

# ETSI EN 300 471-2 V1.1.1 (2001-05)

---

*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Land Mobile Service;  
Rules for Access and the Sharing of common used channels  
by equipment complying with EN 300 113;  
Part 2: Harmonized EN covering essential requirements  
under article 3.2 of the R&TTE Directive**

---



---

**Reference**

REN/ERM-RP02-049-2

---

**Keywords**

EMC, mobile, PMR, radio, regulation, service

**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**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the 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 <http://www.etsi.org/tb/status/>

If you find errors in the present document, send your comment to:  
editor@etsi.fr

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2001.  
All rights reserved.

# Contents

Intellectual Property Rights .....	4
Foreword .....	4
Introduction .....	5
1 Scope .....	8
2 References .....	9
3 Definitions and abbreviations .....	10
3.1 Definitions .....	10
3.2 Abbreviations .....	10
4 Technical specifications .....	10
4.1 Void .....	10
4.2 Technical requirements .....	10
4.2.1 Carrier sense delay .....	10
4.2.1.1 Definition .....	10
4.2.1.2 Limit .....	10
4.2.1.3 Assessment of conformity .....	10
4.2.2 Receiver opening delay .....	10
4.2.2.1 Definition .....	10
4.2.2.2 Limit .....	10
4.2.2.3 Assessment of conformity .....	10
4.2.3 Other requirements concerning timings .....	11
4.2.3.1 Other timing parameters .....	11
4.2.3.2 Limit .....	11
4.2.3.3 Assessment of conformity .....	11
4.2.4 Protocol elements .....	11
4.2.4.1 Definition of the protocol and nominal values .....	11
4.2.4.2 Assessment of conformity .....	11
5 Testing for compliance with technical requirements .....	11
5.1 Void .....	11
5.2 Interpretation of the measurement results .....	11
5.3 Essential radio test suites .....	12
5.3.1 Carrier sense delay .....	12
5.3.2 Receiver opening delay .....	12
5.3.3 Other requirements concerning timings .....	12
5.3.4 Protocol elements .....	13
<b>Annex A (normative): The EN Requirements Table (EN-RT) .....</b>	<b>14</b>
History .....	15

---

## 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 (<http://www.etsi.org/ipr>).

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

The present document is part 2 of a multi-part deliverable covering the Land Mobile Service; Rules for Access and the Sharing of common used channels by equipment complying with 300 113, as identified below:

Part 1: "Technical characteristics and methods of measurement";

**Part 2: "Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive".**

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [4] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

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 [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").

<b>National transposition dates</b>	
Date of adoption of this EN:	27 April 2001
Date of latest announcement of this EN (doa):	31 July 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2003
Date of withdrawal of any conflicting National Standard (dow):	31 January 2003

---

## Introduction

The present document specifies an access protocol and occupation rules for data communications on radio channels shared by different users. It may be used for data communications over channels originally intended for speech use. This standard gives freedom for the use of any bit rate, any constant envelope modulation or any type of protocol which fulfils the normative parameters of the present document to access a shared radio channel.

The access protocol specified in the present document also permits the sharing of speech and data communication.

The present document is part of a set of standards designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [1].

Each standard is a module in the structure. The modular structure is shown in figure 1.

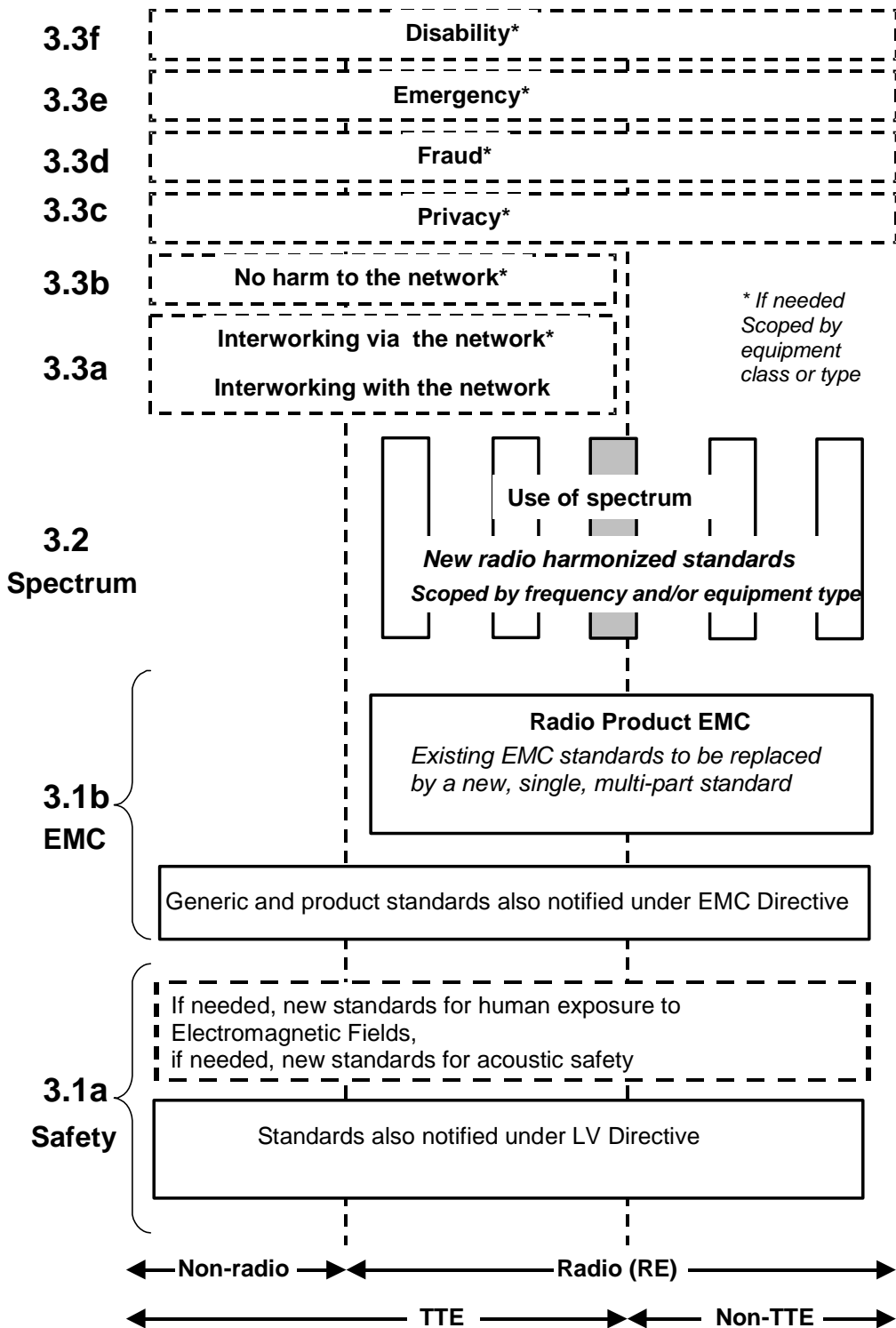


Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

## Explanation of figure 1

The left hand edge of the figure 1 shows the different clauses of article 3 of the R&TTE Directive [1].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of this standard, essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment.

For article 3.1b the diagram shows the new single multi-part product EMC standard for radio, and the existing collection of generic and product standards currently used under the EMC Directive [2]. The parts of this new standard will become available in the second half of 2000, and the existing separate product EMC standards will be used until it is available (at the time of publication of the present document, the part relating to the equipment covered by the present document is part 5).

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive [3] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of the figure shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. One or several radio spectrum standards will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive [1] is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive [1] may be covered in a set of standards.

The modularity principle has been taken because it is expected that it would:

- minimize the number of standards needed (because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment);
- provide scope for standards to be added under article 3.3 should the Commission take the necessary decisions without requiring alteration of standards that are already published;
- clarify and simplify the usage of Harmonized Standards as the relevant means of conformity assessment.

---

# 1 Scope

The present document covers the minimum characteristics considered necessary in order to make the best use of the available frequencies and to avoid harmful interference between different users of a shared channel. It does not necessarily include all the characteristics (or protocols) which may be required by a user, nor does it necessarily represent the optimum performance achievable.

The present document applies to equipment designed to operate within the professional mobile radio service and to the associated frequency planning. It covers equipment fulfilling the requirements of EN 300 113 ([6] and [7]) and/or of EN 300 390 ([8] and [9]) as appropriate.

The present document applies to equipment supporting the transmission of data on shared channels. It applies to digital and combined analogue and digital radio equipment that does not fulfil the requirements of another standard covering specific access protocol and occupation rules.

More specifically, this access protocol applies to single frequency simplex operation (and two frequency repeater operations with the repeater in duplex mode and the mobile units in simplex mode). This access protocol is applicable for:

- multiple data only users, independent of each other, which do not share a common central control facility, but may share a common single or two frequency radio channel;
- multiple mixed analogue speech and data users, independent from each other, which do not share a common central control facility, but may share a common single or two frequency radio channel and where speech is to have priority over data transmissions.

This access protocol is not applicable for data users with common central control facilities or for trunked systems operating on dedicated non-shared channels.

In the case of analogue transmissions, the corresponding access protocol is known as the "radio-discipline" of the users.

Within the limits set out in the present document, each group of users may use its own communication protocol.

The present document, in conjunction with EN 300 113-2 [7] or with EN 300 390-2 [9] as appropriate, is intended to cover the provisions of Article 3.2, of Directive 1999/5/EC [1] (R&TTE Directive), which states that "... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify other technical requirements in respect of essential requirements under Article 3 of the R&TTE Directive [1] may 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

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] 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).
- [2] 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).
- [3] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).
- [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.
- [5] ETSI EN 300 471-1 (V1.2.1) (2001): "Electromagnetic Compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Rules for Access and the Sharing of common used channels by equipment complying with 300 113; Part 1: Technical characteristics and methods of measurement".
- [6] ETSI EN 300 113-1 (V1.3.1) (2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and speech) and having an antenna connector; Part 1: Technical characteristics and methods of measurement".
- [7] ETSI EN 300 113-2 (V1.1.1) (2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and speech) and having an antenna connector; Part 2: Harmonised EN covering essential requirements under article 3.2 of the R&TTE Directive".
- [8] ETSI EN 300 390-1 (V1.2.1) (2000): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Part 1: Technical characteristics and test conditions".
- [9] ETSI EN 300 390-2 (V1.1.1) (2000): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive".
- [10] ETSI ETR 028 (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1] and in EN 300 471-1 [5] apply.

### 3.2 Abbreviations

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

EMC	Electro-Magnetic Compatibility
LV	Low Voltage
R&TTE	Radio and Telecommunications Terminal Equipment

---

## 4 Technical specifications

### 4.1 Void

### 4.2 Technical requirements

#### 4.2.1 Carrier sense delay

##### 4.2.1.1 Definition

The carrier sense delay is defined in EN 300 471-1 [5], clause 8.1.1.

##### 4.2.1.2 Limit

The carrier sense delay shall be as stated in EN 300 471-1 [5], clause 8.1.3.

##### 4.2.1.3 Assessment of conformity

The measurement specified in clause 5.3.1 shall be carried out.

#### 4.2.2 Receiver opening delay

##### 4.2.2.1 Definition

The receiver opening delay is defined in EN 300 471-1 [5], clause 8.2.1.

##### 4.2.2.2 Limit

The receiver opening delay shall be as stated in EN 300 471-1 [5], clause 8.2.3.

##### 4.2.2.3 Assessment of conformity

The measurement specified in clause 5.3.2 shall be carried out.

## 4.2.3 Other requirements concerning timings

### 4.2.3.1 Other timing parameters

In order to operate correctly and to avoid harmful interference, beyond the timing requirements specified above, the equipment shall fulfil the requirements found in EN 300 113-1 [6], clauses 5.1.7 and 5.1.8, and/or of EN 300 390-1 [8], clauses 5.1.5 and 5.1.6.

### 4.2.3.2 Limit

The appropriate limits shall be as stated in EN 300 113-1 [6], clauses 5.1.7 and 5.1.8, and/or of EN 300 390-1 [8], clauses 5.1.5 and 5.1.6.

### 4.2.3.3 Assessment of conformity

The measurement specified in EN 300 113-1 [6], clauses 8.8 and 8.9, or in EN 300 390-1 [8], clauses 8.5 and 8.6 shall be carried out, either as part of the compliance to the present standard, or as part of the compliance to EN 300 113-2 [7] and/or EN 300 390-2 [9].

## 4.2.4 Protocol elements

### 4.2.4.1 Definition of the protocol and nominal values.

The general presentation of the access and sharing protocol is provided in clauses 4.1 and 4.2 of EN 300 471-1 [5].

Details and requirements are given in clause 6 of EN 300 471-1 [5].

Provisions have been made in clause 6.7.1 of EN 300 471-1 [5] for parameters  $t_t$  and  $\Delta t_t$  to have a step size; the default values for these two parameters shall be respectively: 2 seconds and 2 seconds.

### 4.2.4.2 Assessment of conformity

The procedures specified in clause 4.3a and 4.3c of EN 300 471-1 [5] shall be met, in order to ensure conformity of the equipment with the requirements set in clause 6 of EN 300 471-1 [5].

---

# 5 Testing for compliance with technical requirements

## 5.1 Void

## 5.2 Interpretation of the measurement results

The interpretation of the results obtained when making 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 available (and included in test reports, if any);
- the 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 ETR 028 [10] 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.

The particular expansion factor used for the evaluation of the measurement uncertainty shall be stated.

**Table 1: Absolute measurement uncertainties: maximum values**

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF Power conducted (up to 160 W)	$\pm 0,75$ dB
Conducted RF Power variations using a test fixture	$\pm 0,75$ dB
Radiated RF power	$\pm 6$ dB
Adjacent channel power	$\pm 5$ dB
Average sensitivity (radiated)	$\pm 3$ dB
Two-signal measurement, valid up to 4 GHz (using a test fixture)	$\pm 4$ dB
Two-signal measurement using radiated fields (see note)	$\pm 6$ dB
Three-signal measurement (using a test fixture)	$\pm 3$ dB
Radiated emission of the transmitter, valid up to 4 GHz	$\pm 6$ dB
Radiated emission of receiver, valid up to 4 GHz	$\pm 6$ dB
Transmitter transient frequency (frequency difference)	$\pm 250$ Hz
Transmitter transient time	$\pm 20$ %
Carrier sense delay	$\pm 5$ %
Receiver opening delay	1,5 ms
Other timings	5 %
Values valid up to 1 GHz for the RF parameters unless otherwise stated.	
NOTE: For blocking and spurious response rejection measurements.	

## 5.3 Essential radio test suites

### 5.3.1 Carrier sense delay

The measurement specified in EN 300 471-1 [5], clause 8.1.2 shall be carried out. The results obtained shall be compared to the limits found in clause 4.2.1.2 in order to prove compliance with the requirement.

### 5.3.2 Receiver opening delay

The measurements specified in EN 300 471-1 [5], clause 8.2.2 shall be carried out. The results obtained shall be compared to the limits found in clause 4.2.2.2 in order to prove compliance with the requirement.

### 5.3.3 Other requirements concerning timings

The appropriate test suites are those defined in EN 300 113-1 [6] and/or EN 300 390-1 [8] (as appropriate), for the corresponding parameters (see also sub-clause 4.2.3.3).

### 5.3.4 Protocol elements

It shall be verified that the equipment fulfils each of the requirements stated in Clause 6 of EN 300 471-1 [5] (requirements concerning the timings, the sequence of events, the handling of parameters such as "n" and "m", etc.) see also clause 4.2.4.2.

## Annex A (normative): The EN Requirements Table (EN-RT)

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the EN-RT proforma in this annex so that it can be used for its intended purposes and may further publish the completed EN-RT.

The EN Requirements Table (EN-RT) serves a number of purposes, as follows:

- it provides a tabular summary of all the requirements;
- it shows the status of each EN-R, whether it is essential to implement in all circumstances (Mandatory), or whether the requirement is dependent on the supplier having chosen to support a particular optional service or functionality (Optional). In particular it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified;
- when completed in respect of a particular equipment it provides a means to undertake the static assessment of conformity with the EN.

**Table A.1: EN Requirements Table (EN-RT)**

EN Reference		EN 300 471-2			Comment
No.	Reference	EN-R (note)	Status		
1	4.2.1	Carrier sense delay	M		
2	4.2.2	Receiver opening delay	M		
3	4.2.3	Other requirements concerning timing	M		
4	4.2.4	Protocol elements	M		

NOTE: These EN-Rs are justified under Article 3.2 of the R&TTE Directive.

### Key to columns:

**No** Table entry number;

**Reference** Clause reference number of the requirement within the present document;

**EN-R** Title of the technical requirement within the present document;

**Status** Status of the entry as follows:

M Mandatory, shall be implemented under all circumstances;

O Optional, may be provided, but if provided shall be implemented in accordance with the requirements;

O.n this status is used for mutually exclusive or selectable options among a set. The integer "n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, "It is mandatory to support at least one of these options", or, "It is mandatory to support exactly one of these options".

**Comments** To be completed as required.

---

## History

<b>Document history</b>		
V1.1.1	December 2000	One-step Approval Procedure OAP 20010427: 2000-12-27 to 2001-04-27
V1.1.1	May 2001	Publication