

DOCUMENT No.
PH0200-010-1ENVIRONMENTAL TEST PROCEDURE FOR
THE TELLUSART
SEARCH AND RESCUE TRANSPONDER

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Page No.	Issue
1 to 14	A
1 to 14	1

Page No.	Issue

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TABLE OF CONTENTS

PARA	PAGE
1. Scope	4
2. Applicable DOCUMENTs	4
3. Requirements	4
3.1 Test Sequence.....	4
3.2 Test Equipment	5
3.3 Functional Testing	5
3.4 Environmental Testing	5
3.4.1 Objective	5
3.4.2 Preparation	5
3.4.2.1 Operation Test Set-up	5
3.4.3 Tests to be performed	5
3.4.3.1 20 Meter Drop Into Water Test	5
3.4.3.2 Temperature Tests	6
3.4.3.3 Radiated Emissions Test	7
3.4.3.4 Radiated Interference Test	7
3.4.3.5 Electrostatic Discharge Test	7
APPENDIX A - Result Sheets	8

1. SCOPE

This is the Environmental Test Procedure (QTP) document for the TELLUSART Search and Rescue Transponder. The objective of this document is to describe the tests required to re-qualify the partly re-developed TELLUSART system design in accordance with the qualification requirements of the TELLUSART as agreed between the TELLUSART manufacturer and the TELLUSART re-development systems engineer. Test objectives, test equipment required, test methods and acceptance criteria are detailed.

2. APPLICABLE DOCUMENTS

[Ref. 1]	International Standard for GMDSS Part1: Radar Transponder – Marine Search and Rescue (SART) – Operational and performance requirements, methods of testing and required test results.	CEI/IEC 1097-1
[Ref. 2]	International Standard for Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results	CEI/IEC 945
[Ref. 3]	Acceptance Test Procedure for SART Electronic Assembly Type 3A .	PH0200-009-1

3. REQUIREMENTS

The test will be carried out strictly in accordance with the procedures detailed in this document.

Once a particular phase of testing has commenced, no substitution of components or adjustment of the unit under test shall be undertaken unless explicitly called for in the relevant procedure.

3.1 Test Sequence

The qualification testing shall be in accordance with the sequence detailed in Table 1

Table 1: Qualification Test Sequence

Sequence Number	Test Description
1.	Acceptance Test
2	20m Drop into Water [Ref 1 Clause 6.2.6]
3	Dry Heat Cycle [Ref 1 Clause 6.4.1]
4	Low Temperature Storage/Operation [Ref 1 Clause 6.4.2]

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5	Acceptance Test
6	Radiated Emissions
7	Radiated Interference
8	Electrostatic Discharge
9.	Acceptance Test

3.2 Test Equipment

The test equipment required for functional testing are listed in the Acceptance Test Procedure for SART Electronic Assembly Type 3A [Ref. 3].

3.3 Functional Testing

Refer to the Acceptance Test Procedure for SART Electronic Assembly Type 3A [Ref. 3] for a detailed description of the functional test procedure.

3.4 Environmental Testing

3.4.1 Objective

Environmental tests shall be performed to verify system performance against the requirements of a SART as set out in [Ref 1].

3.4.2 Preparation

Two TELLUSART Transponder Electronic Assembly Type 3A's shall be subjected to environmental testing.

3.4.2.1 Operation Test Set-up

As described in the Acceptance Test Procedure for SART Electronic Assembly Type 3A [Ref. 3].

3.4.3 Tests to be performed

3.4.3.1 20 Meter Drop Into Water Test

Reference: - [Ref 1 Clause 6.2.6]

Environmental Test Facility: - A dedicated test facility constructed specifically for the purposes of this test will be used.

Test Item: - The 20 meter drop into water test will be performed on the two selected TELLUSART test items.

The equipment will be subjected to the following tests.

3.4.3.1.1 20 Meter Drop Into Water Test Procedure

The equipment shall be set up for normal use and released to fall freely from a height of 20 meter into water. On completion the equipment shall be inspected for leakage and damage and a functional test shall be carried out.

20 Meter Drop Into Water Test Acceptance Criteria

No leakage or damage on inspection and it must comply with test results as specified in ATP [Ref. 3]

3.4.3.2 Temperature Tests

Reference: - [Ref 1 Clause 6.4].

Environmental Test Facility: - Operational and storage temperature tests shall be performed at Tellumat (Pty) Ltd. environmental test center.

Test Item: - The temperature tests will be performed on the two selected TELLUSART test items.

The equipment shall be subjected to the following tests.

3.4.3.2.1 Dry Heat Cycle

Procedure: - The EUT shall be placed in a chamber at normal room temperature and relative humidity. The temperature shall then be raised to and maintained at $+65^{\circ}\text{C} \pm 3^{\circ}\text{C}$, for a period of 10 h to 16 h.

The EUT shall then be removed from the chamber and transferred to the test station within a short enough time period such that it will retain its temperature. Hereafter the EUT will be subjected to a performance check as specified in the ATP [Ref 3].

At the end of the test, the EUT shall be returned to normal environmental conditions and then subjected to a performance check as specified in the ATP [Ref 3].

Dry Heat Cycle Acceptance Criteria

Must comply with test results as specified in ATP [Ref. 3].

3.4.3.2.2 Low Temperature Storage/Operation

Procedure: - The equipment shall be placed in a chamber at normal room temperature. The temperature shall then be reduced to and maintained at $-30^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for a minimum period of 10 hours. On conclusion of that period the temperature shall be increased to $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ within 30 minutes. The equipment shall then be switched on for a period of at least 2 hours.

During the 2 hour period the unit shall be removed from the chamber and transferred to the test station within a short enough time period such that it will retain its temperature. A functional test will then be carried out as specified in the ATP [Ref 3].

After the test the unit will be returned to the chamber to complete the 2 hour temperature cycle.

At the end of the test, the EUT shall be returned to normal environmental conditions and then subjected to a performance check as specified in the ATP [Ref 3].

Low Temperature Storage/Operation Test Acceptance Criteria

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Must comply with test results as specified in the ATP [Ref. 3].

3.4.3.3 Radiated Emissions Test

Reference: - [Ref 2].

Environmental Test Facility: - Radiated Emissions tests shall be performed at the Houwtech environmental test center.

Test Item: - The Radiated Emissions tests will be performed on the two selected TELLUSART test items. During the test the UUT will be interrogated from an external source at the normal test rate.

Procedure: - The test procedure is set out in [Ref 2] Clause 9.3.2.

Radiated Emissions Test Acceptance Criteria

During the test the radiated emissions must comply with the levels specified in [Ref 2] Clause 9.3.2.

3.4.3.4 Radiated Interference Test

Reference: - [Ref 2].

Environmental Test Facility: - Radiated Interference tests shall be performed at the Houwtech environmental test center.

Test Item: - The Radiated Interference tests will be performed on the two selected TELLUSART test items.

Procedure: - The test procedure is set out in [Ref 2] Clause 10.4.2.

Radiated Emissions Test Acceptance Criteria

During the test the EUT must comply with test results as specified in the ATP [Ref. 3].

3.4.3.5 Electrostatic Discharge Test

Reference: - [Ref 2].

Environmental Test Facility: - Electrostatic Discharge tests shall be performed at the Houwtech environmental test center.

Test Item: - The Electrostatic Discharge tests will be performed on the two selected TELLUSART test items.

Procedure: - The test procedure is set out in [Ref 2] Clause 10.9.2.

Radiated Emissions Test Acceptance Criteria

After the electrostatic discharge test the EUT must comply with test results as specified in the ATP [Ref. 3].

APPENDIX A - Result Sheets**TELLUSART Qualification Tests****20 METER DROP INTO WATER TEST RESULT SHEET****TEST REFERENCE – PARAGRAPH 3.4.3.1**

LOCATION _____

DATE: FROM _____ TO _____

SYSTEM S/N _____

Previous Test the Test Items Have Undergone _____

Results of Visual Examination (Note any Defects or Discrepancies)

ATP No	Description	Specification	Result	
				P/F
3.4.3.1	Visual Inspection	No leakage or damage		

Remarks _____

Results of Operational Tests (See Operational Test Result Sheet for Detailed Results)

Tellusart Acceptance Test (Ref 3) _____

_____ Test Ref. No. _____

Remarks _____

Initial Failure Analysis _____

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Sign Off

Conducted by: _____ Date: _____

QA Representative: _____ Date: _____

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TEMPERATURE TESTS RESULT SHEET**TEST REFERENCE - PARAGRAPH 3.4.3.1**

LOCATION _____

DATE: FROM _____ TO _____

SYSTEM S/N _____

Previous Test the Test Items Have Undergone _____

Results of Operational Tests (See Operational Test Result Sheet for Detailed Results)**3.4.3.2.1 Dry Heat Cycle**

During Test Operation (+65 °C) (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

Post Test Operation (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

3.4.3.2.2 Low Temperature Storage/Operation

During Test Operation (- 20 °C) (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

Post Test Operation (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

Remarks _____

Initial Failure Analysis _____

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Sign Off

Conducted by: _____ Date: _____

QA Representative: _____ Date: _____

RADIATED EMISSIONS TESTS RESULT SHEET**TEST REFERENCE – PARAGRAPH 3.4.3.3**

LOCATION _____

DATE: FROM _____ TO _____

SYSTEM S/N _____

Previous Test the Test Items Have Undergone _____

During the test the radiated emissions must comply with the levels specified in [Ref 2] Clause 9.3.2. (Houwtech EMC Test Report)

Remarks _____

Initial Failure Analysis _____

Sign Off

Conducted by: _____ Date: _____

QA Representative: _____ Date: _____

RADIATED INTERFERENCE TEST RESULT SHEET**TEST REFERENCE - PARAGRAPH 3.4.3.4**

LOCATION _____

DATE: FROM _____ TO _____

SYSTEM S/N _____

Previous Test the Test Items Have Undergone _____

Results of Operational Tests (See Operational Test Result Sheet for Detailed Results)

During Test Operation (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

Remarks _____

Initial Failure Analysis _____

Sign Off

Conducted by: _____ Date: _____

QA Representative: _____ Date: _____

ELECTROSTATIC DISCHARGE TESTS RESULT SHEET**TEST REFERENCE – PARAGRAPH 3.4.3.5**

LOCATION _____

DATE: FROM _____ TO _____

SYSTEM S/N _____

Previous Test the Test Items Have Undergone _____
_____**Results of Operational Tests** (See Operational Test Result Sheet for Detailed Results)

Post Test Operation (Tellusart Acceptance Test (Ref 3)) _____

_____ Test Ref. No. _____

Remarks _____
_____Initial Failure Analysis _____

Sign Off

Conducted by: _____ Date: _____

QA Representative: _____ Date: _____

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