



Reliability Laboratory

TEST REPORT



Report No.: HHD0021B/2016

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Date: January 19, 2017

ALLTEK MARINE ELECTRONICS CORP.
14F-2, NO. 237, SEC. 1, DATONG RD., XIZHI DISTRICT,
NEW TAIPEI CITY, TAIWAN

The following merchandise was submitted and identified by the vendor as:

Product Description: GPS Antenna
Style/ Item No.: GA-22/ No.1
Manufacturer/ Vendor: Alltek Marine Electronics Corp.
Country of Origin: Taiwan
Quantity: Total 1 piece
Testing Period: Jan. 3, 2017 to Jan. 5, 2017

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

Test Required:

Test for Degrees of Protection Provided by Enclosures (IEC 60529 Edition 2.2: 2013)

| IP Code | 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 |

Test Results:

| Conclusion |
|--|
| Submittals sample(s) comply with the requirement and acceptance conditions of IEC 60529 Edition 2.2: 2013 Degrees of Protection Provided by Enclosures -- IP67 The detailed description of test result, please see attached sheet(s). |

*HHD0021/2016, dated on January 12, 2017, is hereby canceled and replaced by HHD0021B/2016.

Signed for and on behalf of
SGS TAIWAN Ltd.

Ivan Wang

Ivan Wang
Team Leader

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Test for Degrees of Protection Provided by Enclosures:Test Equipment:

| Name | Brand | Model | Serial No. |
|--------------------------|-----------|----------------|-------------|
| 1.0 mm Test Wire Probe | ED&D | TRP-02 | B0050180 |
| Digital Force Gauge | ALGOL | HF-50 | HF-110822 |
| Dust Tester | T-MACHINE | TMJ-9723C | T-23-050411 |
| IPX7/IPX8 Immersion Tank | Self-made | SGS-ETR-030201 | ETR000001 |

Lab Environmental Conditions:Ambient temperature: $(25 \pm 3) ^\circ\text{C}$ Ambient humidity: $(55 \pm 20) \% \text{ RH}$ Test Method/ Specification:

Test method: IEC 60529 Edition 2.2: 2013 --IP67

1. Test for protection against access to hazardous parts:

Test method: The test wire with 1.0 mm in diameter and 100 mm long is pushed against or inserted through any openings of the enclosure with designated force. Examine whether the test wire touches the hazardous live parts inside the enclosure or not.

Test force: 1 N \pm 10 %**2. Test for protection against solid foreign objects:**Test method: Dust testSample condition: Non-OperatingType of dust: Talcum powderThe amount of dust: 2 kg per cubic meter of the chamber volumeThe maximum depression: < 20 mbarTest duration: 8 hours

- Examine the protection against ingress dust of specimen(s) and perform functional check after this test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Test Method/ Specification--Continued:

3. Test for protection against water:Sample condition: Non-OperatingTest means: Completely immerse the specimen in water in its service position as specified by client.Test condition: See below items marked “●”.

| | |
|---|--|
| ● | 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 minutesTest Device: As shown in photo 4

- Examine the protection against ingress water of specimen(s) and perform functional check after this test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:Style/ Item No.: GA-22/ No.1Quantity: Total 1 pieceTest Result:

A. Degrees of protection against access to hazardous parts and against solid foreign objects (IP6X)

A-1 Test for protection against access to hazardous parts (IP6X)

| Test Result | | |
|---|---|-----------------|
| Check Item | | Style/ Item No. |
| | | GA-22/ No.1 |
| 1 | Does the test wire penetrate any openings of the enclosure? | No |
| 2 | (followed 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 | (followed check item 2) Does adequate clearance be kept between the test wire and hazardous live parts or hazardous mechanical parts? | N/A |
| Note 1: N/A means "Not Applicable". | | |
| Note 2: The check items in this test report for inspecting the degree of protection provided by enclosures are reference to the requirements specified in IEC 60529 Edition 2.2: 2013 and in accordance with the acceptance conditions specified by client. | | |

A-2 Test for protection against solid foreign objects (IP6X)

| Test Result | | |
|---|---|-----------------|
| Check Item | | Style/ Item No. |
| | | GA-22/ No.1 |
| 1 | Does any dust deposit inside the enclosure? | No |
| 2 | Functional check | Normal |
| Note 1: N/A means "Not Applicable". | | |
| Note 2: The check items in this test report for inspecting the degree of protection provided by enclosures are reference to the requirements specified in IEC 60529 Edition 2.2: 2013 and in accordance with the acceptance conditions specified by client. | | |

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Test Result--Continued:

B. Degree of protection against ingress of water (IPX7)

| Test Result | | |
|--|--|-----------------|
| Check Item | | Style/ Item No. |
| | | GA-22/ No.1 |
| 1 | Does any water enter the enclosure? | No |
| 2 | (followed check item 1) If any water has entered, does the water accumulate near the cable end or live parts? | N/A |
| 2.1 | (followed check item 2) Does the water be sufficient to interfere with the correct operation of the equipment or impair safety? | N/A |
| 2.2 | (followed check item 2.1) Does the water deposit on insulation parts where it could lead to tracking along the creepage distances? | N/A |
| 2.3 | (followed check item 2.2) Does the water reach live parts or windings not designed to operate when wet? | N/A |
| 3 | Functional check | Normal |
| Note 1: N/A means "Not Applicable". Note 2: The check items in this test report for inspecting the degree of protection provided by enclosures are reference to the requirements specified in IEC 60529 Edition 2.2: 2013 and in accordance with the acceptance conditions specified by client. | | |

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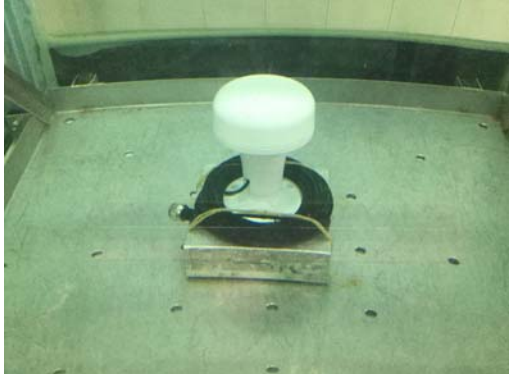
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Test Photos:

| | |
|--|---|
|  |  |
| 1. Appearance of specimen | 2. Appearance of specimen |
|  |  |
| 3. Test for protection against solid foreign objects (Dust test) | 4. Test for protection against water |

— — — The End of Test Report — — —

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