

---

**REPORT ON**  
**Limited Type Approval Testing of the Tellusart Mk II**  
**(Serial No. 31021)**  
**in accordance with IEC 1097-1 First edition 1992-07**

Report No 800011

November 1995

---



Assessment Services Limited  
Sogensworth Road Titchfield  
Fareham Hampshire  
England PO15 5RH  
Telephone: 01329 443300  
Fax: 01329 443421

---

**REPORT ON**

Limited Type Approval Testing of the Tellusart Mk II (Serial No. 31021) in accordance with IEC 1097-1 First edition 1992-07

Report No. 800011

**PREPARED FOR**

Plessey Tellumat SA Limited  
64/74 White Road  
Retreat  
7945  
Cape Town  
South Africa

**DISTRIBUTION**

|                                |             |            |
|--------------------------------|-------------|------------|
| Plessey Tellumat<br>SA Limited | Ms L Preiss | Copy No. 1 |
| Radiocommunications<br>Agency  | Mr M Roccia | Copy No. 2 |
| Assessment Services Limited    |             | Copy No. 3 |

Copy No: 1



## APPLICANT'S DETAILS

CATEGORY OF APPLICANT (a) ☒ Manufacturer  
(Please tick relevant box) (b) ☐ Importer  
(c) ☐ Distributor  
(d) ☐ Agent

If box (b),(c) or (d) is ticked complete details in box below with respect to the manufacturer

COMPANY NAME : Plessey Tellumat SA Limited  
ADDRESS : 64/74 White Road  
Retreat  
7945  
Capetown  
South Africa  
NAME FOR CONTACT PURPOSES : Ms L Preiss  
TELEPHONE NO : (021) 710 2364 FAX NO : (021) 710 2693  
TELEX NO :

## MANUFACTURERS DETAILS

COMPANY NAME : (Details as above)  
ADDRESS :  
NAME FOR CONTACT PURPOSES :  
TELEPHONE NO : FAX NO :  
TELEX NO :

**TYPE DESIGNATION<sup>(1)</sup>**

The type designation may be either a single alphanumeric code or an alphanumeric/code divided into two parts.

Please fill in

**EITHER :**

TYPE DESIGNATION AS

A SINGLE ALPHANUMERIC CODE /T/E/L/L/U/S/A/R/T//M/K//1/

OR :

TYPE DESIGNATION IN

TWO PARTS :

1. EQUIPMENT SERIES NO. (2)

(“MODEL NUMBER”)

/ / / / / / / / / / / / / / / / / / / / / / / / / / / /

AND

2. EQUIPMENT SPECIFIC NO.
- <sup>(b)</sup>

("IDENTIFICATION NO")

/ / / / / / / / / / / / / / / / / / / / / / / / / / / /

- (1) This is the manufacturer's numeric or alphanumeric code or name that is specific to a particular equipment.
- (2) This is the number, code or trade name used by the manufacturer to describe a series or 'family' of equipment of substantially the same mechanical and electrical construction which will include a number of related equipments. This number is often referred to as the "model number".
- (3) This is the manufacturer's identification number given to a specific equipment in the series or 'family' of equipments. It is often referred to as the "identification number".

## TYPE OF SART

- ☐ Fixed Installation in lifeboats, life rafts or on board ship.
- ☒ Portable unit
- ☐ Installed in a release mechanism and/or combined with a float free EPIRB.

## BATTERY

- |                                         |                                             |
|-----------------------------------------|---------------------------------------------|
| <input type="checkbox"/> Nickel Cadmium | <input type="checkbox"/> Lead Acid          |
| <input type="checkbox"/> Mercury        | <input type="checkbox"/> Leclanché          |
| <input type="checkbox"/> Alkaline       | <input checked="" type="checkbox"/> Lithium |
| <input type="checkbox"/> Other          |                                             |

Nominal  
voltage

15.0 Volts

End point voltage

11.0 Volts

| OTHER ITEMS SUPPLIED                                                        |                                     |     |
|-----------------------------------------------------------------------------|-------------------------------------|-----|
| Spare batteries                                                             | <input type="checkbox"/>            | Yes |
| e.g. (portable equipment)                                                   | <input checked="" type="checkbox"/> | No  |
| Battery charging device                                                     | <input type="checkbox"/>            | Yes |
|                                                                             | <input checked="" type="checkbox"/> | No  |
| Special tools for dismantling equipment                                     | <input type="checkbox"/>            | Yes |
|                                                                             | <input checked="" type="checkbox"/> | No  |
| Test interface box (if applicable) or where appropriate the RF test fixture | <input type="checkbox"/>            | Yes |
|                                                                             | <input checked="" type="checkbox"/> | No  |
| Full documentation on equipment<br>(Handbook and circuit diagrams)          | <input checked="" type="checkbox"/> | Yes |
|                                                                             | <input type="checkbox"/>            | No  |
| Others                                                                      | <input type="checkbox"/>            | Yes |
|                                                                             | <input checked="" type="checkbox"/> | No  |
| If Yes, please specify :                                                    |                                     |     |

| DECLARATIONS                                                                                                                                    |                                     |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----|
| Does the equipment comply with the requirements of section 3.2.14 ?                                                                             | <input checked="" type="checkbox"/> | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If no state reasons:                                                                                                                            |                                     |     |
| Are the equipments submitted representative production models ?                                                                                 | <input checked="" type="checkbox"/> | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If not are the equipments pre-production models ?                                                                                               | <input type="checkbox"/>            | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If pre-production equipments are submitted will the final production equipments be identical in <u>all</u> respects with the equipment tested ? |                                     |     |
|                                                                                                                                                 | <input type="checkbox"/>            | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If no supply full details :                                                                                                                     |                                     |     |
| Is the Test Report to be used as part of a DTI Radiocommunications Agency Type Approval Application ?                                           |                                     |     |
|                                                                                                                                                 | <input checked="" type="checkbox"/> | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If yes, has the product, any direct engineering predecessor, or variant ever been granted Type Approval in any EEC member country ?             |                                     |     |
|                                                                                                                                                 | <input checked="" type="checkbox"/> | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If yes supply full details: Tellusart Mk 1                                                                                                      |                                     |     |
| Will labelling of the equipment comply with the requirements of IEC 1097-1 ?                                                                    | <input checked="" type="checkbox"/> | Yes |
|                                                                                                                                                 | <input type="checkbox"/>            | No  |
| If no supply full details:                                                                                                                      |                                     |     |

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature : *L. Preiss*

Name : Ms L. Preiss

Position held : Product Manager : General Electronics & Avionics

Date : 18-05-95

Assessment Services Ltd. formally certifies that the manufacturer's declaration as typed in this report, is a true and accurate record of the original received from the applicant.

## LIST OF CONTENTS.

The list of observations and measured parameters called for in IEC 1097-1 is given below.

| Clause                                                                       | Page number |
|------------------------------------------------------------------------------|-------------|
| 6.2 . . . . . Operational requirements                                       | 8           |
| 6.3 . . . . . Battery capacity                                               | ....        |
| 6.4 . . . . . Environment (temperature)                                      |             |
| 6.4.1 . . . . . Dry heat cycle                                               | 9           |
| 6.4.2 . . . . . Low temperature cycle                                        | 10          |
| 6.5 . . . . . Antenna height                                                 | ....        |
| 6.6 . . . . . Antenna characteristics                                        |             |
| 6.6.1 . . . . . Azimuthal and vertical beamwidths                            | ....        |
| 6.6.2 . . . . . Polarisation                                                 | ....        |
| 6.7 . . . . . Range performance                                              | 11          |
| 6.8 . . . . . Labelling                                                      | 12          |
| 6.9 . . . . . Technical characteristics                                      |             |
| 6.9.3 . . . . . Receiver sensitivity                                         | 13          |
| 6.9.4 . . . . . Sweep characteristics                                        | 14          |
| 6.9.5 . . . . . Radiated power                                               | 15          |
| 6.9.6 . . . . . Antenna characteristics                                      | 16          |
| 6.9.7 . . . . . Recovery time following excitation                           | 17          |
| 6.9.8 . . . . . Delay - Receipt of radar interrogation and SART transmission | 18          |
| 6.9.9 . . . . . Receiver front end protection                                | ....        |

## Supplement to Report

|                                             |
|---------------------------------------------|
| . . . . . Range test results                |
| . . . . . Front end protection results      |
| . . . . . Drop test results                 |
| . . . . . Manufacturer supplied information |

## Operational Requirements

## Clause 6.2

Clause  
No.

- 6.2.1 The unit is fitted with a single rotary switch on the base capable of activation by unskilled personnel.
- 6.2.2 The unit is fitted with a means to prevent inadvertent activation. Manual activation requires a 'weak link' to be broken. The switch must be depressed and then turned to activate.
- 6.2.3 The unit has a visual indication of correct operation (yellow flashing L.E.D.) and both visual and audible indication of activation by a radar (green flashing L.E.D. and buzzer).
- 6.2.4 The unit is capable of manual activation and deactivation. No provision is made for automatic operation.
- 6.2.5 The unit has a visual indication of the standby condition i.e. activated but not triggered.
- 6.2.6 The equipment, serial no. 31021, was set up ready for normal use and allowed to fall freely from a height of 20 m into water. No damage occurred, no water ingress was observed and the unit functioned correctly.
- 6.2.7 Test combined with 6.2.8. No leakage was observed.
- 6.2.8 The unit, serial no. 31021, was placed in an environmental chamber at a temperature of +65°C for  $\geq 3$  h. It was then transferred to a pressure vessel containing water at +20°C and immersed to a depth of 100 mm. The pressure was raised to 100 kPa for a period of 1 h. The test was then repeated with the environmental chamber at a temperature of -10°C. On completion the unit showed no signs of leakage or malformation and functioned correctly.
- 6.2.9 The unit is not specifically designed to be an integral part of a survival craft. The check for floating was performed (5 minutes) following test 6.2.8.
- 6.2.10 The unit is fitted with a 10 m buoyant lanyard suitable for use as a tether.
- 6.2.11 Corrosion test not performed, refer to manufacturer's information, Annex B.
- 6.2.12 Refer to manufacturer's information, Annex B.
- 6.2.13 The unit is made of highly visible orange coloured plastic with yellow labels. A reflective band is fitted to the top of the unit.
- 6.2.14 Refer to manufacturer's information, Annex B.

Environment (temperature): Dry heat cycle

Clause 6.4.1

Performance check : Output Power/Modulation

| Output Power (mW) | Modulation characteristics           |           |                                      |
|-------------------|--------------------------------------|-----------|--------------------------------------|
|                   | $F_l$ in range 9.2 GHz<br>+0/-60 MHz | 12 Sweeps | $F_h$ in range 9.5 GHz<br>+60/-0 MHz |
| > 400             |                                      |           |                                      |
| Yes               | Yes                                  | Yes       | Yes                                  |

Remarks: Unit interrogated using test signal 2  
Performance check made during the final 2 hours of cycle  
 $F_l$  = lowest frequency of sweep  
 $F_h$  = highest frequency of sweep

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23

Environment (temperature): Low temperature cycle

Clause 6.4.2

Performance check : Output Power/Modulation

| Output Power (mW) | Modulation characteristics           |           |                                      |
|-------------------|--------------------------------------|-----------|--------------------------------------|
|                   | $F_l$ in range 9.2 GHz<br>+0/-60 MHz | 12 Sweeps | $F_h$ in range 9.5 GHz<br>+60/-0 MHz |
| >400              |                                      |           |                                      |
| Yes               | Yes                                  | Yes       | Yes                                  |

Remarks: Unit interrogated using test signal 2  
Performance check made during final 2 hours of cycle  
 $F_l$  = lowest frequency of sweep  
 $F_h$  = highest frequency of sweep

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23

Range performance

Clause 6.7

Response to marine X band radar

The SART operated correctly when interrogated at a distance of 7.02n.miles by a navigational radar complying with IMO resolution A.477 (XII), A.422 (XI) and IEC 936, with an antenna height of 15m. Details in report supplement.

Response to airborne radar

Assumptions;

|                      |                                                      |
|----------------------|------------------------------------------------------|
| Antenna height       | 1m                                                   |
| Receiver sensitivity | -53.8 dBm (test signal 1 at 9.5 GHz)                 |
| Radiated power       | 29.4 dBm (minimum including antenna characteristics) |

For a search height of 3000 ft and a peak power equal to 10 kW:

|                             |           |
|-----------------------------|-----------|
| Approximate detection range | 55n.miles |
|-----------------------------|-----------|

Range deduced from Fig. 3 contained in CCIR report 1036.

Limit

Clause 3.7

|                |                   |
|----------------|-------------------|
| Marine radar   | $\geq 5$ n.miles  |
| Airborne radar | $\geq 30$ n.miles |

**Labelling****Clause 6.8**

The labelling conforms to the requirements of IMO Resolution A.694(17). Brief operating instructions and the battery expiry date are also indicated in English on the exterior of the equipment.

## Receiver sensitivity

Clause 6.9.3

| Test Conditions                                      | Test Signal | 9.20 GHz<br>(mW/m <sup>2</sup> ) | 9.35 GHz<br>(mW/m <sup>2</sup> ) | 9.50 GHz<br>(mW/m <sup>2</sup> ) |
|------------------------------------------------------|-------------|----------------------------------|----------------------------------|----------------------------------|
| T <sub>nom</sub> = +23°C    V <sub>nom</sub> (15.0V) | 1           | 0.028                            | 0.028                            | 0.042                            |
|                                                      | 2           | 0.028                            | 0.017                            | 0.033                            |
| Measurement Uncertainty                              |             | ±0.3 dB                          |                                  |                                  |

## Limit

Clause 6.9.3.2

|               |                                   |
|---------------|-----------------------------------|
| Test Signal 1 | < 2.0 mW/m <sup>2</sup> (-37 dBm) |
| Test Signal 2 | < 0.1 mW/m <sup>2</sup> (-50 dBm) |

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

## Sweep characteristics - Frequency range

Clause 6.9.4

| Test Conditions                                          | 12 Sweeps | Minimum Frequency (GHz) | Maximum Frequency (GHz) |
|----------------------------------------------------------|-----------|-------------------------|-------------------------|
| $T_{nom} = +23^{\circ}\text{C}$ $V_{nom}(15.0\text{ V})$ | Yes       | 9.1611                  | 9.5306                  |
| Measurement Uncertainty                                  |           | $\pm 5.0\text{ MHz}$    |                         |

Limit

Clause 6.9.4.2

|                                                                                |
|--------------------------------------------------------------------------------|
| 12 Sweeps each covering the range 9.2 GHz (+0/-60 MHz) to 9.5 GHz (+60/-0 MHz) |
|--------------------------------------------------------------------------------|

## Sweep characteristics - Sweep time

Clause 6.9.4

| Test Conditions                                          | Forward Sweep Time ( $\mu\text{s}$ ) | Return Sweep Time ( $\mu\text{s}$ ) | First Sweep Type |
|----------------------------------------------------------|--------------------------------------|-------------------------------------|------------------|
| $T_{nom} = +23^{\circ}\text{C}$ $V_{nom}(15.0\text{ V})$ | 7.721                                | 0.430                               | Return           |
| Measurement Uncertainty ( $\mu\text{s}$ )                | $\pm 0.022$                          | $\pm 0.003$                         | N/A              |

Limit

Clause 6.9.4.2

|               |                            |
|---------------|----------------------------|
| Forward Sweep | $7.5 \pm 1.0\ \mu\text{s}$ |
| Return Sweep  | $0.4 \pm 0.1\ \mu\text{s}$ |

## Sweep characteristics - Sweep profile

Clause 6.9.4

| Test Conditions                                          | Forward Sweep Error (MHz) | Return Sweep Error (MHz) |
|----------------------------------------------------------|---------------------------|--------------------------|
| $T_{nom} = +23^{\circ}\text{C}$ $V_{nom}(15.0\text{ V})$ | 7.7                       | 5.2                      |
| Measurement Uncertainty                                  | $\pm 2.5\text{ MHz}$      |                          |

Limit

Clause 6.9.4.2

|               |                                                                      |
|---------------|----------------------------------------------------------------------|
| Forward Sweep | Within $\pm 20\text{ MHz}$ of a linear Sweep between 9.2 and 9.5 GHz |
| Return Sweep  |                                                                      |

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

## Radiated power

Clause 6.9.5

| Rotation<br>(deg.)      | Output Power<br>(dBm) |
|-------------------------|-----------------------|
| 0.0                     | 30.16                 |
| 22.5                    | 30.47                 |
| 45.0                    | 29.91                 |
| 67.5                    | 29.58                 |
| 90.0                    | 30.19                 |
| 112.5                   | 29.38                 |
| 135.0                   | 30.61                 |
| 157.5                   | 30.16                 |
| 180.0                   | 29.92                 |
| 202.5                   | 31.62                 |
| 225.0                   | 30.81                 |
| 247.5                   | 30.28                 |
| 270.0                   | 29.87                 |
| 292.5                   | 30.08                 |
| 315.0                   | 29.87                 |
| 337.5                   | 30.33                 |
| Maximum                 | 31.62 dBm             |
| Minimum                 | 29.38 dBm             |
| Range                   | 2.24 dB               |
| Measurement Uncertainty | $\pm 0.6$ dB          |

## Limit

Clause 6.9.5.2

|               |                                                      |
|---------------|------------------------------------------------------|
| Minimum power | $\geq 400$ mW (+26 dBm)                              |
| Power Range   | The maximum and minimum signals shall be within 4 dB |

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

## Antenna characteristics

## Clause 6.9.6

| Rotation (deg.)         | Clause 6.9.5.2 (ref)(dBm) | + 12.5° (dBm) | Variation from ref.(dB) | - 12.5° (dBm) | Variation from ref.(dB) |
|-------------------------|---------------------------|---------------|-------------------------|---------------|-------------------------|
| 0.0                     | 26.0                      | 29.71         | 3.71                    | 29.52         | 3.52                    |
| 22.5                    |                           | 29.70         | 3.70                    | 29.52         | 3.52                    |
| 45.0                    |                           | 29.05         | 3.05                    | 28.94         | 2.94                    |
| 67.5                    |                           | 28.88         | 2.88                    | 29.64         | 3.64                    |
| 90.0                    |                           | 28.37         | 2.37                    | 30.22         | 4.22                    |
| 112.5                   |                           | 28.01         | 2.01                    | 29.62         | 3.62                    |
| 135.0                   |                           | 28.16         | 2.16                    | 30.09         | 4.09                    |
| 157.5                   |                           | 27.67         | 1.67                    | 28.98         | 2.98                    |
| 180.0                   |                           | 29.37         | 3.37                    | 30.04         | 4.04                    |
| 202.5                   |                           | 29.47         | 3.47                    | 30.41         | 4.41                    |
| 225.0                   |                           | 29.41         | 3.41                    | 29.93         | 3.93                    |
| 247.5                   |                           | 27.92         | 1.92                    | 30.00         | 4.00                    |
| 270.0                   |                           | 27.92         | 1.92                    | 28.72         | 2.72                    |
| 292.5                   |                           | 26.96         | 0.96                    | 29.61         | 3.61                    |
| 315.0                   |                           | 27.99         | 1.99                    | 29.97         | 3.97                    |
| 337.5                   |                           | 29.42         | 3.42                    | 29.49         | 3.49                    |
| Maximum                 | -                         | 29.71         | 3.71                    | 30.41         | 4.41                    |
| Minimum                 | -                         | 26.96         | 0.96                    | 28.72         | 2.72                    |
| Range (dB)              | -                         | 2.75          | -                       | 1.69          | -                       |
| Measurement Uncertainty | ±0.6                      |               |                         |               |                         |

## Limit

## Clause 6.9.6.2

|                                    |                                                                                                                                   |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Limit under normal test conditions | Power at $\pm 12.5^\circ$ to the horizontal plane shall be greater than -2 dB relative to the signals required in clause 6.9.5.2. |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

Remarks: Measured Antenna height with mounting pole 1.22 m - requirement  $\geq 1$  m, clause 6.5.1  
 Antenna polarisation - horizontal. Requirement - horizontal, clause 5.2.

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

Recovery time following excitation

Clause 6.9.7

| Test Conditions                                                         | Recovery Time<br>( $\mu\text{s}$ ) |
|-------------------------------------------------------------------------|------------------------------------|
| $T_{\text{nom}} = +25^{\circ}\text{C}$ $V_{\text{nom}}(15.0 \text{ V})$ | 9.57                               |
| Measurement Uncertainty                                                 | $\pm 0.022 \mu\text{s}$            |

Limit

Clause 6.9.7.2

|                                    |                       |
|------------------------------------|-----------------------|
| Limit under normal test conditions | $\leq 10 \mu\text{s}$ |
|------------------------------------|-----------------------|

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

.....

Delay - Receipt of radar interrogation and SART transmission

Clause 6.9.8

| Test Conditions                                                         | Delay Time<br>( $\mu\text{s}$ ) |
|-------------------------------------------------------------------------|---------------------------------|
| $T_{\text{nom}} = +25^{\circ}\text{C}$ $V_{\text{nom}}(15.0 \text{ V})$ | 0.234                           |
| Measurement Uncertainty                                                 | $\pm 0.003 \mu\text{s}$         |

Limit

Clause 6.9.8.2

|                                    |                        |
|------------------------------------|------------------------|
| Limit under normal test conditions | $\leq 0.5 \mu\text{s}$ |
|------------------------------------|------------------------|

## TEST EQUIPMENT USED

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

Date of Receipt: 30-05-95

Start of Test : 12-07-95

Finish of Test : 21-07-95

Engineer : **T PHILLIPS**

Project Manager : **H E WARD**

Approved by :



**C M PARRY**  
Radio Regulatory Manager

Date :

1<sup>st</sup> November 1995

## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

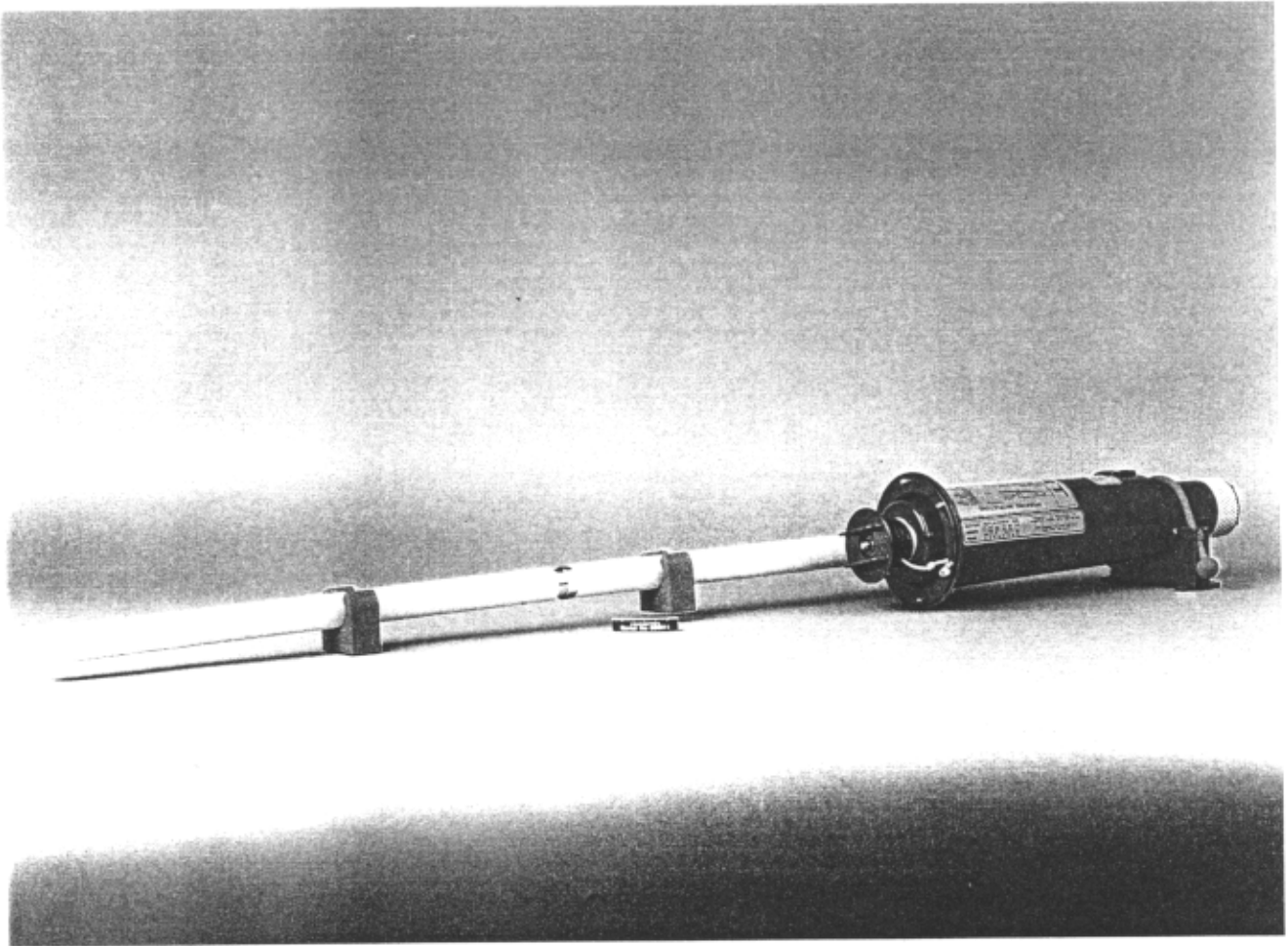
Each item of test and ancillary equipment is identified by number thus;

| No | Instrument/Ancillary          | Type             | Manufacturer    | Serial No.    |
|----|-------------------------------|------------------|-----------------|---------------|
| 1  | Microwave Amplifier           | 8349B            | Hewlett Packard | 2644A03333    |
| 2  | Crystal Detector              | 8470B            | Hewlett Packard | 1822A00761B   |
| 3  | Power Meter                   | 436A             | Hewlett Packard | 1943U00782    |
| 4  | Power Sensor                  | 8481A            | Hewlett Packard | N/S           |
| 5  | Frequency Reference           | FRK              | Efratom         | E250/283      |
| 6  | Freq & Time Interval Analyser | 5372A            | Hewlett Packard | 3141A1073     |
| 7  | Pulse Generator               | 8013B            | Hewlett Packard | 1412900304    |
| 8  | Signal Generator              | 8673B            | Hewlett Packard | 2147A00423    |
| 9  | Signal Generator              | 8673B            | Hewlett Packard | 2147A00421    |
| 10 | Microwave Horn                | 1624-20          | FMI             | 326           |
| 11 | Power Supply Unit             | L30-1            | Farnell         | 003664        |
| 12 | Power Splitter                | 7099             | Phase Devices   | SC308001240A0 |
| 13 | Power Splitter                | 1506A            | Weinschel       | AC4923        |
| 14 | Microwave Mixer               | HMXR-5001        | Hewlett Packard | 0489          |
| 15 | Cable 3.5 m                   | 065-9AA-3500-000 | Sealectro       | N/S           |
| 16 | Cable 1.0 m                   | 065-9AA-1000-000 | Sealectro       | N/S           |
| 17 | Cable 1.0 m                   | 065-9AA-1000-000 | Sealectro       | N/S           |
| 18 | Cable 1.0 m                   | 065-9AA-1000-000 | Sealectro       | N/S           |
| 19 | Cable 1.0 m                   | 065-9AA-1000-000 | Sealectro       | N/S           |
| 20 | Thermohygrograph              | T9154/C          | Casella         | 13058         |
| 21 | Digital Multimeter            | 79 Series II     | Fluke           | 58050999      |
| 22 | Environmental Chamber         | 2F3              | Montford        | 3090-K5467    |
| 23 | Environmental Chamber         | MINI-P-MEGH-P    | Montford        | 3369-K5707    |

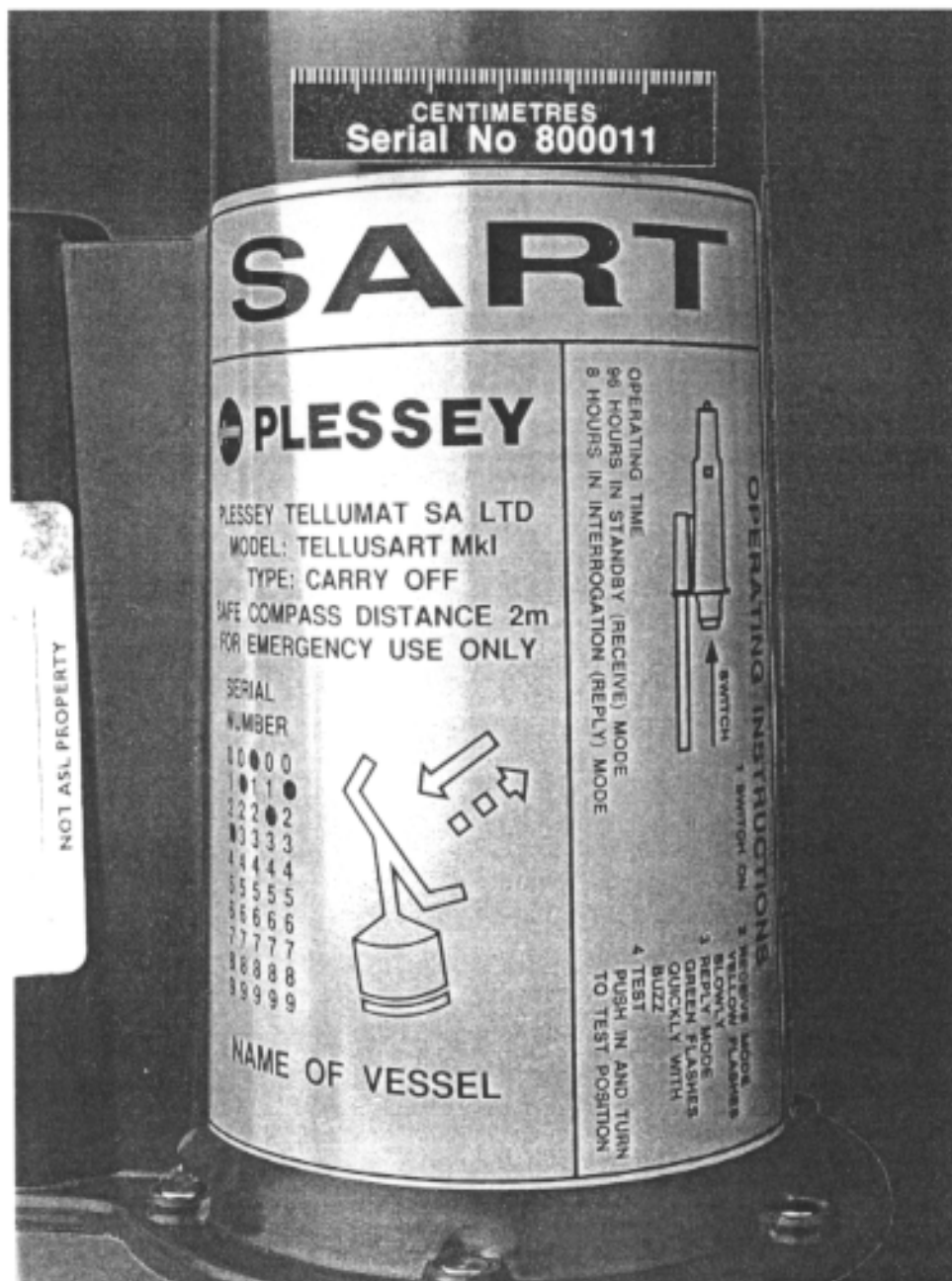


Front View

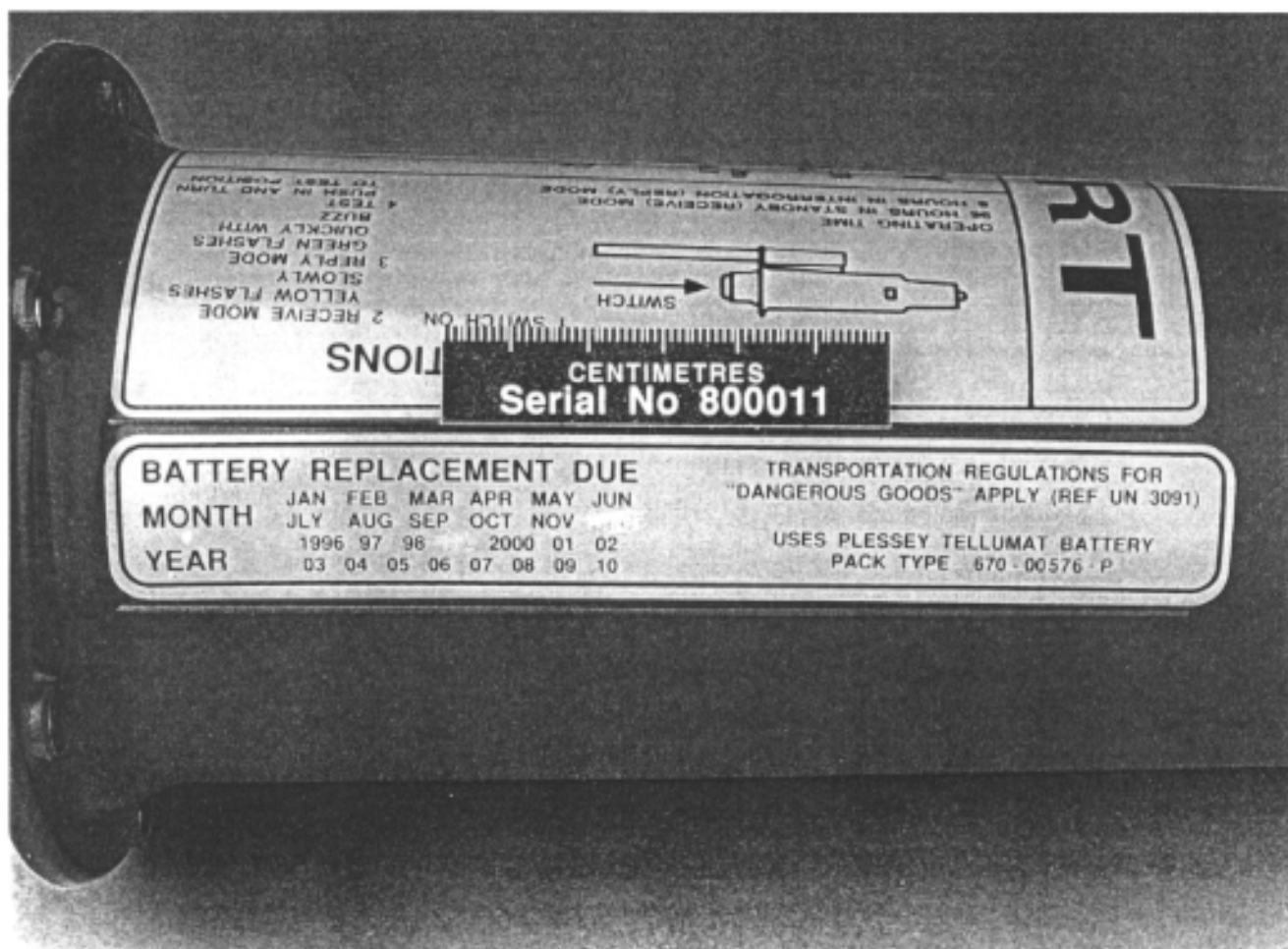
Note : Photographs on Pages 21 to 30 show the Mk II SART tested incorrectly fitted with a Mk I label.



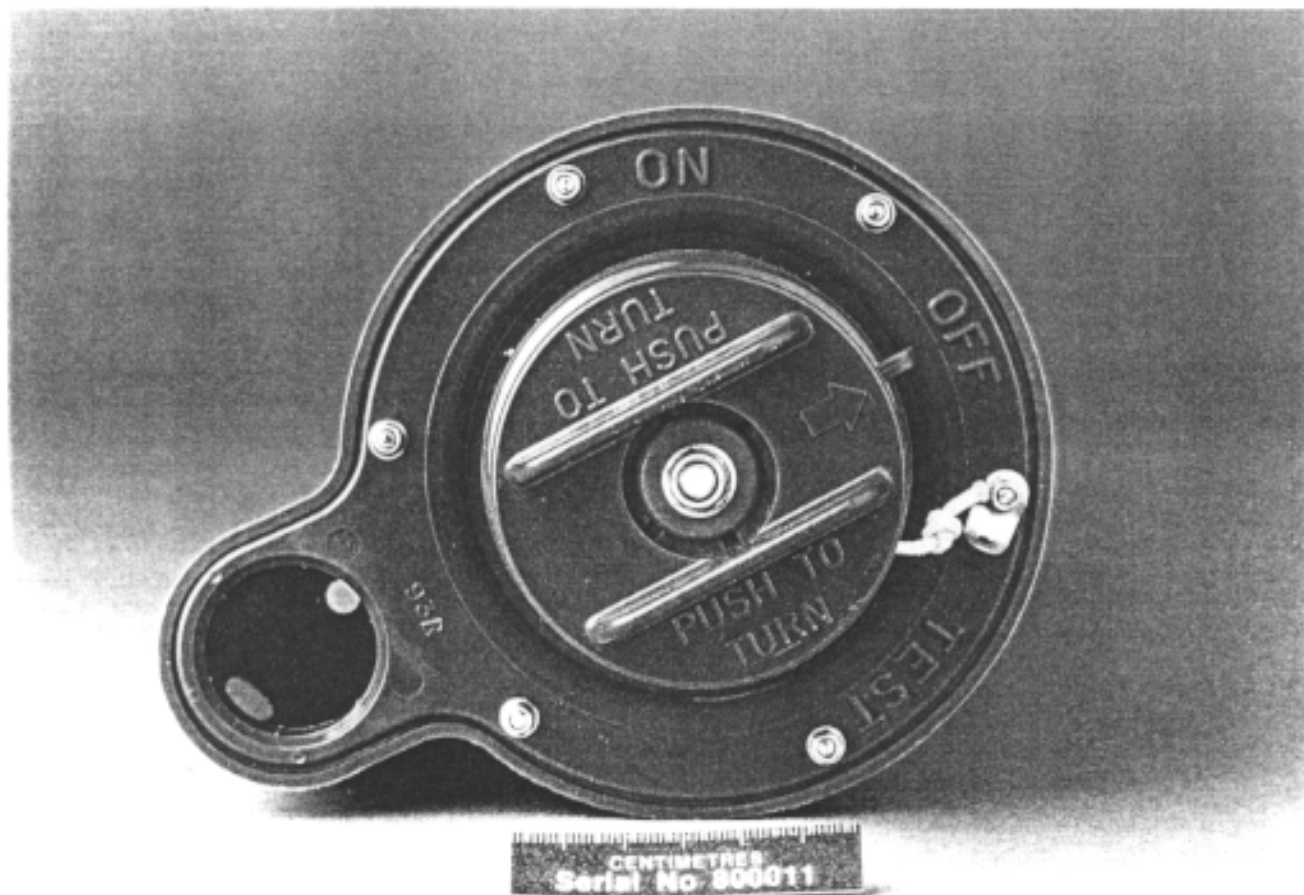
External View, Pole Extended



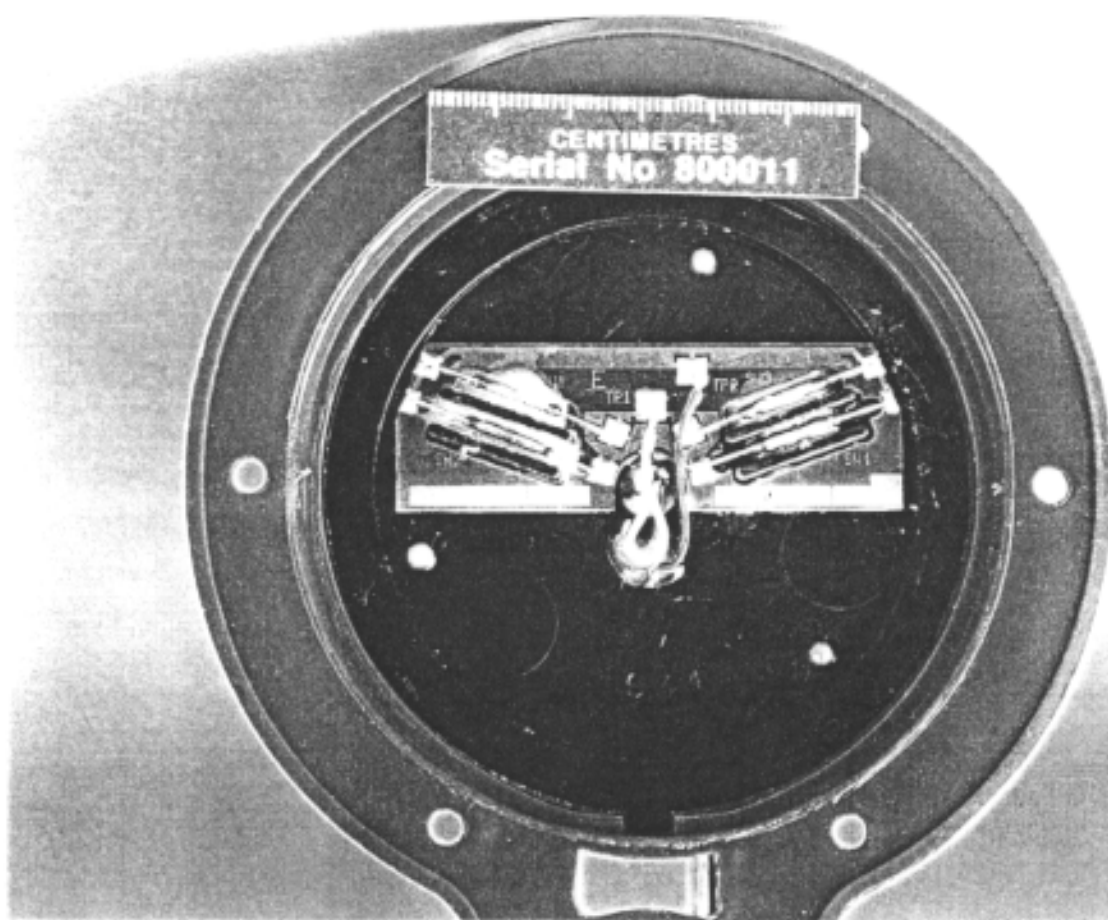
Label View No. 1

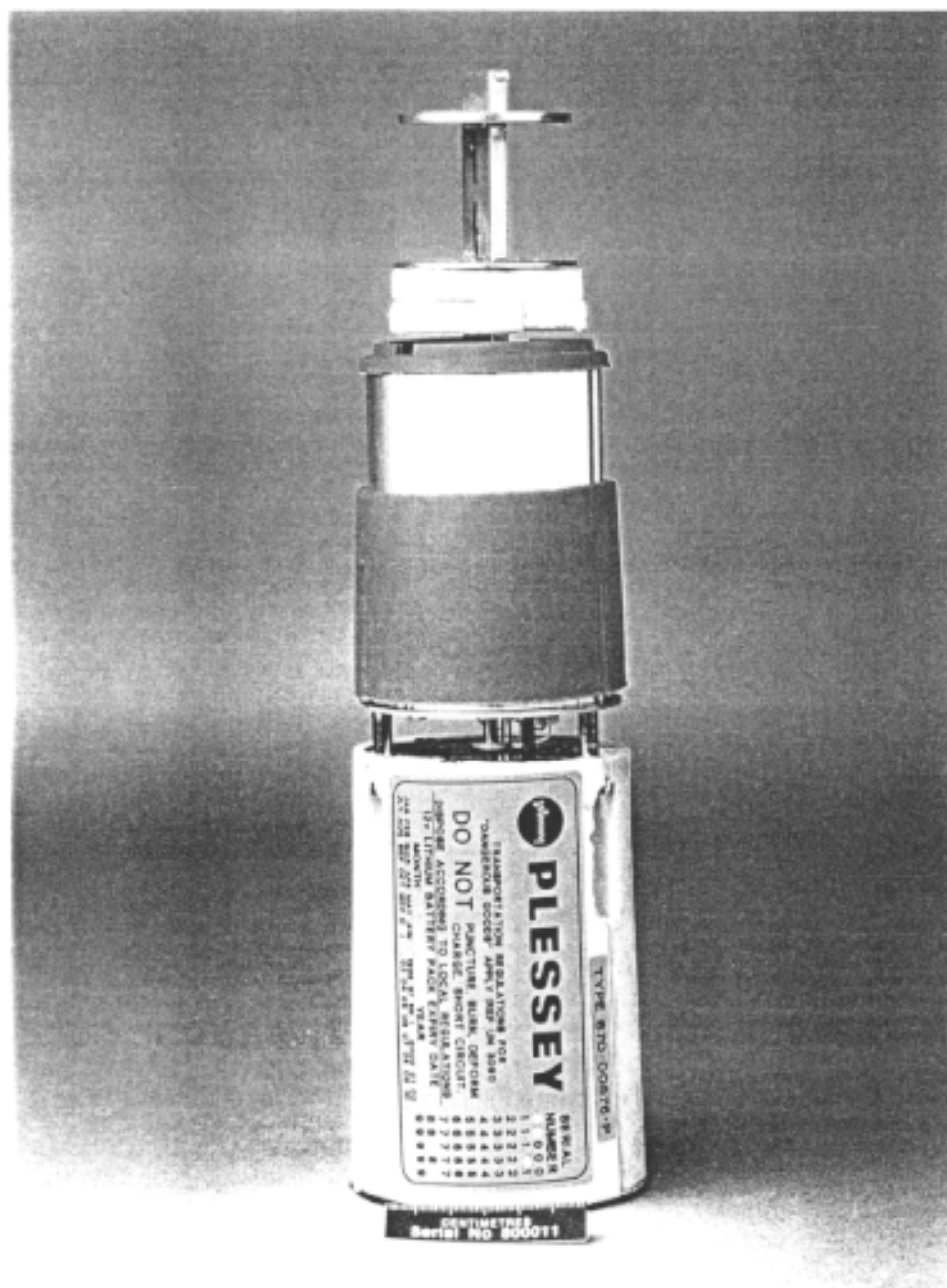




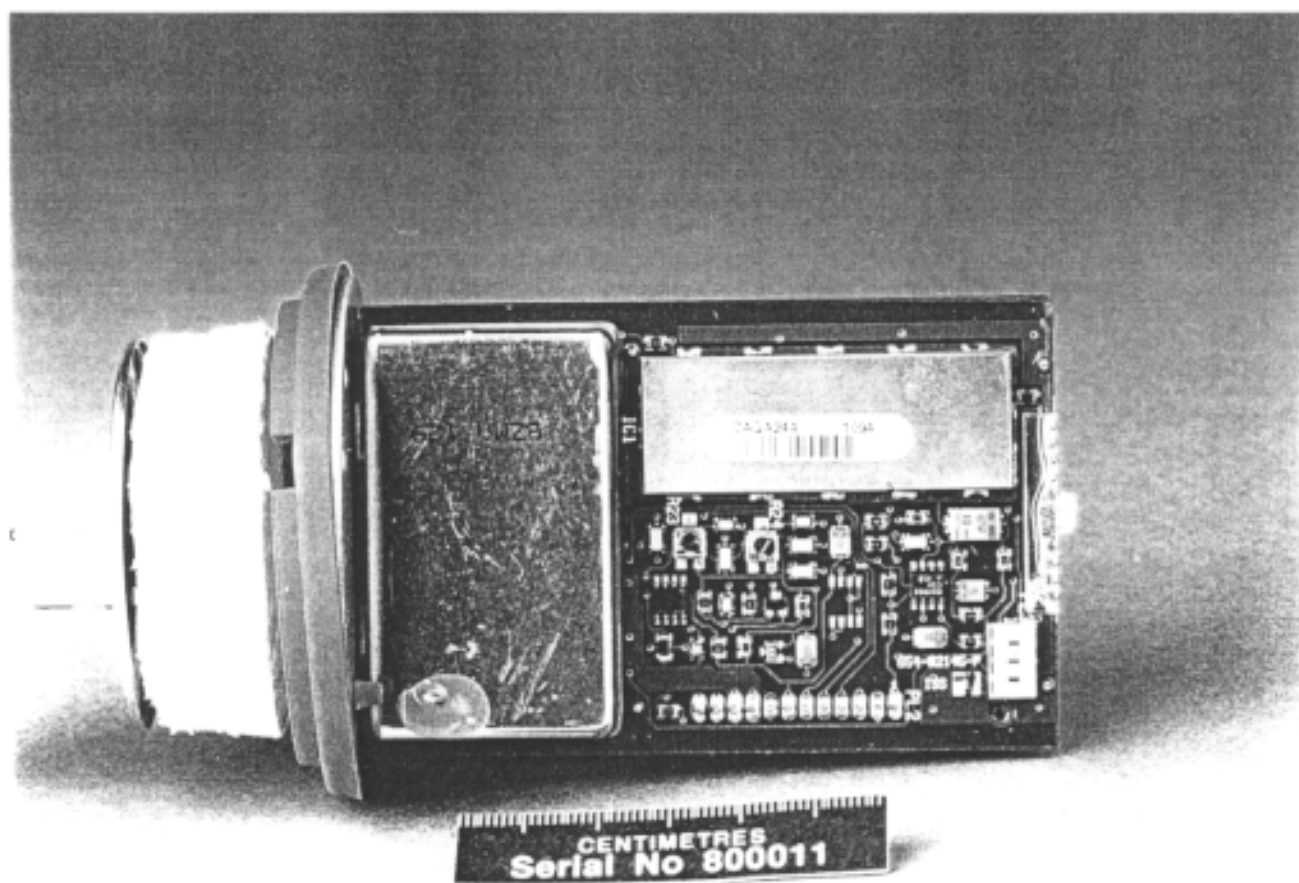


Underneath View

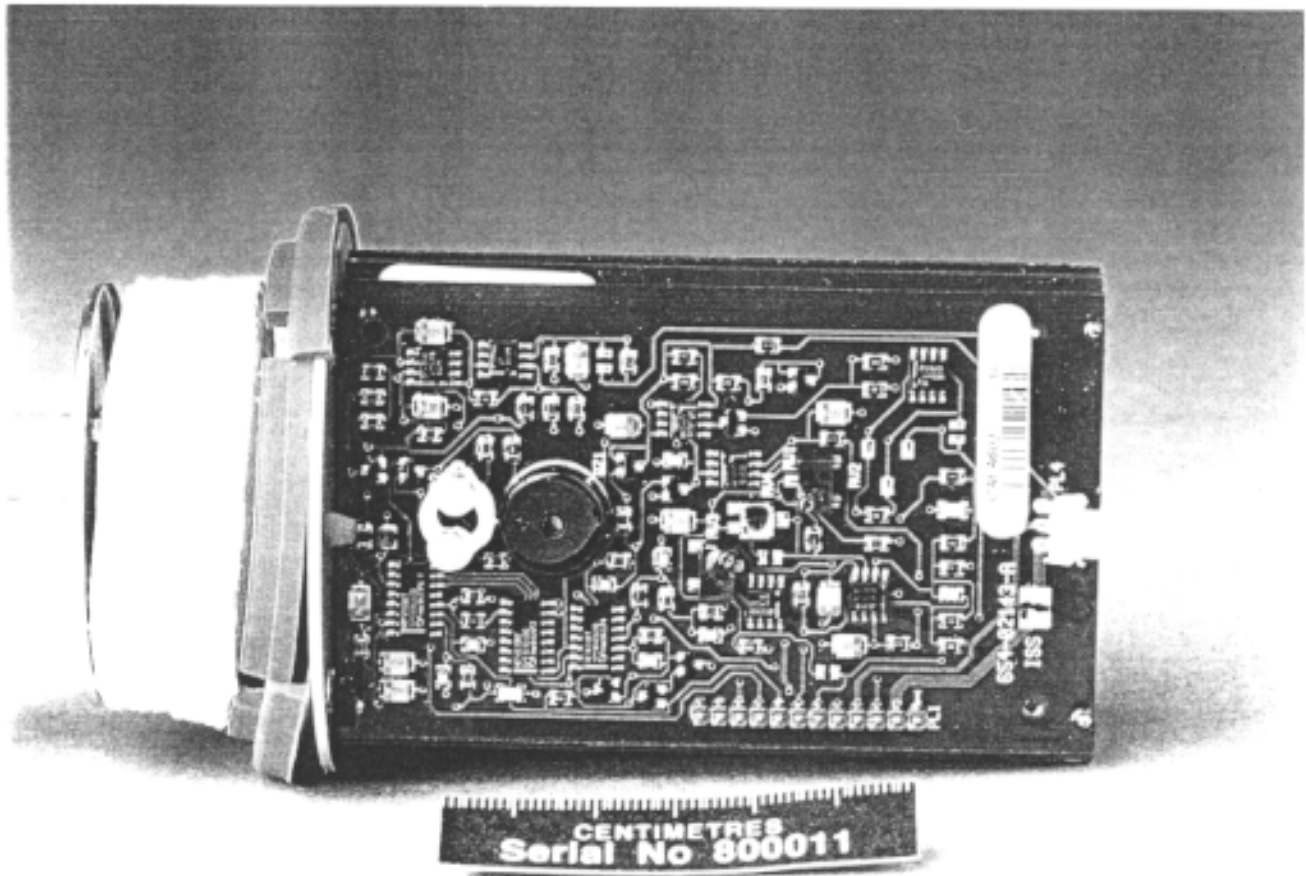
Internal View No. 1



Internal View No. 2



Internal View No. 3



Internal View No. 4



New Mk II Label View

Note : Fitted to all Mk II SART's to be sold from 1 August 1995 by Plessey Tellumat SA Limited

**A N N E X   A**

**DRA (DEFENCE RESEARCH AGENCY)**

**SART RANGE TEST REPORT**



DEFENCE  
RESEARCH  
AGENCY

MARINE NAVIGATION SYSTEMS GROUP  
SART RANGE TEST REPORT



TESTING  
No 1217

FRASER PORTSMOUTH PO4 9LJ

TYPE TEST NO 26/95

DATE 18/7/95

SPECIFICATION OF TEST

BS EN 61097-1: 1993. (IEC 1097 PART 1 FIRST EDITION, 1992.)  
CLAUSE 3.7 "RANGE PERFORMANCE"

EQUIPMENT UNDER TEST

9 GHz SART

Client

Assessment Services Ltd

Address

Segensworth Road, Titchfield, Fareham, Hants. PO15 5RH

Model or type

TELLUSART MK 1

Serial Numbers

31021

Date of test

18/7/95

RADAR INSTALLATION DETAILS

Radar site DRA Fraser

Target site Bracklesham Bay

Separation 7.02 nm

Test Radar FR-1505DA

Manufacturer Furuno

Serial No 343-0318

Frequency 9.410 GHz

Output power 5 kW

PRF 1200 Hz

Antenna Height 15m

Antenna size 1.23 m

Pulse width 0.6 us

ENVIRONMENTAL CONDITIONS

Sea state 5

Visibility 5nm

Tide LOW

PERFORMANCE CHECKS

Date 18/7/95

Time 1015 (BST)

SART response was tested as defined in the above specification with an X band marine radar meeting IMO resolution A477(XII).

The resultant display was video recorded and prints taken.

No of Prints taken 4(2 copies included)

RESULT Satisfactory

REMARKS

The test was conducted with the SART positioned at the waters edge with the lowest part of the antenna set at 1 metre above the surface of the sea and in line of sight to the radar antenna at Fraser range over a sea path. Radar was detuned to reduce returns and enhance the SART response. Prints of tuned and detuned responses included.

Test Officer

R. SHARP

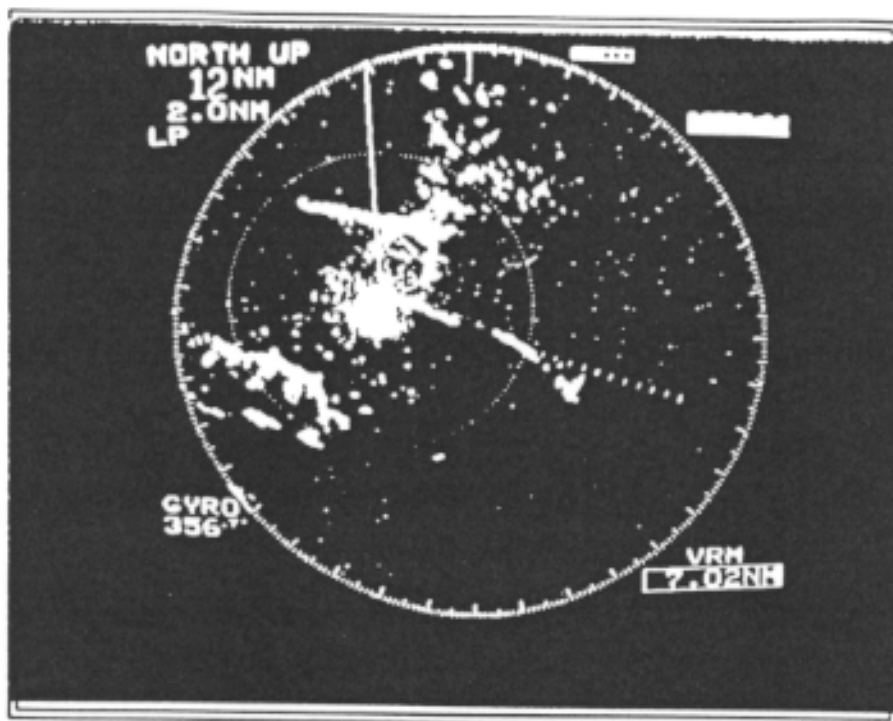
Signature

R. Sharp

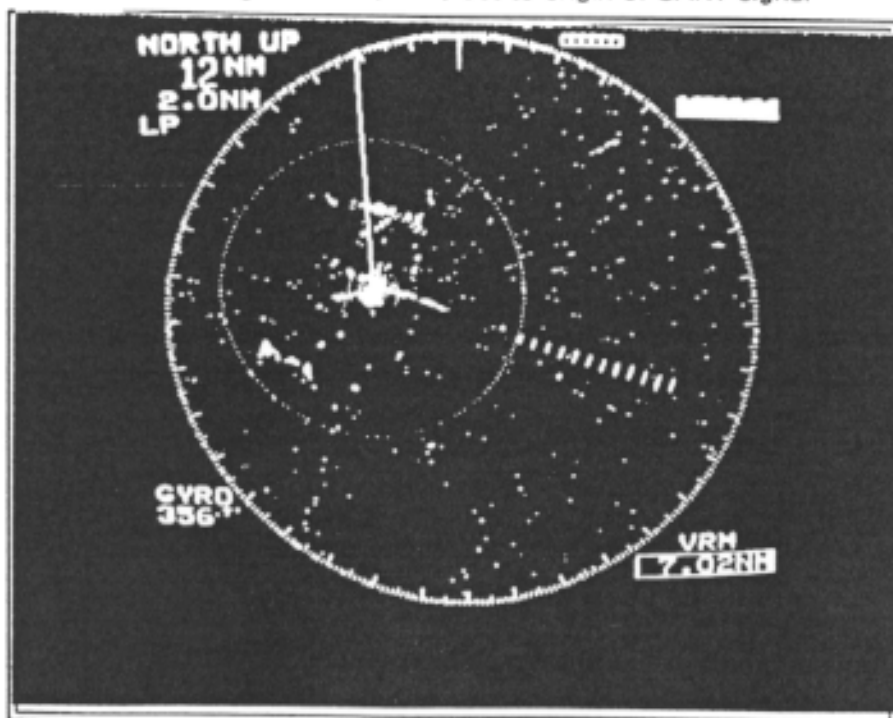
Page 1 of 2

TYPE TEST NO 26/95

DATE 18/7/95



SART Response on tuned radar  
Variable Range Marker (VRM) Set to origin of SART signal



SART Response on de-tuned radar  
(Detuning radar reduces "Land return", to clearly show the SART signal)

Test Officer *R. SHARP*

Signature *R. Sharp*



DEFENCE  
RESEARCH  
AGENCY

MARINE NAVIGATION SYSTEMS GROUP  
SART DROP TEST



FRASER PORTSMOUTH PO4 9LJ

TYPE TEST NO 26/95

DATE 19/7/95

SPECIFICATION OF TEST

BS EN 61097-1: 1993. ( IEC 1097 PART 1 FIRST EDITION, 1992. )  
CLAUSE 3.2.6 "SART DROP TEST"

EQUIPMENT UNDER TEST

9 GHz SART

|                |                                                           |
|----------------|-----------------------------------------------------------|
| Client         | Assessment Services Ltd                                   |
| Address        | Segensworth Road, Titchfield,<br>Fareham, Hants. PO15 5RH |
| Model or type  | TELLUSART MK 1                                            |
| Serial Numbers | 31021                                                     |
| Date of test   | 19/7/95                                                   |

DESCRIPTION OF TEST

As requested by the supplier, the SART was suspended 20 Metres above a 2 Metre deep drop tank and remotely released.

3 drops were undertaken ;

one in a horizontal plane,

one in a vertical plane,

one in an inverted vertical plane

mechanical and electrical integrity were confirmed after each drop.

OBSERVATIONS/COMMENTS

After each drop the SART showed no mechanical damage.

After each drop the SART "self test" functioned correctly.

Post drop performance tests would be carried out by the supplier.

Post drop SART function was confirmed and is indicated on page 2

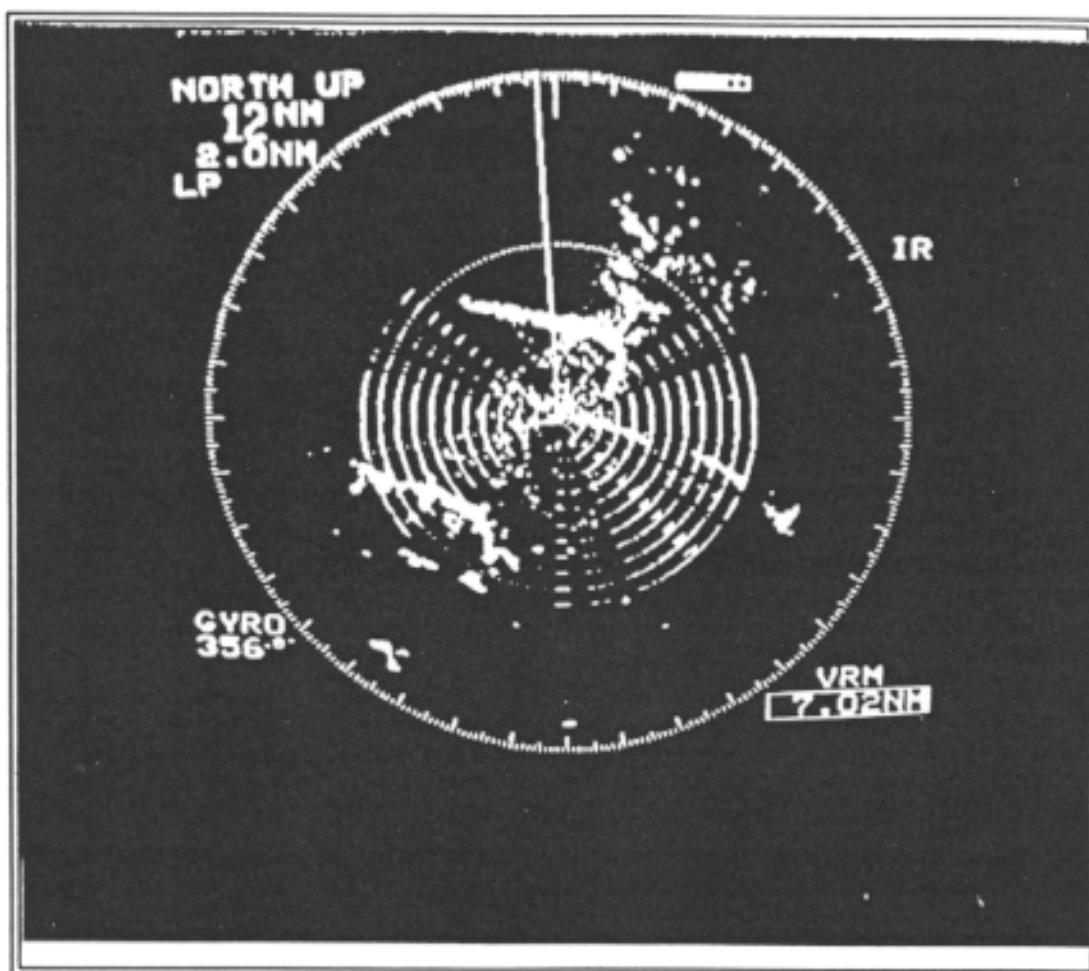
Test Officer R A Sharp.

Signature

Date of Issue 20/7/95

TYPE TEST NO 26/95

DATE 19/7/95



SART response on radar after the drop tests

The "Ring Around" effect confirms that the SART is still functioning and is relatively close to the interrogating Radar. (in this instance the interrogating Radar is approximately 50Mtrs away)

Test Officer *R SHARP*

Signature *R Sharp*

Page 2 of 2

## **A N N E X   B**

### **MANUFACTURER'S INFORMATION**

**PLESSEY  
TELLUMAT**

Plessey Tellumat South Africa Ltd  
Head Office: 64/74 White Road, Retreat 7945  
P O Box 30451, Tokai 7966. Tel: (021)710-2911  
Telex: 5-20508 SA, Fax No. (021)72-1278

**AVIONICS AND MICROWAVE TECHNOLOGY FAX NO. (021) 710-2693**

Plessey Tellumat SA Ltd confirms the following facts with regard to the Type Approval of their SART MkII:

IEC 1097 A Para: **6.9.9 Receiver Front End Protection**

The limiter diode used in the Tellusart Mkl and Tellusart MkII are the same component.

IEC 1097 A Para: **5.2 Antenna Polarisation**

The antenna on Tellusart Mkl and Tellusart MkII are the same and thus the Tellusart MkII antenna polarisation is horizontal (same as the Tellusart Mkl).

IEC 1097 A Para: **5.14 Antenna Vertical Beamwidth**

The antenna on Tellusart Mkl and Tellusart MkII are the same and thus the Tellusart MkII antenna vertical beamwidth is the same as the Tellusart Mkl.

IEC 1097 A Para: **5.15 Antenna Azimuthal Beamwidth**

The antenna on Tellusart Mkl and Tellusart MkII are the same and thus that the Tellusart MkII antenna azimuthal beamwidth is the same as the Tellusart Mkl.

IEC 1097 A Para: **3.2.1 to 3.2.5**

These features are unchanged from Tellusart Mkl to Tellusart Mk II.

IEC 1097 A Para: **3.2.8 Watertightness**

The bottle and sealing features are unchanged from Tellusart Mkl to Tellusart MkII.

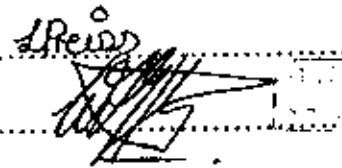
IEC 1097 A Para: **3.2.10 to 3.2.14**

These features are unchanged from Tellusart Mkl to Tellusart MkII.

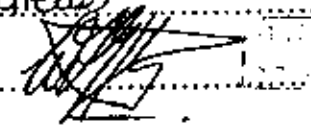
IEC 1097 A Para: **5.12 Antenna Height**

Tellusart Mk II is mounted on a pole to obtain sufficient antenna height

Signatures:

Design Authority: 

Date 26/10/95

Quality Assurance: 

Date 26/10/95