ETSI EN 301 843-4 V2.1.1 (2016-03)

HARMONISED EUROPEAN STANDARD

ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1b of the Directive 2014/53/EU; Part 4: Specific conditions for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers

Reference

REN/ERM-EMC-349

Keywords

EMC, harmonised standard, maritime, NAVTEX, radio, receiver

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 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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 only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

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/CommiteeSupportStaff.aspx

Copyright Notification

Contents

Intellectual Property Rights 4
Foreword 4
Modal verbs terminology 4
1 Scope 5
2 References 5
2.1 Normative references 5
2.2 Informative references 5
3 Definitions, symbols and abbreviations 6
3.1 Definitions 6
3.2 Symbols 6
3.3 Abbreviations 6
4 General and operational requirements 6
4.1 Environmental profile 6
4.2 Arrangements for test signals 6
4.2.0 General 6
4.2.1 Arrangements for test signals at the input of the receiver 6
4.2.2 Arrangements for test signals at the output of the receiver 7
4.3 Exclusion bands 7
4.3.0 General 7
4.3.1 Exclusion bands for receivers 7
4.4 Narrow band responses on receivers 7
4.5 Normal test modulation 7
5 Performance assessment 7
5.1 General 7
5.2 Equipment which can provide a continuous communication link 8
5.3 Ancillary equipment 8
5.4 Equipment classification 8
6 Performance criteria 8
6.0 General 8
6.1 Performance criteria A for continuous phenomena applied to receivers 8
6.2 Performance criteria B for transient phenomena applied to receivers 8
6.3 Performance criteria C applied to power supply failure 9
6.4 Performance check 9
6.4.1 Receiver 9
6.5 Performance criteria for equipment which does not provide a continuous communication link 9
7 Applicability overview 9
7.1 Emission 9
7.1.1 General 9
7.1.2 Special conditions 9
7.2 Immunity 9
7.2.1 General 9
7.2.2 Special conditions 9
Annex A (normative): Relationship between the present document and the essential requirements of Directive 2014/53/EU 10
Annex B (informative): Examples of types of Narrow-Band Direct-Printing (NBDP) NAVTEX equipment in the scope of the present document 11
B.0 General 11
B.1 Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service 11
History 12

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is 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 IPR Policy, no investigation, 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.

Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.4] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 of ETSI EN 301 843-1 [1] confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
Date of adoption of this EN:	21 March 2016
Date of latest announcement of this EN (doa):	30 June 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2016
Date of withdrawal of any conflicting National Standard (dow):	31 December 2017

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.

1 Scope

The present document together with ETSI 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 ETSI EN 300 065 [i.2] 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 ETSI 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 on-board ships as identified in CENELEC EN 60945 [i.3].

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 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.

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

[1] ETSI EN 301 843-1 (V2.1.1) (03-2016): "ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1b of the Directive 2014/53/EU; Part 1: Common technical requirements".

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.

[i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.2] ETSI EN 300 065 (V1.1.1): "Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of the Directive 2014/53/EU".

[i.3] CENELEC EN 60945:2002 + Corrigendum 1 (2008): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".

[i.4] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

3.2 Symbols

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

emf	electromotive force
rms	root mean square

3.3 Abbreviations

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

CER	Character Error Rate
EFTA	European Free Trade Association
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
NAVTEX	NAVigational TelEX
NBDP	Narrow-Band Direct-Printing
RF	Radio Frequency

4 General and operational requirements

4.1 Environmental profile

The provisions of ETSI 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 490 kHz or 518 kHz as appropriate, unless stated otherwise.

4.2 Arrangements for test signals

4.2.0 General

The provisions of ETSI 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 ETSI 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).

The level of the wanted signal shall be 40 dBµV (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

4.3.0 General

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.

4.3.1 Exclusion bands for receivers

The exclusion band for NAVTEX receivers is the frequency range 462 kHz to 545 kHz.

4.4 Narrow band responses on receivers

The provision of ETSI 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 4×10^{-2} shall be used as criterion for the identification of any unwanted responses.

The nominal frequency offset to be used for the identification of narrowband responses shall be ±1 kHz for the first part of the identification procedure, and ±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 ±85 Hz centred on 490 kHz or 518 kHz as appropriate.

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.

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 ETSI EN 301 843-1 [1], clause 5.1.

5.2 Equipment which can provide a continuous communication link

The provisions of ETSI 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 (see clause 4.5). Before each test, this signal (see 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 ETSI 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.

6 Performance criteria

6.0 General

For immunity tests, the wanted input signal, coupled to the receiver, shall be the normal wanted RF test signal (see clause 4.5). Before each test, this signal (see 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 to 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 4×10^{-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 (see clause 4.5) applied to the receiver input using a fixed input level of 40 dBµV (emf).

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

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

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

7 Applicability overview

7.1 Emission

7.1.1 General

ETSI EN 301 843-1 [1], table 1, contains the applicability of EMC emission measurements to the relevant ports 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

ETSI EN 301 843-1 [1], table 2, contains the applicability of EMC immunity measurements to the relevant ports 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 ETSI EN 301 843-1 [1], clause 9.

Table 1: Special conditions for EMC immunity tests

Reference to clauses in ETSI EN 301 843-1 [1]	Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 843-1 [1], clause 9
9.2.2: Test method; Radio frequency electromagnetic field.	**Wanted RF input signal for the receiver under test:** A receiver RF input level of 40 dBµV (emf) shall be used during the test.
9.5.2: Test method; Radio frequency, Common mode.	**Wanted RF input signal for the receiver under test:** A receiver RF input level of 40 dBµV (emf) shall be used during the test.