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Fiksni radijski sistemi ï Antene tipa toļ ka-veļ toļ k ï Antene za fiksne radijske sisteme tipa toļ ka-veļ toļ k, ki delujejo v frekvenļ nem pasu od 11 GHz do 60 GHz ï 1. del: Sploġni vidiki

Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 1: General aspects

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Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 1: General aspects

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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 requirements for antennas in conjunction with multipoint (MP) systems necessary to facilitate frequency co-ordination between services in the frequency bands 11 GHz to 60 GHz, as identified below:

Part 1: "General aspects";

Part 2: "24 GHz to 30 GHz";

Part 3: "Multipoint Multimedia Wireless system in 40,5 GHz to 43,5 GHz";

Part 4: "Multipoint Multimedia Wireless system in 30 GHz to 40,5 GHz".

The present document is organized in the following way. Part 1 gives general information about the scope, normative references, definitions, classification, normative and informative electrical and mechanical characteristics. Part 1 is the framework for further parts, where distinct values of normative characteristics for a given frequency sub-band are defined. Consequently, Part 1 in combination with another part forms the EN for a given sub-band.

National transposition dates	
Date of adoption of this EN:	13 July 2001
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 April 2002
Date of withdrawal of any conflicting National Standard (dow):	30 April 2002

1 Scope

The present document specifies the essential electrical requirements for linear polarization, fixed beam antennas to be utilized with new multipoint (P-MP and MP-MP) Multimedia Wireless Systems (MWS) [1], including central station, repeater and terminal station applications, operating in frequency bands from 11 GHz to 60 GHz. These systems use various multiple access schemes. Antennas may be pointed by manual or electro-mechanical means or by switching between different fixed antennas. Electronically steerable antennas, and circularly polarized antennas are not considered in the present document.

A Regulatory Authority may impose tighter requirements than the minimum values given in the present document, in order to maximize the use of scarce spectrum resources.

For some high gain, multipoint requirements, antennas may be used having performance as per the appropriate point-to-point antenna standard. For these antennas, minimum requirements are given in EN 300 833 [2].

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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.

[1] ETSI EN 301 213-1: "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 1: Basic parameters".

[2] ETSI EN 300 833: "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".

[3] CEPT Recommendation T/R 13-02: "Preferred channel arrangements for fixed services in the range 22.0-29.5 GHz".

[4] ITU-R Recommendation F.746-1: "Radio-frequency channel arrangements for radio-relay systems".

[5] Final Acts of the World Radiocommunications Conference (WARC-95), Geneva 1995.

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

[7] ETSI EN 301 215-2: "Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 2: 24 GHz to 30 GHz".

[8] ETSI EN 301 215-3: "Fixed Radio Systems; Point-to-multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 3: Multipoint Multimedia Wireless system in 40,5 GHz to 43,5 GHz".

[9] ETSI ETS 300 019-1-4: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weatherprotected locations".

[10] Void.

[11] ETSI EN 301 215-4: "Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 4: Multipoint Multimedia Wireless system in 30 GHz to 40,5 GHz".

[12] CEPT ERC/DEC(99)15: "ERC Decision of 1 June 1999 on the designation of the harmonised frequency band 40.5 to 43.5 GHz for the introduction of Multimedia Wireless Systems (MWS) including Multipoint Video Distribution Systems (MVDS)".

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 that is designed to radiate and/or receive electromagnetic waves

boresight: axis of the main beam in a directional antenna

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

co-polar pattern: diagram representing the radiation pattern of a test antenna when the reference antenna is similarly polarized, scaled in dBi or dB relative to the measured antenna gain

cross-Polar Discrimination (XPD): difference in dB between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle measured within a defined region

cross-polar pattern: diagram representing the radiation pattern of a test antenna when the reference antenna is orthogonally polarized, scaled in dBi or dB relative to the measured antenna gain

fixed beam: radiation pattern in use is fixed relative to a defined mechanical reference plane

gain: ratio of the radiation intensity, in a given direction, to the radiation intensity that would be obtained if the power accepted by the antenna was radiated isotropically

half power beamwidth: angle, relative to the main beam axis, between the two directions at which the measured copolar pattern is 3 dB below the value on the main beam axis

input port(s): flange(s) or connector(s) through which access to the antenna is provided

inter-port isolation: ratio in dB of the power level applied to one port of a multi-port antenna to the power level received in any other port of the same antenna as function of frequency

isotropic radiator: hypothetical, lossless antenna having equal radiation intensity in all directions

main beam axis: direction for which the radiation pattern intensity is the maximum

main beam: radiation lobe containing the direction of maximum radiation

mechanical tilt: fixed angular shift in elevation of the antenna main beam axis by a change to the physical mounting

radiation pattern envelope: envelope below which the radiation pattern shall fit

radiation pattern: diagram relating power flux density at a constant distance from an antenna to direction relative to the antenna main beam axis

radome: cover of dielectric material, intended for protecting an antenna from the effects of the physical environment

Repeater Station (RS): radio station providing the connection via the air to a Central Station, Terminal Station(s) and/or other Repeater Stations. The Repeater Station may also provide the interfaces to the subscriber equipment, if applicable.

sector angle: declared angle of coverage in azimuth of a sectored antenna, defined as 2α in the present document

Terminal Station (TS): remote (out) station, which communicates with a Central Station or Repeater Station

tilt: fixed, angular shift of the antenna main beam axis (boresight) in the elevational plane by either electrical, electronic or mechanical means

zero degree (0°) reference direction: declared direction as referenced to the antenna mechanical characteristics, used as reference for RPE

3.2 Symbols

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

dB	Decibel
dBi	Decibels relative to an isotropic radiator
GHz	Gigahertz
α	Alpha (= half of the sector angle)

3.3 Abbreviations

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

CS	Central Station
HPBW	Half power beamwidth
MP-MP	Multipoint to Multipoint
MWS	Multimedia Wireless Systems
P-MP	Point-to-Multipoint
RPE	Radiation pattern envelope
RS	Repeater Station
TS	Terminal Station
VSWR	Voltage standing wave ratio
XPD	cross-Polar Discrimination

4 Frequency bands

The present document applies to a number of frequency ranges within the 11 GHz to 60 GHz frequency bands as considered within CEPT/ERC and ETSI for allocation to the fixed services [3], [4], [5] and [12].

For the purpose of the present document the overall frequency band 11 GHz to 60 GHz is divided into a number of frequency ranges, each of which are addressed in parts 2 onwards.