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gcXcglcd`fl 8 A 5 L`E`8 ] ]Hb]fUX]g\_]g]ghYa ]`hdUhc \_U]Y`hc \_Z\_]XYi`Y`c`j  
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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

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*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**

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## 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".

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".

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| Date of adoption of this EN:                                                           | 16 February 2001 |
| Date of latest announcement of this EN (doa):                                          | 31 May 2001      |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 30 November 2001 |
| Date of withdrawal of any conflicting National Standard (dow):                         | 30 November 2001 |

## 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 communicate with each other without being aware of the radio link.



# 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;

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related to analogue interfaces and:

- 64 Kbit/s;
- ISDN;
- digital video;
- digital audio;

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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.

- [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".
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- [15] ITU-T Recommendation G.813: "Timing characteristics of SDH equipment slave clocks (SEC)".
- [16] ITU-T Recommendation G.825: "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".

- [17] 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".
- [18] ETSI 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".
- [19] ITU-T Recommendation G.703: "Physical / electrical characteristics of hierarchical digital interfaces".
- [20] ITU-T Recommendation G.131: "Control of talker echo".
- [21] ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".
- [22] ITU-T Recommendation G.726: "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
- [23] ITU-T Recommendation G.728: "Coding of speech at 16 kbit/s using low-delay code excited linear prediction".
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- [25] ITU-T Recommendation O.151: "Error performance measuring equipment operating at the primary rate and above".
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- [39] ITU-T Recommendation G.965: "V-Interfaces at the digital local exchange (LE) - V5.2 interface (based on 2 048 kbit/s) for the support of access network (AN)".
- [40] ITU-T Recommendation G.957: "Optical interfaces for equipment and systems relating to synchronous digital hierarchy".
- [41] ETSI ETS 300 324: "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN)".