



Reliability Laboratory

TEST REPORT

Report No.: HC20045/2017
Page: 1 of 17
Date: March 27, 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 set
Testing Period: Feb. 12, 2017 to Mar. 22, 2017

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

Test Required: (According to client's test specification, please see following sheets in detail.)

1. Dry Heat Storage Test
2. Dry Heat Functional Test
3. Damp Heat Functional Test
4. Low Temperature Functional Test
5. Salt Mist Test

Test Results: -PLEASE SEE ATTACHED SHEETS-

Signed for and on behalf of
SGS TAIWAN Ltd.

Winson Tseng
Asst. Manager

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1. Dry Heat Storage Test:

Test Equipment:

Name	Brand	Model	Serial No.
Programmable Temperature & Humidity Chamber	KSON	THS-D6TS-150+LN2	A0495

Lab Environmental Conditions:

Ambient temperature: $(25 \pm 3) ^\circ\text{C}$

Ambient humidity: $(55 \pm 20) \% \text{RH}$

Test Method/ Specification:

Test method: IEC 60945: 2002, Dry Heat Storage Test

Step	Temperature ($^\circ\text{C}$)	Time (minutes)	Sample condition
1	25→70	45	Non-operating
2	70	600	Non-operating
3	70→25	45	Non-operating
4	25	30	Operating and perform functional check

Test cycle: Total 1 cycle

- Examine the appearance of specimen(s) by visual check and perform functional check after test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:

Style/ Item No.: GA-22/ No.1

Quantity: Total 1 set

Test Result:

<div style="text-align: center;">Check Item</div> <div style="text-align: left;">Style/ Item No.</div>	<div style="text-align: center;">Appearance check (Visual check)</div>	<div style="text-align: center;">Functional Check</div>
GA-22/ No.1	No visible damage	Normal

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2. Dry Heat Functional Test:

Test Equipment:

Name	Brand	Model	Serial No.
Programmable Temperature & Humidity Chamber	KSON	THS-D6TS-150+LN2	A0495

Lab Environmental Conditions:

Ambient temperature: $(25 \pm 3) ^\circ\text{C}$

Ambient humidity: $(55 \pm 20) \% \text{RH}$

Test Method/ Specification:

Test method: IEC 60945: 2002, Dry Heat Functional Test

Step	Temperature ($^\circ\text{C}$)	Time (minutes)	Sample condition
1	25→55	30	Operating
2	55	600	Operating
3	55	30	Operating and perform functional check

Test cycle: Total 1 cycle

- Examine the appearance of specimen(s) by visual check and perform functional check after test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:

Style/ Item No.: GA-22/ No.1

Quantity: Total 1 set

Test Result:

Check Item	Appearance check (Visual check)	Functional Check
Style/ Item No.		
GA-22/ No.1	No visible damage	Normal

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3. Damp Heat Functional Test:

Test Equipment:

Name	Brand	Model	Serial No.
Programmable Temperature & Humidity Chamber	KSON	THS-D6TS-150+LN2	A0495

Lab Environmental Conditions:

Ambient temperature: $(25 \pm 3) ^\circ\text{C}$

Ambient humidity: $(55 \pm 20) \% \text{RH}$

Test Method/ Specification:

Test method: IEC 60945: 2002, Damp Heat Functional Test

Step	Temperature ($^\circ\text{C}$)	Humidity (%RH)	Time (minutes)	Sample condition
1	25→40	--→93	180	Non-Operating
2	40	93	600	Non-Operating
3	40	93	30	Non-Operating
4	40	93	120	Operating and perform functional check
5	40→25	93→-	60	Operating

Test cycle: Total 1 cycle

- Examine the appearance of specimen(s) by visual check and perform functional check after test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:

Style/ Item No.: GA-22/ No.1

Quantity: Total 1 set

Test Result:

<div style="text-align: center;">Check Item</div> <div style="text-align: left;">Style/ Item No.</div>	<div style="text-align: center;">Appearance check (Visual check)</div>	<div style="text-align: center;">Functional Check</div>
GA-22/ No.1	No visible damage	Normal

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4. Low Temperature Functional Test:

Test Equipment:

Name	Brand	Model	Serial No.
Programmable Temperature & Humidity Chamber	KSON	THS-D6TS-150+LN2	A0495

Lab Environmental Conditions:

Ambient temperature: $(25 \pm 3) ^\circ\text{C}$

Ambient humidity: $(55 \pm 20) \% \text{RH}$

Test Method/ Specification:

Test method: IEC 60945: 2002, Low Temperature Functional Test

Step	Temperature ($^\circ\text{C}$)	Time (minutes)	Sample condition
1	25→-25	50	Non-operating
2	-25	600	Non-operating
3	-25	30	Non-operating
4	-25	120	Operating and perform functional check
5	-25→25	50	Operating
Test cycle: Total 1 cycle			

- Examine the appearance of specimen(s) by visual check and perform functional check after test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:

Style/ Item No.: GA-22/ No.1

Quantity: Total 1 set

Test Result:

<div style="text-align: center;">Check Item</div> <div style="text-align: left;">Style/ Item No.</div>	<div style="text-align: center;">Appearance check (Visual check)</div>	<div style="text-align: center;">Functional Check</div>
GA-22/ No.1	No visible damage	Normal

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5. Salt Mist Test:

Test Equipment:

Name	Brand	Model	Serial No.
Salt Spray Test Chamber	YI-SANG	ST-BS-S	EC10092914
Programmable Temperature & Humidity Chamber	KSON	THS-D6TS-150+LN2	A0495

Lab Environmental Conditions:

Ambient temperature: (25 ± 3) °C

Ambient humidity: (55 ± 20) % RH

Test Method/ Specification:

Test method: IEC60945 Edition 4.0: 2008, 8.12

Sample Condition: Non-Operating

Test procedure: The Salt Mist test includes two test items. The test sequence is shown as below.

Salt Mist Test	
Test Sequence	Test Action/ Item
1	Salt mist Test, exposing for 2 hours.
2	Temperature & Humidity Storage Test, exposing for 168 hours.

Above test sequences shall be performed for 4 cycles.

(1) Salt Spray test:

Salt solution: 5 wt.% NaCl solution

pH of solution: 6.5-7.2

Temperature: (25 ± 2) °C

Quantity of Mist : 1.0 ~2.0 ml/ 80 cm²/ hour

Exposing duration: 2 hours/ cycle

- Remove the specimen(s) from Salt Spray Test Chamber to Temperature & Humidity Storage Test immediately.

Test Method/ Specification--Continued:

(2)Temperature & Humidity Storage Test:

Temperature: 40 °C
Humidity: 95 %RH
Exposing duration: 168 hours/ cycle

- Examine the appearance of specimen(s) by visual check and perform functional check after test.
- Functional check: Examine whether the GPS 3D fixed or not.

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Specimen:

Style/ Item No.: GA-22/ No.1

Quantity: Total 1 set

Test Result:

<div style="text-align: center;">Check Item</div> <div style="text-align: left;">Style/ Item No.</div>	<div style="text-align: center;">Appearance check (Visual check)</div>	<div style="text-align: center;">Functional Check</div>
GA-22/ No.1	No visible damage	Normal

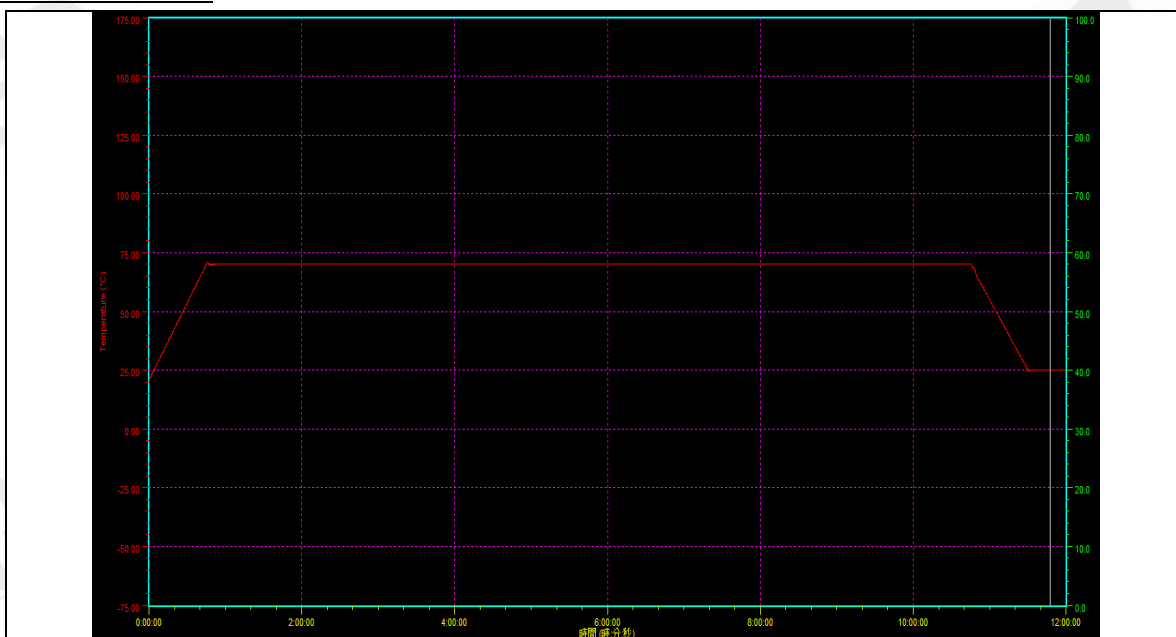
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Test Photos:

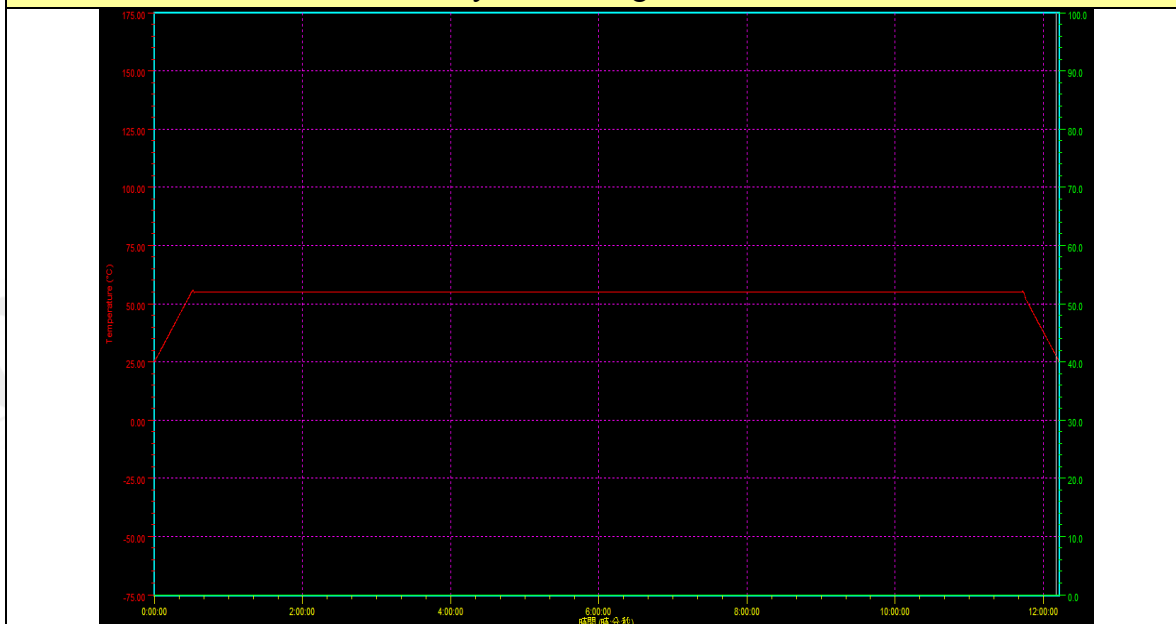


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Chamber Test Profile:



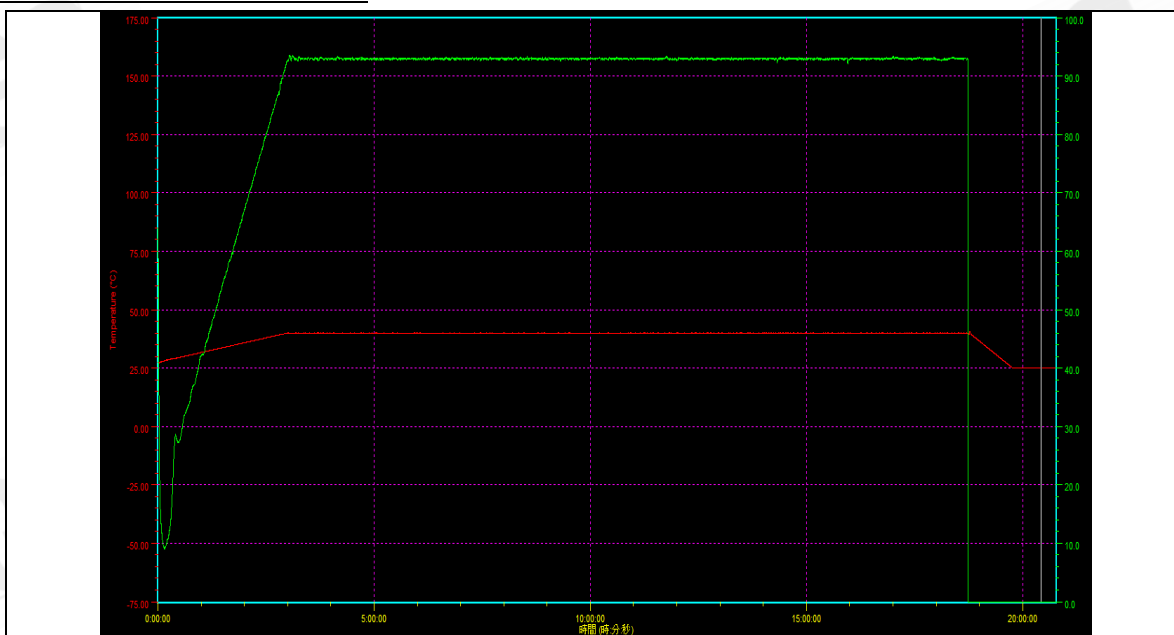
6. Dry Heat Storage Test Profile



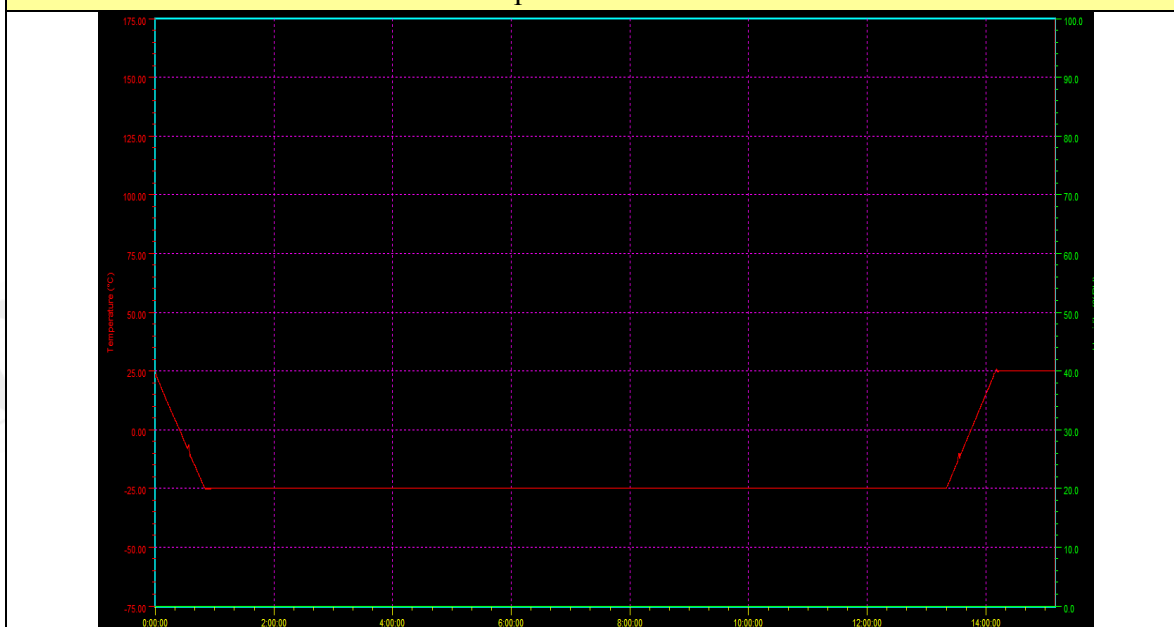
7. Dry Heat Functional Test Profile

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Chamber Test Profile--Continued:



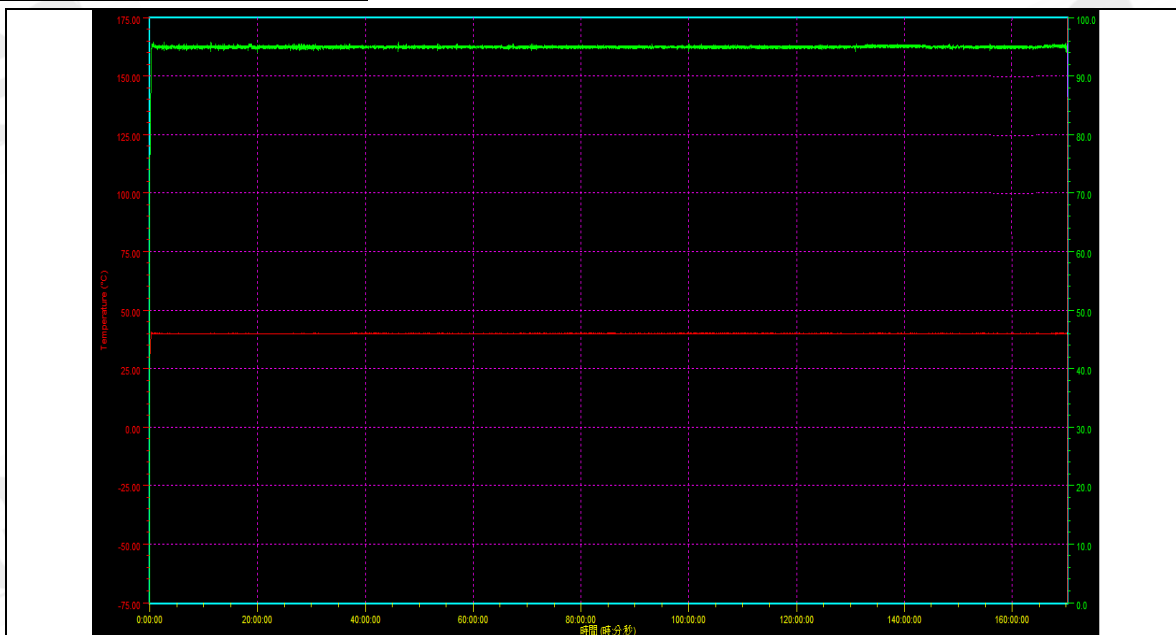
8. Damp Heat Functional Test



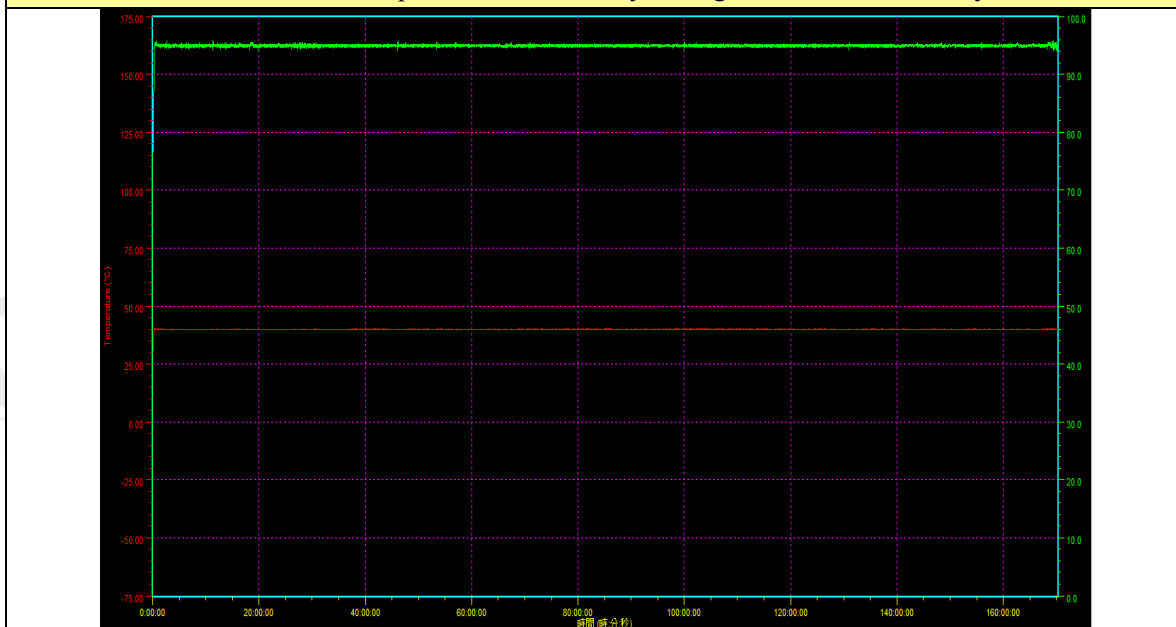
9. Low Temperature Functional Test

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Chamber Test Profile--Continued:



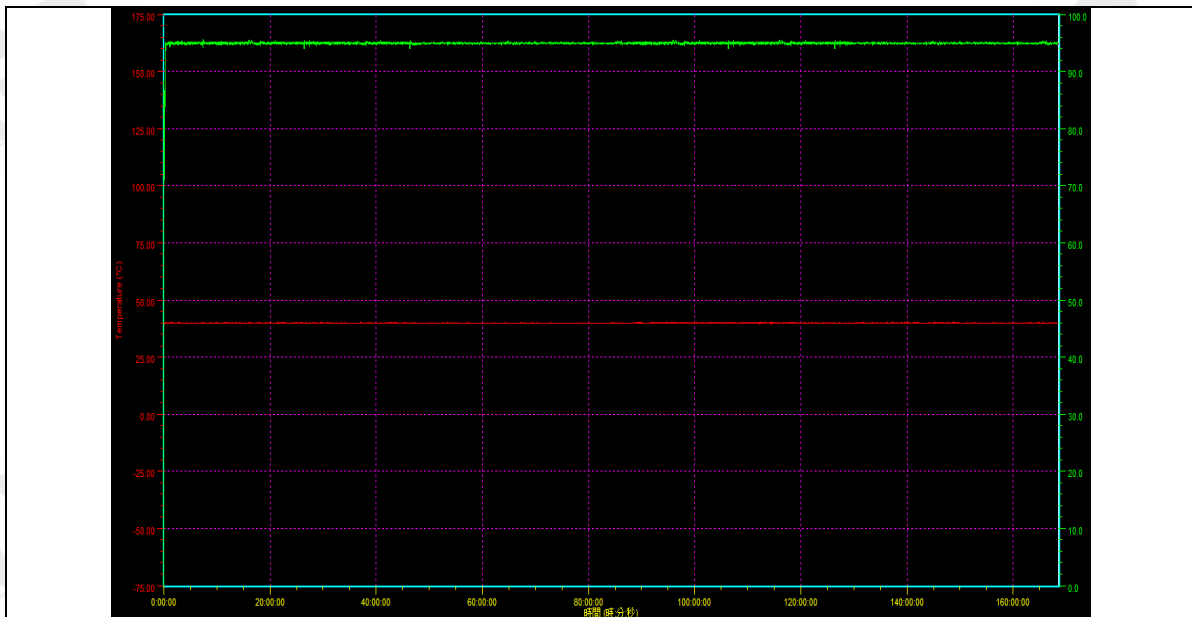
10. Salt Mist Temperature & Humidity Storage Test Profile --1ST cycle



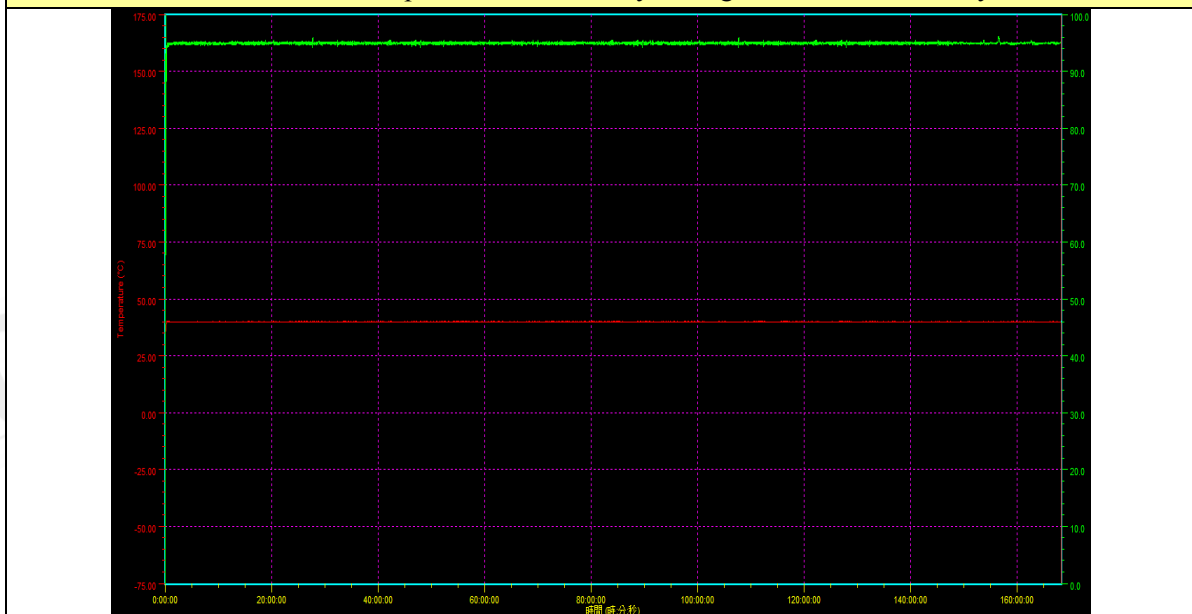
11. Salt Mist Temperature & Humidity Storage Test Profile --2ND cycle

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Chamber Test Profile--Continued:



12. Salt Mist Temperature & Humidity Storage Test Profile--3RD cycle



13. Salt Mist Temperature & Humidity Storage Test Profile--4TH cycle

— — —The End of Test Report — — —

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