SLOVENSKI STANDARD
SIST EN 301 751 V1.2.1:2004

01-februar-2004

Fiksni radijski sistemi - Oprema in antene tipa toļ ka-toļ ka - Generiļ ni harmonizirani standard za digitalne fiksne radijske sisteme in antene tipa toļ ka-toļ ka, ki zajema bistvene zahteve ļ lena 3.2 direktive 1999/5/EC (o radijski in telekomunikacijski terminalski opremi (R&TTE))

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

Ta slovenski standard je istoveten z: **EN 301 751 Version 1.2.1**

ICS:

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

SIST EN 301 751 V1.2.1:2004 **en**

ETSI EN 301 751 V1.2.1 (2002-11)

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

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

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM).

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.

National transposition dates	
Date of adoption of this EN:	1 November 2002
Date of latest announcement of this EN (doa):	28 February 2003
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2003
Date of withdrawal of any conflicting National Standard (dow):	28 February 2005

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.

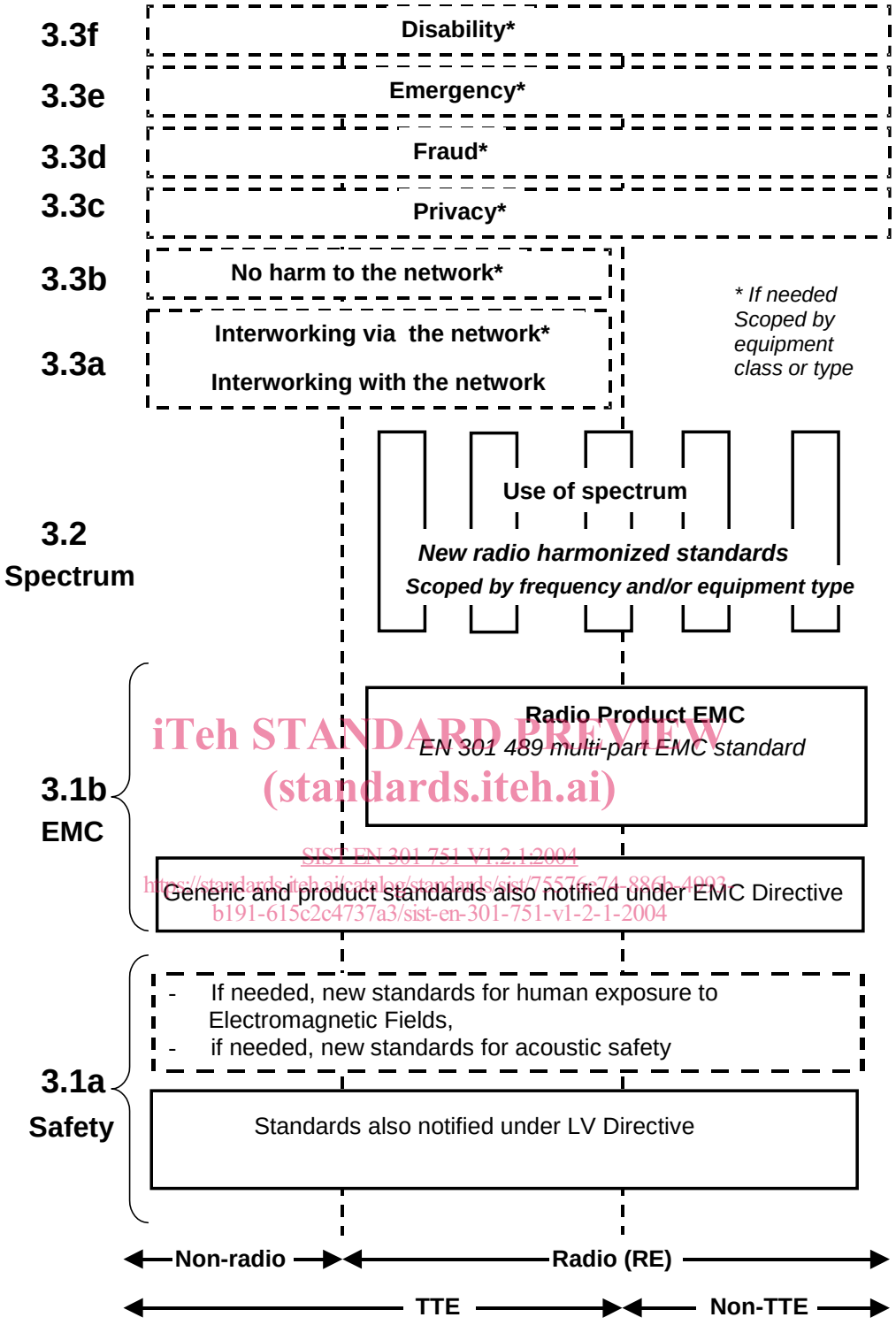

Figure 1: Modular structure for the various standards used under the R&TTE Directive

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 EN 301 489, the multi-part product EMC standard for radio used under the EMC Directive [2].

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 systems for the transmission of digital 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 systems for the transmission of digital signals operating at 23 GHz	23 GHz	3,5 to 56
EN 300 234 [7]	V1.3.b	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	any from the 4 GHz to the 15 GHz	28 to 30
EN 300 407 [6]	V1.3.b	Parameters for digital radio systems for the transmission of digital signals operating at 55 GHz	55 GHz	14 to 140
EN 300 408 [8]	V1.3.b	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	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 in the 18 GHz frequency band with channel spacing of 55 MHz and 27,5 MHz	18 GHz	27,5 and 55
EN 300 431 [10]	V1.4.b	Parameters for radio system for the transmission of digital signals operating in the frequency range 24,50 GHz to 29,50 GHz	26 GHz and 28 GHz	3,5 to 56
EN 300 630 [11]	V1.3.b	Low capacity point-to-point digital radio systems operating in the 1,4 GHz frequency band	1,4 GHz	0,025 to 3,5
EN 300 631 [12]	V1.2.b	Antennas for point-to-point fixed radio systems in the 1 GHz to 3 GHz band	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 systems operating in the frequency range 2,1 GHz to 2,6 GHz	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 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	13 GHz, 15 GHz and 18 GHz	14 and 28
EN 300 786 [15]	V1.3.b	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	13 GHz, 15 GHz and 18 GHz	14
EN 300 833 [16]	V1.4.b	Antennas for point-to-point fixed radio systems operating in the frequency band 3 GHz to 60 GHz	any from 3 GHz to 60 GHz	N.A.
EN 301 127 [17]	V1.3.b	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	any from the 4 GHz to the 15 GHz	28 to 30
EN 301 128 [18]	V1.2.b	Plesiochronous Digital Hierarchy (PDH); Low and medium capacity digital radio systems operating in the 13 GHz, 15 GHz and 18 GHz frequency bands	13 GHz, 15 GHz and 18 GHz	1,75 to 28
EN 301 216 [19]	V1.2.b	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	any from 3 GHz to 11 GHz	1,75 to 30
EN 301 277 [20]	V1.2.b	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	any from the 4 GHz to the 11 GHz	40
EN 301 387 [21]	V1.2.b	Plesiochronous Digital Hierarchy (PDH); Low and medium capacity digital radio 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 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	any from the 4 GHz to the 11 GHz	40
EN 301 461 [23]	V1.3.b	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	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".