INTERNATIONAL STANDARD

IEC 61097-1

Second edition
2007-06

Global maritime distress and safety system (GMDSS) –

Part 1:
Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

Reference number
IEC 61097-1:2007(E)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

IEC 61097-1

Second edition
2007-06

Global maritime distress and safety system (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE P

For price, see current catalogue

CONTENTS

FOREWORD 4

1 Scope 6
2 Normative references 6
3 Performance requirements 7
3.1 General 7
3.2 Operational 7
3.3 Battery 7
3.4 Environment (temperature) 8
3.5 Antenna height 8
3.6 Antenna characteristics 8
3.7 Range performance 8
4 Labelling 8
5 Technical characteristics 8
5.1 Frequency 8
5.2 Polarisation 8
5.3 Sweep rate 8
5.4 Response signal 8
5.5 Form of sweep (sawtooth) 9
5.6 Pulse emission 9
5.7 E.i.r.p. 9
5.8 Effective receiver sensitivity 9
5.9 Duration of operation 9
5.10 Temperature range: 9
5.11 Recovery time following excitation 9
5.12 Effective antenna height 9
5.13 Delay between receipt of radar signal and start of transmission 9
5.14 Antenna vertical beamwidth 9
5.15 Antenna azimuthal beamwidth 9
6 Methods of testing and required test results 10
6.1 General 10
6.2 Operational requirements 10
6.3 Battery capacity 11
6.3.1 Method of measurement 11
6.3.2 Results required 11
6.4 Environment (temperature) 11
6.4.1 Dry heat cycle 11
6.4.2 Low temperature cycle 11
6.5 Antenna height 11
6.6 Antenna characteristics 11
6.6.1 Azimuthal and vertical beamwidths 12
6.6.2 Polarisation 12
6.7 Range performance 12
6.7.1 Method of measurement 12
6.7.2 Results required 12
6.7.3 Alternative method of measurement 12

6.7.4 Results required 12
6.8 Labelling 12
6.9 Technical characteristics 12
6.9.1 General 12
6.9.2 Functional test signals 13
6.9.3 Receiver sensitivity 13
6.9.4 Sweep characteristics 13
6.9.5 Radiated power 13
6.9.6 Antenna characteristics 14
6.9.7 Recovery time following excitation 14
6.9.8 Delay – Receipt of radar interrogation and SART transmission 14
6.9.9 Receiver front end protection 14

Figure 1 – Possible test set-up 15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61097-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition cancels and replaces the first edition published in 1992. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

– some amendments to bring the standard up to date with newer IMO resolutions and ITU recommendations. In particular, in 1995, the IMO adopted new performance standards for the SART in resolution A.802(19) which replaced those of resolution A.697(17). This new resolution introduced a new requirement for the SART to be provided with a pole

arrangement. In 2006, the ITU-R revised recommendation M.628 to permit the optional use of circular polarisation with the SART;

– the Introduction has been deleted as it was of historical interest only;

– Annex A, which contained details of the parts of the IEC 61097 series of standards, has been deleted as this information is now available from this Foreword;

– Annex B which contained a Bibliography has been deleted and the information moved into the normative references.

The text of this standard is based on the following documents:

FDIS	Report on voting
80/479/FDIS	80/485/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 61097 series, published under the general title *Global maritime distress and safety system (GMDSS),* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

1 Scope

This part of IEC 61097 specifies the performance standards and type testing of marine radar transponders used in search and rescue operations at sea (SART), as required by Regulation 6.2.2 of Chapter III, and 7.1.3 and 8.3.1 of Chapter IV of the 1988 amendments to the 1974 International Convention for Safety of Life at Sea (SOLAS), and which is associated with IEC 60936 (Shipborne radar) and IEC 60945 (General requirements).

This standard incorporates the performance standards of IMO Resolutions A.530 (13) and A.802 (19) (Survival craft radar transponders for use in search and rescue operations) and the technical characteristics for such transponders contained in ITU-R Recommendation M.628-4, and takes account of the general requirements contained in IMO Resolution A.694 (17).

NOTE 1 The categories of SART operation which are applicable to the stated SOLAS Regulations, IMO Resolutions and ITU-R Recommendation are:

a) integral with a survival craft;
b) portable and capable of floating;
c) as part of an EPIRB.

NOTE 2 This standard does not include non-SOLAS options for instance those envisaged in ITU-R Recommendation 628-4 - Considering (b).

All text whose meaning is identical to that in IMO Resolutions A.530 (13), A.694 (17), A.802 (19) and ITU-R Recommendation M.628-4 is printed in italics.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60936-1, *Shipborne radar – Operational and performance requirements – Methods of tests and required test results*

IEC 60945, *Marine navigational equipment – General requirements – Methods of testing and required test results.*

IMO Resolution A.222 (VII): *Performance standards for navigational radar equipment.*

IMO Resolution A.477 (XII): *Performance standards for radar equipment.*

IMO Resolution A.530 (13): *Use of radar transponders for search and rescue purposes.*

IMO Resolution A.694 (17): *General requirements for shipborne radio equipment forming part of the Global maritime distress and safety system and for electronic navigational aids*

IMO Resolution A.802 (19): *Peformance standards for survival craft radar transponders for use in search and rescue operations.*

Safety of Life at Sea (SOLAS) Convention (1974) – *Amendments concerning Radiocommunications for the Global maritime distress and safety system (GMDSS) (1988)*

ITU-R Recommendation M.628-4: *Technical characteristics for search and rescue radar transponders.*

ITU-R Report 1036-1: *Frequencies for homing and locating in the global maritime distress and safety system (GMDSS).*

3 Performance requirements

3.1 General

The SART shall be capable of indicating the location of a unit in distress on the assisting units' radar(s) by means of a series of equally spaced dots.

The radio frequency of operation of the equipment shall at all times be within the limits defined by the Radio Regulations.

3.2 Operational

The SART shall:

a) be capable of being easily activated by unskilled personnel;

b) be fitted with means to prevent inadvertent activation;

c) be equipped with a means which is either visual or audible, or both visual and audible, to indicate correct operation and to alert survivors to the fact that a radar has triggered the SART;

d) be capable of manual activation and deactivation, provision for automatic activation may be included;

e) be provided with an indication of the stand-by condition, i.e. activated, but not triggered;

f) be capable of withstanding without damage drops from a height of 20 m into the water;

g) be watertight at a depth of 10 m for at least 5 min;

h) maintain watertightness when subjected to a thermal shock of 45 °C under specified conditions of immersion;

i) be capable of floating if it is not an integral part of the survival craft;

j) be equipped with a buoyant lanyard, suitable for use as a tether, if it is capable of floating (not less than 10 m length);

k) be not unduly affected by seawater or oil;

l) be resistant to deterioration in prolonged exposure to sunlight;

m) be of a highly visible yellow/orange colour on all surfaces where this will assist detection;

n) be of a smooth external construction to avoid damaging the survival craft, and

o) be provided with a pole or other arrangement compatible with the antenna pocket in a survival craft in order to comply with the requirements referred to in 3.5 together with illustrated instructions.

3.3 Battery

The SART shall have sufficient battery capacity to operate in the stand-by condition for 96 h and, in addition, following the stand-by period, to provide transponder transmissions for 8 h when being continuously interrogated with a pulse repetition frequency of 1 kHz.

3.4 Environment (temperature)

The SART shall be so designed as to be able to operate under ambient temperatures of -20 °C to +55 °C. It shall not be damaged in stowage throughout the temperature range of -30 °C to +65 °C.

3.5 Antenna height

The height of the installed SART antenna shall be at least 1 m above sea level.

3.6 Antenna characteristics

The vertical antenna polar diagram and hydrodynamic characteristics of the device shall permit the SART to respond to search radars under heavy swell conditions. The antenna shall be substantially omnidirectional in the horizontal plane. Horizontal polarisation or circular polarisation shall *be used for transmission and reception.*

3.7 Range performance

The SART shall operate correctly when interrogated at a distance of up to at least 5 n.miles by a navigational radar complying with IMO Resolution A.477 (XII) and A.222 (VII) and IEC 60936-1, with an antenna height of 15 m.

It shall also operate correctly when interrogated at a distance of up to at least 30 nautical miles by an airborne radar with at least 10 kW peak output power at a height of 3 000 ft.

4 Labelling

In addition to the items specified in IMO Resolution A.694 (17), the following shall be clearly indicated on the exterior of the equipment:

a) brief operating instructions (in English),

b) expiry date (in English) for the primary battery used (expiry date is battery replacement date).

5 Technical characteristics

The technical characteristics are derived from ITU-R Recommendation M.628-4.

5.1 Frequency

9 200 to 9 500 MHz.

5.2 Polarisation

Horizontal or circular.

5.3 Sweep rate

5 μs per 200 MHz nominal.

5.4 Response signal

12 sweeps.

5.5 Form of sweep (sawtooth)

Forward sweep time: 7,5 μs ± 1 μs; return sweep time: 0,4 μs ± 0,1 μs. The response shall commence with a return sweep.

5.6 Pulse emission

100 μs nominal.

5.7 E.i.r.p.

Not less than 400 mW (equivalent to +26 dBm).

5.8 Effective receiver sensitivity

Better than –50 dBm (equivalent to 0,1 mW/m^2) (see Note 1).

The receiver shall be capable of correct operation when subjected to the radiated field (28 dBW/m²) emitted from a shipborne radar complying with IMO Resolution A.477 (XII) at any distance > 20 m.

5.9 Duration of operation

96 h in stand-by condition followed by 8 h of transponder transmissions while being continuously interrogated with a pulse repetition frequency of 1 kHz.

5.10 Temperature range:

ambient: *–20 °C to + 55 °C*

stowage: *–30 °C to + 65 °C.*

5.11 Recovery time following excitation

10 μs or less.

5.12 Effective antenna height

Greater or equal to 1 m (see Note 2).

5.13 Delay between receipt of radar signal and start of transmission

0,5 μs or less.

5.14 Antenna vertical beamwidth

At least ±12,5° relative to the horizontal plane of the radar transponder.

5.15 Antenna azimuthal beamwidth

Omnidirectional within ± 2 dB.

NOTE 1 Sensitivity:

1.1 Effective receiver sensitivity includes antenna gain.

1.2 Effective receiver sensitivity of better than –50 dBm applies to interrogating radar pulses (medium/long) of >400 ns.

1.3 Effective receiver sensitivity of better than –37 dBm applies to interrogating radar pulses (short) of ≤ 100 ns.

NOTE 2 The effective antenna height applies to equipment required by Regulation 6.2.2 of Chapter III and 7.1.3 and 8.3.1 of Chapter IV of the 1988 Amendments to the 1974 SOLAS Convention.

NOTE 3 The weight of the SART should be limited within manhandling capabilities.

6 Methods of testing and required test results

6.1 General

Tests shall be normally carried out at test sites nominated by the Type Test Authority. The manufacturer shall, unless otherwise agreed, set up the equipment and ensure it is operating normally before testing commences.

Electrical power shall be supplied during performance tests normally by the batteries which form a part of the equipment. However, the normal batteries may be replaced by a test power source for some of the performance tests. Such other sources of power shall be agreed mutually by the manufacturer and the test authority.

For the purpose of this standard a "functional" test comprises a test based upon 6.9.4.

Within 5 min of switching on, the requirements of this standard shall be met.

6.2 Operational requirements

The requirements of 3.2 shall be verified as follows (the subclause reference is given in brackets):

a) (See 3.2.a).) By inspection.

b) (See 3.2.b).) By inspection. Manual activation shall normally require the use of not less than two simple but independent actions.

c) (See 3.2.c).) By inspection at the time the SART commences transmission.

d) (See 3.2.d) and 3.2.b).) By inspection.

e) (See 3.2.e).) By inspection during the time the SART is in the stand-by condition.

f) (See 3.2.f).) The equipment shall be set up as ready for normal use and released to fall freely from a height of 20 m into water. On completion the equipment shall be inspected for damage and a functional test carried out.

g) (See 3.2.g).) The equipment shall be immersed in water to a pressure of 100 kPa, which shall be applied for a period of 5 min. On completion the equipment shall be inspected for leakage and a functional test carried out.

h) (See 3.2.h).) The equipment shall be thermally soaked for a period of at least 3 h at a temperature of 1) 45 °C ± 2 °C above and 2) 30 °C ± 2 °C below the temperature of the water in the pressure test vessel (between 10 °C and 20 °C) and the equipment then immersed in water to a pressure of 100 kPa for at least 1 h. On completion the equipment shall be inspected for leakage and malformation and a functional test carried out.

NOTE Test 6.2.h) may be combined with 6.2.g), especially in connection with leakage.

The pressure test vessel shall be of sufficient capacity to ensure that the water temperature within the vessel remains within the range 10 °C to 20 °C during the period of immersion of the equipment under test.

i) (See 3.2.i).) If the device is not designed specifically to be an integral part of a survival craft, it shall be placed in water for 5 min, as a check that it is capable of floating.

j) (See 3.2.j).) By inspection.

k) (See 3.2.k).) Shall comply with IEC 60945 for corrosion and oil resistance.

l) (See 3.2.l).) By inspection. The manufacturer shall be required to produce evidence that the materials used, including any coloured external coating, are unlikely to be affected adversely by prolonged exposure to sunlight.

m) (See 3.2.m).) By inspection.

n) (See 3.2.n).) By inspection.

o) (See 3.2.o).) By inspection.

6.3 Battery capacity

(See 3.3)

6.3.1 Method of measurement

a) Determine the lowest voltage at which the device will operate correctly, by supplying it with an external power supply. A functional test shall be carried out at this lowest voltage and the functional test requirement shall be met.

b) The average current (I_1) in milliamps required to operate at the nominal battery voltage in the stand-by condition, and similarly in the responding condition (I_2) when being continuously interrogated with a pulse repetition frequency of 1 kHz, shall be measured. A battery of the type to be used in the device shall be connected to a resistive dummy load, adjusted to provide a current flow of I_1 mA, for a period of 96 h. The dummy load shall then be re-adjusted to provide a current flow of I_2 mA for a further period of 8 h.

6.3.2 Results required

a) The on-load terminal voltage measured during the last 15 min of the capacity tests shall not be less than the lowest voltage at which the functional test in 6.3.1.a was carried out.

b) Tests shall be carried out to determine that the required battery capacity will be available at the nominal and the extremes of the operating temperature range. Three sets of batteries shall be tested i.e. at –20 °C, at the nominal temperature and at +55 °C.

6.4 Environment (temperature)

(See 3.4)

6.4.1 Dry heat cycle

Tests shall be carried out in accordance with the dry heat tests of IEC 60945, with the exception that a maximum temperature of 65 °C will be used.

6.4.2 Low temperature cycle

6.4.2.1 Method of measurement

The equipment shall be placed in a chamber at normal room temperature. The temperature shall then be reduced to and maintained at –30 °C ± 3 °C for a minimum period of 10 h. On conclusion of that period the temperature shall be increased to –20 °C ± 3 °C within 30 min. The equipment shall then be switched on for a period of at least 2 h.

6.4.2.2 Results required

During the period of 2 h, the requirements of a functional test shall be met.

6.5 Antenna height

(See 3.5)

Compliance with 3.5 shall be checked by measurement. The worst case condition is when the SART is intended for free-floating operation, in which case the minimum height required is that between the water line and the mid-point of the antenna. The height shall be recorded. For survival craft installation the required height is 1 m or greater.

6.6 Antenna characteristics

(See 3.6)

6.6.1 Azimuthal and vertical beamwidths

(See 5.14, 5.15)

By inspection of the manufacturer's design data, or by measurement (6.9.6).

6.6.2 Polarisation

(See 5.2)

By inspection.

6.7 Range performance

(See 3.7)

6.7.1 Method of measurement

The results obtained from the test as given in 6.5, 6.9.3, 6.9.5 and 6.9.6 shall be used to determine the range performance from a series of graphs of a similar type to those contained in ITU-R Report 1036, for both the float free and survival craft conditions.

In the opinion of the Test Authority, the test given in 6.7.3 may be performed as an alternative.

6.7.2 Results required

The ranges determined in 6.7.1 shall be recorded in the type test certificate.

6.7.3 Alternative method of measurement

Alternatively, if the Test Authority has the relevant capability and the cost is acceptable, the maximum range shall be determined, for the float free condition (if applicable to the equipment under test) using a radar or radars in accordance with 3.7.

6.7.4 Results required

The maximum ranges and the environmental conditions under which the tests were conducted shall be recorded on the type test certificate. The display presentation shall be in accordance with 3.1.

If the range performance is checked by 6.7.1, the display presentation required by 3.1 shall be checked by inspection during a functional test.

6.8 Labelling

(See Clause 4)

By inspection.

6.9 Technical characteristics

6.9.1 General

The equipment under test shall be measured at a test site using field radiation techniques. It shall be free of reflections to the extent of not influencing the results of the tests.

A possible test arrangement is illustrated in Figure 1.

The "functional" test signals referred to in 6.9.2, shall be horizontally polarized and are to be used to simulate the variety of interrogating radar signals that will be experienced in practice.

6.9.2 Functional test signals

6.9.2.1 Test signal 1

The signal shall be a pulsed carrier with a repetition frequency of 3 kHz. The rise time and decay time between the 10 % and 90 % values of the pulse amplitude shall be 20 ns ± 5 ns. The duration of the pulses between the 90 % values shall be 80 ns ± 10 ns.

6.9.2.2 Test signal 2

The signal shall be a pulsed carrier with a repetition frequency of 1 kHz. The rise time and decay time between the 10 % and 90 % values of the pulse amplitude shall be 20 ns ± 5 ns. The duration of the pulses between the 90 % values shall be 500 ns ± 50 ns.

6.9.2.3 Test signal 3

The signal shall be a pulsed carrier with a repetition frequency of 1 kHz. The rise time and decay time between the 10 % and 90 % values of the pulse amplitude shall be 20 ns ± 5 ns. The duration of the pulses between the 90 % values shall be 1 μs ± 0,1 μs.

6.9.3 Receiver sensitivity

(See 5.8)

6.9.3.1 Method of measurement

The equipment under test shall be interrogated with test signal 1 and test signal 2 at frequencies 9 200 MHz, 9 350 MHz and 9 500 MHz. The power level of the signal generator shall be increased until the SART responds at each frequency.

6.9.3.2 Results required

The effective receiver sensitivity (which includes antenna gain) shall be not less than –37 dBm for test signal 1 and –50 dBm (equivalent to 0,1 mW/m² at the antenna input) for test signal 2.

6.9.4 Sweep characteristics

(See 5.1, 5.3, 5.4, 5.5)

6.9.4.1 Method of measurement

Test signal 2 shall be applied to the SART. The frequency/time end points of the sweep shall be measured.

6.9.4.2 Results required

The SART transmission shall be a series of 12 frequency sweeps, each covering the range $9\,200\,^{0}_{-60}$ MHz to $9\,500\,^{+60}_{0}$ MHz.

The forward sweep time shall be 7,5 μs ± 1 μs, and the return sweep time shall be 0,4 μs ± 0,1 μs.

The sweep profile shall be within ±20 MHz of the linear sweep between the 9 200 MHz and the 9 500 MHz crossing points.

6.9.5 Radiated power

(See 5.7)

6.9.5.1 Method of measurement

Test signal 2 shall be applied to the SART. It shall be rotated 360° in the horizontal plane and the signal levels received shall be recorded.

6.9.5.2 Results required

The minimum signal received shall be not less than that corresponding to 400 mW e.i.r.p (+26 dBm).

The maximum and minimum signals shall be within 4 dB.

6.9.6 Antenna characteristics

(See 5.14, 5.15)

6.9.6.1 Method of measurement

Test signal 2 shall be applied to the SART. The SART shall be rotated 360° in the horizontal plane, and the highest and lowest signal levels received from the SART by the test antenna, whilst the line of sight to the test antenna is ± 12,5° to the horizontal plane, shall be recorded.

6.9.6.2 Results required

The recorded signals at ± 12,5° to the horizontal plane shall be greater than –2 dB relative to the signals required in 6.9.5.2.

6.9.7 Recovery time following excitation

(See 5.11)

6.9.7.1 Method of measurement

Test signal 3 shall be applied to the SART. The signal level shall be at least 3 dB above the sensitivity level recorded in 6.9.3.1. The pulse repetition frequency of the test signal shall then be increased until the SART fails to respond to two successive interrogations.

6.9.7.2 Results required

The pulse repetition interval (inverse of pulse repetition frequency) minus SART transmission duration shall be 10 μs or less.

6.9.8 Delay – Receipt of radar interrogation and SART transmission

(See 5.13)

6.9.8.1 Method of measurement

Test signal 3 shall be applied to the SART. The signal level shall be at least 3 dB above the sensitivity level recorded in 6.9.3.1. The time delay between the initiation of the interrogating pulse and the start of the transmission envelope at the 10 % point shall be measured.

6.9.8.2 Results required

The delay shall not exceed 0,5 μs.

6.9.9 Receiver front end protection

(See 5.8)

6.9.9.1 Method of measurement

The SART shall be placed, already functioning, in the radiated field (28 dBW/m^2) of a radar conforming to IMO Resolution A.477 (XII), operating in the 9 GHz band, at a distance of 20 m. After test, the output of the SART shall be viewed on an appropriate radar display.

6.9.9.2 Results required

The SART shall continue to operate correctly.

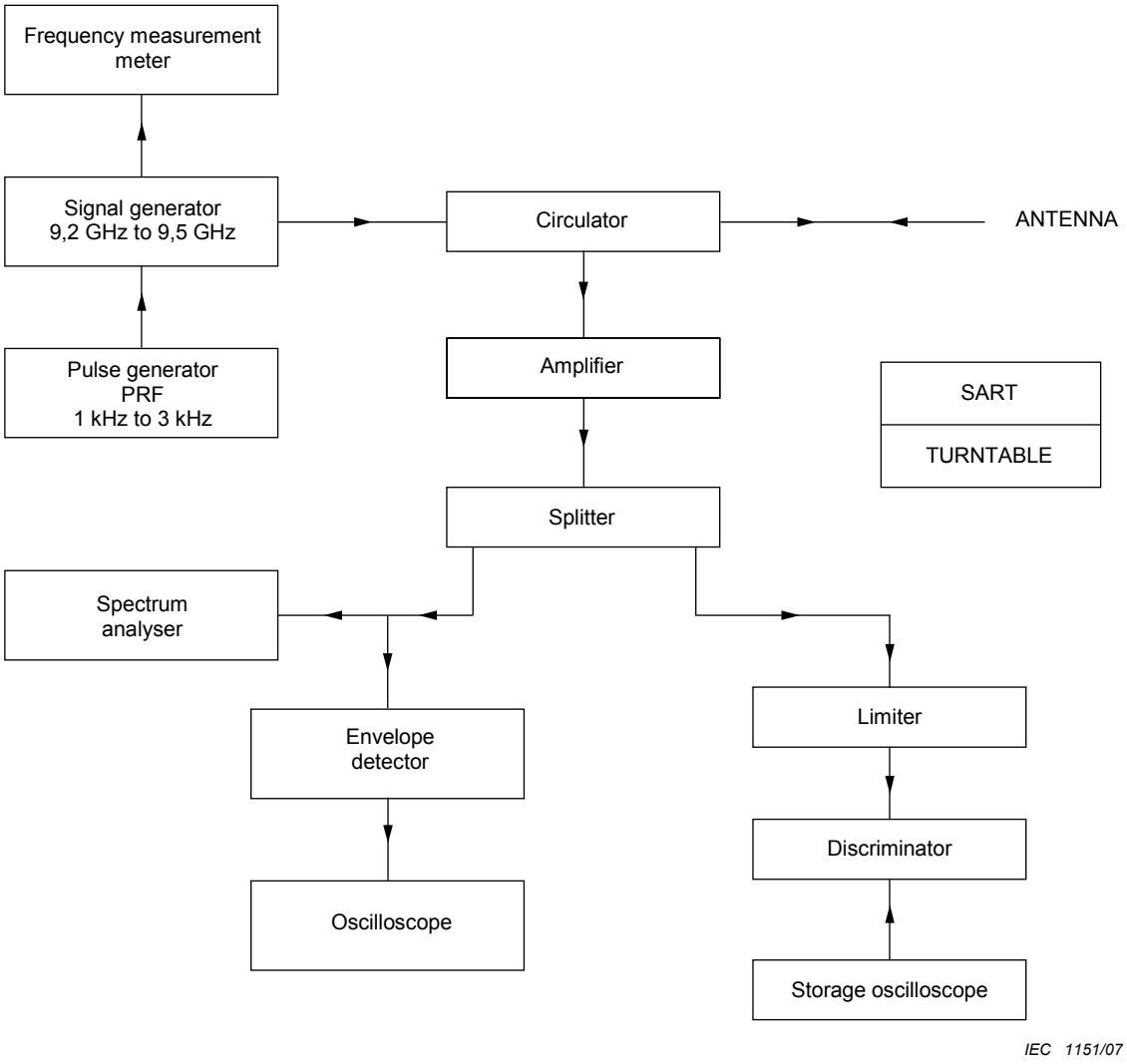

Figure 1 – Possible test set-up

ISBN 2-8318-9214-7

ICS 47.020.70

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND