:</p> <p>EMS-TGL-W85-A1-9R-- 11th Gen Intel®Core Processor i7, Marine Fanless Rugged Embedded System with 4 COM Isolations</p> <p>EMS-TGL-W45-A1-9R -- 11th Gen Intel®Core Processor i5, Marine Fanless Rugged Embedded System with 4 COM Isolations</p> <p>EMS-TGL-W15-A1-9R -- 11th Gen Intel®Core Processor i3, Marine Fanless Rugged Embedded System with 4 COM Isolations</p> <p>2. Mother board type : Industrial Motherboard Model : EBM-TGLSXXXXXXXXXXXX (where "X" may be any alphanumeric character, blank or "-")</p> <p>3.IET Module board Model name :AUX-M07XXXXXXXXXXXX(where "X" may be any alphanumeric character, blank or "-")</p> <p>4. Power board type : Power board Model name : EPM-1722 XXXXXXXXXXXX(where "X" may be any alphanumeric character, blank or "-")</p> <p>5.CPU: CPU : 11th Gen Intel® Core™ i7-1185GRE Intel® Core™ i7-1185GRE (15W, 12M Cache, up to 2.80 GHz), WT Intel® Core™ i5-1145GRE (15W, 8M Cache, up to 2.60 GHz), WT Intel® Core™ i3-1115GRE (15W, 6M Cache, up to 3.00 GHz), WT</p> <p>6.HDD type: SSD</p> <p>7. Maximum normal load: Test conduct on model: EMS-TGL-W85-A1-9R), base on CPU configuration are more critical condition, System running burn-in test program (Ver.8.0),GPIO test and com ports test, each USB2.0 load 2.5W, USB 3.0 load 4.5W (total load 23W), and working continuous..</p>	
<p>2.3 Test sample identification</p> <p>Dimensions (W x D x H) 239.4mm x 150mm x 69mm</p> <p>CPU : 11th Gen Intel® Core™ i7-1185GRE @ 2.8GHz</p> <p>Mounting Kit Wall mount kit (Standard)</p> <p>Check the outward appearance and structure, including chassis and connectors.</p> <p>1. The connectors and components should work properly without any interference.</p> <p>2. All screws should be tightened up appropriately.</p>	

2.4 Summary of Test Results:

Test item No.	Name of Test items	Reference standard	Test Result
3.1	Performance Test	IEC 60945 C.I 6.1.3 IACS E10 N0.2	Pass
3.2	Insulation Resistance Test	IACS E10 N0.9	Pass
3.3	High Voltage Test	IACS E10 N0.10	Pass
3.4	Low Temperature test	IEC 60945 Cl. 8.4	Pass
3.5	Dry Heat Test	IEC 60945 Cl. 8.2	Pass
3.6	Damp Heat Test	IEC 60945 Cl. 8.3	Pass
3.7	Vibration Test	IEC 60945 Cl. 8.7	Pass
3.8	Extreme Power Supply	IEC 60945 Cl. 5.2.2	Pass
3.9	Excessive Conditions of Power Supply	IEC 60945 Cl. 5.2.3	Pass
3.9.1	Excessive Current Test	IEC 60945 Cl. 5.2.3	Pass
3.9.2	Excessive Voltage Test	IEC 60945 Cl. 5.2.3	Pass
3.9.3	Power Supply Misconnection Test	IEC 60945 Cl. 5.2.3	Pass

General product information:

The laboratory's declaration of conformity is based on IEC GUIDE 115 Section 4.3.4 Simple acceptance anticipates the agreement of an acceptable level , Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector, IECEE OD 5010 (Procedure for measuring Laboratory Power Source characteristics), IECEE OD 5014 (Instrument Accuracy Limits) to determining the test result, therefore no additional consideration of the measurement uncertainty

IEC 60945 C.1 11.2: Compass Safe Distance test report was evaluated by the qualified test Lab to meet the standard requirement, Taiwan Testing and Certification Center EMC Testing Laboratory Report number No. 23-09-MAS-050 (10 pages, See attachment 1)



3. Test Item

3.1 Performance Test :

A. Test Equipment

ID No.	Instrument type	Manufacturer	Model	S/N	Calibration Due
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
155	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20755995	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IEC 60945 C.I 6.1.3, IACS E10 N0.2, DNV No.2.4 Cl. 3.3)

1. The units rated for 24 Vdc. DC power supply are used to supply the power during the test.
2. DIDO port connected to test fixture and run GPIO test program for EUT to check DIDO port functions.
3. Each USB3.0 load 4.5W (total 18W), each USB2.0 port load 2.5W (total 5W), DP and HDMI port connected monitor.
4. Audio in connected to Mic, Audio out connected to speaker.
5. Lan Port connected each other
6. Set CPU/2D/Disk/Sound/Memory/Serial Port test items run 100% performance with Burn-IN program (version 10.1 pro) and working continuously .

C. Result

The unit works normally.

D. Judgment

Passed



Performance Test Setup



Test date : 2023-10-23

Sample No.01

Ambient Temperature, °C : 20.46

, Relative Humidity, %RH : 61.21

, Atmospheric pressure (kPa) :991.1

3.2 Insulation Resistance Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
153	Electrical Safety Analyzer	Extech	SE 7452	1714079	2024-04-10
160	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20756000	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IACS E10 N0.9, DNV No.2.4 Cl. 3.12)

- The unit was subject to 48 Vdc voltage (See table)

Rated supply voltage Un (V)	Test voltage (D.C. voltage) (V)	Min. insulation resistance	
		before test M ohms	after test M ohms
Un ≤ 65	2 x Un / min. 24V	10	1,0
Un > 65	500	100	10

- Insulation resistance test is to be carried out before and after: high voltage test, low temperature test, dry heat test and damp heat test.
- The insulation resistance shall be measured between DC terminals to metal enclosure and DC terminals to output connectors.
- Test voltage of Rated DC 24V was 2xUn=48Vdc, test time for 1 minute
- Measure the resistance in the path.
- Resistance is calculated with the DC voltage of 48V divided by measured current

- Resistance is calculated with the DC voltage of 48V divided by Record Reading

C. Result

Insulation applied between	Test Voltage (Vdc)	Test time (sec)	insulation resistance (M Ω)
DC terminals to metal enclosure	48	60	Over 10 G Ω
DC terminals to output connector	48	60	Over 10 G Ω

Resistance is calculated by Record Reading

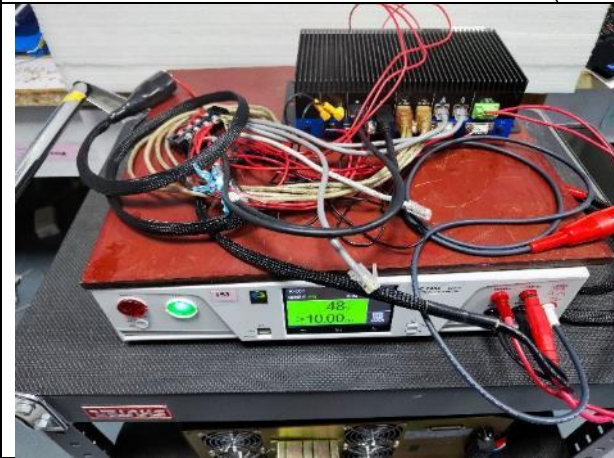
D. Judgment :

Passed (Required minimum insulation resistance : 10M Ω)

Insulation resistance



Insulation resistance (DC terminals to metal enclosure)



Insulation resistance (DC terminals to output connectors)



Test date : 2023-10-23

Sample No.01

Ambient Temperature, °C : 20.46

, Relative Humidity, %RH : 61.21

, Atmospheric pressure (kPa) :991.1

3.3 High Voltage Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
153	Electrical Safety Analyzer	Extech	SE 7452	1714079	2024-04-10
160	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20756000	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IACS E10 N0.10, DNV No.2.4 Cl. 3.13)

- To test for these, In accordance with the Rated voltage (Un) of product and the test voltage as the Table , period of application of the test voltage: 1 minute

Rated voltage Un (V)	Test voltage (A.C. voltage 50 or 60Hz) (V)
Up to 65	2 x Un + 500
66 to 250	1500
251 to 500	2000
501 to 690	2500

- The unit was subject to 775Vdc ($548V_{ac} \times \sqrt{2} = 775V_{dc}$) between the DC terminal to metal enclosure and DC terminal to output connector for one minute.
- Input with 48Vdc between the DC terminal to metal enclosure and DC terminal to output connector measure the insulation resistance according to IACS E10 N0.9 of the same standard immediately after the high voltage test.
- Check the performance

C. Result

Test Type	applied between	Test voltage	Test time	Test Result
Hi Voltage Test	DC terminals to metal enclosure	775Vdc	60 sec	No breakdown
Hi Voltage Test	DC terminals to output connector	775Vdc	60 sec	No breakdown
Insulation Resistance Test	DC terminals to metal enclosure	48Vdc	60 sec	Over 10G Ω
Insulation Resistance Test	DC terminals to output connector	48Vdc	60 sec	Over 10G Ω

- No breakdown during the test
- Resistance is calculated by Record Reading
- The unit works normally.

D. Judgment :

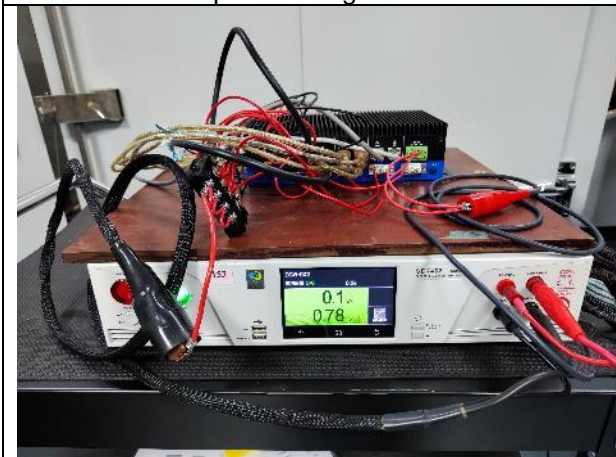
Passed



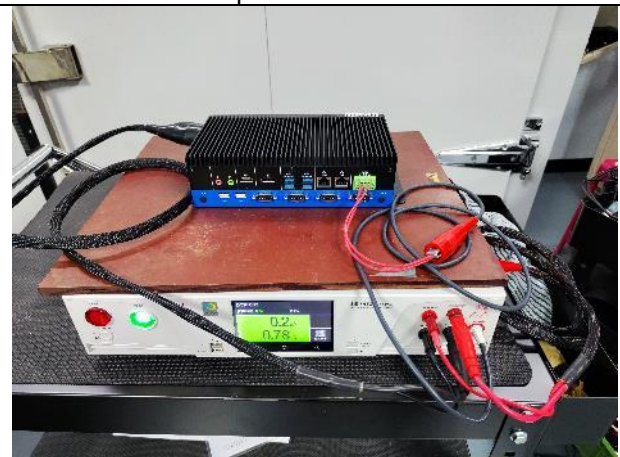
Setup test voltage 775Vdc



Setup test time 60sec



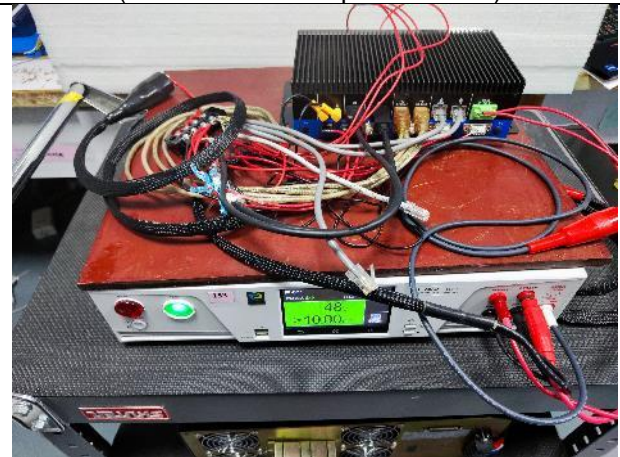
No breakdown during the test
(DC terminal to metal enclosure)



No breakdown during the test
(DC terminal to output connect)



Insulation resistance test after High Voltage Test
(DC terminal to metal enclosure)



Insulation resistance test after High Voltage Test
(DC terminal to output connect)



Test date : 2023-10-25~2023-10-26

Sample No.01

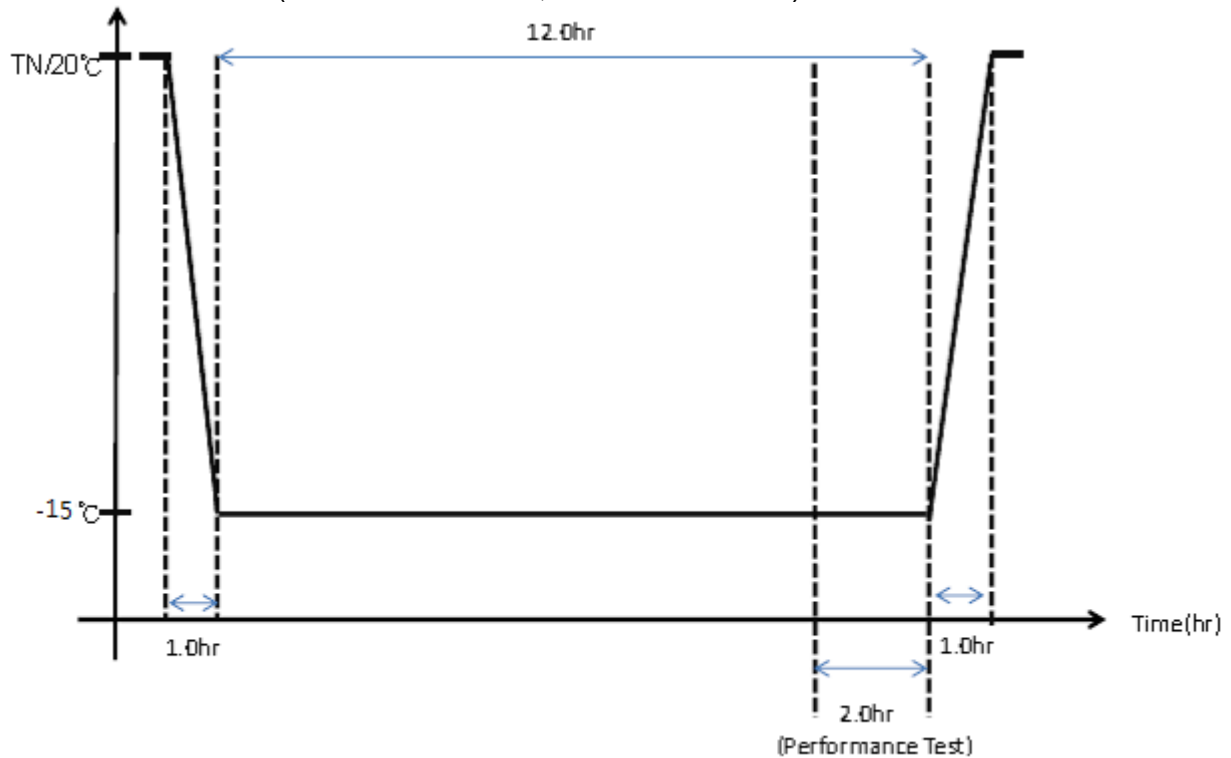
Ambient Temperature, °C : 21.96/21.13 , Relative Humidity, %RH : 55.47/59.20 , Atmospheric pressure (kPa) :988.9/988.6

3.4 Low Temperature Test / Cold Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
116	Humidity Chamber	CTF	LY-2C-TH	2013122402	2024-09-17
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
160	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20756000	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IEC 60945 Cl. 8.4, IACS E10 N0.11)



- Performance check and insulation resistance test first
- The environmental test conditions: Protected area, Test Temperature: $-15^{\circ}\text{C} \pm 2^{\circ}\text{C}$
- Duration: 10-16 hours at least, then the EUT shall be switched on later, and shall be kept operational for at least 2 h shall be subjected to a performance test of 31.2 Vdc(DC +30 %),at the end of test, change Voltage to 24Vdc
- Normal power supply for the particular specimen applied in the temperature rise intervals
- Performance check and insulation resistance test at normal environmental condition

C. Result

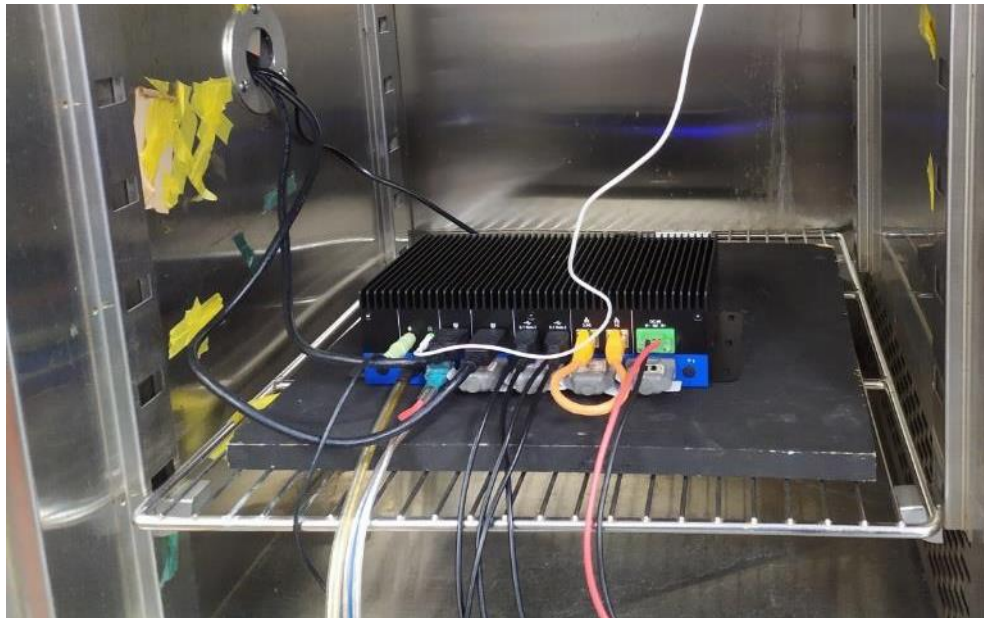
- After low temperature test, Insulation resistance measure is over $10\ \Omega$ (Required minimum insulation resistance $1M\ \Omega$)

Insulation applied between	Test Voltage (Vdc)	Test time (sec)	Before Cold Test ($10M\ \Omega$)	After Cold Test ($1M\ \Omega$)
DC terminal to metal enclosure	48	60	Over $10\ G\ \Omega$	Over $10\ G\ \Omega$
DC terminal to output connector	48	60	Over $10\ G\ \Omega$	Over $10\ G\ \Omega$

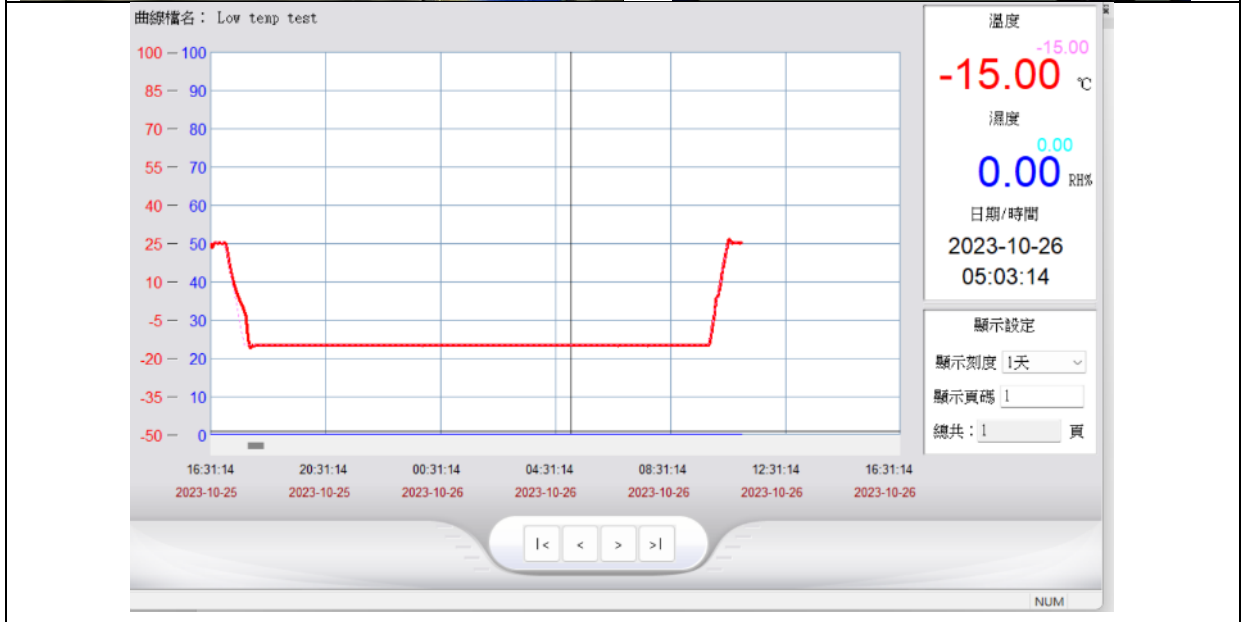
- The unit works normally

D. Judgment

Passed

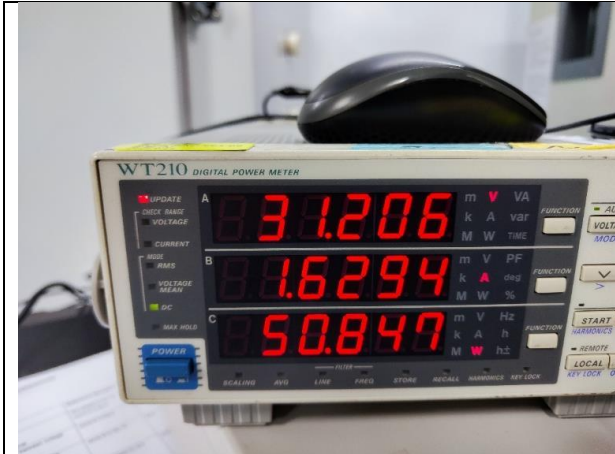


Put the EUT with OFF condition inside



Maintained at $-15^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for 10 hrs

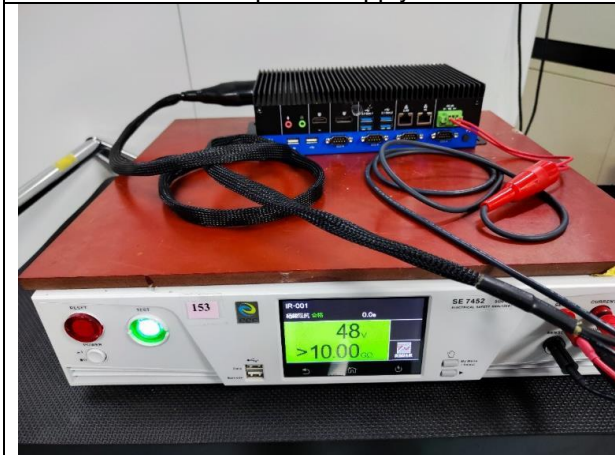




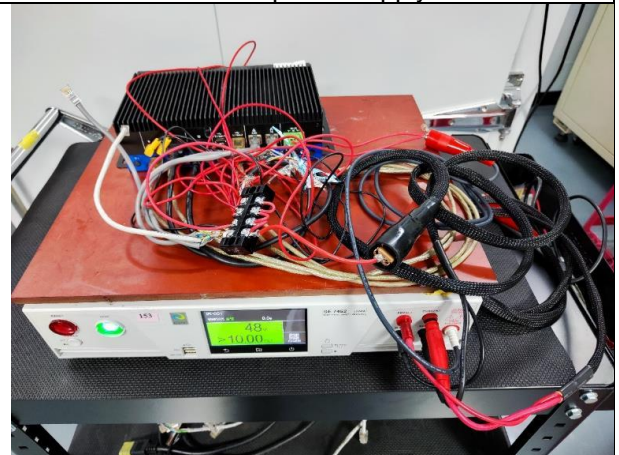
During the 2 hours Performance check with Extreme power supply +30%



During the 2 hours Performance check with Extreme power supply -10%



Insulation resistance test after Low Temperature Test (DC terminal to metal enclosure)



Insulation resistance test after Low Temperature Test (DC terminal to output connector)



Test date : 2023-10-29~2023-10-30

Sample No.01

Ambient Temperature, °C : 21.08/22.23

, Relative Humidity, %RH : 59.50/61.92

, Atmospheric pressure (kPa) : 987.1/988.6

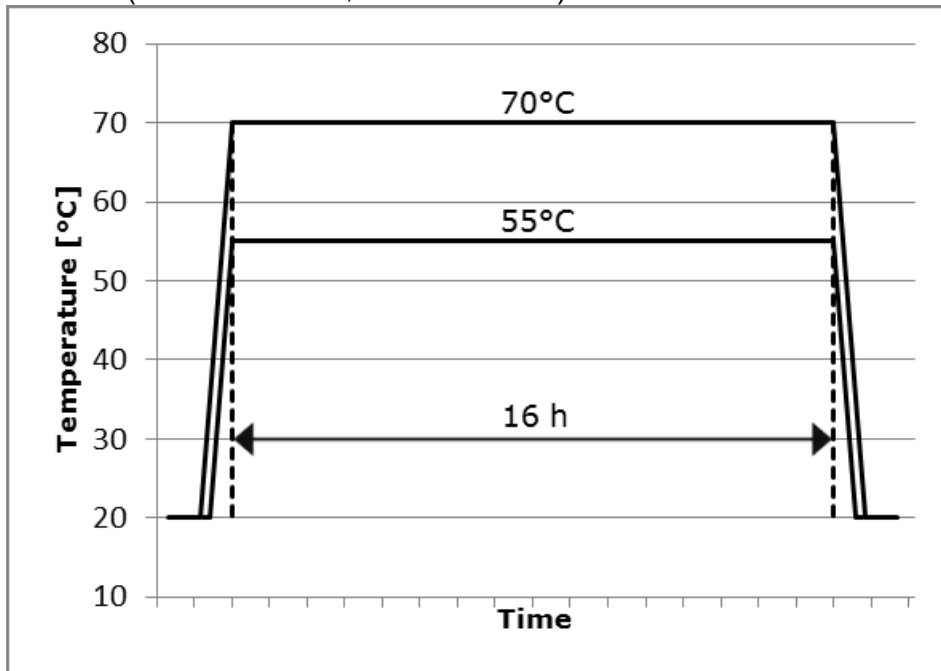
3.5. Dry Heat Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
116	Humidity Chamber	CTF	LY-2C-TH	2013122402	2024-09-17
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
160	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20756000	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IACS E10 N0.5, DNVCG-0339 CI 3.7)

B. Test Procedure (IEC 60945 Cl. 8.2, IACS E10 N0.05)



- The environmental test conditions: Protected area, Test Temperature: 55° ± 2°C
- Duration: 16 hours (the maximum rate of change of temperature is 1°C per min. average over a period of not more than 5 minutes).
- Put the EUT with power on condition inside 55 °C ± 2°C oven for 10 to 16 hrs. Tests were done at normal power supply of 24Vdc
- The last hour performance test with the most unfavorable power supply with extreme voltage of 21.6Vdc (DC - 10 %), at the end of test, change Voltage to 24Vdc
- After completion of the complete test cycle the EUT shall be kept at normal ambient conditions and fed by normal power supply for performance testing under load according to the relevant test program.

C. Result

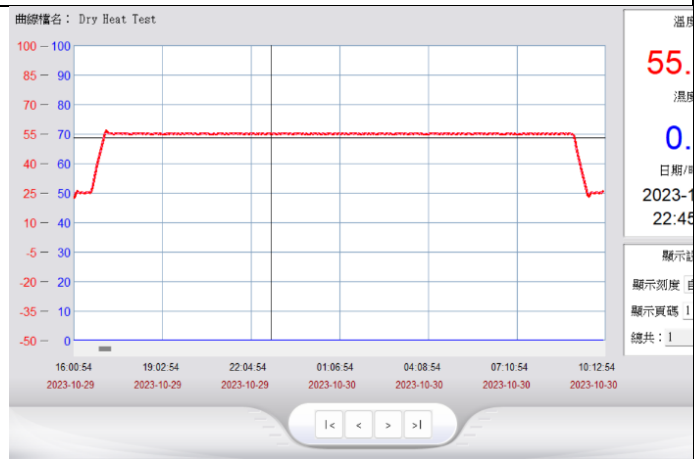
- The unit works normally.

D. Judgment

Passed



Put the EUT with OFF condition inside



Maintained at 55°C±0.1°C for 10 hrs



The last hours doing performance check



with Extreme power supply +30%



with Extreme power supply -10%



Test date : 2023-10-30~2023-11-01

Sample No.01

Ambient Temperature, °C : 22.73/22.60

, Relative Humidity, %RH : 55.99/60.38

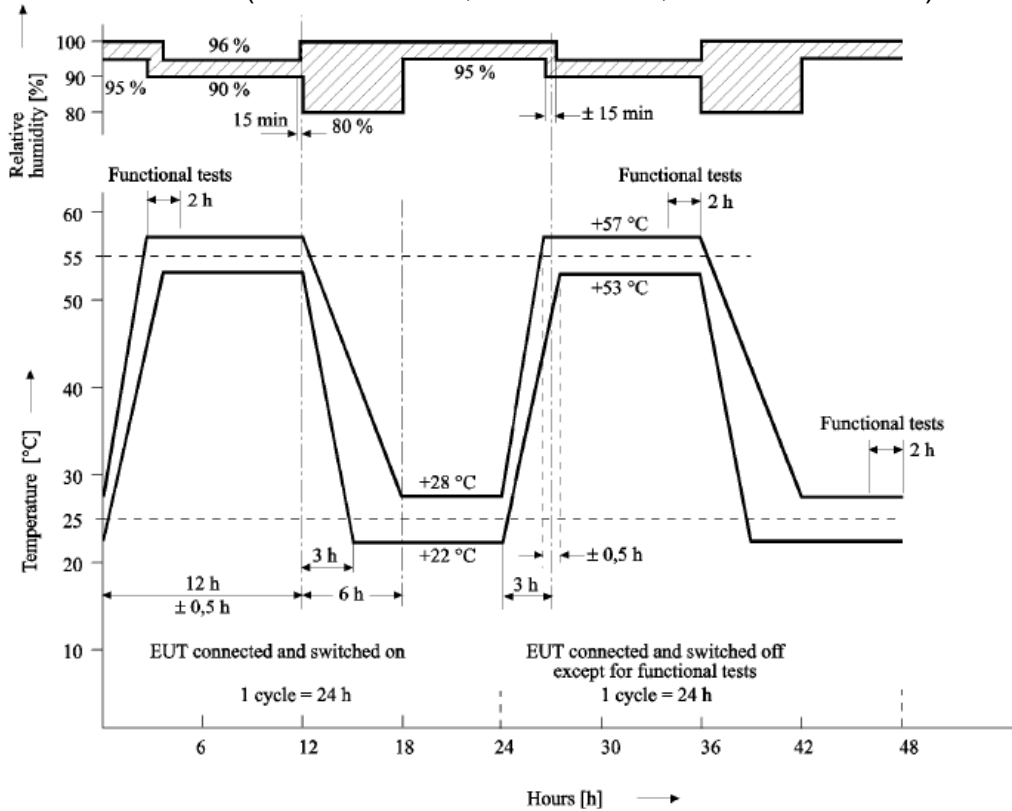
, Atmospheric pressure (kPa) : 988.6/993.0

3.6 Damp Heat Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
116	Humidity Chamber	CTF	LY-2C-TH	2013122402	2024-09-17
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
160	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20756000	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IEC 60945 Cl. 8.3, IACS E10 N0.6, DNV No.2.4 Cl. 3.8.3)



- Performance check and insulation resistance test at normal environmental condition After the preconditioning, the humidity and temperature cycling is carried out in accordance with IEC 60068-2-30 test Db.
- Test temperature 25 to 55°C ± 2°C at humidity 95% ± 3% RH for 24 hr (2 cycles)
- Power ON at first cycle and OFF at second cycle Performance check at 55°C within the first 2 hour of the first and the last 2 hour of the second cycle
- Within one hour at normal ambient humidity and temperature, the following tests shall be carried out, do performance test and insulation resistance test,
- Performance tests are to be performed at upper test temperature within the first 2 hours of the first test cycle, and the last 2 hours of the second test cycle at the test.
- Within one hour at normal ambient humidity and temperature, do the performance and insulation resistance test.

C. Result

- All functions are normal.

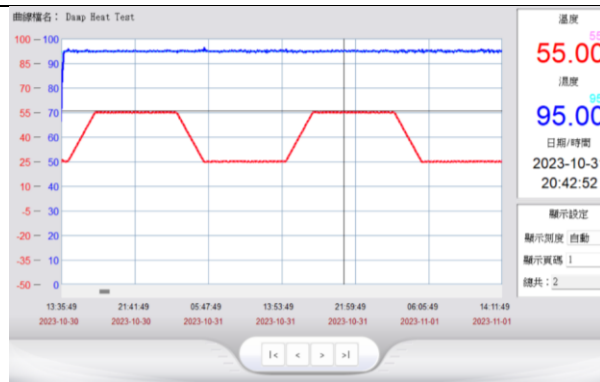
- No visual damage is detected
- After low temperature test, Insulation resistance measure is over 41,818 MΩ (Required minimum insulation resistance 1MΩ)

Insulation applied between	Test Voltage (Vdc)	Test time (sec)	Before Cold Test (10MΩ)	After Cold Test (1MΩ)
DC terminal to metal enclosure	48	60	Over 10 GΩ	Over 10 GΩ
DC terminal to output connector	48	60	Over 10 GΩ	Over 10 GΩ

D. Judgment :
Passed



Put the EUT inside



Power ON at first cycle 2 hour and the last of the second cycle 2 hours for functional test



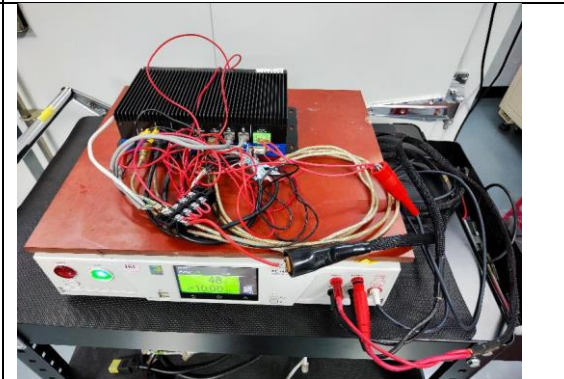
During the last 2 hour doing performance test (31.2Vdc)



During the last 2 hour doing performance test (21.6Vdc)



Insulation resistance test after Damp Heat Test (DC terminal to metal enclosure)



Insulation resistance test after Damp Heat Test (DC terminal to output connector)

Test date : 2023-11-02,2023-11-03,2023-11-06 Sample No.01

Ambient Temperature, °C : 22.37/21.89/
22.85

Relative Humidity, %RH : 5.61/55.94/
55.10

Atmospheric pressure (kPa) :990.3/ 990.8/
991.7

3.7 Vibration Test :

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
178	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20849899	2024-05-17
64	Barometric air pressure	Testo	511	39100826	2024-02-05
219	Electromagnetic vibration test	KING DESIGN	KD-9363-EM- 1000F2K-51N300	RF107293709	2024-07-16

B. Test Procedure (IEC 60945 Cl. 8.7, IACS E10 N0.7, DNV No.2.4 Cl. 3.6.2)

Search for resonance frequency:

- Vibration waveform: Sine waveform
- Resonance search frequency / Displacement: 5 Hz to 13.2 Hz – amplitude ± 1 mm
- Resonance search frequency / Acceleration: 13.2 Hz to 100Hz(0.5 oct/min), acceleration ± 0.7 g.
- Sweep rate: 0.5 oct/min (for IEC60945)
- Number of cycle : 1 cycle for each axis
- Vibration axes : X, Y and Z

Note : During resonance search test, an accelerometer was attached to the unit to measure its frequency response. For accelerometer location, see next page.

Endurance test:

Vibration axes : X, Y and Z

- duration in case of no resonance condition 120 minutes at 30 Hz; (IEC60945 required)
- duration at each resonance frequency at which $Q \geq 2$ is recorded - 120 minutes; (IEC60945 required)
- where sweep test is to be carried out instead of the discrete frequency test and a number of resonant frequencies is detected close to each other, duration of the test is to be 120 min. Sweep over a restricted frequency range between 0.8 and 1.2 times the critical frequencies can be used where appropriate.
- during the vibration test, functional tests are to be carried out;

C. Result

Search for resonance frequency:

- Number of resonant frequencies is detected at sweep rate: 0.5 oct/min(for IACS E10)
- There was no dwell resonance point find

Vibration axes	Resonance frequency (Hz)	Vibration acceleration (g)	Mechanical amplification (Q)
X axes	--	--	--
Y axes	--	--	--
Z axes	--	--	--

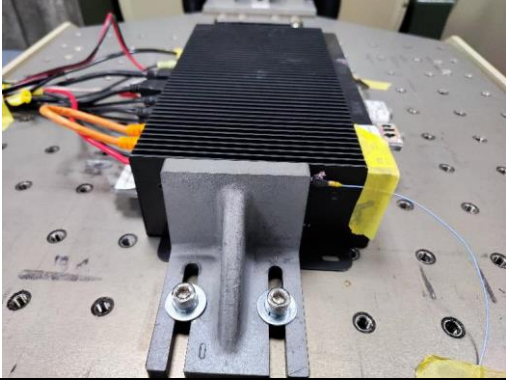
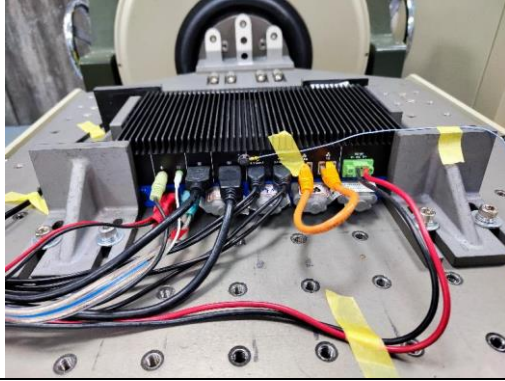
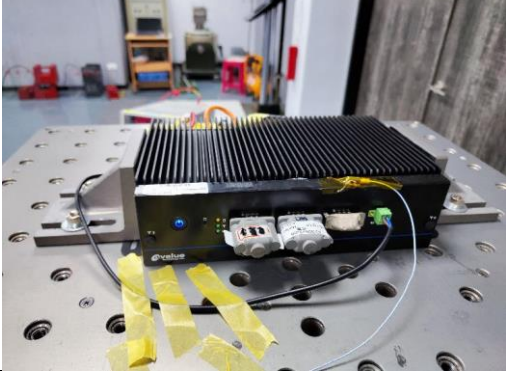
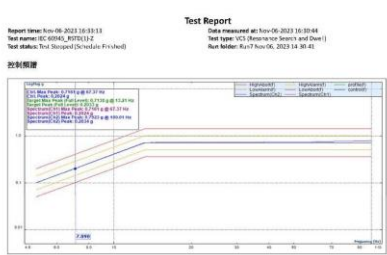
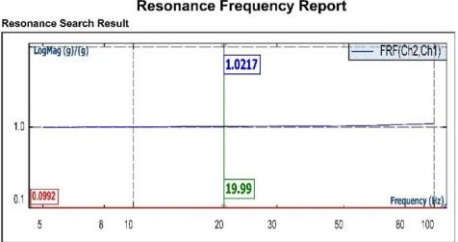
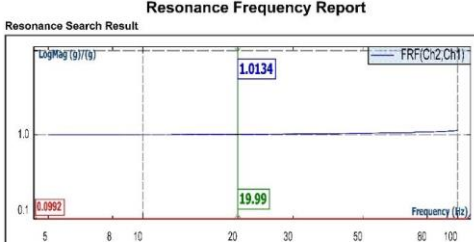
Endurance test:

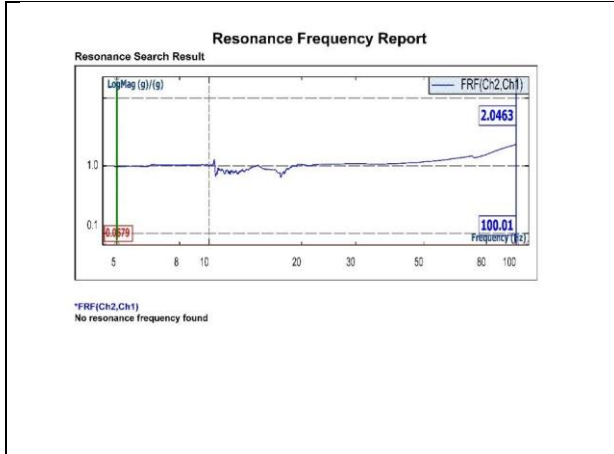
All axes were no resonance occurs ($Q < 2$)

Resonance frequency	resonance dwell duration / Vibration axes
30 Hz	Dell for 120 minutes at the lowest natural frequency for X axis
30 Hz	Dell for 120 minutes at the lowest natural frequency for Y axis
30 Hz	Dell for 120 minutes at the lowest natural frequency for Z axis

- The unit works normally at Vibration test.
- After endurance test, visual inspection showed no physical defect or functional degradation of the unit.

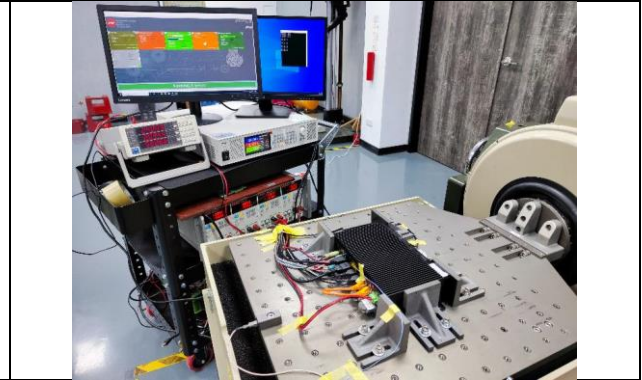
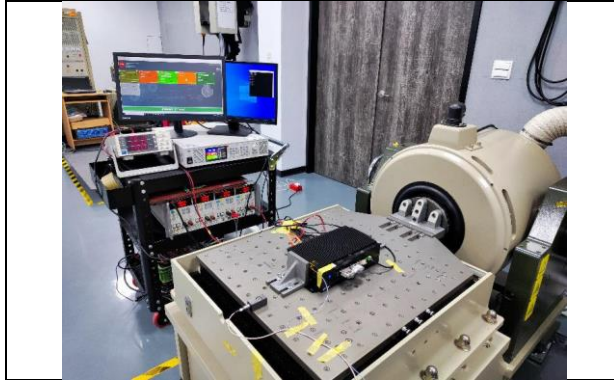
D. Judgment
Passed

	
<p>Accelerometer location (X axis)</p>	<p>Accelerometer location (Y axis)</p>
	 <p>Test Report <small>Report Name: RC-2023-10-02-13 Test Name: RC-0104_0105(1) Z Test Method: Test-Stopper(Schedule-Finish)</small> <small>Start Measurement At: 2023-10-26 10:38:44 Test Type: VCI (Resonance Search and Dwell) Run Number: 40/7 Nov/26, 2023 14:30:41</small></p> <p>Testing Time: <small>Remaining Time: 00:00:00 Run Start Time: Nov-26-2023 14:30:43 Test parameters: Current Frequency: 7.200 Hz Signal Max Pulse: 20.48</small></p> <p>Total elapsed time: 02:00:13 <small>Full level elapsed time: 02:00:00</small></p> <p>Sweeping Rate: 0.5 (1/3) Hz/s Sweep Number: 14 Sweep Type: Logarithmic</p>
<p>Accelerometer location (Z axis)</p>	
 <p>Resonance Frequency Report Resonance Search Result <small>*FRF(Ch2,Ch1) No resonance frequency found</small></p>	 <p>Resonance Frequency Report Resonance Search Result <small>*FRF(Ch2,Ch1) No resonance frequency found</small></p>
<p>Search for resonance frequency (X axis)</p>	<p>Search for resonance frequency (Y axis)</p>



Search for resonance frequency (Z axis)

Endurance test (30Hz 120mins)



Resonance / Endurance test (X axis)

Resonance / Endurance test (Y axis)



Resonance / Endurance test (Z axis)



Test date : 2023-10-23

Sample No.01

Ambient Temperature, °C : 20.46 , Relative Humidity, %RH : 61.21 , Atmospheric pressure (kPa) : 991.1

3.8 Extreme power supply

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
155	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20755995	2024-04-25
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure (IEC 60945 Cl. 7.1)

Environment	Normal power supply	Extreme power supply
Dry heat	Performance test	Performance check
Damp heat	Performance check	--
Low temperature	Performance test	Performance check
Normal temperature	Performance test	Performance test

- Normal power supply

Rated voltage= 24VDC= Un, Exposures, each with a duration of 10 minutes, The test specimens are observed during the exposures, and a functional test is performed at the end of each exposure.

- Extreme power supply are performed at the following:

supply voltages:

U1 = Un+30% = 31.2 Vdc (worse case IEC 60945 Cl. 5.2.2)

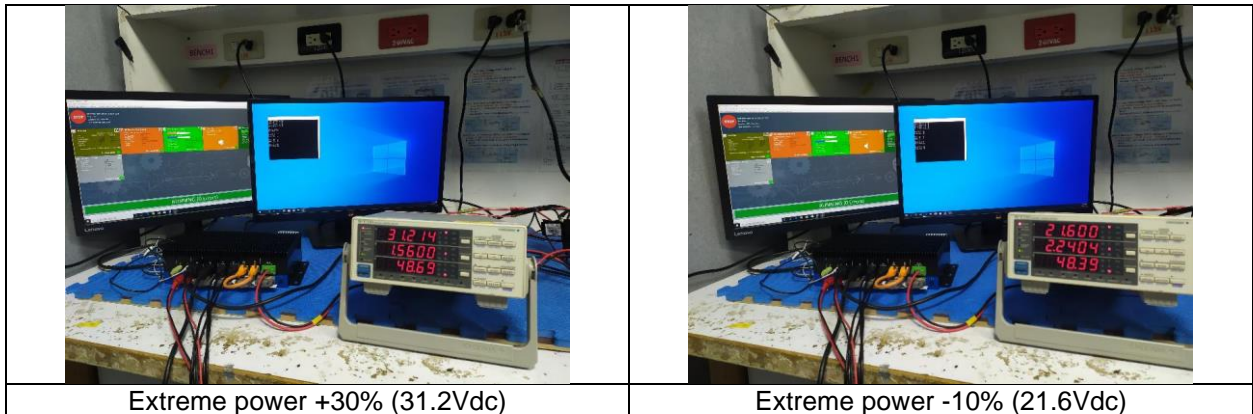
U2 = Un-10% = 21.6 Vdc (worse case IEC 60945 Cl. 5.2.2)

C. Result

- All functions are normal.

D. Judgment :

Passed



Test date : 2023-11-08

Sample No.01

Ambient Temperature, °C : 21.13

, Relative Humidity, %RH : 48.93 , Atmospheric pressure (kPa) : 986.6

3.9 Excessive Conditions

3.9.1 Excessive Current Test

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
181	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20849902	2024-05-17
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure

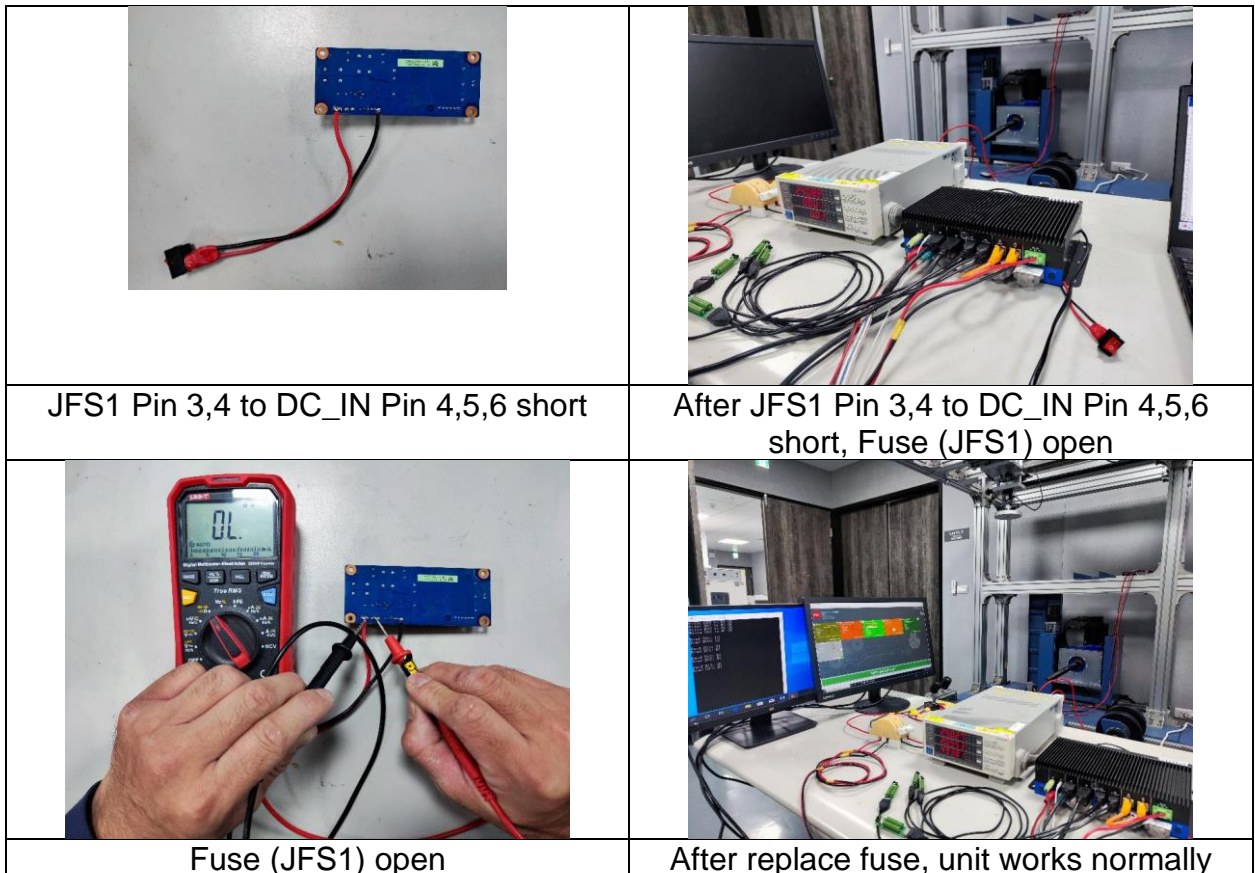
Short circuit on the Positive and Negative input after the fuse in the EUT.

C. Result

- The fuse in the EUT open immediately.
- Check the performance at normal test conditions after replacing a new fuse of the same rating. The unit works normally.

D. Judgment

Passed



3.9. Excessive Conditions

3.9.2 Excessive Voltage Test

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
181	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20849902	2024-05-17
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure



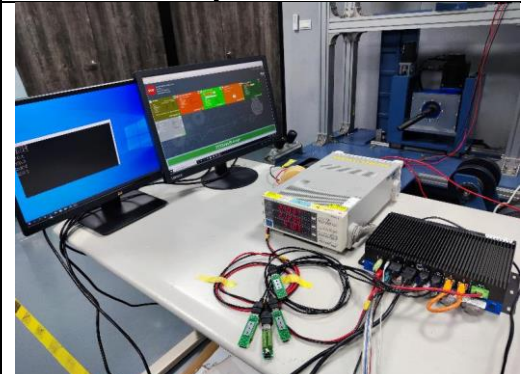
- Set the DC input voltage to + 30 %, of the rated voltage (31.2 Vdc used for the test) for a period of 5 min.
- Increase once every 5 min (increase 1Vdc or 10Vac) from extreme power supply (31.2 Vdc), until the unit power board damage.

C. Result

- The unit works normally at extreme power supply (31.2Vdc).
- The power supply increase to 67Vdc, unit shutdown by power board OVP function.
- After reissue normal operator power 24Vdc, unit works normally. (No component damage), performance function check normally.

D. Judgment

Passed

	
<p>Increase power supply to 66Vdc the unit works normally</p>	<p>Increase power supply to 67Vdc the unit shutdown</p>
	<p>Reissue normal operator power 24Vdc, unit works normally (No component damage)</p>

Test date : 2023-11-08

Sample No.01

Ambient Temperature, °C : 21.13

, Relative Humidity, %RH : 48.93 , Atmospheric pressure (kPa) : 986.6

3.9. Excessive Conditions

3.9.3 Power Supply Misconnection Test

A. Instrument

No.	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
70	Digital Power Meter	Yokogawa	WT210	91L239353	2024-09-27
72	Electronic Load	Prodigit	3301A 3321*4	91201AA0011	2024-09-06
181	Temperature/Relative Humidity Data Logger	HOBO	MX1101	20849902	2024-05-17
64	Barometric air pressure	Testo	511	39100826	2024-02-05

B. Test Procedure

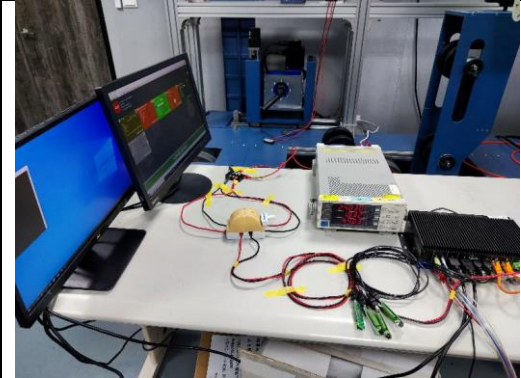
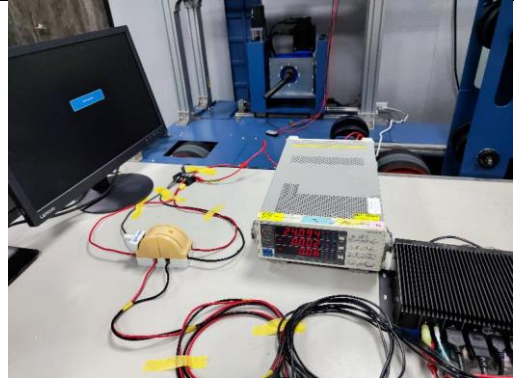
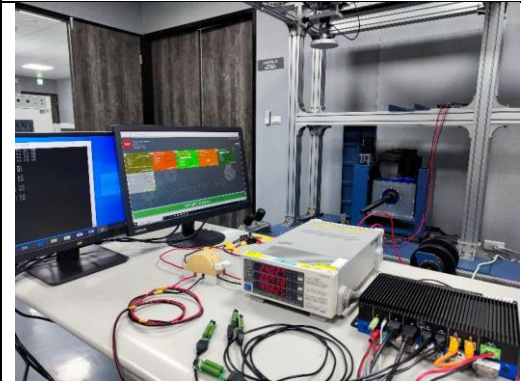
- The unit works at normal test conditions.
- Reverse the DC power source positive and negative polarity for a period of 5 min

C. Result

- The unit doesn't work at reverse the DC power source.
- Return to the correct polarity and check the performance test, the unit works normally.

D. Judgment

Passed

	
<p>Normal test conditions</p>	<p>Reverse the DC power source, unit shutdown</p>
	
<p>Return to the correct polarity , the unit work normally</p>	

Test date :

Test by :

Review by :

Ambient Temperature, °C :

, Relative Humidity, %RH :

, Atmospheric pressure (kPa) :

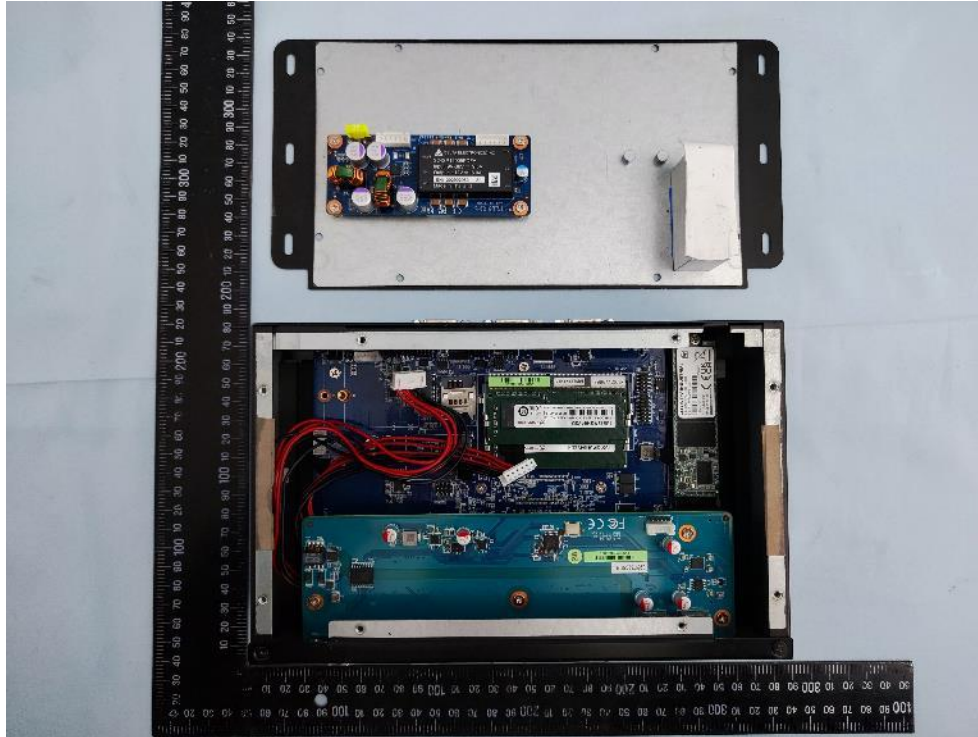
4. Photographs of EUT



Front View of EUT



Rear View of EUT



Label



Product Name: Industrial Marine Computer

Model name: EMS-TGL-Marine

Input rating: 24Vdc/3A

This device complies with part 15 of the FCC Rules.
 Operation is subject to the following two conditions: (1)
 This device may not cause harmful interference, and (2)
 this device must accept any interference received, including
 interference that may cause undesired operation.

Safe compass
 distance
 Standard: 10.0 cm
 Steering: 10.0 cm

Manufacturer:
 AVALUE TECHNOLOGY INCORPORATION.
<https://www.avalu.com>
 MADE IN TAIWAN

Attachment

IEC 60945 C.1 11.2 Compass Safe Distance Test Report

Test By Taiwan Testing and Certification Center EMC Testing Laboratory

Report No.: 23-09-MAS-050



TEST REPORT

IEC 60945 C.1 11.2: Compass Safe Distance

Report No.: 23-09-MAS-050




Applicant : AVALUE TECHNOLOGY INCORPORATION.
Name of Goods Industrial Marine Computer
Model Number EMS-TGL-Marine
Comment Issues: N/A
Manufacturer/supplier: AVALUE TECHNOLOGY INCORPORATION.

Date test item received 2023/09/26
Date test campaign completed 2023/11/09
Date of issue 2023/11/21

The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.

Total number of pages of this test report: 10 pages



Test Engineer	Checked By	Approved By
 Andy Wang	 Kuang Chi Yu	 Jerry Huang

Taiwan Testing and Certification Center
EMC Testing Laboratory
NO.8, LANE 29, Wenming Rd.,
Guishan Dist., Taoyuan City 33383,
Taiwan, R.O.C.

TEL: (03) 3276170~4
INT: +886-3-3276170~4
FAX: (03) 3276188
INT: +886-3-3276188

Laboratory Introduction: Electronics Testing Center, Taiwan is recognized, filed and mutual recognition arrangement as following:


- ① ISO/IEC 17025: BSMI, TAF, NCC, CBTL(JQA), TUV Rheinland
- ② Filing: FCC, IESD(IC), VCCI
- ③ MRA: Australia, New Zealand, Singapore, Japan, ILAC MRA through TAF
- ④ FCC Registration Number: TW0371、TW1112



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1 TEST REPORT CERTIFICATION**【測試報告證明書】**

Applicant : AVALUE TECHNOLOGY INCORPORATION.
Address : 7F, 228, Lian-cheng Road, Zhonghe Dist., New Taipei City 235, Taiwan
Manufacturer : AVALUE TECHNOLOGY INCORPORATION.
Address : 7F, 228, Lian-cheng Road, Zhonghe Dist., New Taipei City 235, Taiwan
Name of Goods : Industrial Marine Computer
Trade Name : AVALUE 
Model No. : EMS-TGL-Marine
Test Method : IEC 60945 C.1 11.2: Compass Safe Distance
IMDG (International Maritime Dangerous)

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product.

This report shall not be reproduced except in full, without the approval of ETC.

The Certification is responsible for the testing of magnetized property of goods.

(本報告僅對貨物的磁性測試負責)

2.TEST DATA & RELATED INFORMATIONS

Test Date 測試日期	2023/11/09	
Test Specification (測試規格)	IEC 60945 Clause 11.2	
Name & Model (貨品名稱)	Industrial Computer	
Climatic Condition (環境狀態)	Ambient Temperature: <u>30</u> °C	Relative Humidity: <u>61</u> % RH
Test Method (測試方法)	<input checked="" type="checkbox"/> Gyro Compass Method	<input type="checkbox"/> Gaussian field strength meter
Test Setup (測試配置)	<input type="checkbox"/> Floor Standing Equipment	<input checked="" type="checkbox"/> Table-Top Equipment
Power Supply System	DC Power: <u>24</u> Vdc	
Other Notice	1. System power ON , test eight angles (Full system) 2. Display+HDMI 3. Run Burnin test 4. Run LoopGPIO	

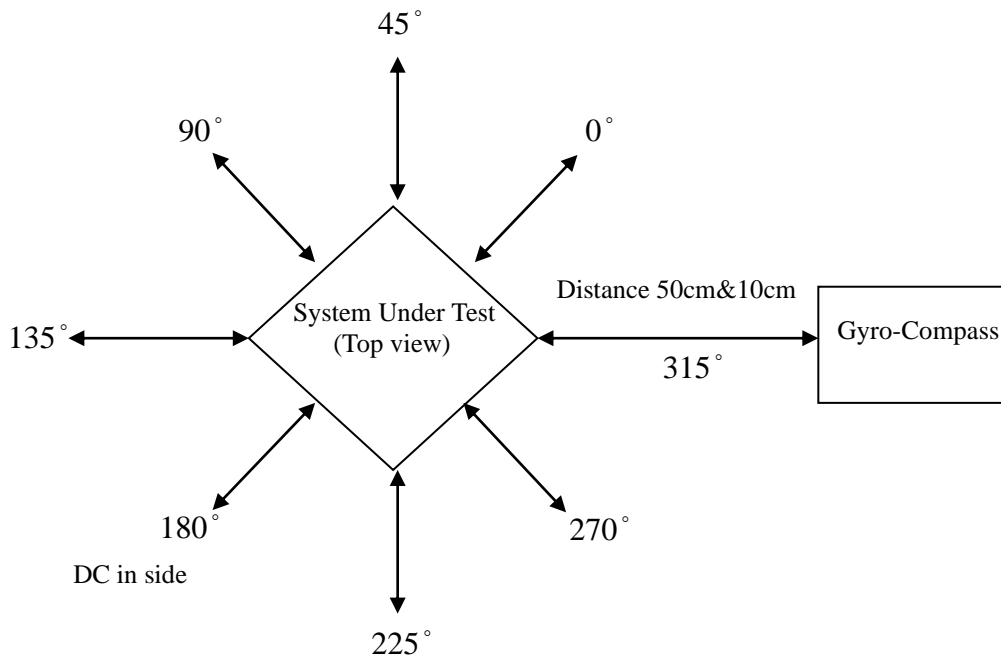
EQUIPMENTS LIST FOR TESTING

Name	Manufacturer	Model
Gyro Compass	SAN OU	SY-11
LCD MONITOR (Display cable shielding 1.8m)	DELL	U2412MB
LCD MONITOR (HDMI cable shielding 1.8m)	DELL	P2415Qb
USB KEYBOARD (Usb cable non-shielding 1.8m)	DELL	KB4021
USB MOUSE (Usb cable non-shielding 1.5m)	Lemel	M857PU
USB 3.0 HDD * 4	WD Elements	N/A

EUT test Degree ° (待測物測試角度)	Distance (cm) (距離)	Gyro-Compass Degree ° (電羅經偏轉角度)	Limit Degree ° (限制偏轉角度)	Result (結果)
0°	50	0.6	5.4	Complied
45°	50	1.0	5.4	Complied
90°	50	1.4	5.4	Complied
135°	50	0.8	5.4	Complied
180°	50	0.7	5.4	Complied
225°	50	0.3	5.4	Complied
270°	50	0.3	5.4	Complied
315°	50	0.4	5.4	Complied

EUT test Degree° (待測物測試角度)	Distance (cm) (距離)	Gyro-Compass Degree° (電羅經偏轉角度)	Limit Degree° (限制偏轉角度)	Result (結果)
0°	10	2.2	5.4	Complied
45°	10	3.1	5.4	Complied
90°	10	4.3	5.4	Complied
135°	10	3.4	5.4	Complied
180°	10	1.6	5.4	Complied
225°	10	0.6	5.4	Complied
270°	10	0.7	5.4	Complied
315°	10	0.9	5.4	Complied

Result: **Complied (符合)** Does not comply



Test Date 測試日期	2023/11/09	
Test Specification (測試規格)	IEC 60945 Clause 11.2	
Name & Model (貨品名稱)	Industrial Computer	
Climatic Condition (環境狀態)	Ambient Temperature: <u>30</u> °C	Relative Humidity: <u>61</u> % RH
Test Method (測試方法)	<input checked="" type="checkbox"/> Gyro Compass Method	<input type="checkbox"/> Gaussian field strength meter
Test Setup (測試配置)	<input type="checkbox"/> Floor Standing Equipment	<input checked="" type="checkbox"/> Table-Top Equipment
Power Supply System	DC Power: <u>---</u> Vdc	
Other Notice	5. System power OFF , test eight angles (Full system)	

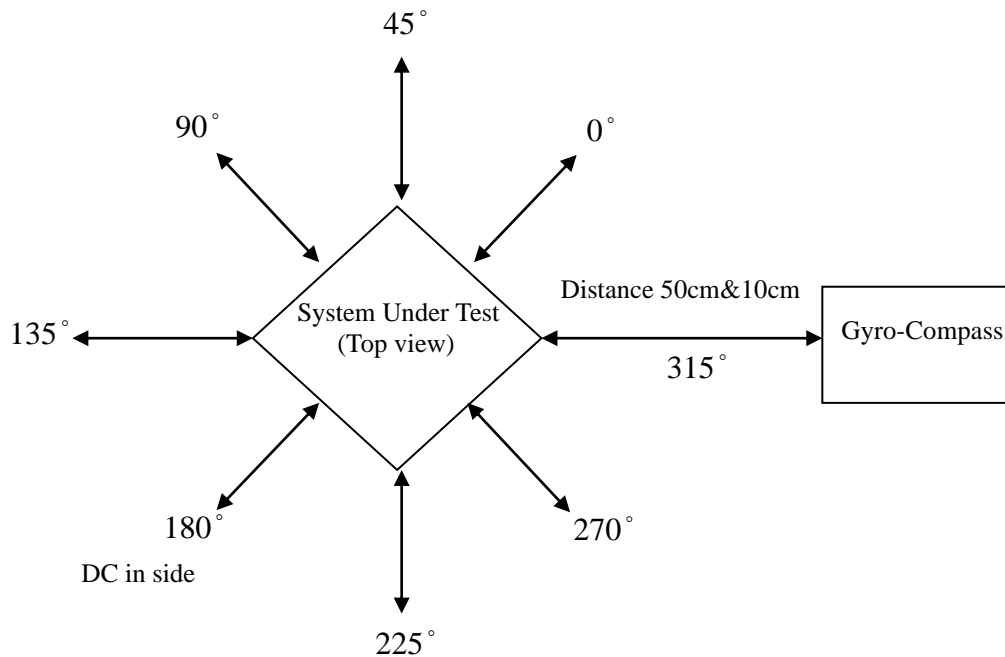
EQUIPMENTS LIST FOR TESTING

Name	Manufacturer	Model
Gyro Compass	SAN OU	SY-11
LCD MONITOR (Display cable shielding 1.8m)	DELL	U2412MB
LCD MONITOR (HDMI cable shielding 1.8m)	DELL	P2415Qb
USB KEYBOARD (Usb cable non-shielding 1.8m)	DELL	KB4021
USB MOUSE (Usb cable non-shielding 1.5m)	Lemel	M857PU
USB 3.0 HDD * 4	WD Elements	N/A

EUT test Degree° (待測物測試角度)	Distance (cm) (距離)	Gyro-Compass Degree° (電羅經偏轉角度)	Limit Degree° (限制偏轉角度)	Result (結果)
0°	50	0.6	5.4	Complied
45°	50	0.8	5.4	Complied
90°	50	1.0	5.4	Complied
135°	50	0.8	5.4	Complied
180°	50	0.5	5.4	Complied
225°	50	0.3	5.4	Complied
270°	50	0.1	5.4	Complied
315°	50	0.2	5.4	Complied

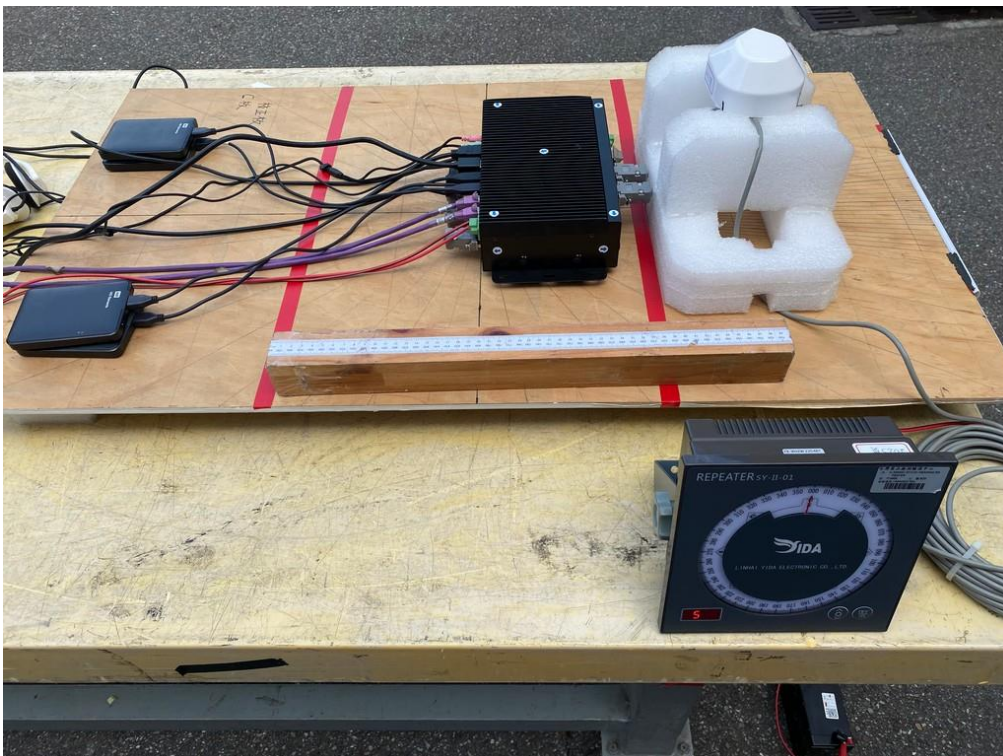
EUT test Degree° (待測物測試角度)	Distance (cm) (距離)	Gyro-Compass Degree° (電羅經偏轉角度)	Limit Degree° (限制偏轉角度)	Result (結果)
0°	10	2.0	5.4	Complied
45°	10	3.4	5.4	Complied
90°	10	4.1	5.4	Complied
135°	10	3.1	5.4	Complied
180°	10	1.7	5.4	Complied
225°	10	0.6	5.4	Complied
270°	10	0.4	5.4	Complied
315°	10	0.7	5.4	Complied

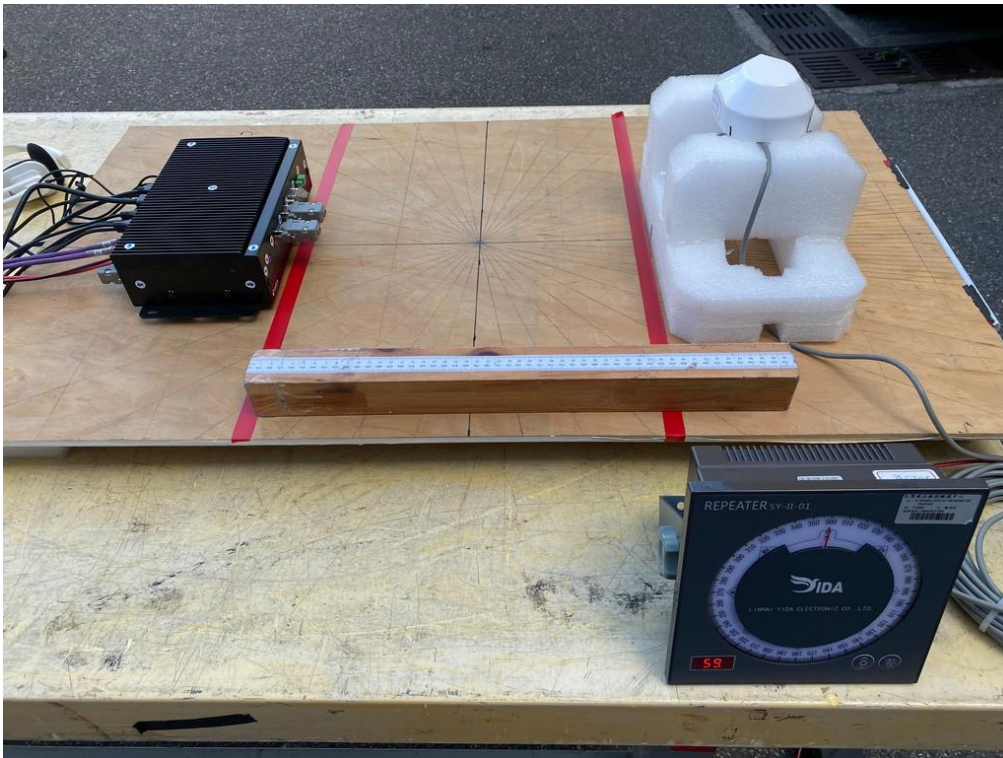
Result: **Complied (符合)** Does not comply



3.TEST PHOTOS

1. Test Setup (10cm)



2. Test Setup (50cm)

3. Industrial Marine Computer**4. Industrial Marine Computer**