SLOVENSKI STANDARD
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Elektromagnetna združljivost (EMC) in zadeve v zvezi z radijskim spektrom (ERM) - Standard elektromagnetne združljivosti (EMC) za ozkopasovne sprejemnike "Direct-Printing (NBDP) NAVTEX", ki delujejo v pomorskih mobilnih storitvah

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service

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Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service

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Foreword

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

Other standards cover radiocommunications equipment not listed in the scope.

The present document is based upon EN 60945 [10].

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 83/189/EEC [8] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document, together with ETS 300 065 [9] 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 [8] as amended).

Technical specifications relevant to the EMC Directive are given in annex A.

National transposition dates	
Date of adoption of this EN:	18 September 1998
Date of latest announcement of this EN (doa):	31 December 1998
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 1999
Date of withdrawal of any conflicting National Standard (dow):	31 December 2001

1 Scope

The present document covers the assessment of radiocommunication and ancillary equipment in respect of Electromagnetic Compatibility (EMC). Technical specifications related to the antenna port are found in the related product standard ETS 300 065 [9] for the effective use of the radio spectrum.

The present document specifies the applicable EMC tests, the test methods, the limits and the minimum performance criteria for Narrow-Band Direct-Printing (NBDP) NAVTEX receivers operating in the maritime mobile service and the associated ancillary equipment.

The electromagnetic environment used in the present document to develop the technical specifications encompasses the electromagnetic environment on board ships as identified in EN 60945 [10].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus in maritime environments. The levels do not cover extreme cases which may occur in any location but have a low probability of occurrence.

Compliance of radio equipment to the requirements of the present document does not signify compliance to any requirements related to the use of the equipment.

Compliance to the present document does not signify compliance to any safety requirements. However, it is the responsibility of the assessor of the equipment that any observations regarding apparatus becoming dangerous or unsafe as a result of the application of the tests defined in the present document, should be recorded in the test report.

2 References

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] CISPR 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus".

[2] EN 55022: "Limits and methods of measurement of radio disturbance characteristics of information technology equipment".

[3] EN 61000-4-2: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test".

[4] EN 61000-4-4 (1995): "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test".

[5] EN 61000-4-5 (1995): "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test".

[6] EN 61000-4-6: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields".

[7] EN 61000-4-3 (1995): "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test".

[8] 89/336/EEC: "Council Directive on approximation of the laws of the Member States relating to electromagnetic compatibility".

[9] ETS 300 065: "Radio Equipment and Systems (RES); Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Technical characteristics and methods of measurement".

[10] EN 60945: "Marine navigation equipment - General requirements - Methods of testing and required test results".

[11] ETS 300 113: "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector".

3 Definitions and abbreviations

3.1 Definitions

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

ancillary equipment: Equipment (apparatus), used in connection with a receiver, transmitter or transceiver is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a receiver, transmitter or transceiver to provide additional operational and/or control features to the radio equipment (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a receiver, transmitter or transceiver; and
- the receiver, transmitter or transceiver to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment, i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions.

artificial antenna: A non-radiating load of 10 Ω in series with 150 pF.

enclosure port: The physical boundary of the apparatus onto which an electromagnetic field may radiate or impinge.

Equipment Under Test (EUT): The EUT comprises one or more units and their interconnecting cables as necessary for it to perform its intended functions.

port: A particular interface of specified equipment (apparatus) with the external electromagnetic environment.

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
emf	electromotive force
EUT	Equipment Under Test
IMO	International Maritime Organization
RF	Radio Frequency
rms	root mean square
SOLAS	Safety Of Life At Sea

4 General test conditions

This clause defines the general test configuration and is relevant for clauses 8 and 9.

4.1 Test conditions and configurations

The test shall be carried out at normal temperature and humidity with the equipment connected to the normal power supply voltage. All tests shall be performed with the wanted signal on the operating frequency 518 kHz unless otherwise stated.

The normal temperature and humidity conditions shall be a combination of temperature and humidity within the following ranges:

- temperature: +15°C to +35°C;
- relative humidity: 20 % to 75 %.

The normal test voltage for equipment to be connected to the AC mains, shall be the nominal mains voltage. The frequency of the test voltage shall be 50 Hz ± 1 Hz.

The normal test voltage for equipment to be connected to a battery, shall be the nominal voltage of the battery (12 V, 24 V, etc.). For operation from other power sources, the normal test voltage shall be declared by the manufacturer.

The test configuration shall be as close as possible to normal intended use.

If the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum representative configuration of ancillary equipment necessary to exercise the ports.

Ports which in normal operation are connected shall be connected to an ancillary equipment or to a representative piece of cable correctly terminated to simulate the input/output characteristics of the ancillary equipment. RF input ports shall be correctly terminated.

If the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested.

Ports which are not connected to cables during normal intended operation, e.g. service connectors, programming connectors, temporary connectors etc. shall not be connected to any cables for the purpose of EMC testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables.

The test conditions, test configuration and mode of operation shall be recorded in the test report.

4.1.1 Emission tests

This subclause defines the test conditions and configurations for the emission tests as follows:

- the measurement shall be made in the operation mode producing the largest emission in the frequency band being investigated consistent with normal applications;
- an attempt shall be made to maximize the detected radiated emissions for example by moving the cables of the equipment.

4.1.2 Immunity tests

This subclause defines the test conditions and configurations for the immunity tests as follows:

- the measurement shall be made in the mode of operation as required in subclause 4.1.2.1;
- for the immunity tests of ancillary equipment without separate pass/fail criteria, the receiver, transmitter or transceiver coupled to the ancillary equipment, shall be used to judge whether the ancillary equipment passes or fails.

4.1.2.1 Mode of operation

For the immunity tests, the wanted input signal, coupled to the receiver, shall be the normal test signal (subclauses 4.1.2.2 and 4.1.2.3). Before each test, the normal test signal (subclause 4.1.2.2) 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 test signal shall be preceded by a different header.

4.1.2.2 Normal test signal

The normal test signal shall be an F1B radio-frequency signal modulated with a frequency shift of ± 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 test signal, the above information shall be transmitted at least 35 times continuously.

4.1.2.3 Arrangements for test signals at the input of the receiver

Test signal sources shall be connected to the receiver input in such a way that the impedance presented to the receiver input is 50 Ω. The wanted signal level shall be 40 dBµV (emf) unless indicated otherwise.

Adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment.

4.1.2.4 Receiver exclusion band

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

4.1.2.5 Narrow band responses

Responses occurring during the test at discrete frequencies which are narrow band responses (spurious responses) are identified by the method specified in this subclause.

If an unwanted signal causes a character error rate of more than 4×10^{-2} it is necessary to establish whether the distortion is due to a narrowband response or to wideband phenomena.

Taking the initial test frequency as reference the procedure is repeated with an increase of the unwanted signal frequency by 1 kHz.

If the character error rate recovers to not more than 4×10^{-2}, then the response is considered as a narrowband response.

If the character error rate is still not more than 4×10^{-2}, the test is repeated with the frequency of the unwanted signal decreased by 1 kHz.

If the character error rate recovers to less than 4×10^{-2}, the response is considered as a narrowband response.

If the character error rate is still more than 4×10^{-2}, this may be due to the fact that the offset has made the frequency of the unwanted signal correspond to the frequency of another narrowband response.