SLOVENSKI STANDARD
SIST EN 302 217-3 V2.2.1:2014

01-junij-2014

Fiksni radijski sistemi - Karakteristike in zahteve za opremo in antene tipa točka-točka - 3. del: Oprema, ki deluje v frekvenčnih pasovih, kjer se lahko uporablja usklajena ali neusklajena oprema - Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE

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

Ta slovenski standard je istoveten z: **EN 302 217-3 Version 2.2.1**

ICS:

33.060.30	Radiorelejni in fiksni satelitski komunikacijski sistemi	Radio relay and fixed satellite communications systems
33.120.40	Antene	Aerials

SIST EN 302 217-3 V2.2.1:2014 **en**

ETSI EN 302 217-3 V2.2.1 (2014-04)

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-04026

Keywords
DFRS, digital, DRRS, FWA, point-to-point, radio, regulation, transmission

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

The present document can be downloaded from:
http://www.etsi.org

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (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://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

Contents

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://ipr.etsi.org).

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 Harmonized European Standard (EN) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

The present document has been produced by ETSI in response to mandate M/284 issued from the European Commission under Directive 98/34/EC [i.19] as amended by Directive 98/48/EC [i.20].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [1].

See article 5.1 of Directive 1999/5/EC [1] for information on presumption of conformity and Harmonized Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The requirements relevant to Directive 1999/5/EC [1] are summarized 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].

National transposition dates	
Date of adoption of this EN:	26 March 2014
Date of latest announcement of this EN (doa):	30 June 2014
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2014
Date of withdrawal of any conflicting National Standard (dow):	31 December 2015

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 shown in EG 201 399 [i.2].

Figure 1: Void

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 simplified frequency planning (see example) rather than conventional link-by-link coordinated deployment.

This would imply that 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&TTE Directive [1]).

The bands in the scope of the present document, to which these frequency assignment procedures apply, are specifically referred in annexes UA through UC where the applicable equipment requirements are reported.

EXAMPLE: The frequency band 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 Recommendation ITU-R 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: 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 [10], 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 [10] 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.7].

For the purposes of the present document two equipment Types are specified, when appropriate, depending on specific network requirements:

- Type A: Digital equipment which apply the standardized automatic RF-channel selection procedure (see clause 4.2) for interference avoidance and error performance enhancement.
- Type B: Equipment not required to have 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 specific references, only the cited version applies. For non-specific references, the latest version of the referenced 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] 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 (01-2011): "Unwanted emissions in the spurious domain".

[3] CEPT/ECC/Recommendation (05)02 (02-2009): "Use of the 64 - 66 GHz frequency band for Fixed Service".

[4] CEPT/ECC/Recommendation (09)01 (02-2009): "Use of the 57 - 64 GHz frequency band for point-to-point Fixed Wireless Systems".

[5] CEPT/ECC/Recommendation (05)07 (05-2013): "Radio frequency channel arrangements for Fixed Service Systems operating in the bands 71 - 76 GHz and 81 - 86 GHz".

[6] ETSI EN 301 126-1 (V1.1.2) (09-1999): "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) (04-2000): "Fixed Radio Systems; Conformance testing; Part 3-1: Point-to-Point antennas; Definitions, general requirements and test procedures".

[8] ETSI EN 302 217-1 (V2.1.1) (07-2013): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 1: Overview and system-independent common characteristics".

[9] ETSI EN 302 217-2-2 (V2.2.1) (04-2014): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Digital systems operating in frequency bands where frequency co-ordination is applied; 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".

[10] ETSI EN 302 217-4-2 (V1.5.1) (08-2010): "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".

[11] 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".

[12] IEEE 802.3-2008: "IEEE Standard for 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".

[13] Recommendation ITU-R SM.1539-1 (11-2002): "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".

[14] Recommendation ITU-T O.151 (10-1992) and Corrigendum 1 (05-2002): "Error performance measuring equipment operating at the primary rate and above".

[15] Recommendation ITU-T O.181 (05-2002): "Equipment to assess error performance on STM-N interfaces".

[16] Recommendation ITU-T O.191 (02-2000): "Equipment to measure the cell transfer performance of ATM connections".

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] Void.

[i.2] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of 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] Void.

[i.5] Void.

[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 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.8] ETSI TR 103 103: "Fixed Radio Systems; Point-to-point systems; ATPC, RTPC, Adaptive Modulation (mixed-mode) and Bandwidth Adaptive functionalities; Technical background and impact on deployment, link design and coordination".

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

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

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

[i.12] Recommendation ITU-R F.2006: "Radio-frequency channel and block arrangements for fixed wireless systems operating in the 71-76 and 81-86 GHz bands".

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

[i.14] Recommendation ITU-R SM.329-12: "Unwanted emissions in the spurious domain".

[i.15] Recommendation ITU-R SM.1541-4: "Unwanted emissions in the out-of-band domain".

[i.16] ITU Radio Regulations (2012).

[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.

[i.20] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC 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.7].

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 Type 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.

4.2.3 Frequency agile automatic channel selection

Frequency agility is an optional feature.

If unacceptable interference which exceeds a predetermined duration is observed, an automatic change of RF-channel can be initiated using the RF-channel selection procedure described above. If an automatic RF-channel change facility is implemented a means shall be provided to disable it. Unacceptable interference criteria shall be declared by the supplier (see informative annex UD, clause UD.3).

4.3 Transmitter requirements

The specified transmitter characteristics shall be met with the appropriate base band signals applied at one of the reference points X' of figure 1 of EN 302 217-1 [8].

The appropriate base band signals for most common digital interfaces are given in table 1.

Table 1: Test signal and type of base band interface

Type of base band signal interface at X/X'	Test signal to be applied according to:
PDH	Recommendation ITU-T O.151 [14] (PRBS)
SDH	Recommendation ITU-T O.181 [15]
ATM	Recommendation ITU-T O.191 [16]
Ethernet interface (packet data)	IEEE 1802.3 [11] and IEEE 802.3 [12]
Other than the above	Relevant standards which the interface refers to (see note)
NOTE: When standard interfaces are provided they shall comply with ITU-T standards or other standardized interface declared by the supplier. However, in some applications of these radio relay systems, interface parts may be integrated with other systems and therefore standard interfaces (X, X' reference sections) are not available under these circumstances. In the latter case the radio system assessment shall be made including those other equipment for properly supplying all loading conditions foreseen.	

4.3.1 Transmitter power

4.3.1.1 Transmitter power

Transmitter maximum mean output power at reference point C' of the system block diagram (figure 1 of EN 302 217-1 [8]), shall not exceed A (dBm or dBW) including tolerance and, if applicable, ATPC/RTPC influence. The values of *A* are dependent on frequency band and are given in the relevant annexes UA to UC.

4.3.1.2 Equivalent Isotropically Radiated Power (EIRP)

The Equivalent Isotropically Radiated Power (EIRP) shall be limited to +B (dBm or dBW) including tolerance and, if applicable, ATPC/RTPC influence. The values of B are dependent on frequency band and are given in the relevant annexes UA to UC.

NOTE: This requirement is for assessment of equipment with integral antenna only; however also equipment placed on the market without antennas should, in principle, when relevant in common practice, refer to such limitations (e.g. defining the maximum associated antenna gain).

4.3.1.3 Output Power Tolerance

The power tolerance and the nominal output power shall be declared by the supplier and shall be included in the limits in clauses 4.3.1.1 and 4.3.1.2.

4.3.1.4 Automatic Transmit Power Control (ATPC)

ATPC is an optional feature. Equipment with ATPC will be subject to a supplier's declaration of ATPC ranges (see note 1) and related tolerances. The supplier shall also declare if the equipment is designed with ATPC as a fixed permanent feature.

When ATPC is used as permanent feature, different Pout and/or EIRP requirements (+A and +B limits in previous clauses) may apply to power levels delivered by the ATPC regime in both "unfaded conditions" and "full power" (see note 2). Requirements are dependent on frequency band and are given in the relevant annexes UA to UC.

NOTE 1: For the relevant power level definitions of ATPC for ATPC operation see EN 302 217-1 [8]. For additional clarification on ATPC operation see TR 103 103 [i.8].

NOTE 2: These ATPC regime power levels are identified as "*minimum power*" and "*maximum available power*", respectively, in the relevant power level definitions in EN 302 217-1 [8].