

SLOVENSKI STANDARD

SIST EN 62287-2:2017

01-julij-2017

Nadomešča:

SIST EN 62287-2:2013

Pomorska navigacijska in radiokomunikacijska oprema in sistemi - Ladijska oprema razreda B avtomatičnega identifikacijskega sistema (AIS) - 2. del: Tehnike samoorganiziranega časovno porazdeljenega sodostopa (SOTDMA) (IEC 62287-2:2017)

Maritime navigation and radiocommunication equipment and systems - Class B shipborne equipment of the automatic identification system (AIS) - Part 2: Self-organising time division multiple access (SOTDMA) techniques (IEC 62287-2:2017)

(standards.iteh.ai)

Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt – Geräte der Klasse B des automatischen Identifikationssystems (AIS) für Schiffe – Teil 2: Sich selbst abstimme Zeitmultiplex-Vielfachzugriffstechniken (SOTDMA) (IEC 62287-2:2017)

Matériels et systèmes de navigation et de radiocommunications maritimes - Transpondeur embarqué du système d'identification automatique (AIS) de classe B - Partie 2: Technique d'accès multiple par répartition dans le temps auto-adaptatif (SOTDMA) (IEC 62287-2:2017)

Ta slovenski standard je istoveten z: EN 62287-2:2017

ICS:

47.020.70

Navigacijska in krmilna oprema

Navigation and control equipment

SIST EN 62287-2:2017

en

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62287-2:2017

<https://standards.iteh.ai/catalog/standards/sist/9349af01-5590-49cd-905f-4f8a0262cb4b/sist-en-62287-2-2017>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62287-2

May 2017

ICS 47.020.70

Supersedes EN 62287-2:2013

English Version

**Maritime navigation and radiocommunication equipment and systems - Class B shipborne equipment of the automatic identification system (AIS) - Part 2: Self-organising time division multiple access (SOTDMA) techniques
(IEC 62287-2:2017)**

Matériels et systèmes de navigation et de radiocommunications maritimes - Transpondeur embarqué du système d'identification automatique (AIS) de classe B - Partie 2: Technique d'accès multiple par répartition dans le temps auto-adaptatif (SOTDMA)
(IEC 62287-2:2017)

Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt - Geräte der Klasse B des automatischen Identifikationssystems (AIS) für Schiffe - Teil 2: Sich selbst abstimme Zeitmultiplex-Vielfachzugriffstechniken (SOTDMA)
(IEC 62287-2:2017)

STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2017-03-14. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member. [SIST EN 62287-2:2017](https://standards.iteh.ai/catalog/standards/sist/9349af01-5590-49cd-905f-404620304030/sist-en-62287-2-2017)

<https://standards.iteh.ai/catalog/standards/sist/9349af01-5590-49cd-905f-404620304030/sist-en-62287-2-2017>

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 62287-2:2017**European foreword**

The text of document 80/827/FDIS, future edition 2 of IEC 62287-2, prepared by IEC/TC 80 "Maritime navigation and radiocommunication equipment and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62287-2:2017.

The following dates are fixed:

- latest date by which the document has to be (dop) 2017-12-14
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-03-14
standards conflicting with the
document have to be withdrawn

This document supersedes EN 62287-2:2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62287-2:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61162-3:2008	NOTE	Harmonized as EN 61162-3:2008.
IEC 61162-3:2008/AMD1:2010	NOTE	Harmonized as EN 61162-3:2008/A1:2010.
IEC 61162-3:2008/AMD2:2014	NOTE	Harmonized as EN 61162-3:2008/A2:2014.
IEC 61924-2:2012	NOTE	Harmonized as EN 61924-2:2012.
IEC 62287-1	NOTE	Harmonized as EN 62287-1.
ISO 9000 (Series)	NOTE	Harmonized as EN ISO 9000 (Series).

Annex ZA

(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60945	2002	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results	EN 60945	2002
IEC 61108	series	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS)	EN 61108	series
IEC 61108-4	-	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 4: Shipborne DGPS and DGLONASS maritime radio beacon receiver equipment - Performance requirements, methods of testing and required test results	EN 61108-4	-
IEC 61162-1	-	Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners	EN 61162-1	-
IEC 61993-2	-	Maritime navigation and radiocommunication equipment and systems - Automatic Identification Systems (AIS) - Part 2: Class A shipborne equipment of the automatic identification system (AIS) - Operational and performance requirements, methods of test and required test results	EN 61993-2	-
ITU Radio regulations, Vol 1	-	Radio Regulations - Volume 1: Articles	-	-
ITU-R Recommendation M.1084-5	-	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.1371-5	-	Technical characteristics for an automatic identification system using time-division multiple access in the VHF maritime mobile band	-	-
ITU-R Recommendation M.825-3	-	Characteristics of a transponder system using digital selective calling techniques for use with vessel traffic services and ship-to-ship identification	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62287-2:2017

<https://standards.iteh.ai/catalog/standards/sist/9349af01-5590-49cd-905f-4f8a0262cb4b/sist-en-62287-2-2017>



IEC 62287-2

Edition 2.0 2017-02

INTERNATIONAL STANDARD



Maritime navigation and radiocommunication equipment and systems – Class B shipborne equipment of the automatic identification system (AIS) – Part 2: Self-organising time division multiple access (SOTDMA) techniques

SIST EN 62287-2:2017

<https://standards.iteh.ai/catalog/standards/sist/9349af01-5590-49cd-905f-4f8a0262cb4b/sist-en-62287-2-2017>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 47.020.70

ISBN 978-2-8322-3906-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	8
1 Scope.....	10
2 Normative references	10
3 Terms, definitions and abbreviated terms	11
3.1 Terms and definitions.....	11
3.2 Abbreviated terms.....	11
4 General requirements	12
4.1 General.....	12
4.1.1 Capabilities of the Class B "SO" AIS.....	12
4.1.2 Quality assurance.....	12
4.1.3 Safety of operation	13
4.1.4 Additional features.....	13
4.1.5 Functionality	13
4.2 Manuals	13
4.3 Marking and identification	13
5 Environmental, power supply, interference and safety requirements	13
6 Performance requirements.....	14
6.1 Internal processes	14
6.2 Operating frequency channels.....	15
6.3 Internal GNSS receiver for position reporting	15
6.4 Identification	15
6.5 AIS Information	15
6.5.1 Information content.....	15
6.5.2 Information reporting intervals	16
6.5.3 Short safety-related messages	17
6.5.4 Permissible initialisation period.....	17
6.6 Alarms and indications, fall-back arrangements	17
6.6.1 Built-in integrity tests (BIIT)	17
6.6.2 Transmitter shutdown procedure.....	18
6.6.3 Position sensor fallback conditions	19
6.7 User interface	19
6.7.1 Indication and display	19
6.7.2 Static data input	20
6.7.3 External interfaces.....	20
6.8 Protection from invalid control commands	20
7 Technical requirements	20
7.1 General.....	20
7.2 Physical layer	21
7.2.1 General	21
7.2.2 Receiver characteristics.....	21
7.2.3 Other characteristics.....	22
7.2.4 Transmitter requirements.....	23
7.3 Link layer	24
7.3.1 General	24
7.3.2 Link sub-layer 1: medium access control (MAC).....	24
7.3.3 Link sub-layer 2: data link service (DLS).....	26

7.3.4	Link sub-layer 3: link management entity (LME).....	26
7.4	Network layer.....	30
7.4.1	General	30
7.4.2	Management of regional operating settings.....	30
7.4.3	Multi-channel operation	31
7.5	Transport layer	31
7.6	Presentation interface	32
7.7	DSC receive capability	32
7.8	Long-range application by broadcast.....	32
8	Test conditions	32
8.1	General.....	32
8.2	Normal test conditions	32
8.2.1	Temperature and humidity	32
8.2.2	Power supply	33
8.3	Extreme test conditions.....	33
8.4	Test signals	33
8.4.1	Standard test signal number 1	33
8.4.2	Standard test signal number 2	33
8.4.3	Standard test signal number 3	33
8.4.4	Standard test signal number 4	33
8.5	Standard test environment.....	34
8.5.1	Test setup	34
8.5.2	Sensor test input	35
8.5.3	Synchronisation	35
8.5.4	Test signals applied to the receiver input	35
8.5.5	Waiver for receivers	35
8.5.6	Artificial antenna (dummy load)	35
8.5.7	Modes of operation of the transmitter.....	35
8.5.8	Common test conditions for protection from invalid controls.....	35
8.5.9	Measurement uncertainties	35
9	Power supply, environmental and EMC tests	36
9.1	Test summary	36
9.2	Vibration	37
9.2.1	Purpose.....	37
9.2.2	Method of measurement	37
9.2.3	Required results	38
9.3	Shock	38
9.3.1	Purpose	38
9.3.2	Method of measurement	38
9.3.3	Required result	38
9.4	Performance tests/checks	38
9.5	Under voltage test (brown out)	38
9.5.1	Purpose.....	38
9.5.2	Method of test.....	38
9.5.3	Required result	39
9.6	Under voltage test (short term)	39
9.6.1	Purpose	39
9.6.2	Method of test.....	39
9.6.3	Required result	39

10	Operational tests	39
10.1	General.....	39
10.1.1	Tests by inspection.....	39
10.1.2	Safety of operation	39
10.1.3	Additional features.....	40
10.2	Modes of operation	40
10.2.1	Autonomous mode.....	40
10.2.2	Single messages	42
10.2.3	Polled mode and interrogation response	45
10.3	Channel selection	45
10.3.1	Valid channels	46
10.3.2	Invalid channels.....	46
10.4	Internal GNSS receiver	46
10.5	AIS information	46
10.5.1	Information content.....	46
10.5.2	Information update intervals	47
10.6	Initialisation period.....	49
10.6.1	Purpose.....	49
10.6.2	Method of measurement	49
10.6.3	Required results	49
10.7	Alarms and indications, fall-back arrangements	49
10.7.1	Built in integrity test.....	49
10.7.2	Transceiver protection	50
10.7.3	Transmitter shutdown procedure.....	50
10.7.4	Position sensor fallback conditions.....	50
10.8	User interface	51
10.8.1	Status indication.....	51
10.8.2	Message display.....	51
10.8.3	Static data input	52
11	Physical tests	53
11.1	TDMA transmitter.....	53
11.1.1	Frequency error.....	53
11.1.2	Carrier power.....	53
11.1.3	Transmission spectrum.....	54
11.1.4	Modulation accuracy	55
11.1.5	Transmitter output power versus time function	56
11.2	TDMA receivers	57
11.2.1	Sensitivity.....	57
11.2.2	Error behaviour at high input levels.....	58
11.2.3	Co-channel rejection.....	58
11.2.4	Adjacent channel selectivity.....	59
11.2.5	Spurious response rejection	60
11.2.6	Intermodulation response rejection	62
11.2.7	Blocking or desensitisation	63
11.3	Conducted spurious emissions.....	64
11.3.1	Spurious emissions from the receiver	64
11.3.2	Spurious emissions from the transmitter	64
12	Specific tests of link layer	65
12.1	TDMA synchronisation	65

12.1.1	Synchronisation test using UTC direct and indirect	65
12.1.2	Synchronisation test without UTC, EUT receiving semaphore	66
12.2	Time division (frame format)	66
12.2.1	Purpose	66
12.2.2	Method of measurement	66
12.2.3	Required results	66
12.3	Synchronisation jitter	66
12.3.1	Definition	66
12.3.2	Purpose	67
12.3.3	Method of measurement	67
12.3.4	Required results	67
12.4	Data encoding (bit stuffing)	67
12.4.1	Purpose	67
12.4.2	Method of measurement	67
12.4.3	Required results	67
12.5	Frame check sequence	67
12.5.1	Purpose	67
12.5.2	Method of measurement	67
12.5.3	Required results	67
12.6	Slot allocation (channel access protocols)	68
12.6.1	Network entry	68
12.6.2	Autonomous scheduled transmissions (SOTDMA)	68
12.6.3	Autonomous scheduled transmissions (ITDMA)	68
12.6.4	Transmission of Messages 24A and 24B (ITDMA)	68
12.6.5	Assigned operation	69
12.6.6	Group assignment	71
12.6.7	Base station reservations	75
12.7	Message formats	75
12.7.1	Received messages	75
12.7.2	Transmitted messages	75
13	Specific tests of network layer	76
13.1	Regional area designation by VDL Message	76
13.1.1	Purpose	76
13.1.2	Method of measurement	76
13.1.3	Required results	77
13.2	Channel management by addressed Message 22	78
13.2.1	Purpose	78
13.2.2	Method of measurement	78
13.2.3	Required results	78
13.3	Invalid regional operating areas	78
13.3.1	Purpose	78
13.3.2	Method of measurement	78
13.3.3	Required results	78
13.4	Continuation of autonomous mode reporting interval	78
13.4.1	Purpose	78
13.4.2	Method of test	79
13.4.3	Required result	79
13.5	Slot reuse and FATDMA reservations	79
13.5.1	Method of measurement	79

13.5.2	Required results	79
13.6	Long-range application by broadcast.....	79
13.6.1	Long-range broadcast.....	79
13.6.2	Multiple assignment operation	80
13.7	Other features.....	81
Annex A (normative)	DSC channel management.....	82
A.1	DSC functionality	82
A.2	DSC time sharing.....	82
A.3	DSC test signals	83
A.3.1	DSC test signal number 1	83
A.3.2	DSC test signal number 2	83
A.3.3	DSC test signal number 3	83
A.3.4	DSC test signal number 4	83
A.4	DSC functionality tests.....	83
A.4.1	General	83
A.4.2	Method of measurement	83
A.4.3	Required results	84
A.4.4	Regional area designation	84
A.4.5	Scheduling	84
A.4.6	DSC flag in Message 18	84
A.4.7	DSC monitoring time plan	85
A.4.8	Replacement or erasure of dated or remote regional operating settings	85
A.4.9	Test of addressed telecommand	86
A.4.10	Invalid regional operating areas	86
A.5	DSC receiver tests.....	86
A.5.1	General	86
A.5.2	Maximum sensitivity.....	87
A.5.3	Error behaviour at high input levels.....	87
A.5.4	Co-channel rejection.....	87
A.5.5	Adjacent channel selectivity.....	88
A.5.6	Spurious response rejection	88
A.5.7	Inter-modulation response rejection	88
A.5.8	Blocking or desensitisation	89
Annex B (normative)	Calculation of area size.....	90
B.1	Importance of a common method for area size	90
B.2	Calculation of area sizes	90
Annex C (informative)	Digital interface sentence to parameter group number equivalence	91
Bibliography		92
Figure 1	– OSI layer model	21
Figure 2	– Power versus time mask	25
Figure 3	– Format for repeating four-packet cluster.....	33
Figure 4	– Measurement arrangement for carrier power	53
Figure 5	– Emission mask.....	55
Figure 6	– Measurement arrangement for modulation accuracy	55
Figure 7	– Measurement arrangement	57
Figure 8	– Measurement arrangement with two generators	58

Figure 9 – SINAD or PER/BER measuring equipment	61
Figure 10 – Measurement arrangement for intermodulation.....	62
Figure 11 – Regional transitional zones	77
Table 1 – Dynamic information autonomous reporting intervals for Class B "SO" AIS.....	16
Table 2 – BIIT and reaction to malfunctions	18
Table 3 – Position sensor fallback conditions	19
Table 4 – Required receiver performance	22
Table 5 – Transceiver characteristics.....	22
Table 6 – Transmitter characteristics	24
Table 7 – Definitions of timing for Figure 2.....	26
Table 8 – Use of VDL Messages by a Class B "SO" AIS	29
Table 9 – Content of first two packets	34
Table 10 – Fixed PRS data derived from ITU-T O.153.....	34
Table 11 – Test.....	37
Table 12 – Peak frequency deviation versus time.....	56
Table 13 – Frequencies for intermodulation test.....	63
Table 14 – Regional area scenario.....	77
Table 15 – Required channels in use	77
Table A.1 – DSC monitoring times	83
Table B.1 – Coordinate points.....	90
Table C.1 – Digital sentence to PGN equivalence	91

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – CLASS B SHIPBORNE EQUIPMENT OF THE AUTOMATIC IDENTIFICATION SYSTEM (AIS) –

Part 2: Self-organising time division multiple access (SOTDMA) techniques

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 62287-2 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 2013. It constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition: the introduction of transmission of Message 27 on channels 75 and 76 for the long range application by broadcast.

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

FDIS	Report on voting
80/827/FDIS	80/836/RVD

Full information on the voting for the approval of this document 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 in the IEC 62287 series, published under the general title *Maritime navigation and radiocommunication and systems – Class B shipborne equipment of the automatic identification system (AIS)*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

STANDARD PREVIEW
(standards.iteh.ai)

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 document using a colour printer.