

RECOMMENDATION ITU-R M.816-1*

**FRAMEWORK FOR SERVICES SUPPORTED ON INTERNATIONAL
MOBILE TELECOMMUNICATIONS-2000 (IMT-2000)**

(Question ITU-R 39/8)

(1992-1997)

1 Introduction

International Mobile Telecommunications-2000 (IMT-2000) are third generation mobile systems which are scheduled to start service around the year 2000 subject to market considerations. They will provide access, by means of one or more radio links, to a wide range of telecommunication services supported by the fixed telecommunication networks (e.g. public switched telephone network/integrated services digital network (PSTN/ISDN)), and to other services which are specific to mobile users.

A range of mobile terminal types is encompassed, linking to terrestrial or satellite based networks, and the terminals may be designed for mobile or fixed use.

Key features of IMT-2000 are:

- incorporation of a variety of systems;
- high degree of commonality of design worldwide;
- compatibility of services within IMT-2000 and with the fixed networks;
- high service quality;
- use of a small pocket terminal worldwide.

IMT-2000 are defined by a set of interdependent ITU-R Recommendations of which this one on services is a member. This Recommendation forms a framework for continued development towards detailed IMT-2000 service descriptions such as ITU-T Recommendation F.115.

A goal for third generation mobile systems is to provide universal coverage and to enable terminals to be capable of seamless roaming between multiple networks. The user's application will need to negotiate to establish a communication path having the required characteristics of bandwidth, delay and quality, recognising that many multimedia communications will be highly asymmetric. The need to provide for future non-standardized services, which can be created independently in a competitive, multi-operator environment places radically new requirements on the radio interface concept. No longer will the various elements of the radio interface (e.g. channel coder, modulator, transcoder, etc.) have fixed parameters, rather, they would be in the form of a "toolbox" whereby the key parameters of bandwidth, transmission quality and delay can be selected, negotiated, mixed and matched by the requirements of the teleservice, according to the instantaneous capability of the radio channel.

2 Scope

A phased approach is adopted for the definition of IMT-2000. In this Recommendation the services required for Phase 1 are described, and an outline of the services for Phase 2 is also given. Phase 1 includes those services supported by user bit rates up to approximately 2 Mbit/s. Phase 2 is envisaged as augmenting Phase 1 with new services, some of which may require higher bit rates.

* This Recommendation should be brought to the attention of the Telecommunication Standardization Sector.

3 Considerations

The ITU-R considers that IMT-2000 will operate in a complex environment which requires recognition of the following factors:

- the involvement of a number of commercial interests (such as service providers, re-sellers, network operators, value-added service suppliers, etc.);
- the possible involvement of, or the cascading of, networks which may be of different types;
- increasing technical developments and opportunities;
- the changing regulatory framework for those involved in supplying services (e.g. competition for users and customers, and deregulation in various forms by administrations);
- the needs of many users for services which are not bounded by constraints of geography or operator;
- that the mobile user of the services may be a person/persons or a machine. That these users could have different service requirements by virtue of either the desires of the user or the economics of providing for that service to the users' mode of mobility;
- that service availability will be dependant on a number of factors which could include: mobile terminal type, speed of motion, and geographic factors; for example hand portable sized/vehicle mounted terminals, indoor/outdoor, residential or business areas, urban/suburban/rural areas etc.;
- that it is to be expected that the number and content of the service offerings will change with time, and will not be the same in every location;
- the increasing importance of the various types of non-voice telecommunication services;
- that mobile terminals of IMT-2000 may be used to access mobile satellite systems for use on land, ships and aircraft;
- that there is a need for mobile terminals to roam between public land mobile telecommunication networks in different countries and between networks in the same country;
- that a standardized radio interface would facilitate the roaming of mobile terminals between networks;
- that users may want to be able to use the same terminal equipment and procedures as in the fixed networks to access similar telecommunications services in IMT-2000;
- that there is a need to provide for fixed wireless access services particularly in developing countries.

4 General service objectives and requirements

4.1 Structure

The service recommendations for IMT-2000 are achieved in three stages. The first gives general objectives and requirements. This provides an outline description of the services offered and can be used to provide a framework within which the services are defined. These objectives are given in this section.

The second stage lists, in descriptive form, the detailed services offered on IMT-2000. These are given in § 7, 8 and 9 of this Recommendation.

Third stage descriptions involve more quantitative definitions and also involve definitions produced by non-ITU-R bodies (ITU-T, etc.).

The ITU-R recommends that the services supported by IMT-2000 be in compliance with the following general objectives and requirements:

4.2 General service objectives

- To provide a capability that enables existing as well as new audio, video, data and multimedia services, which are significantly more advanced than pre-IMT-2000 technologies. Both packet and circuit switched and connection oriented and connectionless services are envisaged;
- To provide flexible radio bearer services;
- To provide capability for bandwidth-on-demand supporting a wide range of data rates, from simple low-rate paging messages, voice, to significantly higher rates associated with video or file transfer;
- To support asymmetrical data capabilities, which require high rates in one direction but much lower rates in the other;
- To provide a wide range of telecommunications services to mobile or fixed users by means of one or more radio links;
- To ensure that the services provided by IMT-2000 should, as far as possible, be identical to those offered to users of fixed telecommunications terminals (connected to fixed telecommunication networks) and with a comparable quality of service;
- To provide a robust signalling interface that is required to support those services not dependent upon a bearer capability;
- To make these services available for mobile terminals located anywhere subject only to constraints of economic provision, and to limitations of implementation timing;
- To provide for flexibility of service provision, for example, between mobile terminal categories and on a geographical or user density basis;
- To ensure that the user of the personal station, when roaming between networks, should have available (provided the personal station has the necessary capabilities):
 - an indication of the service availability;
 - access to voice telephony;
 - Universal Personal Telecommunication (UPT), and
 - access to a selection of data services;
- To provide for services subject to mobile terminal type, location, and availability from the network operator;
- To provide for worldwide roaming.

4.3 Requirements on Service Creation

IMT-2000 services are provided for the mass market but should be offered in a flexible way so that individual requirements can be met. This requires flexible service creation instead of rigidly specified individual services. Support for intersystem roaming will require access to, and invocation of, the user's personalized services where these services are supported by the concerned radio operating environment and access system.

4.4 General service requirements

- To provide validation and authentication procedures to facilitate billing and accounting (see ITU-T Recommendation X.509);
- to provide for additional levels of security for telecommunication services;
- to provide privacy of location of a roaming user when desired by the called or calling party.

4.5 General access requirements

- *For access to the fixed networks:* IMT-2000 may be either an adjunct to or an integral part of the PSTN/ISDN. Services offered in the PSTN/ISDN should, as far as possible, be offered to IMT-2000 users;
- *for international operation:* IMT-2000 should allow international operation and automatic roaming of mobile users and stations to the extent practical or permitted;