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Fiksni radijski sistemi - Veļ toļ kovna oprema in antene - 3. del: Harmonizirani EN, ki zajema bistvene zahteve ļ lena 3.2 direktive R&TTE za veļ toļ kovne radijske antene

Fixed Radio Systems - Multipoint Equipment and Antennas - Part 3: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Multipoint Radio Antennas

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Fixed Radio Systems; Multipoint Equipment and Antennas; Part 3: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Multipoint Radio Antennas

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This 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" [1]).

Technical specifications relevant to Directive 1999/5/EC [1] 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 3 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".

EN 302 326-2 [6] and the present document are Harmonized ENs and essential requirements are those requirements which are essential under article 3.2 of the R&TTE Directive [1].

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

Besides its previous version V1.1.1, the present document with EN 302 326-2 [6] replaces and supersedes the harmonized EN 301 753 (see bibliography) for all Multipoint equipment and antennas under its scope.

National transposition dates	
Date of adoption of this EN:	1 June 2007
Date of latest announcement of this EN (doa):	30 September 2007
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 March 2008
Date of withdrawal of any conflicting National Standard (dow):	31 March 2009

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 [5].

With respect to previous version of the present document, provisions for TS omnidirectional antennas for indoor NWA applications.

0.2 Relationship with the R&TTE essentials requirements

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [1]. The modular structure is described in EG 201 399 (see bibliography) and shown in figure 1.

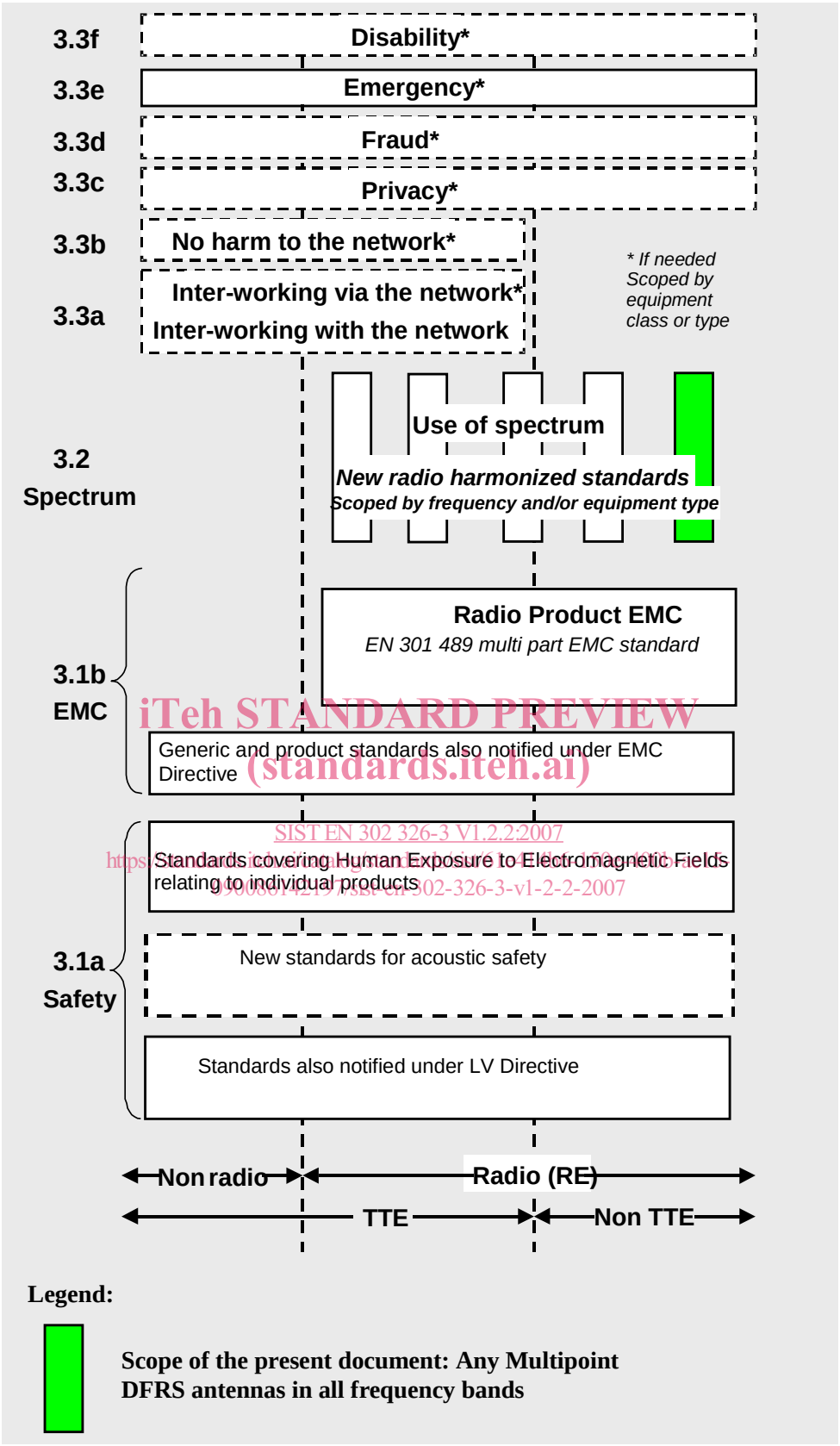

Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

1 Scope

1.1 General

The present document is intended to cover the provisions of the R&TTE Directive [1] 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 antennas (including those in equipment with integral antennas) used in Multipoint (MP) Digital Fixed Radio Systems (DFRS) (see note 1) intended for use in the frequency bands identified in EN 302 326-1 [5].

NOTE 1: Applications intended for offering in the bands 3,4 GHz to 3,8 GHz the option of Nomadic Wireless Access (NWA), according to the NWA definition in ITU-R Recommendation F.1399 (see bibliography), are also considered in the scope of the present document.

Besides its previous versions, the present document together with EN 302 326-2 [6], replaces and supersedes, after a suitable transition period, the harmonized EN 301 753 (see bibliography) for all multipoint equipment and antennas under its scope.

The present document and EN 302 326-2 [6] introduce rationalization among systems conforming to previous EN 301 753 (see bibliography) referencing a number of ENs which, being developed at different times, may have specified slightly different antenna parameters. Nevertheless, 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 antennas 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 required, will be specifically mentioned in EN 302 326-2 [6] and in the present document.

A formal change in the requirements, with respect to EN 301 753 (see bibliography), is that the antenna manufacturer shall declare the nominal gain and tolerance of the antenna against which the conformity assessment is done.

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 [1] and which will apply to antennas within the scope of the present document.

NOTE 2: 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 302 326-2 [6], 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, as well as omnidirectional alternative for TS intended for Nomadic Wireless Access (NWA);
- antenna basic polarization (linear or circular).

For Digital Fixed Radio Systems (DFRS), antennas are considered "relevant components" of "radio equipment" according the definition in article 2(c) of the R&TTE Directive [1].

More information and background on the R&TTE Directive [1] possible applicability and requirements for stand alone DFRS antennas is found in EG 201 399 (see bibliography) and in TR 101 506 (see bibliography).

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

1.2 Frequency ranges

The present document is applicable to antennas (whether integral or non-integral) used in multipoint radio systems operating in bands allocated to Fixed Service and assigned by national regulations to MP applications within the following frequency ranges:

- 1 GHz to 3 GHz;
- 3 GHz to 5,9 GHz;
- 5,9 GHz to 8,5 GHz;
- 8,5 GHz to 11 GHz;
- 24,25 GHz to 30 GHz;
- 30 GHz to 40,5 GHz.

NOTE 1: Attention is drawn to the fact that the specific operating bands are subject of CEPT or national licensing rules. Currently applicable Fixed Service bands and channel plans are described in EN 302 326-1 [5], although the applicability of these Fixed Service bands is at the discretion of the national administrations. Therefore, the present document applies only to those bands which are allocated to the Fixed Service and/or assigned by national regulations to MP applications on the date on which the EN was published.

NOTE 2: Antenna characteristics are not specified at frequencies below 1 GHz and therefore the present document and Harmonized EN 302 326-2 [6] can not be used for Declaration of conformity, according article 3.2 of the R&TTE Directive [1] for non integral antennas or for equipment with integral antennas below this limit. In this case, additional test suites for relevant antenna directional phenomena shall be produced in accordance with a Notified Body.

NOTE 3: MWS antenna systems in the band 40,5 GHz to 43,5 GHz are not within the scope of the present document. For these systems see EN 301 997-2 (see bibliography).

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, the applicability is limited to certain combinations 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

This whole multi-part deliverable allows 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 [5]. Clause 6.1 of EN 302 326-1 [5] defines the permitted equipment profiles in terms of the various fields of EqC.

1.3.3 Antenna profiles

According to their characteristics, multipoint systems use different types of antennas. Table 1 outlines the multipoint antenna types described in the present document.

Table 1: Antenna Types

Frequency Range	Types	Polarization	Notes
1 GHz to 3 GHz	Directional Sectored single beam Omnidirectional	Linear	The sectored and omnidirectional antennas may have a symmetric or asymmetric radiation pattern in the elevation plane.
3 GHz to 11 GHz	Directional Sectored single beam Sectored multi-beam (up to 5,9 GHz only) Omnidirectional	Linear	The sectored single and omnidirectional 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 Omnidirectional	Circular	The sectored and omnidirectional 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 Omnidirectional	Linear	The omnidirectional 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 on the interference to be considered in network planning. A number of antenna options are defined in the present document 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 present and future networks requirements and constraints.

Annex B discusses Antenna Profiles for multipoint systems.

1.3.4 System profiles

This multi-part deliverable applies only to Multipoint systems using the following antenna type to station type combinations according to whether the network topology is P-MP or MP-MP (Mesh). Table 2 indicates which system profiles are within the scope of this multi-part deliverable.

Table 2: System Profiles within the scope of this multi-part deliverable: Antenna types - Station types combinations

		Antenna types		
Network topology	**Station types**	**Omnidirectional**	**Sectored**	**Directional**
P-MP	Central Station (CS)	Yes	Yes (See note 1)	No (See note 1)
	Repeater Station (RS)			
	Facing CS	No	No	Yes
	Facing TS or further RS	Yes	Yes	Yes
	Terminal Station (TS)	Yes (note 2)	No	Yes
MP-MP	Repeater Station (RS)	No	No	Yes

NOTE 1: Sectored antennas with beamwidth < 15° shall conform to the specification otherwise applicable to a directional antenna.

NOTE 2: Omnidirectional TS antennas are limited to typically indoor deployment (e.g. desk antennas) for NWA applications in 3,4 GHz to 3,8 GHz bands. Nor outdoor deployable at fixed location, neither integral to handheld TS, are considered antennas within the scope of the present document.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

[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] ETSI EN 301 126-3-2(V1.2.1): "Fixed Radio Systems; Conformance testing; Part 3-2: Point-to-Multipoint antennas - Definitions, general requirements and test procedures".

[3] ETSI EN 302 217-4-1 (V1.1.3): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 4-1: System-dependent requirements for antennas".

[4] ETSI EN 302 217-4-2 (V1.2.1): "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 4-2: Harmonized EN covering essential requirements of article 3.2 of R&TTE Directive for antennas".

[5] ETSI EN 302 326-1: "Fixed Radio Systems; Multipoint Equipment and Antennas; Part 1: Overview and Requirements for Digital Multipoint Radio Systems".

[6] ETSI EN 302 326-2: "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".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

antenna: part of the transmitting or receiving system designed to transmit or receive electromagnetic radiation

azimuth plane: reference plane (see note) from which Radiation Pattern Envelopes are referenced

NOTE: This plane is nominally horizontal (see also *tilt*). The azimuth plane is generally mechanically identified by reference to the technical description for actual antennas for testing and deployment purposes. Sectorial and omnidirectional antennas might have intrinsic down-tilt of few degrees. In such cases, it would be more theoretically appropriate reference to a "conical" surface rather than a plane. However, tilt is generally compensated for by the test set antenna mounting (i.e. by tilting up the antenna test set mounting by an equivalent quantity) and the assessment is done by rotating the antenna rather then the receiving instrument. The test is thus performed in such a way that the measurements may be considered equivalent to those made in a true azimuth plane.

Central Station (CS): base station which communicates with Terminal Stations and in some cases Repeater Stations