



**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Maritime low power personal locating  
devices employing AIS;  
Part 2: Harmonized EN covering the essential requirements  
of article 3.2 of the R&TTE Directive**

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**Reference**

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## Foreword

This final draft Harmonized European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the Vote phase of the ETSI standards EN Approval Procedure.

The present document has been produced by ETSI in response to mandate M/284 issued from the European Commission under Directive 98/34/EC [i.2] as amended by Directive 98/48/EC [i.4].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.1].

See article 5.1 of Directive 1999/5/EC [i.1] for information on presumption of conformity and Harmonized Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The requirements relevant to Directive 1999/5/EC [i.1] are summarized in annex A.

The present document is part 2 of a multi-part deliverable covering the Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime low power personal locating devices employing AIS as identified below:

Part 1: "Technical characteristics and methods of measurement";

**Part 2: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".**

<b>Proposed national transposition dates</b>	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

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## Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**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 is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.1]. The modular structure is shown in EG 201 399 [i.3].

# 1 Scope

The present document applies to low power maritime personal locating devices employing AIS and an integrated GNSS receiver to provide the locating function.

The applicable frequencies of operation of this type of radio equipment are given in table 1.

**Table 1: Radiocommunications service frequencies**

	<b>Radiocommunications service frequencies</b>
Transmit AIS1	161,975 MHz
Receive AIS1	161,975 MHz
Transmit AIS2	162,025 MHz
Receive AIS2	162,025 MHz

The present document is intended to cover the provisions of Directive 1999/5/EC [i.1] (R&TTE Directive), article 3.2, which states that "... *radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference*".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of Article 3 of the R&TTE Directive [i.1] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org>.

## 2 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 <http://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.

### 2.1 Normative references

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

- [1] ETSI EN 303 098-1 (V1.2.1) (09-2014): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime low power personal locating devices employing AIS; Part 1: Technical characteristics and methods of measurement".

### 2.2 Informative references

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.

- [i.1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [i.2] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

- [i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".
- [i.4] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations.
- [i.5] ETSI TR 100 028 (all parts) - (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

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## 3 Abbreviations

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

AIS	Automatic Identification System
ERP	Effective Radiated Power
GNSS	Global Navigation Satellite System
RF	Radio Frequency

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## 4 Technical requirements specifications

### 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 supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

### 4.2 Conformance requirements

#### 4.2.1 Transmitter frequency error

##### 4.2.1.1 Definition

The frequency error is defined in EN 303 098-1 [1], clause 8.1.1.

##### 4.2.1.2 Limit

The transmitter frequency error limit shall be as stated in EN 303 098-1 [1], clause 8.1.3.

##### 4.2.1.3 Conformance

Conformance tests as defined in clause 5.3.1 shall be carried out.

#### 4.2.2 Conducted power

##### 4.2.2.1 Definition

The conducted power is defined in EN 303 098-1 [1], clause 8.2.1.

##### 4.2.2.2 Limit

The conducted power limit shall be as stated in EN 303 098-1 [1], clause 8.2.3.



#### 4.2.2.3 Conformance

Conformance tests as defined in clause 5.3.2 shall be carried out.

### 4.2.3 Effective radiated power (ERP)

#### 4.2.3.1 Definition

The ERP is defined in EN 303 098-1 [1], clause 8.3.1.

#### 4.2.3.2 Limit

The ERP limit shall be as stated in EN 303 098-1 [1], clause 8.3.3.

#### 4.2.3.3 Conformance

Conformance tests as defined in clause 5.3.3 shall be carried out.

### 4.2.4 Transmitter spectrum mask

#### 4.2.4.1 Definition

The transmitter spectrum mask is defined in EN 303 098-1 [1], clause 8.4.1.

#### 4.2.4.2 Limit

The transmitter spectrum mask limit shall be as stated in EN 303 098-1 [1], clause 8.4.3.

#### 4.2.4.3 Conformance

Conformance tests as defined in clause 5.3.4 shall be carried out.

### 4.2.5 Transmitter transient behaviour - output power

#### 4.2.5.1 Definition

The transmitter transient behaviour - output power is defined in EN 303 098-1 [1], clause 8.5.1.

#### 4.2.5.2 Limit

The transmitter transient behaviour - output power limit shall be as stated in EN 303 098-1 [1], clause 8.5.3.

#### 4.2.5.3 Conformance

Conformance tests as defined in clause 5.3.5 shall be carried out.

### 4.2.6 Transmitter transient behaviour - frequency deviation

#### 4.2.6.1 Definition

The transmitter transient behaviour - frequency deviation is defined in EN 303 098-1 [1], clause 8.6.1.

#### 4.2.6.2 Limit

The transmitter transient behaviour - frequency deviation limit shall be as stated in EN 303 098-1 [1], clause 8.6.3.

#### 4.2.6.3 Conformance

Conformance tests as defined in clause 5.3.6 shall be carried out.

### 4.2.7 Synchronization accuracy

#### 4.2.7.1 Definition

The synchronization accuracy is defined in EN 303 098-1 [1], clause 8.7.1.

#### 4.2.7.2 Limit

The synchronization accuracy limit shall be as stated in EN 303 098-1 [1], clause 8.7.3.

#### 4.2.7.3 Conformance

Conformance tests as defined in clause 5.3.7 shall be carried out.

### 4.2.8 Spurious emissions

#### 4.2.8.1 Definition

The spurious emissions are defined in EN 303 098-1 [1], clause 8.8.1.

#### 4.2.8.2 Limit

The spurious emissions limits shall be as stated in EN 303 098-1 [1], clause 8.8.3.

#### 4.2.8.3 Conformance

Conformance tests as defined in clause 5.3.8 shall be carried out.

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## 5 Testing for compliance with technical requirements

### 5.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

The test conditions and procedures shall be as defined in EN 303 098-1 [1], clause 6.

### 5.2 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;

- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 2.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in TR 100 028 [i.5], in particular in annex D of the TR 100 028-2.

Table 2 is based on such expansion factors.

**Table 2: Absolute measurement uncertainties: maximum values**

Parameter	Maximum uncertainty
RF frequency	$\pm 1 \times 10^{-7}$
RF power	$\pm 0,75$ dB
Frequency deviation	$\pm 5$ %
Radiated emission of transmitter	$\pm 6$ dB
Transmitter transient time	$\pm 20$ %
Transmitter transient frequency	$\pm 250$ Hz

## 5.3 Essential radio test suites

### 5.3.1 Transmitter frequency error

The test specified in EN 303 098-1 [1], clause 8.1.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.1.2 in order to prove compliance with the requirement.

### 5.3.2 Conducted power

The test specified in EN 303 098-1 [1], clause 8.2.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance with the requirement.

### 5.3.3 Effective radiated power (ERP)

The test specified in EN 303 098-1 [1], clause 8.3.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.3.2 in order to prove compliance with the requirement.

### 5.3.4 Transmitter spectrum mask

The test specified in EN 303 098-1 [1], clause 8.4.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance with the requirement.

### 5.3.5 Transmitter transient behaviour - output power

The test specified in EN 303 098-1 [1], clause 8.5.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.5.2 in order to prove compliance with the requirement.

### 5.3.6 Transmitter transient behaviour - frequency deviation

The test specified in EN 303 098-1 [1], clause 8.6.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.6.2 in order to prove compliance with the requirement.

### 5.3.7 Synchronization accuracy

The test specified in EN 303 098-1 [1], clause 8.7.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.7.2 in order to prove compliance with the requirement.

### 5.3.8 Spurious emissions

The test specified in EN 303 098-1 [1], clause 8.8.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.2.8.2 in order to prove compliance with the requirement.

## Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A.1 serves a number of purposes, as follows:

- it provides a statement of all the requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
  - Unconditional: meaning that the requirement applies in all circumstances; or
  - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

**Table A.1: HS Requirements and conformance Test specifications Table (HS-RTT)**

<b>Harmonized Standard EN 303 098-2</b>						
The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive [i.1]						
<b>Requirement</b>			<b>Requirement Conditionality</b>		<b>Test Specification</b>	
<b>No</b>	<b>Description</b>	<b>Reference: Clause No</b>	<b>U/C</b>	<b>Condition</b>	<b>E/O</b>	<b>Reference: Clause No</b>
1	Frequency error	4.2.1	U		E	5.3.1
2	Conducted power	4.2.2	U		E	5.3.2
3	ERP	4.2.3	U		E	5.3.3
4	Transmitter spectrum mask	4.2.4	U		E	5.3.4
5	Transient behaviour - output power	4.2.5	U		E	5.3.5
6	Transient behaviour - freq deviation	4.2.6	U		E	5.3.6
7	Synchronization accuracy	4.2.7	U		E	5.3.7
8	Spurious emissions	4.2.8	U		E	5.3.8

### Key to columns:

#### Requirement:

**No** A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

**Description** A textual reference to the requirement.

**Clause Number** Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

**Requirement Conditionality:**

**U/C** Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the manufacturers claimed functionality of the equipment (C).

**Condition** Explains the conditions when the requirement shall or shall not be applicable for a requirement which is classified "conditional".

**Test Specification:**

**E/O** Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).

NOTE: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

**Clause Number** Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly. Where no test is specified (that is, where the previous field is "X") this field remains blank.

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## Annex B (informative): Change History

<b>date</b>	<b>Version</b>	<b>Information about changes</b>
June 2013	V0.0.1	First draft HS from TG26#35

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## History

<b>Document history</b>				
V1.1.0	July 2013	EN Approval Procedure	AP 20131106:	2013-07-09 to 2013-11-06
V1.1.1	February 2014	Vote	V 20140422:	2014-02-21 to 2014-04-22
V1.2.1	September 2014	Vote	V 20141116:	2014-09-17 to 2014-11-17