

Australian/New Zealand Standard™

**Maritime navigation and
radiocommunication equipment and
systems—Automatic identification
system (AIS)**

**Part 3: Repeater stations—Minimum
operational and performance
requirements—Methods of test and
required test results**



AS/NZS IEC 62320.3:2015

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee RC-004, Radiocommunications Equipment—Maritime and Safety of Life. It was approved on behalf of the Council of Standards Australia on 9 June 2015 and on behalf of the Council of Standards New Zealand on 11 June 2015. This Standard was published on 29 June 2015.

The following are represented on Committee RC-004:

Australian Communications and Media Authority
Australian Industry Group
Australian Maritime Safety Authority
Australian Volunteer Coast Guard Association
Civil Aviation Safety Authority
Department of Defence (Australian Government)
Electromagnetic Technical Evaluation Committee
Maritime New Zealand
Ministry of Business, Innovation and Employment, New Zealand
Telecommunications Users Association of New Zealand
Wireless Institute Australia
Yachting Australia

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS IEC 62320.3:2015.

Australian/New Zealand Standard™

Maritime navigation and radiocommunication equipment and systems—Automatic identification system (AIS)

Part 3: Repeater stations—Minimum operational and performance requirements—Methods of test and required test results

First published as AS/NZS IEC 62320.3:2015.

COPYRIGHT

© Standards Australia Limited/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140.

ISBN 978 1 76035 134 2

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee RC-004, Radiocommunications Equipment—Maritime and Safety of Life.

The objective of this Standard is to provide the minimum operational and performance requirements, methods of test and the required test results for a type of non-shipborne automatic identification system (AIS) equipment known as an AIS repeater station.

This Standard is identical with, and has been reproduced from IEC 62320-3, Ed. 1.0 (2015), *Maritime navigation and radiocommunication equipment and systems—Automatic identification system (AIS), Part 3: Repeater stations—Minimum operational and performance requirements—Methods of test and required test results*.

As this Standard is reproduced from an International Standard, the following applies:

- (a) In the source text ‘this part of IEC 62320’ should read ‘this Australian/New Zealand Standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

None of the normative references in the source document have been adopted as Australian or Australian/New Zealand Standards.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annexes to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas an ‘informative’ annex is only for information and guidance.

CONTENTS

1	Scope	9
2	Normative references	9
3	Symbols and abbreviations	10
4	Functional requirements for a repeater station	11
4.1	General	11
4.1.1	Types of repeater stations	11
4.1.2	Repeating operation	11
4.1.3	Synchronisation	12
4.1.4	Access to the VDL	12
4.1.5	Configuration	13
4.2	Functional block diagram of an AIS repeater station	13
4.3	Repeating rules	14
4.3.1	General repeating rules	14
4.3.2	Repeater station use of repeat indicator	15
4.3.3	Duplicate message filtering	15
4.3.4	Content filtering	16
4.3.5	Reporting interval filtering	19
4.3.6	Channel filtering	19
4.3.7	Filtering procedure	19
4.3.8	Message processing	21
4.3.9	Overload protection	21
4.3.10	Slot selection using RSSI – RSSI measurement	22
4.4	Message scheduling	22
4.4.1	Station report	22
4.4.2	Repeater station identification message structure	23
4.4.3	Broadcast active AIS-SART message	24
4.4.4	Configuration parameters	24
4.5	Repeater station input/output sentence formatters	29
5	Performance requirements	30
5.1	Cyclic redundancy check	30
5.2	Physical layer requirement	30
5.2.1	Transmitter requirements	30
5.2.2	Receiver requirements	34
5.2.3	Power consumption	34
5.2.4	Environmental requirements	35
5.3	Link layer requirements	35
6	Functional tests	35
6.1	Configuration tests	35
6.1.1	Factory default settings	35
6.1.2	Standard test set-up	36
6.1.3	Configuration via VDL	37
6.2	Basic functional tests	38
6.2.1	Basic repetition test	38
6.2.2	Power setting	38

6.2.3	Repeat indicator handling	39
6.2.4	Synchronisation jitter	40
6.3	VDL access.....	41
6.3.1	RATDMA	41
6.3.2	FATDMA access	44
6.3.3	ITDMA access	44
6.4	Repetition rates	45
6.4.1	Downsampling	45
6.4.2	Fixed repetition interval	46
6.4.3	Maximum VDL load.....	46
6.4.4	Maximum transmissions per second	47
6.4.5	Age of time stamp.....	47
6.5	Filtering	48
6.5.1	Duplicate filtering.....	48
6.5.2	Channel filtering	48
6.5.3	Position filtering.....	49
6.5.4	Message type filtering.....	51
6.5.5	Message content filtering.....	51
6.5.6	AIS-SART filtering	56
6.6	Repeater station identification message.....	56
6.6.1	Purpose.....	56
6.6.2	Method of measurement	56
6.6.3	Required results	57
7	Test conditions	57
7.1	Normal and extreme test conditions	57
7.1.1	Normal test conditions	57
7.1.2	Extreme test conditions	57
7.2	Additional test arrangements.....	57
7.2.1	Arrangements for test signals applied to the receiver input	57
7.2.2	Encoder for receiver measurements	58
7.2.3	Waiver for receivers.....	58
7.2.4	Impedance.....	58
7.2.5	Artificial antenna (dummy load)	58
7.2.6	Facilities for access	58
7.2.7	Modes of operation of the transmitter.....	58
7.3	Measurement uncertainties	58
7.4	Test signals	59
7.4.1	Standard test signal number 1	59
7.4.2	Standard test signal number 2	59
7.4.3	Standard test signal number 3	59
7.4.4	Standard test signal number 4	59
8	Physical radio tests	60
8.1	Transceiver protection test.....	60
8.1.1	Purpose.....	60
8.1.2	Method of measurement	60
8.1.3	Required results	61
8.2	TDMA transmitter.....	61
8.2.1	General	61
8.2.2	Frequency error	61

8.2.3	Carrier power.....	61
8.2.4	Modulation spectrum slotted transmission.....	62
8.2.5	Transmitter test sequence and modulation accuracy verification	63
8.2.6	Transmitter output power versus time function	64
8.2.7	Intermodulation attenuation (Type 1 only)	66
8.3	TDMA receivers	67
8.3.1	Sensitivity.....	67
8.3.2	Error behaviour at high input levels.....	68
8.3.3	Co-channel rejection.....	68
8.3.4	Adjacent channel selectivity.....	69
8.3.5	Spurious response rejection	70
8.3.6	Intermodulation response rejection	72
8.3.7	Blocking or desensitisation	73
8.3.8	Conducted spurious emissions at the antenna	74
Annex A (normative)	Configuration structures	75
A.1	General.....	75
A.2	PI sentences for repeater stations.....	77
A.2.1	RFS – Repeater station FATDMA slots	77
A.2.2	RMF – Repeater station MMSI filter	79
A.2.3	Area configuration	79
A.3	Configuration via VDL using Message 26	83
Annex B (informative)	Test area arrangement	103
Bibliography		104
Figure 1	– Functional block diagram of an AIS repeater station.....	14
Figure 2	– Power versus time characteristics	32
Figure 3	– Format for repeating four-packet cluster.....	60
Figure 4	– Measurement arrangement	61
Figure 5	– Measurement arrangement	62
Figure 6	– Modulation spectrum for slotted transmission	63
Figure 7	– Measurement arrangement	63
Figure 8	– Power versus time characteristics	65
Figure 9	– Measurement arrangement	66
Figure 10	– Measurement arrangement.....	67
Figure 11	– Measurement arrangement.....	68
Figure 12	– Measurement arrangement.....	68
Figure 13	– Measurement arrangement.....	69
Figure 14	– SINAD or PER/BER measuring equipment	71
Figure 15	– Measurement arrangement.....	72
Figure 16	– Measurement arrangement.....	73
Figure B.1	– Test area arrangement.....	103
Table 1	– SOTDMA communication state of received station	12
Table 2	– ITDMA Communication state of received station.....	13
Table 3	– ITDMA communication state of received station with rescheduling	13
Table 4	– Duplicate message filtering parameters	16
Table 5	– Repeater station behaviour for message repeat.....	17

Table 6 – Contents of Message 26 used for repeater station identification	23
Table 7 – Alarm status definition for Table 6	24
Table 8 – Message 8 structure with AIS-SART related content	24
Table 9 – Configurable parameters	25
Table 10 – Repetition parameters	26
Table 11 – Area related configuration parameters	28
Table 12 – Repeater station input/output sentence formatters	30
Table 13 – Transmitter parameters	31
Table 14 – Power versus time characteristics for Figure 2	32
Table 15 – Required parameter settings for a repeater station	33
Table 16 – Required settings of physical layer constants	33
Table 17 – Modulation parameters of the physical layer of the repeater station	33
Table 18 – Required receiver characteristics	34
Table 19 – Factory default values	35
Table 20 – Standard test set-up	36
Table 21 – Test area of standard test set-up	37
Table 22 – Content of first two packets	60
Table 23 – Fixed PRS data derived from Recommendation ITU-T O.153	60
Table 24 – Power versus time characteristics	65
Table 25 – Frequencies for intermodulation tests	73
Table A.1 – Basic system parameters	76
Table A.2 – General repetition parameters	77
Table A.3 – Basic structure of Message 26	84
Table A.4 – Message 26 repeater command IDs	84
Table A.5 – EPV configuration	85
Table A.6 – EPV query	86
Table A.7 – Property identifiers for use with EPV – Basic system parameters	87
Table A.8 – Property identifiers for use with EPV – General repetition parameters	88
Table A.9 – AES key configuration	89
Table A.10 – RFS configuration	90
Table A.11 – RFS query	91
Table A.12 – RMF configuration	92
Table A.13 – RMF query	93
Table A.14 – RA1 configuration	94
Table A.15 – RA1 query	95
Table A.16 – RA2 configuration	96
Table A.17 – RA2 query	98
Table A.18 – RA3 configuration	99
Table A.19 – RA3 query	100
Table A.20 – RA4 configuration	101
Table A.21 – RA4 query	102

INTRODUCTION

Chapter V of the 1974 SOLAS Convention requires mandatory carriage of Automatic Identification System (AIS) equipment on all vessels constructed on or after 01 July 2002. Implementation for other types and sizes of SOLAS Convention vessels was required to be completed not later than 31 December 2004.

SOLAS Chapter V, Regulation 19, section 2.4.5 states that AIS shall:

- a) provide automatically to appropriate equipped shore stations, other ships and aircraft information, including ship's identity, type, position, course, speed, navigational status and other safety-related information;
- b) receive automatically such information from similarly fitted ships;
- c) monitor and track ships; and
- d) exchange data with shore-based facilities.

In addition, the IMO Performance Standards for AIS states that:

- The AIS should improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of Vessel Traffic Services (VTS), by satisfying the following functional requirements:
 - 1) in a ship-to-ship mode for collision avoidance;
 - 2) as a means for littoral States to obtain information about a ship and its cargo; and
 - 3) as a VTS tool, i. e. ship-to-shore (traffic management).
- The AIS should be capable of providing to ships and to competent authorities, information from the ship, automatically and with the required accuracy and frequency, to facilitate accurate tracking. Transmission of the data should be with the minimum involvement of ship's personnel and with a high level of availability.

The provision of Shore Based AIS will be necessary to attain the full benefit of the SOLAS Convention requirements.

This standard provides the minimum operational and performance requirements, methods of test and the required test results for AIS repeater stations. The testing is divided into two parts, the logical tests and the transceiver tests. These are captured in Clause 6 and Clause 8 respectively.

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Maritime navigation and radiocommunication equipment and systems—Automatic identification system (AIS)**Part 3:****Repeater stations—Minimum operational and performance requirements—Methods of test and required test results****1 Scope**

This part of IEC 62320 specifies the minimum operational and performance requirements, methods of testing and required test results for AIS repeater stations, compatible with the performance standards adopted by IMO Res. MSC.74 (69), annex 3, Universal AIS. It incorporates the technical characteristics of non-shipborne, fixed station AIS equipment, included in Recommendation ITU-R M.1371 and IALA Recommendation A-124. Where applicable, it also takes into account the ITU Radio Regulations. This standard takes into account other associated IEC International Standards and existing national standards, as applicable.

This standard is applicable for AIS repeater stations. It does not include specifications for the display of AIS data on shore.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 61162-1, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

ITU-R Recommendation M.585, *Assignment and use of identities in the maritime mobile service*

ITU-R Recommendation M.1084, *Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service*

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

ITU-T Recommendation O.153, *Basic parameters for the measurement of error performance at bit rates below the primary rate*

ITU Radio Regulations, Appendix 18

3 Symbols and abbreviations

AES	Advanced Encryption Standard
AIS	Automatic Identification System
AtoN	Aids To Navigation
BER	Bit Error Rate
BFO	Beat frequency oscillator
BIIT	Built-In Integrity Tests
BT	Bandwidth Time product
COG	Course Over Ground
CS	Carrier Sense
CSTDMA	Carrier Sense Time Division Multiple Access
DAC	Digital Area Code
dBc	Decibel-carrier
dBm	Decibel-milliwatts
EUT	Equipment under test
FATDMA	Fixed Access Time Division Multiple Access
FI	Function Identifier
FIFO	First in, first out
GNSS	Global Navigation Satellite System
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ITDMA	Incremental Time Division Multiple Access
IMO	International Maritime Organization
ITU	International Telecommunication Union
kn	Knots
MMSI	Maritime Mobile Service Identity
NavStatus	Navigational Status
NM	Nautical Mile
NRZI	Non-Return to Zero Inverted
PER	Packet Error Rate
P _c	Carrier Power
PI	Presentation Interface
PPS	Pulse(s) Per Second
RATDMA	Random Access Time Division Multiple Access
RSSI	Received Signal Strength Indication
Rx	Receive
AIS-SART	Search And Rescue Transmitter
SO	Self-Organizing
SOG	Speed Over Ground
SOTDMA	Self-Organizing Time Division Multiple Access
TDMA	Time Division Multiple Access
Tx	Transmit
UTC	Coordinated Universal Time

VCO	Voltage controlled oscillator
VDL	VHF Data Link
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio
VTS	Vessel Traffic Services

4 Functional requirements for a repeater station

4.1 General

4.1.1 Types of repeater stations

AIS repeater stations are designed to retransmit VDL messages in one or several steps to extend the receiving range in areas with impaired VHF coverage. Careful consideration needs to be taken not to overload the VDL with repeated messages, considering the additional load repeated messages generate. The AIS environment may also contain one or more repeaters.

A repeater station is a store and forward repeater process.

A repeater station is a non-controlling station on the VDL.

The repeater station can be one of two types.

Type 1:

- Radio requirements as per the AIS base station requirements
- A dedicated repeater station is a Type 1 device

Type 2:

- Radio requirements as per the AIS AtoN station requirements
- Restricted repeater capability
- Suitable for areas with low AIS activity only

These two types of repeater functions can be implemented in three different ways:

- As a dedicated repeater station (Type 1)
- As an internal process of an AIS Base Station (Type 1)
- As an internal process of an AIS AtoN device (Type 2)

4.1.2 Repeating operation

(See 6.2.1)

4.1.2.1 Modes of repeating operation

The repeater station is designed for independent operation in autonomous and assigned mode. No polled mode is allowed.

4.1.2.2 Message by message repeating

Each received message that shall be repeated is internally allocated for transmission using RATDMA, ITDMA, or FATDMA as supported and configured.

4.1.2.3 Message rescheduling

This mode is only applicable for scheduled position reports.

Received messages shall be analysed and the repeater station shall reschedule transmissions using an ITDMA schedule.

The repeater station may reschedule repeated messages using a reporting interval different from the original interval, depending on configuration.

4.1.3 Synchronisation

(See 6.2.4)

The repeater station shall primarily use an internal source for UTC direct synchronisation.

The repeater station can synchronise on any AIS station that has direct UTC (otherwise known as UTC indirect). The repeater station shall have UTC direct, or UTC indirect and only transmit when sync state is 0 or 1.

4.1.4 Access to the VDL

4.1.4.1 Means of access

Access to the VDL can be by using pre-configured transmission slots. Pre-configured transmission slots shall in this case be reserved by Message 20 from a base station.

If pre-configured slots are not available, RATDMA may be used for transmission.

A repeater station shall use as a minimum RATDMA, ITDMA and FATDMA to allocate and pre-announce transmissions.

The repeater station needs to take into account all received Message 20s. It shall respect slot reservations. If a base station reserves slots for the repeater station, the repeater station shall be configured to use FATDMA.

CSTDMA is not suitable for repeater stations and not permitted because of:

- slot start delay;
- no protection from collision with Class B CS units;
- only one slot messages;
- intentional slot reuse is not allowed.

4.1.4.2 RATDMA and FATDMA access scheme

(See 6.3.1, 6.3.2)

The repeater station shall not change the data content of the message, but shall change the SOTDMA communication state or ITDMA if relevant. The repeater station shall change the SOTDMA communication state as indicated in Table 1.

Table 1 – SOTDMA communication state of received station

Received parameter	Transmit parameters
Synch state	Change to Synch State of repeater station
Slot time out	Set to zero
Slot offset	Set to zero

The repeater station shall change the ITDMA communication state as indicated in Table 2.

Table 2 – ITDMA Communication state of received station

Received parameter	Transmit parameters
Synch state	Change to synch state of repeater
Slot increment	Set to zero
Number of slots	Set to zero
Keep flag	Set to FALSE (= 0)

4.1.4.3 ITDMA access scheme

(See 6.3.3)

The repeater station shall not change the data content of the message, but shall change the SOTDMA communication state or ITDMA as relevant. The repeater station shall change the SOTDMA or ITDMA communication state to an ITDMA communication state as described in Table 2. When using ITDMA to reschedule refer to Table 3.

If ITDMA is used and the repeater station receives a Message 1 that shall be repeated, the repeater station shall change the message ID from 1 to 3 to all ITDMA access scheme.

Table 3 – ITDMA communication state of received station with rescheduling

Received parameter	Transmit parameters
Synch state	Change to synch state of repeater station
Slot increment	Offset set to next transmission slot
Number of slots	As required for next repeated message
Keep flag	Set to FALSE (= 0)

ITDMA can be used to schedule transmissions that originate from different stations.

When using ITDMA reservations, the selection interval shall be 150 slots. Set the ITDMA communication state at time of transmission to the next scheduled transmission.

4.1.5 Configuration

(See 6.1.3)

Initial configuration shall be possible using the presentation interface of the repeater station as defined in Annex A.

The repeater station may use VDL Messages for configuration and status reports as defined in Clause A.3.

4.2 Functional block diagram of an AIS repeater station

Figure 1 shows the principal components of the AIS repeater station.

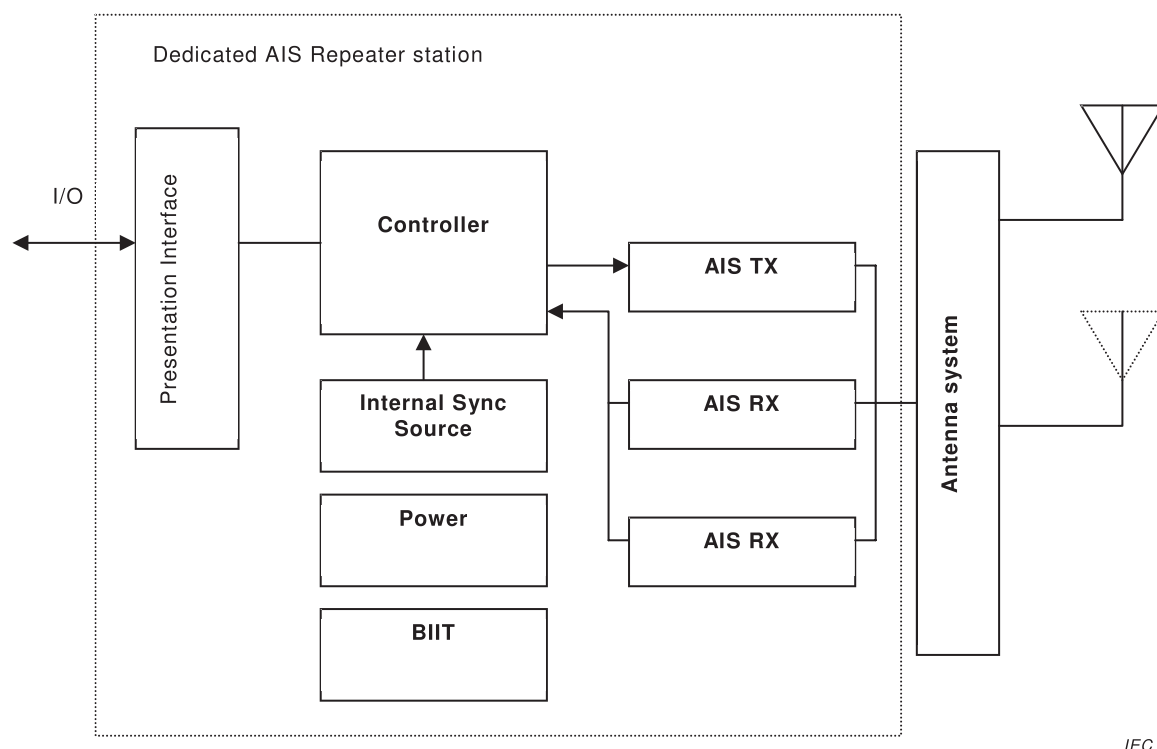


Figure 1 – Functional block diagram of an AIS repeater station

As a minimum, the following functional elements are required for the AIS repeater station:

- two multi-channel receiving processes;
- one multi-channel TDMA transmitter;

NOTE Since the minimum configuration of the repeater station has only one transmitter, the repeater station cannot transmit on both AIS Channels (AIS A and AIS B) simultaneously.

- a controlling unit, which includes a unique identifier to the repeater station;
- an internal synchronisation source capable of providing UTC;
- a Built-In-Integrity-Test unit (BIIT), which shall provide alarms;
- a power supply;
- an interface with data format conforming to IEC 61162-1. The physical interface will be determined by the manufacturer. The interface shall output VDO sentences for all transmitted messages, and VDM sentences for all received messages. Additionally, the repeater station shall be configurable using the PI. The repeater station shall be configurable for repeater enable via the VDL, and may optionally be configurable for all parameters via the VDL.

4.3 Repeating rules

4.3.1 General repeating rules

(See 6.2.1, 6.4.5)

The repeater station is a store-and-forward process and shall use the FIFO principle.

Retransmission of messages shall be performed as soon as possible, according to configuration, after receiving the relevant messages which are required to be retransmitted.

The maximum delay of the retransmission shall be within 9 s of reception in order to ensure one minute interval UTC time stamp in a position report that has undergone no change.

repetitions. If RATDMA is used to transmit a message, the received message can be held for maximum 4 s and 10 slots.

With the exception of AIS-SART position reports, messages containing a time stamp older than 30 s shall not be repeated.

The repeater station shall be capable of retransmission of a message within 10 slots of reception of that received message.

Received position messages (Message 1, 2, 3 or 18) shall replace queued messages from the same MMSI (within a reasonable time limit to already scheduled transmission of the same MMSI. Updating a queued message shall not take longer than 2 slots.

Retransmission (repeat) shall be performed on the same channel in which the original message was received by the repeater station.

4.3.2 Repeater station use of repeat indicator

(See 6.2.3)

4.3.2.1 Repeat indicator value

Each time a received message is processed by the repeater station, the repeat indicator value shall, at least, be incremented by one (+1) before retransmitting the message.

If the received repeat indicator equals 3, the relevant message shall not be retransmitted.

4.3.2.2 Message repetition process

A message is repeated based on the repeat indicator if the repeat indicator is less than the "Max repeated RI" configuration value.

The repeat indicator of retransmitted message can be updated using two different methods.

- a) Increment repeat indicator by one (+1), to a maximum value of three.
- b) Set repeat indicator to the value defined by the "RI increment setting" configuration parameter.

4.3.2.3 Configuration of repetition process

There are three parameters to configure the repetition process:

- incoming repeat indicator value limit;
- set if above value is the maximum number of repeats or a value for exact match;
- increment rule. Set to either increase repeat indicator by one (+1), or replace repeat indicator with 3.

All repeater stations within coverage of one another should be set to the same number of repeats, in order to ensure that "Binary acknowledgement" Message 7 and "Safety related acknowledgement" Message 13 are delivered to the originating station.

4.3.3 Duplicate message filtering

(See 6.5.1)

The same message shall be repeated only once within 30 s, by the same repeater station using the filtering parameters of Table 4. To make sure this is the case, messages shall be checked using repeat history 30 s back in time.

Table 4 – Duplicate message filtering parameters

Message type	Filter parameters
Position reports (1,2,3,18, 21)	MMSI, Time stamp
Static data (5,19)	MMSI
Static data (24A,24B)	MMSI, Message part
Binary messages (6, 8, 25, 26)	MMSI, Binary data
Safety related messages (12,14)	MMSI, Data
Other messages	No filtering required

4.3.4 Content filtering

4.3.4.1 Filter by message type

(See 6.5.4)

Received messages shall be filtered according to Table 5.

Table 5 – Repeater station behaviour for message repeat

Message type	Repeating allowed	Action	Comment
1	Yes	Amend communication state.	
2	Yes	Amend communication state.	
3	Yes	Amend communication state.	
4	No		Message 4 transmissions are not candidates for slot reuse and shall therefore not be repeated. See ^a .
5	Yes		
6	Yes		
7	Yes		
8	Yes		
9	No		SAR units generally have great range and therefore do not require retransmission.
10	No		See ^a .
11	No		See ^a .
12	Yes		
13	Yes		
14	Yes		
15	Yes	Disallow repeat of Message 15 with slot offset.	
16	No		See ^b .
17	No		Time to alarm for unhealthy satellites may not be fulfilled. DGPS messages may also be long.
18	Yes	Amend communication state (check for CS).	Message 18 from CS and SOTDMA may be handled differently.
19	Yes		
20	No		See ^b .
21	Yes		
22	No		See ^b .
23	No		See ^b .
24	Yes		
25	Yes		
26	Yes	Amend communication state.	
27	No		Not intended to be received by mobiles. Different frequencies.
^a UTC time will not be accurate after retransmission, hence the message is not repeated.			
^b This is a VDL control message.			

Any message type can be switched off by configuration.

4.3.4.2 AIS-SART filtering rules

(See 6.5.6)

Received message filtering shall use the following rules:

- repetition of AIS-SART test messages is configurable with “default=don’t repeat” this includes the AIS-SART text messages while undergoing tests;
- active AIS-SART position reports without a position shall be repeated;
- capability to trigger binary and text messages on reception of an active AIS-SART message shall contain repeater ID and RSSI of the received AIS-SART message;
- only one message from the burst can be repeated;
- continue repetition once per minute for 15 min after last message received. In this case the timestamp in the repeated AIS-SART position report shall be set to 60 (unavailable);
- prioritise active AIS-SART messages over others under heavy VDL load;
- filtering shall be disabled for active AIS-SART.

NOTE The “SART” in this standard includes devices using AIS-SART technology such as AIS-SART, AIS-MOB and EPIRB-AIS as defined in Recommendation ITU-R M.1371.

4.3.4.3 Filter by position

(See 6.5.3)

4.3.4.3.1 Defined areas

Messages shall be filtered by position using defined areas. When a message that does not contain a position field is received from a station whose position is not yet known, no filtering shall be applied. For example if a Message 5 is received before a position message from the same station is received, the Message 5 shall not be filtered.

A position report received from a station with a “default=not available” position shall not be repeated.

4.3.4.3.2 Area filter rules

(See 6.5.3)

Include/Exclude rule set – Each area defined shall be for either inclusion or exclusion of retransmission. If no included area is defined, the repeater station shall not retransmit any VDL message.

Number of areas – Minimum number of configurable areas shall be 8 in total. Overlapping areas are allowed. Exclude from transmission areas have priority over include areas in case of overlapping. An area for filtering is defined by two points forming a rectangle at its NE/SW geographic coordinates.

Distance to areas – The distance to an area shall not be considered by the repeater station.

Area sizes – There shall be no minimum or maximum area size limit required.

4.3.4.4 Filter by other message content

(See 6.5.5)

It shall be possible to filter messages by specific parameters within the messages.

As a minimum it shall be possible to filter AIS units by:

SOG – A SOG threshold for exclusion when SOG is lower than the threshold value;

COG – A COG range shall be configurable for inclusion or exclusion;