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ITU-T

E.750

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TELEPHONE NETWORK AND ISDN

QUALITY OF SERVICE, NETWORK MANAGEMENT AND TRAFFIC ENGINEERING

INTRODUCTION TO THE E.750-SERIES OF RECOMMENDATIONS ON TRAFFIC ENGINEERING ASPECTS OF NETWORKS SUPPORTING MOBILE AND UPT SERVICES

ITU-T Recommendation E.750

(Previously “CCITT Recommendation”)

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation E.750 was prepared by ITU-T Study Group 2 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the19th of February 1996.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

SUMMARY

This Recommendation is the first of a series of Recommendations, the E.750-Series (Recommendations E.750 to E.799), dealing with the traffic engineering aspects of networks supporting mobile and UPT (Universal Personal Telecommunication) services.

The Recommendation describes the scope and the structure of the E.750-Series.

INTRODUCTION TO THE E.750-SERIES OF RECOMMENDATIONS ON TRAFFIC ENGINEERING ASPECTS OF NETWORKS SUPPORTING MOBILE AND UPT SERVICES

(revised in 1996)

1 Scope

The E.750-Series is intended to cover traffic engineering aspects related to terminal and personal mobility.

Terminal mobility involves the ability of the user to be in continuous motion whilst accessing and using telecommunication services and the capability of the network to keep track of the location of the user's terminal. This requires the telecommunication services to be available throughout a spatial volume and ideally at all times.

Personal mobility is conferred by flexibility of the users access to telecommunication service provision which is available at any terminal, in such a way that the user identifies with, and may configure any of these terminals, fixed or mobile, to meet the user's requirements. These requirements may then be relocated from terminal-to-terminal. Personal mobility involves the network capability to locate the user on the basis of a unique personal identity (e.g. UPT number) for the purposes of addressing, routing and charging of the users calls.

This Recommendation outlines the scope and the structure of the E.750-Series. Recommendations in the E.750-Series are identified by the three-digit number. Recommendations with the third digit in the range 0 to 4 are either of a general nature or apply to mobile networks; Recommendations with the third digit in the range 5 to 9 normally apply to UPT.

1.1 Terminal mobility

The E.750-Series of Recommendations focus initially on circuit switched traffic and common channel signalling traffic. Packet switched connections are for further study. The series considers the impact of mobile related traffic demands on both radio resources and fixed network resources, i.e. PSTN, ISDN and SS No. 7 networks. This recognizes the use of radio technology as either a separate or integral part of PSTN/ISDN.

The Recommendations in the E.750-Series are applicable to both existing and emerging public land mobile systems. Examples of second generation digital systems include: GSM (Europe), NADC (North America) and PDC (Japan). FPLMTS and UMTS represent examples of long-term (third generation) systems which are being specified in the ITU and ETSI, respectively. Teletraffic issues related to interworking with B-ISDN (including MAN's), is for further study.

The E.750-Series of Recommendations are also applicable to maritime and aeronautical systems, both terrestrial- and satellite-based. An example of satellite-based systems are the INMARSAT systems A, Aero, M and B.

1.2 Personal mobility

The E.750-Series is intended to be phased with the progress of the definition of the UPT service. In particular, the series will initially concentrate on UPT service set 1.

2 Related Recommendations

The following Recommendations are the ones applicable at the time of publication of this Recommendation.

Recommendations related to terminal mobility include:

- CCITT Recommendation E.220 (1992), *Interconnection of public land mobile networks (PLMN)*.
- CCITT Recommendation E.723 (1992), *Grade-of-service parameters for Signalling System No. 7 networks*.
- CCITT Recommendation F.111 (1991), *Principles of service for mobile systems*.
- ITU-T Recommendation F.115 (1995), *Service objectives and principles for future public land mobile telecommunication systems*.
- ITU-R Recommendation M.687-1, *Future public land mobile telecommunication systems (FPLMTS)*.
- ITU-R Recommendation M.1079, *Speech and voiceband data performance requirements for future public land mobile telecommunication systems (FPLMTS)*.
- CCITT Recommendation Q.1001 (1988), *General aspects of public land mobile networks*.
- CCITT Recommendation Q.1002 (1988), *Network functions*.
- CCITT Recommendation Q.1003 (1988), *Location registration procedures*.

A comprehensive list of Recommendations related to the overall subject of mobile systems and services is given in Recommendation E.201 (reference Recommendation for mobile services).

Recommendations related to UPT aspects include:

- ITU-T Recommendation E.168 (1993), *Application of E.164 numbering plan for UPT*.
- ITU-T Recommendation E.174 (1995), *Routing principles and guidance for Universal Personal Telecommunication (UPT)*.
- CCITT Recommendation E.723 (1992), *Grade-of-service parameters for Signalling System No. 7 networks*.
- ITU-T Recommendation F.851 (1995), *Universal Personal Telecommunication (UPT) – service description (service set 1)*.
- ITU-T Recommendation I.373 (1993), *Network capabilities to support Universal Personal Telecommunication (UPT)*.
- CCITT Recommendation Q.1201 (1992), *Principles of intelligent network architecture*.

Finally, the following Recommendations address traffic modelling:

- CCITT Recommendation E.710 (1992), *ISDN traffic modelling overview*.
- CCITT Recommendation E.711 (1992), *User demand modelling*.
- CCITT Recommendation E.712 (1992), *User plane traffic modelling*.
- CCITT Recommendation E.713 (1992), *Control plane traffic modelling*.
- CCITT Recommendation E.720 (1988), *ISDN grade of service concept*.
- CCITT Recommendation E.721 (1991), *Network grade of service parameters and target values for circuit-switched services in the evolving ISDN*.

3 Abbreviations

For the purposes of this Recommendation, the following abbreviations are used.

B-ISDN	Broadband Integrated Services Digital Network
ETSI	European Telecommunications Standards Institute
FPLMTS	Future Public Land Mobile Telecommunication Systems

GSM	Global System for Mobile communication
IN	Intelligent Network
ISDN	Integrated Services Digital Network
MAN	Metropolitan Area Network
NADC	North American Digital Cellular
PLMN	Public Land Mobile Networks
PDC	Personal Digital Cellular
PSTN	Public Switched Telephone Network
SS No. 7	Signalling System No. 7
UMTS	Universal Mobile Telecommunication System
UPT	Universal Personal Telecommunication

4 Introduction

Mobile services are expanding at a very high rate all over the world and mobile related traffic is forecast to represent a significant share of the overall traffic increase in the years to come. A parallel increase is also being expected in the radio coverage, with incurred consequences on the fixed network infrastructure. This situation will lead to an impact of mobile related traffic on the fixed network which should be measured, forecast and appropriately handled, to ensure that it does not create service impairment.

Consideration of mobile traffic characteristics and control, and identification of teletraffic interfaces between mobile and fixed network domain are important problems to be addressed in view of the variety of and the pace at which different architecture and scope for mobile systems are being proposed worldwide. Other key objectives of the E.750-Series relating to terminal mobility are to provide methods for:

i) engineering radio transmission resources; and

ii) partitioning available spectrum among different cell types (e.g. micro- and macrocells) in overlaid cellular lay-outs.

UPT is expected to be introduced initially by making use of the existing technology, hence its potential is estimated from its inception.

It is recognized that in the long-term UPT will provide a wide range of services using IN capabilities and may also have a significant wireless access component. In the near-term, however, it is anticipated that the primary focus will be on service-specific architecture solutions (ISDN/PSTN/PLMN) with voice as a priority. UPT performance Recommendations should therefore follow a phased approach taking account of such influencing factors as the increasing wireless access component, the signalling network and IN architecture, and the registration/authentication arrangements for access security.

5 Organization and content of the E.750-Series

Recommendations in the E.750-Series are grouped into five major categories. These are:

– General: Recommendations E.750 to E.759.

– Traffic modelling: Recommendations E.760 to E.769.

– Grade of service: Recommendations E.770 to E.779.

– Dimensioning methods: Recommendations E.780 to E.789.

– Traffic measurements: Recommendations E.790 to E.799.

Figure 1 shows the organization and the development of the E.750-Series. One of the objectives of the E.750-Series is the characterization of the mobile related traffic, both in the user and in the control plane, at the interface where mobile and fixed networks interconnect.

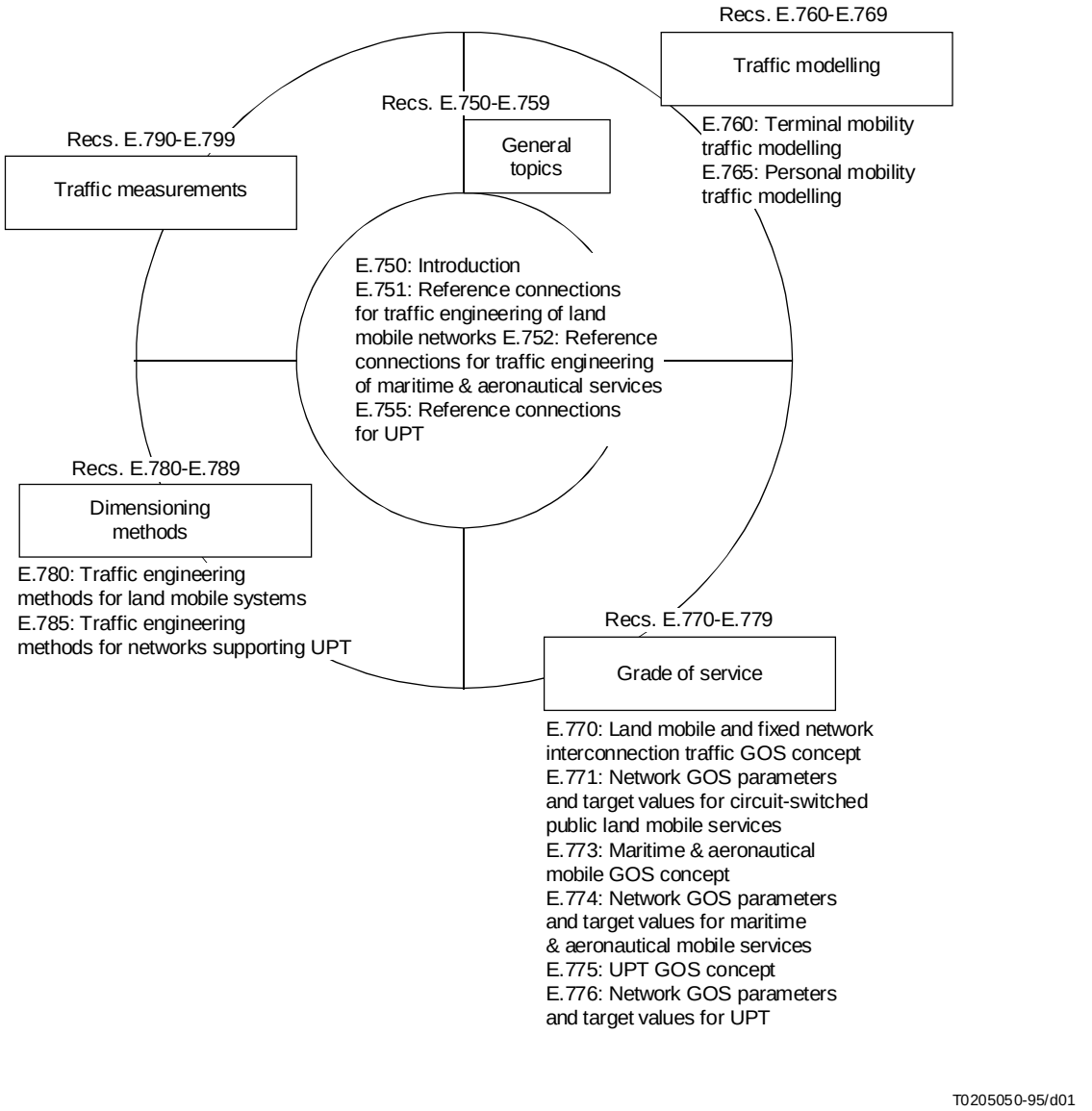

FIGURE 1/E.750

Organization and existing/proposed Recommendations in the E.750 Recommendation Series

Due to the characteristics of the mobile services and the radio environments, several issues (like location tracking, channel quality monitoring, handover handling, etc.) not relevant for fixed networks have to be considered for characterizing the mobile related traffic. Such issues normally add to those necessary to describe fixed network related traffic.

Basic functions required to support UPT include location registration, UPT user authentication, database interworking for number translation and supplementary services handling, and service profile management. The message interchanges required for these functions introduce new teletraffic engineering problems which must be addressed to ensure smooth and efficient introduction of UPT.

The E.750-Series will model traffic processes using the user plane and control plane notions in a similar fashion as done in the E.700 to E.749-Series of Recommendations on traffic engineering of the ISDN.

Recommendations in the E.750-Series are summarized in Table 1.

TABLE 1/E.750

Recommendations in the E.750-Series

Rec.	Title	Status (at the time of publication of this Recommendation)
E.750	Introduction to the E.750-Series of Recommendations on traffic engineering aspects of networks supporting mobile services and UPT	First approved in 1993, revised in 1996
E.751	Reference connections for traffic engineering of land mobile networks	First approved in 1993, revised in 1996
E.752	Reference connections for traffic engineering of maritime and aeronautical systems	First approved in 1996
E.755	Reference connections for UPT	First approved in 1996
E.760	Terminal mobility traffic modelling	Draft
E.765	Personal mobility traffic modelling	Draft
E.770	Land mobile and fixed network interconnection traffic grade of service concept	First approved in 1993
E.771	Network grade of service parameters and target values for circuit-switched public land mobile services	First approved in 1993
E.773	Maritime and aeronautical mobile GOS concept	First approved in 1996
E.774	Network GOS parameters and target values for maritime and aeronautical mobile services	First approved in 1996
E.775	UPT grade of service concept	First approved in 1996
E.776	Network grade of service parameters and target values for UPT	First approved in 1996
E.780	Traffic engineering methods for land mobile systems	Draft
E.785	Traffic engineering methods for networks supporting UPT	Draft

6 History

Recommendation first published in 1993, revised in 1996.

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