



SLOVENSKI STANDARD
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Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment

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ETSI EN 302 326-2 V1.1.2 (2006-03)

Candidate Harmonized European Standard (Telecommunications series)

**Fixed Radio Systems;
Multipoint Equipment and Antennas;
Part 2: Harmonized EN covering the essential requirements
of article 3.2 of the R&TTE Directive
for Digital Multipoint Radio Equipment**

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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) 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 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") [2].

Technical specifications relevant to Directive 1999/5/EC [2] are given in annex A.

This multi-part deliverable covers characteristics and requirements for fixed multipoint radio equipment and antennas using a variety of access and duplex methods and operating at a variety of bit rates in frequency bands as specified in the present document.

The present document is part 2 of a multi-part deliverable covering the Fixed Radio Systems; Multipoint Equipment and Antennas, as identified below:

- Part 1: "Overview and Requirements for Digital Multipoint Radio Systems";
- Part 2: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment";**
- Part 3: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Multipoint Radio Antennas".

The present document and EN 302 326-3 [12] are Harmonized ENs and essential requirements are those requirements which are essential under article 3.2 of the R&TTE Directive [2].

In the above, "equipment" includes equipment with integral antennas, and "antennas" include requirements for antennas whether they are integral or non-integral.

The present document with EN 302 326-3 [12] will replace and supersede the harmonized EN 301 753 (see bibliography) for all MP equipment and antennas.

The date of cessation of presumption of conformity to R&TTE Directive [2] with reference to EN 301 753 (see bibliography, latest Version published) is proposed to be two years after the date of publication in the OJ EC of the present document.

National transposition dates	
Date of latest announcement of this EN (doa):	30 June 2006
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2007
Date of withdrawal of any conflicting National Standard (dow):	31 December 2007

0 Introduction

0.1 General

For the general background, rationale and structure of the present document see also the clause "Introduction" in EN 302 326-1 [11].

0.2 Applicability to the R&TTE Directive

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 [2]. Each standard is a module in the structure. The modular structure is shown in figure 1.

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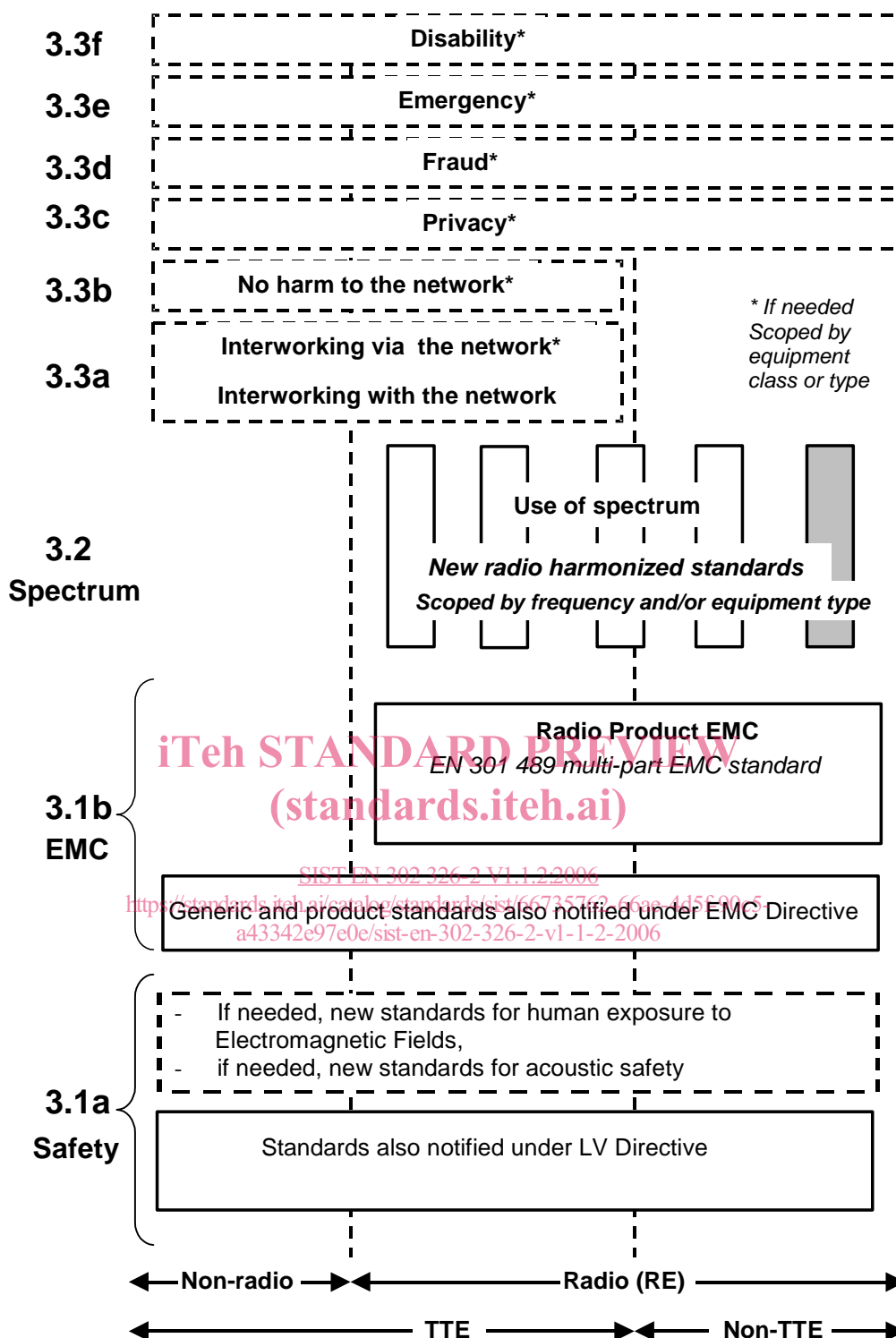


Figure 1: Modular structure for the various standards used under the R&TTE Directive [2]

The left hand edge of figure 1 shows the different clauses of article 3 of the R&TTE Directive [2].

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 (see bibliography), the multi-part product EMC standard for radio used under the EMC Directive 89/336/EEC (see bibliography).

NOTE: For Fixed Radio Systems, EN 301 489-1 and EN 301 489-4 are relevant.

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive 73/23/EEC (see bibliography) 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 [2] 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 [2] 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

1.1 General

The present document is intended to cover the provisions of the R&TTE Directive [2] regarding article 3.2, which states that "[...] radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

The present document is applicable to the essential requirements of equipment (including equipment with integral antennas) used in Multipoint (MP) Digital Fixed Radio Systems (DFRS).

The present document, together with EN 302 326-3 [12] are intended to replace and supersede, after a suitable transition period, the harmonized EN 301 753 (see bibliography) for all multipoint equipment and antennas.

The present document and EN 302 326-3 [12] introduce rationalization among systems conforming to previous EN 301 753 (see bibliography) referencing a number of ENs which, being developed at different times, might have specified slightly different requirements. However, care has been taken so that such variations will not affect any frequency planning assumption for already deployed networks. Therefore, unless specifically mentioned, these new requirements, whenever different from those single ENs, are considered completely "equivalent". Therefore mixed use of equipment conforming to the present document and to those previous ones will not change, in practice, any frequency planning rule in any network.

Therefore, from a strictly technical point of view, in most cases it is expected that equipment already conforming to the previous versions of Harmonized EN 301 753 (see bibliography), would not need re-assessment of essential requirements according to the present document. The legal implications of the declaration of conformity and equipment labelling are, however, outside the scope of this whole multi-part deliverable. Cases, where additional conformance assessment is anyhow required, will be specifically mentioned in the present document and also EN 302 326-3 [12].

In addition to the present document, other ENs specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [2] and which will apply to equipment within the scope of the present document.

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

In order to (technically) cover different market and network requirements, with an appropriate balance of performance to cost and effective and appropriate use of the radio spectrum, the present document, together with EN 302 326-3 [12], offers a number of system types and antennas alternatives, for selection by administrations, operators and manufacturers dependent on the desired use of the radio spectrum and network/market requirements; those options include:

- channel separation alternatives (as provided by the relevant CEPT Recommendation);
- spectral efficiency class alternatives (different modulation formats provided in radio equipment standards);
- antenna sectorization alternatives and directivity classes for CS;
- antenna directivity class alternatives for TS and/or RS;
- antenna basic polarization (linear or circular).

The applicability of this whole multi-part deliverable to MP equipment is governed by the definition of a number of system profiles that define the set of consistent requirements as described in EN 302 326-1 [11] to which equipment shall conform.

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 and in EN 302 326-3 [12] apply, and to separate equipment products, to which only the relevant technical requirements apply, and which might therefore be subject to separate declarations of conformity with respect to the essential requirements of the R&TTE Directive [2].

1.2 Classification of equipment

The present document is applicable, in principle to multipoint radio system equipment using any access method, operating in some combinations of frequency bands, equipment variations on the above access methods (referred to as secondary equipment type), equivalent modulation orders and channel separation.

The applicability of this whole multi-part deliverable to MP equipment is governed by the definition of a number of system profiles that define the set of consistent requirements (see clause 1.3) to which equipment shall conform. The supplier shall uniquely identify in the technical construction file which Equipment Classification(s) (EqC) (among those limited sets defined in clause 1.3) apply to his equipment and assess it consequently.

Those sets of parameters, relevant to article 3.2 of the R&TTE Directive [2], have been derived from a set of previous ENs that historically included only parameters derived from a finite number of combinations of basic system characteristics.

However, from the article 3.2 of R&TTE Directive [2] point of view, it is not required that the systems to be assessed physically conform to a specific system description. It is, however, necessary that the equipment should conform to a consistent set of parameters as designated in the present document. The set of parameters for conformance shall be indicated by the supplier, according to the classification method described in annex A to EN 302 326-1 [11].

The basic system characteristics are described in the introduction of EN 302 326-1 [11].

1.3 Profiles

1.3.1 General

This whole multi-part deliverable allows many distinct types of equipment, several different antenna types and several ways in which they might be interconnected to form a network. However, within this whole multi-part deliverable these are restricted to certain combination of attributes and these combinations of attributes are called "profiles". The following clauses address:

- Equipment profiles
- Antenna profiles.
- System profiles.

1.3.2 Equipment profiles

The applicability of the present document is limited to alternative consistent sets of recommendations and requirements, each for identified equipment profiles, which are defined in terms of their Equipment Classification (EqC) which classify equipments in terms of key characteristics. The profiles (or indeed any specific equipment) within the scope of this whole multi-part deliverable may be classified as discussed in normative annex A of EN 302 326-1 [11] in terms of the various fields of EqC, which are:

- Frequency Range (EqC-FR);
- Primary Equipment Type (EqC-PET);
- Secondary Equipment Type (EqC-SET), (where needed to distinguish variants of EqC-PET);
- Equivalent Modulation Order (EqC-EMO);
- Channel separation (EqC-ChS) - or range of separations;
- Station type (EqC-STN).

Table 1 shows the complete list of equipment profiles within the scope of this multi-part deliverable in terms of the allowed values (or ranges of values) of the various fields of EqC. The manufacturer shall indicate, in the Technical Construction File or elsewhere, the profile that the specific equipment shall comply with, by defining the values of those fields of EqC shown in table 1 that are applicable to the equipment. The equipment shall then comply with *all* requirements in EN 302 326-1 [11] and the present document relevant to that EqC.

In the case of asymmetric MP implementations (see clause 1.6 of EN 302 326-1 [11]), the supplier shall identify separately the profiles of the equipment in the two alternate directions in terms of the various EqC fields, and the present document shall apply independently to each direction.

Table 1: Equipment Profiles within the scope of this multi-part deliverable defined by their Equipment Classification (see notes 1 and 2)

EqC-FR Frequency Range (Basic ranges) (note 7)	EqC-PET Primary Equipment Type (note 3)	EqC-EMO Equivalent Modulation Order (note 4)	EqC-SET Secondary Equipment Type (note 5)	EqC-ChS Channel Separation (MHz) (Basic Ranges) (note 6)
< 1 GHz	T	2	QP, DQ, or GM	No restriction
	O	2, 4, 6	DM or MA	No restriction
	F (note 8)	2, 3, 4	Null	No restriction
	D	Not applicable	OR or PR	3,5 to 20
	H	Not applicable	Null	1 to 14
1 GHz to 3 GHz	T	1,2	Null	1,75 to 4
	O	2, 4, 6	DM or MA	1,75 to 14
	F (note 8)	2,3,4	Null	1 to 14
	D	Not applicable	OR or PR	3,5 to 14
3 GHz to 11 GHz	H	Not applicable	Null	1 to 14
	T	2	Null	0,025 to 30
	O	2, 4, 6	HC	1,75 to 30
	F (note 8)	2, 3, 4	LC	0,025 to < 2
	D	Not applicable	Null	0,025 to 30
	H	Not applicable	Null	1,75 to 30
	O	2, 4, 6	DM or MA	0,025 to 30
	F (note 8)	2, 3, 4	DM or MA	1,75 to 30
	D	Not applicable	OR or PR	1 to 30
	H	Not applicable	Null	1 to 30
24,25 GHz to 29,5 GHz	T	2	Null or HC	3,5 to 112
		4,6	Null	3,5 to 112
	M	2, 4, 6	Null	3,5 to 112
	F (note 8)	2, 3, 4, 6	Null	3,5 to 112
	D	Not applicable	OR or PR	3,5 to 112
31,0 GHz to 33,4 GHz	T	2, 4, 6	Null	3,5 to 56
	M	2, 4, 6	Null	3,5 to 56
	F (note 8)	2, 3, 4	Null	3,5 to 56
NOTE 1: A description of the fields of EqC appears in annex A of EN 302 326-1 [11], and the relationship between EqC fields and the previous equipment types described in the superseded ENs appears in annex B of EN 302 326-1 [11].				
NOTE 2: In the earlier standards a number of system types were defined (e.g. A, B, C, etc.). Annex B of EN 302 326-1 [11] indicates the relationship between the earlier system types and the present EqC.				
NOTE 3: Although EqC-PET historically has a relationship with a specific multiple access method, any access method, or combination of access methods, may be used provided that the entire set of requirements relevant to article 3.2 of the R&TTE Directive [2] in the present document and, if desired, also other complimentary requirements in EN 302 326-1 [11] are met for the stated EqC-PET value.				
NOTE 4: In the EqC-EMO column, the reference made to the modulation order is only indicative, and any equivalent modulation scheme is allowed provided that the whole set of requirements relevant to article 3.2 of the R&TTE Directive [2] in the present document and, if desired, also other complimentary requirements in EN 302 326-1 [11] are met for the manufacturer's stated EqC-EMO value. For mixed-mode systems EqC-EMO=1 might also be provided, among other more efficient EMO, within the same channel separations.				

NOTE 5:	For certain primary equipment types (EqC-PET) it has historically been necessary to sub-divide the equipments according to further characteristics which have different consistent sets of requirements. Although no longer tied to specific characteristics, this subdivision is reflected in Secondary Equipment Type (EqC-SET) classifications which are represented by various two-letter codes. (See annex A of EN 302 326-1 [11]).
NOTE 6:	The EqC-ChS column indicates range of ChS values for which the present document is applicable. Several parameters in the present document are given for discrete values of ChS only. For intermediate ChS values, methods are given for deriving the required characteristics with the default being by interpolation between the two nearest adjacent ChS values.
NOTE 7:	The EqC-FR column represents the basic frequency range for which the present document is applicable. For assessment purpose the specific frequency band of the equipment/antenna operation should be defined (e.g. EqC-FR = 3,5 or EqC - FR = 3,4 - 3,6) according the assessment rules for wide band equipment and antennas defined in annex B of the present document.
NOTE 8:	Systems of EqC-PET = H, implementing an actual FH-CDMA access method with hopping period exceeding 400 ms, are not considered within the scope of the present document.

For defining the coherent set of essential test suites for conformity assessment, a number of declared EqC codes and other parameters are needed as declaration from the supplier. Standing the considerable number of possibilities under the scope of the present document summarized in table 1 and, for systems with integral antennas in table 3, it is recommended to consider the production of a summary table, such as E.1 proposed in informative annex E, to be attached as header of the technical construction file and/or test documentation for aid the correct identification of the equipment/system profile by any interested third party.

1.3.3 Antenna profiles

According to their characteristics, multipoint systems use different types of antennas as indicated in clause 1.3.4. Table 2 outlines the multipoint antenna types described in EN 302 326-3 [12].

Table 2: Antenna Types
(standards.iteh.ai)

Frequency Range	Types	Polarization	Notes
1 GHz to 3 GHz	Directional Sectored single beam Omni directional	Linear	The sectored and omni directional antennas may have a symmetric or asymmetric radiation pattern in the elevation plane.
3 GHz to 11 GHz	Directional Sectored single beam Sectored multibeam (up to 5,9 GHz only) Omni directional	Linear	The sectored single and omni directional antennas may have a symmetric or asymmetric radiation pattern in the elevation plane. The sectored multi beam antennas have a symmetric radiation pattern only.
1 GHz to 11 GHz	Directional Sectored single beam Omni directional	Circular	The sectored and omni directional antennas may have a symmetric or asymmetric radiation pattern in the elevation plane.
24,25 GHz to 30 GHz	Directional Sectored single beam	Linear	
30 GHz to 40,5 GHz	Directional Sectored single beam Omni directional	Linear	The omni directional antennas may have a symmetric or asymmetric radiation pattern in the elevation plane.

The present document is applicable to multipoint radio system antennas of both linear (single or dual) polarization and circular (single or dual) polarization. Linear polarization antennas may support either or both of two mutually perpendicular planes of polarization. These planes are frequently, though not always, horizontal and vertical. Circular polarization antennas may support either right hand or left hand polarization or, for dual polarization, both.

The RPE directional characteristics and polarization characteristics (co-polar and cross-polar and for either linear or circular polarized antennas) impact the interference considerations in network planning. A number of antenna options are defined in EN 302 326-3 [12] to allow a trade-off between highly demanding RPE directivity and the cost/size/weight of the antennas. The antenna choice should take into account the constraints of present and future networks requirements and constraints.

Annex B of EN 302 326-3 [12] discusses Antenna Profiles for multipoint systems.