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Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 1: Overview and system-independent common characteristics

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Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 1: Overview and system-independent common characteristics

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Foreword

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

The present document is part 1 of a multi-part deliverable covering the Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas, as identified below:

Part 1: "Overview and system-independent common characteristics";

Part 2-1: "System-dependent requirements for digital systems operating in frequency bands where frequency co-ordination is applied";

Part 2-2 "Harmonized EN covering essential requirements of Article 3.2 of R&TTE Directive for digital systems operating in frequency bands where frequency co-ordination is applied";

Part 3: "Harmonized EN covering essential requirements of Article 3.2 of R&TTE Directive for equipment operating in frequency bands where no frequency co-ordination is applied";

Part 4-1: "System-dependent requirements for antennas";

Part 4-2: "Harmonized EN covering essential requirements of Article 3.2 of R&TTE Directive for antennas".

National transposition dates	
Date of adoption of this EN:	19 November 2004
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Introduction

Generality

Digital Fixed Radio Systems (DFRS), used in European countries, have been specified up to now in a relatively large number of specific European Norms produced by ETSI.

Previous documents, to be replaced by EN 302 217 series, contained both essential requirements, cross-referenced in EN 301 751 (see bibliography), and other requirements that, even if not considered essential under 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 (hereafter mentioned as the R&TTE Directive) [1], may be applicable.

Existing standards for point-to-point systems, including antennas, cover a very large range of traffic capacities, channel separations, modulation formats and applications over a very wide range of frequency bands that are summarized in table 1.

Table 1: Digital Fixed Radio Systems (DFRS) parameters

Parameter	Range
Frequency bands	from 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 modulated states)
Typical applications	**POINT-TO-POINT (P-P) CONNECTIONS:** rural and urban low/medium/high capacity links for mobile infrastructure, transport/trunk (long haul), FWA/BFWA backhaul, access, governmental (non-military) links, private fixed networks, SAP/SAB P to P audio and video links **STAND ALONE ANTENNAS:** for all of the above applications when integral antennas are not employed

The new regulatory framework for placing radio systems on the market, established by the R&TTE Directive [1] also requires the availability of Harmonized ENs covering the essential requirements under article 3.2 of the R&TTE Directive [1]. This was achieved in the first instance by the harmonized EN 301 751 (see bibliography), which cross-references to the relevant clauses of the ENs in table 2, dealing with those essential requirements. However, as a long-term solution, an EN 302 217 series including stand-alone harmonized ENs containing all necessary information and avoiding as much as is practical cross-references, better suits regulatory and market requirements.

EN 302 217 series (see bibliography) meets this demand by providing a rational subdivision of requirements into general, system dependent "not essential" and "essential" requirements from the perspective of the R&TTE Directive [1].

Part 1 includes system-independent common characteristics; these requirements are not essential under article 3.2 of the R&TTE Directive [1].

EN 302 217-2-2, EN 302 217-3 and EN 302 217-4-2 (see bibliography) relevant to essential requirements under article 3.2 of the R&TTE Directive [1] replicate, within the scope and applicability of the R&TTE Directive [1], the requirements set out in harmonized EN 301 751 (see bibliography).

NOTE 1: It is proposed that the date of cessation of presumption of conformity to the R&TTE Directive [1] with reference to harmonized EN 301 751 (see bibliography) be kept two years after the date of publication in the OJ EC of the present document.

EN 302 217 series introduces, for systems (equipment and antennas) already covered by EN 301 751 (see bibliography), only technically equivalent or less stringent requirements (see note 2). Care has been taken so that such variations will not affect any frequency planning assumption for already deployed networks. Therefore, from a strictly technical point of view, it is expected that equipment already conforming to EN 301 751 (see bibliography), would not need a new test report for re-assessment of essential requirements according EN 302 217 series (see note 1). Legal implications with respect to declaration of conformity and equipment labelling are outside the scope of the present document.

NOTE 2: The only exception is with respect to class 5A equipment for system D.7 (see annex D of EN 302 217-2-2) and for systems E.1, E.2 and E.3 (see annex E of EN 302 217-2-2) for which a previous design objective has here been transformed into a more stringent RSL versus BER. In this case a supplementary test report might be required (e.g. in case the technical construction file, made for declaration of conformity to EN 301 751 (see bibliography), does not give evidence of enough margin to fulfil the requirements of the present document).

In the present document, the equipment subject of the former standards is grouped into families of either similar frequency bands or applications. Five families are identified for frequency bands where frequency co-ordination is applied, corresponding, in both EN 302 217-2-1 and EN 302 217-2-2 (see bibliography), to annexes referenced from A to E and one family associated with applications of packet data and combination of other signals mapped into proprietary transport modules, detailed in annex F.

- A frequency bands from 1,4 GHz to 2,7 GHz;
- B frequency bands from 3 GHz to 11 GHz (channel separation up to around 30 MHz);
- C frequency bands from 3 GHz to 11 GHz (channel separation 40 MHz);
- D frequency bands 13 GHz, 15 GHz and 18 GHz;
- E frequency bands from 23 GHz to 55 GHz;
- F transmission of Packet Data and combination of other signals.

Cross references to previous relevant ENs

The EN 302 217 series will replace and supersede, after a suitable transition period, the standards that are listed in table 2 (sorted by ascending EN number). Table 2 provides also an overview of the correspondence between equipment considered in those ENs and part/annexes in the present document.

Requirements in the previous ENs have been rationalized and redistributed in the present document according to a logic subdivision dictated by the coming into force of the R&TTE Directive [1]:

- requirements considered essential under article 3.2 of the R&TTE Directive [1] have been placed in the relevant harmonized ENs EN 302 217-2-2, EN 302 217-3 and EN 302 217-4-2 (see bibliography);
- other requirements that, even if not considered essential under the R&TTE Directive [1], may be applicable, on a voluntary basis, as a common basis for maintaining performance and operability of DFRS in typical deployment, have been placed in the relevant ENs, EN 302 217-1, EN 302 217-2-1 and EN 302 217-4-1 (see bibliography).

Table 2: List of ETSI standards that will be replaced and superseded by the EN 302 217 series

Equipment and antenna standards (see note 3)					
ETSI Reference number	**Version**	**Title**	**Fixed Service frequency bands of operation (see note 1)**	**Channel separation (MHz)**	**Relevant parts and annexes of EN 302 217 series (see note 2)**
EN 300 197	V1.6.x	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	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 300 198	V1.5.x	Parameters for radio systems for the transmission of digital signals operating at 23 GHz	23 GHz	3,5 to 56	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 300 234	V1.3.x	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 4 GHz to 15 GHz	28 to 30	Annexes B and D EN 302 217-2-1 and EN 302 217-2-2
EN 300 407	V1.3.x	Parameters for digital radio systems for the transmission of digital signals operating at 55 GHz	55 GHz	3,5 to 56	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 300 408	V1.3.x	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 302 217-3

Equipment and antenna standards (see note 3)					
ETSI Reference number	**Version**	**Title**	**Fixed Service frequency bands of operation (see note 1)**	**Channel separation (MHz)**	**Relevant parts and annexes of EN 302 217 series (see note 2)**
EN 300 430	V1.4.x	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	Annex D EN 302 217-2-1 and EN 302 217-2-2
EN 300 431	V1.4.x	Parameters for radio system for the transmission of digital signals operating in the frequency range 24,5 GHz to 29,5 GHz	26 GHz and 28 GHz	3,5 to 56	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 300 630	V1.3.x	Low capacity point-to-point digital radio systems in the 1,4 GHz frequency band	1,4 GHz	0,025 to 3,5	Annex A EN 302 217-2-1 and EN 302 217-2-2
EN 300 631	V1.2.x	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 302 217-4-1 and EN 302 217-4-2
EN 300 633	V1.3.x	Low and medium capacity point-to-point digital radio systems operating in the frequency range 2,1 GHz to 2,6 GHz	any from 2,1 GHz to 2,6 GHz	0,5 to 14	Annex A EN 302 217-2-1 and EN 302 217-2-2
EN 300 639	V1.3.x	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	Annex D EN 302 217-2-1 and EN 302 217-2-2
EN 300 786	V1.3.x	Sub STM-1 digital radio systems 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	Annex D EN 302 217-2-1 and EN 302 217-2-2
EN 300 833	V1.4.x	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 302 217-4-1 and EN 302 217-4-2
EN 301 127	V1.3.x	High capacity digital radio systems carrying SDH signals (2 x STM-1) in frequency bands with about 30 MHz channel spacing and using Co-Channel Dual-Polarized (CCDP) operation	any from 4 GHz to 15 GHz	28 to 30	Annexes B and D EN 302 217-2-1 and EN 302 217-2-2
EN 301 128	V1.2.x	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	Annex D EN 302 217-2-1 and EN 302 217-2-2
EN 301 216	V1.2.x	PDH low and medium capacity and STM-0 digital radio 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	Annex B EN 302 217-2-1 and EN 302 217-2-2
EN 301 277	V1.2.x	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 4 GHz to 11 GHz	40	Annex C EN 302 217-2-1 and EN 302 217-2-2
EN 301 387	V1.2.x	PDH low and medium capacity digital radio systems operating in the frequency band 48,5GHz to 50,2 GHz	50 GHz	3,5 to 28	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 301 461	V1.3.x	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 4 GHz to 11 GHz	40	Annex C EN 302 217-2-1 and EN 302 217-2-2
EN 301 669	V1.2.x	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 4 GHz to 11 GHz	40	Annex C EN 302 217-2-1 and EN 302 217-2-2

Equipment and antenna standards (see note 3)					
ETSI Reference number	**Version**	**Title**	**Fixed Service frequency bands of operation (see note 1)**	**Channel separation (MHz)**	**Relevant parts and annexes of EN 302 217 series (see note 2)**
EN 301 785	V1.2.x	Parameters for packet data radio systems for transmission of digital signals operating in the frequency range 7, 8, 13, 15, 18, 23, 26, 28, 32, 38, 52 to 55 GHz	7 GHz to 55 GHz	1,75 to 56	Annex F EN 302 217-2-1 and EN 302 217-2-2
EN 301 786	V1.2.x	Parameters for digital radio systems for the transmission of digital signals operating at 52 GHz	52 GHz	3,5 to 56	Annex E EN 302 217-2-1 and EN 302 217-2-2
EN 301 787	V1.1.x	Parameters for radio systems for the transmission of Sub-STM-0 digital signals operating in the 18 GHz frequency band	18GHz	3,5	Annex D EN 302 217-2-1 and EN 302 217-2-2
EN 302 062	V.1.1.x	High capacity digital radio systems carrying 2 x STM-1, 4 x STM-1 or STM-4 signals in frequency bands with 55/56 MHz channel spacing	15 GHz, 18 GHz, 23 GHz, 26 GHz, 32 GHz and 38 GHz	55/56 and 110/112	Annexes D and E EN 302 217-2-1 and EN 302 217-2-2
NOTE 1: 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.					
NOTE 2: The reference of the annex where system specific requirements and characteristics are introduced is the same for EN 302 217-2-1 and EN 302 217-2-2 (see bibliography), respectively.					
NOTE 3: All references in this table are found in the bibliography.					

The characteristics of equipment considered in those ENs have also been rationalized, recompacted and resubdivided into different annexes and sub-annexes/systems in the various sub-parts of this EN 302 217 series (see bibliography).

Table 3 summarizes the relevant cross-reference between radio frequency and other requirements of equipment in various Fixed Service frequency bands and the relevant sub-parts and annexes of this EN 302 217 series (see bibliography).

Table 3: Cross reference of equipment requirements, parts, sub-parts and annexes

EN 302 217																					
System independent common characteristics	**Part 1**																				
Antenna characteristics	**EN 302 217-4-1 and EN 302 217-4-2**																				
Sub-systems in relevant annexes and EN parts ⇨	**Sub-systems in annexes A of parts 2-1 and 2-2**		**Sub-systems in annexes B and C of parts 2-1 and 2-2**							**Sub-systems in annexes D of parts 2-1 and 2-2**			**Sub-systems in annex E of parts 2-1 and 2-2**								**Part 3**
Frequency band (GHz)⇨	1,4	2,1/ 2,6	3,5/4	5	L6	U6	7/8	10,5	11	13	15	18	23	26/28	31	32	38	50	52	55	58
System capacity (payloads) ⇩																					
PDH systems	A.1	A.2	B.1	–	B.1	B.1	B.1	B.1	–	D.1	D.1	D.1	E.1	E.2	E.3	E.3	E.3	E.5	E.6	E.7	Any
STM-0	–	–	B.1	–	B.1	B.1	B.1	B.1	–	D.3 D.4	D.3 D.4	D.3 D.4	E.1	E.2	E.3	E.3	E.3	–	E.6	E.7	
SubSTM-0	–	–	–	–	–	–	–	–	–	–	–	D.2	–	–	–	–	–	–	–	–	
STM-1 NxSTM-1 STM-4	–	–	B.2 B.3 C.1 C.2 C.3	C.1 C.2 C.3	B.2 B.3	C.1 C.2 C.3	B.2 B.3	B.2 B.3	C.1 C.2 C.3	D.5 D.6	D.5 D.6 D.8	D.7 D.8	E.1 E.4	E2 E.4	E.3	E.3 E.4	E.3 E.4	–	E.6	E.7	
Packet data and mixed interfaces	Annex F of parts 2-1 and 2-2																				

User's guide

With reference to the former standards listed in table 2, the present EN series provides the same set of characteristics and requirements, with the same values. However, this information is presented differently, spread across six parts corresponding to three categories.

The first category (the present document) corresponds to characteristics which are either common to the whole family of equipment or are provided in a comprehensive list, i.e. performance and availability, environmental profiles, power supply, system block diagram, TMN interface, mechanical characteristics and baseband interfaces and parameters. The symbols and abbreviations, which apply to the EN 302 217 series, are listed in the present document. The present document defines those requirements and characteristics set out in the other parts of this EN 302 217 series.

The second category (EN 302 217-2-1and EN 302 217-4-1 in the bibliography) corresponds to characteristics and requirements, which are not relevant to article 3.2 of the R&TTE Directive [1]. Nevertheless, compliance to all or some of these requirements is mandatory in order to claim compliance with the relevant part of the EN 302 217 series. Requirements are either "main requirements" or "complementary requirements". Even though compliance to these parts is not mandatory for the R&TTE Directive [1] conformity, compliance may be claimed to all or some requirements of these parts.

EN 302 217-2-1 and EN 302 217-4-1 (see bibliography) provide a description of the main and complementary requirements, for equipment operating in co-ordinated frequency bands and for antennas.

Main requirements are requirements that are also related to the "essential requirements" under article 3.2 of the R&TTE Directive [1] and are further detailed in EN 302 217-2-2 and EN 302 217-4-2 (see bibliography) of this EN 302 217 series; for equipment operating in co-ordinated frequency bands (part 2-2) and for antennas (part 4-2), respectively.

Complementary requirements are requirements that are not related to essential requirements under article 3.2 of the R&TTE Directive [1]. Nevertheless they are considered, having been commonly agreed for proper system operation and deployment when specific deployment conditions or compatibility requirements are present. Compliance to all or some of these requirements is made on a voluntary basis.

The limiting values for main and complementary requirements that are not common to all of the equipment covered by one part, but specific to one frequency range, one hierarchy (PDH or SDH), one capacity, etc, are located in annexes which may be further divided into sub-annexes. A sub-annex, when created, is dedicated to one system, described by the association of the range of capacities, the range of frequencies and the range of channel separations.

The third category (EN 302 217-2-2, EN 302 217-3 and EN 302 217-4-2) corresponds to essential phenomena, with respect to article 3.2 of the R&TTE Directive [1] and are consequently candidate-harmonized standards. The requirements are provided in the same way as in EN 302 217-2-1and EN 302 217-4-1. The limiting values associated with the essential requirements which are not common to all of the equipment covered by one part, but specific to one frequency range, one hierarchy (PDH or SDH), one capacity, etc, are located in annexes which may be further divided into sub-annexes. Reference to each annex is the same for EN 302 217-2-1 as in EN 302 217-2-2. An EN-RT (requirements table) summarizes those requirements to be addressed in order to claim compliance.

To conclude, this EN 302 217 series shall be used as a decision tree, from part 1 down to the relevant annexes/sub-annexes of parts X-1 and X-2. At every level, a check of compliance shall be performed.