"It is dangerous to put limits on wireless"
Guglielmo Marconi (1932)
"What is now wired will become wireless and virtually everything now transmitted over the airwaves will be wired"
Nicholas Negroponte (MIT Media Laboratory)

Introduction

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It is widely and unanimously acknowledged that Telecommunications will play a role of strategic importance in the future of both developed and developing countries. In the European Commission's vision, a reasonable scenario for the near and long-term future services which should be offered to the customer, could be depicted according to the following approximate time schedule:

- 1990-1995: Deployment of ISDN
- 1995-2000: Implementation of IBC (Integrated Broadband Communications)
- 2000-2005: Emergence of Personal Communications Services, with a full integration of user mobility and Intelligent Network
- 2005-2010: Photonic Network implementation at all network levels

In the above scenario four major requirements are to be met by future telecommunication networks: high transport capacity (high speed, multimedia services), access and addressing flexibility (full user mobility, customised services, multi-purpose communications), network intelligence ("ad hoc" service creation, personalised performance, bandwidth on demand), service quality (reliability, security, communication integrity).

As to the third issue in the list, the publication of the Green Paper by the European Commission on April 1994 [1] and the following decision by the Council on July 1994 [2] on the adoption of a specific research and technological programme, emphasise the importance of the mobile and personal communications in shaping the future information environment on a world-wide basis. The Green Paper, in particular, and the subsequent public consultation (and concertation) process may be considered as a first basic step in preparing the total liberalisation of the telecommunications market within the European Union, effective by January 1998, promoting the migration towards personal services and stimulating the implementation of trans-European networks, with a progressive disappearance of the traditional distinction between fixed and mobile networks. In this context, Personal Communication Services (PCS) are intended as a set of capabilities providing a mixture of terminal and personal mobility and may be considered as a service that

may be run transparently on top of different networks, offering personalised access to communication services and facilities to people on the move. Access to the service is by a mobile-radio (referred to as terminal mobility) or any wired terminal (referred to as personal mobility) using coded means to personalise the right of access: the key requirements for the success will be the availability of ubiquity of access by users travelling across large geographical areas and related administrative domains. Notwithstanding the vagueness of any possible definition of PCS, the user expectations seem to be for a sort of family or continuum of wireless communications services at lower power and with more, smaller cell sites than cellular; some services will be feature-rich and therefore are presumed to be more costly; other, more modest offerings, will perhaps be less costly.

Such a vision is strongly supported by current mobile communications market analyses which indicate that Europe is mobile aware and entering the consumer market. The most successful estimates suggest a penetration greater than 10%. To achieve such high penetration levels will require broadening the general user community and at the same time offering more advanced and different services. Even if personal communications services are likely to be based initially on combinations of existing systems such as GSM, DCS@1800 and DECT, ultimately they should be carried most economically via a single integrated technology concept, the so-called UMTS (Universal Mobile Telecommunications System). Although incompatibility is the essential weakness between today's cellular, paging, cordless and mobile data services, their strength lies in their responsiveness to customer demand in a variety of different public and private market sectors with an element of service-creation flexibility and standardisation of the individual system-access technology. With the UMTS implementation, all the potential aspects of mobility would be fully accommodated:

- *Access (or Local) Mobility*, based on use of radio technologies, typical of cordless systems;
- *Terminal Mobility*, typical of current (and future) mobile cellular systems, based on mobility management capabilities at the fixed and/or mobile network levels;
- *Personal Mobility*, which is the main feature of the UPT (Universal Personal Telecommunications) service concept, aimed at providing the user with personalised services through a personal identity number and a specific user profile.

The development of UMTS is therefore an opportunity both to exploit the spectrum resources in the 2 GHz band and to converge the presently separate mobile services into a more unified and universal system solution in multi-operator environments. UMTS is in fact a multi-function, multi-service, multi-application digital system that will use future technology to provide personal mobile telecommunications that support universal roaming, offer broadband multi-media services and have a much larger user base than current mobile networks. In particular, the current work of ETSI relating to integration of GSM-DECT and GSM-DCS@1800 is paving the way to the evolution towards multimode transceivers and as such is relevant to the introduction of UMTS. Furthermore, UMTS is designed to have both terrestrial and satellite components, with a suitable degree of commonality between them, including the radio interfaces. Therefore, it is of paramount importance that the

progressive migration from second to third generation systems, expected to start at the turn of the century, must be undertaken while ensuring that the current user markets will perceive such a service evolution as relatively seamless, attractive and natural.

References

[1] CEC DGXIII, *Towards the Personal Communications Environment: Green Paper on a common approach in the field of mobile and personal communications in the European Union*, COM(94)145, Apr. 1994

[2] Council of the European Union, *Decision on a specific programme of research and technological development and demonstration in the area of Advanced Communications Technologies and Services (1994-1998)*, July 1994