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*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
ElectroMagnetic Compatibility (EMC)  
standard for marine radio equipment and services;  
Part 4: Specific conditions for Narrow-Band  
Direct-Printing (NBDP) NAVTEX receivers**

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## Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued under the Council Directive 98/34/EC [6] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulation.

The present document, together with EN 301 843-1 [1], is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [3] as amended), and the Council Directive on the approximation of the laws of the Member States relating to radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (the "R&TTE Directive" 1999/5/EC [2]).

The present document is part 4 of a multi-part deliverable covering the ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services, as identified below:

- Part 1: "Common technical requirements";
- Part 2: "Specific conditions for maritime radiotelephone transmitters and receivers";
- Part 4: "Specific conditions for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers".**

<b>National transposition dates</b>	
Date of adoption of this EN:	23 February 2001
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# 1 Scope

The present document together with the EN 301 843-1 [1], covers the assessment of Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service, and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of NAVTEX receivers are not included in the present document. Such technical specifications are found in the related product standard ETS 300 065 [4] for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment, and performance criteria for NAVTEX receivers operating in the maritime mobile service, and the associated ancillary equipment.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and EN 301 843-1 [1], the provisions of the present document take precedence.

The electromagnetic environment used in the present document to develop the technical specifications encompasses the electromagnetic environment onboard ships as identified in EN 60945 [5].

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ETSI EN 301 843-1 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Part 1: Common technical requirements".
- [2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications equipment and the mutual recognition of their conformity. (R&TTE Directive).
- [3] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility. (EMC Directive).
- [4] ETSI ETS 300 065 (1992): "Radio Equipment and Systems (RES); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Technical characteristics and methods of measurement".
- [5] EN 60945 (1997): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".
- [6] 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.

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## 3 Definitions, abbreviations, and symbols

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 843-1 [1], clause 3, apply.

### 3.2 Abbreviations

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

AC	Alternating Current
CER	Character Error Rate
DC	Direct Current
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
IMO	International Maritime Organization
RF	Radio Frequency
SOLAS	Safety Of Life At Sea

### 3.3 Symbols

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

emf	electromotive force
rms	root mean square

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## 4 Test conditions

For the purposes of the present document, the test conditions of EN 301 843-1 [1], clause 4, shall apply as appropriate. Further product related test conditions for NAVTEX receivers are specified in the present document.

### 4.1 General

The provisions of EN 301 843-1 [1], clause 4.1 shall apply with the following modifications.

For emission and immunity tests the normal test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

All tests shall be performed with the wanted RF input signal on the operating frequency 518 kHz unless stated otherwise.

### 4.2 Arrangements for test signals

The provisions of EN 301 843-1 [1], clause 4.2 shall apply.

#### 4.2.1 Arrangements for test signals at the input of the receiver

The provisions of EN 301 843-1 [1], clause 4.2.3 shall apply with the following modifications.

The wanted RF input signal, coupled to the receiver, shall be modulated with normal test modulation as specified for that type of equipment (see clause 4.5 of the present document).

The level of the wanted signal shall be 40 dB $\mu$ V (emf) unless indicated otherwise.

## 4.2.2 Arrangements for test signals at the output of the receiver

The output of the receiver consists of the printout of transmitted messages.

During immunity tests with continuous RF test signals, the output of the receiver shall be monitored, e.g. by means of a camera coupled to a monitor located outside the test environment, for the verification of continuous printing.

## 4.3 Exclusion bands

The frequencies on which NAVTEX receivers are intended to operate, shall be excluded from conducted and radiated RF immunity tests.

There shall be no frequency exclusion band applied to emission measurements of NAVTEX receivers, and/or associated ancillary equipment.

The immunity test exclusions are referred to as "exclusion band" and are defined in clause 4.3.1 of the present document.

### 4.3.1 Exclusion bands for receivers

The exclusion band for NAVTEX receivers is the frequency range 490 kHz to 545 kHz.

## 4.4 Narrow band responses on receivers

The provision of EN 301 843-1 [1], clause 4.4 shall apply with the following modifications.

No immunity tests shall be carried out on frequencies of identified narrow band responses on NAVTEX receivers.

An increase of the Character Error Rate (CER) above the value of  $4 \times 10^{-2}$  shall be used as criterion for the identification of narrow band responses.

The nominal frequency offset to be used for the identification of narrowband responses shall be  $\pm 1$  kHz for the first part of the identification procedure, and  $\pm 1,25$  kHz for its second part.

All narrowband responses shall be disregarded from immunity tests.

## 4.5 Normal test modulation

The normal wanted RF test signal shall be an F1B radio-frequency signal modulated with a frequency shift of  $\pm 85$  Hz centred on 518 kHz.

It shall contain signals providing the following traffic information:

- 1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J K L M N O P Q R S T U - Carriage return - Line feed.

For tests with the normal wanted RF test signal, the above information shall be transmitted at least 35 times continuously.

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# 5 Performance assessment

## 5.1 General

The manufacturer shall at the time of submission of the equipment for test, supply the necessary general information as requested in EN 301 843-1 [1], clause 5.1.

## 5.2 Equipment which can provide a continuous communication link

The provisions of EN 301 843-1 [1], clause 5.2 shall apply with the following modification.

For immunity tests, the wanted input signal, coupled to the receiver, shall be the normal wanted RF test signal (clause 4.5). Before each test, this signal (clause 4.5) shall be applied to the EUT to check the correct functioning and to load the message header memory. The user memories shall be loaded with appropriate test data. During the immunity tests, the normal wanted RF test signal shall be preceded by a different header.

## 5.3 Ancillary equipment

The provisions of EN 301 843-1 [1], clause 5.4 shall apply.

## 5.4 Equipment classification

NAVTEX receivers belong solely to the category of mobile marine radio equipment.

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# 6 Performance criteria

For immunity tests, the wanted input signal, coupled to the receiver, shall be the normal wanted RF test signal (clause 4.5). Before each test, this signal (clause 4.5) shall be applied to the EUT to check the correct functioning and to load the message header memory. The user memories shall be loaded with appropriate test data. During the immunity tests, the normal wanted RF test signal shall be preceded by a different header.

The equipment shall meet the performance criteria as specified in clauses 6.1, 6.2, 6.3, 6.4, and 6.5, as appropriate.

## 6.1 Performance criteria A for continuous phenomena applied to receivers

During the test the EUT shall continue to print.

After the test the print shall be examined. The Character Error Rate (CER) in the printed output shall be below  $4 \times 10^{-2}$ .

After the test the wanted RF test signal shall be applied to the EUT using the same header as used preceding the test. The test signal shall not be printed.

After the test the data in the user memories shall be checked. The data shall be unchanged from that loaded preceding the test.

## 6.2 Performance criteria B for transient phenomena applied to receivers

If during the test the printing stops, one more RF test signal with the same header shall be applied to the EUT and this test signal shall be printed.

If during the test the printing does not stop, at the conclusion of the test the following shall be carried out:

- a wanted RF test signal shall be applied to the EUT using the same header as used preceding the test. This test signal shall not be printed;
- a wanted RF test signal shall be applied to the EUT using a new header. This test signal shall be printed.

After the test the data in the user memories shall be checked. The data shall be unchanged from that loaded preceding the test.



## 6.3 Performance criteria C applied to power supply failure

After the test, the EUT shall enter receive mode without operator intervention.

After the test the data in the user memories shall be checked. The data shall be unchanged from that loaded preceding the test.

## 6.4 Performance check

### 6.4.1 Receiver

For the purpose of the present document a "performance check" of the receiver is taken to mean a measurement of the receiver's Character Error Rate (CER) with the normal wanted RF test signal (clause 4.5) applied to the receiver input using a fixed input level of 40 dB $\mu$ V (emf).

The Character Error Rate shall be less than  $4 \times 10^{-2}$ .

## 6.5 Performance criteria for equipment which does not provide a continuous communication link

The provisions of EN 301 843-1 [1], clause 6.5 shall apply.

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# 7 Applicability overview

## 7.1 Emission

### 7.1.1 General

EN 301 843-1 [1], table 1, contains the applicability of EMC emission measurements to the relevant parts of marine radio and/or associated ancillary equipment.

### 7.1.2 Special conditions

No special conditions shall apply to EMC emission measurements on NAVTEX receivers in the scope of the present document.

## 7.2 Immunity

### 7.2.1 General

EN 301 843-1 [1], table 2, contains the applicability of EMC immunity measurements to the relevant parts of marine radio and/or associated ancillary equipment.

## 7.2.2 Special conditions

The following special conditions set out in table 1, relate to the immunity test methods and performance criteria used in EN 301 843-1 [1], clause 9.

**Table 1: Special conditions for EMC immunity tests**

Reference to clauses in EN 301 843-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 843-1 [1], clause 9
<b>9.2.2: Test method;</b> <b>Radio frequency electromagnetic field</b> <b>(80 MHz to 1 000 MHz)</b>	<b>Wanted RF input signal for the receiver under test:</b> A receiver RF input level of 40 dB $\mu$ V (emf) shall be used during the test. <b>Modulation of the immunity RF test signal:</b> The immunity RF test signal shall be amplitude modulated with a sinusoidal audio signal of 400 Hz, to a depth of 80 %.
<b>9.5.2: Test method;</b> <b>Radio frequency, Common mode</b>	<b>Wanted RF input signal for the receiver under test:</b> A receiver RF input level of 40 dB $\mu$ V (emf) shall be used during the test. <b>Modulation of the immunity RF test signal:</b> The immunity RF test signal shall be amplitude modulated with a sinusoidal audio signal of 400 Hz, to a depth of 80 %.

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## History

<b>Document history</b>		
V1.1.1	July 2000	Public Enquiry PE 20001117: 2000-07-19 to 2000-11-17
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