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RTCM Type Approval Certification Test Report for the

Seimac, Ltd. Cospas-Sarsat Beacon

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EXECUTIVE SUMMARY

This document represents the results of an Emergency Position Indicating Radio Beacon (EPIRB), Model PROFIND 406, serial number 029, manufactured by SEIMAC Limited. The tests were conducted at the Electronic Proving Ground's Environmental Test Facility (ETF) at Fort Huachuca, Arizona. The test period lasted intermittently from 30 June to 13 October 2000, including 2 days of confidence testing.

During the Drop Test on hard surface, the dome of the EPIRB, SN 029, cracked. The argument was that due to a miscommunication, only a 50-ohm connector was provided on the EPIRB and not the antenna which would have cushioned the dome and protected it from cracking.

With the U.S. Coast Guard's approval, and witnessed by EPG, the proper testing dome (50-ohm connector and antenna) was attached to EPIRB, SN 029, with the electronic components left intact. Subsequently, the Drop on hard surface was retested without incident.

The Automatic Release Mechanism and Automatic Activation Test was conducted utilizing our military pool. The maximum obtainable depth was approximately 12 feet. The manufacturer of the EPIRB intends to equip the stowage/release assembly with either the HAMMAR or Pains-Wessex H2O hydrostatic release mechanisms; therefore, the EPIRB stowage/release assembly was tested with both hydrostatic release mechanisms. Preliminary pressure checks, at ambient temperature, indicated that both hydrostatic mechanisms would activate above the 3.66 meter level of our pool.

For the Drop Test in Water, we attached a guide wire from the top of the tower to the center of the water tank to avoid accidentally damaging the EPIRB. This worked very well and in no way negatively affected the outcome of the test.

Testing was successfully completed on the Pains-Wessex unit. While at minimum stowage temperature, the HAMMAR unit failed to activate above the 3.66 meter level. We then removed the HAMMAR mechanism from the stowage/release assembly and stabilized it at its minimum stowage temperature then submerged it into our pressure vessel. Pressure was slowly ramped toward the equivalent of 4 meters. The release mechanism activated at the equivalent of 3.94 meters. Although the stowage/release assembly was not tested in this scenario, its performance was validated with the Pain-Wessex device. Again, the U.S. Coast Guard agreed that this approach is acceptable and that the stowage/release assembly has met the intent of the requirements of section A14.0.

The manufacturer did not want to test the Peak Effective Radiated Power (121.5 MHz Auxiliary Radio-Locating Device) Measurement. He instead wanted to provide a report conducted by a testing facility in Canada. This report is enclosed in Appendix A,
Annex XVI.

On 18 September 2000, after starting the Cospas-Sarsat required tests, the EPIRB,
SN 029, failed phase modulation during low temperature spurious harmonics. The manufacturer carried out an investigation to determine the cause of this failure and on
2 October 2000 replaced resistors in the EPIRB, SN 029. The manufacturer provided a detailed explanation of the cause of failure; this report is presented in Appendix C.

The manufacturer of the EPIRB had also requested to test two batteries for the 48-hour Operating Lifetime, ETERN and SAFT. EPIRB, SN 029, was used to test the ETERN battery according to specifications and passed the requirements. However, after subsequently attempting to test the SAFT battery with the same unit, the transmit power output of that unit dropped to 28 decibel with reference to 1 milliwatt (dBm).

Consequently, the SAFT battery was subjected to the 48-hour Operating Lifetime test with EPIRB, SN 017, without incident.

RTCM REQUIRED TESTS

The following environmental and operational performance tests were conducted in the given sequence and were performed on a single test unit (except as noted below). All tests were conducted in accordance with (IAW) the RTCM Paper, Recommended Standards for 406 MHz Satellite EPIRBs, version 2.0 of January 1997 in conjunction with MIL-STD-810E, Environmental Test Methods and Engineering Guidelines of 31 July 1995.

The following environmental and operational tests were conducted in the sequence below and were performed on a single test unit with the exception of Dry Heat, Spurious Emission, and Thermal Shock. These were conducted in conjunction with the Cospas-Sarsat required tests.

1. Initial Aliveness Test
2. Dry Heat Test
3. Damp Heat Test
4. Vibration Test
5. Bump Test
6. Salt Fog Test
7. Drop Test
8. Leakage and Immersion Test
9. Spurious Emission Test
10. Thermal Shock Test
11. Cospas-Sarsat Type Approval Tests
12. Operational Life, Strobe Light, and Self-tests

The remaining tests were run in any sequence and/or were performed on separate test units:

13. Automatic Release Mechanism and Automatic Activation for Category I satellite EPIRBs
14. Stability and Buoyancy
15. Auxiliary Radio-Locating Device Transmitter
16. Humidity
17. Orientation

TEST RESULTS

Initial Aliveness Test

The unit under test (UUT) passed the initial aliveness test.

Dry Heat Cycle

The UUT passed the required aliveness tests.

Damp Heat Cycle

The UUT passed the required aliveness tests.

Vibration Test

The UUT passed the required aliveness tests.

Bump Test

The UUT passed the required aliveness test.

Salt Fog Test

The UUT passed the required aliveness test.

Drop Test

Drop Test on Hard Surface.

The UUT passed the required aliveness test.

Drop Test in Water.

The UUT passed the required aliveness test.

Leakage and Immersion Test

The UUT passed the required aliveness test.

Spurious Emissions Test

The UUT passed the required aliveness test.

Thermal Shock Test

The UUT passed the required aliveness test.

COSPAS-SARSAT Type Approval Tests

See Cospas-Sarsat Test Report

Operational Life and Strobe Light Test

The UUT passed the requirements.

Self-Test

The UUT passed the requirements.

Automatic Release Mechanism and Automatic Activation Tests for Category 1 Satellite EPIRBs

The UUT passed the requirements.

Stability and Buoyancy Test

The UUT passed the requirements.

Inadvertent Activation Test

The UUT passed the requirements.

121.5 MHz Auxiliary Radio-Locating Device Transmitter

The UUT passed the requirements.

Peak Effective Radiated Power (121.5 MHz Auxiliary Radio-Locating Device) Measurement

Test results were provided by the manufacturer.

Voltage Standing Wave Ratio (VSWR) Measurement

Not applicable (non-removable antenna).

Humidity

The UUT passed the required aliveness test.

Orientation Test

The UUT passed the required aliveness tests.

CONCLUSION

The UUT passed RTCM certification requirements.

SUPPORTING TEST DATA (APPENDIX A)

1. Initial Aliveness Test (See Annex I of Appendix A)
2. Dry Heat Cycle (See Annex II of Appendix A)
3. Damp Heat Cycle (See Annex III of Appendix A)
4. Vibration (See Annex IV of Appendix A)

5. Bump (See Annex V of Appendix A)

6. Salt Fog (See Annex VI of Appendix A)

7. Drop Test (See Annex VII of Appendix A)

    a. Drop Test on Hard Surface. (See page A-VII-1)

    b. Drop Test in Water. (See page A-VII-4)

8. Leakage and Immersion (See Annex VIII of Appendix A

9. Spurious Emissions (See Annex IX of Appendix A)

10. Thermal Shock (See Cospas-Sarsat Test Report)

11. Cospas-Sarsat Type Approval Tests (See Cospas-Sarsat Test Report)

12. Operational Life and Strobe Light (See Annex X of Appendix A)

    a. ETERN Battery (See page A-X-1)

    b. SAFT Battery (See page A-X-6)

13. Self-Test (See Annex XI of Appendix A)

14. Automatic Release Mechanism and Automatic Activation for Category 1 Satellite EPIRBs (See Annex XII of Appendix A)

15. Stability and Buoyancy (See Annex XIII of Appendix A)

16. Inadvertent Activation (See Annex XIV of Appendix A)

17. 121.5 MHz Auxiliary Radio-Locating Device Transmitter (See Annex XV of Appendix A)

18. Peak Effective Radiated Power (121.5 MHz Auxiliary Radio-Locating Device) Measurement (See Annex XVI of Appendix A) **(Document was provided by manufacturer)**

19. VSWR Measurement (not applicable)

20. Humidity (See Annex XVII of Appendix A)

21. Orientation Test (See Annex XVIII of Appendix A)

Following are the detailed environmental test procedures for the tests required:

Ad-1 Aliveness Test

Ad-1.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A1.0.

b. The objective was to verify the correct operating status of the beacon by measuring the transmitter frequency, power, and digital message coding.

Ad-1.2 Facilities and Instrumentation.

- Environmental Test Facility

- Cospas-Sarsat Measurement System

Ad-1.3 Test Condition.

This test was run with the following conditions for the identified tests:

a. Normal ambient conditions.

(1) Initial Aliveness Test.

(2) Orientation Test (vertical, horizontal, upside down, and return to vertical).

b. Environmental test conditions:

(1) Dry Heat Cycle (during and at the end of the last 2-hour period at 55° C).

(2) Damp Heat Cycle (during and at the end of the 2 hour period at 40° C/ 93% humidity).

(3) Vibration Test (at conclusion of vibration).

(4) Bump Test (at conclusion of series of bumps).

(5) Salt Fog Test (at conclusion of final drying period).

(6) Drop Test-Hard Surface (after drop).

(7) Drop Test-Water (after drops in all orientations).

(8) Humidity Test (at conclusion of humidity cycle).

Ad-1.4 Test Procedure.

a. Measured and recorded transmitter frequency by selecting Frequency Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Frequency testing was performed IAW C/S Test Procedure paragraph 3.2.1.

b. Measured and recorded transmitter output power by selecting Output Power Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Power output testing was performed IAW C-S Test Procedure paragraph 3.2.2.

c. Obtained and verified correct digital message coding by selecting Message Coding Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Message coding testing was performed IAW C-S Test Procedure paragraph 3.1.4.

Ad-1.5 Data Reduction and Presentation.

Annotated printed results from each subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-2 Dry Heat Cycle

Ad-2.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A3.0.

b. The objective was to determine whether the UUT can survive exposure to Dry Heat without degrading performance or autonomously activating.

Ad-2.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Thermotron F-110-CHV-30-30-Agree Style-Climatic Chamber
  - Thermotron 6500 Series-Climatic Controller
  - Omega 4500 Series-Chart Recorder

Ad-2.3 Test Condition.

a. Hot Soak at 70° Celsius (C) (non-operating).

b. Hot Soak at 55° C (operating).

Ad-2.4 Test Procedure.

a. The UUT was placed in a chamber of normal room temperature. Then the temperature was raised to and maintained at 70° Celsius (C) ±3° C for a period of 10 hours.

b. At the end of the 10-hour period, any climatic control devices provided in the equipment were switched on and the chamber cooled to 55° ±3° C. The cooling of the chamber was completed within 30 minutes.

c. The equipment was switched on 30 minutes after the end of the 10-hour period and remained on for a period of at least 2 hours in the 55° ±3° C chamber. An aliveness check IAW paragraph Ad-1 was performed during and at the end of the 2-hour period.

Ad-2.5 Data Reduction and Presentation.

Annotated and maintained environmental chamber charts with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-3 Damp Heat Cycle

Ad-3.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A4.0.

b. The objective was to determine whether the UUT can survive exposure to Damp Heat without degrading performance or autonomously activating.

Ad-3.2 Facilities and Instrumentation.

- Environmental Test Facility

  - American Research-Climatic Chamber
  - Thermotron-6500 Series-Climatic Controller
  - Omega 4500 Series-Chart Recorder

Ad-3.3 Test Condition.

Hot soak at 40° C, 93% relative humidity (non-operating and operating).

Ad-3.4 Test Procedure.

a. The UUT was placed in a chamber of normal room temperature and humidity which, steadily over a period of 3 ±0.5 hours, was heated to 40° ±3° C and was during this period brought to a relative humidity of 93% ±2% so that excessive condensation was avoided. These conditions were maintained for a period of 10 hours.

b. At the conclusion of the 10 hours, the satellite EPIRB and any climatic control devices provided in the equipment were switched on and remained on for a period of at least 2 hours in the 40° ±3° C and 93% ±2% relative humidity chamber. An aliveness check was performed IAW paragraph Ad-1 during and at the end of the 2-hour period.

c. The chamber was brought to room temperature in not less than 1 hour. The equipment was then removed from the test chamber and exposed to normal room temperature and humidity for not less than 3 hours, or until moisture had dispersed, whichever was longer, before the next test was carried out.

Ad-3.5 Data Reduction and Presentation.

Annotated and maintained environmental chamber charts with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-4 Vibration Test

Ad-4.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A5.0.

b. The objective was to determine whether the UUT can survive exposure to sinusoidal vibration without degrading in performance or autonomously activating.

c. The UUT was secured to the vibration table through its normal attachments or mounting intended for use in service conditions with vibration isolators, if any, in place. Additional straps or other holding means were not used for Category I satellite EPIRBs. The UUT was mounted in the same position (with respect to the direction of gravity) for all vibration tests and was subjected to sinusoidal motion in each of its three orthogonal axes according to the following profile:

Frequency (Hz)	Peak Amplitude (mm)
4-10	2.5
10-15	0.8
15-25	0.4
25-33	0.2

d. The frequency changed either linearly or logarithmically with time between 4 Hz and 33 Hz such that a complete cycle (4 Hz – 33 Hz - 4 Hz) took approximately 5 minutes.

e. The UUT did not activate during the vibration tests.

Ad-4.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Unholtz Dickie-T1000-Dynamic Shaker
  - Spectral Dynamics-SD415A-Digital Sine Servo
  - PCB-483A07-Charge Amp
  - Endevco-7251-10-Isotron Accelerometer

Ad-4.3 Test Condition.

Vibration 3 axes (non-operating).

Ad-4.4 Test Procedure.

a. The UUT was exposed to vibration in each direction for a period of at least 30 minutes.

b. Upon completion of the vibration test, an exterior mechanical inspection for physical damage was performed and the aliveness test conducted IAW paragraph Ad-1.

Ad-4.5 Data Reduction and Presentation.

Annotated and maintained vibration equipment records with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-5 Bump Test

Ad-5.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A6.0.

b. The objective was to determine whether the UUT can survive exposure to 4000, 10g shock pulses without degrading performance or autonomously activating.

Ad-5.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Unholtz Dickie-T1000-Dynamic Shaker
  - Spectral Dynamics-SD400A-Digital Random Generator
  - PCB 483A07-Charge Amp
  - Endevco-7251-10-Isotron Accelerometer

Ad-5.3 Test Condition.

4000 Half-cycle sinewave bump vibration (non-operating).

Ad-5.4 Test Procedure.

a. The UUT was secured to the testing equipment through its normal attachments or mounting intended for use in service conditions and mounted in the normal operating position(s). Additional straps or other holding means were not used for Category I satellite EPIRBs. Category 2 satellite EPIRBs were securely mounted to the testing equipment with the antenna in the vertical axis. The bump test was conducted to give a measure of confidence that the equipment will meet service conditions.

b. The UUT was secured to the testing equipment and subjected to the bump test according to the following profile:

Peak Acceleration	9.8 m/s^2
Pulse Duration	16 ms
Waveshape	Half-cycle Sinewave
Number of Bumps	4000

c. Upon completion of the bump test, an exterior mechanical inspection was performed and an aliveness test conducted IAW paragraph Ad-1.

Ad-5.5 Data Reduction and Presentation.

Annotated and maintained vibration equipment records with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-6 Salt Fog Test

Ad-6.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A7.0.

b. The objective was to determine whether the UUT can survive exposure to a Salt Fog atmosphere without deterioration sufficient to impact performance or service life.

c. The salt fog test was conducted on a complete Category 1 satellite EPIRB including the release mechanism and on a Category 2 satellite EPIRB with its mounting device.

d. The UUT was turned OFF during the test.

e. The Category 1 satellite EPIRB was not removed from the release mechanism for cleaning.

Ad-6.2 Facilities and Instrumentation.

- Environmental Test Facility

  - 150 cu/ft Mallory Engineering Inc, Salt Fog Chamber

Ad-6.3 Test Condition.

Salt fog soak (non-operating).

Ad-6.4 Test Procedure.

a. Before exposing the UUT to salt fog, it was conditioned for a duration of at least 2 hours at a temperature of 35° C ±2°C. After this conditioning, and with the ambient temperature maintained at 35°C, salt fog was added and maintained at the saturation point for 48 hours.

b. The salt fog was prepared from a 5-percent ±1% salt (sodium chloride) solution. For detailed guidance on preparation of the solution and the apparatus for generating salt fog, MIL-STD-810E method 509.3 was utilized.

c. After exposure to salt fog, the UUT was permitted to dry at room temperature (20° C ±5° C) for 24 hours before being exposed to another 12 hours of salt fog exposure, at 35° C.

d. Upon completion of this exposure and after a 12-hour drying period at room temperature, the exterior of the UUT was inspected for corrosion, peeling paint, and other signs of deterioration. The aliveness test was conducted next.

e. Salt deposits and water stains were washed off with clean, warm water not exceeding a temperature of 38° C.

Ad-6.5 Data Reduction and Presentation.

Annotated and maintained environmental chamber records with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-7 Drop Test

Ad-7.1 Scope.

a. Reference: RTCM, Appendix A, paragraphs A8.0, A8.1, and A8.2.

b. The objective was to determine whether the UUT can survive exposure to 1-meter drops onto hard surface and 20 meter drops into water, without degrading performance or autonomously activating.

c. The Drop Test in Water was conducted on all categories of satellite EPIRBs, with the UUT removed from the stowage bracket and/or release mechanism. The Category 1 satellite EPIRB was automatically or manually activated and Category 2 satellite EPIRBs were manually activated prior to the drop.

Ad-7.2 Facilities and Instrumentation.

- Environmental Test Facility

  - L.A.B. -5D-100-Drop Tester

Ad-7.3 Test Condition.

a. 1-meter drop to hard surface (non-operating).

b. 20-meter drop to water (operating).

Ad-7.4 Test Procedure.

Ad-7.4.1 Drop Test on Hard Surface.

a. The UUT was soaked at minimum storage temperature for 2 hours, then soaked at –40° C for 2 hours. The drop test was then performed within 5 minutes after removal from a temperature chamber.

b. The UUT was dropped from a height of 1 meter (±10 mm) above the test surface. The orientation of the UUT when dropped was the normal floating position.

c. The test surface consisted of a piece of solid hard wood with a thickness of at least 150 mm and a mass of 30 kg or more.

d. At the conclusion of the drop, the UUT was subjected to an aliveness check IAW paragraph Ad-1.

Ad-7.4.2 Drop Test in Water.

a. The UUT was dropped three times from a height of at least 20 meters into water. Each drop was initiated from a different orientation as follows: Antenna vertical up, antenna vertical down, and antenna horizontal.

b. Upon completion of the drop test, an exterior mechanical inspection was performed and the aliveness test conducted IAW paragraph Ad-1.

Ad-7.5 Data Reduction and Presentation.

Annotated and maintained environmental chamber charts with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-8 Leakage and Immersion Test

Ad-8.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A9.0.

b. The objective was to determine whether the UUT can survive exposure to immersion up to 10 meters without leakage or degradation in performance.

c. The UUT was turned OFF during the Leakage and Immersion tests.

Ad-8.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Custom Fabricated-Immersion Tank
  - American Research-Climatic Chamber.
  - Omega 4500 series-Chart Recorder

Ad-8.3 Test Condition.

Water immersion (non-operating).

Ad-8.4 Test Procedure.

The tests were performed in the following sequence:

a. The UUT was placed in an atmosphere of 65° C ±3°C for 1 hour. It was immediately immersed in water at 20° C ±3° C to a depth of 100 mm ±5 mm, measured from the highest point of the equipment to the surface of the water, for a period of 48 hours.

b. The UUT was then immersed under a 10-meter head of water for 5 minutes.

c. At the end of the test period, the UUT was subjected to an aliveness check IAW paragraph Ad-1, and inspected for damage and visible ingress of water viewed with the unaided eye.

Since the battery is user replaceable, the UUT was immersed under a 10-meter head of water for 5 minutes with the battery compartment open to the water. After 5 minutes, the UUT was removed from the water, wiped dry, and opened for inspection. There was no free water inside the compartment containing the electronic components.

Ad-8.5 Data Reduction and Presentation.

Annotated and maintained environmental chamber charts with UUT part/serial number, date, and test description. Annotated printed results from each aliveness check subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-9 Spurious Emissions Test

Ad-9.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A10.0

b. The objective was to ensure spurious and harmonic emissions produced by 406 MHz and 121.5 MHz signals do not exceed the limits defined in figures 2-1 and 2-5 of the RTCM.

Ad-9.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System

Ad-9.3 Test Condition.

a. Normal ambient conditions.

b. Environmental test conditions: minimum operating temperature; maximum operating temperature.

Ad-9.4 Test Procedure.

At the conclusion of each of the ambient, low, and high temperature electrical and functional tests performed for C/S Type Approval, maintained the beacon at the test temperature and selected and performed the 406- and 121.5-MHz Spurious Test from the manual test selection menu. Spurious emissions testing was performed IAW C/S Test Procedure paragraph 3.2.2.3 with the spectrum analyzer center frequency set to 121.5 and 406 MHz.

Ad-9.5 Data Reduction and Presentation.

Prepared a computer plot of the spectral response with the limit mask superimposed. Annotated plotted results with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-10 Thermal Shock Test

Ad-10.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A11.0.

b. The objective was to ensure proper activation and operation after being exposed to a rapid thermal change.

Ad-10.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System

Ad-10.3 Test Condition.

Environmental test conditions: minimum stowage temperature to 0° C fresh and salt water; maximum stowage temperature to +30° C fresh and salt water.

Ad-10.4 Test Procedure.

Conducted the following for both Low-Temperature and High-Temperature Thermal tests:

a. Following fresh water immersion, observed beacon and recorded time at which it activated as evident by illumination of strobe light.

b. Following salt water immersion, observed beacon and recorded time at which it activated as evident by illumination of strobe light. After beacon had been activated for 20 minutes, performed the following tests:

   (1) Measured and recorded transmitter frequency by selecting Frequency Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Frequency testing was performed IAW C/S Test Procedure paragraph 3.2.1.

   (2) Measured and recorded transmitter output power by selecting Output Power Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Power output testing was performed IAW C/S Test Procedure paragraph 3.2.2.

   (3) Obtained and verified correct digital message coding by selecting Message Coding Test from the manual test selection menu of the Cospas-Sarsat Measurement System. Message coding testing was performed IAW C/S Test Procedure paragraph 3.1.4.

   (4) Measured and recorded short and medium term frequency stability by selecting Frequency Stability Test from the manual selection menu of the Cospas-Sarsat Measurement System. Frequency stability was conducted IAW C/S Test Procedure paragraph 3.2.1.

Ad-10.5 Data Reduction and Presentation.

Recorded activation times and annotated printed results from each subtest with test condition (Low or High Thermal Test) under which test was conducted and submitted for review and inclusion in the test report.

Ad-11 COSPAS-SARSAT Type Approval Tests

Testing was conducted IAW Revised Test Procedures for Cospas-Sarsat 406-MHz Distress Beacon Type Approval, publication No. EPG-RTPR00-05-001X, June 2000, with the following modifications to accommodate RTCM specific requirements.

Soak times for minimum and maximum temperature tests were increased from 2 hours minimum to 3 hours minimum.

Frequency stability measurements, strobe light flash rate, and auxiliary radio-locating device output power measurements were conducted during the Operational Life Test. Preconditioning of battery and additional test details are provided in paragraph Ad-12 below.

At the conclusion of the standard suite of C/S Electrical and Functional Tests at Constant Temperature (ambient, minimum, and maximum operating temperatures), conducted a Strobe Light Test IAW section Ad-13 below, and a Self-Test to include a measurement of the 406 MHz output pulse duration.

Annotated printed results from these additional measurements with test condition in which they were made and submitted for review and inclusion in the test report.

Ad-12 Operational Life Test

Ad-12.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A13.1.

b. The objective was to ensure the beacon will operate for a period of 48 hours using a battery pack that has reached its expiration date.

Ad-12.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System

Ad-12.3 Test Condition.

Environmental test conditions: minimum operating temperature.

Ad-12.4 Test Procedure.

a. Preconditioned a fresh battery pack by operating the beacon at ambient temperature for a period of time equal to the extended interval [F (test extension factor) x 48 h]. This preconditioning also satisfies the requirements of C/S T.007 paragraph A2.3.

b. Selected and performed the Operational Life Test from the automatic test selection menu of the Cospas-Sarsat Measurement System for a minimum of 48 hours.

c. Once within 24 hours of activating the beacon, and at intervals of 6 hours thereafter, performed and recorded the following additional tests:

   (1) Nominal carrier frequency (406.025 ±0.002 MHz).

   (2) Short-term frequency stability [≤0.002 part/million in 100 milliseconds (ms)].

   (3) Medium-term frequency stability.

   Mean slope
   Residual frequency variation

   (4) Radio Frequency (RF) output power (5 watt ±2 dB).

   (5) Verified and recorded the beacon strobe flash rate is 20-30 flashes per minute.

   (6) Using the spectrum analyzer with center frequency set to 121.5 MHz, and accounting for test interconnect cable losses, verified and recorded that the auxiliary radio-locating device transmitter output power is 14 to 20 dBm.

Ad-12.5 Data Reduction and Presentation.

a. Obtained printed results from the automated test and submitted for review and inclusion in the test report.

b. Recorded test times and results of beacon strobe rate and auxiliary radio-locating device transmitter output power and submitted for review and inclusion in the test report.

Ad-13 Strobe Light

Ad-13.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A13.2.

b. The objective was to ensure the beacon strobe light will operate within specifications throughout its operating temperature range.

Ad-13.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System
  - IL1700 Radiometer

Ad-13.3 Test Condition.

a. Normal ambient conditions.

b. Environmental test conditions: minimum operating temperature; maximum operating temperature.

Ad-13.4 Test Procedure.

a. At the conclusion of each of the ambient, low, and high temperature electrical and functional tests performed for C/S Type Approval, maintained the beacon at the test temperature.

b. Observed and recorded the strobe light flash rate.

c. Removed the beacon from the temperature chamber and measured and recorded the effective intensity using the radiometer within 1 minute of removal.

Ad-13.5 Data Reduction and Presentation.

Recorded results of beacon strobe rate and intensity tests and annotated the environmental condition under which test was performed. Submitted for review and inclusion in the test report.

Ad-14 Self-Test

This test was conducted IAW Cospas-Sarsat Type Approval tests, paragraph 3.6 of the Revised Procedures, June 2000.

Ad-15 Automatic Release Mechanism and Automatic Activation Tests for Category 1 Satellite EPIRBs

Ad-15.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A14.0.

b. The objective was to determine whether the UUT will activate when submerged to a depth of 4 meters.

c. The UUT shall float free before reaching a depth of 4 meters and shall automatically activate.

d. If the UUT is equipped with an automatically deployable antenna, the antenna must properly deploy during each immersion.

e. Activation shall be verified by observing operation of the strobe light.

Ad-15.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Custom Fabricated-Immersion Tank
  - American Research-Climatic Chamber
  - Omega 4500 Series-Chart Recorder
  - Thermotron 6500 Series-Climatic Controller

Ad-15.3 Test Condition.

Ambient water with UUT at minimum and maximum stowage temperature and ambient temperature (non-operating).

Ad-15.4 Test Procedure.

a. The automatic release mechanism and the assembly were mounted on a fixture simulating a deck or a bulkhead as per manufacturer's installation instructions. The fixture was then submerged in water to ensure the UUT floated free before reaching a depth of 4 meters and automatically activated.

b. The test was then conducted at ambient temperature except as specified below with the UUT rotated in each instance prior to immersion.

c. Normal mounted orientation:

   (1) UUT (including automatic release mechanism and assembly) soaked at minimum stowage temperature for 1 hour minimum.

   (2) UUT (including automatic release mechanism and assembly) soaked at maximum stowage temperature for 1 hour minimum.

(3) UUT (including automatic release mechanism and assembly) at ambient temperature.

d. With UUT, released mechanism and assembly simulating a rolling 90° starboard orientation.

e. With UUT, released mechanism and assembly simulating a rolling 90° port orientation.

f. With UUT, released mechanism and assembly simulating a rolling 90° pitch bow down orientation.

g. With UUT, released mechanism and assembly simulating a rolling 90° pitch stern down orientation.

h. With UUT, released mechanism and assembly in an upside down orientation.

Ad-15.5 Data Reduction and Presentation.

Recorded results of each test for inclusion in the test report.

Ad-16 Stability and Buoyancy Test

Ad-16.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A15.0.

b. The objective was to ensure the UUT will remain in a stable upright orientation with the antenna a minimum distance above the waterline.

Ad-16.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Custom Fabricated-Immersion Tank

Ad-16.3 Test Condition.

Normal ambient conditions.

Ad-16.4 Test Procedure.

a. With the antenna deployed in its normal operating position, the UUT, when rotated to a horizontal position about any axis, submerged just below the surface, and released, passed through an upright position within 2 seconds.

b. The reserve buoyancy of the satellite EPIRB was at least 5% when determined by one of the following procedures:

   (1) Submerged the complete unit and measured the buoyant force with a scale. Divided the measured buoyant force by the weight of the unit. The result was at least 1.05.

   (2) Determined the location of the waterline on the floating satellite EPIRB. Calculated the volume of the unit above the water and the volume below the water. Divided the volume above the water by the volume below the water. The result was at least 1.05.

Ad-16.5 Data Reduction and Presentation.

Recorded the time to upright, reserve buoyancy value, and antenna base distance above waterline for inclusion in the test report.

Ad-17 Inadvertent Activation Test

Ad-17.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A16.0.

b. The objective was to ensure the UUT will not release from its bracket, nor automatically activate inadvertently as a result of the occasional water contact. Note: A Category 2 satellite EPIRB is not required to be subjected to this test, unless it is provided with a bracket intended to be mounted in an exposed location on deck.

Ad-17.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Blowing Rain Chamber

Ad-17.3 Test Condition.

Ambient conditions with water spray.

Ad-17.4 Test Procedure.

The unit consisting of the satellite EPIRB and its release mechanism installed in its bracket, if any, was mounted successively in each method intended for mounting on a ship, as described in the manufacturer's instructions. A stream from a hose was directed at the UUT for a period of 5 minutes. The nozzle had a nominal diameter of 63.5 mm and a water delivery rate of approximately 2300 liters of water per minute. The end of the nozzle was 3.5 meters away from the UUT and 1.5 meters above the base of the antenna. The satellite EPIRB was rotated, or the nozzle moved in a horizontal plane during the test, so that water struck the UUT from all directions over an arc of at least 180°.

Ad-17.5 Data Reduction and Presentation.

Recorded confirmation that the UUT did not activate under water spray conditions for inclusion in the test report.

Ad-18 121.5 MHz Auxiliary Radio-Locating Device Transmitter

Ad-18.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A17.1, A.17.2

b. The objective was to verify the correct operating status of the 121.5 MHz auxiliary radio-locating device by measuring the carrier frequency and modulation characteristics.

Ad-18.2 Facilities and Instrumentation.

- Environmental Test Facility

  - Cospas-Sarsat Measurement System

Ad-18.3 Test Condition.

a. Normal ambient conditions.

b. Environmental test conditions: minimum operating temperature; maximum operating temperature.

Ad-18.4 Test Procedure.

With the UUT stabilized at temperature and on for at least 15 minutes, performed and recorded the results of the following measurements:

a. Using the Cospas-Sarsat Measurement System spectrum analyzer, measured peak carrier center frequency to verify it is within 121.5 (±0.006) MHz and verified the transmitter duty cycle is 100% except for up to 2 seconds during the 406 MHz bursts.

b. Using a storage oscilloscope:

   (1) Measured the audio frequency sweep range to ensure it is greater than or equal to 700 Hz and completely within the range of 300-1600 Hz.

   (2) Ensured the sweep repetition rate was between 2 and 4 seconds.

   (3) Ensured the modulation duty cycle was between 33 and 55 percent.

   (4) Ensured the modulation factor was between 0.85 and 1.0.

Ad-18.5 Data Reduction and Presentation.

Recorded results from each subtest and annotated with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-19 Peak Effective Radiated Power (121.5 MHz Auxiliary Radio-Locating Device) Measurement

The manufacturer provided the test results for this requirements.

Ad-20 Voltage Standing Wave Ratio (VSWR) Measurement

The satellite EPIRB's antenna is non-removable (in its normal configuration).

Ad-21 Humidity

Ad-21.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A4.0.

b. The objective was to determine if the UUT's electrical components performance are compromised when exposed to high humidity.

Ad-21.2 Facilities and Instrumentation.

- Environmental Test Facility

  - American Research-Climatic Chamber
  - Thermotron-6500 Series-Climatic Controller
  - Omega 4500 Series-Chart Recorder

Ad-21.3 Test Condition.

High temperature (>40° C) and humidity (>95%) (non-operating).

Ad-21.4 Test Procedure.

a. The humidity test was conducted with the electrical components removed from the satellite EPIRB or with the housing opened or modified to expose the internal elements to the humid test environment.

b. The test chamber atmosphere was maintained at a relative humidity in excess of 95% and at a temperature of at least 40° C for a period of 8 hours or more. During this time, the UUT was turned OFF.

c. At the end of the period, the unit was removed from the test chamber to ambient room conditions. Within 5 minutes after removal, the unit was turned ON.

d. Fifteen minutes after application of power, the aliveness test was conducted IAW paragraph Ad-1.

Ad-21.5 Data Reduction and Presentation.

Recorded results from each subtest and annotated with test condition under which test was conducted and submitted for review and inclusion in the test report.

Ad-22 Orientation Test

Ad-22.1 Scope.

a. Reference: RTCM, Appendix A, paragraph A19.0.

b. The objective was to verify the correct operating status of the beacon during normal and abnormal orientations by measuring the transmitter frequency, power, and digital message coding.

Ad-22.2 Facilities and Instrumentation.

- Environmental Test Facility

- Cospas-Sarsat Measurement System

Ad-22.3 Test Condition.

Normal ambient conditions.

Ad-22.4 Test Procedure.

Conducted an aliveness check IAW paragraph Ad-1, 2 minutes after placing the UUT in the following orientations:

Vertical (normal)
Horizontal
Upside down
Return to vertical

Ad-22.5 Data Reduction and Presentation.

Annotated printed results from each subtest with test condition under which test was conducted and submitted for review and inclusion in the test report.

APPENDIX A.

ENVIRONMENTAL AND OPERATIONAL PERFORMANCE DATA SHEETS

Intentionally Blank

ANNEX 1. INITIAL ALIVENESS TEST

4.06028126572E+8, 4.06028126287E+8, 4.06028126503E+8
4.0602812662E+8, 4.06028126527E+8, 4.06028126643E+8
4.0602812667E+8, 4.0602812635E+8, 4.06028126588E+8
4.0602812659E+8, 4.06028126236E+8, 4.06028126594E+8
4.06028126596E+8, 4.06028126275E+8, 4.06028126533E+8
4.06028126805E+8, 4.06028126512E+8, 4.06028126742E+8
4.06028126805E+8, 4.0602812669E+8, 4.06028126963E+8
4.06028126368E+8, 4.06028126247E+8, 4.06028126349E+8
4.06028126269E+8, 4.06028125966E+8, 4.06028126229E+8
4.06028126464E+8, 4.06028126179E+8, 4.06028126477E+8
4.06028125981E+8, 4.06028125771E+8, 4.06028126082E+8
4.06028125972E+8, 4.06028125806E+8, 4.06028126028E+8
4.06028125888E+8, 4.06028125743E+8, 4.06028125942E+8
4.06028125996E+8, 4.06028125806E+8, 4.06028125966E+8
4.06028126305E+8, 4.06028126044E+8, 4.06028126287E+8
4.06028126263E+8, 4.06028126158E+8, 4.06028126446E+8
4.06028126461E+8, 4.0602812614E+8, 4.06028126389E+8
4.06028126383E+8, 4.0602812601E+8, 4.06028126326E+8

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 29
BEACON CERTIFICATION TEST RESULTS - INITIAL ALIVENESS CHECK
MEASUREMENT DATE: 11 Jul 2000 TIME: 09:23:42

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Nominal transmitted frequency	406.028 ±.001	406.028126	MHz	passed
Short term frequency stability	< 2.0E-9	4.35E-10		passed
Medium term: mean slope	< 1.0E-9	-9.32E-11	/min	passed
residual deviation	< 3.0E-9	5.16E-10		passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 29
BEACON CERTIFICATION TEST RESULTS - INITIAL ALIVENESS CHECK
MEASUREMENT DATE: 11 Jul 2000 TIME: 09:27:01

TESTED BY: [illegible] APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.44	W	pas
Tx ouput power level	3.15 TO 7.93	4.44	W	pas
Tx ouput power level	3.15 TO 7.93	4.44	W	pas

36.5 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 29
BEACON CERTIFICATION TEST RESULTS - INITIAL ALIVENESS CHECK
MEASUREMENT DATE: 11 Jul 2000 TIME: 09:30:29

TESTED BY: [illegible] **APPROVED BY:** Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	0
Should be:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	
Decoded:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 29
BEACON CERTIFICATION TEST RESULTS - INITIAL ALIVENESS CHECK
MEASUREMENT DATE: 11 Jul 2000 TIME: 09:31:03

TESTED BY: [signature] APPROVED BY: Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	0

BIT NUMBER:

40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0

BIT NUMBER:

80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0

ANNEX II. DRY HEAT CYCLE

ALIVENESS TEST AFTER 10-HOUR SOAK

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Storage Test 70°C
BEACON CERTIFICATION TEST RESULTS - 55°C ALIVENESS TEST AFTER SOAK (10 HR)
MEASUREMENT DATE: 4 Oct 2000 TIME: 06:25:50 1ST Test after "ON"

TESTED BY: CBah APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Tx ouput power level	3.15 TO 7.93	4.35	W	passed
Tx ouput power level	3.15 TO 7.93	4.35	W	passed
Tx ouput power level	3.15 TO 7.93	4.36	W	passed

36.4 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Storage Test 70°C
BEACON CERTIFICATION TEST RESULTS - 55°C ALIVENESS TEST AFTER SOAK (10 HR)
MEASUREMENT DATE: 4 Oct 2000 TIME: 06:32:04 1ST TEST after "ON"

TESTED BY: CBk APPROVED BY: Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06
Should be:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1
Decoded:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Storage Test 70°C
BEACON CERTIFICATION TEST RESULTS - 55°C Aliveness test AFTER SOAK (10 HRS)
MEASUREMENT DATE: 4 Oct 2000 TIME: 06:32:57 1ST TEST AFTER "ON"

TESTED BY: C Bell APPROVED BY: _____

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

```
                    1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
-----------------------------------------------------------------------------
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 1 0 1 1 1 1 0 1 0 1 0 1 1 0 1 1 1 0 0 1 1
```

BIT NUMBER:

```
4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
-----------------------------------------------------------------------------
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0
```

BIT NUMBER:

```
                                        1 1 1 1 1 1 1 1 1 1 1 1 1
8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 0 0 0 0 0 0 0 0 0 0 1 1 1
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
-----------------------------------------------------------------
0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 0 1 1 0 1 0 0 0 0 4.06027995611E+8, 4.060
4.06027995672E+8, 4.06027995659E+8, 4.0602799562E+8
```

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Heat Test 70°C
BEACON CERTIFICATION TEST RESULTS - 55°C ALIVENESS TEST AFTER SOAK (10 HR
MEASUREMENT DATE: 4 Oct 2000 TIME: 06:48:37
1ST ALIVENESS TEST

TESTED BY: C Bahn APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027995	MHz	pas
Short term frequency stability	< 2.0E-9	1.64E-10		pas
Medium term: mean slope	< 1.0E-9	-5.14E-11	/min	pas
residual deviation	< 3.0E-9	2.03E-10		pas

```
4.06027995636E+8, 4.06027995599E+8, 4.06027995641E+8
4.06027995572E+8, 4.06027995503E+8, 4.06027995611E+8
4.06027995566E+8, 4.06027995641E+8, 4.06027995617E+8
4.06027995468E+8, 4.06027995495E+8, 4.0602799559E+8
4.06027995435E+8, 4.06027995462E+8, 4.06027995584E+8
4.06027995426E+8, 4.06027995393E+8, 4.06027995512E+8
4.06027995304E+8, 4.06027995207E+8, 4.0602799542E+8
4.06027995379E+8, 4.06027995348E+8, 4.06027995378E+8
4.06027995393E+8, 4.06027995435E+8, 4.0602799553E+8
4.06027995264E+8, 4.06027995321E+8, 4.06027995417E+8
4.06027995324E+8, 4.06027995333E+8, 4.06027995222E+8
4.06027995289E+8, 4.06027995372E+8, 4.06027995327E+8
4.06027995295E+8, 4.06027995324E+8, 4.06027995219E+8
4.06027995234E+8, 4.06027995312E+8, 4.06027995312E+8
4.06027995136E+8, 4.06027995285E+8, 4.06027995282E+8
4.06027995268E+8, 4.06027995387E+8, 4.06027995276E+8
```

ALIVENESS TEST – 2-HOURS AT +55º

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 DRY HEAT Cycle (70°C)
BEACON CERTIFICATION TEST RESULTS - Second test (2 hours at 55°C) ALIVENESS TEST
MEASUREMENT DATE: 4 Oct 2000 TIME: 08:08:15

TESTED BY: CBl APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.027995	MHz	pas
Short term frequency stability	< 2.0E-9	9.76E-11		pas
Medium term: mean slope	< 1.0E-9	+1.04E-11	/min	pas
residual deviation	< 3.0E-9	1.61E-10		pas

```
4.06027994772E+8, 4.06027994877E+8, 4.06027994895E+8
4.06027994764E+8, 4.06027994898E+8, 4.06027994826E+8
4.06027994757E+8, 4.06027994853E+8, 4.06027994862E+8
4.06027994832E+8, 4.06027994883E+8, 4.06027994817E+8
4.06027994793E+8, 4.06027994919E+8, 4.06027994893E+8
4.06027994748E+8, 4.06027994694E+8, 4.0602799479E+8
4.06027994637E+8, 4.06027994685E+8, 4.0602799477E+8
4.06027994712E+8, 4.06027994835E+8, 4.06027994838E+8
4.06027994685E+8, 4.06027994841E+8, 4.06027994766E+8
4.06027994742E+8, 4.06027994838E+8, 4.06027994872E+8
4.06027994832E+8, 4.06027994883E+8, 4.06027994802E+8
4.06027994883E+8, 4.06027994838E+8, 4.06027994836E+8
4.06027994883E+8, 4.06027994868E+8, 4.06027994832E+8
4.0602799489E+8, 4.06027994907E+8, 4.06027994946E+8
4.06027994784E+8, 4.06027994865E+8, 4.06027994871E+8
4.06027994841E+8, 4.06027994889E+8, 4.06027994775E+8
4.06027994928E+8, 4.06027994976E+8, 4.06027994961E+8
4.06027994857E+8, 4.06027994871E+8, 4.06027994883E+8
```

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 DRY HEAT Cycle (70°C)
BEACON CERTIFICATION TEST RESULTS - Second Test (2hours at 55°C)
MEASUREMENT DATE: 4 Oct 2000 TIME: 08:08:28 ALIVENESS TEST.

TESTED BY: CBeh **APPROVED BY:** Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	0
Should be:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	
Decoded:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Heat Cycle (70°C)
BEACON CERTIFICATION TEST RESULTS - Second Test (2 hours at 55°C)
MEASUREMENT DATE: 4 Oct 2000 TIME: 08:09:08 ALIVENESS TEST

TESTED BY: CBL **APPROVED BY:** Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	0

BIT NUMBER:

40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0

BIT NUMBER:

80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029 Dry Heat Cycle (70°C)
BEACON CERTIFICATION TEST RESULTS - Second Test (2 Hours AT 55°C)
MEASUREMENT DATE: 4 Oct 2000 TIME: 08:09:30 Aliveness Test

TESTED BY: C Bak **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.36	W	pas
Tx ouput power level	3.15 TO 7.93	4.36	W	pas
Tx ouput power level	3.15 TO 7.93	4.36	W	pas

36.4 dBm

ANNEX III. DAMP HEAT CYCLE

4.06028113366E+8, 4.06028113327E+8, 4.06028113492E+8
4.06028113438E+8, 4.06028113376E+8, 4.06028113333E+8
4.0602811327E+8, 4.06028113072E+8, 4.06028113129E+8
4.06028113114E+8, 4.06028112976E+8, 4.0602811312E+8
4.06028113198E+8, 4.06028112836E+8, 4.06028113192E+8
4.06028113231E+8, 4.06028113087E+8, 4.06028113084E+8
4.06028113111E+8, 4.06028113018E+8, 4.06028113169E+8
4.0602811407E+8, 4.06028113975E+8, 4.06028114322E+8
4.06028113978E+8, 4.06028113537E+8, 4.06028113792E+8
4.0602811372E+8, 4.06028113477E+8, 4.06028113684E+8
4.0602811372E+8, 4.06028113637E+8, 4.06028113714E+8
4.06028113597E+8, 4.06028113405E+8, 4.06028113612E+8
4.06028113918E+8, 4.06028113699E+8, 4.06028113969E+8
4.06028113825E+8, 4.06028113768E+8, 4.06028113972E+8
4.06028114208E+8, 4.06028114091E+8, 4.06028114265E+8
4.0602811404E+8, 4.06028113762E+8, 4.06028114049E+8
4.06028114026E+8, 4.06028113867E+8, 4.06028114073E+8

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS - DAMP HEAT BEGINNING OF TWO HOUR TEST PERIOD
MEASUREMENT DATE: 12 Jul 2000 TIME: 21:21:03 TEMP 40°C @ 93% HUMIDITY

TESTED BY: [signature] **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.028114	MHz	pas
Short term frequency stability	< 2.0E-9	3.69E-10		pas
Medium term: mean slope	< 1.0E-9	+1.70E-10	/min	pas
residual deviation	< 3.0E-9	5.92E-10		pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS - DAMP HEAT BEGINNING at 2 Hour Test Period
MEASUREMENT DATE: 12 Jul 2000 TIME: 21:22:55 Temp 40°c @ 93% humidity

TESTED BY: [signature] **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.42	W	pas
Tx ouput power level	3.15 TO 7.93	4.41	W	pas
Tx ouput power level	3.15 TO 7.93	4.41	W	pas
Tx ouput power level	3.15 TO 7.93	4.42	W	pas
Tx ouput power level	3.15 TO 7.93	4.42	W	pas

36.5 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS -
MEASUREMENT DATE: 12 Jul 2000 TIME: 21:27:29
DAMP HEAT BEGINNIG OF THE TEST PERIOD (2HOUR) TEMP 49°C @93% humidity
TESTED BY: [signature] **APPROVED BY:** Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	0
Should be:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	
Decoded:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029 of
BEACON CERTIFICATION TEST RESULTS - Damp Heat Cycle Beginning of the Test
MEASUREMENT DATE: 12 Jul 2000 TIME: 21:28:38 Period. Temp 40°C @93% RH.

TESTED BY: [signature] APPROVED BY: Rora Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	0

BIT NUMBER:	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0

BIT NUMBER:	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0

END OF 2-HOUR PERIOD

4.06028113669E+8, 4.06028113348E+8, 4.06028113738E+8
4.0602811345E+8, 4.06028113261E+8, 4.06028113564E+8
4.06028113543E+8, 4.06028113489E+8, 4.06028113639E+8
4.06028113435E+8, 4.06028113222E+8, 4.06028113516E+8
4.06028113504E+8, 4.06028113336E+8, 4.06028113525E+8
4.06028113414E+8, 4.06028113414E+8, 4.06028113438E+8
4.06028113522E+8, 4.0602811336E+8, 4.06028113729E+8
4.06028113537E+8, 4.06028113342E+8, 4.06028113471E+8
4.06028113471E+8, 4.06028113405E+8, 4.06028113579E+8
4.06028113666E+8, 4.06028113489E+8, 4.06028113597E+8
4.06028113624E+8, 4.06028113604E+8, 4.06028113681E+8
4.06028113777E+8, 4.0602811369E+8, 4.06028113891E+8
4.0602811345E+8, 4.06028113328E+8, 4.06028113567E+8
4.06028113561E+8, 4.06028113387E+8, 4.06028113501E+8
4.0602811348E+8, 4.06028113169E+8, 4.06028113375E+8
4.06028113531E+8, 4.06028113366E+8, 4.06028113414E+8
4.06028113696E+8, 4.06028113489E+8, 4.06028113642E+8
4.06028113873E+8, 4.0602811363E+8, 4.06028113828E+8

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS - End of two hour test period Damp Heat.
MEASUREMENT DATE: 12 Jul 2000 TIME: 23:05:38 40°C 93% RH

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Nominal transmitted frequency	406.028 ±.001	406.028114	MHz	passed
Short term frequency stability	< 2.0E-9	3.69E-10		passed
Medium term: mean slope	< 1.0E-9	+2.57E-11	/min	passed
residual deviation	< 3.0E-9	3.11E-10		passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS - End of 2 hour Test period - Damp heat 40°C @ 93% RH
MEASUREMENT DATE: 12 Jul 2000 TIME: 23:06:29

TESTED BY: APPROVED BY: Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.40	W	pas
Tx ouput power level	3.15 TO 7.93	4.42	W	pas
Tx ouput power level	3.15 TO 7.93	4.42	W	pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029 0#
BEACON CERTIFICATION TEST RESULTS - End of 2 hour test period Damp heat
MEASUREMENT DATE: 12 Jul 2000 TIME: 23:12:48 40°C 93% RH

TESTED BY: [signature] **APPROVED BY:** Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 4 4 0 4 0 1 0 0 A A 9 A

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06
Should be:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1
Decoded:	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1

*** BCH CODE OK ***

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~023~~ 029
BEACON CERTIFICATION TEST RESULTS - end of twhour Test period - Damp heat 40°C @ 93% RH.
MEASUREMENT DATE: 12 Jul 2000 TIME: 23:13:59

TESTED BY: [signature] APPROVED BY: Rosa Barrineau

DIGITAL MESSAGE IN BINARY:

BIT NUMBER:

```
                    1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
-----------------------------------------------------------------------------
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 1 0 1 1 1 1 0 1 0 1 0 1 1 0 1 1 1 0 0 1 1
```

BIT NUMBER:

```
4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9
-----------------------------------------------------------------------------
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0
```

BIT NUMBER:

```
                                        1 1 1 1 1 1 1 1 1 1 1 1 1
8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 0 0 0 0 0 0 0 0 0 0 1 1 1
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
-----------------------------------------------------------------
0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 0 1 1 0 1 0 0 0 0
```

ANNEX IV. VIBRATION TEST

POST VIBRATION ALIVENESS TEST

4.06027747769E+8, 4.06027747694E+8, 4.06027747952E+8
4.06027747841E+8, 4.06027747676E+8, 4.06027747853E+8
4.06027748E+8, 4.0602774791E+8, 4.06027748107E+8
4.06027748012E+8, 4.06027747838E+8, 4.06027748293E+8
4.06027748164E+8, 4.06027748146E+8, 4.06027748368E+8
4.06027748306E+8, 4.06027748288E+8, 4.06027748384E+8
4.06027748443E+8, 4.0602774838E+8, 4.06027748716E+8
4.06027748456E+8, 4.06027748603E+8, 4.06027748741E+8
4.06027748675E+8, 4.06027748531E+8, 4.06027748623E+8
4.06027748732E+8, 4.0602774866E+8, 4.06027748996E+8
4.06027748752E+8, 4.060277488E+8, 4.06027748851E+8
4.06027749005E+8, 4.06027748855E+8, 4.06027749086E+8
4.06027749052E+8, 4.06027748959E+8, 4.06027749322E+8
4.06027749193E+8, 4.06027749127E+8, 4.06027749361E+8
4.06027749205E+8, 4.06027749095E+8, 4.06027749313E+8
4.06027749238E+8, 4.06027749187E+8, 4.06027749328E+8
4.0602774913E+8, 4.06027749071E+8, 4.0602774958E+8
4.06027749556E+8, 4.06027749376E+8, 4.0602774949E+8

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~029~~ 018
BEACON CERTIFICATION TEST RESULTS - POST VIB ALIVENESS TEST
MEASUREMENT DATE: 20 Jul 2000 TIME: 12:17:35

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMMENTS
Nominal transmitted frequency	406.028 ±.001	406.027749	MHz	passed
Short term frequency stability	< 2.0E-9	4.57E-10		passed
Medium term: mean slope	< 1.0E-9	+2.92E-10	/min	passed
residual deviation	< 3.0E-9	2.48E-10		passed

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~029~~ 018
BEACON CERTIFICATION TEST RESULTS - Post VIB Test Aliveness Test.
MEASUREMENT DATE: 20 Jul 2000 TIME: 12:18:19

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.31	W	pas

36.3 dBm

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: ~~029~~ 018
BEACON CERTIFICATION TEST RESULTS - POST VIB TEST & ALIVENESS
MEASUREMENT DATE: 20 Jul 2000 TIME: 12:19:46

TESTED BY: [signature] **APPROVED BY:** Rosa Barrineau

BEACON DIGITAL MESSAGE VERIFICATION

SYNCHRONIZATION BIT #:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Should be:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Decoded:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

*** BIT SYNCHRONIZATION OK ***

FRAME SYNCHRONIZATION BIT #:	16	17	18	19	20	21	22	23	24
Should be:	0	0	0	1	0	1	1	1	1
Decoded:	0	0	0	1	0	1	1	1	1

*** FRAME SYNCHONIZATION OK ***

MESSAGE TYPE: SHORT MESSAGE (bit 25 = 0)

DIGITAL MESSAGE IN HEXADECIMAL: A D C D 0 0 0 0 0 C 4 0 4 0 1 2 5 4 1 8 2

BEACON BCH CODE VERIFICATION

BCH CODE BIT #:	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	0
Should be:	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	1	1	0	0	
Decoded:	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	1	1	0	0	

*** BCH CODE OK ***

Intentionally Blank

ANNEX V. BUMP TEST

POST ALIVENESS TEST

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - POST BUMP ALIVENESS CHECK
MEASUREMENT DATE: 14 Jul 2000 TIME: 14:24:24

TESTED BY: _____ **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Nominal transmitted frequency	406.028 ±.001	406.028115	MHz	pas
Short term frequency stability	< 2.0E-9	3.92E-10		pas
Medium term: mean slope	< 1.0E-9	+8.53E-11	/min	pas
residual deviation	< 3.0E-9	5.50E-10		pas

WSMR ELECTRONIC PROVING GROUND, US ARMY, FORT HUACHUCA, ARIZONA
MANU: SEIMAC MODEL NO: PROFIND 406 SERIAL NO: 029
BEACON CERTIFICATION TEST RESULTS - POST BUMP ALIVENESS CHECK
MEASUREMENT DATE: 14 Jul 2000 TIME: 14:06:20

TESTED BY: JLC **APPROVED BY:** Rosa Barrineau

SPECIFICATIONS TESTED	LIMITS	RESULTS	UNITS	COMM
Tx ouput power level	3.15 TO 7.93	4.48	W	pas
Tx ouput power level	3.15 TO 7.93	4.47	W	pas

36.5 dBm