

Final draft **ETSI EN 301 751** V1.2.1 (2002-07)

Candidate Harmonized European Standard (Telecommunications series)

**Fixed Radio Systems;
Point-to-Point equipments and antennas;
Generic harmonized standard for Point-to-Point digital
fixed radio systems and antennas covering
the essential requirements under article 3.2
of the 1999/5/EC Directive**



Reference

REN/TM-04126

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DRRS, DFRS, FWA, point-to-point, radio,
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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 Transmission and Multiplexing (TM), and is now submitted for the ETSI standards One-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) [30] 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").

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

This second version intends to endorse, within the scope and applicability under the R&TTE Directive [1] of the present harmonized EN, some new product standards and revisions of already considered product standards. They have been produced by TC-TM, following the market demand, after the publication in the OJ of the first version V1.1.1.

For systems already covered by the previous version of the present document, only equal or technically equivalent requirements have been introduced by this second version. Therefore, from a strictly technical point of view only, it is expected that equipment already conforming to the previous version, would not need re-assessment of essential requirements according to this second version; however, legal implications on the actual declaration of conformity and equipment labelling are outside the scope of the present document.

In addition, justification has been introduced in order to support some positions, commonly shared in the Fixed Service community, on some areas not yet fully clarified in their application and relationship to R&TTE Directive [1] implementation. This with the intention of, at least, keeping a common understanding of those issues, in the spirit of maintaining market competition on equitable level.

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):	24 months after doa

Notes to the NSOs for the OAP procedure:

In tables 2 to 14 reference is made to a specific version of a number of ENs; most of them are under amendment currently at various stages of approval. When these new or amended ENs are approved they should be published as ENs with the quoted version number (as currently required for dated references provisions in harmonized standards).

Prior to the publication of the present document, references of table 2 will be updated to match with the current status of the references deliverables and the publication of the present document will be held until all the quoted versions are published.

In the case that one or more of the revisions are unacceptably delayed beyond the end of this OAP, the reference will be changed to the previous published version of the EN and provision will be made for an amendment of the present document for endorsing such amendment.

The present document does not introduce any new technical requirements beyond those already present in the ENs listed in table 2, currently approved or under approval procedure.

Introduction

Digital Radio systems for the Fixed Service, used in European countries, are presently referred to in a relatively large number of specific ETSI standards.

These ENs contain other requirements that even if not considered essential under the R&TTE Directive [1] are nevertheless applicable, on the ETSI commonly understood voluntary basis, to guarantee good performance and operability of Digital Fixed Radio Systems (DFRS).

These standards either for point-to-point or for point-to-multipoint systems, cover a very wide range of frequency bands of emission, traffic capacities, channel separations and modulation formats that, for the point-to-point systems subject of the present document, are typically summarized in table 1.

Table 1: Digital Fixed Radio System (DFRS) parameters

Parameter	Range
Frequency bands	below 1 GHz to 58 GHz
Traffic capacities	from 9,6 kbit/s to 622 Mbit/s
Channel separations	from 25 kHz to 112 MHz
Modulation formats	from 2 to 512 states (amplitude and/or phase and/or frequency states).
Typical applications	POINT-TO-POINT (P-P) CONNECTIONS: long haul (trunk), rural and urban low/medium/high capacity links STAND ALONE ANTENNAS: for all the above applications when integral antennas are not employed

Many of the standards are produced for similar systems, which have different capacity and spectrum efficiency parameters, for applications in the various radio frequency channel arrangements as shown in table 1. It is expected that other standards will be developed in the future to cover emerging technologies and/or new frequency bands.

All the systems are very similar in the "principles of parameters" but, besides a few common horizontal parameters, they differ in the "required numerical values".

The present document, for point-to-point systems contains only the phenomena relevant to the essential requirements of article 3.2 of the R&TTE Directive [1], giving the reference of the relevant clauses of the ETSI product standards, which contain the actual numerical values and the relevant test methods for the declaration of conformity to the essential requirements.

Where appropriate some horizontal requirements are directly reported.

The selection of the phenomena relevant to the essential requirements has been based on the guidance given by EG 201 399 [27] and by the specific analysis applied to DFRS given in TR 101 506 [28].

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.

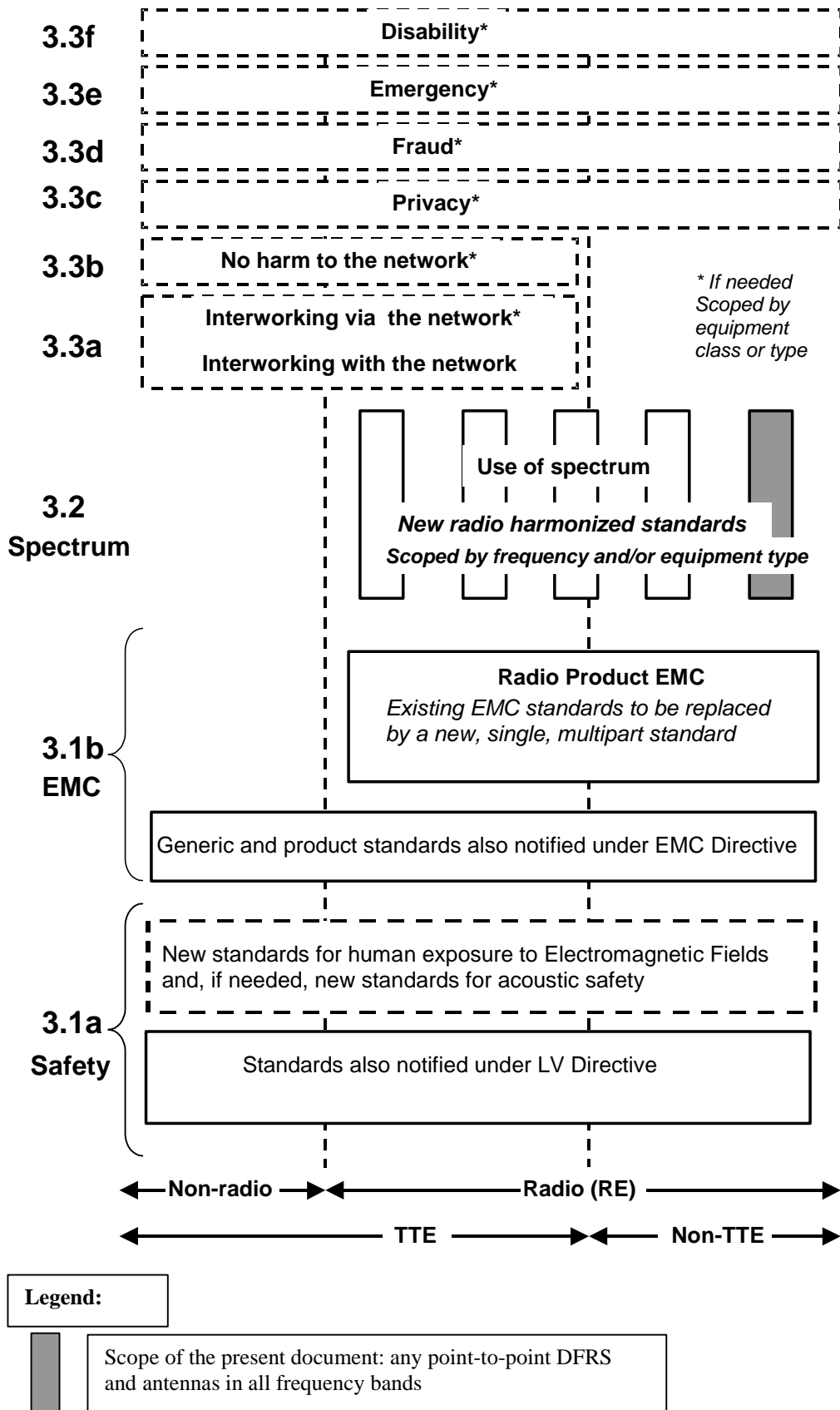


Figure 1: Modular structure for the various standards used under the R&TTE Directive

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 the present document 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 the diagram shows the new single multipart 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, relevant to fixed links equipment, have been published on the EC OJ, and the existing separate product EMC standards will be superseded by the date reported in the EC OJ.

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. 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.

1 Scope

The present document applies to the following digital fixed radio systems (DFRS) types:

- 1) point-to-point systems intended for operation in frequency bands that require co-ordination;
- 2) point-to-point systems intended for operation in frequency bands that do not require co-ordination;
- 3) antennas for point-to point DFRS.

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (R&TTE Directive) 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 1: A list of such ENs is included on the ETSI web site at <http://www.newapproach.org>.

Table 2 summarizes the ETSI standards applicable to point-to-point DFRS, from which the technical parameters within the present document have been extracted.

NOTE 2: The third digit of the EN 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 that version.

Table 2: Applicability of the present document to the equipments in the scope of ETSI standards

Equipment standards				
ETSI Reference number	Version	Title	Fixed Service Frequency bands of operation (note)	Channels separation (MHz)
EN 300 197 [4]	V1.6.b	Parameters for radio relay systems for the transmission of digital signals and analogue video signals operating at 32 GHz and 38 GHz	32 GHz and 38 GHz	3,5 to 56
EN 300 198 [5]	V1.5.b	Parameters for radio relay systems for the transmission of digital signals and analogue video signals operating at 23 GHz	23 GHz	3,5 to 56
EN 300 234 [7]	V1.3.b	High capacity digital radio-relay systems carrying 1 x STM-1 signals and operating in frequency bands with about 30 MHz channel spacing and alternated arrangements	any from the 4 GHz to the 15 GHz	28 to 30
EN 300 407 [6]	V1.3.b	Parameters for radio-relay systems for the transmission of digital signals and analogue video signals operating around 55 GHz	55 GHz	14 to 140
EN 300 408 [8]	V1.3.b	Parameters for radio-relay systems for the transmission of digital signals and analogue video signals operating at around 58 GHz, which do not require frequency planning	58 GHz	50 and 100
EN 300 430 [9]	V1.4.b	Parameters for radio systems for the transmission of STM-1 digital signals operating at 18 GHz in either 55 MHz or 27,5 MHz channel spacing	18 GHz	27,5 and 55
EN 300 431 [10]	V1.4.b	Digital fixed point-to-point radio link equipment operating in the frequency range 24,5 GHz to 29,5 GHz	26 GHz and 28 GHz	3,5 to 56
EN 300 630 [11]	V1.3.b	Low capacity point to point digital radio relay systems in the 1,4 GHz band	1,4 GHz	0,025 to 3,5
EN 300 631 [12]	V1.2.b	Antennas for point-to-point radio links in band 1 to 3 GHz	any from 1 GHz to 3 GHz	N.A.
EN 300 633 [13]	V1.3.b	Low and medium capacity point-to-point digital radio relay systems operating in the 2,1 GHz to 2,6 GHz frequency band	any from the 2,1 GHz to the 2,6 GHz	0,5 to 14

Equipment standards				
ETSI Reference number	Version	Title	Fixed Service Frequency bands of operation (note)	Channels separation (MHz)
EN 300 639 [14]	V1.3.b	Sub STM-1 digital radio relay systems (DRRS) operating in the 13 GHz, 15 GHz and 18 GHz frequency band with about 28 MHz co-polar and 14 MHz cross-polar channel spacing	13 GHz, 15 GHz and 18 GHz	14 and 28
EN 300 786 [15]	V1.3.b	Sub STM-1 digital radio relay systems in the 13 GHz, 15 GHz and 18 GHz bands with about 14 MHz co-polar channel spacing	13 GHz, 15 GHz and 18 GHz	14
EN 300 833 [16]	V1.4.b	Antennas used in point-to-point radio relay systems operating in frequency bands from 3 GHz to 60 GHz	any from 3 GHz to 60 GHz	N.A.
EN 301 127 [17]	V1.3.b	High capacity DRRS carrying 2 x STM-1 in frequency bands with about 30 MHz channel spacings using co-polar arrangements or co-channel dual-polarized (CCDP) operation	any from the 4 GHz to the 15 GHz	28 to 30
EN 301 128 [18]	V1.2.b	PDH low and medium capacity digital radio relay systems operating in the frequency bands 13 GHz, 15 GHz and 18 GHz	13 GHz, 15 GHz and 18 GHz	1,75 to 28
EN 301 216 [19]	V1.2.b	PDH low and medium capacity and STM-0 digital radio relay systems operating in the frequency bands in the range 3 GHz to 11 GHz	any from 3 GHz to 11 GHz	1,75 to 30
EN 301 277 [20]	V1.2.b	High capacity DRRS transmitting STM-4 or 4 x STM-1 in a 40 MHz radio frequency channel using Co-Channel Dual Polarized (CCDP) operation	any from the 4 GHz to the 11 GHz	40
EN 301 387 [21]	V1.2.b	PDH low and medium capacity digital radio relay systems operating in the frequency band 48,5 GHz to 50,2 GHz	50 GHz	3,5 to 28
EN 301 669 [22]	V1.2.b	High capacity DRRS carrying STM-4 in two 40 MHz channels or 2 x STM-1 in 40 MHz channel with alternate channel arrangement	any from the 4 GHz to the 11 GHz	40
EN 301 461 [23]	V1.3.b	High capacity DRRS carrying 2 x STM-1 in frequency bands with 40 MHz channel spacings using co-channel dual-polarized (CCDP) operation	any from the 4 GHz to the 11 GHz	40
EN 301 786 [32]	V1.2.b	Parameters for digital radio systems for the transmission of digital signals operating at 52 GHz	52 GHz	3,5 to 56
EN 301 787 [33]	V1.1.b	Parameters for radio systems for the transmission of Sub-STM-0 digital signals operating in the 18 GHz frequency band	18 GHz	3,5
Test methods for spurious emissions and receiver immunity standards that are relevant for the test and definition of essential requirements				
ETSI Reference number	Version	Title		
EN 301 126-1 [24]	V1.1.b	Fixed Radio Systems; Conformance testing; Part 1: Point-to-Point equipment - Definitions, general requirements and test procedures		
EN 301 126-3-1 [25]	V1.1.b	Fixed Radio Systems; Conformance testing; Part 3-1: Point-to-Point antennas - Definitions, general requirements and test procedures		
EN 301 390 [26]	V1.1.b	Spurious emissions and receiver immunity at equipment antenna port of Digital Fixed Radio Systems		
NOTE:	The frequency band identification is taken from the approximate centre frequency as commonly used in Fixed Service ITU-R Recommendations; it also includes national frequency bands that may slightly differ from each other but are commonly referred to by the same term.			
N.A.:	Not applicable.			

The provisions of the present document are valid for all point-to-point (P-P) DFRS (Digital Fixed Radio Systems) and related antennas also in the scope of the relevant ETSI standards summarized in table 1.

In order to technically cover different market and network requirements, with appropriate balance of cost/benefit, the ETSI standards summarized in table 1 offers a number of system types and antennas alternatives, for different network/market requirements, including:

- channel separation alternatives (as provided by the relevant CEPT Recommendation);
- spectral efficiency class alternatives (different complexity of modulation formats provided in radio equipment standards);
- antenna directivity class alternatives (for different network density requirement).

However, the Fixed Service generally operate in not harmonized bands, therefore it is currently understood that National Regulatory Bodies can limit the licensing only to some selected alternatives according the provision of R&TTE Directive [1] article 7.2 "...for reasons related to the effective and appropriate use of the radio spectrum,...".

In a long-term regime, it is desirable that the allowed alternatives be included within the "national interface notification" under the provision of R&TTE Directive [1] article 4.1 and also that the covered alternatives be mentioned in the "notification of the intention to place a DFRS on the national market" under the provision of R&TTE Directive [1] article 6.4.

The present document is considered applicable to fixed radio systems products with integral antennas, for which all the technical requirements included in the present document apply. It also applies to fixed radio equipment without integral antennas and to separate antenna products, to which only the relevant technical requirements apply, and which would be therefore subject to separate declarations of conformity to the essential requirements of the R&TTE Directive [1].

In particular, it has to be noted that TCAM, while recognizing the "essentiality" of antenna directional requirements for some applications, including the Fixed Service, has deliberated that there should be no obligation for separate declaration of conformity for stand alone antennas and that the respect of the relevant essential requirements should be demanded to the final system integrator.

However, it has also been recognized that the assessment of article 3.2 requirements on the radio-sites is technically impractical. Therefore, it should not be forbidden to a supplier of DFRS antennas, who decides, under his responsibility, to declare compliance to the relevant harmonized standard (or part thereof, in this case), to affix the CE label to a stand-alone Fixed Radio antenna product, fulfilling all other obligation foreseen by R&TTE Directive [1]; in particular, providing information for the user on the intended use of the apparatus. The final system integrator might benefit of such declaration of conformity for any final radio-site assessment obligations.

In any case, the antenna manufacturer is expected to keep a technical construction file (according annex II of R&TTE) to be supplied, on request, to the radio system vendor or to the final system integrator.

Technical specifications relevant to the R&TTE Directive [1] are summarized in annex A.

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 EN 300 197 (V1.6.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for radio systems for the transmission of digital signals operating at 32 GHz and 38 GHz".
- [5] ETSI EN 300 198 (V1.5.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for radio systems for the transmission of digital signals operating at 23 GHz".
- [6] ETSI EN 300 407 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for digital radio systems for the transmission of digital signals operating at 55 GHz".
- [7] ETSI EN 300 234 (V1.3.2): "Fixed Radio Systems; Point-to-point equipment; High capacity digital radio systems carrying 1 x STM-1 signals and operating in frequency bands with about 30 MHz channel spacing and alternated arrangements".
- [8] ETSI EN 300 408 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for digital radio systems for the transmission of digital signals and analogue video signals operating at around 58 GHz, which do not require co-ordinated frequency planning".
- [9] ETSI EN 300 430 (V1.4.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for radio systems for the transmission of STM-1 digital signals operating in the 18 GHz frequency band with channel spacing of 55 MHz and 27,5 MHz".
- [10] ETSI EN 300 431 (V1.4.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for radio system for the transmission of digital signals operating in the frequency range 24,50 GHz to 29,50 GHz".
- [11] ETSI EN 300 630 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Low capacity point-to-point digital radio systems operating in the 1,4 GHz frequency band".
- [12] ETSI EN 300 631 (V1.2.1): "Fixed Radio Systems; Point-to-Point Antennas; Antennas for Point-to-Point fixed radio systems in the 1 GHz to 3 GHz band".
- [13] ETSI EN 300 633 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Low and medium capacity point-to-point digital radio systems operating in the frequency range 2,1 GHz to 2,6 GHz".
- [14] ETSI EN 300 639 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Sub-STM-1 digital radio systems operating in the 13 GHz, 15 GHz and 18 GHz frequency bands with about 28 MHz co-polar and 14 MHz cross-polar channel spacing".
- [15] ETSI EN 300 786 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; Sub-STM-1 digital radio systems operating in the 13 GHz, 15 GHz and 18 GHz frequency bands with about 14 MHz co-polar channel spacing".
- [16] ETSI EN 300 833 (V1.4.1): "Fixed Radio Systems; Point-to-point antennas; Antennas for point-to-point fixed radio systems operating in the frequency band 3 GHz to 60 GHz".
- [17] ETSI EN 301 127 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; High capacity digital radio systems carrying SDH signals (up to 2 x STM-1) in frequency bands with about 30 MHz channel spacing and using co-polar arrangements or Co-Channel Dual Polarized (CCDP) operation".
- [18] ETSI EN 301 128 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; Plesiochronous Digital Hierarchy (PDH); Low and medium capacity digital radio systems operating in the 13 GHz, 15 GHz and 18 GHz frequency bands".
- [19] ETSI EN 301 216 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; Plesiochronous Digital Hierarchy (PDH); Low and medium capacity and STM-0 digital radio system operating in the frequency bands in the range 3 GHz to 11 GHz".

- [20] ETSI EN 301 277 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; High capacity digital radio systems transmitting STM-4 or 4 x STM-1 in a 40 MHz radio frequency channel using Co-Channel Dual Polarized (CCDP) operation".
- [21] ETSI EN 301 387 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; Plesiochronous Digital Hierarchy (PDH); Low and medium capacity digital radio systems operating in the frequency band 48,5 GHz to 50,2 GHz".
- [22] ETSI EN 301 669 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; High capacity digital radio systems carrying STM-4 in two 40 MHz channels or 2 x STM-1 in a 40 MHz channel with alternate channel arrangement".
- [23] ETSI EN 301 461 (V1.3.1): "Fixed Radio Systems; Point-to-point equipment; High capacity fixed radio systems carrying SDH signals (2 x STM-1) in frequency bands with 40 MHz channel spacing and using Co-Channel Dual Polarized (CCDP) operation".
- [24] 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".
- [25] 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".
- [26] ETSI EN 301 390 (V1.1.1): "Fixed Radio Systems; Point-to-point and Point-to-Multipoint Systems; Spurious emissions and receiver immunity at equipment/antenna port of Digital Fixed Radio Systems".
- [27] ETSI EG 201 399 (V1.1.1): "A guide to the production of Harmonized standards for application under the R&TTE Directive".
- [28] ETSI TR 101 506 (V1.1.1): "Fixed Radio Systems; Generic definitions, terminology and applicability of essential requirements under the article 3.2 of 99/05/EC Directive to Fixed Radio Systems".
- [29] ITU-R Recommendation F.746: "Radio-frequency arrangements for fixed service systems".
- [30] 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.
- [31] ETSI EN 300 385 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment".
- [32] ETSI EN 301 786 (V1.2.1): "Fixed Radio Systems; Point-to-point equipment; Parameters for digital radio systems for the transmission of digital signals operating at 52 GHz".
- [33] ETSI EN 301 787 (V1.1.1): "Fixed Radio Systems; Point-to-Point equipment; Parameters for radio systems for the transmission of Sub-STM-0 digital signals operating in the 18 GHz frequency band".
- [34] CEPT/ERC/REC 12-09: "Radio frequency channel arrangement for fixed service systems operating in the band 57.0 - 59.0 GHz which do not require frequency planning".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

allocated radio frequency band: allocation (of a frequency band), entry in the table of frequency allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radioastronomy service under specific conditions

NOTE: This term shall also be applied to the frequency band concerned (Radio Regulations, Geneva 2001 article S1.16).

Automatic Transmit Power Control (ATPC): function implemented to offer a dynamic power control that delivers the maximum power only during deep fading activity; in this way for most of the time the interference is reduced and the transmitter operates in a higher linearity mode

NOTE: When this function is used, the transmit power is dynamically changed by the far-end receiver and follows the propagation condition. In principle, when ATPC is implemented, three different level of power may be identified:

- maximum available power (delivered only in condition of deep fading);
- maximum nominal power (useable on permanent base when ATPC is disabled); it should be noted that this power is "nominal for the equipment" and has not to be confused with the "nominal level set link by link" by the frequency co-ordinator body, eventually achieved through passive RF attenuators or RTPC function;
- maximum nominal and maximum available power levels may be coincident or, in case of multi-states modulations formats, the maximum available power may be used to overdrive the transmitter (loosing linearity but gaining fade margin when the fade conditions have already impaired the expected RBER). Performance predictions are usually made with the highest "available power";
- minimum power (delivered in unfaded condition).

conformity assessment procedure: as described in the R&TTE Directive [1] annexes II, III, IV and V.

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

essential phenomenon: radio frequency phenomenon related to the essential requirements under article 3.2 of the Directive, that is capable of expression in terms of quantifiable technical parameters

harmonized radio frequency band: commonly referred as a portion of the frequency spectrum that CEPT/ERC allocates to a specific service through a CEPT/ERC Decision (proper definition is currently under study by CEPT/ERC)

NOTE: It should be noted that, presently, radio frequency bands allocated to Fixed Service are not harmonized.

maximum available power: See Automatic Transmit Power Control (ATPC).

maximum nominal power: See Automatic Transmit Power Control (ATPC).

national radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels, covered by a national regulation in a not harmonized frequency band used in a country (it may all or in part overlap with other national or recommended radio frequency channel arrangements)

operating frequency range: range(s) of radio frequency channels covered by the Equipment Under Test (EUT) without any change of units (definition from EN 300 385)

radio Equipment: (as defined in the R&TTE Directive): radio equipment means a product, or relevant component thereof, capable of communication by means of the emission and/or reception of radio waves utilizing the spectrum allocated to terrestrial/space radiocommunication

radio frequency channel: portion of a radio frequency band, where a radio frequency channel arrangement has been established, dedicated to one fixed radio link

radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels, as defined by ITU-R Recommendation F.746 used by administrations for co-ordination in the same geographical area.

recommended radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels, covered by a CEPT/ERC Recommendation in a not harmonized frequency band (not used for the same purpose by all administrations) that is recommended to the member countries in the case they use the relevant frequency band for Fixed Service

Remote Frequency Control (RFC): Many fixed digital radio systems offered this functionality as a qualifying aid to the deployment. When this function is used, the transmit centre frequency/channel can be set either by a local control unit connected to the system control unit or to a by a remote network management terminal. The frequency variation is static and usually made at the activation or re-commissioning of links in order to easily obtain the licensed frequency assigned by the co-ordinating body to the network operator for that link, to control network interference in the same geographical area.

Remote Transmit Power Control (RTPC): Many fixed digital radio systems offered this functionality as a qualifying aid to the deployment. When this function is used, the transmit power can be set either by a local control unit connected to the system control unit or to a by a remote network management terminal. The power variation is static and usually made at the activation or re-commissioning of links in order to easily obtain the EIRP required by the frequency co-ordinating body for that link, to control co-channel and adjacent channel interference in the same geographical area. In principle, this function is equivalent to the requirement of power regulation capability (e.g. by fixed attenuators) commonly required in fixed systems.

3.2 Symbols

For the purposes of the present document, the following symbol applies:

dBm decibel ratio relative to 1 milliWatt

3.3 Abbreviations

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

ATPC	Automatic Transmit Power Control
BER	Bit Error Rate
EIRP	Equivalent Isotropically Radiated Power
EMC	Electro-Magnetic Compatibility
ERC	European Radiocommunications Committee
DFRS	Digital Fixed Radio Systems
FWA	Fixed Wireless Access
HW	HardWare
IF	Intermediate Frequency
LV	Low Voltage
P-P	Point-to-Point
R&TTE	Radio equipments and Telecommunication Terminal Equipment
RBER	Residual Bit Error Rate
RF	Radio Frequency
RFC	Remote Frequency Control
RSL	Receiver input Signal Level
RTPC	Remote Transmit Power Control
TCAM	Telecommunication Conformity Assessment Matter committee
XPD	Cross-Polar Discrimination

4 Technical requirements specifications

4.1 General

With reference to article 3.2 of the R&TTE Directive [1], the technical phenomena in this clause have been identified as relevant to the essential requirements.

Guidance and description of the phenomena is given by EG 201 399 [27] and specific applications and descriptions for DFRS is given by TR 101 506 [28].

Point-to-point equipment are generally used in the fixed infrastructure by Operators of Public Telecommunication Networks. It is generally understood that, when used in PCN (Public Communication Networks), DFRS, as all fixed network equipment, shall meet a number of ITU-T availability recommendations, which are essential for national and international communications that may commonly include any kind of high priority government, business and emergency communications. Poor receiver parameters may endanger these kinds of communications.

In all cases, standardized receiver parameters ensure that equipment will operate on the transmitter side with characteristics optimized in terms of transmission characteristics, thus reducing its interference potential to the strict minimum. In several but not all cases, this is also ensured by a functional feedback link between receiver and transmitter operations.

Therefore, also in the light of the conclusion expressed by TCAM 7 endorsing ERM/TG 18 proposal, it is considered that, for Point-to-point equipment used in the "public core and access networks" offering high service availability radio links (e.g. requirements to meet PSTN performance objectives and safety of life considerations), all receiver parameters, referred in the present document are to be considered relevant to the essential requirements under article 3.2 of the R&TTE Directive [1]. This statement would not be supported only in particular cases, such as equipment for the 58 GHz band considered in EN 300 408 [8], due to the different deployment method recommended by CEPT/ERC/REC 12-09 [34].

The tables stated in the following clauses identify, in the specific ETSI standards (see table 2), which are in the scope of the present document, the applicable clauses that are relevant to the essential requirements under article 3.2 of the R&TTE Directive [1].

Test methods referenced are only those considered essential *for the assessment of conformity to article 3.2* of the R&TTE Directive [1] (i.e. for the reproducibility of the results).

4.2 Environmental profile and tests

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

The environmental profile, may be determined by the environmental class of the equipment according the guidance given in clause 4.4 of EN 301 126-1 [24].

The equipment shall comply with all the requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

Any test, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1] for radio equipment, shall be carried-out with the same principles and procedures, for reference and extreme conditions, reported in clause 4.4 of EN 301 126-1 [24]. The requirement for test at reference or extreme conditions is reported in any relevant section of clauses 4.5 and 4.7 of the present document according to the principles for similar requirements in EN 301 126-1 [24].

Any test, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], for integral or stand-alone DFRS antennas (directional phenomena in clause 4.6 of the present document), shall be carried-out at reference environmental conditions of the test field according clause 4.1 of EN 301 126-3-1 [25].

The test report shall be produced according to the procedure foreseen by article 10 of the Directive 1999/5/EC [1].

4.3 Wide radio-frequency band covering units specification and tests

4.3.1 Radio equipments

Even if radio frequency front-ends for DFRS are commonly designed for covering all or part(s) of the possible operating channels within a specific radio frequency channel arrangement, equipments can provide single radio frequency channel operation (e.g. when the RF duplexer filters is tuned to a specific channel) or offer a wider operating frequency range (e.g. wide-band RF duplexer and frequency agility by RFC function for easiness of deployment and spare parts handling by operators with large networks made by more than one assigned channels).

The equipment shall comply with all the requirements of the present document at any possible operating frequency.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out in the following way:

- 1) in the case of equipments intended for single channel operation, the test report shall be produced for one radio frequency channel arbitrarily chosen by the supplier (see figure 2);
- 2) in the case of equipments intended for covering an operating frequency range, the test report shall be produced for the lowest, intermediate and highest possible radio frequency channel within that operating frequency range (see figure 3);
- 3) it is not required that all the tests, required for the test report, are done on the same sample of equipment and at the same time; provided that the test report includes all the tests required by the present document, each test may be made on different samples of the same equipment, at different channel frequencies or frequency ranges and in different times.

When applicable also the following additional provisions apply to the production of the test report:

- in the case of equipments covering a radio frequency channel arrangement with more than one operating frequency range, the test report shall be produced for one of the operating frequency ranges arbitrarily chosen by the supplier, using the above procedures for covering an operating frequency range (see figure 3);
- in the case of equipments designed to cover, with the same requirements under the same ETSI standard, a number of fully or partially overlapping recommended and/or national radio frequency channel arrangements, similarly established across contiguous radio frequency bands allocated to fixed service, the test report shall be produced for one radio frequency channel arrangements arbitrarily chosen by the supplier, using the above procedures for equipments intended for single channel operation or for covering an operating frequency range (see figures 2 and 3).

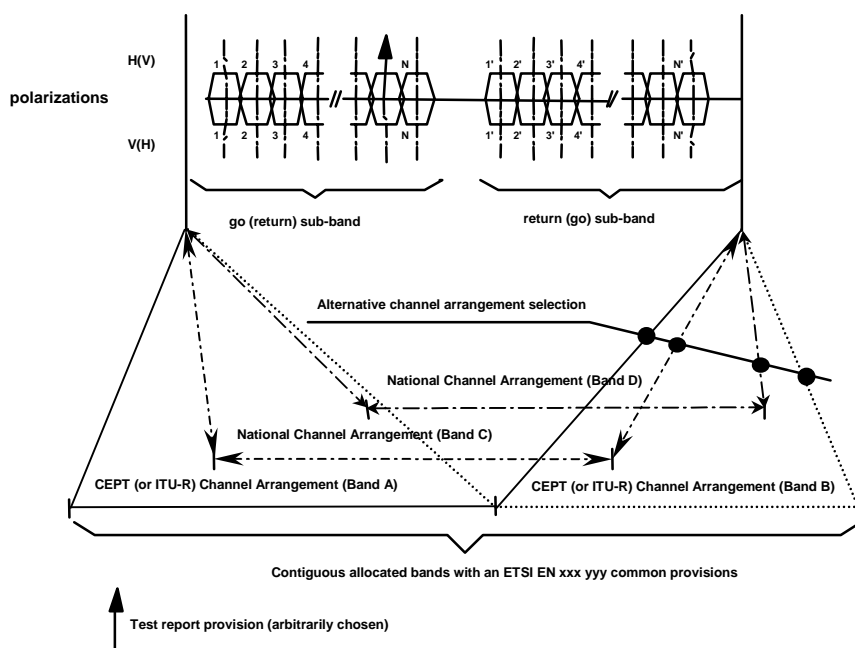


Figure 2: Test report frequency requirement for equipments intended for single channel operation

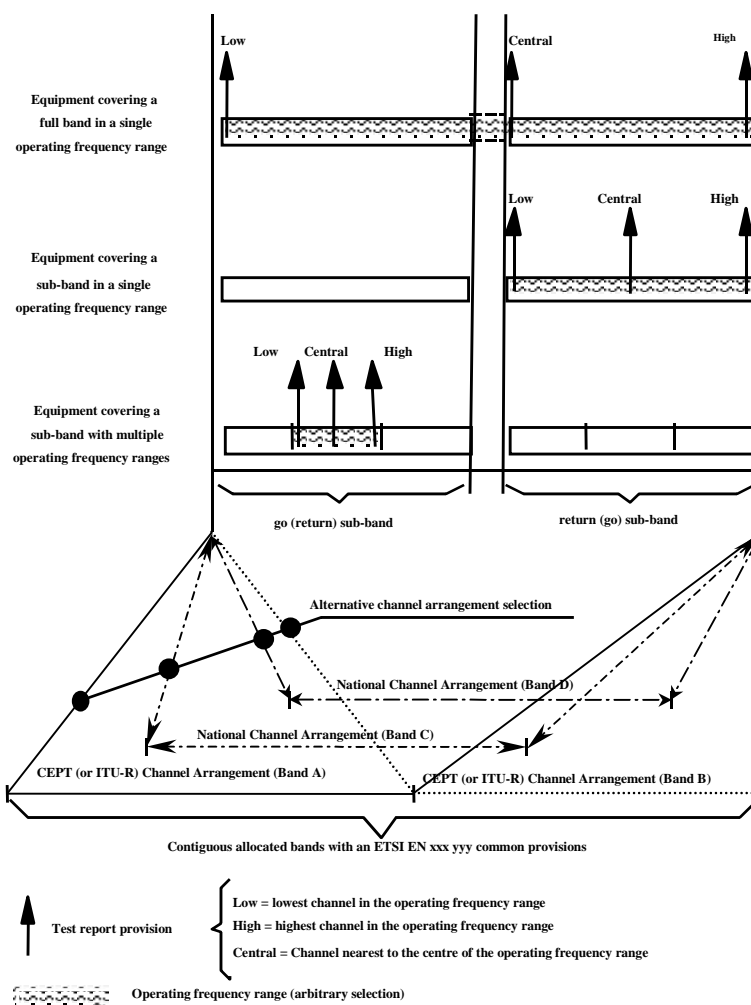


Figure 3: Test report frequency requirements for equipments intended for covering an operating frequency range

4.3.2 Antennas for DFRS

Also DFRS antennas commonly cover an operating frequency range, the antenna parameters shall comply with all the requirements of the present document at any possible operating frequency.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out at the highest and the lowest possible operating frequency.

4.4 Specification and testing of multi-rate/multi-format equipment

DFRS equipment can cover a number of different payload-rate or different modulation format through software pre-settings.

In such cases the equipment shall comply with all the requirements of the present document at any possible payload operation.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out:

- a) for transmitting phenomena (see clause 4.5) at any possible bit rate and modulation format operation;

- b) for receiving phenomena (see clause 4.7) and control and monitoring functions (see clause 4.8) shall be tested only at the lowest and the highest bit rate for any modulation format.

4.5 Transmitter requirements

4.5.1 Radio frequency tolerance (frequency error/stability)

In table 3 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and the test methods.

The tests, carried out to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out at reference and extreme climatic conditions.

Table 3: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 198 [5]	V1.5.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 234 [7]	V1.3.b	6.6	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 407 [6]	V1.3.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 408 [8]	V1.3.b	5.3.3	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 431 [10]	V1.4.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 630 [11]	V1.3.b	6.5	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 633 [13]	V1.3.b	6.5	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 639 [14]	V1.3.b	6.6	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 300 786 [15]	V1.3.b	6.6	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 127 [17]	V1.3.b	6.6	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 128 [18]	V1.2.b	6.5	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 216 [19]	V1.2.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 277 [20]	V1.2.b	6.7	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 387 [21]	V1.2.b	5.4.5	RF tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 669 [22]	V1.2.b	6.6	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 461 [23]	V1.3.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 786 [32]	V1.2.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	
EN 301 787 [33]	V1.1.b	5.3.8	Radio frequency tolerance	EN 301 126-1 [24] clause 5.2.5	

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.5.2 Transmitter power range

In table 4 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and the test methods.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out at reference and extreme climatic conditions.

Table 4: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 300 198 [5]	V1.5.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 300 234 [7]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 300 407 [6]	V1.3.b	5.3.1 5.3.3	Transmitter power range Transmitter output power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 300 408 [8]	V1.3.b	5.3.1.1 5.3.1.2	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 300 431 [10]	V1.4.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 300 630 [11]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 300 633 [13]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 300 639 [14]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 300 786 [15]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 301 127 [17]	V1.3.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 301 128 [18]	V1.2.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 301 216 [19]	V1.2.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 301 277 [20]	V1.2.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 301 387 [21]	V1.2.b	5.4.1 5.4.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 301 669 [22]	V1.2.b	6.1	Output power	EN 301 126-1 [24] clause 5.2.1	
EN 301 461 [23]	V1.3.b	5.3.1 5.3.3	Transmitter power range Transmitter output power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 301 786 [32]	V1.2.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	
EN 301 787 [33]	V1.1.b	5.3.1 5.3.3	Transmitter power range Transmitter power tolerance	EN 301 126-1 [24] clause 5.2.1	

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.5.3 Spectrum mask, discrete CW lines and RTPC (adjacent channel power)

4.5.3.1 Spectrum mask and discrete CW lines

In table 5 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of these essential phenomena and test methods.

The spectrum masks and discrete CW lines limits, reported in the relevant clauses of table 5, are necessary for a number of intra-system and inter-system regulatory and performance requirements. Whenever required in the relevant clause of table 5, mask attenuations beyond those reported in table 6 are considered not relevant to essential requirements under article 3.2 of the R&TTE Directive [1].

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at reference and extreme climatic conditions.

Table 5: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 198 [5]	V1.5.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 234 [7]	V1.3.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 407 [6]	V1.3.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 408 [8]	V1.3.b	5.3.2	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 431 [10]	V1.4.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 630 [11]	V1.3.b	6.2	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.3	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 633 [13]	V1.3.b	6.2	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.3	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 639 [14]	V1.3.b	6.3	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.4	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 300 786 [15]	V1.3.b	6.3	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.4	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 127 [17]	V1.3.b	6.3	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.4	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 128 [18]	V1.2.b	6.2	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.3	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 216 [19]	V1.2.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW components exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 277 [20]	V1.2.b	6.4	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.5	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 387 [21]	V1.2.b	5.4.3.1	spectrum density mask	EN 301 126-1 [24] clause 5.2.6	
		5.4.3.2	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 669 [22]	V1.2.b	6.3	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		6.4	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 461 [23]	V1.3.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 786 [32]	V1.2.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	
EN 301 787 [33]	V1.1.b	5.3.5	RF spectrum mask	EN 301 126-1 [24] clause 5.2.6	
		5.3.6	Discrete CW lines exceeding the spectrum mask limit	EN 301 126-1 [24] clause 5.2.8	

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

Table 6: Maximum spectrum masks attenuation relevant to the essential requirements under article 3.2 of the Directive

Operating frequency band	Maximum attenuation
$F < 10$ GHz	60 dB
$10 \text{ GHz} \leq F < 17$ GHz	55 dB
$17 \text{ GHz} \leq F < 30$ GHz	50 dB
$F \geq 30$ GHz	45 dB

4.5.3.2 Remote Transmit Power Control (RTPC)

This functionality and ATPC (see clause 4.5.5.1) are commonly optional features; from the point of view of HW implementation, both these functions are made by an electronic attenuator implemented along the transmitting chain (e.g. at IF or at RF level or at both level) and can be realized in a mixed configuration, e.g.:

- ATPC only is implemented;
- RTPC only is implemented;
- ATPC + RTPC are implemented with separate attenuator functions;
- ATPC + RTPC are implemented with a single attenuator complying both functions with different command functions (either HW or SoftWare (SW)) and the ranges of both may be traded-off from a maximum available attenuation.

Equipment with RTPC will be subject to manufacturer declaration of RTPC ranges and related tolerances.

The equipment shall comply with the requirements of spectrum masks of the above table 5 along all RTPC range.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at three operating conditions (lowest, medium, and highest delivered power) of the RTPC power excursion and with ATPC (if any) set to maximum available power. The test shall be carried-out at reference and extreme climatic conditions.

Even if all the procedure provided by clause 5.2.6 of EN 301 126-1 [24] are followed, the actual tests, at the lower RTPC power levels, might fall outside the available sensitivity of test instruments, currently available on the market. In this event the supplier shall produce an attachment to the test report containing:

- the calculated evidence that the noise floor of the actual test bed is higher than the mask requirement;
- the calculated evidence that the actual noise floor, generated by the transmitter according its noise figure and its implemented amplification/attenuation chain; is lower than the mask requirement.

4.5.4 Spurious emissions

The equipment shall comply with the requirements of clauses 4.1 and 4.1.1 of EN 301 390 [26] in any setting conditions of ATPC and RTPC, if any.

Test methods shall be in accordance with clause 5.2.9 of EN 301 126-1 [24].

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out with ATPC, if any, set to maximum available power and RTPC, if any, set at minimum attenuation; actual test shall be limited to the practical frequency ranges foreseen by clause A.1 of EN 301 390 [26]. The test shall be carried-out at reference climatic conditions.

4.5.5 ATPC and RFC (transient behaviour of the transmitter)

4.5.5.1 Automatic Transmit Power Control (ATPC)

This functionality and RTPC (see clause 4.5.3.2) are commonly optional features; from the point of view of hardware implementation, both these functions are made by an electronic attenuator implemented along the transmitting chain (e.g. at IF or at RF level or at both level) and can be realized in a mixed configuration, e.g.:

- ATPC only is implemented;
- RTPC only is implemented;
- ATPC + RTPC are implemented with separate attenuator functions;
- ATPC + RTPC are implemented with a single attenuator complying both functions with different command functions (either HW or SW) and the ranges of both may be traded-off from a maximum available attenuation.

Equipment with ATPC will be subject to manufacturer declaration of ATPC ranges and related tolerances.

The correct operation of ATPC function according the supplier declaration shall be tested according the test method described in clause 5.2.3 of EN 301 126-1 [24].

The equipment shall comply with the requirements of spectrum masks of the above table 5 with ATPC operating in the range between maximum nominal power and maximum available power including the attenuation introduced by RTPC function (if any).

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out with ATPC set at the maximum available output power of the equipment. The test shall be carried-out at reference climatic conditions.

4.5.5.2 Remote Frequency Control (RFC)

This functionality is commonly an optional feature.

Equipment with RFC will be subject to manufacturer declaration of RFC ranges and related change frequency procedure.

RFC setting procedure shall not produce emissions outside the previous and final centre frequency spectrum masks required in table 5.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried for RFC setting procedure for three frequencies (i.e. frequencies settings from lower to centre, centre to higher and back in the covered range). The test shall be carried-out at reference climatic conditions.

4.6 Antenna directional requirements

4.6.1 Radiation Pattern Envelope (off-axis EIRP density)

In table 7 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and the test methods.

Table 7: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	Relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 198 [5]	V1.5.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 234 [7]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 407 [6]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 408 [8]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	un-coordinated frequency band Applicable only to equipments with integral antennas
EN 300 430 [9]	V1.4.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 431 [10]	V1.4.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 630 [11]	V1.3.b	6.1 of EN 300 631 [12]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 631 [12]	V1.2.b	6.1	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 300 633 [13]	V1.3.b	6.1 of EN 300 631 [12]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 639 [14]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 786 [15]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 833 [16]	V1.4.b	6.1	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 301 127 [17]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 128 [18]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 216 [19]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 277 [20]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 387 [21]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas

ETSI standard	Version	Clause(s) N°	Relevant clause(s) title	test method (if essential)	Notes
EN 301 669 [22]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 461 [23]	V1.3.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 786 [32]	V1.2.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 787 [33]	V1.1.b	6.1 of EN 300 833 [16]	Radiation Pattern Envelope	6.1 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas

4.6.2 Antenna gain

In table 8 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

Table 8: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 198 [5]	V1.5.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 234 [7]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 407 [6]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 431 [10]	V1.4.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 630 [11]	V1.3.b	6.3 of EN 300 631 [12]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 631 [12]	V1.2.b	6.3	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 300 633 [13]	V1.3.b	6.3 of EN 300 631 [12]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 639 [14]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 786 [15]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 833 [16]	V1.4.b	6.3	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 301 127 [17]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 128 [18]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 216 [19]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 277 [20]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 387 [21]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 669 [22]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 461 [23]	V1.3.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 786 [32]	V1.2.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 787 [33]	V1.1.b	6.3 of EN 300 833 [16]	Antenna gain	6.3 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

4.6.3 Antenna cross-Polar Discrimination (XPD)

In table 9 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

Table 9: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 198 [5]	V1.5.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 234 [7]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 407 [6]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 431 [10]	V1.4.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 630 [11]	V1.3.b	6.2 of EN 300 631 [12]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 631 [12]	V1.2.b	6.2	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 300 633 [13]	V1.3.b	6.2 of EN 300 631 [12]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 639 [14]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 786 [15]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 300 833 [16]	V1.4.b	6.2	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable to both integral and stand alone antennas used in the frequency band(s) covered by the present document
EN 301 127 [17]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 128 [18]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 216 [19]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 277 [20]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 387 [21]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 669 [22]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 461 [23]	V1.3.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 786 [32]	V1.2.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
EN 301 787 [33]	V1.1.b	6.2 of EN 300 833 [16]	Cross-polar discrimination (XPD)	6.2 of EN 301 126-3-1 [25]	Applicable only to equipments with integral antennas
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

4.7 Receiver requirements

The equipment shall comply with the following receiving requirements with transmitter ATPC function, if any, set in automatic operation or at maximum nominal power and RTPC function, if any, set at any value along its power excursion.

Some systems may offer space diversity options for performance improvement on real links; this option is not considered essential for the scope of the R&TTE Directive [1]. Receiving phenomena are therefore considered only without this option.

For receiving phenomena, the tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out with ATPC, if any, set to either automatic or maximum nominal power operation and RTPC, if any, set to an arbitrary value chosen by the supplier.

4.7.1 BER as a function of receiver input signal level (maximum usable sensitivity inc. duplex)

In table 10 are reported, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at reference and extreme climatic conditions.

Table 10: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 198 [5]	V1.5.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 234 [7]	V1.3.b	8.2	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 407 [6]	V1.3.b	5.5.1	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 431 [10]	V1.4.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 630 [11]	V1.3.b	8.1	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 633 [13]	V1.3.b	8.1	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 639 [14]	V1.3.b	8.2	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 300 786 [15]	V1.3.b	8.2	BER as a function of Receiver input level (without interference)	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 127 [17]	V1.3.b	8.2	BER as a function of Receiver input level (dBm)	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 128 [18]	V1.2.b	8.1	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 216 [19]	V1.2.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 301 277 [20]	V1.2.b	8.2	BER as a function of Receiver input level (dBm)	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 387 [21]	V1.2.b	5.6.1	BER performance	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 669 [22]	V1.2.b	8.2	BER as a function of Receiver input level	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 461 [23]	V1.3.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 786 [32]	V1.2.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
EN 301 787 [33]	V1.1.b	5.5.1	BER as a function of Receiver input signal level (RSL)	EN 301 126-1 [24] clause 5.3.3.1	
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.7.2 Co-channel external interference sensitivity

In table 11 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the Directive 1999/5/EC [1], shall be carried-out at reference climatic conditions.

Table 11: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 198 [5]	V1.5.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 234 [7]	V1.3.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 407 [6]	V1.3.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 431 [10]	V1.4.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 630 [11]	V1.3.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 633 [13]	V1.3.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 639 [14]	V1.3.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 300 786 [15]	V1.3.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 127 [17]	V1.3.b	8.3.1	Co-channel "external" interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 128 [18]	V1.2.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 216 [19]	V1.2.b	5.5.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 277 [20]	V1.2.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 301 387 [21]	V1.2.b	5.6.3 (a)	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 669 [22]	V1.2.b	8.3.1	Co-channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 461 [23]	V1.3.b	5.5.3.1	Co-channel "external" interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 786 [32]	V1.2.b	5.5.3.1	Co-channel "external" interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
EN 301 787 [33]	V1.1.b	5.5.3.1	Co-channel "external" interference sensitivity	EN 301 126-1 [24] clause 5.3.3.2	
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.7.3 Adjacent channel interference sensitivity (adjacent channel selectivity)

In table 12 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

The requirement shall be met independently on upper and lower adjacent interference.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at reference climatic conditions. The test will be produced for the lower or for the upper frequency adjacent channel, arbitrarily selected by the supplier.

Table 12: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 198 [5]	V1.5.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 407 [6]	V1.3.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 234 [7]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 431 [10]	V1.4.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 630 [11]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 633 [13]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 639 [14]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 300 786 [15]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 127 [17]	V1.3.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 128 [18]	V1.2.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 216 [19]	V1.2.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 277 [20]	V1.2.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 387 [21]	V1.2.b	5.6.3 (b)	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 301 669 [22]	V1.2.b	8.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 461 [23]	V1.3.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 786 [32]	V1.2.b	5.5.3.2	Adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
EN 301 787 [33]	V1.1.b	5.5.3.2	First adjacent channel interference sensitivity	EN 301 126-1 [24] clause 5.3.3.3	
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.7.4 CW Spurious Interference (blocking or desensitization including duplexer)

In table 13 are stated, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon and test methods.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at reference climatic conditions.

Table 13: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 197 [4]	V1.6.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 198 [5]	V1.5.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 234 [7]	V1.3.b	5.5.3.3	CW interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 407 [6]	V1.3.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 408 [8]	V1.3.b	N.E.	N.E.	N.E.	un-coordinated frequency band
EN 300 430 [9]	V1.4.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 431 [10]	V1.4.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 630 [11]	V1.3.b	8.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 633 [13]	V1.3.b	8.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 639 [14]	V1.3.b	8.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 300 786 [15]	V1.3.b	8.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 127 [17]	V1.3.b	7 (clauses included) of EN 301 390 [26]	Receiver immunity at antenna port	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 128 [18]	V1.2.b	8.3.4	CW Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 216 [19]	V1.2.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 277 [20]	V1.2.b	7 (clauses included) of EN 301 390 [26]	Receiver immunity at antenna port	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 387 [21]	V1.2.b	5.6.3 (c)	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 669 [22]	V1.2.b	8.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 301 461 [23]	V1.3.b	5.5.3.3	CW interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 786 [32]	V1.2.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
EN 301 787 [33]	V1.1.b	5.5.3.3	CW Spurious Interference	EN 301 126-1 [24] clause 5.3.3.4	
N.E.: Not essential for article 3.2 of the R&TTE Directive [1].					

For EN 300 631 [12] and EN 300 833 [16], also in the scope of the present document, this requirement is not applicable.

4.7.5 Spurious emissions

The equipment shall comply with the requirements of clause 5 of EN 301 390 [26].

The test, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be limited to the practical frequency ranges foreseen by clause A.1 of EN 301 390 [26]. The test shall be carried-out at reference climatic conditions.

Test methods shall be in accordance with clause 5.3.2 of EN 301 126-1 [24].

4.8 Control and monitoring function requirements

4.8.1 Sharing protocols (interference avoidance requirement)

In table 14 are reported, where applicable, for each ETS/EN in the scope of the present document, the clauses that give the limits of this essential phenomenon.

The tests, requested to generate the test report and/or declaration of conformity in order to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1], shall be carried-out at reference climatic conditions.

Table 14: Relevant ETS/ENs clause(s)

ETSI standard	Version	Clause(s) N°	relevant clause(s) title	test method (if essential)	Notes
EN 300 408 [8]	V1.3.b	4.1.3.1 4.1.3.2.1	RF-channel selection procedure Interference avoidance limit	EN 300 408 [8] clause 4.1.3.2.2	un-coordinated frequency band

For all other EN/ETS in the scope this requirement is not essential or not applicable.

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

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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 implement 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.

The following tables A.1, A.2 and A.3 are intended for declaration of conformity of Fixed service Digital Radio Systems in frequency bands that require co-ordination, Digital Fixed Radio Systems in frequency bands that do not require co-ordination and Fixed service Radio Systems antennas, respectively.

Table A.1: EN Requirements Table (EN-RT) for point-to-point DFRS (including integral antennas) in frequency bands that require co-ordination

EN Reference		EN 301 751 Requirements for equipment under the scope also of ETS/EN xxx xxx (note 2)			
Transmitter requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
1	4.5.1	Frequency error/stability	M		
2	4.5.2	Transmitter power	M		
3	4.5.3.1	Adjacent channel power - Spectrum mask and spectral lines at symbol rate	M		
	4.5.3.2	Adjacent channel power - Remote Transmit Power Control (RTPC)	O		
4	4.5.4	Spurious emissions	M		
5	4.5.5.1	Transient behaviour of the transmitter - Automatic Transmit Power Control (ATPC)	O		
6	4.5.5.2	Transient behaviour of the transmitter - Remote Frequency Control (RFC)	O		
Antenna directional requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
7	4.6.1	Off-axis EIRP density - Radiation pattern envelope (RPE)	M	Applicable only to equipments with integral antennas	
8	4.6.2	Antenna Gain	M	Applicable only to equipments with integral antennas	
9	4.6.3	Antenna X-polar discrimination	M	Applicable only to equipments with integral antennas	
Receiving requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
10	4.7.1	BER as a function of receiver input signal level	M		
11	4.7.2	Co-channel interference sensitivity	M		
12	4.7.3	Adjacent channel interference sensitivity	M		
13	4.7.4	Blocking or desensitization inc. duplex (CW Spurious Interference)	M		
14	4.7.5	Spurious emissions	M		

NOTE 1: These EN-Rs are justified under article 3.2 of the R&TTE Directive.
NOTE 2: Select from table 2 as appropriate.

Table A.2: EN Requirements Table (EN-RT) for Point-to-point DFRS (including integral antennas) in frequency bands that do not require co-ordination

EN Reference		EN 301 751 Requirements for equipment under the scope also of ETS/EN xxx xxx (note 2)			
Transmitter requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
1	4.5.1	Frequency error/stability	M		
2	4.5.2	Transmitter power	M		
3	4.5.3.1	Adjacent channel power - Spectrum mask and spectral lines at symbol rate	M		
	4.5.3.2	Adjacent channel power - Remote Transmit Power Control (RTPC)	O		
4	4.5.4	Spurious emissions	M		
5	4.5.5.1	Transient behaviour of the transmitter - Automatic Transmit Power Control (ATPC)	O		
6	4.5.5.2	Transient behaviour of the transmitter - Remote Frequency Control (RFC)	O		
Antenna directional requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
7	4.6.1	Off-axis EIRP density - Radiation pattern envelope (RPE)	M	Applicable only to equipments with integral antennas	
Receiving requirement					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
8	4.7.5	Spurious emissions	M		
Control and monitoring function requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
9	4.8.1	Sharing protocols – Interference avoidance requirement	M	For equipment classes with this requirement	

NOTE 1: These EN-Rs are justified under article 3.2 of the R&TTE Directive.
NOTE 2: Select from table 2 as appropriate.

Table A.3: EN Requirements Table (EN-RT) for Point-to-point DFRS stand-alone antennas

EN Reference		EN 301 751 Requirements for equipments under the scope also of ETS/EN xxx xxx (note 2)			
Antenna directional requirements					
No.	Clause	EN-R (note 1)	Status	Note	Supplier Comment for declaration
1	4.6.1	Off-axis EIRP density - Radiation pattern envelope (RPE)	M		
2	4.6.2	Antenna Gain	M	Only for frequency bands that require co-ordination	
3	4.6.3	Antenna X-polar discrimination	M	Only for frequency bands that require co-ordination	

NOTE 1: These EN-Rs are justified under article 3.2 of the R&TTE Directive.
NOTE 2: Select from table 2 as appropriate.

Key to columns in tables A.1 to A.3:

No Table entry number;

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

EN-R Title of conformance 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;

Supplier Comment for declaration To be completed as required.

Annex B (informative): Bibliography

- EC Standardization Mandate M.284: "Harmonized standards for the R&TTE Directive".
- Radio Regulations, Geneva 2001.

History

Document history		
V1.1.1	December 2000	Publication
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