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MRT AU9-AIS / AU10
RTCM 11901.1:2012 Test Report
Clause 8.1.5.1 – Water activation
Clause 8.1.2 – IEC 60945:2002 Selected tests:
Clause 8.2 – Dry heat. Clause – 8.4 Low temperature
Clause 8.5 –Thermal shock
Clause 8.9.3 – Portable equipment (temporary immersion)

25 November 2013

Product:	MRT AU9-AIS / AU10 dual-band personal Man Overboard (MOB) Alerting Unit (AU)
Manufacturer:	Marine Rescue Technology Marshall House Zarya Court, Grovehill Road Beverley, East Yorkshire HU17 0JG
Serial Number(s):	M16130037
Date tested:	13→20 November 2013 and 25 November 2013
Standards Tested to:	RTCM Standard 11901.1:2012 "For Maritime Survivor Locating Devices (MSLD)" – selected clauses. IEC 60945:2002 "Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results"
Summary:	The sample tested met the requirements after modification.
Tested by:	T.P.Jarvis & G.Smith
Report Author:	T.P.Jarvis

Project: MT242-ENV2 STATUS: Issued

1.1 Manufacturer Information

MRT AU9-AIS / AU10

The AU10 (formerly know as the AU9-AIS) is a dual-operation personal MOB Alerting Unit (AU) transmitting on 121.5 MHz SAR frequency, whilst simultaneously sending GPS position information on maritime AIS channels AIS1 & AIS2.

(i) Ports: (1) Antenna cable (260+260mm).

(ii) EUT Software version: V1.64

1.2 Notes relating to the assessment

Thermal shock testing is known from previous experience with this product family to stress the water seals of the equipment severely. Therefore the schedule set out in section 1.6 was adopted. Tests were performed in the above sequence on a single sample EUT. Final water immersion testing to 10m was performed. Immersion to 10m was simulated using a test pressure vessel pressurised to 1 bar hydraulic pressure.

The order of testing is not as stated in IEC 60945:2002 but the test suite concludes with IEC 60945 clause 8.9.3 – Portable equipment (temporary immersion) test to fully check the affect of the previous tests on the EUT's water seals.

1.3 Variations

The sample was submerged to a depth of 80mm in the thermal shock test.

1.4 Summary of Compliance

The sample met the requirements following modification. The sample was opened on completion of the test schedule and inspected for water ingress. No water ingress was found.

1.5 Modifications

The sample was sealed with Wickes Solvent Cement (Bisphenol A-Epichlorohydin Epoxy Resin).

1.6 Schedule

All tests were performed in sequence on a single sample EUT:

(i) IEC 60945 clause 8.5 thermal shock followed by,
(ii) RTCM 11901.1 clause 8.1.5.1 water activation followed by,
(iii) IEC 60945 clause 8.2 dry heat (storage +70°C) followed by,
(iv) IEC 60945 clause 8.4 low temperature (storage –30°C) followed by,
(v) IEC 60945 clause 8.4 low temperature (operating –20°C) followed by,
(vi) IEC 60945 clause 8.2 dry heat (operating +55°C) followed by,
(vii) RTCM 11901.1 clause 8.1.3 buoyancy test followed by,
(viii) Clause 8.9.3 – Portable equipment (temporary immersion).

1.7 Results Table

Spec	Clause	Test	Notes	Mod State	Result
IEC60945	8.5	Thermal shock		1	PASS
11901.1	8.1.5.1	Water activation	Sample activated with 5 seconds.	1	PASS
IEC60945	8.2	Dry heat	Test time = 10 hours Temperature = +70°C	1	PASS
IEC60945	8.4	Low temperature	Test time = 10 hours Temperature = –30°C	1	PASS
IEC60945	8.4	Low temperature	Test time = 14.5 hours Temperature = –20°C	1	PASS
IEC60945	8.2	Dry heat	Test time = 15.5 hours Temperature = +55°C	1	PASS
11901.1	8.1.3	Buoyancy	Reserve buoyancy = 11.8%	1	PASS
IEC60945	8.9.3	Temporary immersion	Test time = 5 minutes Simulated depth = 10m	1	PASS

Signed 25 November 2013:

T.P.Jarvis BSc CEng MIEE MIEEE

A Appendix: Photography

Figure A.1 – Thermal shock submersion in water

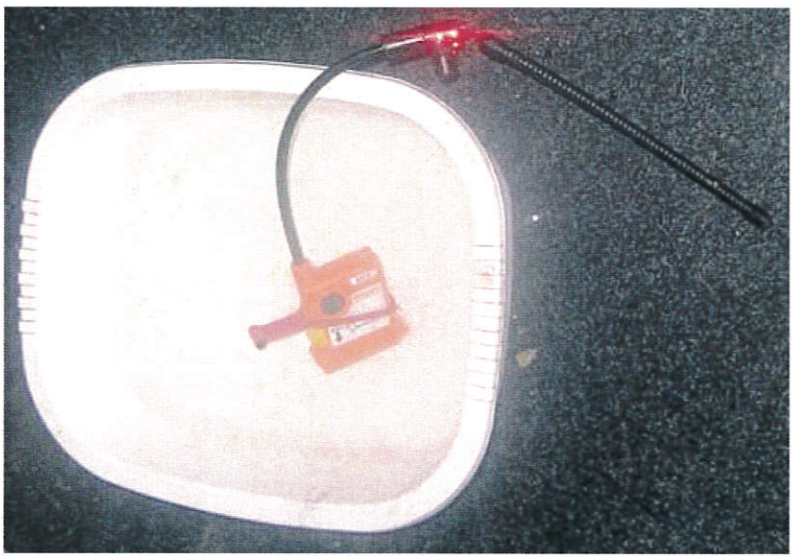

Figure A.2 – Water activation

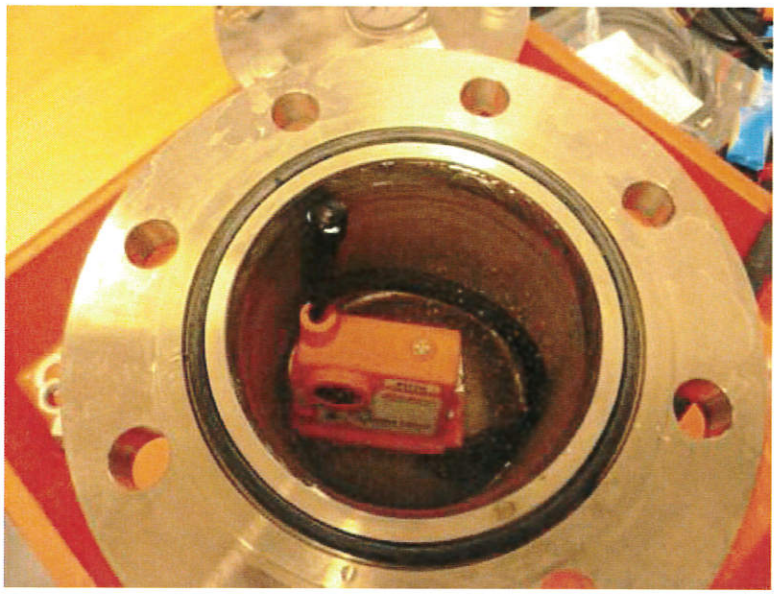

Figure A.3 – EUT in the pressure test vessel

B Appendix: Test Equipment Used

	Item	Serial
1	LEC Special Projects –50 to +150 °C environmental chamber	
2	Maycom AR108 air-band scanner	07030096
3	ALDI E46008 Digital scales	
4	Comar AIS-3R receiver	207644
5	Snowden Test Vessel PD550/Cat3	6807
6	Hameg HM5014-2 spectrum analyser	045580-19
7	Standard Horizon GX2100 AIS radio	
8	Standard Horizon GPSChart CP300i	

Table B.1 – Test equipment used

<ENDS>

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MRT AU9-AIS / AU10

IEC 60945:2002 Test Report
Clause 8.6 – Drop (Portable equipment)
Clause 8.9.3 – Portable equipment (temporary immersion)

28 October 2013

Product:	MRT AU9-AIS / AU10 dual-band personal Man Overboard (MOB) Alerting Unit (AU)
Manufacturer:	Marine Rescue Technology Marshall House Zarya Court, Grovehill Road Beverley, East Yorkshire HU17 0JG
Serial Number(s):	M16130094
Date tested:	30 September 2013, 15 October 2013
Standards Tested to:	IEC 60945:2002 "Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results"
Summary:	The sample tested met the requirements.
Tested by:	P. Dalton & M. Swale
Report Author:	T. P. Jarvis

Project: MT242-ENV1 STATUS: Issued

1.1 Manufacturer Information

MRT AU9-AIS / AU10

The AU10 (formerly know as the AU9-AIS) is a dual-operation personal MOB Alerting Unit (AU) transmitting on 121.5 MHz SAR frequency, whilst simultaneously sending GPS position information on maritime AIS channels AIS1 & AIS2.

(i) Ports: (1) Antenna cable (260+260mm).

(ii) EUT Software version: V1.64

1.2 Notes relating to the assessment

Drop testing is known from previous experience with this product family to stress the water seals of the equipment severely. Therefore a schedule of drop testing followed by water immersion testing on a single sample EUT was performed. Immersion to 10m was simulated using a test pressure vessel pressurised to 1 bar hydraulic pressure.

1.3 Variations

Clause 8.6.1: The impact surface used was concrete and not hardwood.
Clause 8.6.2: The distance from the drop point to the water surface was 23 metres.
Clause 8.9.3: The simulated depth used was 10 m rather than 1 m.

1.4 Summary of Compliance

The sample met the requirements without modification. The sample was opened on completion of the test schedule and inspected for water ingress. No water ingress was found.

1.5 Modifications

None.

1.6 Schedule

A single sample was tested in the following sequence:

(i) Clause 8.6.2: The sample was armed for the drops into water and a check made that the sample activated shortly after contact with the water. The sample was then deactivated, opened and inspected for water ingress.
(ii) Clause 8.6.1: The sample was armed for the drops onto a hard surface and a check was made that the sample did not falsely activate at any point.
(iii) Clause 8.9.3: The sample was disarmed to prevent inadvertent triggering by water immersion and held in a water filled pressure vessel at 1 bar (10 m depth) for 5 minutes. On completion the sample was armed and activated and tested to be transmitting within specification. The sample was then deactivated, opened and inspected for water ingress.

1.7 Results Table

Clause	Test	Mod State	Result
8.6.2	Drop into sea water	No modifications	PASS
8.6.1	Drop onto hard surface	No modifications	PASS
8.9.3	Water immersion	No modifications	PASS

Signed 28 October 2013:

T.P.Jarvis BSc CEng MIEE MIEEE

A Appendix: Photography

Figure A.1 – Drop into water, test site, Kingston-U-Hull UK

Figure A.2 – Drop onto hard surface

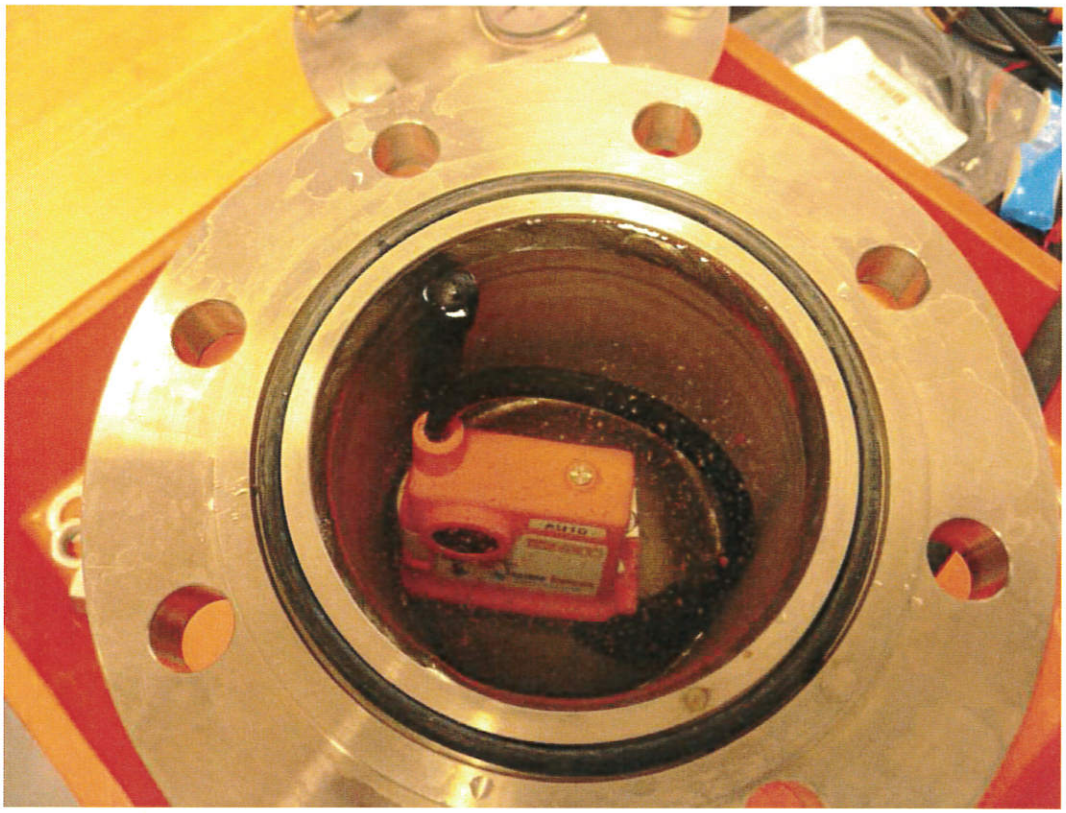

Figure A.3 – EUT in the pressure test vessel

B Appendix: Test Equipment Used

	Item	Serial
1	Snowden Test Vessel PD550/Cat3	6807
2	Hameg HM5014-2 spectrum analyser	045580-19
3	Standard Horizon GX2100 AIS radio	
4	Standard Horizon GPSChart CP300i	

Table B.1 – Test equipment used

<ENDS>