Software Radio Technology

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SRT-MTB-OEM and

COMAR CSB200

Vibration and Shock Testing

Performance Report

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Software
Radio Technology

1. HISTORY

Issue	Date	Author	Review No.	Details
1	04/09/2006	M Clarke		First issue

2. TABLE OF CONTENTS

3. TABLE OF FIGURES

4. INTRODUCTION

4.1. Purpose

This document provides details of the performance testing carried out during vibration and shock testing of the SRT-MTB-OEM and COMAR CSB200 units at GKN services in accordance with IEC62287 / IEC60945.

4.2. Scope

This document covers only performance verification of the unit during and after vibration and shock testing as required by IEC62287 / IEC60945. It does not provide details of the vibration and shock testing; this is documented in GKN test report WA/TF/0689.

4.3. Summary

This report describes the test environment used to verify performance of the equipment during vibration and shock testing. The results provided demonstrate that the equipment meets the requirements of IEC62287 §9.2.

4.4. References

[1] GKN Services test certificate WA/TF/0689 – “Vibration and shock tests on two Marine AIS Electronic units”
[2] IEC62287, First edition – “Maritime navigation and radiocommunication equipment and systems –Class B shipborne equipment of the automatic identification system (AIS)
[3] Log file: “SRT during vertical axis vibration.txt”
[4] Log file: “SRT performance check – vertical axis vibration.txt”
[5] Log file: “SRT during lateral axis vibration.txt”
[6] Log file: “SRT performance check – lateral axis vibration.txt”
[7] Log file: “SRT during longitudinal axis vibration.txt”
[8] Log file: “SRT performance check – longitudinal axis vibration.txt”
[9] Log file: “SRT performance check – post shock.txt”
[10] Log file: “COMAR during vertical axis vibration.txt”
[11] Log file: “COMAR performance check – vertical axis vibration.txt”
[12] Log file: “COMAR during lateral axis vibration.txt”
[13] Log file: “COMAR performance check – lateral axis vibration.txt”
[14] Log file: “COMAR during longitudinal axis vibration.txt”
[15] Log file: “COMAR performance check – longitudinal axis vibration.txt”
[16] Log file: “COMAR performance check – post shock.txt”

4.5. Glossary

SRT: Software Radio Technology
EUT: Equipment under test
AIS: Automatic Identification System

5. TEST ENVIRONMENT

Vibration and shock testing of the SRT-MTB-OEM and COMAR CSB200 units was carried out in accordance with the requirements of [2]. This specification requires that the unit remains operational throughout each test and that a successful performance check is carried out at the end of each test period.

The performance check requires the following:

a) The EUT transmits messages 18 and 24 following the nominal schedule and alternates between channel A and channel B

b) The unit receives Class A position reports continuously

During each vibration test the serial data output from both EUTs was logged to verify that the EUT remained operational during the test. The test environment is shown in Figure 1.

After each vibration test the EUTs were placed in the test environment shown in Figure 2. This environment allowed for verification of conditions (a) and (b) given above. The test facility was located close to the coast hence real Class A targets were included in the test environment. In excess of 50 Class A targets were present during performance checks.

During each performance check the serial output from both EUTs was recorded in log files. Analysis of these log files provides the data to show that the unit meets requirements (a) and (b) above. The complete log files collected during each test are provided in references [3] to [16].

The performance check in IEC62287 §10.2.1.2.1 specifies three test conditions whereby:

i) The test targets are switched on, followed by the EUT
ii) The EUT is switched on, followed by the test targets
iii) Test targets are transmitted using the same time periods on channel A and channel B.

Due to the presence of real Class A targets in the test environment it was not possible to test the different switch on orders specified in (i) and (ii). It was also not possible to re-produce test condition (iii) due to equipment limitations.

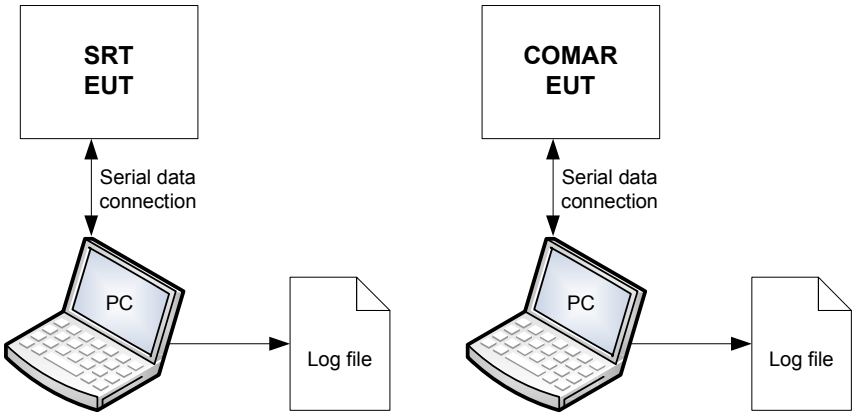


Figure 1 - Operation verification during tests

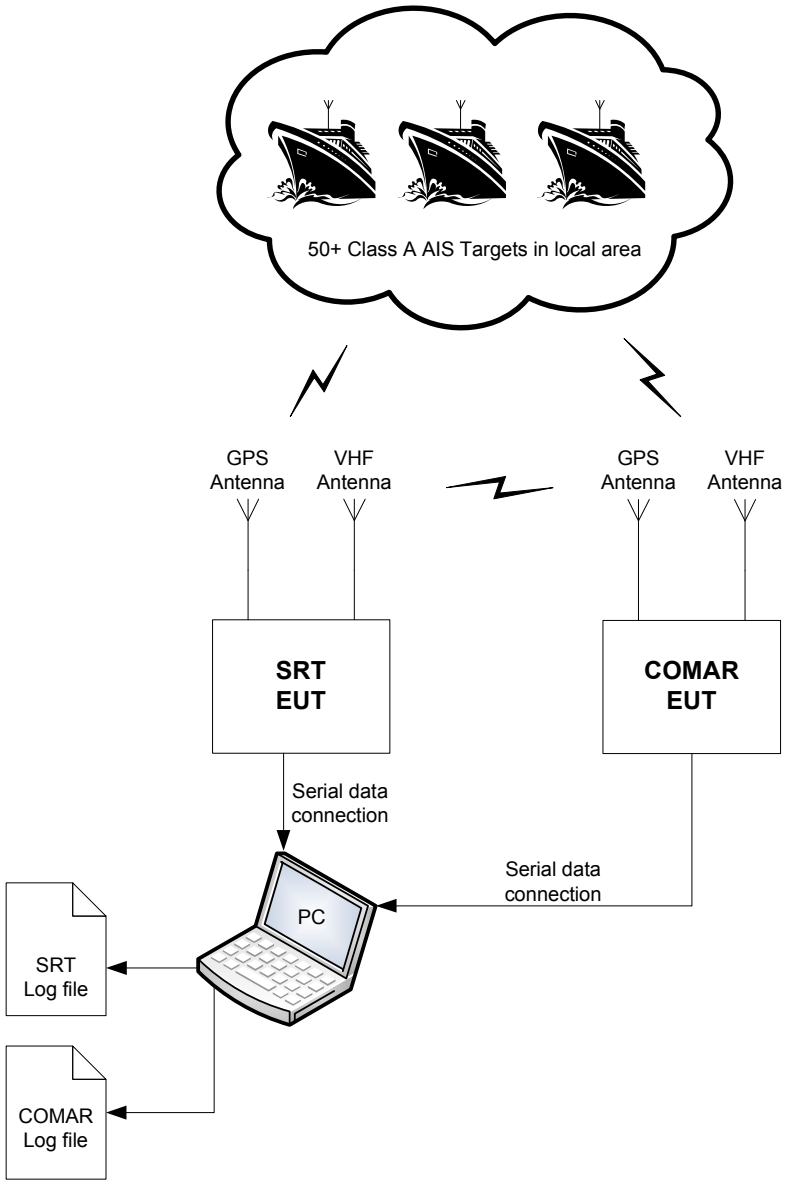


Figure 2 - Performance check after tests

Note that during the testing it was not possible to connect a GPS or VHF antenna to the units due to the location of the vibration equipment. Antennas were connected only to carry out the performance check at the end of each test.

6. ANALYSIS OF PERFORMANCE CHECK LOGS

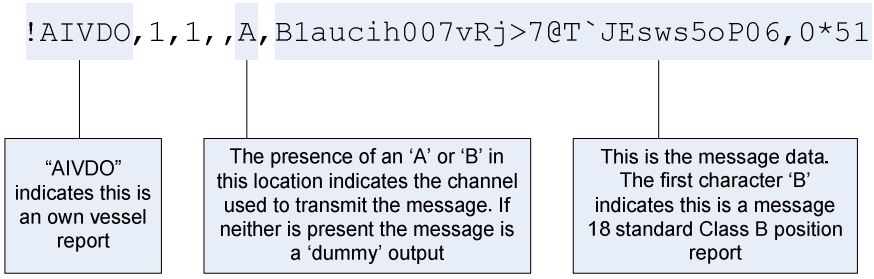
The serial data logs contain all NMEA sentences output by the EUT. The logs show all position reports received from other units (VDM messages) and all 'Own Vessel position reports' (VDO messages) transmitted.

The logs can be analysed to show that the performance check conditions are met as follows:

"The EUT transmits messages 18 and 24 following the nominal schedule and alternates between channel A and channel B"

The logs show all messages transmitted by the unit as VDO sentences. Note that not all VDO sentences shown are actually transmitted. Only the transmitted sentences are relevant to this test report.

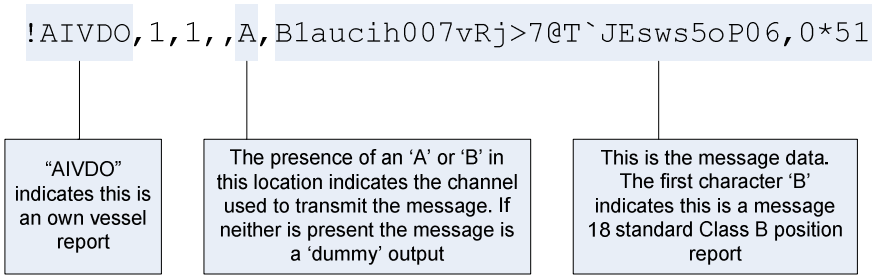
A typical transmitted message 18 VDO sentence would be:



A typical non-transmitted (or dummy) message 18 VDO sentence would be:

```
!AIVDO,1,1,,,B1aucih007vRjhW@TVITswTUsP06,0*59
```

A typical transmitted message 24A VDO sentence would be:

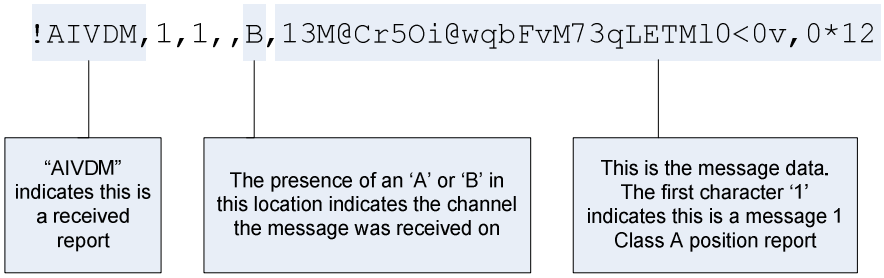


A typical transmitted message 24B VDO sentence would be:

```
!AIVDO,1,1,,A,H1aucilUCBD00@1123456P000000,0*19
```

The unit receives Class A position reports continuously

The logs show all received position reports from Class A vessels as VDM sentences.
A typical VDM sentence would be:



7. VIBRATION TESTING PERFORMANCE CHECK RESULTS

The results are organised by Axis as defined in Figure 3. These axis definitions match those found in [1]. The SRT and COMAR units were tested simultaneously and the axis definitions apply to both units.

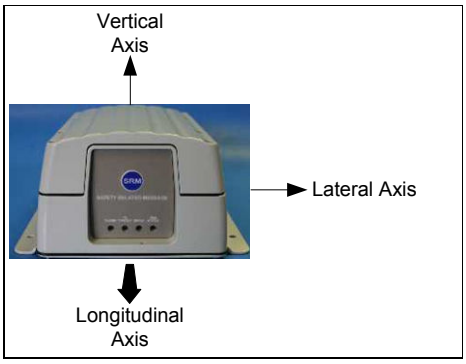


Figure 3 - Axis definition

7.1. Vertical axis results

7.1.1. Operation verification during test

The log file provided in reference [3] was collected from the SRT EUT during the vertical axis sweep. The log file shows normal operation of the unit during the test.

The log file provided in reference [10] was collected from the COMAR EUT during the vertical axis sweep. The log file shows normal operation of the unit during the test

7.1.2. Performance check post test

The log file provided in reference [4] was collected from the SRT EUT during the performance check after the vertical axis sweep. The log file shows that the EUT passes the performance test.

The log file provided in reference [11] was collected from the COMAR EUT during the performance check after the vertical axis sweep. The log file shows that the EUT passes the performance test.

7.2. Lateral axis results

7.2.1. Operation verification during test

The log file provided in reference [5] was collected from the SRT EUT during the lateral axis sweep. The log file shows normal operation of the unit during the test.

The log file provided in reference [12] was collected from the COMAR EUT during the lateral axis sweep. The log file shows normal operation of the unit during the test

7.2.2. Performance check post test

The log file provided in reference [6] was collected from the SRT EUT during the performance check after the lateral axis sweep. The log file shows that the EUT passes the performance test.

The log file provided in reference [13] was collected from the COMAR EUT during the performance check after the lateral axis sweep. The log file shows that the EUT passes the performance test.

7.3. Longitudinal axis results

7.3.1. Operation verification during test

The log file provided in reference [7] was collected from the SRT EUT during the longitudinal axis sweep. The log file shows normal operation of the unit during the test.

The log file provided in reference [14] was collected from the COMAR EUT during the longitudinal axis sweep. The log file shows normal operation of the unit during the test

7.3.2. Performance check post test

The log file provided in reference [8] was collected from the SRT EUT during the performance check after the longitudinal axis sweep. The log file shows that the EUT passes the performance test.

The log file provided in reference [15] was collected from the COMAR EUT during the performance check after the longitudinal axis sweep. The log file shows that the EUT passes the performance test.

8. SHOCK TESTING PERFORMANCE CHECK RESULTS

Shock testing was carried out according to IEC62287 §9.2.2.2. This requires that a performance check is performed before and after application of the shock.

The shock test was carried out immediately after the longitudinal vibration performance check (section 7.3.2) so the results from this performance check are also used as the pre-shock performance check results

8.1. Post shock test performance check results

The log file provided in reference [9] was collected from the SRT EUT during the performance check after the shock test. The log file shows that the EUT passes the performance test.

The log file provided in reference [16] was collected from the COMAR EUT during the performance check after the shock test. The log file shows that the EUT passes the performance test.