

Office of the Director of
**Telecommunications
Regulation**

INTRODUCTION OF 3RD GENERATION MOBILE SERVICES IN IRELAND

BRIEFING NOTE AND REQUEST FOR VIEWS

Document No. ODTR 00/29

18 April, 2000

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INTRODUCTION OF 3RD GENERATION MOBILE SERVICES IN IRELAND

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(Written responses should be submitted by Friday 5 May 2000)

1 Introduction

This paper provides an introduction to 3rd generation (3G) mobile services and considers some of the technical, market, economic and regulatory issues that may need to be addressed prior to the introduction of 3G services in Ireland. Initial views are requested on these issues, and will be taken into account by ODTR in formulating its initial proposals on the introduction of 3G mobile services. *Details on how to respond are given at the end of this paper.*

2 3G Mobile Overview

3G represents the next major step in the evolution of mobile communications. What principally differentiates 3G services from their current 2G counterparts is the emphasis on data rather than voice services. The principal enablers of 3G mobile are availability of new radio spectrum and the development of a global family of standards under the banner "IMT-2000" (International Mobile Telecommunications 2000).

3G spectrum is identified in CEPT¹ Decisions ERC/DEC (97)07 and (00)01. A further CEPT Decision, ERC/DEC(99)25, defines channel spacings, minimum carrier separations and the apportionment of spectrum between licensed and unlicensed UMTS services.

So far only Finland and Spain have issued 3G licences, although the UK is in the process of conducting an auction and a number of other countries have announced plans for later this year. The current situation in individual European countries is summarised in Table 5.1 at the end of this brief.

3 The 3G Market

3.1 3G's place in the market

The positioning of 3G mobile in the wider telecommunications market can best be summarised in terms of the bandwidth and mobility capability:

- Current 2G mobile networks are capable of providing high mobility, narrow band services

¹ European Conference of Postal and Telecommunications Administrations, regional planning and regulatory body for telecommunications and radio communications services. The European Radiocommunications Committee is a constituent body of CEPT, responsible for frequency management at a European level. Copies of CEPT Decisions may be obtained from the European Radiocommunications Office web site at <http://www.ero.dk>

- Current fixed networks are capable of providing low mobility, wide band services
- 3G mobile networks will be able to provide high mobility, wide band services

This is illustrated diagrammatically in figure 2.1 below

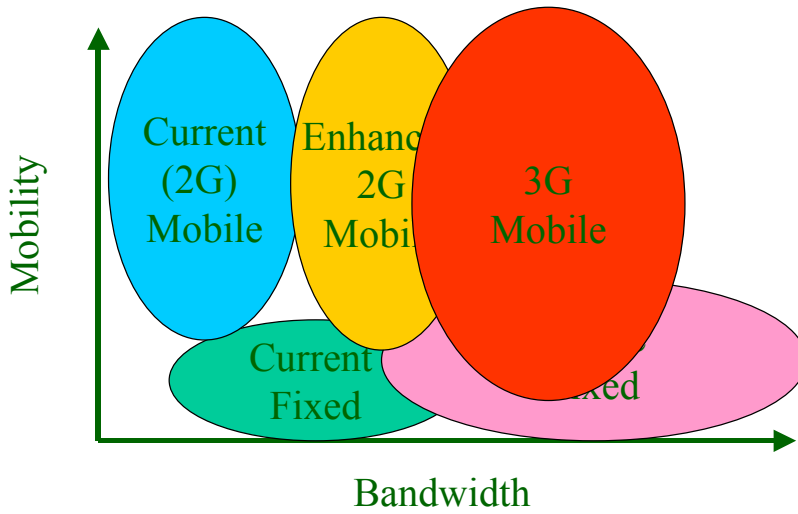


Figure 3.1: 3G Mobile’s position in the wider telecommunications market

Many observers believe that content and value added services will play an increasingly important role in the 3G market. A useful analogy is broadcasting, where much of the value is focussed on obtaining rights to key content such as sport or movies.

The success of non-network players in developing innovative new services and applications may depend upon the terms under which they can gain access to the air interfaces of the licensed 3G network operators. Figure 2.2 indicates the various players who are likely to be involved in the delivery of 3G mobile services and content.

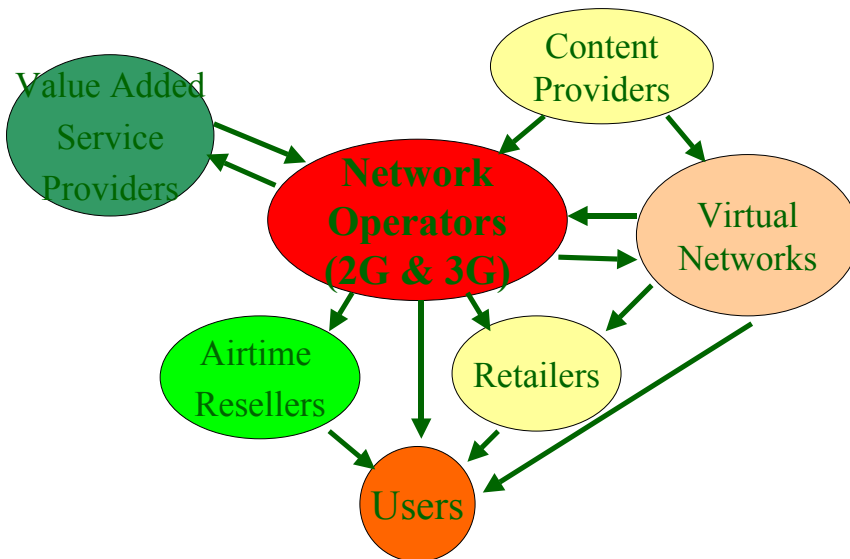


Figure 3.2: The likely players in the 3G market

3.2 The current mobile market

Mobile penetration in Ireland is now approaching 50% of population, while in some European countries levels of 60% or higher have been achieved. Some analysts are forecasting long term penetration levels of over 100% as users acquire multiple phones for different purposes (e.g. one for home, one for work or different terminals for voice and data services).

Operators are increasingly focussing on value added data services, which are widely anticipated to be the major mobile growth area over the next decade. E-mail and Internet access are already available over 2G mobile networks, however connections speeds are slow (9,600 kbit/s max compared with up to 56 kbit/s for a fixed modem). Enhancements to GSM networks such as the General Packet Radio Service (GPRS) are expected to increase transmission speeds to 56 kbit/s or more within a couple of years, paving the way for delivery of true multimedia services when 3G networks are launched. In the meantime initiatives such as WAP², which provides limited access to web content, are likely to stimulate public interest in mobile data. Other mobile initiatives in the pipeline include interactive games and the ability to download MP3 files and listen to them on the move.

A report produced for the UMTS Forum³ estimates that the mobile multimedia market in Western Europe will be worth 24 billion Euros per year by 2005. Another report by Giga Information Group suggested that by 2002, more people in Europe will be accessing the Internet via mobile WAP terminals than via PCs. A number of major corporate alliances between the mobile and IT sectors are being formed to develop this vision.

Question 1. Do you have a view on the role of content and service providers in the delivery of 3G services?

Please give your views and reasons for them.

4 Technical Issues

4.1 3G Standards and Technology

A family of 3G standards is being developed by the 3rd generation partnership project, a grouping of regional standards bodies. These standards are collectively known as IMT-2000⁴ and are officially mandated by the ITU⁵ for all third generation mobile services.

IMT-2000 comprises a set of five definitive radio interfaces for non-satellite services (figure 2.3). Unlike existing 2G mobile networks, where the various services and applications (voice, data, SMS, etc) form part of the network standards, 3G networks will deliver standard *service capabilities*, enabling specific services such as voice,

² Wireless Application Protocol

³ The Future Mobile Market: Global trends and developments with a focus on Western Europe, UMTS Forum, March 1999

⁴ International Mobile Telecommunications 2000

⁵ International Telecommunications Union

video or multimedia to be determined by individual users, networks or service providers. This should facilitate the differentiation of services among operators and service providers whilst ensuring transparency across different 3G radio access networks. This concept is also known as the “virtual home environment”, whereby the user should be able to access the same set of basic and enhanced services regardless of the access network being used.

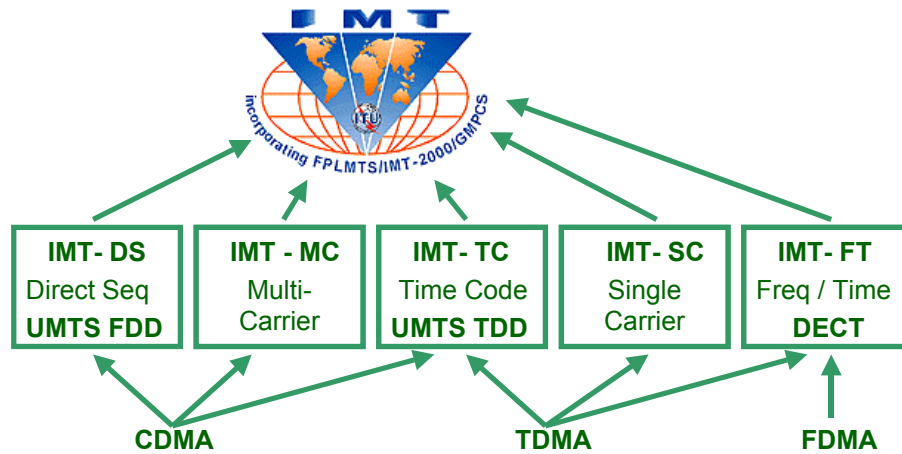


Figure 4.1: IMT-2000 Terrestrial Radio Interfaces

IMT-2000 specifies the following minimum data transmission rates for indoor, pedestrian and vehicular use:

	INDOOR	PEDESTRIAN	VEHICULAR
Data Rate	2.048 Mbit/s	384 Kbit/s	144 Kbit/s
Bit Error Rate	10^{-6}	10^{-6}	10^{-6}

4.2 Radio Spectrum Requirements and Availability

The currently available spectrum for 3G mobile services based on the IMT 2000 standards is shown in figure 4.2. A total of 155 MHz is available. The UMTS Forum⁶ has recommended a minimum spectrum assignment per operator of 2 x 15 MHz (paired) plus 5 MHz (unpaired). In some countries, however, smaller amounts of spectrum have been proposed for some licences to enable a more than four operators to be accommodated. Also, smaller packages have been offered in some circumstances where there are existing 2G networks which may relieve some of the load on the 3G network.

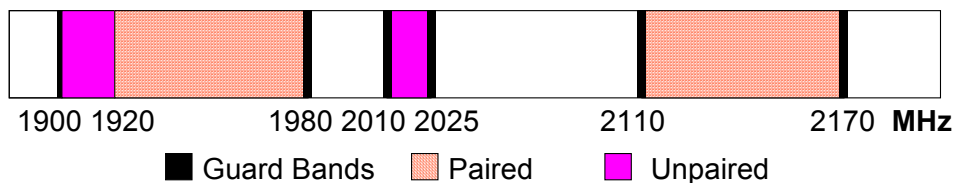


Figure 4.2: Currently available spectrum for terrestrial 3G services

⁶ The UMTS Forum is a global organisation with over 200 members, aiming to build a cross-industry consensus to the introduction of 3G mobile communications systems.

As services mature, significantly more spectrum may be required to deliver the capacity and data rates demanded by users. An estimated 160 MHz of additional spectrum is required by the year 2010.

5 Regulatory and Competition Issues

5.1 Relation between 2G and 3G networks

Whereas 2G digital networks (GSM) were completely separate entities from their 1G analogue counterparts, 3G networks will have much in common with enhanced 2G networks and in many cases the two may be jointly used by an operator to deliver a full range of mobile services. 3G core networks will be based on the GSM General Packet Radio Service (GPRS), enabling existing GSM operators to provide 3G services using either a GPRS or 3G air interface⁷. 3G terminals are expected to be multi-mode, providing access to both 2G and 3G radio networks⁸.

Prior to the introduction of 3G services, significant enhancements to existing 2G networks are likely to be implemented. High Speed Circuit Switched Data (HSCSD) and the GPRS enable TDMA time slots to be combined to provide potential bit rates of 56 kilobits per second and beyond. EDGE (Enhanced Data Rates in a GSM Environment) is anticipated in 2 – 3 years as the final evolutionary step towards 3G mobile networks, and will provide potential bit rates of up to 384 kilobits per second.

This connection between 2G and 3G networks has prompted many European regulators to consider measures to ensure that those without existing 2G networks are not disadvantaged in entering the 3G market. Such measures include the right for new 3G operators, subscribers to “roam” onto existing 2G networks, the availability of additional 3G or 2G spectrum to new market entrants, or the ability of “virtual network operators” (VNOs) to gain access to others’ radio access networks to deliver services. The ODTR will shortly be consulting on the question of access to mobile markets, including the issue of VNOs. Table 5.1 below indicates the approach to roaming being taken in various other European countries.

Question 2.: Should roaming, availability of additional spectrum to new market entrants, or other measures be considered when introducing 3G mobile services in Ireland? Please give your reasons.

5.2 Number of licences

The majority of European countries have opted for the UMTS Forum’s recommended minimum of 2 x 15 MHz of paired spectrum plus 5 MHz of unpaired spectrum per operator. This enables four operators to be accommodated in the available spectrum.

In some markets where there are already four 2G operators and there is a desire to enhance competition further by licensing a fifth 3G operator, smaller spectrum packages have been offered on the basis that these would be sufficient for an existing

⁷ In practice, only the 3G air interface will provide the highest data rates (up to 2 Mbit/s), however many 3G services such as web browsing or audio downloads will not require such high speeds.

⁸ In some cases, access to other radio interfaces such as satellite networks or cordless base stations may also be provided.

operator with access to 2G spectrum. Table 5.1 below indicates the number of licences being offered in various other European countries.

Question 3. How many 3G mobile licences should be made available in Ireland?
Please give your views.

5.3 Licensing Selection Procedures

There are essentially three possible approaches to the award of 3G mobile licences, namely comparative selection (commonly referred to as “beauty contests”), auctions and lotteries.

Comparative selection has historically been the most common approach to awarding licences where demand exceeds supply. The procedure involves defining a set of criteria against which applications are judged. The applications which appear best against the defined criteria are awarded the licence. The criteria may include economic, technical service related or other factors.

Auctions involve the awarding of licences to those who bid the greatest amount in monetary terms. There are many varieties of auction and their design is a specialised skill. However, in all cases it is likely that certain pre-qualification criteria must be met to enable bidders to participate. Auctions may be run on site with all bidders in attendance or they may be run remotely. Auctions have been used extensively for the award of radio spectrum licences in North America, Australia, New Zealand and elsewhere, with varying degrees of success. A number of European countries are either already running or planning to run auctions for 3G services.

Lotteries involve licences being allocated on a random basis to suitably pre-qualified applicants. In this case the value is set by regulatory action rather than by the companies bidding in an auction. The companies who get licences are chosen by lot rather than by regulatory evaluation or the market.

Table 5.1 below indicates the selection procedure that has been chosen in various other European countries.

Table 5.1: Approach to 3G mobile licensing in various other European countries

<i>Country</i>	<i>Competition Format</i>	<i>No of 3G Licences</i>	<i>Roaming on 2G networks</i>
Austria	Auction	4	tbc
Belgium	Beauty contest + Auction	4	mandatory - restricted in urban areas
Denmark	Beauty contest	4	mandatory
France	Beauty contest	4	tbc
Germany	Auction	4-6	right to access 2G services
Greece	tbc	n/a	tbc
Italy	Beauty contest	5	mandatory for up to 5 years
Netherlands	Auction	5	commercial agreement
Portugal	Beauty contest	4	preferential condition
Sweden	Beauty contest	5	proposals for mandatory roaming before parliament

Question 4. Do you have a view on the type of selection procedure that should be used for the introduction of 3G mobile services in Ireland? Please give your reasons.

5.4 Status of unlicensed spectrum / private 3G systems (section 5.6)

At least 2 unpaired carriers must be reserved for unlicensed use, according to ERC Decision 99/25. In practice these are likely to be used to provide high density indoor coverage. Regulatory issues include whether roaming might take place between public and private systems, and whether public operators can use the unlicensed spectrum to supplement their own licensed spectrum.

5.5 Further Considerations (section 5.7)

A number of further regulatory matters will need to be considered when introducing 3G mobile services. These include licence duration and the encouragement of mast sharing between radio users.

Question 5. What should be the duration of 3G licences?

Question 6. Do you have views on mast sharing.

Question 7. Do you have any further views on the introduction of 3G mobile services in Ireland that are not addressed elsewhere in this document?

Please give your reasons.

Important notice:

This document is a preliminary request for views. We expect to carry out a formal consultation on the 3G competition later this year.

Preliminary Views

If you do wish to present preliminary views on the introduction of 3G mobile services please submit your **responses by Friday 5th May** to:

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Irish Life Centre
Lower Abbey Street
Dublin 1

E-mail: nolanc@odtr.ie

Tel: 01 804 9629

The Director expects to make available the responses and to publish a report on this consultation. If there are elements of any response that are commercially confidential, then it is essential that these be clearly identified and placed in a separate annex to the main document. They will then be treated in confidence.

