



**SLOVENSKI STANDARD**  
**SIST EN 300 631 V1.2.1:2003**  
**01-december-2003**

---

: ]\_gb]fUX]g\_ ]g]ghYa ]E'5 bhYbYhjdUhc \_U!hc \_UE'5 bhYbYnUZ]\_gbYfUX]g\_Y  
g]ghYa YhjdUhc \_U!hc \_Uj 'dUgi `cX`%; <n`Xc`" `; <n

Fixed Radio Systems; Point-to-point Antennas; Antennas for point-to-point fixed radio systems in the 1 GHz to 3 GHz band

**iteh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Ta slovenski standard je istoveten z: **EN 300 631 Version 1.2.1**  
<https://standards.iteh.ai/catalog/standards/sist/997a9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003>

**ICS:**

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

**SIST EN 300 631 V1.2.1:2003** en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 300 631 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003>

# ETSI EN 300 631 V1.2.1 (1999-12)

---

*European Standard (Telecommunications series)*

## **Fixed Radio Systems; Point-to-Point Antennas; Antennas for Point-to-Point fixed radio systems in the 1 GHz to 3 GHz band**

---

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 300 631 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003>



---

**Reference**

REN/TM-04083 (5uc00ioo.PDF)

---

**Keywords**

antenna, CDMA, DRRS, FDMA, point-to-point,  
radio, RLL, TDMA, transmission

**ETSI**

---

**Postal address**

F-06921 Sophia Antipolis Cedex - FRANCE

---

**Office address**

650 Route des Lucioles - Sophia Antipolis  
Valbonne - 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  
Sous-Préfecture de Grasse (06) N° 7803/88

<https://standards.etsi.org/standards-search/5c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003>

---

**Internet**

secretariat@etsi.fr

Individual copies of this ETSI deliverable  
can be downloaded from

<http://www.etsi.org>

If you find errors in the present document, send your  
comment to: editor@etsi.fr

---

**Important notice**

This ETSI deliverable may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference should be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1999.  
All rights reserved.

# Contents

Intellectual Property Rights .....	4
Foreword .....	4
1 Scope .....	5
2 References .....	5
3 Definitions, symbols and abbreviations .....	6
3.1 Definitions .....	6
3.2 Symbols .....	6
3.3 Abbreviations .....	6
4 Frequency bands .....	7
5 Classification of antennas .....	7
6 Electrical characteristics .....	8
6.1 RPE .....	8
6.2 Cross-Polar Discrimination (XPD) .....	13
6.3 Antenna gain .....	13
6.4 Radomes .....	13
6.5 Antenna polarization .....	13
6.6 Elevation RPE for class 1 antennas .....	14
7 Conformance tests .....	14
<b>Annex A (informative): Antenna characteristics .....</b>	<b>15</b>
A.1 Mechanical characteristics .....	15
A.1.1 Environmental characteristics .....	15
A.1.2 Antenna stability .....	15
A.2 Antenna input connectors .....	15
A.3 Voltage Standing Wave Ratio (VSWR) at the input ports .....	16
A.4 Inter-port isolation .....	16
A.5 Antenna labelling .....	16
Bibliography .....	17
History .....	18

ITeL STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/997a9c2-b55c-4d90-972d-c1ecc1e0ecb7/sist-en-300-631-v1-2-1-2003>

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://www.etsi.org/ipr>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## Foreword

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

The purpose of the present document is to define the antenna performance standards necessary to ensure optimum frequency co-ordination between services in the re-planned 1 GHz to 3 GHz band. The 3 GHz upper limit has been introduced making reference to the WRC-95 Final Acts [3] and the frequency plans as given in CEPT Recommendation T/R 13-01 [1].

Additional parameters appropriate to system implementation may be subject to agreement between the equipment purchaser and supplier. Further guidance is provided in annex A.

This document has been elaborated as a version of EN 300 631-1 V1.1 [9]. The initially foreseen part 2 of EN 300 631-1 has been uncoupled and will be published as EN 301 525.

SIST EN 300 631 V1.2.1:2003  
National transposition dates  
<https://standards.itsolutions.com/standards/sist/300631-v1-2-1-2003>

Date of adoption of this EN:	26 November 1999
Date of latest announcement of this EN (doa):	29 February 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2000
Date of withdrawal of any conflicting National Standard (dow):	31 August 2000

---

## 1 Scope

The present document addresses the requirements for directional fixed beam antennas to be utilized with new Point-to-Point (P-P) systems operating in the frequency band 1 GHz to 3 GHz. Electronically steerable antennas, and circularly polarized antennas will not be considered under the present document.

The application of these Fixed Radio Systems (FRS) is anticipated to be for P-P links in local, regional and national networks, mobile base station connections, customer access links, telemetering and telecontrol (including transportable and offshore use).

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

---

## 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, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- iTech STANDARD PREVIEW  
(standards.itech.ai)
- [1] CEPT Recommendation T/R 13-01: "Preferred Channel Arrangement for Fixed Services in the range 1-3 GHz". [SIST EN 300 631 V1.2.1:2003](https://standards.itech.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1cc1e0cc6/sist-en-300-631-v1-2-1-2003)
  - [2] ITU-R Recommendation F.746: "Radio-Frequency channel arrangements for radio-relay systems". <https://standards.itech.ai/catalog/standards/sist/997af9c2-b55c-4d90-972d-c1cc1e0cc6/sist-en-300-631-v1-2-1-2003>
  - [3] Final Acts of the World Radiocommunications Conference (WRC-95), Geneva 1995.
  - [4] EN 301 126-3-1: "Conformance Testing for Point-to-Point Radio Relay Systems Part 3: Antenna Specific Parameters".
  - [5] IEC 339, Parts 1 and 2: "General purpose rigid coaxial transmission lines and their associated flange connectors".
  - [6] IEC 169: "Radio-frequency connectors. Part 1: General requirements and measuring methods", and applicable sub-parts.
  - [7] CENELEC CECC 22.150: "Radio frequency coaxial connectors - Series EIA flange".
  - [8] CENELEC CECC 22.151: "Radio frequency coaxial connectors - Series EIA flange".
  - [9] EN 300 631-1 (V1.1): "Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Part 1: Antennas for Point-to-Point (P-P) radio links in the 1 GHz to 3 GHz band".

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

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

**antenna:** that part of the transmitting or receiving system that is designed to radiate or receive electromagnetic waves

**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 between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the half power beamwidth of the co-polarized main beam

**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

**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 between the two directions at which the measured co-polar pattern is 3 dB below the value on the main beam axis

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

**main beam:** radiation lobe containing the direction of maximum radiation

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

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

**Radiation Pattern Envelope (RPE):** envelope below which the radiation pattern shall fit

**radome:** cover of dielectric material, intended to protect an antenna from the effects of its physical environment

### 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

### 3.3 Abbreviations

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

DRRS	Digital Radio Relay Systems
FRS	Fixed Radio Systems
P-P	Point-to-Point
RPE	Radiation Pattern Envelope
XPD	Cross-Polar Discrimination
UV	Ultra Violet
VSWR	Voltage Standing Wave Ratio



---

## 4 Frequency bands

The present document applies to the frequency bands given in CEPT Recommendation T/R 13-01 [1] and ITU-R Recommendation F.746 [2].

---

## 5 Classification of antennas

With respect to Radiation Pattern Envelopes (RPEs), three classes of antennas have been identified to give a guideline for regulatory and planning purposes:

**Class 1:** Those antennas required for environments where there is a low interference potential.

Typical examples of a low interference potential might be:

- antennas for use in radio networks where there is a thin topography, and therefore, a low potential for inter- and intra-system interference, and where high capacity digital radio is proposed;
- antennas for use in radio networks where there is a medium potential for inter- and intra-system interference, and where low capacity digital radio is proposed.

**Class 2:** Those antennas required for use in networks where there is a medium interference potential.

Typical examples of a medium interference potential might be:

- antennas for use in radio networks where there is a medium potential for inter- and intra-system interference, and where high capacity digital radio is proposed;
- antennas for use in radio networks where there is a dense topography, and therefore, a high potential for inter- and intra-system interference, and where low capacity digital radio is proposed.

**Class 3:** Those antennas required for use in networks where there is a high interference potential.

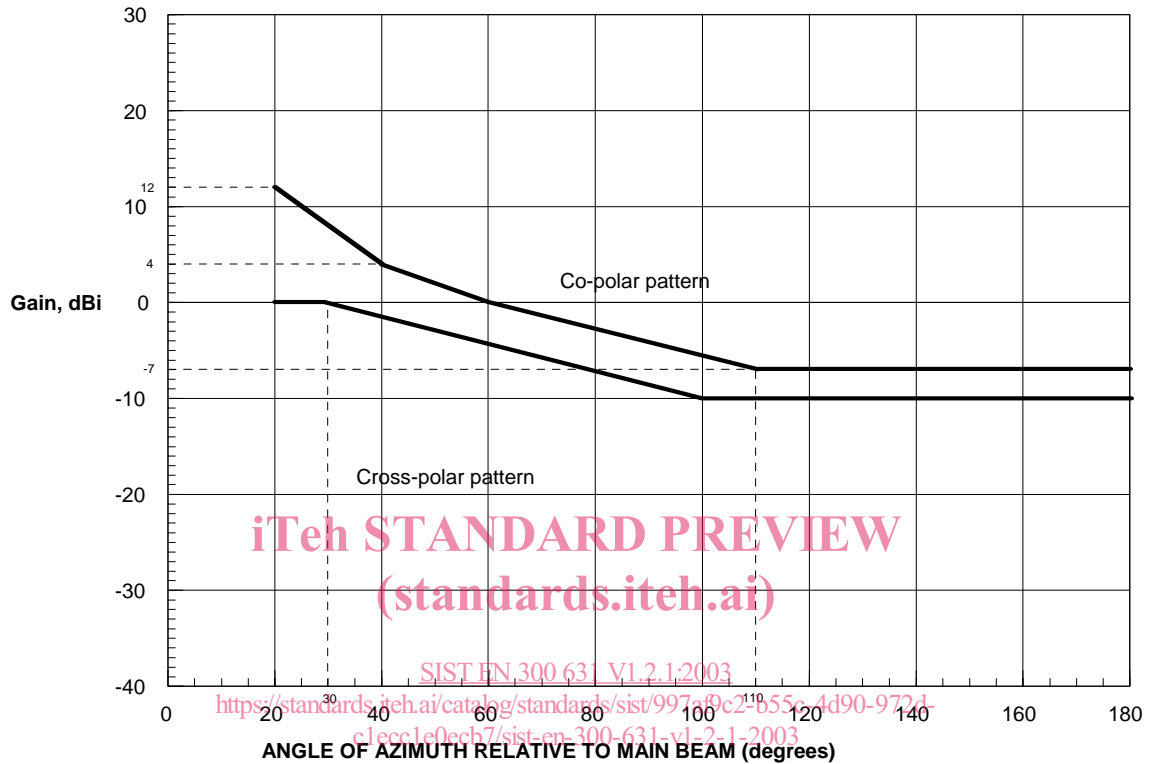
Typical example of a high interference potential might be:

- antennas for use in radio networks where there is a dense topography, and therefore, a high potential for inter- and intra-system interference, and where high capacity digital radio is proposed.

## 6 Electrical characteristics

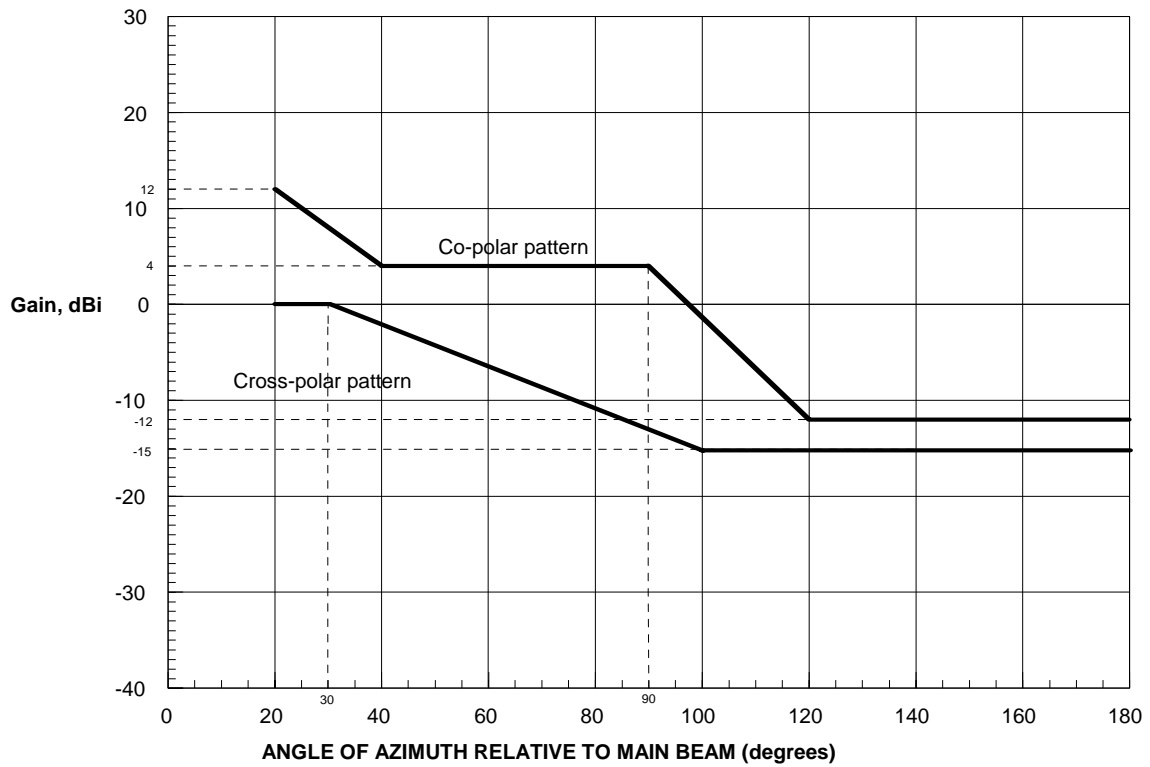
### 6.1 RPE

The choice of antenna depends on the application planned for this band, requirements of the operators and the responsible administration. Figures 1 to 5 give the RPEs for antenna classes 1 to 3.



Angle (degree)	Co-polar (dBi)	Angle (degree)	Cross-polar (dBi)
20	12	20	0
40	4	30	0
110	-7	100	-10
180	-7	180	-10

Figure 1: Class 1 antenna



Angle (degree)	Co-polar (dBi)	Angle (degree)	Cross-polar (dBi)
20	12	20	0
40	4	30	0
90	4	100	-15
120	-12	180	-15
180	-12		

Figure 2: Class 2 antenna