



0. Executive Summary

0.1 SCOPE OF THIS REPORT

Convergence of communications, information, entertainment, commerce and computing, as a result of advances in technology in areas such as multimedia computing, interactive TV and the Internet will lay a foundation for the development of an „Information Society“.

This report describes the Forum's view based on a study carried out by Analysys/Intercai [8], under the guidance of and with contributions from the Market Aspects Group (MAG) of the UMTS Forum. Findings of the study were first published in 1997 as part of the UMTS Forum's first report, „A Regulatory Framework for UMTS“ [1]. Certain figures, particularly with reference to mobile user and Internet user predictions have been updated.

The objectives of the study were to forecast the evolution of the world-wide market for mobile communication services, in particular mobile multimedia services, over the next ten to twenty years, and to identify the key requirements for the successful development and implementation of third-generation UMTS/IMT-2000 mobile systems.

Spectrum demand to support UMTS/IMT-2000 services is significantly dependent on the number of users, the quantity of traffic flow and its distribution. In order to identify this critical impact, the original study that forms the basis of this report considered the total public market for mobility. Assessment was made of developments and growth of the global market, spanning North America and Asia Pacific regions but with a primary focus on the EU15 member states. Subsequent study work by the Forum has assessed spectrum requirement for satellite services.

The study was underpinned by a central hypothesis that the evolution of the market for mobile multimedia services will be strongly influenced by the site and nature of the market for networked multimedia services, e. g. Internet and Intranet. Societal and technological trends were evaluated, leading to the evaluation of „scenarios“ and hence market forecasts. Key findings may be summarised:

0.2 TERRESTRIAL MOBILE SERVICES MARKET – KEY FINDINGS

1. The world market for physical users of terrestrial mobile services (including multimedia) will be 426 million users by the year 2000, rising to 940 million by 2005 and more than 1.7 billion users by 2010.

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2. There will be 190 million physical mobile users in North America by 2005, rising to 220 million by 2010.
 3. There will be 400 million physical mobile users in Asia Pacific by 2005, rising to 850 million by 2010.
 4. There will be 200 million physical mobile users in Western Europe by 2005, rising to 260 million by 2010. 32 million of these will be mobile multimedia users in 2005, rising to 90 million mobile multimedia users by 2010.
 5. In the rest of the world, there will be 150 million physical mobile users by 2005, rising to 400 million by 2010.
 6. The total Western European mobile market will be worth 104 billion ECU¹ per year in 2005, representing total traffic levels of 6,300 million Mbytes/month.
 7. The mobile multimedia segment of this Western European market will be worth 24 billion ECU¹ per year in 2005, representing total traffic levels of 3,800 million Mbytes/month. Terminal revenues in 2005 will add a further 10 billion ECU¹ per year to this European market value.
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UMTS/IMT-2000 services are also likely to be used by other sectors, including systems with limited mobility (e.g. in areas with low population density), and in private/corporate markets, ranging from home use to wireless PBXs, emergency and cordless systems. Note that the market for non-public (or „license exempt“) applications of this type is the subject of separate study by the UMTS Forum, and is not addressed in this report.

0.3 MOBILE SATELLITE SERVICES MARKET – KEY FINDINGS

Additional material contained in this report, particularly with reference to the market for satellite based systems, is based on the findings of separate work carried out by the UMTS Forum's Spectrum Aspects Group (SAG) and published in UMTS Forum Report #6 *UMTS/IMT-2000 Spectrum*.

While more than 80% of the European population can be expected to be covered by terrestrial UMTS/IMT-2000 in 2010, less than 20% of the world's total land area will be covered by terrestrial cellular networks within the envisaged timescales of UMTS/IMT-2000. Satellite sys-

¹ The currency denomination „ECU“ has later been replaced by the name „Euro“.



tems are therefore important to UMTS/IMT-2000 to provide complete coverage. The forecasts summarised in this report deal only with mobile satellite services, i.e. those services supplied from either moving terminals or portable/transportable terminals capable being moved easily:

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8. **The world market for physical users of mobile satellite services (MSS) (including multimedia MSS) will be 11.5 million users by the year 2005, rising to 18.5 million by 2010.**
 9. **There will be 1 million MSS users in Europe by 2005, rising to 1.6 million by 2010. 0.4 million of these will be multimedia MSS users in 2005, rising to 0.7 million multimedia MSS users in Europe by 2010.**
 10. **Total traffic levels (multimedia + non-multimedia) for the European MSS market will reach 22 million Mbytes/month in 2005, rising to 40 million Mbytes/month in 2010.**
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0.4 STUDY APPROACH

A multi-stage process was adopted for the (non-satellite) study conducted by Analysys/Intercai. Societal and technological trends likely to have an impact on the future market for mobile multimedia services were first researched and identified, followed by a process of service scenario development, validation and finally drawing of conclusions relevant to the successful development of a market for UMTS/IMT-2000.

0.4.1 MARKET DEFINITIONS

UMTS and other IMT-2000 third generation mobile systems will deliver voice, graphics, video and other broadband information direct to the user, regardless of location, network or terminal. These fully personal communication services will provide terminal and service mobility on fixed and mobile networks, taking advantage of the convergence of existing and future fixed and mobile networks and the potential synergies that can be derived from such convergence. The key benefits that UMTS/IMT-2000 promises include improvements in quality and security, incorporating broadband and networked multimedia services, flexibility in service creation and ubiquitous service portability.

Networked multimedia may be defined here to include services such as pay-TV; video- and audio-on-demand; interactive entertainment; educational and information services; and communication services such as video-telephony and fast, large file transfer.

0.4.2 KEY ASSUMPTIONS AND DYNAMICS MODEL

While global market growth was considered, the major focus of the study was on the 15 EU member states. The study forecast the evolution of personal communication services delivered via a wireless interface to personal or portable devices. The market for the delivery of services to fixed terminals was not explicitly considered. Furthermore, the analysis assumed that the first mobile multimedia services will be delivered via enhancements to the second generation network technologies such as GPRS or via DECT before the commercial launch of third generation systems such as UMTS.

0.5 KEY SOCIETAL AND TECHNOLOGY TRENDS INFLUENCING THE EVOLUTION OF THE MOBILE MULTIMEDIA MARKET

Research was undertaken to identify societal trends that are likely to have an important effect on how the marketplace reacts to third generation mobile services. Equally, the continuing evolution of existing technologies will have an important impact on the capability of third generation mobile systems and services.

0.5.1 SOCIETAL AND MARKET TRENDS

Three market trends were identified that will have the most significant impact on the size and nature of demand for mobile multimedia services.

- The market for fixed networked multimedia services - e.g. home entertainment - is growing rapidly, at over 60% per year.
- Computer-based communications is being widely accepted and embraced by society. The Internet market, for example, is predicted to grow to over 500 million world-wide by 2005.
- There is growing demand for accessing both information and entertainment services while mobile.

0.5.2 TECHNOLOGY TRENDS

Developments were identified which will exert a direct influence on the attractiveness and cost of mobile multimedia terminals and services over the next ten years and beyond:

- Mobile multimedia terminals will create a step-change in the way in which individuals communicate and access information. Functionality and cost of these devices will be determined by semiconductor, display and interface technologies.

- The attractiveness and costs of mobile multimedia services will be determined by delivery and management technologies including the Internet, Java, database and spectrum-enhancing as well as service creation technologies.

0.6 SCENARIO ANALYSIS

Four scenarios for the evolution of the mobile multimedia services market up to 2005 were developed. These scenarios examined permutations of two key factors, namely take-up of fixed multimedia services in the mass market, and the primary location of intelligence, be it in the network or the device. Of the scenarios considered, that of an „Evolved mass market“ may be regarded as most plausible, characterised by a high market take-up of multimedia services and a „device-centric“ environment.

0.6.1 KEY DRIVERS, ENABLERS, BARRIERS AND UNCERTAINTIES

Other key factors likely to affect development of the mobile multimedia market were also considered in the study:

- Drivers:*
- Growth in communications, commerce and entertainment services on the fixed network, influenced by increased Internet usage and falling costs.
 - Demand for rapid, remote access to information, driven by increasing need for business productivity, greater personalisation and increased mobility.
- Enablers:*
- Regulation to encourage competition and allow cheap, easy access.
 - World-wide adoption few mobile radio and open service standards.
 - UMTS/IMT-2000 specifications to support IP-based services.
 - Early exploitation of GPRS as an interim means of delivering MM services.
 - Improvements in user interface design and display technologies.
 - Technologies that enhance spectrum efficiency & utilisation.
 - Improvements in semiconductor performance/costs.
- Barriers:*
- High cost and limited availability of spectrum.
 - Failure to resolve security issues and re-assure consumers re-security.
 - Slow development of IT literacy in the mass market.
- Uncertainties:*
- Rate of growth of the mobile multimedia market.
 - The network paradigm - network or device centric?
 - Increase in demand for capacity/spectrum in a network centric scenario.

0.7 MARKET FORECASTING RESULTS

0.7.1 WORLD MOBILE MARKET

World markets for mobile and mobile multimedia were projected on the basis of the current status of market development, GDP per head and expected sophistication of the telecoms market in each country or region. Results show clearly that markets outside the EU will dominate the world mobile market by 2005.

Exhibit 0.7 shows the world-wide market forecast for the physical users of terrestrial mobile services including multimedia.

Physical users in millions	2000	2005	2010
Europe, EU15	113	200	260
North America	127	190	220
Asia Pacific ²	149	400	850
Rest of the world	37	150	400
Total	426	940	1730

Exhibit 0.7: World-wide Mobile Market Forecast

Europe, Japan and North America are most likely to face market saturation in terms of physical users by the year 2010. However, there is likely to be further market potential for machine-to-machine communications. Many countries in Asia Pacific, Africa and South America are expected to be far from saturation in terms of users in 2010.

0.7.2 THE EUROPEAN MOBILE TERMINAL MARKET

Assuming that users will upgrade their mobile device every three years, by 2005 the annual mobile terminal market is forecast to be between ECU11 billion and ECU23 billion with mobile multimedia devices accounting for between 45% and 60% of this total. (The currency denomination „ECU“ has later been changed to „Euro“)

² thereof Japan Segment acc. To ARIB 1/98 year 2000: 60-70m; year 2010: 90-100m

0.7.3 THE EUROPEAN MARKET FOR MOBILE MULTIMEDIA CONTENT

A significant proportion of the total revenue collected by the service provider will be passed on to the third party content providers. By 2005, the value of this market is projected to reach between ECU1.5 billion and ECU7 billion per year.

0.7.4 EUROPEAN MOBILE TRAFFIC FORECASTS

Projections were made for levels of voice and multimedia traffic in a variety of radio environments. A significant assumption was made that asymmetric multimedia services will require an average of 33% higher information flow due to the need to download software for processing locally. A significant result is that in the mass market/network centric scenario, data traffic will reach in some environments around 70% of total mobile traffic by 2005.

0.8 SUMMARY

A great opportunity exists for the mobile communications industry to develop services that will meet the developing needs of both businesses and consumers as the Information Society emerges world-wide over the next decade. Those needs are rapidly being shaped by developments in the convergence of computing, broadcasting and communications. Consequently, the mobile industry must respond in a manner that recognises those influences and exploit their characteristics to the greatest effect.