

IEC 61097-14

Edition 1.0 2010-02

INTERNATIONAL STANDARD



Global maritime distress and safety system (GMDSS) – Part 14: AlS search and rescue transmitter (AlS-SART) – Operational and performance requirements, methods of testing and required test results

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE



ICS 47.020.70 ISBN 978-2-88910-412-3

CONTENTS

FO	REWO	DRD		5		
1	Scope					
2	Norm	Normative references				
3	Perfo	rmance	requirements	8		
	3.1		al			
	3.2		ional			
	3.3	Battery				
	0.0	3.3.1	General			
		3.3.2	Battery life and expiry date	-		
		3.3.3	Reverse polarity protection			
	3.4		identifier (user ID)			
	3.5 Environment					
	3.6 Range performance					
	3.7	Transmission performance				
		3.7.1	Active mode			
		3.7.2	Test Mode			
	3.8		ng			
	3.9		ls			
4	Tech		quirements			
	4.1		onal block diagram of an AIS-SART			
		4.1.1	General			
		4.1.2	TDMA transmitter (AIS Tx)			
		4.1.3	Controller			
		4.1.4	Timing and synchronisation device			
		4.1.5	Battery			
		4.1.6	Electronic position fixing system			
		4.1.7	Activator			
		4.1.8	Indicator			
	4.2	Physic	al layer requirement	15		
		4.2.1	Transmitter requirements			
	4.3	Link la	yer requirements			
		4.3.1	General			
		4.3.2	AIS Messages	16		
		4.3.3	Synchronisation	17		
		4.3.4	VDL access scheme	17		
		4.3.5	Link sub-layer 1: Medium Access Control (MAC)	18		
		4.3.6	Link sub-layer 2: Data Link Service (DLS)	18		
		4.3.7	Link sub-layer 3: Link Management Entity (LME)	18		
5	Gene	eral metl	nods of testing	18		
	5.1 Introduction					
	5.2	General requirements				
		5.2.1	General			
		5.2.2	Performance check	19		
		5.2.3	Performance test	19		
	5.3	Norma	l test conditions	19		
	5.4	Extrem	e test conditions	19		

	5.5 5.6	Preparation of AIS-SART for type-approval testing Test signals		
		5.6.1	Standard test signal number 1	19
		5.6.2	-	
		5.6.3	Standard test signal number 3	
	5.7	Artificia	al antenna (dummy load)	
	5.8		es for access	
	5.9		of operation of the transmitter	
	5.10		rement uncertainties	
6	Perfo		e tests	
	6.1		tional tests	
	6.2		/	
	0.2	6.2.1	Battery capacity test	
		6.2.2	Expiry date indication	
		6.2.3	Reverse polarity protection	
	6.3		e identifier	
	6.4	•	nment	
	6.5		performance	
	6.6	•	nission performance	
	6.7		ng	
	6.8		ıls	
	6.9		onic position fixing system	
	6.10		tor	
			or	
7			io tests	
	7.1		al description	
	7.2		ency error	
		7.2.1	Purpose	
		7.2.2	Method of measurement	
		7.2.3	Required results	
	7.3		•	24
		7.3.1	Purpose	
		7.3.2	Method of measurement	
		7.3.3	Required result	
	7.4		ed power	
		7.4.1	Purpose	
		7.4.2	Method of measurement	
		7.4.3	Required results	
	7.5		ation spectrum slotted transmission	
		7.5.1	Purpose	
		7.5.2	Method of measurement	
		7.5.3	Required results	
	7.6		nitter test sequence and modulation accuracy	
		7.6.1	Purpose	
		7.6.2	Method of measurement	
		7.6.3	Required results	
	7.7		nitter output power versus time function	
		7.7.1	Definition	
		772	Mothed of measurement	20

		7.7.3	Required results	30
	7.8	Spuriou	us emissions from the transmitter	30
		7.8.1	Purpose	30
		7.8.2	Method of measurement	30
		7.8.3	Required results	30
8	Link I	ayer tes	sts	30
	8.1	Tests for synchronisation accuracy		
		8.1.1	Method of measurement	30
		8.1.2	Required results	30
	8.2	Active	mode tests	30
		8.2.1	Method of measurement	31
		8.2.2	Initialisation period – Required results	31
		8.2.3	Message content of Message 1 – Required results	31
		8.2.4	Message content of Message 14 – Required results	31
		8.2.5	Transmission schedule for Message 1 – Required results	32
		8.2.6	Communication state of Message 1 – Required results	32
		8.2.7	Transmission schedule of Message 14 – Required results	32
		8.2.8	Transmission with lost EPFS – Required results	32
	8.3	Test m	ode tests	33
		8.3.1	General	33
		8.3.2	Transmission with EPFS data available	33
		8.3.3	Transmission without EPFS data available	33
			tive) Results of trials to verify the range performance of the AIS-	
Bib	iograp	ohy		39
Fiai	ıre 1 -	- Functi	onal block diagram of an AIS-SART	13
_			transmissions in active mode	
			rement arrangement	
_			ion mask	
•				
			rement arrangement for modulation accuracy	
Figi	ure 6 -	- Power	versus time mask	29
Tab	le 1 –	Require	ed parameter settings for an AIS-SART	15
		-	ed settings of physical layer constants	
			ition parameters of the physical layer of the AIS-SART	
			·	
			m required transmitter characteristics	
			um values of absolute measurement uncertainties	
Tab	le 6 –	Conduc	cted power – Required results	25
Tab	le 7 –	Peak fr	equency deviation versus time	28
Tab	le 8 –	Definiti	on of timings	29
			results, AIS-SART to vessel (Oban Bay, Scotland) Distances detected (NM)	37
			results, AIS-SART to helicopter (Oban Bay, Scotland) Distances	
			cal miles (NM)	37
			results, AIS-SART to aircraft (Key West, Florida) Distances detected (NM)	38

INTERNATIONAL ELECTROTECHNICAL COMMISSION

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) -

Part 14: AIS search and rescue transmitter (AIS-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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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 61097-14 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

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

FDIS	Report on voting	
80/582/FDIS	80/589/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.

61097-14 © IEC:2010(E)

-6-

A list of all parts of the 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.

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

61097-14 © IEC:2010(E)

-7-

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) -

Part 14: AIS search and rescue transmitter (AIS-SART) –
Operational and performance requirements,
methods of testing and required test results

1 Scope

This part of IEC 61097 specifies the minimum performance requirements, technical characteristics and methods of testing, and required test results, for Automatic Identification Systems (AIS) search and rescue transmitters (AIS-SART) which may be carried by ships as a search and rescue locating device as required by Chapters III and IV of the International Convention for Safety of Life at Sea (SOLAS), as amended. It takes account of IMO resolution A.694(17) and is associated with IEC 60945. When a requirement in this standard is different from IEC 60945, the requirement in this part of IEC 61097 takes precedence.

This standard incorporates the applicable parts of the performance standards included in IMO Resolution MSC.246(83) and the applicable technical characteristics included in Recommendation ITU-R M.1371 and is associated with IEC 61993-2 (Class A shipborne AIS).

All the text of this standard, whose wording is identical to that of IMO Resolution MSC.246(83), is printed in *italics*, and the Resolution and associated performance standard paragraph numbers are indicated in brackets.

NOTE IEC 61097-1 specifies the requirements for radar transponders for use in search and rescue operations (SART) which may alternatively be carried by ships as a search and rescue locating device.

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 60945, Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results

IEC 61108 (all parts), Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS)

IMO Resolution MSC.246(83), Performance standards for survival craft AIS search and rescue transmitter (AIS-SART)

ITU-R Recommendation M.1371, Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band

ITU-T Recommendation 0.153, Basic parameters for the measurement of error performance at bit rates below the primary rate