

Office of the Director of
**Telecommunications
Regulation**

The Regulatory Framework for Access in the Mobile Market

Consultation paper

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1. Introduction

The Director of Telecommunications Regulation (“the Director”) and her Office (“the ODTR”) are responsible for the regulation of the Irish telecommunications market in accordance with EU and National legislation. The ODTR is the National Regulatory Authority (“NRA”) for the purposes of that legislation.

In carrying out her functions, the Director seeks to ensure that Irish consumers benefit from the best possible deal in terms of price, choice and quality and that competition, as a key enabler of this, is fostered in the market. Despite the rapid increase in mobile penetration rates in Ireland, competition in the mobile market is currently limited to two mobile operators. In line with other European countries and in the context of the 1999 Communications Review¹, the Director is now examining the issue of competition in the mobile market and, in particular, the opportunities for increased tariff and value added service competition that might be provided by the introduction of independent service providers, indirect access providers, mobile virtual network operators (“MVNOs”) and airtime resellers in the Irish mobile market.

The structure of this paper is as follows:

Section 2: Background to this Consultation and current situation in other European countries

Section 3: Regulatory Framework

Section 4: Growth in the Irish Mobile

Section 5: Key consumer and regulatory issues

Section 6: Next steps

Appendix 1: The GSM Network.

Appendix 2: Call conveyance on Mobile Networks

The Director wishes to invite comments from interested parties in relation to any of the questions raised in Sections 2 to 5 of this paper. The closing date for receipt of comments is **16th June 2000**. Please see Section 6 for details on submitting comments on this paper.

This consultation paper does not constitute legal, commercial or technical advice. The Director is not bound by it. The consultation is without prejudice to the legal position of the Director or her rights and duties under legislation.

¹ Communication from the Commission; The Results of the public consultation on the 1999 Communications Review and Orientations for the new Regulatory Framework. **Comm (2000)239final**
http://www.europa.eu.int/comm/information_society/publications/docs/index_en.htm

2. Background

2.1. General

The growth of the mobile sector in Ireland has been spectacular. We have moved from a penetration rate of 7% in March 1997 to almost 50% in February 2000. The Irish market is one of the fastest growing in the EU. However, despite such extraordinary growth it is generally perceived that competition in the mobile market is not yet effective. The delayed start up of a third mobile operator has hindered the development of competition in the mobile market and the benefits of such increased competition for the consumer. In Chapter 4 of this document the current structure of the mobile market in Ireland is described and comments are invited on the level of competition in the market.

Within the constraints imposed by spectrum availability, the licensing of additional mobile network operators (one additional GSM licence together with 3G licence holders) will increase the level of competition in the mobile market. With at least three mobile network operators in the market, the prospects for increased competition in the longer term should improve.

However, in the interests of achieving the best deal for consumers in terms of price, choice and quality, the Director wishes to explore all means of enhancing the level of competition in the market. This includes the question of access to mobile networks and independent service provision. The Director believes that access to mobile networks has the potential to stimulate greater competition in the mobile market by providing consumers with more choice and possibly lower prices. Access to mobile networks may also be a critical enabler towards the emergence of fixed mobile convergence (FMC) facilitating greater innovation and expanding choice of new services for consumers.

One of the most fundamental issues addressed in this consultation is whether access to mobile networks, or the right to purchase airtime for resale, should be mandated, and, if so, on what basis. Currently, mobile network operators are free to negotiate access to their networks or to provide airtime for resale to independent service providers on a commercial basis. The Director recognises that network operators may choose to negotiate such agreements where it is in their commercial interest to do so. However, where such commercial negotiations break down, regulatory intervention may be sought and this is an alternative way of addressing the issue. This paper discusses the basis for such intervention.

The Director is aware that a case involving eircell and Cellular 3, relating to the provision of airtime for resale, is currently before the Courts. This consultation is without prejudice to the claims being considered by the Court, which the Director understands, are founded in competition law. This consultation addresses the general issue of access to mobile networks within the telecommunications regulatory framework.

2.2. Purpose of the Consultation

The purpose of this consultation paper is to seek views on the technical, economic and commercial issues involved in access to mobile networks in the context of the telecommunications regulatory framework. The views received will assist the Director in the development of further proposals on what (if any) regulatory measures may be necessary in the market in the interests of consumers and the stimulation of effective competition in mobile markets. In other words, the Director is seeking the views of interested parties as to whether ex-ante regulatory action to mandate access to networks is required or whether access to the mobile networks should be dealt with on a case by case basis as requests arise.

This consultation is wide ranging in nature and seeks to obtain views on a range of issues relating to access to mobile networks. Following this consultation, the Director will issue a Report on the Consultation setting out the further steps, if any, that she considers are necessary. Chapter 6 sets out the next steps and timetable.

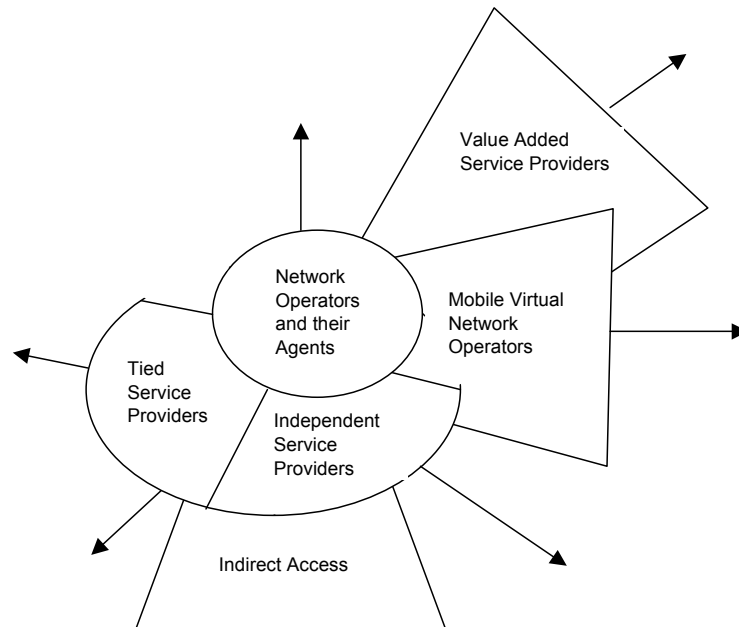
In summary, the Director is interested to receive consumer and industry views on a number of questions regarding access issues in the mobile market. These questions cover:

- Possible benefits of competition to consumers through increased service provision in the mobile market;
- Where commercial negotiations to enable airtime resale, indirect access or MVNO's, fail, on what basis would a case for regulatory intervention be founded, and, if justified, would it apply to all or only some of the mobile operators?
- The types of services a mobile service provider might offer and the number of potential mobile service providers that might seek to enter the market;
- Identification of any technical issues that might impose practical or timetable restrictions in the introduction of any class of mobile service provider.

2.3. Independent Service Provision - an Overview

This section provides an overview of the various forms that access and service providers in the mobile market can take. A more detailed technical description of indirect access and MVNOs is contained in Appendix 2.

Access to mobile networks and independent service provision can take many different structural and technical forms. Different legal, technical, economic and commercial issues will arise in relation to each type of access. The following diagram and descriptions provide an introduction to some of the possible structures of mobile service provision.



Layers of Mobile Service Providers

There are a number of structures and forms that the mobile market could take incorporating service providers. The descriptions below highlight one possible scenario with network operators and their agents at the core, feeding into basic service providers, with indirect access providers, MVNOs and value added service providers making up the outer layers.

2.3.1. Mobile Network Operators

At the core are the **mobile network operators** themselves and their agents, who package mobile services to sell direct to customers but who can also sell services into the other layers. Clearly mobile network operators have access to and control of all elements of mobile services. The services they provide are end to end from calling subscriber right through to the called customer.

The mobile network operators can sell their services through a number of agency arrangements. These agents can be tied or independent mobile retailers.

Pre Pay Providers operate under an agency agreement with the mobile network operator. The mobile phone is packaged under the brand name of one of the network operators but the pre paid mobile services are provided without contract to a mobile network operator. These pre pay providers also offer a type of airtime resale by providing call cards to mobile users.

Tied Mobile Retailers have exclusive agency agreements with the mobile network operators to sell subscription and call services on behalf of the network operator. Whilst tied retailers have some degree of freedom with respect to marketing and packaging, the user's contract is with the mobile network operator and the standard terms and conditions apply.

Independent Mobile Retailers simply have agency agreements with more than one mobile network operator. They can offer a choice of packages from the mobile operators but once again the customer's contract is directly with the mobile network operator.

2.3.2. Basic Service Provision

There are a number of other ways in which basic mobile telephony services can be provided apart from directly by mobile network operators. Basic services for the purposes of this paper describe the core subscription and call services provided by the mobile service providers.

Tied Service Providers offer a type of mobile airtime resale. The tied service providers (TSPs) sell branded subscriptions and calls (airtime) of their parent network. The TSP buys them at wholesale rates and has some freedom to vary packaging and tariffing. The key point is that the customer's contract is not with the network operator but with the TSP itself, which is responsible for customer service and billing.

Independent Service Providers (ISPs) make up another category of airtime resellers. ISPs are similar to TSPs in that they resell airtime that they purchase wholesale from network operators and to their contracted customers. The difference is that ISPs are not tied to individual network providers and can offer a choice between networks. Once again, the customer's contract is directly with the ISP itself rather than the mobile network operator.

This layer makes up the most familiar form of airtime resale services in the mobile market, delivered either by service arms of the network operator or independent service providers through airtime wholesale and providing tailored billing and tariff packages.

2.3.3. Virtual Network Provision

The category of Virtual Network Provision includes players who, while they do not have a network or infrastructure of their own, create a "virtual" network by entering into agreements with network operators (mobile and/or fixed). They then provide a service to customers based on the management of the combination of network elements they have purchased. This "virtual network" can be managed by the provider themselves or by third parties.

One method of providing a virtual network is using **Indirect Access**. The service provider obtains a carrier selection code and it is by dialling this that the customer accesses the service. The call is originated on a mobile network and routed according to the agreement between the indirect access provider and the mobile network provider. The indirect access provider pays the mobile network operator for the network elements used. This is similar to indirect access over fixed networks. Under this scenario, the customer retains his or her contract for connection to the network (similar to line rental in fixed networks), and has a second contract with the indirect access provider for the call service.

The key characteristics that allow indirect access operators to differentiate their service are:

- they only use the mobile network to originate calls and may use other networks to transit and terminate calls,
- they have freedom of choice in the packaging and tariffing of services and there is scope for adding in new value added services.

Mobile Virtual Network Operators (MVNOs) are also included in this category. The additional characteristic is that the MVNO in effect purchases from the mobile network operator the network elements to enable the MVNO to provide both connection/rental and call services directly to customers. The analogy here is to an operator with access to unbundled local loops of a fixed network operator. Customers of MVNOs have only one contract directly with the MVNO who then has full control over the customers' subscription services and call services. MVNOs provide their own SIM cards and billing and are likely to also provide their own 'Home Location Register' (HLR) systems requiring a new level of interconnect with the underlying physical network operator. Logically these MVNOs could operate either through independent service providers or the network operator.

MVNOs are often considered to be engaged in a form of 'roaming' because to the network operator, an MVNO's customers look similar to those roaming in from other countries. However, unlike conventional roaming there is not scope for reciprocal agreements because the virtual network does not operate its own access network.

The additional freedom that MVNOs have and the full control of the customer provide greater scope for innovation in tariff packaging, billing and introduction of new innovative services.

2.3.4. Value Added Services

This category includes a wide range of 'value added' service providers who could offer a range of new services over the various access forms including direct provision by the network operators. These might include:

- **Virtual Home Environment (VHE)** is where the customer uses a single access number and has access to a consistent range of services but these can be delivered over a variety of fixed and mobile networks.

- New content services such as **Transport Telematics** (e.g. navigation) or **M-Business** (mobile e-business applications such as banking).
- Content based services including **Narrow-Casting**, for example video on demand services such as news updates.

Given the bandwidth required to deliver these services, it is likely that they will require either enhanced GSM (General Packet Radio Service – GPRS) or 3rd Generation networks. However, certain value added services can also be delivered using narrow band technologies like SMS and WAP. Again these converged services can draw on the layer of services provided by MVNOs or can link directly to the physical network operator.

2.3.5. Other forms of Access

This consultation attempts to address the key issues relevant to the subject of access irrespective of the form that such access takes. For that reason the analysis contained in the paper may not be exhaustive. If respondents feel that a matter of relevance and importance has not been addressed or in particular, that a specific form of access has not been included, they are invited to raise such matters under the appropriate heading, or in general comments.

2.4. The Situation in other European States

In the UK, the two mobile operators designated with Significant Market Power (SMP) have a licence requirement obliging them to provide wholesale airtime to service providers. The service providers/resellers do not require licences in order to provide their services. There is a similar obligation on SMP mobile operators in Spain and the Netherlands. In these countries, the regulator is involved only where required, in dispute resolution where SMP operators and service providers cannot agree commercial negotiation. Spain is also introducing an amendment to the mobile licences of SMP operators so carrier selection is available on a call by call basis for international calls. This will be implemented by December of this year and is expected to be extended to national calls next year.

The situation in Denmark and Germany is such that all mobile network operators (irrespective of having been designated with SMP) are obliged to enter into negotiations with service providers for access to their networks. In Germany, there are approximately 10 companies that provide mobile services by obtaining airtime from the operators and in Denmark the NRA is currently proposing changes to the legislation that will broaden the range of players that will have a right to access the mobile networks including MVNOs.

Countries that do not mandate access to the mobile networks include Sweden, Switzerland, Italy, Belgium, Finland, Austria, Greece and France. However mobile service providers do provide services in many of these countries having successfully concluded negotiations with the network operators. In France and Italy, the NRAs are currently reviewing the issue of mobile network access and proposals are due in the next few months.

3. Regulatory Framework

3.1. Introduction

This section briefly outlines the regulatory law within which service providers in the mobile market including airtime resellers, service providers requesting indirect access, and Mobile Virtual Network Operators (“MVNOs”), can be considered.

The issues raised in this consultation document are the subject of much debate right across Europe and indeed internationally. In 1999, Oftel in the UK issued two consultation papers addressing indirect access for mobile networks and MVNOs². Other European countries such as Denmark, Sweden and Norway have issued determinations regarding access to the mobile networks arising out of disputes involving the application for interconnection by various mobile service providers. In addition, other countries such as Switzerland, Belgium and Italy are examining the issue of access to the mobile networks in the context of a public consultation on 3rd generation mobile licences.

Part of the context to that debate is provided for by the European Commission’s current review of the legislative framework for telecommunications³. That review recognises that the current legislative framework requires considerable updating and the issue of access to mobile networks is identified as a relevant issue⁴

Notwithstanding this, the current framework does contain a range of measures in relation to access and interconnection which are relevant and which form the basis for regulatory action at this time. In particular, in accordance with European Directives, NRAs may act under their own initiative to grant specific forms of access, or may be called upon to resolve disputes involving access. The NRA has the authority to determine the terms and conditions for access, ensuring that its actions are consistent with Community law. The relevant legal framework, which may apply to service providers in the mobile market, is largely dependent on the proposed services and legal status of the reseller or MVNO.

3.2. Interconnection Services

Interconnection is one form of access that is provided for in the legislative framework – specifically in the European Communities (Interconnection in Telecommunications) Regulations 1998 (SI No 15 of 1998) (“the Interconnection Regulations”) and in Directive 97/33/EC of 30 June 1997 on interconnection in Telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP), (“the Interconnection Directive”).

² Customer Choice: OFTEL’s review of indirect access for mobile networks, *February 1999*
Mobile Virtual Network Operators: OFTEL inquiry into what MVNOs could offer consumers, *June 1999*

³ Communication from the Commission, the Results of the Public Consultation on the 1999 Communications review and Orientations for the new regulatory framework, COM(2000)239 final.

⁴ *Access to infrastructure p. 26* - The 1999 Communications Review – Communication on a new Framework for Electronic Communications Infrastructure and Associated Services. **Comm (1999) 539**

Regulation 2(1) of the Interconnection Regulations defines interconnection as

... " the physical and logical linking of telecommunications networks used by the same or a different organisation in order to allow the users of one organisation to communicate with users of the same or another organisation, or to access services provided by another organisation "

Organisations entitled to interconnection are defined in Regulation 4(2) as

"organisations which are authorised pursuant to the Act of 1983, and which provide all or any of the following:

- (i) a public telecommunications network,*
- (ii) voice telephony services,*
- (iii) a public mobile telephony network,*
- (iv) a public mobile telephony service, or*
- (v) leased lines to users' premises,*

or

(b) whose names have been notified to the Commission by other Member States on the basis that those organisations are subject to the provisions of the Directive concerning organisations with significant market power or to which Annex II applies."

Annex II of the Interconnection Directive defines the organisations on which rights and obligations to achieve interconnection are imposed. In summary:

- Organisations with networks;
- Organisations which provide leased lines to users' premises;
- Authorised organisations for the purpose of providing international telecommunications circuits between the Community and third countries;
- Organisations providing telecommunications services permitted to interconnect in accordance with licensing/authorisation schemes.

The obligations to interconnect "*organisations*" is a reference to "authorised organisations". Where MVNOs and service providers are not authorised (licensed), have no networks, or do not supply leased lines to premises, then Regulation 4(1) and Annex II do not impose rights or obligations in favour of such entities.

3.3. Access to the Radio Access Networks of Mobile Operators with SMP

Provision is made in Irish and EU legislation for access to the networks of mobile telephony operators, apart from interconnection with such networks.

In particular, regulation 4(6) of the Interconnection Regulations provides that any organisation providing public mobile telephony services or public mobile telephony networks that has been designated as having Significant Market Power, may not refuse reasonable requests for access, including access at points in the network other than those offered to the majority of users. Such refusal is deemed to be an offence under the legislation.

The Regulations refer specifically to the limited circumstances in which access can be refused, stating that refusal may be defended on the basis that the request for access is “*unreasonable having regard to the resources available to the organisation to meet that request*”.

3.4. Spectrum Availability

The availability of spectrum may limit the number of mobile networks in a given geographical area. In such circumstances, the only way that other operators can enter the market is by obtaining access to an existing network.

The European Commission has stated that where a service provider cannot negotiate access to any of the existing networks in a given market (i.e. all operators refuse access) and where no spectrum or mobile licences are available then that service provider can claim there are no technical alternatives available for the introduction of his services.⁵

The Commission has also stated that in cases where the infrastructure provider alleges insufficient capacity to provide the access requested, the burden of proof should be on the infrastructure provider to demonstrate the lack of resources⁶.

3.5. National Roaming

One commonly held view adopted in certain other Member States in relation to the services provided by airtime resellers and MVNOs is that these services do not fall under the category of interconnection. A number of NRAs have taken the view that the key feature of MVNO operations, the recognition of a SIM card, is not interconnection as defined in the Directive and should instead be viewed as the equivalent of roaming services⁷. The Director has not yet taken a position on this issue.

⁵ Information Society DG – Access to fixed and mobile network infrastructures owned by operators designated as having significant market power – Explanatory Note. 17 September 1999

⁶ *ibid.* p. 7.

⁷ Mobile Virtual Network Operators: OFTEL inquiry into what MVNOs could offer consumers – June 1999, paragraph 3.15

3.6. Resale of Airtime

Airtime resellers can be said to be in a different position to other forms of service providers who are accessing a mobile network. Although the term ‘access’ is often used to cover simple resale, in most cases the resale of airtime may not involve interconnection or roaming and the access that such resellers require to the network is the same as that for any ordinary customer. These providers usually operate on the basis of a volume discount agreement from the network operator.

In these circumstances, the service provider may not be entitled to rely on the provisions in relation to interconnection. The general obligations on licensees as set out in the Mobile Licences, will apply. The enforcement of licence conditions and the management of disputes under those licences may be referred to the ODTR.

4. Growth in the Irish mobile market

4.1. Introduction

This section of the paper looks at a number of factors that can be used as indicators of the extent of competition in the Irish mobile market. These factors include the number of players, the structure of the market, trends in market shares, prices and new services, barriers to entry or switching costs.

These indicators provide broad headings under which competition in the Irish mobile market can be examined. Respondents' views on these issues or other competitive indicators are welcomed.

International data obtained by the ODTR seeking to demonstrate the effect of the introduction of new service providers using various forms of access is limited and inconclusive. Data supporting any views expressed in response to this section would be welcome.

4.2. Structure of the mobile market in Ireland

In Ireland, mobile telephony services are currently offered by two companies, Eircell and Esat Digifone. Following a competitive process, the Director proposed to issue a third licence in 1998, but this is subject to court action at present. Eircell operates two networks, one analogue or first generation network (based on the TACS technology) and the second digital, based on GSM technology or second-generation network. Eircell is a wholly owned subsidiary of the incumbent fixed operator, eircom. It has been the sole provider of analogue (TACS) mobile services in Ireland since 1985 and since 1993 has also been providing digital mobile services. Esat Digifone operates a GSM network and commenced provision of mobile services in the first quarter of 1997 as Ireland's second GSM mobile operator. Esat Digifone is 50.5% owned by British Telecom (as a result of its acquisition of Esat Telecom) and 49.5% owned by Telenor.

4.3. Trends in market shares

Since 1997 mobile penetration in Ireland has increased from 7% to almost 50%. This spectacular growth, stimulated by the introduction of competition into the market, has allowed the two mobile operators to build a significant customer base and market share in terms of total revenues in the last two years. Market shares, based on revenues from call termination, at end March 1998 were an estimated 75.6% for Eircell and Esat Digifone 24.4% of the market. Market shares a year later were 64% and 36% for Eircell and Esat Digifone respectively. ODTR estimates of current market shares show a 60/40 relation between the two operators. It is notable that, notwithstanding the steady decrease in Eircell's market share, because of the overall growth in the market, Eircell's total subscriber base, revenues and returns have grown dramatically.

4.4. Mobile prices and services

The Irish mobile operators currently offer a range of mobile telephony packages that focus on very well defined market segments. The market for mobile services can be classified into two main segments, contract or post-paid and prepaid services. Contract subscribers can also be divided into those who pay subscription charges on a monthly basis and those who subscribe to an advanced payment scheme. The impact of prepaid services is one of the success stories of the mobile telephony industry. In most European countries, a vast proportion of recent growth has come from prepaid services. This has been largely responsible for taking cellular into the mass market.

The system of pricing used within each of these targeted segments differs quite considerably. The reasoning behind these tariff options is to segment mobile services so as to provide every potential customer with an ideal package. It is for this reason that any attempt at classification of current services and packages offered by the operators is almost immediately out of date. The variety of mobile services and tariff options makes analysis of the trend in prices very difficult.

It is possible to say that the wide availability of tariff packages, particularly pre-pay, allows consumers to tailor their expenditure and control the costs they incur. Recent studies⁸ indicate that this is indeed what customers are doing and the effect has been to reduce the average revenue per customer earned by the operators by around 20% from year end 1998 to year end 1999.

Looking at the Irish situation relative to other countries, most recently a report by Philips Tarifica⁹ suggested that peak rates for most mobile phones in Ireland are high compared to others in Europe. Also a recent report by Salomon, Smith Barney,¹⁰ based on an assumed usage of 65 minutes per month, placed Irish rates higher than 12 European counterparts. The Table below presents a ranking of mobile prices published by the ITU and shows that the two Irish mobile operators, with similar commercial offers, are placed among the more expensive for those particular services.

The tariff plan chosen for each operator is that which would provide the lowest price for the chosen basket of calls and mobile subscription.	
Price of a monthly basket of 100 minutes of national mobile phone calls, including subscription, 50 minutes peak-rate and 50 minutes off-peak, for a selection of major economies, August 1999, by mobile/service operator. Tariff data is valid for August 1999.	
	US\$
Indonesia (Satelindo)	9.74
India (Max Touch)	14.30
Philippines (Globe)	16.26
Israel (Cellcom)	17.36
Thailand (Worldphone)	19.34
Rep. Korea (SK Telecom)	20.12
HongKong Sar (HKT)	21.69
Canada (Bell Mobility)	23.59
Singapore (Sing Tel)	23.90
USA (Bell South)	25.00

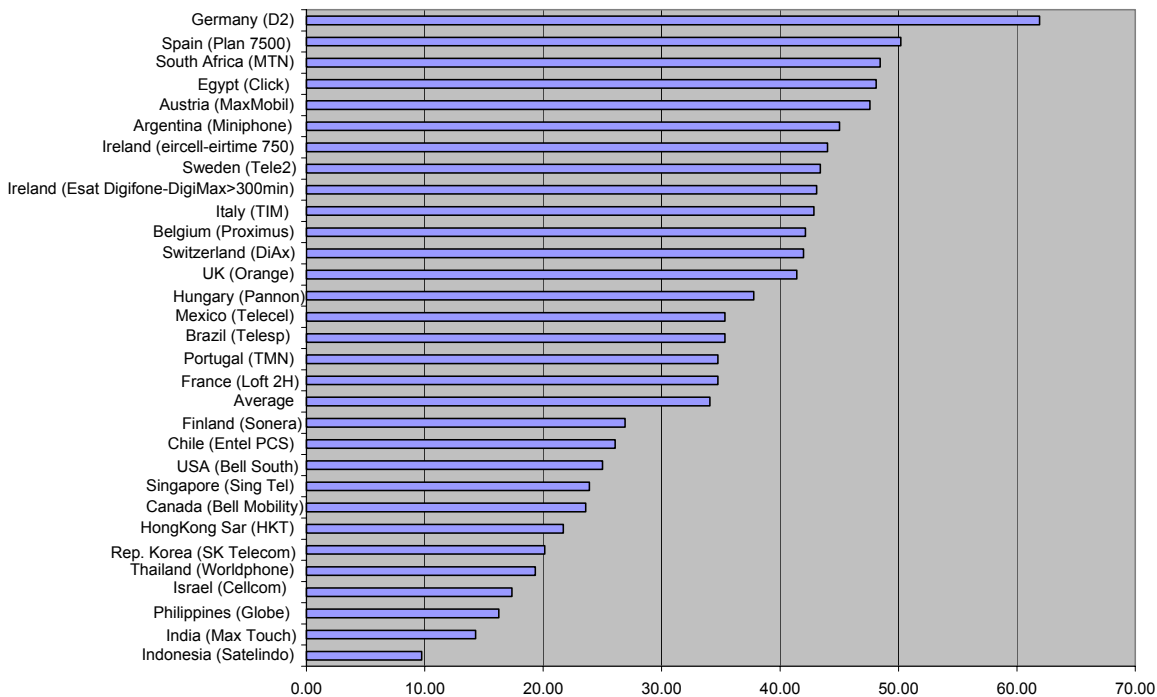
⁸ Kagan World Media Ltd, European Cellular, Vol No.1, March 31; *Revenue Patterns of Eurocellular Operators*

⁹ Quoted in the Sunday Times, 2 April 2000

¹⁰ Quoted in Sunday Tribune 20 January 2000

Chile (Entel PCS)	26.07
Finland (Sonera)	26.91
Average	34.08
France (Loft 2H)	34.75
Portugal (TMN)	34.76
Brazil (Telesp)	35.34
Mexico (Telecel)	35.35
Hungary (Pannon)	37.78
UK (Orange)	41.40
Switzerland (DiAx)	41.99
Belgium (Proximus)	42.15
Italy (TIM)	42.85
Ireland (Esat Digifone-DigiMax>300min)	43.09
Sweden (Tele2)	43.40
Ireland (eircell-eirtime 750)	44.01
Argentina (Miniphone)	45.02
Austria (MaxMobil)	47.58
Egypt (Click)	48.11
South Africa (MTN)	48.46
Spain (Plan 7500)	50.20
Germany (D2)	61.91

Source: ITU and ODTR



4.5. Barriers to entry

Competition can be limited by the scarcity of radio spectrum in that spectrum limits the number of networks that can be accommodated. At present the existence of just two licensed mobile operators necessarily limits the level of competition in the Irish market.

This situation can be expected to change with the granting of a third GSM licence and, in the first quarter of the year 2001, the award of third generation mobile licences. These additional licences should help promote more aggressive and effective competition. The 3G licences are unlikely to come into operation until 2002.

4.6. Number portability and switching costs

The absence of mobile number portability may also be an obstacle to the development of competition as the lack of number portability is the main switching cost faced by users. Number portability means that customers can switch networks without changing their mobile number. However, the very high customer churn rates in the mobile sector (an EU average of 25%¹¹) suggest that number portability is not the same entry barrier as it appears to be in the fixed-line sector, although it may still be considered quite an important factor by business customers.

Q 4.1 Do respondents agree with the analysis set out above? If not, why?

Q 4.2 Are there any other indicators that are appropriate? If so what indicators and why? Respondents are invited to submit any additional data that they might consider useful or appropriate.

¹¹ Source: Telecommunications Policy no. 23 (1999) Pages 521-538. "An investment view of mobile telecommunications in the European Union".

5. Key Consumer and Regulatory Issues

5.1. General Principles

As stated, the Director's overriding goal is to put in place a framework which will allow the Irish consumer obtain the best deal in terms of price, choice and quality. The Director considers that the introduction of independent service based competition has the potential to enhance consumer welfare. This section asks further specific questions as to what benefits might accrue to consumers - through lower tariffs, improved quality and greater choice. The Director acknowledges that different types of service providers could bring different benefits to consumers. For example, MVNOs have the potential to offer different and more advanced services than a service provider providing simple resale of airtime. In addressing the issues below, respondents are asked to consider the potential benefits to consumers of each type of service provider.

Q 5.1.1 What benefits do respondents consider that the various types of independent service providers can deliver to consumers?

Airtime resellers

Indirect Access Providers

Virtual Mobile Network Operators

Please give reasons for your answers.

5.2. Choice and Quality

The introduction of service providers would provide the consumer with a greater choice of organisations offering mobile services. Depending on the type of service provider the consumer may also end up with a greater choice in services and the provision of more innovative services. One of the potential key benefits of access to mobile networks is that it could enable the development of converged fixed mobile services. Such a converged environment offers a number of benefits for customers;

- customers will have a single contact point for customer care;
- they will receive a single bill for both their mobile and fixed terminal usage;
- there could be a single handset for both services (for example a GSM/DECT handset);
- customers could have one single directory number which diverts to fixed or mobile depending on the location of the customer.

In a converged environment there may be further innovative service developments such as:

- Virtual Home Environment (VHE) where a single access number and a consistent range of services are delivered over a variety of fixed and mobile networks.
- New content services such as Transport Telematics (e.g. navigation) or M-Business (mobile e-business applications such as banking).

- Other content services such as Narrow-Casting which are video on demand services such as news updates.

These services will require either enhanced GSM (General Packet Radio Service – GPRS) or 3rd Generation networks for viable delivery. These converged services can draw on the services provided by MVNOs or can link directly to the physical network operator.

Indirect Access provides an example of how the customer can exercise choice on a call by call basis. At present customers can exercise choice only by changing network operator or through the use of indirect access by dialling a 1800 number and entering a PIN number, enabling cheap national and international calls. This kind of indirect access is cumbersome and may not be attractive to users.

Q 5.2.1 Do respondents consider independent service provision will lead to greater choice of products and services? Please give reasons.

Q 5.2.2 Do respondents consider that access to mobile networks will be a key enabler in the development of fixed mobile converged services? Please give reasons.

Q 5.2.3 What services could be provided by MVNOs, indirect access providers, airtime resellers?

Q 5.2.4 What type of organisation is likely to seek access to mobile networks?

5.3. Prices to consumers

The potential effect the introduction of service providers could have on tariffs in the mobile market may depend on whether the service provider is an MVNO, indirect access operator or simple reseller of airtime. As shown in Section 4 there is evidence that mobile tariffs in Ireland are relatively high by international standards. It should be expected that mobile tariffs could fall after the introduction of further network based competition in the form of the third second generation operator and the granting of 3rd generation licences. However, at this stage the Director wishes to consider the potential impact on mobile tariffs of the introduction of service providers. For example, tariffs may fall in the short term where service providers can take advantage of arbitrage opportunities where network operator margins are high.

The impact on tariffs is, of course directly related to the terms on which access to networks may be granted (see 5.4 below). It could also depend on how efficient service providers are in substituting their own facilities for those of the network operators.

There is also the possibility that falling margins in mobile tariffs could lead to greater rigidity in mobile termination rates. Mobile operators could seek to recover lost revenue through higher termination rates. In other words, while the cost of calling **from** a mobile may fall the cost of calling **to** a mobile may rise. This could be mitigated where there is scope for regulatory control of rates as in the case of an operator with SMP on the interconnection market.

Q 5.3.1 What effect could the introduction of service providers have on tariffs in the mobile market? In your response please distinguish between MVNOs, indirect access operators and airtime resellers.

Q 5.3.2 Do respondents consider that the introduction of service provision will have any effect on mobile network termination rates and if so what effect?

5.4. Obligations to provide access

If access is to be mandated, the Director must consider;

- Which operators or categories of operators should be obliged to provide access, and
- For how long a mandatory requirement should be in place.

In relation to who should provide access, the options include,

- Requiring all mobile network operators in the market to provide access,
- Requiring operators with SMP in the mobile market to provide access,
- Requiring operators with SMP in the interconnection market to provide access.

The first option implies that mandatory access is required to some degree independently of the number or the relative positions of the players in the market. This would include imposing a mandatory requirement to allow access on new entrants as soon as they enter the market. The Director does not consider that this would be proportionate.

Underlying the second and third options is the view that if the mobile market were fully competitive, mandatory access would be unnecessary – therefore the requirement to provide access is related to the position of the players in the market, their market power and the structure of the market. In a competitive market any initial arbitrage opportunity would have been removed due to competitive downward pressure on prices, either from service providers or from other forms of competition. Service providers who continued to operate in a fully competitive market would most likely compete on innovative and value added services and would be in a position to negotiate access on commercial terms with alternative suppliers.

Q 5.4.1 Should access to mobile networks be mandated and why?

Q 5.4.2 If access to mobile networks is mandated, which operators should be obliged to provide such access; all network operators, SMP operators or operators with SMP in the interconnect market? Please give supporting information where possible.

Q 5.4.3 For how long should access be mandated? Should there be a sunset clause in relation to mandatory access and if so when and how would this be triggered?

5.5. Terms and Conditions of Access

If access or provision of airtime is to be mandated on mobile networks, the basis on which access will be charged must be considered. As stated in section 5.3 above the charging basis for access to networks is a key determinant in the level of tariffs which the service provider can offer and consequently for increased price competition in the mobile market. There are a number of options as to the basis on which such access may be charged. These options may depend on the nature of the access in question e.g. airtime resale, indirect access or MVNO. The options include

- retail minus prices,
- cost plus return on capital (similar to interconnection pricing), or
- commercial negotiation.

The advantages of using retail minus include speed of implementation as it does not rely on the detailed capturing and measurement of costing information. Speed of introduction of competition in turn can benefit consumers as previously discussed. On the other hand, the use of retail minus passes the tariff structure of existing network operators onto the new service providers, potentially limiting the scope for innovative packaging and billing options.

Cost oriented pricing would take longer to implement but has the advantage firstly of linking the prices that network operators receive with their costs plus return on capital (this is addressed further in section 5.6 below), and secondly of allowing service providers greater freedom in how they structure their own tariffs and service offerings, thus increasing the scope for innovation.

Finally, commercial negotiations assume that both parties (network operators and access seekers) can see mutual advantage in the transaction. This advantage may be based on the payment to be received for otherwise under utilised network, but may also be based on a commercial assessment taking into account, for example, the returns to be expected from the overall stimulation of the market and/or of segments attracted by innovative services/ marketing by service providers. This is also addressed further in section 5.6 below.

Q 5.5.1 *If access to mobile networks is mandated on what basis should such access be charged:*

- for airtime resellers?*
- for MVNOs?*
- for indirect access operators?*

Please give reasons

5.6. Network Investment

Investors in the mobile market, like investors everywhere, seek out opportunities providing the potential for the most rapid and largest returns. Markets with few players and strong consumer demand are particularly attractive, and the technical limits on the number of players arising from the use of spectrum mean that the mobile market fits well into this category. This applies to the Irish market with two players and other European markets where there are more players. The effects of such strong investor interest is clear when we consider the very rapid deployment of complex and expensive mobile networks throughout Europe. In Ireland, mobile networks were capable of handling 94,500 subscribers in January 1997, and in February 2000 they are capable of handling over 1,800,000 subscribers.

There are a number of questions to be considered. First whether the introduction of any or all of the various forms of access with any of the various pricing options described above, will have an effect on investment in networks. Second, would the effect be to inhibit the widespread deployment and updating of mobile networks, thus damaging the longer term interests of consumers.

To answer these questions, it is worthwhile noting the increased introduction of service provision in the European Union either on mandated terms or on commercially negotiated terms. This may be happening, particularly on commercially negotiated terms, because of the potential for service provision to stimulate growth in the mobile market overall, allowing network operators to access segments of the market that might not otherwise have been reached. The overall effect is an increase in the size of the market and an increase in the business of both service providers and network operators.

Clearly, there are potential difficulties if, over any extended period, the return to network operators is insufficient to fund future investment. However, all of the pricing options for access noted above involve the network operator setting prices to service providers that cover at least their efficiently incurred costs plus a return on investment.

It would appear therefore that the introduction of service provision has the potential to stimulate growth and increase returns to all players, while at the same time increasing the benefits to consumers as the market is expanded to include new segments. The potential for negative impact on investment would on the other hand appear to be limited having regard to the fact that prices for access should adequately cover

investment costs. The Director would be pleased to receive duly reasoned views on these important issues supported by business data where possible.

Q 5.6.1 What impact do respondents consider that access might have on network investment and why?

Q 5.6.2 If there is a likely impact on network investment, what terms of access might negate this impact or minimise it and why?

6. Next Steps

The Director believes that access to mobile networks has the potential to enhance competition in the mobile market. She notes that this is a key issue in the Commission's review of the regulatory framework and also that many other European countries are addressing it at this stage. The matters raised in this paper are complex, involving legal, economic, technical and commercial issues as well as covering various different forms of access and service provider. The views received in response to this Consultation will be very useful in informing the Director as to the further actions that might be appropriate in this area. The following categorisation is given as a broad guide to the consideration by the Director of the views received and the further action that may be needed:

- **Indirect Access** – Carrier Pre-Selection / Carrier Selection for Mobile. In line with ODTR Decision Notice D2/99 – Introducing Carrier Pre-selection in Ireland, the issue of extending the obligations of CPS and CS to the mobile networks may be further reviewed by the ODTR. Views obtained in this consultation will help to determine the framework for any such a review.
- **Airtime Resale** – The views received will assist the Director in considering whether there is any need for regulatory intervention, either generally or on a case by case basis under existing dispute resolution procedures.
- **Roaming on 2G and 3G** – The matter of national roaming is particularly relevant to the 3G licensing process and views will assist the Director in her consideration of this.
- **MVNO** – the complexity of virtual mobile operators may require that further analysis is undertaken as the market develops and demand for such services is realised in the market

Given the complexity of this matter, the questions raised may not be exhaustive. Respondents are invited to submit additional relevant comments where they consider that such issues have not been addressed by the questions in this Paper.

The Next Steps in this Process are:

1. Response to Consultation by 16th June 2000
2. Report on Consultation 17th July 2000

Consultation Procedure, Timetable and Contact Personnel

The consultation period will run from 16th May to 16th June 2000.

Comments should be submitted in writing before 5.00 p.m. on 16th June 2000 to:

Ms. Louise Power,
The Office of the Director of Telecommunications Regulation,
Abbey Court,
Irish Life Centre,
Lower Abbey Street,
Dublin 1

OR

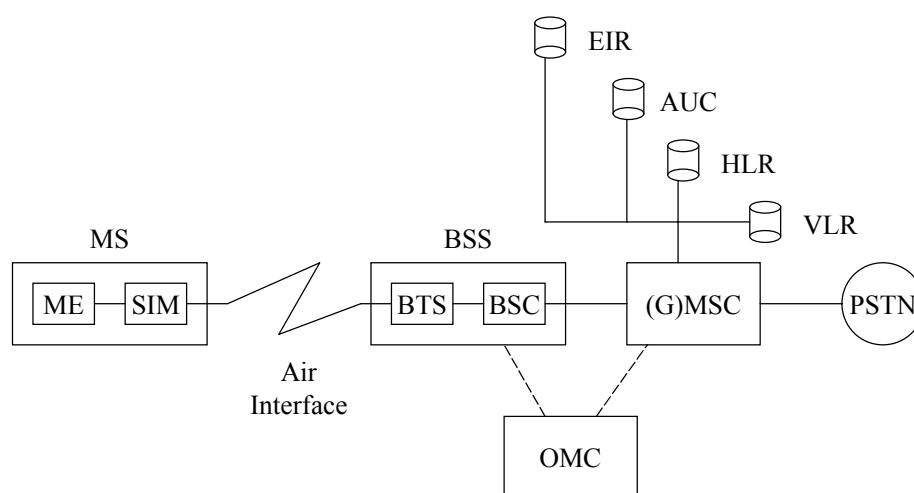
Comments may be submitted via email before 5pm on 16th June 2000 to:

powerl@odtr.ie

Appendix 1: The GSM Network

Elements in a GSM Network

In order to describe the technical possibilities and requirements for MVNOs and Indirect Access, it is first necessary to briefly outline the different elements that comprise a GSM network and certain key GSM functions such as registration. Figure 1 shows the essential elements that make up a GSM network. Other elements may also be connected to the GSM network, .e.g. an IN Platform, SMS Gateway etc., but for reasons of simplicity these elements are not included in this figure.



MS:	Mobile Station	OMC:	Operations and Maintenance Centre
ME:	Mobile Equipment	(G)MSC:	(Gateway) Mobile services Switches Centre
SIM:	Subscriber Identity Module	HLR:	Home Location Register
BSS:	Base Station subSystem	VLR:	Visitor Location Register
BTS:	Base Transceiver Station	EIR:	Equipment Identity Register
BSC:	Base Station Controller	PSTN:	Public Switched Telephone Network

Figure 1: The GSM Network

Functions of the GSM Network Elements

The mobile station (MS) consists of the Subscriber Identity Module (SIM) and the Mobile Equipment (ME), i.e. the mobile handset. The SIM is a small smart card type device that contains details of the user, such as the subscriber related security information (International Mobile Subscriber Identity (IMSI), authentication keys), the subscriber's PIN and other mobile subscriber information.

The MS communicates with the Base Station subSystem (BSS) over the GSM air interface.

The BSS consists of a Base Station Controller (BSC) and a number of Base Transceiver Stations (BTSs). Normally a BTS consists of a mast and an antenna and its main function is to transmit and receive information to and from MSs. A BTS is connected to a Base Station Controller (BSC), whose main responsibility is to manage

the radio interface through one or more BTSs, i.e. the reservation and release of radio channels as well as location management for handovers.

Connected to one or a number of BSCs is a Mobile service Switching Centre (MSC). The MSC is a switching centre that holds all the switching functions needed for MSs located in a geographical area designated as the MSC area. The main functions of the MSC include:

- the setting up of calls to and from mobile phones in the GSM operator's network, and;
- the routing of calls to and from the Public Switched Telephone Network (PSTN);

A special form of MSC is the Gateway MSC (GMSC) which acts as the first point of contact between the PSTN and the GSM network.

A call between a mobile subscriber and the PSTN will pass through each of these elements to reach the PSTN. However a mobile network has a more complicated task than just routing and switching of calls. To facilitate these tasks a number of registers are connect to MSCs. As shown in Figure 3 these registers are the:

- Home Location Register (HLR);
- Visitor Location Register (VLR);
- Equipment Identity Register (EIR) and;
- Authentication Centre (AUC).

The HLR is a database that is used for the management of mobile subscribers. It statically stores all important 'home' subscriber information required to provide customer services without knowing the exact location of the mobile within the network. Among other information the HLR stores the International Mobile Subscriber Identity (IMSI).

The VLR is very similar to the HLR with the exception that it dynamically stores subscriber information and keeps a more exact location of where the subscriber is. To get this subscriber information a VLR has to communicate with the subscriber's HLR.

The AUC is associated with the HLR, and stores an identity key for each mobile subscriber registered with the associated HLR. This information is required to verify that the SIM card in the mobile is the one that is announcing itself to the network.

The EIR is a central database which checks that the mobile equipment (ME), i.e. handset as opposed to the SIM is valid.

Finally the GSM network also has an Operations and Maintenance Centre (OMC) for controlling and monitoring the network, in order to locate faults or alarms in the network.

GSM registration process:

In order to be able to use the GSM network, the mobile subscriber must first register. The registration procedure is different depending on whether the mobile is roaming and whether it has previously registered with the network or not.

For mobiles that have previously registered all that is required is the sending of a simple mobility management update message from the MS to the MSC/VLR. For roaming mobiles, i.e. a mobile visiting another GSM network, and for mobiles that have not previously registered, the IMSI (International Mobile Subscriber Identity) number is sent by the mobile to the MSC/VLR. The IMSI number is the GSM number associated with each mobile. Note it is not the same as the directory number (E.164) used to dial someone from the PSTN. In the case of a roaming customer the IMSI is used to identify the home country and network and allows the visited network to send signalling messages to the HLR of the subscriber's home network (assuming there is a roaming agreement between the two networks) to check the roamer's subscription status and to see if roaming is allowed. This information is then communicated back to the VLR of the visited network.

It can be seen therefore that the IMSI is important for GSM registration and roaming. The IMSI number, as shown in Figure 2, consists of the following elements:

- Mobile Country Code (MCC) which uniquely identifies the country of domicile of the mobile subscriber;
- Mobile Network Code (MNC) which identifies the home GSM network of the mobile subscriber;
- Mobile Subscriber Identification Number (MSIN) which identifies the mobile subscriber within a GSM network.

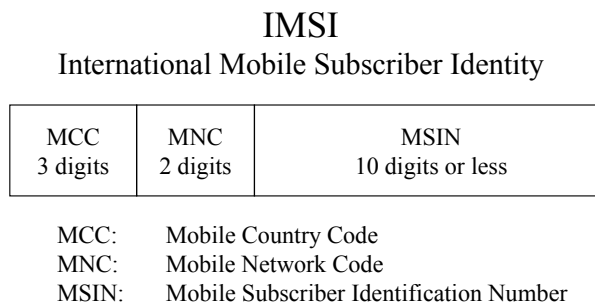


Figure 2: The structure on the IMSI

This description of a GSM network and the functions performed by the various elements of the network, provides a basis for considering various types of call conveyance over mobile networks in Appendix 2.

Appendix 2: Call conveyance on Mobile Networks:

This Appendix describes various forms of conveyance of calls across mobile networks. Firstly we describe basic call conveyance as it takes place over a GSM network where there is no service provision. Then we provide examples of call conveyance where service provision is involved, including indirect access and MVNOs. These are examples of how call conveyance might be structured in such circumstances, and respondents are invited to comment and, if appropriate, provide alternative technical configurations.

Current mobile network call conveyance:

Once a mobile subscriber has successfully registered with the GSM network, incoming or outgoing calls can be completed.

For incoming calls, the originating network routes the call to the GMSC of the mobile subscriber's home network which interrogates its HLR to find the position of the mobile station. For mobile stations located in the home GSM network the call is simply routed to the mobile subscriber via the different GSM network elements, i.e. the MSC, BSC and BTS. For 'roaming' mobile stations the call is routed to the GMSC of the visited network which then routes the call to the mobile subscriber using its GSM network elements.

For outgoing calls, the mobile subscriber simply requests a communications channel from the BSS of the GSM network. Assuming that the mobile subscriber has successfully registered and in the case of 'roaming' subscribers is authorised to roam, the call is then routed to the appropriate network, via the GMSC, which then terminates the call.

Figure 3 shows at a very high level how a call is conveyed from the calling party (mobile customer) to the called party who is located in an external network.

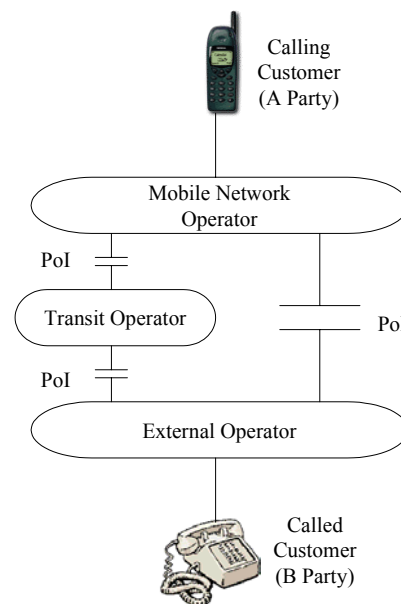


Figure 3: Conveyance of calls over a GSM network

A mobile caller wishing to make a call dials the number of the B party and the mobile network operator arranges for the call to be handed over to the terminating network at a convenient point of interconnection. The mobile operator also has the possibility of using another operator, the transit operator, to convey the call across the country to the most convenient Point of Interconnect (POI). These two options are shown in Figure 3. For each call the mobile operator has to pay:

- Any transit operators for ‘transit’ conveyance (if applicable);
- The terminating operator for ‘call termination’; and
- Its own costs.

Indirect Access call conveyance:

Indirect Access (IA) on telecommunications networks can be achieved by a number of different methods. IA customers could dial a short access code (Carrier Selection) or a freefone number or carrier pre-selection (CPS) could be employed in the network. IA only works for outgoing calls and customers still need to subscribe to (or have pre pay credit with) a mobile network – i.e. rental of access to the network. For reasons of simplicity IA on a mobile network using a short access code is described in this annex.

In the previous scenario, the mobile operator makes all the decisions about how the call is conveyed and the customer has no choice but to pay the price set by the mobile operator. With Indirect Access the customer has a choice for call services, which he or she can execute on a call-by-call basis (in the case of CPS the choice is not on a call by call basis). The customer dials a short access code before dialling the number of the called party. The mobile operator’s switch recognises this short access code and passes the call over to the IA operator’s network at a designated Point of Interconnect (POI). The IA operator’s network must at a minimum consist of a single switch. The IA operator’s switch then routes the call to the called party using the IA operator’s preferred route. This is shown in Figure 4.

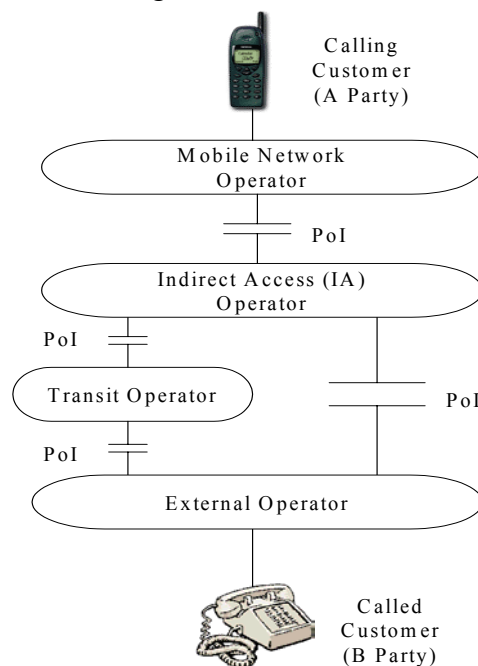


Figure 4: Conveyance of calls with Indirect Access (IA)

In this scenario the calling party has a contract with the IA operator for call services and with the mobile operator for connection services. The calling party pays the IA operator for any calls made using the IA short code. Out of this the IA operator would have to pay:

- The mobile operator for ‘call origination’
- Any alternative operators for ‘transit’ conveyance (if applicable)
- Its own costs; and
- The terminating operator for ‘call termination’.

MVNO Operation and Call conveyance:

SIM Cards and IMSI Number:

An MVNO will issue its own SIM cards which is the key that allows MVNOs to ‘own’ the customer. The IMSI number is stored on the SIM card and as previously stated in Appendix 1 is a unique number which is used to identify mobile subscribers and their home network.

Therefore to identify an MNVO it is necessary that either the MNC, or a combination of the MNC, MSIN (see Figure 2) and mobile directory numbers (E.164) are unique to the MVNO. Using the MNC, the GMSC of the MVNO could be identified. At the GMSC the mobile directory number (E.164) could then be used to identify that this customer belongs to a MVNO and the MSIN could be used for billing purposes.

MVNO call conveyance:

In order for MVNOs to operate on a mobile network, the MVNO SIM card has to be recognised. Once successfully registered an MVNO subscriber is able to communicate in a similar fashion as normal subscribers and therefore could use the same call conveyance possibilities shown in Figure 3 and 4. Added to this, an MVNO call could be routed through a combination of MVNO network elements and the mobile operator, as described in the following paragraphs and shown in Figure 5.

MVNO registration and operation:

In order to register an MVNO customer, a roaming agreement between a mobile operator and an MVNO is the required. This roaming agreement allows MVNO subscribers to use the mobile operator’s network and specifies how the billing is to be arranged between the different operators.

Roaming, from a technical point of view, also requires signalling information, such as subscriber information, to be passed between the two networks. This implies that for an MVNO to work in its simplest form it requires the same functionality as an existing GSM network; that is, it requires a gateway MSC (GMSC) function to allow the MVNO network to interact with external networks, e.g. the PSTN network, an HLR, MSC, AUC, EIR, and billing functions, along with a maintenance centre. Added to this an MVNO requires a network code (or a number space within a network code) to route calls to the MVNO GMSC.

The level of investment, which an MVNO puts into its network, is entirely up to the MVNO itself. It can either own or control any of the different GSN network elements mentioned in the previous paragraph. Likewise an MVNO may enter into an agreement with the mobile network to route outgoing calls or it may sign interconnect agreements directly with other operators. Figure 5 shows an example of an MVNO network where interconnect agreements are in place and the MVNO owns the majority of the GSM elements.

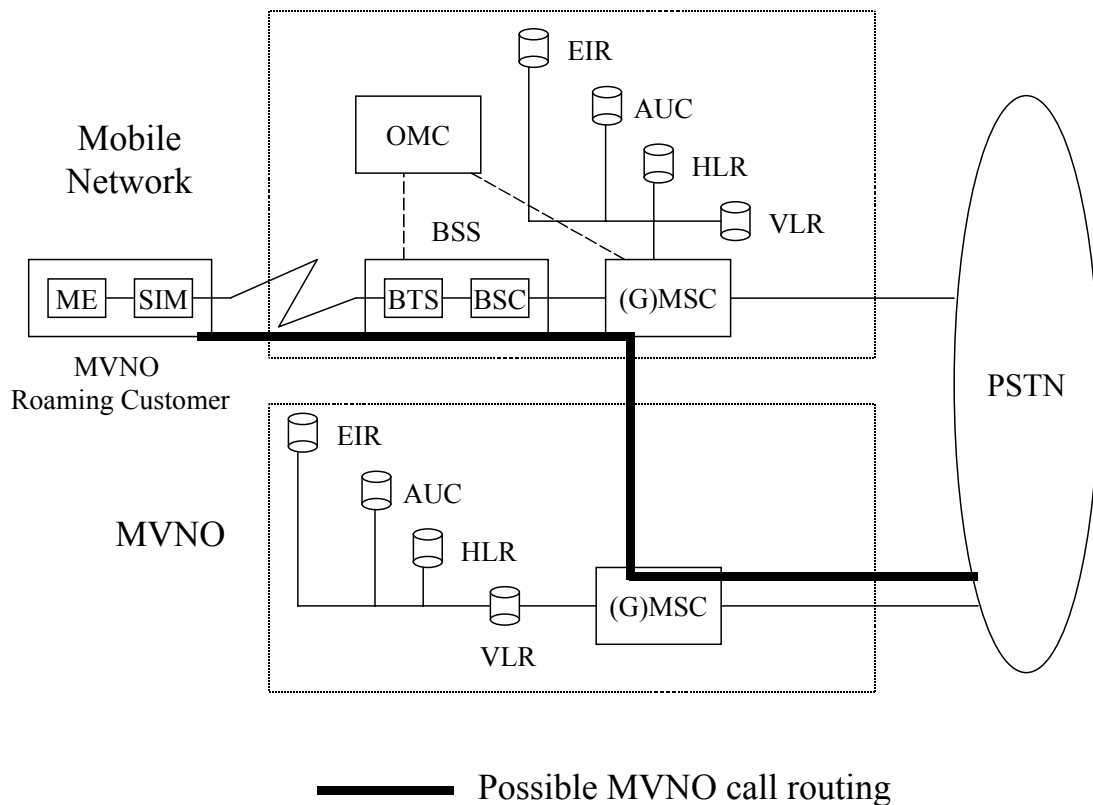


Figure 5: Example of an MVNO network

MVNOs also have the option of not investing in any network elements, i.e. having no switching functionality or HLR capability, instead entering into agreements with a mobile network operator to use the network operator's facilities. In that case the MVNO would enter the customers' data directly onto a mobile network's databases, and all that is required is a database that can communicate with a GSM network. The GSM network will have all the details required to handle the call to or from the mobile, and will produce the billing information for the MVNO who will process it. In this situation the MVNO might not require its own MNC, but may issue SIM cards with the MNC of an existing operator.