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*Candidate Harmonized European Standard (Telecommunications series)*

**Terrestrial Trunked Radio (TETRA);  
Harmonized EN for TETRA Advanced Packet Service (TAPS)  
equipment covering essential requirements  
of article 3.2 of the R&TTE Directive**

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## Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (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 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 are given in annex A.

<b>Proposed national transposition dates</b>	
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
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

## Introduction

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.

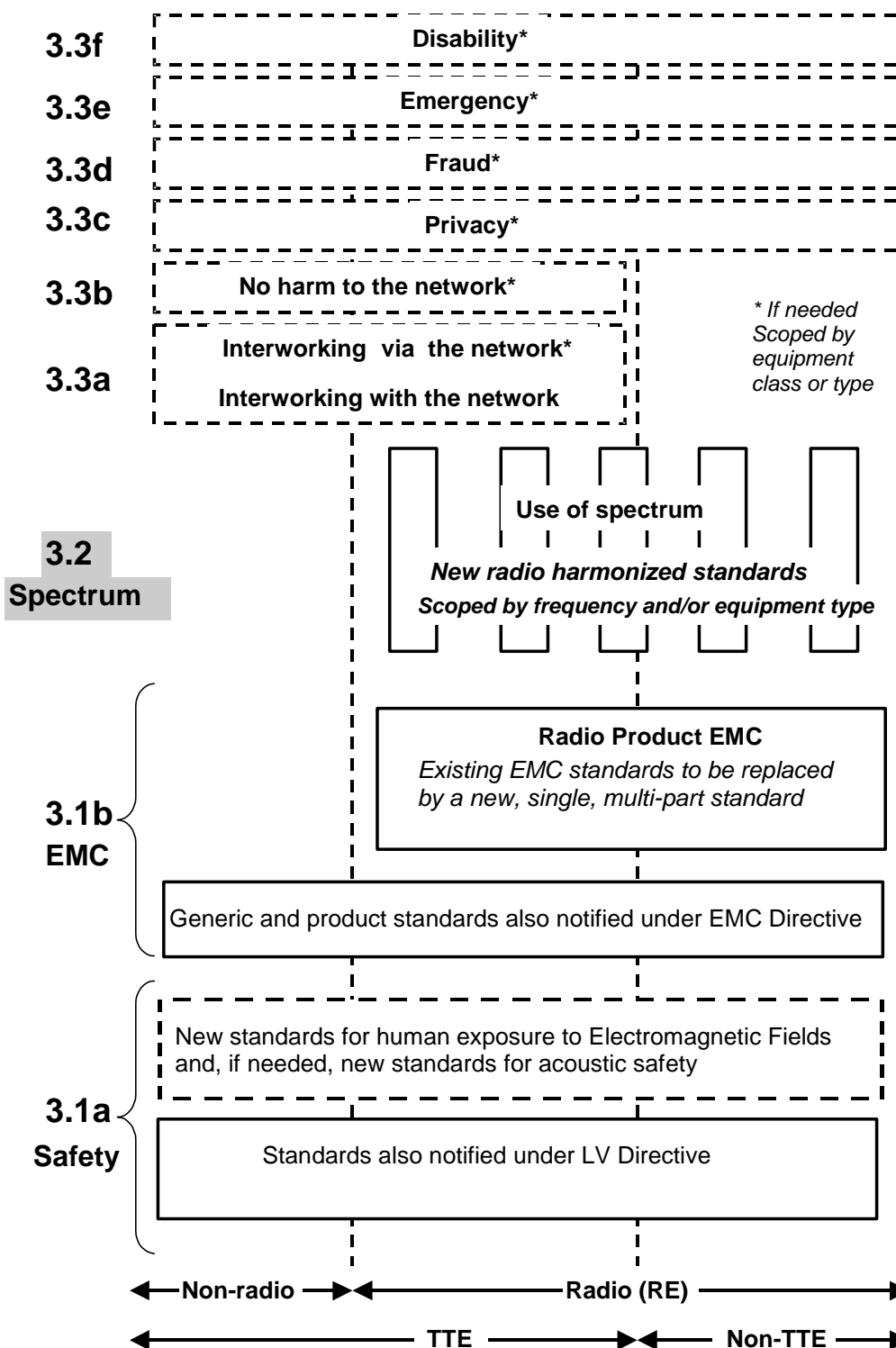


Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

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. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b figure 1 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 the present document will become available in the second half of 2000, and the existing separate product EMC standards will be used until it is available.

For article 3.1a figure 1 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. A radio spectrum standard 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 minimizes 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;
- it provides scope for standards to be added:
  - under article 3.2 when new frequency bands are agreed; or
  - under article 3.3 should the Commission take the necessary decisions without requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

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# 1 Scope

The present document applies to the following radio telecommunications terminal equipment types:

- 1) TAPS mobile station
- 2) TAPS Base Transceiver Station
- 3) TAPS Base Transceiver Station Repeater

This radio equipment type is for operation within the following Trans-European Trunked Radio frequency bands, with a channel separation of 200 kHz, carrying traffic channels according to the Time Division Multiple Access (TDMA) principle.

- TETRA 380: 380 MHz - 390 MHz Mobile transmit; 390 MHz - 400 MHz base station transmit
- TETRA 410: 410 MHz - 420 MHz Mobile transmit; 420 MHz - 430 MHz base station transmit
- TETRA 450: 450 MHz - 460 MHz Mobile transmit; 460 MHz - 470 MHz base station transmit
- TETRA 870: 870 MHz - 876 MHz Mobile transmit; 915 MHz - 921 MHz base station transmit

The present document is intended to cover the provisions of the R&TTE Directive [1] article 3.2, 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 technical requirements in respect of essential requirements under other parts of 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/>.

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# 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] ETSI TS 101 978: "Terrestrial Trunked Radio (TETRA); TETRA Advanced Packet Service (TAPS) Test Purposes".

## 3 Abbreviations

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

MS	Mobile Station
BTS	Base Transceiver Station

## 4 Technical requirements specifications

### 4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier.

To avoid unnecessary interference in the radio spectrum, the equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

### 4.2 Conformance requirements

This clause references the conformance requirements by cross-reference to the requirements in the standards TS 101 978 [4]. It also contains a reference to the relevant test to verify compliance with the requirement.

NOTE: This clause does not specify the exact status (e.g. mandatory or optional) of the listed features, services and requirements. The applicability shall be taken to be as specified in TS 101 978 [4].

#### 4.2.1 TAPS Mobile Station

The conformance requirements from the clauses in annex A of TS 101 978 [4] listed in table 1 are applicable to a TAPS Mobile Station.

**Table 1: Requirements for TAPS MS**

Clause	Title
12.1.1	Conducted spurious emissions, MS allocated a channel
12.1.2	Conducted spurious emissions, MS in idle mode
12.2.1	Radiated spurious emissions, MS allocated a channel
12.2.2	Radiated spurious emissions, MS in idle mode
13.1	Frequency error and phase error
13.2	Frequency error under multipath and interference conditions
13.3	Transmitter output power and burst timing
13.4	Output RF spectrum
13.16.1	Frequency error and phase error in GPRS multislot configuration
13.16.2	Transmitter output power in GPRS multislot configuration
13.16.3	Output RF spectrum in GPRS multislot configuration
13.17.1	Frequency error and Modulation accuracy in EGPRS Configuration
13.17.2	Frequency error under multipath and interference conditions
13.17.3	EGPRS Transmitter output power
13.17.4	Output RF spectrum in EGPRS configuration
13.17.5	Intermodulation attenuation



## 4.2.2 TAPS Base Transceiver Station

The conformance requirements from the clauses in annex B of TS 101 978 [4] listed in table 2 are applicable to a TAPS BTS.

**Table 2: Requirements for TAPS BTS**

Clause	Title
6.2	Modulation accuracy
6.3	Mean transmitted RF carrier power
6.4	Transmitted RF carrier power versus time
6.5.1	Spectrum due to modulation and wideband noise
6.5.2	Switching transients spectrum
6.6.1	Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band
6.6.2.1	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.6.2.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.6.2.3	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.7	Intermodulation attenuation
6.8	Intra Base Station System intermodulation attenuation
7.3	Static Reference Sensitivity Level
7.4	Multipath Reference Sensitivity Level
7.5	Reference interference level
7.6	Blocking Characteristics
7.7	Intermodulation characteristics
7.8	AM suppression
7.9	Spurious emissions from the receiver antenna connector
8	Radiated spurious emissions

## 4.2.3 TAPS Base Transceiver Station Repeater

The conformance requirements from the clauses in annex C of TS 101 978 [4] listed in table 3 are applicable are applicable to a TAPS Repeater.

**Table 3: Requirements for TAPS Repeater**

Clause	Title
5	Spurious emissions
6	Intermodulation attenuation
7	Out of band gain
8	Frequency error
9	Modulation accuracy at GMSK modulation
10	Modulation accuracy at 8-PSK modulation

# 5 Testing for compliance with technical requirements

## 5.1 Environmental conditions for testing

Radio testing shall be performed at normal and extreme test conditions as specified in TS 101 978 [4].

For tests on equipment at extreme ambient temperatures measurements shall be made at an upper temperature and a lower temperature defined as follows:

- the lower temperature shall be the lowest intended operational temperature;
- the upper temperature shall be the highest intended operational temperature.

## 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 according to TS 101 978 [4] clause 7.

## 5.3 Essential radio test suites

This clause provides the references for the tests essential to assessment of conformity with the requirements of the present document in accordance with annex III of the R&TTE Directive [1].

### 5.3.1 Reference test specifications

The tests referenced in this clause are defined in TS 101 978 [4].

### 5.3.2 Test configuration

The test configurations given or referenced in the present document do not imply a specific realization of test equipment or arrangement or use of specific test devices to assess compliance with the requirements. However, any test configuration and equipment used shall provide the test conditions specified in the tests to enable testing.

### 5.3.3 Test specification

#### 5.3.3.1 TAPS Mobile Station

The following tests from annex A of TS 101 978 [4] listed in table 4 are applicable to a TAPS Mobile Station.

**Table 4: Tests for TAPS MS**

Clause	Title
12.1.1	Conducted spurious emissions, MS allocated a channel
12.1.2	Conducted spurious emissions, MS in idle mode
12.2.1	Radiated spurious emissions, MS allocated a channel
12.2.2	Radiated spurious emissions, MS in idle mode
13.1	Frequency error and phase error
13.2	Frequency error under multipath and interference conditions
13.3	Transmitter output power and burst timing
13.4	Output RF spectrum
13.16.1	Frequency error and phase error in GPRS multislot configuration
13.16.2	Transmitter output power in GPRS multislot configuration
13.16.3	Output RF spectrum in GPRS multislot configuration
13.17.1	Frequency error and Modulation accuracy in EGPRS Configuration
13.17.2	Frequency error under multipath and interference conditions
13.17.3	EGPRS Transmitter output power
13.17.4	Output RF spectrum in EGPRS configuration
13.17.5	Intermodulation attenuation

### 5.3.3.2 TAPS Base Transceiver Station

The following tests from annex B of TS 101 978 [4] listed in table 5 are applicable.

**Table 5: Tests for TAPS BTS**

Clause	Title
6.2	Modulation accuracy
6.3	Mean transmitted RF carrier power
6.4	Transmitted RF carrier power versus time
6.5.1	Spectrum due to modulation and wideband noise
6.5.2	Switching transients spectrum
6.6.1	Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band
6.6.2.1	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.6.2.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.6.2.3	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band
6.7	Intermodulation attenuation
6.8	Intra Base Station System intermodulation attenuation
7.3	Static Reference Sensitivity Level
7.4	Multipath Reference Sensitivity Level
7.5	Reference interference level
7.6	Blocking Characteristics
7.7	Intermodulation characteristics
7.8	AM suppression
7.9	Spurious emissions from the receiver antenna connector
8	Radiated spurious emissions

### 5.3.3.3 TAPS Base Transceiver Station Repeater

The following tests from annex C of TS 101 978 [4] listed in table 6 are applicable.

**Table 6: Tests for TAPS Repeater**

Clause	Title
5	Spurious emissions
6	Intermodulation attenuation
7	Out of band gain
8	Frequency error
9	Modulation accuracy at GMSK modulation
10	Modulation accuracy at 8-PSK modulation

## 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) for TAPS MS**

EN Reference		EN 301 979			TR 101 976 annex A Clause
No.	Reference	EN-R (see note)	Status	Supported	
1	4.2.1	Conducted spurious emissions, MS allocated a channel	M		12.1.1
2	4.2.1	Conducted spurious emissions, MS in idle mode	M		12.1.2
3	4.2.1	Radiated spurious emissions, MS allocated a channel	M		12.2.1
4	4.2.1	Radiated spurious emissions, MS in idle mode	M		12.2.2
5	4.2.1	Frequency error and phase error	M		13.1
6	4.2.1	Frequency error under multipath and interference conditions	M		13.2
7	4.2.1	Transmitter output power and burst timing	M		13.3
8	4.2.1	Output RF spectrum	M		13.4
9	4.2.1	Frequency error and phase error in GPRS multislot configuration	M		13.16.1
10	4.2.1	Transmitter output power in GPRS multislot configuration	M		13.16.2
11	4.2.1	Output RF spectrum in GPRS multislot configuration	M		13.16.3
12	4.2.1	Frequency error and Modulation accuracy in EGPRS Configuration	C1		13.17.1
13	4.2.1	Frequency error under multipath and interference conditions.	C1		13.17.2
14	4.2.1	EGPRS Transmitter output power	C1		13.17.3
15	4.2.1	Output RF spectrum in EGPRS configuration	C1		13.17.4
16	4.2.1	Intermodulation attenuation	C1		13.17.5
NOTE	C1	If MS supports EGRPRS			

Table A.2: EN Requirements Table (EN-RT) for TAPS BTS

EN Reference		EN 301 979			TR 101 976 annex B Clause
No.	Reference	EN-R	Status	Supported	
1	4.2.2	Modulation accuracy	M		6.2
2	4.2.2	Mean transmitted RF carrier power	M		6.3
3	4.2.2	Transmitted RF carrier power versus time	M		6.4
4	4.2.2	Spectrum due to modulation and wideband noise	M		6.5.1
5	4.2.2	Switching transients spectrum	M		6.5.2
6	4.2.2	Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band	M		6.6.1
7	4.2.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band	M		6.6.2.1
8	4.2.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band	M		6.6.2.2
9	4.2.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band	M		6.6.2.3
10	4.2.2	Intermodulation attenuation	M		6.7
11	4.2.2	Intra Base Station System intermodulation attenuation	M		6.8
12	4.2.2	Static Reference Sensitivity Level	M		7.3
13	4.2.2	Multipath Reference Sensitivity Level	M		7.4
14	4.2.2	Reference interference level	M		7.5
15	4.2.2	Blocking Characteristics	M		7.6
16	4.2.2	Intermodulation characteristics	M		7.7
17	4.2.2	AM suppression	M		7.8
18	4.2.2	Spurious emissions from the receiver antenna connector	M		7.9
19	4.2.2	Radiated spurious emissions	M		8

Table A.3: EN Requirements Table (EN-RT) for TAPS Repeater

EN Reference		EN 301 979			TR 101 976 annex C Clause
No.	Reference	EN-R (see note)	Status	Supported	
1	4.2.3	Spurious emissions	M		5
2	4.2.3	Intermodulation attenuation	M		6
3	4.2.3	Out of band gain	M		7
4	4.2.3	Frequency error	M		8
5	4.2.3	Modulation accuracy at GMSK modulation	M		9
6	4.2.3	Modulation accuracy at 8-PSK modulation	C1		10
NOTE	C1	If Repeater supports 8-PSK			

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

<b>Language</b>	<b>EN title</b>
Danish	
Dutch	
English	
Finnish	
French	
German	
Greek	
Icelandic	
Italian	
Portuguese	
Spanish	
Swedish	

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## History

<b>Document history</b>		
V1.1.1	July 2001	Public Enquiry PE 20011109: 2001-07-11 to 2001-11-09