



SLOVENSKI STANDARD SIST EN 303 746 V1.1.1:2021

01-junij-2021

Pomorski lokacijski sistemi - Radijski oddajniki in sprejemniki za radijske povezave v pomorskih radijskih lokacijskih sistemih, ki delujejo v frekvenčnem pasu 9 GHz (pas X)

Maritime Location Systems - Radio transmitters and receivers for radio links in maritime radio location systems operating in the 9 GHz frequency band (X band)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 303 746 V1.1.1:2021](https://standards.iteh.ai/catalog/standards/sist/en-303-746-v1-1-1-2021)

Ta slovenski standard je istoveten z: **ETSI EN 303 746 V1.1.1 (2021-04)**

ICS:

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
47.020.70	Navigacijska in krmilna oprema	Navigation and control equipment

SIST EN 303 746 V1.1.1:2021

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 303 746 V1.1.1:2021](https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021>

ETSI EN 303 746 V1.1.1 (2021-04)



**Maritime Location Systems;
Radio transmitters and receivers for radio links
in maritime radio location systems
operating in the 9 GHz frequency band (X band)**

<https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021>

ReferenceDEN/ERM-TGMAR-611

Keywordslocation, maritime, radio

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2021.
All rights reserved.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	5
Introduction	6
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	7
3 Definition of terms, symbols and abbreviations.....	8
3.1 Terms.....	8
3.2 Symbols.....	8
3.3 Abbreviations	8
4 Technical requirements	9
4.1 Environmental profile.....	9
4.2 Construction	9
4.3 Controls and indicators.....	9
4.4 Safety precautions	9
4.5 Labelling.....	10
4.6 Frequencies.....	10
4.7 Polarization.....	10
4.8 Transceiver data interface.....	10
5 General conditions of measurements	10
5.1 Test site and general arrangements for measurements.....	10
5.2 General	10
5.3 Impedance	11
5.4 Tests of equipment with a notch filter.....	11
5.5 Facilities for access	11
5.5.1 Coupling arrangements.....	11
5.6 Modes of operation of the transmitter	11
6 Test conditions	11
6.1 General	11
6.2 Test signals.....	11
6.3 Normal test conditions.....	11
6.3.1 Normal temperature and humidity	11
6.3.2 Normal power source.....	12
6.3.2.1 Mains voltage and frequency	12
6.3.2.2 Battery power source.....	12
6.3.2.3 Other power sources.....	12
6.4 Extreme test conditions	12
6.4.1 General requirements.....	12
6.4.2 Extreme temperatures	12
6.4.3 Extreme values of test power source	12
6.4.3.1 Mains voltage and frequency	12
6.4.3.2 Battery power source.....	12
6.4.3.3 Other power sources.....	12
6.4.4 Procedure for tests at extreme temperatures	12
7 Environmental tests	13
7.1 General requirements	13
7.2 Procedure.....	13
7.3 Performance check	13
7.4 Vibration tests	13
7.4.1 Purpose	13

iTech STANDARD PREVIEW
(standards.itech.ai)

7.4.2	Method of measurement	13
7.4.3	Requirement.....	14
7.5	Damp heat	14
7.5.1	Purpose	14
7.5.2	Method of measurement	14
7.5.3	Requirement.....	14
8	Transmitter	14
8.1	Frequency error	14
8.1.1	Definition.....	14
8.1.2	Method of measurement	14
8.1.3	Limit	14
8.2	Transmitter EIRP.....	14
8.2.1	Definition.....	14
8.2.2	Method of measurement	15
8.2.3	Limit	15
8.3	Transmitter B _{-40 dB} bandwidth.....	15
8.3.1	Definition.....	15
8.3.2	Method of measurement	15
8.3.3	Limit	15
8.4	Transmitter out-of-band emissions.....	15
8.4.1	Definition.....	15
8.4.2	Method of measurement	15
8.4.3	Limit	16
8.5	Transmitter spurious emissions.....	16
8.5.1	Definition.....	16
8.5.2	Method of measurement	16
8.5.3	Limit	17
8.6	Standby mode emissions	17
8.6.1	Definition.....	17
8.6.2	Method of measurement	17
8.6.3	Limits.....	17
9	Receiver.....	17
9.1	Maximum usable sensitivity.....	17
9.1.1	Definition.....	17
9.1.2	Method of measurement	17
9.1.3	Limit	17
9.2	Co-channel rejection.....	18
9.2.1	Definition.....	18
9.2.2	Method of measurement	18
9.2.3	Limit	18
9.3	Adjacent channel selectivity.....	18
9.3.1	Definition.....	18
9.3.2	Method of measurement	18
9.3.3	Limit	19
9.4	Blocking	19
9.4.1	Definition.....	19
9.4.2	Method of measurement	19
9.4.3	Limit	19
10	Testing for compliance with technical requirements.....	19
10.1	Environmental conditions for testing	19
10.2	Interpretation of the measurement results	20
	History	21

ITeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 303 746 V1.1.1:2021](https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021)

[https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-](https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021)

[1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021](https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021)

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

Foreword

SIST EN 303 746 V1.1.1:2021

This European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

<https://standards.iteh.ai/catalog/standards/sist/bc6a5d1-5291-4124-af08-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021>

National transposition dates

Date of adoption of this EN:	16 April 2021
Date of latest announcement of this EN (doa):	31 July 2021
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2022
Date of withdrawal of any conflicting National Standard (dow):	31 January 2022

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document applies to systems utilizing radio links between platforms and vessels for dynamic positioning of vessels engaged in coordinated maritime activities.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 303 746 V1.1.1:2021](https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1cb07b6b2b6e/sist-en-303-746-v1-1-1-2021>

1 Scope

The present document specifies technical characteristics and methods of measurements for radiolocation equipment with the following characteristics:

- intended to operate in maritime dynamic positioning systems functioning with full duplex links having a duplex separation of 30 MHz;
- operating in the 9 GHz frequency band;
- with an integral antenna.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] Recommendation ITU-T E.161 (02-2001): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".
- [2] ISO 25862:2019: "Ships and marine technology -- Marine magnetic compasses, binnacles and azimuth reading devices".
- [3] ETSI TS 103 052 (V1.1.1) (03-2011): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiated measurement methods and general arrangements for test sites up to 100 GHz".
- [4] ERC Recommendation 74-01 (2019): "Unwanted emissions in the spurious domain".
- [5] ISO 7010:2019: "Graphical symbols - Safety colours and safety signs - Registered safety signs".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

B	Bandwidth
dBm	Level (dB) relative to 1 mW
dBpp	Level (dB) below peak power
dB μ V	Level (dB) relative to 1 μ V/m
f	Frequency
m	Metre
ppm	Parts per million (10^{-6})
Q	Q factor is a resonance parameter
s	Second
V	Volt
W	Watt
Ω	Ohm

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ac	alternating current	SIST EN 303 746 V1.1.1:2021
dc	direct current	https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1c60-066200e303-746-v1-1-1-2021
EIRP	Equivalent Isotropically Radiated Power	https://standards.iteh.ai/catalog/standards/sist/be8a5f91-3231-4424-a876-1c60-066200e303-746-v1-1-1-2021
EN	European Norm	
ERC	European Radiocommunication Committee	
EUT	Equipment Under Test	
FM	Frequency Modulation	
IPR	Intellectual Property Right	
ISO	International Organization for Standardization	
ITU-T	International Telecommunication Union - Telecommunication standardization sector	
PEP	Peak Envelope Power	
pp	peak power	
RF	Radio Frequency	
Rx	Receiver	
SR	Special Report	
TS	Technical Specification	
Tx	Transmitter	
VSWR	Voltage Standing Wave Ratio	

4 Technical requirements

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the manufacturer, but as a minimum, shall be that specified in the test conditions contained in the present document.

4.2 Construction

The mechanical and electrical construction and finish of the equipment shall conform in all respects to good engineering practice, and the equipment shall be suitable for use on board ships.

All controls shall be of sufficient size to enable the usual control functions to be easily performed and the number of controls should be the minimum necessary for simple and satisfactory operation.

For the purpose of conformance testing, relevant technical documentation shall be supplied with the equipment.

The equipment shall be capable of operating on two full duplex channels.

It shall not be possible to transmit while any frequency synthesizer used within the transmitter is out of lock.

4.3 Controls and indicators

The equipment shall have a frequency selector and shall indicate the operating frequency at which the installation is set and this shall be legible irrespective of the external lighting conditions.

Where an input panel on the equipment for entering digit 0 to digit 9 is provided, this shall conform to Recommendation ITU-T E.161 [1].

The equipment shall have the following additional controls and indicators:

- a means for reducing the brightness of the equipment illumination to almost zero;
- an on/off switch for the entire installation with a visual indication that the installation is in operation;
- a visual indication that the equipment is transmitting.

The equipment shall also meet the following requirements:

- the user shall not have access to any control which, if wrongly set, might impair the technical characteristics of the equipment.

4.4 Safety precautions

Measures shall be taken to protect the equipment against the effects of overcurrent or overvoltage.

Measures shall be taken to prevent damage to the equipment if the electrical power source produces transient voltage variations and to prevent any damage that might arise from an accidental reversal of polarity of the electrical power source.

Means shall be provided for earthing exposed metallic parts of the equipment.

All components and wiring in which the dc or ac voltage (other than radio-frequency voltage) are generated, separately or in combination, peak voltages in excess of 50 V shall be protected against any accidental access and shall be automatically isolated from all electrical power sources if the protective covers are removed. Alternatively, the equipment shall be constructed in such a way as to prevent access to components operating at such voltages unless an appropriate tool is used such as a nut-spanner or screwdriver. Conspicuous warning labels in accordance with ISO 7010 [5] shall be affixed both inside the equipment and on the protective covers.