



## **ANNEX**

# **Cost Structures in Mobile Networks and their Relationship to Prices**

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**Final Report  
for the  
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by  
Europe Economics**

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## 1 INTRODUCTION

This annex provides an overview of the mobile telecoms market in the EU, including brief descriptions of the major regulatory actions and initiatives in each member state.<sup>1</sup> Unless otherwise stated, the information is correct as of 31 August 2001.

The annex contains, where possible, developments that have occurred in each country since publication of the last Information Society Implementation Report. Most of the information presented is already in the public domain. Much of it can be found at regulators' websites. Other sources for information include the websites of EC Information Society, the GSM Association, and MNOs. A number of NRAs have helped us in collecting material for the annex. We thank the NRAs in Denmark, Finland, Germany, Greece, the Netherlands, Norway and the UK for reviewing the contents of the annex. We also thank DG Information Society for providing some information for this Annex.

### 1.1 Industry Overviews

For each country, the first part of the section contains information on the where the market is today. This includes information on penetration rates; the market shares of different firms; which firms have acquired which spectrum licenses; and the presence, or otherwise, of firms in the retail mobile market who do not own any spectrum.

The penetration rates provide an indication of the maturity of the mobile market in each country. This rate, expressed as a percentage, is typically calculated by dividing the number of mobile subscriptions by the total population. However, comparisons between different countries are not always possible, since some NRAs have made adjustments to reflect the fact that it has become increasingly common for people to subscribe to more than one MNO at the same time, or to more than one package with their network. For many countries, an additional data source has been the 1999 OECD report titled "Cellular Mobile Pricing Structures and Trends".

The number of subscribers and the coverage area are both cost drivers, as discussed in section 2 of the main report. For each country the annex details the number of subscribers and the landmass (which will be strongly correlated with the coverage area of the largest network in terms of coverage).

The industry overview includes details of all the licensed MNOs in each member country, including the year when their licenses were awarded, indicating how long the operator has had to roll out its network and build-up a subscriber base. Market shares, based on number of subscriptions, are presented for 1997–2000 and, where available, the first quarter of 2001. Differences in the types of licence will have implications for the costs of the competing networks. Details are provided on which operators have 3G licences and how they were acquired, and any spectrum licenses that are about to issued. A brief summary of the ownership structure for each operator is also given. The cross-country links may affect the way that competition in the roaming market evolves.

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<sup>1</sup> There is also an overview of the Norwegian mobile market.



Finally, the industry overview provides details on the competition in the retail market from firms that do not own their own spectrum. This includes details, where publicly available, on some of the arrangements independent service providers and MVNOs have with MNOs. Legislation governing rights to access, including indirect access for ISPs and MVNOs, is not harmonised across the EU.

## 1.2 Regulatory Actions and Initiatives

The EC provides the framework for regulatory action and initiatives in Member States. Until 1999 the main body of mobile sector specific legislation could be found under the Mobile Directive (96/2/EC) and the Interconnection Directive (97/13/EC), the R&TTE Directive (99/5/EC), the Licensing Directive (97/13/EC) and the UMTS Decision (128/1999/EC). In addition to these the 1999 Communications Review resulted in six proposed legal measures. The Lisbon European Council of March 2000 called on Member States to make the utmost effort to adopt these measures as soon as possible in the course of 2001. See the Section 7 of the main report for more information on the new EC guidelines and a discussion of their impact on NRAs.

Notification refers to the designation of an MNO with Significant Market Power (SMP) in the mobile market and/or for interconnection. SMP is defined as a greater than 25 per cent share of the revenues in a specified market. For many member states this is the main mechanism through which the NRA regulates the wholesale market, though there are often other general obligations designed to promote competition that apply to all MNOs. In some member states NRAs have notified MNOs with designations other than SMP. In the UK and Spain, for example, NRAs used the concept of Market Influence.

Where there is direct regulation of MNO's charges this has been expressed in the country's own currency and Euros, converted using the exchange rate of September 2001.

The attempt to distinguish between regulation affecting the wholesale market and regulation affecting the retail market is one that we make. It may not accord with the definitions of retail and wholesale market regulation that the respective NRAs make. Measures that regulate the direct interactions between MNOs and other firms, including other MNOs, are treated as regulation of the wholesale market.



## 2 BELGIUM

The landmass of Belgium is 30.520 km<sup>2</sup>.

### 2.1 Industry Overview

**Table 2.1: Market Penetration**

	1997	1998	1999	2000	2001(Q1)
Mobile Subscribers	974,494	1,748,000	2,186,500		
Penetration rate	9.6%	17.2%	21.5%		

Source: OECD

There are three mobile network operators in Belgium, all three have UMTS licenses.

GSM 900- Proximus, Mobistar (1995)

DCS 1800- Proximus, KPN Orange (1999); Mobistar (2000)

3G- Four offered by auction Mar. 2001, only three awarded.

Proximus, Mobistar, KPN Orange

Proximus (Belgacom Mobile) is the incumbent fixed operator's mobile subsidiary. It is a private limited liability jointly owned by Belgacom (75%) and Vodafone (25%).

Mobistar has been listed since 1998, with 21 per cent of shares floating in 2001. The majority shareholder (50.5 per cent) is part of France Telecom/Orange.

KPN Mobile (85 per cent KPN, 15 per cent NTT DoCoMo) has bought out its previous partner Orange in December 2000 and is now the sole shareholder, with a licence from Orange SA to use the Orange brand until 1 October 2002.

### 2.2 Regulatory Actions and Initiatives

#### Regulation of the wholesale market

Proximus was notified of SMP in the market for interconnection in December 2000. Interconnection charges must be cost-oriented. The company has been asked to develop a comprehensive (confidential) cost model.

Until Proximus develops a cost model, a price-cap of RPI- 15% (from Feb. 15, 2001) will apply to its call termination charges.

Roaming between 2G operators is subject to commercial negotiation. In Oct. 2000 the Council of State refused to allow obligations on roaming and site sharing to be imposed by a Royal Decree. Obligations on site-sharing and national roaming have been imposed through the 3G licenses.



IBPT/BIPT can impose an agreement on a 2G operator who has obtained a 3G license and a 3G new entrant. The entrant's right to roaming will be for eight years only.

Building permits for network infrastructure can be refused for environmental and health reasons. Antennas are subject to municipal taxes.

#### Regulation of the retail market

Carrier pre-selection for calls to mobiles was introduced in late 2000.

Number portability also became available in 2000.



### 3 GERMANY

#### 3.1 Industry Overview

The mobile penetration rate in Germany was 59% at the end of 2000, representing a subscriber base of 48.1 million. The landmass of Germany is 357,000 km<sup>2</sup>

**Table 3.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	8,276,000	13,913,000	23,470,000	48,145,000	
Penetration rate	10.1%	17.0%	28.6%	58.7%	

Source: RegTP, Report 2000

There are four 2G operators in Germany. These four operators all have 3G licences.

GSM 900 - D2 Vodafone, T- Mobil (1990)

DCS 1800 - E-Plus Mobilfunk (1993), Viag (1997), T-Mobil, D2 Vodafone (1999)

Analogue - T- Mobil (phasing out due to be completed by the end of 2001.)

3G- Six licenses awarded by auction Aug. 2000.

Mannesmann, Group 3G, E-Plus Hutchinson, VIAG Interkom, MobilCom Multimedea, T-Mobil

T- Mobil is the incumbent fixed operator's mobile subsidiary (it is wholly owned by Deutsche Telecom.) In Jan 2000 T- Mobil was transferred to T-Mobile International, a holding company which contains other mobile operations, including One2One in the UK.

D2 Vodafone was formerly known as Mannesmann Mobilfunk. Following the acquisition of Mannesmann by Vodafone in April 2000, the Vodafone Group now owns 99.2% (see UK).

E- Plus Mobilfunk is majority owned by KPN (see The Netherlands).

Viag Interkom has been 100% owned by the BT group since December 2000 (see UK).



**Table 3.2: Market Shares Based on Number of Subscriptions**

	<b>D2 Vodafone</b>	<b>De Te</b>	<b>E-Plus</b>	<b>Viag Interkom</b>
2001 (Q1)				
2000	40.0%	39.7%	13.7%	6.6%
1999	40.9%	38.8%	16.4%	3.9%
1998				
1997				

Source: Reg TP

There are currently no MVNOs in Germany. A consultation concerning MVNOs should start soon. There are several independent service providers, the most prominent one being debitel.

### **3.2 Regulatory Action and Initiatives**

#### Regulation of the wholesale market

References, unless otherwise stated, are to the Telecoms Act (“TKG”) of July 1996.

Operators must offer interconnection and access agreement subject to commercial negotiation. (Articles 37 and 35) Rules obliging MNOs to provide interconnection and access for service providers, including MVNOs, were published in 1999 (Telecommunications Customer Protection Ordinance.)

Under Section 4(1) of the Telecommunications Customer Protection Ordinance operators of public telecommunications networks must supply their offerings in such a way as to allow providers of public telecommunications services to market, in their own name and on their own account, and provide customers with these offerings.

Operators are obliged to offer “efficient service provision” subject to certain requirements on charges such that there are no surcharges and operators respect the principle of non-discrimination. (Article 24.). The NRA publishes the terms of interconnection annually (Article 26.)

Under the Telecoms Act, the rates of operators with a dominant position in the relevant market (according to Article 19 of the Law against Restrictions of Competition) are subject to approval by the NRA. However the RegTP has not notified any operator as having SMP in the mobile or interconnection markets. There is no direct regulation of cost orientation of charges.

There is no condition in the terms of the UMTS/ IMT-2000 licenses under which the new entrant 3G licensees are entitled to national roaming agreements over 2G networks. The UMTS/ IMT-2000 licensing regime does permit national roaming agreements between the UMTS/ IMT-2000 operators on the reciprocal use of their networks under the Telecommunications Act, provided they do not breach the licensing provisions. In June 2001, RegTP endorsed the principle of co-operation between 3G MNOs who are committed in their terms of license to provide 50% coverage by 2005. Only 8% coverage will have to be on the MNOs own network so long as this is supplemented by roaming agreements.

Germany



### Regulation of the retail market

Service providers do not need a license but need to notify the RegTP within a month of beginning operations.

Reg TP deferred the obligation for MNOs to provide non-geographic number portability until January 2002.



## 4 DENMARK

### 4.1 Industry Overview

The mobile penetration rate reached over 60% in the year 2000, with over 3,36 million subscribers. Denmark has a landmass of 42,394 km<sup>2</sup>.

**Table 4.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	1,444,011	1,931,101	2,628,585	3,363,552	3,659,893
Penetration rate	27.3%	36.3%	49.3%	62.9%	68.3%

Source: *Telestyrelsen*

There are four 2G operators in Denmark.

- GSM 900 - TDC, Sonofon (1991); Orange (formerly: Mobilix A/S), Telia A/S (Jan. 2001)
- DCS 1800 - Orange (formerly: Mobilix A/S) (1997), Telia (1997); TDC A/S (1997), Sonofon (1997)
- NMT 450 - TDC (1982)
- TETRA - Motorola A/S, T- Cell A/S (Jun. 2001)
- 3G - Awarded in September 2001 to H3G, TDC Mobile, Telia Mobile and Orange.

TDC (formerly Tele Danmark) is the incumbent fixed operator's mobile subsidiary. TDC Mobile International has operations in Denmark, Germany, Poland, Lithuania, Austria, the Netherlands and the Ukraine.

Sonofon is jointly owned by Telenor (see Norway) and BellSouth International, a unit of the American Atlanta-based BellSouth Corp.

Mobilix is part of the Orange Group (see France).

Telia's Danish operations are owned by a holding company, which is a fully owned subsidiary of the Swedish parent company, Telia. (See Sweden)

**Table 4.2: Market Shares Based on Number of Subscriptions**

Market share	TDC	Sonofon	Telia	Orange (Mobilix)	debitel	Ovrige/others
2001 (Q1)	42.0%	24.0%	8.0%	15.0%	7.0%	4.0%
2000	44.4%	26.9%	8.1%	12.2%	6.6%	1.8%
1999	46.8%	29.5%	6.5%	12.1%	5.1%	N/A
1998	48.5%	36%	5.8%	4.0%	5.6%	N/A
1997	60.3%	38.1%	N/A	N/A	1.5%	N/A

Source: *TeleYearbook 2000, Telestyrelsen*

There are about ten service providers in the Danish mobile market.

An agreement with Sonofon in August 2000 made Tele2 the first mobile virtual network operator (MVNO). The agreement enables Tele2 to offer mobile telephony services to existing fixed telephony customers. Sonofon anticipates additional MVNO agreements.

debitel started offering services in 1997, it is owned by debitel AG, Germany and Flaggard. It is an airtime reseller using the Sonofon and TDC networks and has its own tariff packages, branding, customer service and billing. The MNOs supply SIM cards and subscriber's numbers to debitel, and each month debitel will pay for calls made by its customers.

Other service providers include GTS, Link Telecom, Tele 1 Europe/Song Networks, Telefona, Telmore, and Telepassport

## 4.2 Regulatory Actions and Initiatives

Telestyrelsen published an Internet version of Tele Yearbook 2000 in April 2000. It also publish an annual Status Report on developments in the telecommunications market. The most recent report was published in October 2000.

### Regulation of the wholesale market

All MNOs with SMP in the mobile market are obliged to offer interconnection agreements on objective, transparent and non-discriminatory terms (Act No. 418 (2000), Part 14, Article 42/52.). The definition of interconnection employed includes lease of infrastructure, access for service providers and sharing of facilities. (Act No. 418 (2000), Part 11).

All MNOs must meet reasonable demands for national roaming, including requests for roaming agreements by MVNOs, subject to technical and financial feasibility. The agreement is subject to commercial negotiation but must be objective, transparent and non-discriminatory. (Act No 418 (2000), Article 43/52)

TDC and Sonofon are designated with SMP in the mobile market. There is no obligation to provide interconnection at cost-based prices. However, operators with SMP are obliged to practice accounting separation (Act No. 418 (2000), Part 19, Article 82.).



All 3G mobile operators are entitled to conclude roaming agreements between one other and with 2G licensees where technically possible.

3G licensees are obliged to provide 30% coverage by 2004, 80% coverage by 2008. They must also provide financial, statistical and other information at the discretion of the NRA.

#### Regulation in the retail market

Since 1998, the NRA contributes to price transparency by publishing a quarterly pamphlet "Hello, hello – Do you know how much it costs?" This includes usage profiles of mobile telephony and price lists of individual companies. A recent publication included a special section on prices of pre-paid phone cards for mobiles.

In 2000, the NRA developed an interactive price guide, enabling consumers to obtain information on the Agency's homepage about prices for individual companies.

The NRA has indicated that they will also require a higher-tariffs warning when originating a call to a mobile.

Number portability was introduced 1 July 2001. End-users have had the opportunity to carry with them subscriber numbers when changing MNOs.



## 5 GREECE

### 5.1 Industry Overview

The mobile penetration rate in Greece was 52% at the end of 2000. Greece has a landmass of 132.000 km<sup>2</sup>.

**Table 5.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile Subscribers	938,038	2,056,084	3,894,312	5,932,403	6,386,471
Penetration rate	8.9%	19.6%	37.1%	56.5%	60.8%

Source: EETT

Until July 2001 there were three GSM operators in Greece. All three have 3G licences.

GSM 900 - Panafon, Stet Hellas (1992); Panafon (2001)

DCS1800 - Cosmote (1995); Panafon, Stet Hellas, Info-Quest (2001)

3G - Three licenses awarded by auction July 2001.

Cosmote, Panafon and Stet Hellas

Cosmote was the incumbent fixed operator's mobile subsidiary. It had its Initial Public Offering in October 2000. Principle shareholders are OTE (the Hellenic Telecommunications Organisation), Telenor B-Invest AS, and WR Com Enterprises Ltd.

Panafon merged with Unifon in May 2001. Vodafone is the majority shareholder (see UK). France Telecom has an 11% holding (see France); Intracom Group owns 8.7%.

STET Hellas' major shareholders are STET Mobile Holding NV and Verizon. STET Mobile Holding NV is a Netherlands-based entity of the Telecom Italia group (see Italy).

**Table 5.2: Market Shares Based on Number of Subscriptions**

Market share	PANAFON	Stet Hellas	COSMOTE
2001 (Q1)	36.6%	27.6%	35.8%
2000	37.5%	27.7%	34.8%
1999	42.7%	30.4%	26.9%
1998	52.0%	33.5%	14.5%
1997	58.3%	41.7%	N/A

Source: EETT



## **5.2 Regulatory Action and Initiatives**

In 2000 the National Telecoms and Post Commission (EETT) undertook a number of regulatory reforms in the telecoms sector in order to comply with EC directives.

### Regulation of the wholesale market

All MNOs must provide interconnection according to the stipulations of Presidential Decree 165/1999, Directive 97/33/EC as well as their individual licences. They must provide national roaming according to the stipulations of the Decision of EETT 218/36/30.5.2001.

No operator is currently designated with SMP in the mobile market.

Only collocation is required under Directive 97/22/EC. For the other issues, agreements are permitted but not required. EETT reserves the right to intervene if commercial agreement cannot be reached. To date, no disputes have been brought to EETT regarding the provision of facility sharing by the incumbent to the EETT.

### Regulation of the retail market

Number portability and carrier pre-selection is under consideration.



## 6 SPAIN

### 6.1 Industry Overview

In 2000 there were 22.7 million mobile subscribers in Spain, a penetration rate of 62%. Spain has a landmass of 504,800 km<sup>2</sup>.

**Table 6.1: Market Penetration**

	1997	1998	1999	2000	2001(Q1)
Mobile Subscribers	4,337,000	7,051,000	15,005,000	22,670,000	-
Penetration rate	10.8%	16.3%	38%	62%	-

Source: CMT

There are three 2G operators in Spain. All three have 3G licences.

GSM 900 - Airtel (1994); TSM (1995)

DCS 1800 - TSM, Airtel, Retevision (1998)

Analogue - TSM (1991) The analogue technology will be phased out, and the frequencies freed up for GSM by 2007.

3G - TSM, Airtel, Retevision, Xfera

Telefónica Móviles España (TSM) is the incumbent fixed operator in Spain. It operates in 48 countries, with a focus on the Spanish-speaking world.

Airtel Vodafone is 91.6% owned by Vodafone (see UK).

Retevisión Móviles (Amena) is owned by STET of the Telecom Italia Group (see Italy) and two large Spanish electricity companies, Unión Fenosa and Endesa.

**Table 6.2: Market Shares Based on Number of Subscriptions**

Market share	Airtel	Telefonica	Retevision
2001 (Q1)			
2000	28%	56%	16%
1999	33%	60%	7%
1998	24%	76%	N/A
1997			N/A

Source: CMT

The Spanish NRA has granted eight provisional authorisations to companies for the resale of mobile telephony services. The companies include Affinalia, Alo Comunicacion, Aviron,



Globatel, Primus, Timón, VallehermosoTelecom and BT. Some of these companies have their own fixed networks and want to widen their telecoms offer.

## **6.2 Regulatory Actions and Initiatives**

The Comisión del Mercado de las Telecomunicaciones (CMT) regularly issues consultation reports on the introduction of competition in the telecommunications sector. The most recent study, published in October 2000, sets out possible ways of increasing competition in the mobile market.

### Regulation of the wholesale market

Telefónica and Airtel have been designated with market dominance. Consequently, they must apply non-discrimination and transparency to the setting of interconnection charges and access charges should also be transparent and cost-oriented.

Only Telefónica has been designated with SMP for interconnection.

Airtel and Telefonica are required to practice unbundling of interconnection and mobile services, and undertake cost- accounting of their services.

Reductions in fixed-to-mobile termination charges were announced in December 2000.

MNOs are obliged to offer national roaming services to new 3G operators.

### Regulation of the retail market

The announcement of reduced termination charges resulted in reduction in fixed-to-mobile call prices by the fixed operator in Jan. 2001.

The CMT has granted provisional authorisations that will allow the companies to begin operations as MVNOs. The regulatory terms for MVNOs have not yet been specified, so the holders of these provisional authorisations will be allowed to resell them in two years. If regulations for these services haven't come into effect by then, the contracts could be extended one more year.



## 7 FINLAND

### 7.1 Industry Overview

Mobile penetration in Finland has exceeded fixed penetration since 1998. The penetration rate is now over 75% with almost four million subscribers. Finland has a landmass of 338,000 km<sup>2</sup>.

**Table 7.1: Market Penetration**

	1997	1998	1999	2000	2001(Q1)
Mobile Subscribers	2,091,791	2,845,985	3,273,433	3,728,625	3,909,000
Penetration rate	40.6%	55.2%	63.4%	72.0%	75.6%

Source: Ministry of Transport and Communications, *Telecommunications Statistics, 2001*;  
[http://www.mintc.fi/www.sivut/suomi/tele/tilastot/Mobile\\_Communications.htm](http://www.mintc.fi/www.sivut/suomi/tele/tilastot/Mobile_Communications.htm) for 2001 Q1 numbers.

There are four 2G operators in Finland. All four operators also have 3G licenses.

- GSM 900 - Sonera (1990); Radiolinja (1996); Suomen 2G (2000); Ålands Mobiletelefon
- DCS 1800 - Sonera, Radiolinja, Telia (1995)
- Local GSM 1800 - Finnet companies (1996) (After receiving a GSM 900 license in 2000, Suomen 2G intends to integrate most of the local GSM 1800 networks into one dual band service.)
- NMT 450 - Sonera (operated since 1982 with no license required, but will be terminated at the end of 2002 — the consumer and corporate customers of the NMT 450 network are entitled to one Sonera GSM subscription for each valid NMT subscription they have with on connection charge.)
- 3G - Four licenses awarded by beauty contest March 1999.  
 Sonera, Radiolinja, Telia and Suomen 3G

There are two incumbent mobile operators in Finland, both of which have operated GSM networks since 1991. At the end of 1999, they still had about 98% of the market share.

Sonera is the incumbent fixed operator's mobile subsidiary.

Radiolinja is part of the Elisa Communications Group (Finland and the Baltic area.) Elisa is comprised of 17 companies. (Until Elisa split from the Finnet Group last year, Radiolinja was part of the Finnet Group.)

Telia is owned by Telia AB, a Scandinavian internet and communications company listed on the Swedish stock exchange (see Sweden). Telia's operations in Finland were formerly run by Telivo, the telecommunications arm of IVO, the state-owned power company. Telia has a roaming agreement with Radiolinja and has recently also reached an agreement with Sonera. It offers



countrywide GSM services even though it only has GSM 1800 networks of its own covering the largest three cities. Companies include Telia Infomedia and TeliaProduct.

Suomen 2G is a consortium of Finnet companies. Finnet Focus Ltd was founded in 1998 and is totally owned by the Finnet Association. This is a lobbying organisation for 49 private companies involved in telecommunications in Finland. Suomen 3G is a consortium of Finnet companies and the Swedish company Tele2 (See Sweden). Both Suomen 2G and Suomen 3G have announced that they will operate as network operators only and will invite service providers to use their network.

**Table 7.2: Market Shares Based on Number of Subscriptions**

Market shares	Radiolinja	Sonera	Telia	Finnet/ Suomen 2G	Elisa
2001 (Q1)	31.4%	62.0%	4.4%	1.5%	0.7%
2000	31.6%	62.1%	4.1%	0.8%	0.5%
1999	34.6%	63.1%	1.1%		1.0%
1998	35%	63.9%	0.3%		0.6%
1997	32%	67.8%			

Source: Ministry of Transport and Communications, *Telecommunications Statistics, 2001*, [http://www.mintc.fi/www.sivut/suomi/tele/tilastot/Mobile Communications.htm](http://www.mintc.fi/www.sivut/suomi/tele/tilastot/Mobile%20Communications.htm) for 2001 Q1 numbers. Figures for 1997–2000 are from tables 6.3a and 6.3b of the Ministry's *Telecommunications Statistics 2001*. Radiolinja's figures for 2001 include Ålands Mobiletelefon subscribers; Sonera's figures for 2001 include Jippi Group and RSL subscribers. Elisa's GSM 1800 subscribers were previously included in Finnet Group's figures.

There are a number of independent service providers in the Finnish market.

DNA Finland is an independent service provider owned by the Finnet consortium.

RSL COM already has a service provider's arrangement with Sonera and Jippi Group (formerly Saunhalanti) has a service contract with Sonera to provide Internet services.

## 7.2 Regulatory Action and Initiatives

All references are to the Telecommunications Market Act (1997/ 396) unless otherwise indicated.

### Regulation in the wholesale market

Both Sonera and Radiolinja are designated with SMP for mobile telecommunications. As a consequence the NRA may impose obligations such as non-discrimination and cost-orientation with regard to charges for inter-connection (Decision No 1393/1997, Section 16).

MNOs with SMP are obliged to publish a Reference Interconnection Offer (RIO) (Decision No. 1393/1997, Article 19 and 24.)

SMP mobile operators are obliged to offer operators an interconnection tariff for call termination on mobile networks, although the duty does not apply to communication from a local telecommunications network to a mobile communications network or its service (Decision No



1393/1997, Section 15a). The Finnish Communications Regulatory Authority (FICORA) investigated Sonera's interconnection charges and decided in April 2001 that they were not reasonable (FICORA's decision no 421/04/98). It has obliged Sonera to lower its interconnection charges to a cost-oriented level, showing evidence for how it has computed those costs. The FICORA is also investigating the interconnection charges of Radiolinja.

FICORA uses FDC top-down models based both on historic costs and current costs when evaluating the cost orientation of charges.

Since January 1998, operators have been obliged to have accounting separation in place for network interconnection and services. All operators must account separately for network operation and service operation, unless these services are relatively small (Decision No. 472/1997, Section 6.)

All MNOs are obliged to offer interconnection subject to commercial agreement. (Decision No. 472/1997, Section 10) Operators must also lease capacity and facilities to other operators subject to availability (Decision No. 472/1997, Section 8)

Initially, FICORA did not consider that MNOs were obliged to provide national roaming. It made this decision in respect to a case brought before it by Telia in March 1998 following the failure of Telia and the two incumbent NMOs to reach commercial agreement on national roaming.

In April 2001, though, an amendment was made to the Telecommunications Act giving 3G network operators the right to roam on GSM networks outside their own coverage area. This is a transitional arrangement for a maximum of eight years.

#### Regulation in the retail market

The possibility for carrier pre-selection for calls from fixed local networks (including for calls to mobile networks) has existed since 1 September 2001. Call-by-call selection is available for international mobile calls.

Number portability for mobile telecommunications is not in place. FICORA is starting to investigate how to introduce it.

A provision banning handset subsidies came into force in 1996. In August 2000, TAC began an investigation into reports that Radiolinja were contravening this rule and considered whether action needed to be taken by the regulator.



## 8 FRANCE

### 8.1 Industry Overview

In March 2001 there were 31.3 million subscribers in France, a penetration rate of 52%. France has a landmass of 549,100 km<sup>2</sup>.

**Table 8.1: Market Penetration**

	1997	1998	1999	2000	2001(Q1)
Mobile Subscribers		11,210,100	20,619,100	29,681,300	31,314,300
Penetration rate		19%	34%	49%	52%

Source: ART

There are three 2G operators in France. Only two have acquired 3G licences.

GSM 900 - Orange, SFR (1991); Bouygues (1998)

GSM 1800 - Bouygues Telecom (1994); Orange, SFR (1998))

3G - ART received only two applications for 3G licenses by the January 2001 deadline. It had intended to license four 3G operators, so plans to hold another application procedure also following a beauty contest model during the first half of 2002. Two licenses awarded by beauty contest in May 2001.

#### SFR and Orange

Orange (Iternis), formerly France Telecom Mobile, is the incumbent fixed network operator's mobile subsidiary. France Telecom acquired Orange in Aug. 2000. The enlarged group is now known as Orange SA and has a 100% holding in Orange plc.

Bouygues Telecom is majority owned by Bouygues, a construction company that also controls TV company TF1. Telecom Italia owns most of the remainder (see Italy).

SFR is 80% owned by Cegetel and 20% Vodafone (see UK). Cegetel is the second fixed-line operator in France.



**Table 8.2: Market Shares Based on Number of Subscriptions**

Market shares	Orange	SFR	Bouygues Telecom
<b>2001 (Q1)</b>	48.2%	33.9%	17.9%
<b>2000</b>	48.2%	34.2%	17.6%
<b>1999</b>	48.7%	35.6%	15.7%
<b>1998</b>			
<b>1997</b>			

Source: ART

## 8.2 Regulatory Actions and Initiatives

The Autorite de regulation des telecommunications (ART) publishes quarterly updates on the mobile sector. It also conducts an annual study of the quality of service and coverage offered by mobile telephony networks in Metropolitan France. The latest was conducted in Nov./Dec. 2000.

### Regulation of the wholesale market

Orange and SFR have been designated with significant power for interconnection as well as in the mobile market. They are required to apply cost orientation for interconnection charges. In June 2001, ART published a set of guidelines. The ART plans to put in place a system for regularly examining the accounts of the SMP operators and to ensure that interconnection charges do reflect cost.

MNOs that agree to provide national coverage are exempt from part of the universal service contribution. The MNOs must allow roaming between their terrestrial network and at least one of their satellite systems and agree to the conditions governing infrastructure sharing in scarcely populated areas.

In June 1999 ART asked mobile operators to lower their retail prices for fixed-to-mobile calls and recommended a cut of 20% by October 1999. They were also asked to cut the call termination charge for fixed operators by a proportionate amount and to increase the charge for terminating international calls, since the relatively low price for this service had encouraged international re-routing of domestic fixed-to-mobile traffic in France.

In September 2000 ART ruled on a dispute between Bouygues Telecom and Orange regarding interconnection conditions for international calls. The international termination charge was FRF0.69, still significantly lower than the national one. ART decided to increase the call termination charge for international calls, setting it at FRF 1.05 (approx. 0.16 EUR) for 2000 and FRF 1.26 (approx. 0.19 EUR) for 2001. (Exchange rate Sep. 2001 1 FRF= 0.152449 EUR)

In Oct. 2000 Orange was ordered by ART to lower its call termination price by 20%. It can now charge FRF 1.26 (approx. 0.19 EUR) for the first minute, and then bill by the second at 1.26 FRF (approx. 0.19 EUR) in peak times and 0.63 FRF (approx. 0.10 EUR) off peak.



### Regulation of the retail market

In the market for fixed to mobile calls ART introduced pre-selection in Nov. 2000. Subscribers can now choose an alternative operator to France Telecom for fixed to mobile calls by either dialling a selection prefix on a call-by-call basis, or by subscribing to a pre-selection contract. MNOs no longer set retail prices for fixed-to-mobile calls. These prices are set by the operator who originates the call as is the case in the French fixed market and mobile markets elsewhere.

Full number portability was implemented in the mobile sector in Jan. 2001. Prior to that ART launched a public consultation to determine the conditions required to generalise portability, including methodology and technical solutions.



## 9 IRELAND

### 9.1 Industry Overview

The Irish mobile penetration rate rose to 73% in March 2001. There are now 2.7 million subscribers. Ireland has a landmass of 70,300 km<sup>2</sup>.

**Table 9.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	510,747	946,000	970,000		2,700,000
Penetration rate	9.5%	14.4%	26.6%		73%

Source: ODTR and OECD

There are three 2G operators in Ireland.

GSM 900 - Eircell (1993); ESAT Digifone (1996), Meteor (2000)

DCS 1800 - Eircell, ESAT Digifone, Meteor (2000)

Analogue network - Eircell.(1983) Spectrum in the 900 MHz band currently used for analogue cellular services will be made available to the new 3G entrant.

Tetra - Competition launched a competition for the award of one national TETRA Public Access Mobile Radio (PAMR) utilising 2 x 2 MHz of spectrum in the 410-430MHz band. The term of the licence will be fifteen years. Announcement of the winner was expected January 2001

3G - Plans to issue 4 licences by beauty contest procedure by end 2001, including one license reserved for a new entrant.

Eircell was the incumbent fixed network operator's mobile subsidiary. It was a wholly owned subsidiary of Eircom until acquired in May 2001 by Vodafone Group Plc (see UK).

ESAT Digifone was launched in 1997. Following the acquisition of ESAT by BT in January 2001, BT now owns 50.5% of Digifone (see UK). The remaining 49.5% is held by Telenor (see Norway).

Meteor is owned by Western Wireless International and RF Communications. It launched mobile services in February 2001.

**Table 9.2: Market Shares Based on Number of Subscriptions**

	<b>Eircell</b>	<b>ESAT</b>	<b>Meteor</b>
2001 (Q1)			
2000	62%	38%	
1999	64%	36%	N/A
1998			N/A
1997			N/A

Source: ODTR

Meridian Communications operated as an airtime reseller in the Irish market under the Cellular 3 Imagine mobile phone brand but ceased operation in April 2001. Eircell terminated its volume discount agreement with Meridian/Cellular 3, forcing the closure, following a high court judgement that found Eircell not to be the dominant operator in the Irish market.

Until April 2001 another ISP, Spirit Mobile, also offered services through a deal with Meridian.

## 9.2 Regulatory Actions and Initiatives

In May 2000 the Office of the Director of Telecommunications Regulation (ODTR) launched a consultation process on the regulatory framework for access in the mobile market. Responses were received and a Report on the Consultation issued in July 2000.

### Regulation of the wholesale market

Eircell and Esat Digifone are designated with SMP in the mobile market. They are obliged to meet all reasonable requests for access to the network and non-discrimination with regard to interconnection. (Section 4 (6) of the Interconnection Regulation) A refusal may be defended only in the circumstances that the request for access is “unreasonable having regard to the resources available to the organisation to meet that request.”

Both Eircell and ESAT Digifone have also been designated as having SMP for interconnection, although this decision was only made with respect to ESAT in July 2000. (Decision 00/57) The additional requirement that result from this is that charges for interconnection follow the principles of transparency and cost orientation.

According to the ODTR, the resale of airtime may not involve interconnection. Airtime resellers are free to negotiate commercial terms for access to mobile networks but may not be entitled to rely on the legal provisions in relation to interconnection. Any disputes regarding the terms of a request for access by an airtime reseller can be referred to the ODTR.

There is no charge regulation on termination charges for mobile-to-mobile calls and on termination charges for fixed-to-mobile calls. In the July 2000 consultation report the Director indicated that the ODTR was examining mobile interconnection rates with reference to rates throughout Europe, as well as approaches available to quantify the costs of operators. The



Director remarked that mobile termination rates were at the lower end of the EU range. No further work in this area has been publicly announced.

MVNOs may negotiate with MNOs for use of the air interface and roaming access required for the provision of service. The ODTR can intervene when commercial negotiations fail to result in an agreement. The ODTR issues short codes for call-by-call access for use in routing calls to MVNOs and Indirect Access providers.

MNOs have a right to negotiate site-sharing agreements and the ODTR is empowered to intervene if disputes arise. Road authorities may require site sharing in bottleneck areas.

A precondition for entry into the license competition for UMTS/ IMT- 2000 was a requirement from the bidders licensed to provide GSM services and networks in Ireland to accept an obligation to provide roaming facilities on the GSM network to all 3G licensees. These agreements will be determined on the basis of commercial negotiations.

3G licensees must meet a minimum rollout requirement. Roaming will apply for five years from the date when an operator has 20% of its network constructed.

#### Regulation of the retail market

Further consultation on carrier pre-selection may be undertaken. This will involve the automatic identification of the indirect access subscriber by the mobile network operator and the subsequent routing of calls via the indirect access network. No action has yet been publicly announced.

In January 2001 the Director decided to implement Full Mobile Number Portability. A consultation paper outlining proposals for handling of mobile number portability was issued in May 2001. The proposed new process would allow a customer to take their number to a new mobile operator simply by making a phone call to that operator, with no need to physically visit any particular outlet. It is expected that mobile number portability will be mandated during 2002.



## 10 ITALY

### 10.1 Industry Overview

The mobile market in Italy has approximately 34 million subscribers and a penetration rate of over 55%. Italy has a land mass of 301,300 km<sup>2</sup>.

**Table 10.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile Subscribers	11,733,904	20,480,000	24,500,000		
Penetration rate	20.5%	35.8%	42.8%		

Source: OECD

There are four 2G GSM operators in Italy. Three of them have 3G licences.

GSM 900 TIM, OPI (licensed 1994, operating since 1995); Wind licensed 1999)

DCS 1800 license Wind (1998); TIM, OPI (1999); Blu Spa (1999)

Analogue (TACS 900 standard) TIM (1990.)

The analogue system is to be phased out by 2005. According to the National Frequency Plan, further GSM 1800 frequencies are to be allocated by Jan. 2002.

3G Five licenses awarded by a combination of auction and beauty contest in Nov. 2000. (The competition authority has initiated an investigation into whether competition for bidding was restricted by collusion among the participants.)

TIM, OPI, Andala, Ipe 2000 and Wind

Telecom Italia Mobile (TIM) is the incumbent fixed network operator's mobile subsidiary. It is 52.46% owned by Telecom Italia.

Omnitel Pronto Italia (OPI) is majority owned by Vodafone (see UK).

Wind was a joint venture between France Telecom, Deutsche Telekom and the Italian electricity company ENEL, created in late 1997. Enel now owns 73.4% and the Orange group owns the remaining 26.6%.

Blu is currently owned by BT (see UK), Autostrade SpA and Edizoni Holding.



**Table 10.2: Market Shares Based on Number of Subscriptions**

Market share	TIM	OPI	Wind	Blu
2001 (Q1)				
2000	48.7%	38.7%	11.1%	1.5%
1999				
1998				
1997				

Source: OECD Report 2000

## 10.2 Regulatory Actions and Initiatives

### Regulation in the wholesale market

The legal framework for licensing has been reviewed. MNOs are required to purchase individual licenses, which have the duration of 15 years and are renewable. The original pre-liberalisation concessions granted to TIM and Omnitel were changed into licenses in March 2001.

TIM and OPI are designated as operators with SMP for interconnection and in the mobile market (Determination no 197/99).

The interconnection charges of these MNOs should be transparent, non-discriminatory and cost-orientated (Interconnection Determination 1/CIR/98).

The operators with significant market power have an obligation to meet reasonable requests for site-sharing. Following the issuance of the third and the fourth mobile licences, TIM and Omnitel are required to provide site-sharing agreements at cost-oriented prices to Wind and Blu under the supervision of AGCOM.

The existing operators which have won a 3G license have to offer to the new entrants national roaming on their 2G network on fair, non-discriminatory and transparent conditions, for given periods of time (30 and 60 months). On top of these, roaming tariffs offered by those operators who are also designated as having SMP, have to be cost oriented. In valuing the economical conditions offered by the SMP operators, the Authority could use a comparison with the most favourable (the cheapest) retail prices, such the tariffs of on-net calls. Through such a comparison, the Authority verifies that the roaming prices charged by SMP operators are not higher than the retail tariffs stripped off of the retail and administrative costs not attributable to the roaming services.

The new entrant has the right to request roaming agreements as long as he has covered national territory corresponding to 10 per cent of the national population.

Call termination rates are capped for the operators with SMP status, although at present the price cap does not bite. (Determination n. 10/99). In Dec. 1999, the AGCOM set up a charge cap for TIM and OPI's fixed-to-mobile interconnection charges. The cap was based on European best



practice, adjusted to take into account Italian specific factors. The MNOs are free to set different prices in peak and off-peak times subject to the caveat that the weighted average price not exceed the cap of 360 ITL /min (approx. 0.19 EUR). Weighted averages are calculated on the traffic of the previous year. (Decision 338/99)

There is also a price cap applied to the retention share of the fixed network on a fixed-to-mobile call.

The AGCOM has specified LRIC as the basis for cost orientation and WACC to determine the rate of return of capital. In 2000 the AGCOM created a working group and required TIM and OPI to prepare a regulatory accounting system based on FAC for the year 1999, as an intermediate step for adoption of LRIC in call termination charges in future years. AGCOM can determine interconnection charges either by accepting the operator's proposals based on the FDC model or impose the EU best practice charge.

The SMP obligations prevent SMP operators from discriminating between termination charges between calls originated within the country and calls originated from other countries, as used to be the case in Italy.

Municipalities reserve control of digging rights. This situation may result in complications for infrastructure deployment of new entrants. OECD report 2000 mentioned that AGCOM will introduce new rights of way legislation.

#### Regulation in the retail market

Number portability has been implemented in June 2001.



## 11 LUXEMBOURG

The landmass of Luxembourg is 2.586 km<sup>2</sup>.

### 11.1 Industry Overview

**Table 11.1: Market Penetration**

	1997	1998	1999	2000	2001(Q1)
Mobile Subscribers	67,208	94,000	164,000		
Penetration rate	16.1%	22.5%	39.3%		

Source: OECD

There are two operators offering mobile services in Luxembourg.

GSM 900 - LUXGSM (1993), Tango (1998)

DCS 1800 - LUXGSM, Tango (1998)

3G - Expected to be allocated by beauty contest in 2001.

LUXGSM is the incumbent fixed operator's mobile subsidiary. It is controlled by the state's post and telecommunications business P&T Luxembourg.

Tango is part of Tele2 AB (See Sweden).

### 11.2 Regulatory Actions and Initiatives

#### Regulation of the wholesale market

MNOs are obliged to meet all reasonable requests for interconnection. The legal framework does not enable ILT to take binding decisions to solve interconnection agreements. Cost orientation of the voice telephony tariffs of SMP operators has not been adopted.

Both LUXGSM and Tango have been notified as having SMP in the mobile market.

There are no obligations on MNOs to grant MVNOs access to their networks. No decision has yet been taken on whether to impose national roaming between 2G and 3G.

The law makes the construction of radio-emission stations subject to public consultation and an environmental impact assessment.

Although the incumbent fixed operator has SMP in the market for interconnection, tariffs for interconnection to mobile services are not covered by the RIO.

#### Regulation of the retail market

Number portability has not yet been implemented.



## 12 THE NETHERLANDS

### 12.1 Industry Overview

At the end of 2000 there were over 10 million subscribers in the Netherlands. The penetration rate was about 60%. The Netherlands has a landmass of 41,785 km<sup>2</sup>.

**Table 12.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	1,688,550	6,790,000	10,057,000	10,060,000	
Penetration rate	10.8%	21.4%	32.0%	60%	

Source: OPTA, Market Vision 2000, and OECD

There are five 2G operators in the Netherlands. All five have a stake in 3G licenses.

GSM 900 - KPN Mobile (1994), Libertel Vodafone (1995), Dutchtone, Telfort (1998)

DCS 1800 - KPN Mobile, Libertel Vodafone, Telfort, Ben, Dutchtone (1998)

3G - Five licenses awarded by auction in 2000.

KPN Mobile, Libertel Vodafone, Dutchtone, Telfort and Blue 3G

KPN Mobile is the incumbent fixed network operator's mobile subsidiary. It is a subsidiary of KPN, formerly the state owned Netherlands Postal and Telecommunications Services but liberalised and split up (between postal and Telecommunications activities) in 1998. KPN now has mobile interests in a number of countries including E-Plus (Germany), KPNOrange (Belgium), UMC (Ukraine) and Telkomsel (Indonesia).

Libertel Vodafone is majority owned by Vodafone (see UK). ING Bank also has 7.5%.

Telfort was originally a joint venture set up in September 1996 by the Dutch Railways company Nederlandse Spoorwegen and BT (see UK). In April 2000, BT acquired 100% of the company. In January 2001, Telfort announced it was to split into two companies from April - one concentrating on mobile communications (Telfort Mobile), and the other on fixed services for voice and data (BT Ignite). Telfort's mobile organisation is part of BT Wireless.

Ben is jointly owned by Belgacom (see Belgium), Tele Danmark (see Denmark) and T-Mobile International (see Germany). Ben is part of a consortium, along with Belgacom and T- Mobil that own Blue 3G.

Dutchtone is a 100% subsidiary of Orange (see France).

**Table 12.2: Market Shares Based on Number of Subscriptions**

Market share	KPN Mobile	Libertel	Ben	Dutchtone	Telfort
2001 (Q1)					
2000	48.8%	29.9%	6%	6.9%	8.5%
1999	51.5%	32.1%	4.4%	5.3%	6.6%
1998	64.3%	34.2%	N/A	N/A	1.5%
1997			N/A	N/A	

Source: OPTA, *Market Vision 2000*

In the Netherlands the mobile service providers Debitel, Talkline and Intercity Mobile Communications have direct agreements with the MNOs KPN Mobile and Libertel-Vodafone.

Tele2 announced very recently that they will provide mobile services by means of an MVNO construction on the network of Telfort Mobile.

## 12.2 Regulatory Actions and Initiatives

Onafhankelijke Post en Telecommunicatie Autoriteit (OPTA) concluded in its report *Market Vision 2000*, there are gaps and deficiencies in legislation and regulation that places considerable limitation on the impact and speed of its activities. OPTA proposes to undertake an assessment about how sector specific regulation might be introduced.

### Regulation of the wholesale market

In Nov. 2000, KPN Mobile and Libertel-Vodafone were informed of their continued SMP status in the Mobile market. Libertel launched an appeal with OPTA against its original designation of October 1999. When OPTA decided on this appeal that Libertel-Vodafone continued to be an SMP MNO, Libertel-Vodafone appealed against OPTA's decision in the court.

The implementation of a new interconnection model for regulation of SMP operators is planned but has been delayed. (Market Vision 2000)

The designation of SMP means that other parties can request special access to that party's network. According to OPTA's definition special access can for example involve carrier selection. OPTA believe that these provisions create the necessary pre-conditions for the entrance of MVNOs into the mobile market.

In 2000, the service provider Talkline lodged a dispute with OPTA in which it claimed a right to discount from KPN Mobile. In its decision OPTA agreed with the competition authority, the NMa, indicating that Talkline had a right to negotiate rather than the right to discount (Annual Report 2000)

No designation has been made for an MNO with SMP in the national market for interconnection although a review is currently underway. If an MNO is designated with SMP in this market cost-orientation for call termination would result. The completed study is expected by the end of 2001.



A consultation process looking at MVNOs is expected to produce a consultation document in late 2001.

Roaming between 2G networks is left to commercial negotiation and the Government decided following the 3G auction that roaming between 2G and 3G networks would also be left to commercial negotiation.

In 2000, MNOs complained that local authorities were increasingly obstructing the rollout of networks. Every antenna requires a building permit and the court has ruled that with regards to site sharing, a rooftop cannot be considered a site. Site sharing was also not addressed in the 3G licensing procedure because there is a general site-sharing obligation in the Telecommunications Act and site-sharing issues can be addressed via the special access arrangements required of SMP operators.

Newcomers to the market were having problems with the conditions and the periods for which site sharing was supplied by KPN Mobile and Libertel-Vodafone. OPTA drew up regulations about the site sharing of antennae sites at the beginning of 2000 but in early 2000, the Courts ruled that this exceeded OPTA's authority. It is expected that a proposal to change the Telecommunications Act on this point will be passed in 2001. (Annual Report 2000)

A consultation document made of July 2001 by the competition authority NMa, OPTA and the Ministry will allow 3G MNOs to collaborate in the roll out of their networks, provided that there are clear parameters set for this collaboration. By January 2007, UMTS license holders must have constructed their own networks providing coverage for, inter alia, all towns and cities with a population greater than 25,000.

#### Regulation of the retail market

Starting June 2000, the KPN (fixed) network operator differentiated the rates for calling from a fixed to a mobile. By modifying its interconnection charge a MNO can influence the charge for fixed-to-mobile calls. OPTA has stated that the retention rate must be cost-oriented and non-discriminatory. The incumbent is allowed to pass on retail costs in the retention rate, e.g. cost of sales department, billing and defaulters.

OPTA believes that competition in the market for new subscribers is being financed by cross subsidisation and in particular, excessively high tariffs for fixed- to mobile calls. Competition is being expressed in discounts on handsets rather than call units. OPTA have indicated that they will consider whether more strict regulation of the fixed- mobile market is required, for example whether or not tariffs for fixed-to-mobile calls should be brought into line with actual costs.

OPTA have noted that another indication of deficiency in the mobile market is extremely high tariffs for international roaming.

OPTA has prepared a set of quality requirements regarding mobile number portability. Penalty payments have been imposed on nine mobile service operators for failure to comply with these regulations since February 2000, however reports from service providers now indicate that they all meet the quality standards. OPTA recently published guidelines on this issue.



OPTA launched an investigation in Oct. 2000 into the efficiency of mobile number use.

OPTA noted that the increasing use of mobile telephony has been accompanied by an increasing number of complaints about the poor quality of connections provided, the practice of SIM-locking, and non- transparency of tariffs. The planned signing of a quality covenant was aborted in October 2000, but this initiative was started up again and stimulated by the Ministry.



## 13 AUSTRIA

### 13.1 Industry Overview

Austria has a landmass of 83,000 km<sup>2</sup>.

**Table 13.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	1,164,270	2,000,000	4,000,000		
Penetration rates	14.3%	24%	49%		

Source: TKK and OECD

Analogue	-	Mobilkom (1990)
GSM 900	-	Mobilkom (1994); max.mobil. (1996)
DCS 1800	-	Connect (licensed 1997); tele.ring (1999); Mobilkom, max mobil (local DCS in 1999)
3G	-	Six licenses were awarded by auction in Nov. 2000.  Connect, Hutchinson 3G, tele.ring, max.mobil., Mobilkom and 3G Mobile GmbH.

Mobilkom was the incumbent fixed operator's mobile subsidiary but was spun-off from the Austrian Postal Telecommunications service in the form of a stock corporation in 1996. Its fully owned subsidiary Mobilkom (Liechtenstein) operates in Liechtenstein. Mobilkom also has 61% share in VIPNet GSM Croatia and interests in SI. MOBIL in Slovenia.

max.mobile is owned by DeTeMobil, a fully owned subsidiary of Deutsche telecom (see Germany).

Connect is a joint venture between the German VIAG, the Austrian RHI Telekom, Telenor (see Norway) and TDC (see Denmark).

**Table 13.2: Market Shares Based on Number of Subscriptions**

Market share	Mobilkom	max.mobil.	Connect	tele.ring
2000 (Q1)				
2000				
1999	53%	36%	11%	N/A
1998				N/A
1997				N/A

Source: TKK



## 13.2 Regulatory Action and Initiatives

The RTR-GmbH (RTR) have taken over the functions of the Telekom-Control Commission (TKK) as of April 2001.

### Regulation in the wholesale market

Mobilkom was determined as having SMP for interconnection in August 1999. It must provide interconnection, including indirect access at cost-oriented prices.

Mobilkom and max mobil have been designated with SMP in the mobile market. SMP operators are obliged to operate a cost accounting system that assigns costs and cost elements to all services and service elements and permits subsequent auditing. They must observe the principle of non-discrimination for interconnection.

In 1999 the RTR calculated the interconnection costs for an efficient MNO on the basis of a cost calculation according to FL-LRAIC. They then introduced regulation on Mobilkom's charges for termination and for call origination to free services. The price cap of ATS 1.90 (13.8 Euro) for call termination was adopted gradually.

In July 2000 the regulator also reduced the interconnection fees of max.mobil and Connect (order Z4, Z7, Z8- 2000) on the grounds that mobile termination represents an essential facility and that the interconnection market cannot be regarded as competitive. The MNOs were ordered to reduce their fees to the fixed cost-oriented fee that Mobilkom is obliged to apply. These decisions were challenged before the courts.

The NRA set the termination charge at ATS 2.70 for tele.ring, reasoning that as a new entrant they needed to be protected.

The RTR intends to carry out extensive cost studies for mobile networks.

The RTR regulates (fixed operator) Telekom Austria's charges for calls to mobile networks. When this regulation was imposed in 1999, call charges were reduced by 15.5%. Telekom Austria must also pass on any future reduction in call termination charges by MNOs to its customers.

### Regulation in the retail market

All network operators are obliged to fulfil quality standards that are monitored by the RTR.



## 14 PORTUGAL

### 14.1 Industry Overview

At the end of the first quarter of 2001, Portugal had over 6.9 million mobile subscribers with a penetration rate of 69.6%. Portugal has a landmass of 92,389 km<sup>2</sup>.

**Table 14.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	1,506,958	3,074,600	4,671,500	6,665,000	6,959,000
Penetration rate	15.4%	30%	47%	67%	70%

Source: ICP Annual Reports

- GSM 900 - Telecel (1991); TMN (1992); Optimus (1997),
- DCS 1800 - Optimus (1997); Telecel, TMN (1998)
- 3G - Four licenses awarded by beauty contest in Dec. 00)  
Telecel, TMN, Optimus and One Way.

TMN is the incumbent fixed operator mobile subsidiar. It is a fully owned subsidiary of Portugal Telecom. Portugal Telecom was privatised in 1996 and is now only 10% state- owned.

Telecel is 50.9% owned by Vodafone, with the remaining 49.1% publicly owned.

Optimus is owned by Orange (see France) and the Sonae Group.

### 14.2 Regulatory Actions and Initiatives

The Instituto das Comunicacoes de Portugal (ICP) published quarterly market reviews for the mobile sector and has for the second consecutive year carried out a series of tests on the quality of the service provided by the three mobile operators.

#### Regulation of the wholesale market

All MNOs must offer interconnection subject to commercial negotiation. (Law No. 91/97, Article 3)

Telecel and TMN were notified of their SMP status in the Mobile market in 1999. No MNOs have been notified of SMP in the market for interconnection. The two SMP MNOs are therefore not subject to the additional obligation of cost oriented charges, the preparation of reference interconnection offers and separate accounting for interconnection services.

Facility sharing is obligatory when it is not possible to build new infrastructure for reasons of environmental protection, cultural heritage, town and country planning, or the conservation of urban and rural landscapes. Development of infrastructure is subject to the issue of licenses by



local authorities. The ICP can intervene to resolve conflicts between MNOs. (Decree- Law No 381-A/97 and Decree-Law290-A/99)

Following a decision from the ICP, from Oct. 2000 fixed operators have set prices of fixed-to-mobile calls. An ICP decision on Aug. 2000 imposed a price ceiling on mobile termination, requiring a reduction of around 8%. The maximum termination price cap is Esc 47.50 (0.24 Euro) for fixed-to-mobile calls of duration of 100 seconds.

OniWay (owner of 3G license but not a 2G license) has recently requested the use of DCS 1800 frequencies or roaming rights on the 2G networks, in order to offer GSM services. The ICP has informed Oniway that it will be regarded as an MVNO seeking access to the 2G market.

The ICP has recently submitted a discussion document to the MNOs containing an analysis of the necessary conditions for the exercise of the activity of an MVNO, in order to ensure the viability of new entrants in this market.

In a decision made July 31 2001 the ICP has ruled that it is not possible to impose roaming on other operators before the implementation of the licensed UMTS network.

#### Regulation of the retail market

MNOs and providers of mobile telecommunications services were obliged to make available call-by-call selection by March 2000. Carrier selection for fixed-to-mobile calls was due for Oct. 2000.

In June 2001 the NRA contracted a reference entity to act as an intermediary between the different providers, with the objective of bringing into operation number portability for fixed and mobile telephony. Operator portability in the mobile telephone network will be introduced simultaneously with 3G services, scheduled for Jan. 2002.



## 15 SWEDEN

### 15.1 Industry Overview

In the first quarter of 2001 there were over 6,300,000 mobile subscribers in Sweden. The penetration rate was 71%. Sweden has a landmass of 449,964 km<sup>2</sup>.

**Table 15.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	3,200,000	4,100,000	5,126,000	6,338,000	
Penetration rate	35.8%	46.5%	58%	71%	

Source: PTS and OECD

- GSM 900 - Telia, Europolitan, Tele2/ Comviq (1992)
- DCS 1800 - Telia, Europolitan, Tele2/Comviq (1996)
- NMT 450 - Telia (1981)
- NMT 900 - Telia (1986) The 900 MHz band will be allocated exclusively to GSM by 2010.
- 3G - Four licenses awarded by beauty contest in Dec. 2000. The decision is subject to appeal to the courts by Telia, Reach Out Mobile and Telenordia.  
Europolitan, HI3G, Orange and Tele2.

(In Jan 2001 PTS expressed its intention to investigate interest for new GSM licenses. A time schedule for allocation of GSM licenses on the basis of a beauty contest will be released in Sep. 2001.)

Telia the incumbent fixed operator's mobile subsidiary. It is owned by Telia AB, a Scandinavian Internet and communications company. The Telia Group comprises 100 hundred subsidiaries and approximately 40 associated companies.

Tele2 Sweden AB was formerly known as NetCom. It was formed in 1993 and is a part of Tele2 AB, listed on the Oslo Stock Exchange. In 2000 Tele2 merged with SEC (Societe Europeenne de Communication).

Europolitan Vodafone is 71.1 % owned by Vodafone (see UK).



**Table 15.2: Market Shares Based on Number of Subscriptions**

Market share	Telia NMT	Telia GSM	Tele 2	Europolitan
2001 (Q1)				
2000	3%	49%	33%	16%
1999	6%	46%	32%	17%
1998	12%	41%	31%	15%
1997	24%	37%	26%	13%

Source: PTS Report 2000

In Feb. 01, the NRA counted just over thirty undertakings that were either registered or held a license for mobile communication services. However the new service providers are still extremely small, and have an aggregate market share that hardly exceeds a few thousand of total subscriptions.

Europolitan has signed contracts for leasing of mobile network capacity with six or seven service providers.

In 2000 there were two service providers operating in the mobile market; Sense Communications and Tele1 Europe. Six new entrants are expected in 2001. Dial n'Smile started to offer services in Jan. 2000. Glocalnet, HemEI, ICA, LunarStorm and Mobyson have also given notice to the NRA that they will start operations.

There are three service providers offering telematics i.e. telecommunication between specific machines for particular use within sectors like transport or security. These are Wireless Maingate, Doubleway and Wireless Car.

## 15.2 Regulatory Actions and Initiatives

In 1999, the Post-och Telestyrene (PTS) prepared a report in conjunction with the Competition Authority and Consumer Agency entitled *The Swedish mobile telecommunications market from a consumer perspective*.

PTS indicated that there was insufficient competition in the mobile market and submitted a proposal for amendment of the Telecommunications Act. A competition report on the mobile market has recently been completed.

### Regulation of the wholesale market

Telia was notified of SMP for interconnection in July 1998, as well as SMP in the mobile market. It is obliged to respect cost orientation for interconnection charges (Telecommunications Act 93: 597, Section 32). In May 2001 PTS decided that Telia had to reduce its interconnection charge from an average of 1.18 SEK /min (approx. 0.12 EUR) to 0.98 SEK /min (approx. 0.10 EUR) by June 1st. This is the third time PTA has reduced Telia's charges since it was designated with



SMP. The costs are derived using FDC but the PTS is developing a LRIC cost model, expected to take two years to complete.

A legislative amendment came into force in July 2001 obliging MNOs to grant access to network capacity to service providers to the extent that such capacity is available and on fair market terms. (Government Bill 1999/2000:57.)

A further amendment obliges all MNOs who have been operating for more than five years (all existing MNOs) to grant roaming to new MNOs. This roaming facility is to be provided on fair market terms. (Extract from the Government's Spring Bill 1999/2000:100.)

There were a number of disputes between operators regarding tromboning of calls to mobile networks via foreign networks in 1999. In October 1999 the PTS made a statement indicating that it will not take action.

In August 2000 PTS made several Decisions on the principles of compensation between operators for calls to mobile networks. It decided that the operator that hands over the call to the terminating operator should pay the termination charge. The termination charge for non-SMP MNOs need not be cost-oriented but considered that "reasonable compensation" for these MNOs would be in the order of 10% higher than the cost oriented price.

Infrastructure sharing not compulsory but is subject to commercial agreement under the Right of Way Act.

#### Regulation of the retail market

Carrier pre- selection is available for calls to mobiles.

Number portability planned for September 2001.



## 16 UNITED KINGDOM

### 16.1 Industry Overview

At the end of 2000 there were over 40 million subscribers in the UK. The landmass of the UK is 244,100 km<sup>2</sup>.

**Table 16.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile subscribers	9,022,000	14,860,000	27,185,000	34,380,000	
Penetration rate	20.4%	25.5%	28.9%		

Source: OfTel Market Information and OfTel estimates (Effective Competition Review: Mobile, Feb 2001) and OECD

GSM 900 licenses	-	Vodafone, Cellnet (1992)
DCS 1800 licenses	-	One2One (1993), Orange (1994)
Analogue	-	BT Cellnet, Vodafone (1992) By 2005 analogue networks will cease operating and the spectrum will be allocated to Vodafone and Cellnet's GSM 900 networks and also to other operators
TETRA	-	Dolphin (recently gone into bankruptcy)
3G	-	Licenses were awarded by auction in early 2000.  Vodafone, Cellnet, One2One, Orange and Hutchison 3G

Vodafone in the UK is a fully-owned service of the larger Vodafone network spanning 29 countries. Vodafone merged with Airtouch Communications to form Vodaphone Airtouch plc in June 1999. In May 2000 Airtouch launched a 50:50 joint venture with Vivendi forming Vizzavi, which will deliver a multi-access branded portal for Europe. In 2001, Vodafone acquired Mannesmann.

BT Cellnet is the incumbent fixed network operator's mobile subsidiary. Cellnet changed its name to BT Cellnet, when BT purchased an additional 40% stake in Cellnet to gain 100% ownership in mid 1999. As a result of a reorganisation at BT, BT Cellnet is managed by BT Wireless, whilst Genie (its mobile centric Internet portal) is managed by BT Openworld.

One2One PCN services were originally launched by Mercury in 1993. It was bought by Deutsche Telecom for in August 1999 and is now part of the T- Mobile International group (see Germany). In November 1999 it launched a 50:50 joint venture with Virgin Mobile, a fast growing mobile phone retailer.



Orange mobile services were launched in the UK in April 1994. In Oct. 1999, Mannesmann acquired Orange plc. When Vodafone acquired Mannesman (see Vodafone above) Orange was disinvested and was acquired by France Telecom in August 2000 (see France).

**Table 16.2: Market Shares Based on Number of Subscriptions**

Market share	Vodafone	BTCellnet	One2One*	Orange
2001 (Q1)	30%	25%	21%	24%
2000	32%	27%	19%	22%
1999	37%	30%	15%	17%
1998	38%	34%	13%	15%
1997				

Source: OfTel Market information and OfTel estimates (*Review of Price Controls on Calls to Mobiles, 2001*)

\*Number of subscribers on One2One includes those using Virgin.

There are more than a dozen ISPs with a significant base of customers. Well over 2.5m customers (as at September 2000) rent their mobile phone service from an ISP. In recent years however, the market share of ISPs has declined from 26% of the market in 1997/98 to 7% in 1999/2000.

Virgin Mobile is an MVNO that started operations in the UK in 1999. It is a joint venture between the Virgin Group and One2One. Virgin also has MVNO operations in Australia and Singapore as well as development projects in the US, Taiwan, Japan, Hong Kong, and Europe.

## 16.2 Regulatory Actions and Initiatives

*Effective Competition Review: Mobile* was published in October 2001 with a supplementary document *Review of Price Control on Calls to Mobiles*.

### Regulation of the wholesale market

OfTel concluded in the October 2001 publications that it could start to reduce regulation. OfTel proposed to lift the designation of Market Influence on BTCellnet and Vodafone (see below). However, OfTel found that there remain areas of concern such as charges for roaming and call termination. It is publishing draft licensing modifications that would require all four operators to reduce termination charges by RPI-12 per cent each year for four years from March 2002 when current controls expire. Since these are still proposals, the summary below focuses on legislation actually in place.

In December 1999, Vodafone and BTCellnet were designated as having SMP in the mobile market. They must not unduly discriminate in the provision of interconnection services, including indirect access (IA). (No provider has yet launched retail services based on the IA services of BTCellnet or Vodafone.)



Both BT Cellnet and Vodafone were designated with market influence.<sup>2</sup>

Existing price controls on call termination are due to expire in March 2002. In 1998, the level of termination charges for fixed-to-mobile calls on the BTCellnet and Vodafone networks have been capped. Their average charge was reduced by 25% to a ceiling of 11.7 pence /min (approx. 0.19 EURO) for 1999/2000 with subsequent reductions of RPI-9% for the years 2000/01 and 2001/02. The weighted average retention charge is not to exceed 3.4 pence/ min (approx 5.4 Euro cents) for the year 1999/2000 followed by a reduction of RPU-7%. (MMC Recommendation of Dec. 1998)

BT asked the Director General to determine termination charges of Orange, One2One and Dolphin, but prior to the DG reaching a determination BT reached agreement with the operator and withdrew its request.

3G licencees have an interim obligation of 80% coverage by the end of 2007. Since all four MNOs have received UMTS/IMT-2000 licenses, they will be obliged to offer national roaming to the remaining 3G licensee once its own coverage reaches 20% of the population. Regulatory intervention is foreseen only if agreements fail to be reached. The new entrant should obtain roaming services at a fair, non-discriminatory price. A retail-minus approach will be followed. Roaming will end 31 December 2009.

Oftel encourage MNOs to share mobile masts wherever possible, in keeping with Article 11 of the Interconnection Directive 1997.

There is an RPI-X price control on the retention that BT (fixed-line operator) is permitted on calls from fixed lines to mobile phones.

Oftel is carrying out modelling of the long run incremental costs (LRIC) of the UK mobile networks. A bottom-up costing model was developed in 1998 and has been updated in 2001; both versions of the model have been made publicly available.

### Regulation of the retail market

Oftel has required MNOs to provide number portability. Modified licence conditions also oblige operators to ensure that portability is provided for independent service providers.

An agreement between the MNOs, announced in July 2000, will make it quicker and easier for customers to transfer their number to a new MNO.

Condition 66 of the mobile PTO licence prohibits unfair cross-subsidies between a licensee's separate telecoms businesses. This condition is not presently enforced and is likely to be

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<sup>2</sup> In March 2000, the Director General determined that Vodafone and BTCellnet continued to have MI in the market for mobile telephony in the UK. As a result of a judgement by the Courts in October 2000, these MI determinations presently have no effect, however in December 2000 Oftel stated its intention to remake the original determinations effectively replacing those that were rendered invalid by the court decision.

United Kingdom



enforced only in relation to those operators who are designated with Market Influence. (*Fair Trading in the Mobile Telephony Market*, April 1997)

Ofcom is considering taking action to address the practice of SIM locking by MNOs.



## 17 NORWAY

### 17.1 Industry Overview

Mobile penetration in Norway during 2000 was 74.8%, and the NMT/GSM mobile networks had almost 3,370,000 customers. Mobile numbers have exceeded fixed- line numbers since 1999. The landmass of Norway is 307,860 km<sup>2</sup>.

**Table 17.1: Market Penetration**

	1997	1998	1999	2000	2001 (Q1)
Mobile Subscribers	1,676,763	2,106,414	2,744,793	3,367,763	
Penetration rate	38.0%	47.4%	61.3%	74.8%	

*Source: Norwegian Telecom Statistics 2000 draft. The number of subscribers includes both GSM and NMT subscribers.*

There are two 2G MNOs in Norway, plus a number of firms operating using TETRA.

GSM 900 - Telenor Mobil AS, Netcom (1991)

DCS 1800 - Netcom, Telenor Mobil AS (1998); Telia's license terminated Aug. 2000

The TA intends to allocate additional licenses in the 900 and 1800 MHz bands by auction in 2001. In July 2001 it released draft legislation on the auction of these licenses, with an invitation to comment.

TFTS - Telenor AS

NMT 450 - Telenor Mobil (license expires Dec. 2001 but services terminated March 2001)

NMT 900 - Telenor Mobil AS

TETRA - EITele Ost, EITele Vest AS, Stento ASA (licensed 1999)

3G - Four licenses awarded by beauty contest in 2000.

Telenor, NetCom, Tele2 and Broadband Mobile. Since then, Broadband Mobile has been declared bankrupt and has turned in their license. The Norwegian Ministry intend to find a substitute buyer.

Telenor Mobile Communications is a subsidiary of Telenor ASA, a publicly listed company 78.9% owned by the Norwegian government. Telenor has 70 wholly or partly owned subsidiaries in 30 countries.

NetCom Norway is 100% owned by Telia (see Sweden).

**Table 17.2: Market Shares Based on Number of Subscriptions**

Market share	NetCom	Sense	Telenor	Other Operators
2001 (Q1)				
2000	26.5%	3.4%	65.5%	4.6%
1999				
1998				
1997				

Source: Norwegian Telecom Statistics 2000

There are about 15 service providers who do not own a network. Through resale, these agreements enable service providers to offer subscription to end-users.

Sense is the largest services provider in Norway and Sweden providing mobile, mobile Internet and Internet services. They re-sell call minutes on the Netcom and Telenor networks, buying at a wholesale price set on a retail-minus basis. The wholesale price that Sense pays depends on whether they identify their customer as a high-end or low-end user, in accordance with the two-part tariffs offered by the MNOs.

## 17.2 Regulatory Actions and Initiatives

### Regulation of the wholesale market

Telenor Mobil and NetCom are designated with SMP in the end-user mobile market. They must offer access to their networks, delivery of public telephony services and transmission capacity at objective, transparent and non-discriminatory conditions. Access must be provided at cost-oriented charges and at a quality at least equal to the provider's own business units.

Telenor also has SMP for interconnection. It must offer interconnection at non-discriminatory and cost-oriented prices and must publish reference offers on interconnection, which contain standardised interconnection services, prices, points, interfaces and terms.

Cost oriented interconnection charges for Telenor are established using an historic FAC methodology. The operator sets charges based on its own model which is then checked by the regulator and open to questioning by other parties. Service provider's access to mobile networks is based on a retail-minus model.

In January 2000 Telenor was asked to provide evidence that its call termination charge was cost-oriented. By May 2001 the call termination charge of Telenor Mobil was NOK 0.85. The NPT then required Telenor Mobile to reduce this termination charge further, to NOK 0.68. The set-up is unchanged at NOK 0.20.

All MNOs are required to comply with any reasonable request from service providers to enter into or amend an agreement on interconnection. The first agreements took place between MNOs and service providers in early 2000. The NPT may determine ex post access or interconnection terms, on its own initiative, as a result of complaints, or through mediation between two parties.



Network providers are not obliged to give access to MVNOs. A White Paper stating this position and its rationale was issued in 1999. 3G entrants will have national roaming rights on 2G networks.

Accounting separation has been imposed on Telenor since 1998 between mobile and fixed operations, interconnection and other services. Netcom is also subject to rules regarding accounting separation.

There will be an auction for GSM 900 and 1800 frequency in 2001.

#### Regulation of the retail market

In 1997 the NPT intervened to prevent Telenor from giving discounts from its fixed network to the mobile subscribers of Telenor Mobil.

Number portability is to be implemented as of November 2001.

The NPT has noted that for several years the price of making a mobile call within a mobile network has been considerably less expensive than calls to another network. Although they mention that this may have adverse effects on the market, no action has yet been taken.