



**ElectroMagnetic Compatibility (EMC) standard
for marine radio equipment and services;
Harmonised Standard for electromagnetic compatibility;
Part 4: Specific conditions for
Narrow-Band Direct-Printing (NBDP) NAVTEX receivers**

Reference

REN/ERM-EMC-387

Keywords

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Foreword

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

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 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].

Proposed national transposition dates	
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
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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).

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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 IEC EN 60945 [i.3].

NOTE: The relationship between the present document and essential requirements of article 3.1b of Directive 2014/53/EU [i.1] is given in annex A.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version 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] ETSI EN 301 843-1 (V2.2.0) (07-2017): "ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Harmonised Standard for electromagnetic compatibility; 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 (V2.1.2): "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] IEC EN 60945 (2002-10-01) + 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 abbreviations given in ETSI EN 301 843-1 [1] and the following 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 dB μ 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

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 $\pm 1,25$ 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 ± 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 Equipment which does not provide a continuous communication link

The provisions of ETSI EN 301 843-1 [1], clause 5.3 shall apply.

5.4 Ancillary equipment

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

5.5 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 dB μ V (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 dB μ V (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 dB μ V (emf) shall be used during the test.

Annex A (informative): Relationship between the present document and the essential requirements of Directive 2014/53/EU

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 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.

Table A.1: Relationship between the present document and the essential requirements of Directive 2014/53/EU

Harmonised Standard ETSI EN 301 843-4					
Requirement				Requirement Conditionality	
No	Description	Essential requirements of Directive	Clause(s) of the present document	U/C	Condition
1	Emmissions: Enclosure of ancillary equipment measured on a stand alone basis	3.1b	8.2 of ETSI EN 301 843-1 [1]	U	
2	Emmissions: DC power input/output ports	3.1b	8.3 of ETSI EN 301 843-1 [1]	C	DC powered equipment with cables > 3 m
3	Emmissions: AC mains power input/output ports	3.1b	8.4 of ETSI EN 301 843-1 [1]	C	AC powered equipment
4	Immunity: Radio frequency electromagnetic field (80 MHz to 2,7 GHz)	3.1b	9.2 of ETSI EN 301 843-1 [1] and 7.2.2	U	
5	Immunity: Electrostatic discharge	3.1b	9.3 of ETSI EN 301 843-1 [1]	U	
6	Immunity: Fast transients, differential and common mode AC ports	3.1b	9.4 of ETSI EN 301 843-1 [1]	C	AC powered equipment
7	Immunity: Fast transients, differential and common mode DC ports	3.1b	9.4 of ETSI EN 301 843-1 [1]	C	DC powered equipment with cables > 3 m
8	Immunity: Fast transients, differential and common mode Signal and control ports	3.1b	9.4 of ETSI EN 301 843-1 [1]	C	Cables > 3 m
9	Immunity: Radio frequency, common mode AC ports	3.1b	9.5 of ETSI EN 301 843-1 [1]	C	AC powered equipment
10	Immunity: Radio frequency, common mode DC ports	3.1b	9.5 of ETSI EN 301 843-1 [1] and 7.2.2	C	DC powered equipment with cables > 3 m
11	Immunity: Radio frequency, common mode signal and control ports	3.1b	9.5 of ETSI EN 301 843-1 [1] and 7.2.2	C	Cables > 3 m
12	Immunity: Power supply short term variations	3.1b	9.6.1 of ETSI EN 301 843-1 [1]	C	AC powered equipment
13	Immunity: Power supply failure	3.1b	9.6.2 of ETSI EN 301 843-1 [1]	C	Not for battery powered or equipment with back-up batteries
14	Immunity: Surges	3.1b	9.7 of ETSI EN 301 843-1 [1]	C	AC powered equipment

Key to columns:**Requirement:**

No A unique identifier for one row of the table which may be used to identify a requirement.

Description A textual reference to the requirement.

Essential requirements of Directive

Identification of article(s) defining the requirement in the Directive.

Clause(s) of the present document

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 unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

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

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

Annex B (informative):
Examples of types of Narrow-Band Direct-Printing (NBDP)
NAVTEX equipment in the scope of the present document

**B.1 Narrow-Band Direct-Printing (NBDP) NAVTEX
receivers operating in the maritime mobile service**

The present document applies to Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service as defined in ETSI EN 300 065 [i.2].

Annex C (informative): Change history

Version	Information about changes
2.1.1	First version under the Radio Equipment Directive

History

Document history		
V1.1.1	February 2001	Publication
V1.2.1	June 2004	Publication
V2.1.1	March 2016	Publication
V2.2.0	July 2017	EN Approval Procedure AP 20171017: 2017-07-19 to 2017-10-17