

ETSI EN 301 025-3 V1.4.1 (2010-09)

Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
VHF radiotelephone equipment for general communications
and associated equipment for Class "D"
Digital Selective Calling (DSC);
Part 3: Harmonized EN covering the essential requirements
of article 3.3(e) of the R&TTE Directive**



Reference

REN/ERM-TG26-080-3

Keywords

maritime, radio, traffic, VHF

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This 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 Council Directive 98/34/EC [i.4] laying down a procedure for the provision of information in the field of technical standards and regulations and following the Commission Decision 2000/638/EC of 22 September 2000.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [i.1] 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 ("the R&TTE Directive").

Technical specifications relevant to Directive 1999/5/EC [i.1] are given in annex A.

The present document is part 3 of a multi-part deliverable covering the VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC), 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";
- Part 3: "Harmonized EN covering the essential requirements of article 3.3(e) of the R&TTE Directive".**

National transposition dates	
Date of adoption of this EN:	31 August 2010
Date of latest announcement of this EN (doa):	30 November 2010
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2011
Date of withdrawal of any conflicting National Standard (dow):	31 May 2011

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. The modular structure is shown in EG 201 399 [i.6].

1 Scope

The present document covers the minimum requirements for general communication for shipborne fixed installations using a VHF radiotelephone operating in certain frequency bands allocated to the maritime mobile service using 25 kHz or 25 kHz and 12,5 kHz channels with associated equipment for DSC - class D.

The present document is intended to cover the provisions of Directive 1999/5/EC [i.1] (R&TTE Directive) article 3.3(e), which states that radio equipment within the scope of the present document shall be so constructed that: "it supports certain features ensuring access to emergency services".

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] will 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 reference 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 301 025-1 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC); Part 1: Technical characteristics and methods of measurement".
- [2] 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".

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] ITU-R Recommendation M.493-12 (2007): "Digital selective-calling system for use in the maritime mobile service".
- [i.3] EC Decision 2004/71/EC of 4 September 2003 on essential requirements relating to marine radio communication equipment which is intended to be used on non-SOLAS vessels and to participate in the Global Maritime Distress and Safety System (GMDSS).
- [i.4] 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.5] Void.
- [i.6] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [i.1] and the following apply:

class D: class D equipment is intended to provide minimum facilities for VHF DSC distress, urgency and safety as well as routine calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for VHF installations

NOTE: See ITU-R Recommendation M.493-12 [i.2].

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

G2B: phase-modulation with digital information, with a sub-carrier for DSC operation

G3E: phase-modulation (Frequency modulation with a pre-emphasis of 6 dB/octave) for speech

modulation index: ratio between the frequency deviation and the frequency of the modulation signal

3.2 Abbreviations

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

DSC	Digital Selective Calling
IMO	International Maritime Organization
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
SINAD	Signal, Noise And Distortion
SOLAS	Safety Of Life And Sea
VHF	Very High Frequency

4 Technical requirements specifications

4.1 Environmental profile

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile which, as a minimum, shall be that specified in the test conditions contained in the present document.

As technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions as specified in the present document to give confidence of compliance for the affected technical requirements. These environmental conditions represent those required by article 2 of EC decision 2004/71/EC [i.3] (which shall also be within the boundary limits of the declared operational environmental profile).

4.2 General, operational and technical requirements

4.2.1 General and operational requirements

4.2.1.1 Requirements

The general and operational requirements are defined in EN 301 025-1 [1], clause 4.

4.2.1.2 Conformance

The manufacturer shall declare that compliance to these requirements is achieved and shall provide relevant documentation.

4.2.2 Technical requirements

4.2.2.1 Requirements

The technical requirements are defined in EN 301 025-1 [1], clause 5.

4.2.2.2 Conformance

The manufacturer shall declare that compliance to these requirements is achieved and shall provide relevant documentation.

4.3 Environmental requirements

4.3.1 Vibration test

4.3.1.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.4.1.

4.3.1.2 Requirement

The equipment shall meet the requirements of the performance check defined in EN 301 025-1 [1], clause 7.3.

There shall be no harmful deterioration of the equipment visible.

4.3.1.3 Conformance

Relevant environment tests as defined in clause 5.3.1.4 shall be carried out.

4.3.2 Temperature tests

4.3.2.1 Definition

This series of tests is defined in EN 301 025-1 [1], clause 7.5.1.

4.3.2.2 Dry heat

4.3.2.2.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.2.1.

4.3.2.2.2 Requirement

The equipment shall meet the requirements of the performance check defined in EN 301 025-1 [1], clause 7.3.

4.3.2.2.3 Conformance

Relevant environment tests as defined in clause 5.3.1.5.1 shall be carried out.

4.3.2.3 Damp heat

4.3.2.3.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.3.1.

4.3.2.3.2 Requirement

The equipment shall meet the requirements of the performance check defined in EN 301 025-1 [1], clause 7.3.

4.3.2.3.3 Conformance

Relevant environment tests as defined in clause 5.3.1.5.2 shall be carried out.

4.3.2.4 Low temperature

4.3.2.4.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.4.1.

4.3.2.4.2 Requirement

The equipment shall meet the requirements of the performance check defined in EN 301 025-1 [1], clause 7.3.

4.3.2.4.3 Conformance

Relevant environment tests as defined in clause 5.3.1.3 shall be carried out.

4.4 Conformance requirements

4.4.1 Sensitivity of the modulator, including microphone

4.4.1.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.4.1.

4.4.1.2 Limit

The frequency deviation shall be as stated in EN 301 025-1 [1], clause 8.4.3.

4.4.1.3 Conformance

Conformance tests as defined in clause 5.3.2.1 shall be carried out.

4.4.2 Audio frequency response

4.4.2.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.5.1.

4.4.2.2 Limit

The audio frequency response shall lie within the limits shown in EN 301 025-1 [1], clause 8.5.3, figure 2.

4.4.2.3 Conformance

Conformance tests as defined in clause 5.3.2.2 shall be carried out.

4.4.3 Audio frequency harmonic distortion of the emission

4.4.3.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.6.1.

4.4.3.2 Limit

The harmonic distortion limit shall be as stated in EN 301 025-1 [1], clause 8.6.3.

4.4.3.3 Conformance

Conformance tests as defined in clause 5.3.2.3 shall be carried out.

4.4.4 Residual modulation of the transmitter

4.4.4.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.11.1.

4.4.4.2 Limit

The residual modulation shall not exceed the limit stated in EN 301 025-1 [1], clause 8.11.3.

4.4.4.3 Conformance

Conformance tests as defined in clause 5.3.2.4 shall be carried out.

4.4.5 Frequency error (demodulated DSC signal)

4.4.5.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.12.1.

4.4.5.2 Limit

The frequency error shall not exceed the limit stated in EN 301 025-1 [1], clause 8.12.3.

4.4.5.3 Conformance

Conformance tests as defined in clause 5.3.2.5 shall be carried out.

4.4.6 Modulation index for DSC

4.4.6.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.13.1.

4.4.6.2 Limit

The modulation index shall not exceed the limit stated in EN 301 025-1 [1], clause 8.13.3.

4.4.6.3 Conformance

Conformance tests as defined in clause 5.3.2.6 shall be carried out.

4.4.7 Modulation rate for DSC

4.4.7.1 Definition

This test is defined in EN 301 025-1 [1], clause 8.14.1.

4.4.7.2 Limit

The frequency shall not exceed the limit stated in EN 301 025-1 [1], clause 8.13.3.

4.4.7.3 Conformance

Conformance tests as defined in clause 5.3.2.7 shall be carried out.

4.4.8 Void

4.4.9 Harmonic distortion and rated audio-frequency output power

4.4.9.1 Definition

This test is defined in EN 301 025-1 [1], clause 9.1.1.

4.4.9.2 Limit

The rated audio-frequency output power shall comply with the limits stated in EN 301 025-1 [1], clause 9.1.3.

4.4.9.3 Conformance

Conformance tests as defined in clause 5.4.2 may be carried out.

4.4.10 Receiver audio frequency response

4.4.10.1 Definition

This test is defined in EN 301 025-1 [1], clause 9.2.1.

4.4.10.2 Limit

The audio frequency response shall lie within the limits shown in EN 301 025-1 [1], clause 9.2.3, figure 5.

4.4.10.3 Conformance

Conformance tests as defined in clause 5.4.3 may be carried out.

4.4.11 Receiver residual noise level

4.4.11.1 Definition

This test is defined in EN 301 025-1 [1], clause 9.11.1.

4.4.11.2 Limit

The receiver residual noise level shall not exceed the limit stated in EN 301 025-1 [1], clause 9.11.3.

4.4.11.3 Conformance

Conformance tests as defined in clause 5.4.4 may be carried out.

4.4.12 Squelch operation

4.4.12.1 Definition

This test is defined in EN 301 025-1 [1], clause 9.12.1.

4.4.12.2 Limit

The squelch operation shall comply with the limits stated in EN 301 025-1 [1], clause 9.12.3.

4.4.12.3 Conformance

Conformance tests as defined in clause 5.4.5 may be carried out.

4.4.13 Squelch hysteresis

4.4.13.1 Definition

This test is defined in EN 301 025-1 [1], clause 9.13.1.

4.4.13.2 Limit

The squelch hysteresis shall comply with the limits stated in EN 301 025-1 [1], clause 9.13.3.

4.4.13.3 Conformance

Conformance tests as defined in clause 5.4.6 may be carried out.

4.4.14 Dynamic range

4.4.14.1 Definition

This test is defined in EN 301 025-1 [1], clause 10.6.1.

4.4.14.2 Limit

The bit error ratio shall not exceed the limit stated in EN 301 025-1 [1], clause 10.6.3.

4.4.14.3 Conformance

Conformance tests as defined in clause 5.4.7 may be carried out.

5 Testing for compliance with technical requirements

5.1 Test conditions, power supply and ambient temperatures

The general conditions for measurement as stated in EN 301 025-1 [1], clause 6 shall apply.

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 1.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] 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)).

Table 1 is based on such expansion factors.

Table 1: Maximum measurement uncertainty

Parameter	Maximum uncertainty
Radio Frequency (RF)	$\pm 1 \times 10^{-7}$
RF power/level	$\pm 0,75$ dB
Audio output power	$\pm 0,5$ dB
Amplitude characteristics of receiver limiter	$\pm 1,5$ dB
Sensitivity at 20 dB SINAD	± 3 dB
Two-signal measurement	± 4 dB
Three-signal measurement	± 3 dB

5.3 Essential radio test suites

5.3.1 Environmental tests

5.3.1.1 Introduction

Environmental tests shall be carried out before tests are performed on the same equipment with respect to the other requirements of the present document.

5.3.1.2 Procedure

This test procedure is defined in EN 301 025-1 [1], clause 7.2.

5.3.1.3 Performance check

The "performance check" series of tests are defined in EN 301 025-1 [1], clause 7.3.

5.3.1.4 Vibration test

5.3.1.4.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.4.1.

5.3.1.4.2 Limit

The equipment shall comply with the limits of the performance check defined in EN 301 025-1 [1], clause 7.3.

There shall be no harmful deterioration of the equipment visible.

5.3.1.4.3 Conformance

Relevant environment tests as defined in clause 5.3.1 shall be carried out.

5.3.1.5 Temperature tests

5.3.1.5.1 Dry heat

5.3.1.5.1.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.2.1.

5.3.1.5.1.2 Limit

The equipment shall comply with the limits of the performance check defined in EN 301 025-1 [1], clause 7.3.

5.3.1.5.1.3 Conformance

Relevant environment tests as defined in clause 5.3.1 shall be carried out.

5.3.1.5.2 Damp heat

5.3.1.5.2.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.3.1.

5.3.1.5.2.2 Limit

The equipment shall comply with the limits of the performance check defined in EN 301 025-1 [1], clause 7.3.

5.3.1.5.2.3 Conformance

Relevant environment tests as defined in clause 5.3.1 shall be carried out.

5.3.1.5.3 Low temperature

5.3.1.5.3.1 Definition

This test is defined in EN 301 025-1 [1], clause 7.5.4.1.

5.3.1.5.3.2 Limit

The equipment shall comply with the limits of the performance check defined in EN 301 025-1 [1], clause 7.3.

5.3.1.5.3.3 Conformance

Relevant environment tests as defined in clause 5.3.1 shall be carried out.

5.3.2 Conformance tests

5.3.2.1 Sensitivity of the modulator, including microphone

The test specified in EN 301 025-1 [1], clause 8.4.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.1.2 in order to prove compliance with the requirement.

5.3.2.2 Audio frequency response

The test specified in EN 301 025-1 [1], clause 8.5.2 shall be carried out.

The results obtained shall be compared to the limits in clause 4.4.2.2 in order to prove compliance with the requirement.

5.3.2.3 Audio frequency harmonic distortion of the emission

The test specified in EN 301 025-1 [1], clause 8.6.2 shall be carried out. The results obtained under each of the stated test conditions shall be compared to the limits in clause 4.4.3.2 in order to prove compliance with the requirement.

5.3.2.4 Residual modulation of the transmitter

The test specified in EN 301 025-1 [1], clause 8.11.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.4.2 in order to prove compliance with the requirement.

5.3.2.5 Frequency error (demodulated DSC signal)

The test specified in EN 301 025-1 [1], clause 8.12.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.5.2 in order to prove compliance with the requirement.

5.3.2.6 Modulation index for DSC

The test specified in EN 301 025-1 [1], clause 8.13.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.6.2 in order to prove compliance with the requirement.

5.3.2.7 Modulation rate for DSC

The test specified in EN 301 025-1 [1], clause 8.14.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.7.2 in order to prove compliance with the requirement.

5.4 Other test suites

5.4.1 General

The requirements in clauses 4.4.9 to 4.4.15 inclusive have been set on the assumption that the test specifications in clauses 5.4.2 to 5.4.8 will be used to verify the performance of the equipment.

5.4.2 Harmonic distortion and rated audio-frequency output power

The test specified in EN 301 025-1 [1], clause 9.1.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.9.2 in order to prove compliance with the requirement.

5.4.3 Receiver audio frequency response

The test specified in EN 301 025-1 [1], clause 9.2.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.10.2 in order to prove compliance with the requirement.

5.4.4 Receiver residual noise level

The test specified in EN 301 025-1 [1], clause 9.11.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.11.2 in order to prove compliance with the requirement.

5.4.5 Squelch operation

The test specified in EN 301 025-1 [1], clause 9.12.2 shall be carried out. The results obtained in each of the tests shall be compared to the appropriate limits in clause 4.4.12.2 in order to prove compliance with the requirement.

5.4.6 Squelch hysteresis

The test specified in EN 301 025-1 [1], clause 9.13.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.13.2 in order to prove compliance with the requirement.

5.4.7 Dynamic range

The test specified in EN 301 025-1 [1], clause 10.6.2 shall be carried out. The results obtained shall be compared to the limits in clause 4.4.14.2 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 supplier 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)

Harmonized Standard EN 301 025-3 The following requirements and test specifications are relevant to the presumption of conformity under article 3.3(e) of the R&TTE Directive						
Requirement			Requirement Conditionality		Test Specification	
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No
1	General and operational requirements	4.2.1	U		X	
2	Technical requirements	4.2.2	U		X	
3	Vibration test	4.3.1	U		E	5.3.1.4
4	Dry heat	4.3.2.2	U		E	5.3.1.5.1
5	Damp heat	4.3.2.3	U		E	5.3.1.5.2
6	Low temperature	4.3.2.4	U		E	5.3.1.5.3
7	Sensitivity of the modulator, including microphone	4.4.1	U		E	5.3.2.1
8	Audio frequency response	4.4.2	U		E	5.3.2.2
9	Audio frequency harmonic distortion of the emission	4.4.3	U		E	5.3.2.3
10	Residual modulation of the transmitter	4.4.4	U		E	5.3.2.4
11	Frequency error (demodulated DSC signal)	4.4.5	U		E	5.3.2.5
12	Modulation index for DSC	4.4.6	U		E	5.3.2.6
13	Modulation rate for DSC	4.4.7	U		E	5.3.2.7
14	Harmonic distortion and rated audio-frequency output power	4.4.9	U		O	5.4.2
15	Receiver audio frequency response	4.4.10	U		O	5.4.3
16	Receiver residual noise level	4.4.11	U		O	5.4.4

Harmonized Standard EN 301 025-3 The following requirements and test specifications are relevant to the presumption of conformity under article 3.3(e) of the R&TTE Directive						
Requirement			Requirement Conditionality		Test Specification	
17	Squelch operation	4.4.12	U		O	5.4.5
18	Squelch hysteresis	4.4.13	U		O	5.4.6
19	Dynamic range	4.4.14	U		O	5.4.7

Key to columns:**Requirement:**

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

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the essential 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 technical 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.

Annex B (informative): The EN title in the official languages

The enlargement of the European Union (EU) resulted in a requirement from the EU for a larger number of languages for the translation of the titles of Harmonized Standards and mandated ENs that are to be listed in the Official Journal to support the implementation of this legislation.

For this reason the title translation concerning the present document can be consulted via the [e-approval](#) application.

History

Document history		
V1.1.1	August 1998	Publication as EN 301 025
V1.1.1	May 2001	Publication
V1.2.1	September 2004	Publication
V1.3.1	February 2007	Publication
V1.4.1	May 2010	One-step Approval Procedure OAP 20100831: 2010-05-03 to 2010-08-31
V1.4.1	September 2010	Publication