



**SLOVENSKI STANDARD**  
**SIST EN 301 080 V1.2.1:2003**  
**01-december-2003**

: ]\_gb]fUX]g\_]g]ghYa ]ÈCdfYa U]hdU]c \_U]j Y ]c \_È: fY\_j Yb bc'dcfUnXY^Yb]  
gcXcglcd'fi 8 A 5 LÈÈ 8 ] [ ]fU]b]fUX]g\_]g]ghYa ]hdU]c \_U]j Y ]c \_ž\_]XYi ^Yc]j  
ZY\_j Yb b] ]dUgcj ] ]j'cVa c 1'cX' ; <n'Xc'%%; <n

Fixed Radio Systems; Point-to-multipoint equipment; Frequency Division Multiple Access (FDMA); Point-to-multipoint digital radio systems in frequency bands in the range 3 GHz to 11 GHz

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

[SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3dfe2/sist-en-301-080-v1-2-1-2003)  
<https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3dfe2/sist-en-301-080-v1-2-1-2003>

**Ta slovenski standard je istoveten z: EN 301 080 Version 1.2.1**

**ICS:**

33.040.20	Prenosni sistem	Transmission systems
33.060.30	Radiorelejni in fiksni satelitski komunikacijski sistemi	Radio relay and fixed satellite communications systems

**SIST EN 301 080 V1.2.1:2003**                      **en**

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

[SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-v1-2-1-2003>

# ETSI EN 301 080 V1.2.1 (2000-02)

---

*European Standard (Telecommunications series)*

**Fixed Radio Systems;  
Point-to-multipoint equipment;  
Frequency Division Multiple Access (FDMA);  
Point-to-multipoint digital radio systems in frequency bands  
in the range 3 GHz to 11 GHz**

---

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

[SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3dfe2/sist-en-301-080-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3dfe2/sist-en-301-080-v1-2-1-2003>



---

**Reference**

REN/TM-04063-18

---

**Keywords**

FDMA, multipoint, radio, RLL, transmission, FWA

**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-Prefecture de Grasse (06) N° 7803/88

---

**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 shall 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 2000.  
All rights reserved.

# Contents

Intellectual Property Rights.....	5
Foreword .....	5
Introduction .....	5
1 Scope .....	7
2 References .....	8
3 Definitions, symbols and abbreviations .....	10
3.1 Definitions .....	10
3.2 Symbols .....	10
3.3 Abbreviations .....	11
4 General characteristics .....	12
4.1 General system architecture.....	12
4.2 Frequency bands and channel arrangements.....	13
4.2.1 Channel plan .....	13
4.2.2 Proposed channel arrangements.....	13
4.3 Compatibility requirements .....	13
4.4 Environmental conditions.....	13
4.4.1 Equipment within weather protected locations (indoor locations).....	14
4.4.2 Equipment for non-weather protected locations (outdoor locations).....	14
4.5 Power supply .....	14
4.6 Electromagnetic Compatibility (EMC) conditions.....	14
4.7 Telecommunications Management Network (TMN) interfaces .....	14
4.8 Synchronization of interface bit rates .....	14
4.9 Branching / feeder / antenna requirements.....	14
4.9.1 Antenna radiation patterns.....	14
5 System parameters.....	15
5.1 System capacity .....	15
5.2 Round trip delay .....	15
5.3 Transparency .....	15
5.4 Voice coding methods .....	15
5.5 Transmitter characteristics.....	15
5.5.1 Transmitter power range .....	16
5.5.2 Automatic Transmit Power Control (ATPC) .....	16
5.5.3 Transmitter (Tx) Local Oscillator (LO) frequency arrangements .....	16
5.5.4 RF spectrum mask.....	16
5.5.4.1 RF spectrum mask for the central radio station .....	16
5.5.4.2 RF-spectrum mask for the terminal station and the repeater station.....	17
5.5.5 RF tolerance.....	17
5.5.6 Spurious emissions.....	18
5.6 Receiver characteristics .....	18
5.6.1 Receiver (Rx) LO frequency arrangements.....	18
5.6.2 Spurious emissions.....	18
5.7 System performance without diversity.....	18
5.7.1 Dynamic level range .....	18
5.7.2 BER as a function of Receiver input Signal Level (RSL).....	18
5.7.3 Equipment Background BER (BBER).....	19
5.7.4 Interference sensitivity (external) .....	20
5.7.4.1 Cochannel interference.....	20
5.7.4.2 Adjacent channel interference .....	20
5.7.5 Distortion sensitivity .....	20
5.7.6 Continuous Wave (CW) spurious interference .....	20
5.8 System performance with diversity.....	21

6	Types of interfaces at the subscriber equipment and the network node .....	21
	Bibliography .....	22
	History .....	23

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

[SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-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 present document contains the minimum technical requirements to ensure compatibility of products and conformance with radio regulations across ETSI member states. Radio terminals from different manufacturers are not required to interwork at radio frequency (i.e. no common air interface).

The present document is intended to cover a variety of systems designed for a variety of services, applications, performance objectives and deployment conditions. Therefore it is necessary to include in the present document different sets of system parameters. In the present document these set of parameters are referred to as "system types".

When compared to EN 301 080 V1.1.1, the present document contains modifications to clause 2 and subclauses 4.6, 5.5.6 and 5.6.2 only, brought about by the publication of CEPT/ERC Recommendation 74-01 (Spurious Emissions).

The former title of the present document was: "Transmission and Multiplexing (TM); Digital Radio Relay Systems (DRRS); Frequency Division Multiple Access (FDMA); Point-to-multipoint DRRS in frequency bands in the range 3 GHz to 11 GHz".

### National transposition dates

Date of adoption of this EN:	31 December 1999
Date of latest announcement of this EN (doa):	31 March 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2000
Date of withdrawal of any conflicting National Standard (dow):	30 September 2000

---

## Introduction

The main field of application of Point-to-Multipoint (P-MP) systems, using the Fixed Service (FS), is to provide access to both public and private networks (Public Switched Telephone Network (PSTN), Public Data Network (PDN), etc.). By means of P-MP systems the network service area may cover scattered subscriber locations. The systems may be applied to build new access networks by means of a multi cellular architecture, covering both urban and regional areas.

Subscribers are offered the full range of services by the particular public or private network. Subscribers have access to these services by means of the various standardized user network interfaces (e.g. 2-wire loop, and Integrated Services Digital Network (ISDN) ranging from basic rate to  $n \times$  primary rate).

P-MP systems provide standard network interfaces and transparently connect subscribers to the appropriate network node. These systems allow a service to be connected to a number of subscribers ranging from a few to several thousand, and over a wide range of distances.

P-MP systems are generally configured as pre-assigned systems or as Demand Assigned Multiple Access (DAMA) radio systems.

The essential features of a typical P-MP radio system are:

- efficient use of the radio spectrum;
- concentration;
- transparency.

Radio is often the ideal way of obtaining communications at low cost and almost independent of distance, and difficult topography. Moreover, a small number of sites are required for these installations, thus facilitating rapid implementation and minimizing maintenance requirements of the systems.

Concentration means that  $m$  subscribers can share  $n$  radio channels ( $m$  being larger than  $n$ ), allowing a better use of the available frequency spectrum at a lower equipment costs. The term "multi-access" means that every subscriber has access to every channel (instead of a fixed assignment as in most multiplex systems). When a call is initiated, an available channel is allocated to it. When the call is terminated, the channel is released for another call.

Concentration requires the use of distributed intelligent control which in turn allows many other operation and maintenance functions to be added.

Transparency means that the network node (service node) and the subscriber equipment communicates with each other without being aware of the radio link.

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-v1-2-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3df2/sist-en-301-080-v1-2-1-2003>



---

# 1 Scope

The present document specifies the minimum requirements for system parameters of Frequency Division Multiple Access (FDMA) Point-to-Multipoint (P-MP) radio systems in the terrestrial Fixed Service (FS) operating in the bands 3 GHz to 11 GHz.

The system will provide access to both public and private networks (Public Switched Telephone Network (PSTN), Public Data Network (PDN), etc.) by means of the various standardized network interfaces (e.g. 2-wire loop, Integrated Services Digital Network (ISDN) and 2 Mbit/s).

The system may be applied to build access networks by means of a multi cellular architecture, covering urban, suburban, and regional areas.

The FDMA P-MP system will transmit a Radio Frequency (RF) signal from the customer site to the Central Station (CS) only utilizing a spectral bandwidth corresponding to that capacity which is requested from and assigned to the customer by pre-assignment or by Demand Assigned Multiple Access (DAMA). The CS receives from each customer site a single modulated carrier being processed independently within the CS. Thus the CS is receiving a FDMA signal.

The present document covers the following typical P-MP applications:

The transmission of:

- voice;
- fax;
- voice band data;
- telex;

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

related to analogue interfaces and:

- 64 Kbit/s; [SIST EN 301 080 V1.2.1:2003](https://standards.iteh.ai/catalog/standards/sist/93fd733a-6ca5-4134-8705-c742aba3dfe2/sist-en-301-080-v1-2-1-2003)
- ISDN;
- digital video;
- digital audio;

related to digital interfaces.

Further applications like Asynchronous Transport Mode (ATM) may also be provided.

Two classes of systems have been defined in order to take into account the large variety of possible applications due to access network implementations and type of service to be provided.

The equipment covered by the present document should be designed to be able to meet the network performance requirements foreseen by ITU-R Recommendations F.696-2 [1] and F.697-2 [2], for medium, local grade or ITU-R Recommendation F.1189-1 [3] national portion (access or short haul) of the digital connection following the criteria defined in ITU-T Recommendation(s) G.821 [4] and/or G.826 [5]. It should be noted that the values for B and C are provisional taking also into account note 5 of ITU-R Recommendation F.1189-1 [3].

The availability requirements are under further study by the relevant bodies.

Network operators may choose different performance and availability requirements in order to extend the possible area of application thus fitting to their network needs.

Radio terminals from different manufacturers are not intended to interwork at radio frequency (i.e. no common air interface).

The present document defines the requirements of radio terminal and radio-relay equipment including the interfaces. The requirements for multiplex, network management and antenna / feeder equipment may be addressed elsewhere.

## 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.
- [1] ITU-R Recommendation F.696-2: "Error performance and availability objectives for hypothetical reference digital sections forming part or all of the medium-grade portion of an ISDN connection at a bit rate below the primary rate utilizing digital radio relay systems".
  - [2] ITU-R Recommendation F.697-2: "Error performance and availability objectives for the local-grade portion at each end of an ISDN connection a bit rate below the primary rate utilizing digital radio relay systems".
  - [3] ITU-R Recommendation F.1189-1: "Error-Performance Objectives for constant bit rate digital paths at or above the primary rate carried by digital radio-relay systems which may form part or all the national portion of a 27 500 km hypothetical reference path".
  - [4] ITU-T Recommendation G.821: "Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an integrated services digital network".
  - [5] ITU-T Recommendation G.826: "Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate".
  - [6] ERC Recommendation 14-03: "Harmonized radio frequency channel arrangements for low and medium capacity systems in the band 3 400 MHz to 3 600 MHz".
  - [7] ERC Recommendation 12-05: "Harmonized radio frequency channel arrangements for digital terrestrial fixed systems operating in the band 10,0 to 10,68 GHz".
  - [8] ETS 300 019: "Equipment engineering (EE); Environmental conditions and environmental tests for telecommunication equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations and Part 1-4: Classification of environmental conditions Stationary use at non-weatherprotected locations".
  - [9] ETS 300 132: "Equipment engineering (EE); Power supply interface at the input to telecommunications equipment".
  - [10] EN 300 385: "EMC and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment".
  - [11] Void.
  - [12] ITU-T Recommendation G.773: "Protocol suites for Q-interfaces for management of transmission systems".
  - [13] ITU-T Recommendation G.810: "Definitions and terminology for synchronization networks".
  - [14] ITU-T Recommendation G.812: "Timing requirements at the output of slave clocks suitable for plesiochronous operation of international digital links".
  - [15] ITU-T Recommendation G.823: "The control of jitter and wander within digital networks which are based on the 2 048 kbit/s hierarchy".

- [16] ITU-T Recommendation G.813: "Timing characteristics of SDH equipment slave clocks (SEC)".
- [17] ITU-T Recommendation G.825: "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".
- [18] 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".
- [19] EN 302 085: "Fixed Radio Systems; Point-to-Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 3 GHz to 11 GHz band".
- [20] ITU-T Recommendation G.703: "Physical / electrical characteristics of hierarchical digital interfaces".
- [21] ITU-T Recommendation G.131: "Control of talker echo".
- [22] ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".
- [23] ITU-T Recommendation G.726: "40, 32, 24, 16 kbit/s adaptive differential pulse code modulation (ADPCM)".
- [24] ITU-T Recommendation G.728: "Coding of speech at 16 kbit/s using low-delay code excited linear prediction".
- [25] ITU-T Recommendation G.729: "Coding of speech at 8 kbit/s using conjugate-structure algebraic-code-excited linear-prediction".
- [26] ITU-T Recommendation O.151: "Error performance measuring equipment operating at the primary rate and above".
- [27] ITU-T Recommendation O.181: "Equipment to assess error performance on STM-N interfaces".
- [28] ITU-R Recommendation SM.329-7: "Spurious Emissions".
- [29] CEPT/ERC Recommendation 74-01: "Spurious Emissions".
- [30] ITU-T Recommendation Q.552: "Transmission characteristics at 2-wire analogue interfaces of digital exchanges".
- [31] ITU-T Recommendation Q.553: "Transmission characteristics at 4-wire analogue interfaces of digital exchanges".
- [32] ITU-T Recommendation R.20: "Telegraph modem for subscriber lines".
- [33] ITU-T Recommendation V.-series: "Data communication over the telephone network".
- [34] ITU-T Recommendation X.-series: "Data networks and open system communication".
- [35] ITU-T Recommendation G.961: "Digital transmission system on metallic local lines for the ISDN basic rate access".
- [36] ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles".
- [37] ETS 300 011: "Integrated Services Digital Network (ISDN); Primary rate user-network interface; Layer 1 specification and test principles".
- [38] ITU-T Recommendation G.962: "Access digital line section for ISDN primary rate at 2 048 kbit/s".
- [39] ITU-T Recommendation G.707: "Network node interface for the synchronous digital hierarchy (SDH)".
- [40] ITU-T Recommendation G.964: "V-Interfaces at the digital local exchange (LE) - V5.1-interface (based on 2 048 kbit/s) for the support of access network (AN)".