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Harmonized European Standard (Telecommunications series)

Fixed Radio Systems;
Characteristics and requirements for point-to-point equipment and antennas;
Part 3: Equipment operating in frequency bands where both frequency coordinated or uncoordinated deployment might be applied;
Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

Reference
REN/ATTM-04003

Keywords
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Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM), and is now submitted for the Vote 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 [i.19] (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").

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

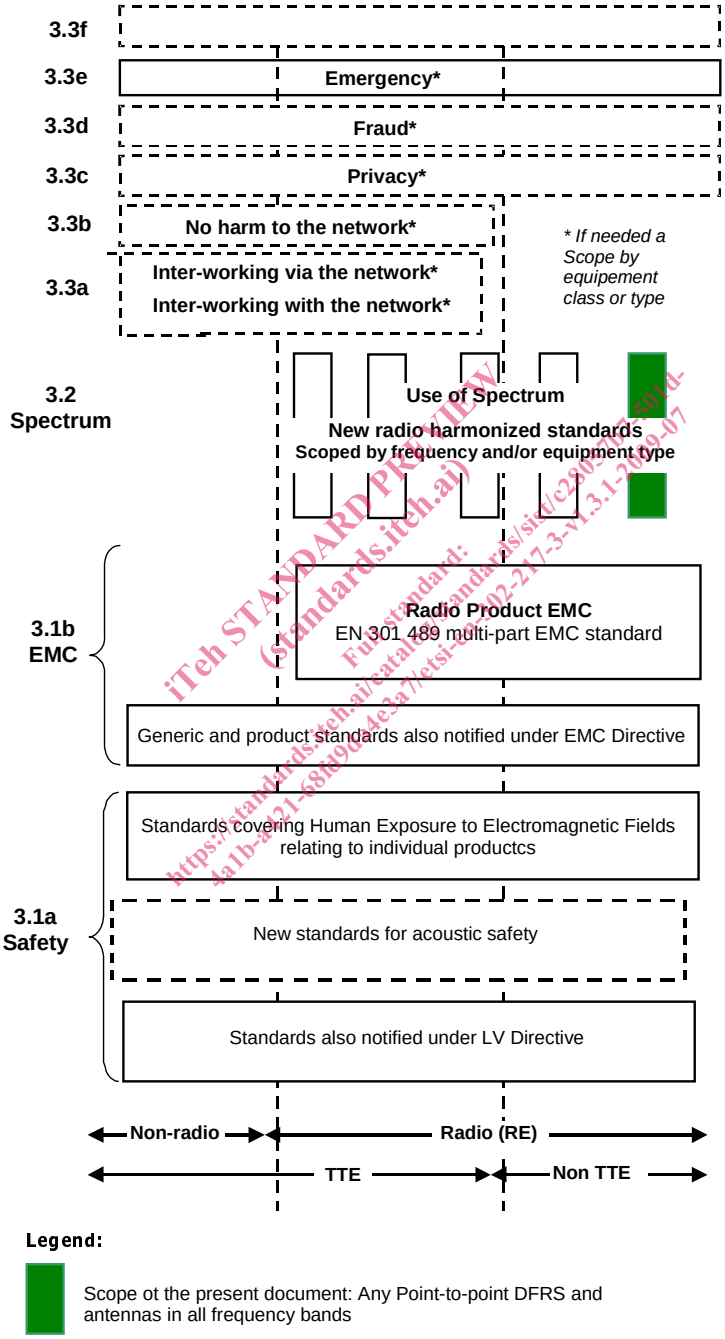
The present document is part 3 of a multi-part deliverable covering Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas. Full details of the entire series can be found in part 1 [8].

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
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

Introduction

The EN 302 217 series has been produced in order to rationalize a large number of previous ETSI ENs dealing with equipment and antennas for Point-to-Point (P-P) Fixed Service applications. For more details, see Foreword in the EN 302 217-1 [8].

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 [1]. The modular structure is described in EG 201 399 [i.2] figure 1 shows how the present document fits within that structure.



NOTE: For article 3.1b the diagram shows EN 301 489, the multi-part product EMC standard for radio used under the EMC Directive 89/336/EEC [i.1]. For Fixed Radio Systems EN, EN 301 489-1 [i.4] and EN 301 489-4 [i.5] are relevant.

Figure 1: Present document relationship with the modular structure of standards used under the R&TTE Directive

1 Scope

The present document specifies the essential requirements for point-to-point Digital Fixed Radio Systems (DFRS) operating in higher frequency bands, which propagation characteristics might be suitable for different frequency planning (see note 1). This would imply that, besides conventional link-by-link coordinated deployment, administrations may apply either no co-ordination at all (i.e. the band usage is free and the user is responsible for detecting a suitable interference-free operating frequency) or simplified co-ordination procedures based on the knowledge of existing links (e.g. through a public national data base) so that the impact of a possible new link could be evaluated on the basis of budgetary considerations of typical equipment receiver performances (which will not be considered related to essential requirements of article 3.2 of R&TTED [1]).

NOTE 1: For example, the frequency bands 58 GHz is proposed to be used by various technologies for uncoordinated use of the band. Besides the RF-channel selection procedure, specified in clause 4.2 to avoid unacceptable interference situations, this band, and those above up to ~63 GHz, also benefits from the high and stable atmospheric attenuation which suppresses efficiently distant interferers (about 10 dB/km to 15 dB/km at sea level), refer to ITU-R Recommendation P.676 [i.13].

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (R&TTE Directive) regarding 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] will apply to equipment within the scope of the present document.

NOTE 2: A list of such ENs is included on the web site http://www.newapproach.org/.

In order to technically cover different market and network requirements, with an appropriate balance of performance to cost and effective and appropriate use of the radio spectrum, the present document, together with EN 302 217-4-2 [9], offers system types and antennas alternatives, for selection by administrations, operators and manufacturers dependent on the desired use of the radio spectrum and network/market requirements, those options include:

- channel separation alternatives (as provided by the relevant CEPT Recommendation);
- implemented procedure for free radio channel selection;
- antenna directivity class alternatives (for different network density requirement).

The present document is mainly intended to cover fixed radio equipment without integral antennas. However, it also applies to fixed radio systems products with integral antennas, for which all the technical requirements included in the present document and in EN 302 217-4-2 [9] apply. For more background information on the equipment and antenna parameters here identified as relevant to article 3.2 of R&TTE Directive [1] see EG 201 399 [i.2] and TR 101 506 [i.8].

For the purposes of the present document two equipment Classes are specified depending on the network requirements:

- Class A: Digital equipment which apply the automatic RF-channel selection procedure (see clause 4.2) for interference avoidance and error performance enhancement.
- Class B: Equipment without automatic RF-channel selection procedure.

2 References

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

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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 indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

NOTE: With regard to ETSI ENs, the third digit of the version number is not considered essential for dated reference purposes because the ETSI Technical Working Procedures reserve this digit for editorially changed versions, thereby not affecting the technical parameters within versions with the same two initial digits. Here is reported the third digit of the latest version available at the time of publication of the present document.

[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] CEPT/ERC/Recommendation 74-01 (2005): "Unwanted emissions in the spurious domain".

[3] CEPT/ERC/Recommendation 05-02 (2005): "Use of the 64,0 - 66,0 GHz frequency band for Fixed Service".

[4] CEPT/ERC/Recommendation 09-01 (2009): "Use of the 57 - 64 GHz frequency band for point-to-point fixed wireless systems".

[5] CEPT/ERC/Recommendation 05-07 (2009): "Radio frequency channel arrangements for Fixed Service systems operating in the bands 71,0 - 76,0 GHz and 81,0 - 86,0 GHz".

[6] ETSI EN 301 126-1 (V1.1.2): "Fixed Radio Systems; Conformance testing; Part 1: Point-to-Point equipment - Definitions, general requirements and test procedures".

[7] ETSI EN 301 126-3-1 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 3-1: Point-to-Point antennas; Definitions, general requirements and test procedures".

[8] ETSI EN 302 217-1 (V1.2.1): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 1: Overview and system-independent common characteristics".

[9] ETSI EN 302 217-4-2 (V1.4.1): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 4-2: Antennas; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[10] IEEE 1802.3 (2001): "IEEE Conformance Test Methodology for IEEE Standards for Local and Metropolitan Area Networks-Specific Requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".

[11] IEEE 802.3 (2002): "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and physical layer specifications".

[12] ITU-R Recommendation SM.1539-1: "Variation of the boundary between the out-of-band and spurious domains required for the application of Recommendations ITU-R SM.1541 and ITU-R SM.329".

[13] ITU-T Recommendation O.151 and Corrigendum 1 (2002): "Error performance measuring equipment operating at the primary rate and above".

[14] ITU-T Recommendation O.181 (2002): "Equipment to assess error performance on STM-N interfaces".

[15] ITU-T Recommendation O.191 (2000): "Equipment to measure the cell transfer performance of ATM connections".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] 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).

[i.2] 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".

[i.3] ETSI EN 301 390 (V1.2.1): "Fixed Radio Systems; Point-to-point and Multipoint Systems; Spurious emissions and receiver immunity limits at equipment/antenna port of Digital Fixed Radio Systems".

[i.4] ETSI EN 301 489-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".

[i.5] ETSI EN 301 489-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 4: Specific conditions for fixed radio links and ancillary equipment and services".

[i.6] ETSI EN 302 217-2-1: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-1: System-dependent requirements for digital systems operating in frequency bands where frequency co-ordination is applied".

[i.7] ETSI EN 302 217-2-2: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Harmonized EN covering essential requirements of Article 3.2 of R&TTE Directive for digital systems operating in frequency bands where frequency co-ordination is applied".

[i.8] ETSI TR 101 506: "Fixed Radio Systems; Generic definitions, terminology and applicability of essential requirements under the article 3.2 of 1999/05/EC Directive to Fixed Radio Systems".

[i.9] ITU-R Recommendation F.1101: "Characteristics of digital fixed wireless systems below about 17 GHz".

[i.10] ITU-R Recommendation F.1191: "Bandwidths and unwanted emissions of digital fixed service systems".

[i.11] ITU-R Recommendation F.1497: "Radio-frequency channel arrangements for fixed wireless systems operating in the band 55.78-59 GHz".

[i.12] Void.

[i.13] ITU-R Recommendation P.676: "Attenuation by atmospheric gases".

[i.14] ITU-R Recommendation SM.329-10: "Unwanted emissions in the spurious domain".

[i.15] ITU-R Recommendation SM.1541-2: "Unwanted emissions in the out-of-band domain".

[i.16] ITU Radio Regulations (2008).

[i.17] CEPT/ERC/Recommendation 12-09 (2004), withdrawn (2009): "Radio frequency channel arrangement for Fixed Service systems operating in the band 57,0 - 59,0 GHz which do not require frequency planning".

[i.18] ETSI TR 100 028: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[i.19] 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.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 302 217-1 [8] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in EN 302 217-1 [8] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 302 217-1 [8] apply.

4 Technical requirements specifications

Guidance and description of the phenomena relevant to "essential requirements" under article 3.2 is given in EG 201 399 [i.2]; specific applications and descriptions for DFRS is given in TR 101 506 [i.8].

In the following clauses, limits are required to be met at specific reference points of the system block diagram. Reference points and the system block diagram are those set out in figure 1 of EN 302 217-1 [8].

In the case of wide radio-frequency bands covering units and multirate/multiformat equipment, these specifications shall be met at any frequency and at any rate/format. However the tests, required for generating a test report and/or declaration of conformity, in order to fulfil any conformity assessment procedure with respect to the R&TTE Directive [1], shall be carried-out in accordance with the principles set out in annex B.

Testing methods and conditions for assessing all requirements are specified in clause 5, where each clause directly refers to corresponding clause in this clause.

4.1 Environmental profile

The required environmental profile for operation of the equipment shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

For testing the compliance with technical requirements see also EN 301 126-1 [6] and clause 5 of the present document.

NOTE: With the generic term of environmental profile, it is here intended any variation of the "external" conditions (e.g. climatic and external primary/secondary power supply sources feeding the equipment to be assessed) that might affect the system parameter relevant to the "essential requirements" of article 3.2 of the R&TTE Directive [1].

4.2 RF-channel selection

RF-channel selection procedure is mandatory for Class A equipment only.

4.2.1 RF-channel selection procedure

The purpose of the RF-channel selection procedure is to detect and protect existing transmissions in order to avoid unacceptable interference situations.

At both transmission sites, radio-relay terminals shall measure during installation, the interference levels of both receive and transmit channels (see note). Only in the instance when an unoccupied channel is identified and selected as the transmission channel shall the transmit power be switched on. The interference avoidance requirements for the receiver to detect occupied channels are specified in clause 4.2.2.

The principle of protecting existing transmission shall be respected also during the antenna alignment procedure.

NOTE: If the national regulatory rules allow to change the frequency of the link during its operation, it may be considered, in order to decrease the possibility of undetected interference, to apply the RF channel selection procedure whenever appropriate (e.g. when restoring a link after a failure or by suitable automatic timed routine in conjunction with frequency agility as in clause 4.2.3).

4.2.2 Interference avoidance requirements

4.2.2.1 Interference avoidance limit

The radio relay terminal shall consider the radio channel occupied when the level of the interference is above the following limit:

- Pi > C dBm + 10 log (BW/10 MHz).

Where:

- BW is the noise bandwidth of the receiver expressed in MHz;
- Pi is the interference power expressed in dBm measured within the receiver noise bandwidth (BW);

The value C is dependent on frequency band and is given in the relevant annexes UA to UC.

For the rationale of the interference limit formula see informative annex UD.

For test purpose this requirement shall be fulfilled at reference point C within the intended band of transmission:

- with a signal similar to the transmitted one;
- with a CW signal at any frequency within this band.

The value of the intended band of transmission shall be declared by the supplier.