

RECOMMENDATION ITU-R M.1636

Basic reference models and performance parameters of Internet Protocol packet network transmission in the mobile-satellite service

(Questions ITU-R 85/8, ITU-R 87/8, ITU-R 112/8 and ITU-R 233/8)

(2003)

Summary

This Recommendation provides basic reference models and definitions of performance parameters of Internet Protocol packet network transmission in the mobile-satellite service (MSS). The defined reference models and performance parameters are intended as a technical basis on which the performance objectives and availability are developed, in combination with the technical and operational characteristics for packet network transmission in the MSS.

The ITU Radiocommunication Assembly,

considering

- a) that Internet Protocol (IP) packet transmission has become one of major services in modern communication networks including mobile-satellite systems;
- b) that hypothetical reference circuits, technical characteristics, performance objectives and availability requirements have been stipulated for conventional MSS in a number of existing Recommendations;
- c) that technical characteristics and performance should be defined on the basis of IP packet layers, in addition to basic digital transmission performance of MSS bearer links;
- d) that definitions are needed for reference models, technical characteristics and performance parameters as a technical basis for the development of IP packet transmission in MSS;
- e) that studies are continuing for performance and availability of IP packet transmission in other forums of ITU-T and ITU-R;
- f) that properties inherent to MSS should be taken into consideration when performance objectives and availability requirements are discussed for IP packet network transmission;
- g) that studies conducted using a basic reference model of IP packet data transmission are meaningful, however, advanced reference models are needed to conduct study for more advanced IP packet data transmission in MSS,

recommends

- 1 that the basic reference models in Annex 1 should be applied as a minimum set of IP packet transmission in MSS;
- 2 that the technical characteristics in Annex 2 should be used for studies and definition of performance parameters and availability for IP packet applications in MSS defined in Annex 1;

3 that the performance parameters and definitions in Annex 3 should be employed for IP packet transmission in MSS defined in Annex 1.

Annex 1

Basic reference models of IP packet transmission in MSS

1 Introduction

MSS systems provide mobile application with worldwide coverage. Recently IP packet transmission has been introduced in some MSS systems. However, IP packet transmission networks are not formally structured. A hypothetical reference connection has not been well defined for IP packet transmission networks. It is therefore important to define the use of MSS links in IP packet transmission services and to establish a reference model on which characteristics and performance can be discussed for MSS.

2 Basic reference model for IP packet transmission in MSS

MSS links will not be used as high-speed backbone links of IP core networks. They are intended as part of the access portion to an edge router, in the global IP network. Two applications for MSS links are considered. The first is a user-terminal to router (R) access connection as shown in Fig. 1. The second considers a larger capacity connection between a mobile local area network (LAN) and an edge router as illustrated in Fig. 2.

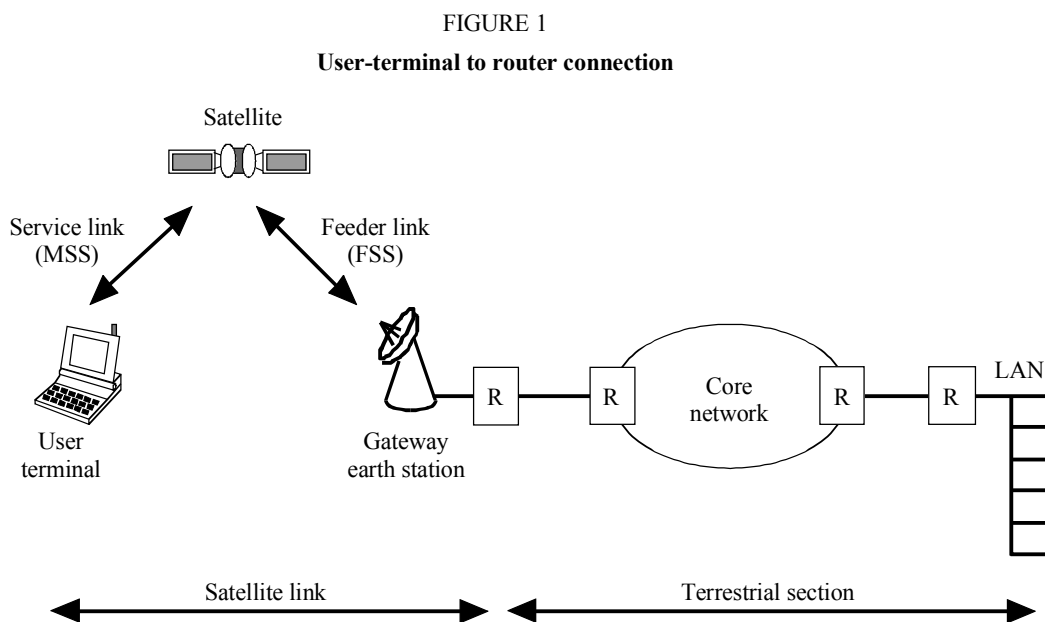
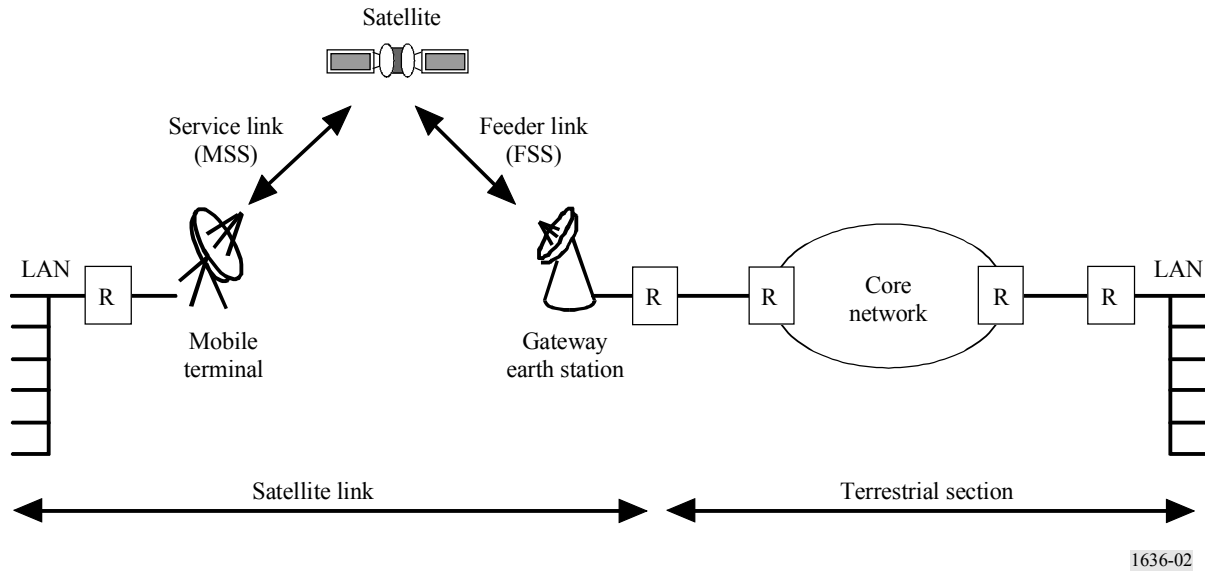


FIGURE 2
LAN to router connection



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2.1 Reference models

The classification of MSS topologies is shown in Table 1 and the corresponding routing is shown in Fig. 3. This Recommendation covers reference models denoted by a “Yes” in Table 1.

Both GSO and non-GSO satellite systems are included. Non-GSO systems cover low Earth orbit (LEO) and medium Earth orbit (MEO) satellites but not high Earth orbit (HEO) satellites. Bent-pipe systems are assumed because on-board processing adds extra processing time and inter-satellite links (ISLs) require additional propagation delay.

TABLE 1

Classification of MSS system configurations

Characteristics	Route	GSO	HEO	MEO	LEO
Single hop	A-B-C-D	Yes	No	Yes	Yes
Double hop – no ISL	A-B-C-B-A' or A-B-C-C'-B'-A'	No	No	No	No
Double hop – via ISL	A-B-B'-A'	No	No	No	No