

CHAPTER V

| |
|---|
| WHOLESALE AND RETAIL FIXED NETWORKS AND SERVICES |
|---|

TABLE OF CONTENTS

| | |
|---|-----|
| INTRODUCTION | 115 |
| I. WHOLESALE FIXED NETWORK ACCESS TO END USERS | 116 |
| I.1 EU Member State Analysis | 117 |
| I.1.A. Summary of Main Relevant Markets Identified by the Member States | 117 |
| I.1.B. Relevant Product Markets..... | 118 |
| I.1.C. Relevant Geographic Markets | 120 |
| I.1.D. Relevant Product and Geographic Markets Identified Outside the EU..... | 120 |
| I.2 Analysis under EU Competition Rules..... | 121 |
| I.2.A. Demand-side Analysis | 122 |
| I.2.B. Supply-side Analysis | 124 |
| I.2.C. Relevant Geographic Market..... | 124 |
| I.3 Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 125 |
| I.3.A. Elements Indicative of the Relevant Market | 125 |
| I.3.B. Elements Capable of Narrowing or Broadening the Market Definition..... | 131 |
| II. ACCESS TO DEDICATED CAPACITY | 133 |
| II.1 EU Member State Analysis | 133 |
| II.1.A. Retail..... | 134 |
| II.1.B. Wholesale | 137 |
| II.2 Analysis under EU Competition Rules..... | 141 |
| II.2.A. Demand-side Analysis | 144 |
| II.2.B. Supply-side Analysis | 144 |
| II.2.C. Relevant Geographic Market..... | 145 |
| II.3 Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 146 |
| II.3.A. Elements Indicative of the Relevant Market | 147 |
| II.3.B. Elements Capable of Narrowing or Broadening the Market Definition..... | 154 |
| III. FIXED INTERCONNECTION SERVICES | 157 |
| III.1 EU Member State Analysis | 158 |
| III.1.A. Summary of Main Relevant Markets Identified by the Member States | 158 |
| III.1.B. Relevant Product Markets..... | 159 |
| III.1.C. Relevant Geographic Markets | 163 |
| III.1.D. Relevant Product and Geographic Markets Identified Outside the EU..... | 164 |
| III.2 Analysis under EU Competition Rules..... | 165 |
| III.3 Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 169 |
| III.3.A. Elements Indicative of the Relevant Market | 169 |
| IV. WHOLESALE ACCESS TO FIXED NETWORKS FOR THE PROVISION OF VOICE AND LOW-SPEED SWITCHED SERVICES | 181 |
| IV.1 EU Member State Analysis | 183 |
| IV.1.A. Summary of Main Relevant Markets Identified by the Member States | 183 |
| IV.1.B. Relevant Product Markets..... | 184 |

| | | |
|---------|---|-----|
| IV.1.C. | Relevant Geographic Markets | 188 |
| IV.1.D. | Relevant Product and Geographic Markets Identified Outside the EU | 189 |
| IV.2 | Analysis under EU Competition Rules | 191 |
| IV.2.A. | International Voice Telephony Services | 191 |
| IV.2.B. | Subscriber Access to Telephone Services | 192 |
| IV.3 | Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 195 |
| IV.3.A. | Relevant Product Market | 195 |
| IV.3.B. | Relevant Geographic Market | 204 |
| V. | NARROWBAND AND BROADBAND ACCESS SERVICES | 207 |
| V.I | EU Member State Analysis | 207 |
| V.I.A. | Summary of Main Relevant Markets Identified by the Member States | 208 |
| V.I.B. | Relevant Product Markets | 208 |
| V.I.C. | Relevant Geographic Markets | 212 |
| V.I.D. | Relevant Product and Geographic Markets Identified Outside the EU | 212 |
| V.2 | Analysis under EU Competition Rules | 213 |
| V.2.A. | Narrowband Access | 214 |
| V.2.B. | Broadband Access | 216 |
| V.3 | Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 219 |
| V.3.A. | Elements Indicative of the Relevant Market | 219 |
| V.3.B. | Elements Capable of Narrowing or Broadening the Relevant Market Definition | 228 |
| VI. | INTERNET CONNECTIVITY | 231 |
| VI.1 | EU Member State Analysis | 232 |
| VI.1.A. | Summary of Main Relevant Markets Identified by the Member States | 232 |
| VI.1.B. | Relevant Product Markets | 232 |
| VI.1.C. | Relevant Geographic Markets | 233 |
| VI.1.D. | Relevant Product and Geographic Markets Identified Outside the EU | 234 |
| VI.2 | Analysis under EU Competition Rules | 234 |
| VI.2.A. | Demand-side Analysis | 235 |
| VI.2.B. | Supply-side Analysis | 236 |
| VI.2.C. | Relevant Geographic Market | 236 |
| VI.3 | Market Analysis for <i>Ex Ante</i> Regulation under the New Regulatory Framework . | 237 |
| VI.3.A. | Elements Indicative of the Relevant Market | 239 |
| VI.3.B. | Elements Capable of Narrowing or Broadening Market Definition | 251 |

INTRODUCTION

The development of fixed communications markets (and the evolution of competition in these markets) has been driven, from the early days of liberalisation, by the ONP regulatory framework (and the manner in which it has been implemented in the Member States). In many cases, competitive supply and demand dynamics have developed to overlay the dictated ONP structures and mandated behaviour. The Study Team has attempted to identify and differentiate between the potential fixed communications markets exhibiting true competitive characteristics and those that are shaped and driven largely by existing *ex ante* regulation.

In examining a broad range of potential relevant fixed communications markets, it became clear to the Study Team that some of these potential markets are significantly more mature than others. In addition, there appears to be not insignificant variation in this respect between Member States.

The Study Team has also been careful to consider related wholesale and retail markets, in part to ensure that the impact of the competitive dynamics at one level on the dynamics at the other level is accorded due weight. In the course of investigating the inter-relationships between these different levels of trade, it has become clear to the Study Team that true wholesale markets do not yet exist in many Member States for some communications services (*e.g.* leased lines). The Study Team considers that it will be important for NRAs to consider the impact of such omissions at the wholesale level on the development of retail services in their Member State.

There are a number of potential relevant markets that have been analysed by the Study Team which are either rapidly evolving or appear likely to be significantly affected by new developments (*e.g.*, the potential impact of local loop unbundling on related retail markets). The Study Team has drawn attention to such factors, where it considers that they have the potential to broaden the scope of potential relevant markets in the short-to-medium-term.

The markets which will be subject to analysis in this Chapter are those for:

- wholesale fixed network access to end users;
- access to dedicated capacity;
- fixed interconnection services;
- wholesale access to fixed networks for the provision of voice and low-speed switched services;
- narrowband and broadband access services; and
- Internet connectivity.

I. WHOLESALE FIXED NETWORK ACCESS TO END USERS

Summary:

1. A relevant market analysis for wholesale fixed network access to end users is considerably impacted by the perceived utility of unbundled local copper loops¹ for retail broadband applications once the loops are conditioned with xDSL technology. Consequently, the market definition for wholesale fixed network access to end users is significantly influenced by both the incumbent PSTN operators' historical monopoly over local copper loops and the current lack of alternative ubiquitous platforms (*i.e.*, cable TV networks, fibre, electricity cables, wireless local loop systems, mobile and satellite systems) which, in bundled or unbundled form, can provide operators with access to end users via physical facilities under their own control.
2. Empirical research indicates that, at present, the market for wholesale fixed network access primarily consists of access to the incumbent PSTN operator's local copper loop, although emerging consolidation of the cable industry in a number of EU Member States may mean that the relevant product market might include a greater range of national delivery platforms.
3. Because of the role of retail bandwidth-intensive services as a driver of wholesale fixed network access to end users, the market encompasses both full local loop unbundling and shared access services.
4. The relevant geographic market is national in scope, both because incumbent PSTN operators have deployed nationwide local loop infrastructures and because service providers seek access to end users over the widest possible geographic territory with respect to which they are licensed to provide services.

¹ Local copper loops are defined in the Regulation of the European Parliament and of the Council on unbundled access to the local loop as the physical twisted metallic pair of circuit connecting the network termination point at the subscriber's premises to the main distribution frame or the equivalent facility in the fixed public telephone network. 2000/0185 (COD), Article 2(c), OJ L 336, 30/12/2000.

I.1 EU MEMBER STATE ANALYSIS

Issue:

The extent to which the local copper loop of the PSTN operator has been identified by Member States as a relevant wholesale market of its own accord, or the extent to which Member States have viewed the local loop as a unique facilitator for access to a particular range of services.

I.1.A. Summary of Main Relevant Markets Identified by the Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|---|---|-------------------------------|
| Access to the local loop (<i>Denmark,</i> ² <i>Germany, Greece, Italy,</i> ³ <i>Portugal</i>). | None. | National. |
| Internet access services (<i>Italy, The Netherlands,</i> ⁴ <i>Portugal, the United Kingdom</i>). | <ul style="list-style-type: none"> • Narrowband access services (<i>The Netherlands</i>). • Broadband access services (<i>The Netherlands</i>). Potentially further sub-divided for xDSL and cable (<i>The Netherlands</i>). • Internet access services via ADSL technologies (<i>Italy</i>) • Wholesale Internet call origination (the <i>United Kingdom</i>). • Wholesale Internet call termination (the <i>United Kingdom</i>). | National. |
| Wireless local loop (WLL) systems (<i>Germany, Greece, Italy, Portugal</i>). | None. | National. |

² The NRA in *Denmark* has identified this market as the “subscription (local loop)” market.

³ In addition to a distinctive market for access to local loops, *Italy* has defined the broader market for the “provision of local connectivity”. This market includes not only connectivity obtained through the local loop, but also connectivity through all other fixed and wireless platforms.

⁴ *The Netherlands* has identified this market as that for “network access services”.

I.1.B. Relevant Product Markets

a. General Conclusions

A number of Member States have defined wholesale markets for fixed access to end users. Five Member States (*Denmark, Germany, Greece, Italy, Portugal*) have identified a wholesale market for **access to the local loop**, while another four Member States (*Italy, The Netherlands, Portugal, the United Kingdom*) have identified a distinct wholesale market for **Internet access services**, which include, *inter alia*, specific market segments for dial-up PSTN and xDSL services. In the *United Kingdom*, the market for Internet access services includes a market for wholesale Internet call origination and a market for wholesale Internet call termination.

b. Specific Analysis

In *Italy*, the NRA and the NCA have identified a distinctive market for **the provision of unbundled local loops**. This is a national market which comprises the following services:

- unbundled access to the copper local network
- unbundled access to the fibre local network
- co-location facilities
- connection from a peripheral network location (*e.g.*, MUX) to the incumbent's nearest local switch (or to a new entrant's PoI) through either a transmission circuit or a digital channel
- bit-stream access/xDSL services

Because of the total lack of competition in this market, the Italian NRA has exercised its regulatory powers and outlined a detailed regulatory framework for implementation of unbundled local loop access, as mandated under the EU's *Interconnection Directive*. The Italian authorities also appear to have identified a separate wholesale market for **xDSL services**.

Concurrently, the Italian NCA has defined a broader wholesale market for **the provision of local connectivity**, which consists of the provision of the physical infrastructure allowing telecoms operators to reach end users for the provision of telecoms services. According to the NCA, this market comprises all of the other technically available means that can be used for this purpose, *i.e.*, not only connectivity through the unbundled local loop, but also coaxial cable, fibre, electricity wires, cable television, wireless technologies, or satellite. This market is said to be characterised by high barriers to entry, including high investment costs and long-term investment requirements, plus administrative, legal and environmental barriers related to the award of rights-of-way.

Finally, the Italian NCA has identified a national market for the **provision of telecoms networks**, which includes, *inter alia*, switched connections between the ISP and the end user.

In the *United Kingdom*, Ofcom has defined a market for **Internet call origination** and a market for **Internet call termination**. Both consist of wholesale products which are needed by ISPs to provide retail Internet access services to their customers.

In the process of transposing relevant EC directives into Portuguese law, the NRA (the ICP) in *Portugal* has defined a market for **access to the local loop**, which consists of the provision to any telecoms network operator of the physical infrastructure (generally twin copper wires in the local access network) connecting end users to the infrastructure of that operator.

According to the ICP, this market consists of the following services:

- full unbundling of the local loop
- shared access to the local network
- access to intermediary points of the local loop
- co-location (including remote and virtual co-location)

Recently, the ICP has also moved towards identifying a distinct market for **Internet traffic**, which includes flat-rate wholesale Internet services. Previously, the ICP treated Internet traffic the same as any other fixed telecommunications service.

In *Denmark*, the NRA has identified a **wholesale subscription (local loop)** market, which is a sub-market of a broader “wholesale” market. Meanwhile, the NCA has identified a broad wholesale market for access to fixed networks, called “**fixed network subscriptions**”, which presumably includes access to local loops.

In a Consultation Document published on 20 March 2001, regulatory authorities in *The Netherlands* have identified a separate wholesale, upstream market for Internet access services which is referred to as the wholesale market for **network access services** (*e.g.*, the services that the providers of Internet access have to purchase from the owners of networks in order to offer retail Internet access services). Thus, according to the Consultation Document, the demand for network access services is derivative of the demand for Internet access services. Accordingly, since a distinction between **narrowband** and **broadband** for Internet access services might be appropriate, the Consultation Document surmised that it would be logical to make the same distinction for network access services. The basis of such a distinction includes the following: (1) the costs of network access for narrowband and broadband differ significantly; and (2) to supply narrowband services to the end user, the transport of Internet traffic is contracted by ISPs from the PSTN operator, while to supply broadband services ISPs must purchase broadband network access services in the form of access to xDSL connections or the cable network. The Consultation Document also asks to what extent the telephone network and the cable network in the derivative market for network access services do or do not belong to the same relevant product markets, or whether there are two separate product markets for broadband network access services – **cable** and **xDSL**.

In *France*, although the EU’s *Local Loop Unbundling Regulation* has been implemented by Decree, the ART and the Conseil de la Concurrence do not appear to have identified a specific wholesale local loop access market. The only market associated with the local loop that has been identified by the ART appears to be a retail market, generally comprising the retail services provided to end users over the local loop.

Four EU Member States (*Germany, Greece, Italy, Portugal*) also have identified a market for **wireless local loop systems** that appears to be separate and distinct from other wholesale fixed access markets. In *Germany*, the RegTP has decided that wireless local loop (WLL) belongs to a different product market than fixed access to the local loop, but has declined to answer the question whether WLL is a competitive alternative to access via the unbundled local loop, primarily because there has not yet been a commercial application of WLL.

Nonetheless, in recent decisions, the RegTP has addressed the question whether Internet access via WLL could be a competitive threat to Internet access via fixed lines and, analysing this question on the basis of dominant market position, has suggested that WLL access to the Internet falls within the same relevant market as fixed line Internet access.

In *Italy*, the authorities have considered the WLL market to include fixed wireless access (FWA), while in *Portugal* the NRA has stated that the WLL market does not include the provision of FWA services.

I.1.C. Relevant Geographic Markets

The general consensus among EU Member States is that the relevant geographic market for wholesale fixed access to end users is national in scope, in light of the fact that the incumbent has deployed a nationwide local loop infrastructure and the fact that installation of such infrastructure by new entrants is subject to a national licensing regime.

Meanwhile, in those Member States that have identified a separate market for WLL, the market generally also is considered to be national in scope, even if licences are allocated for specific regions.

I.1.D. Relevant Product and Geographic Markets Identified Outside the EU

Among the group of non-European countries reviewed by the Study Team, *Australia* has identified a wholesale **customer access market**, which the ACCC has described as a national market for the supply of customer access services by service providers to themselves and other service providers. This market primarily consists of an unconditioned local loop service. The ACCC has not included the full range of wireless customer access services in this market, except for wireless customer access services supplied by means of LMDS technology, which it views as a substitutable downstream service. The ACCC has recognised that access by means of satellite technology, and access through second generation (*i.e.*, GSM and CDMA) and third generation (*i.e.*, UMTS) mobile services might be substitutable in the future, but that they are not currently interchangeable at this time and therefore should not be included within the relevant market.

Meanwhile, although neither *Canada* nor the *United States* have specifically identified relevant markets related to wholesale network access to end users, local loop unbundling has played a critical role in the regulatory processes in those countries to open local markets to competition. In *Canada*, for example, the CRTC has concluded that local loops in small urban and rural areas are “essential facilities” and, therefore, subject to mandatory unbundling rules and regulated pricing. In addition, the CRTC has determined that loops in urban areas, though not essential because of their limited competitive supply, should nevertheless be unbundled and priced based on the rating principles for essential facilities in the short-term (for a period of five years, expiring in 2002). According to the CRTC, this approach will permit entry at a pace that will better serve the public interest and, at the same time, provide incentives to competitive local exchange carriers (CLECs) to undertake construction or acquisition of facilities.

Similarly, in the *United States*, the 1996 *Telecommunications Act* mandates that incumbent PSTN operators provide to any requesting telecommunications carrier non-discriminatory access to loops on an unbundled basis at cost-based prices. The FCC has devised an extensive set of rules to implement the unbundling provisions of the 1996 *Act* (including collocations

rules). Moreover, the importance of unbundled local loops for both the provision of local telephone exchange services and xDSL services has received vast amount of attention in various proceedings before the FCC and the courts. In particular, the FCC has required that the incumbent PSTN operators provide unbundled access to the high frequency portion of the local loop when it provides voice band service on the same loop (*i.e.*, line sharing), and has required that incumbent PSTN operators condition loops to enable requesting carriers to provide acceptable forms of xDSL-based services over the high frequency portion of the loop, regardless of loop length, unless such conditioning would significantly degrade the incumbent's analogue voice service.

Meanwhile, wholesale access to cable network has been a hot issue in the *United States* in recent years, with the FCC rejecting petitions to require cable companies to permit unaffiliated ISPs to obtain unbundled access to their cable networks and the courts overturning local rulings requiring cable companies to provide unaffiliated ISPs with access to their cable systems on a non-discriminatory basis.

Conclusions:

- 1. EU Member States have in general viewed the local loop of the incumbent PSTN operator as one of a number of platforms that enables service providers to directly access end user customers. Nevertheless, many Member States have identified access to the local loop as a distinct and separate relevant wholesale product market due to unique characteristics that distinguish it from other forms of access to the customer (*e.g.*, its ubiquity and its ability to be unbundled).**
- 2. By contrast, the *United Kingdom*, instead of identifying a specific market for unbundled local loops, has identified wholesale markets for Internet call origination and Internet call termination.**
- 3. A few Member States have considered Internet access services as constituting a wholesale market which is distinct from the local loop, and a few Member States have even identified a separate and distinct market for wireless local loop (WLL) systems. However, Internet access services are not services that provide wholesale access to end users using physical facilities under the control of the entity acquiring the service. WLL is currently irrelevant for *ex ante* market analysis because it neither offers the same functionality nor ubiquity as do unbundled local loops, nor has it actually been deployed in many Member States.**
- 4. Because one of the defining elements of the local loop as a relevant product market has been its ubiquity, it has followed that the relevant geographic market also reflect this national coverage.**

I.2 ANALYSIS UNDER EU COMPETITION RULES

The term “local loop”, as used by the Commission, finds its definition in the EU's *Unbundled Local Loop Regulation*, where it is defined as the physical twisted metallic pair circuit

connecting the network termination point at the subscriber's premises to the main distribution frame or the equivalent facility in the fixed public telephone network.⁵ The *Unbundled Local Loop Regulation* requires that, as of 31 December 2000, operators designated as having SMP must meet all reasonable requests for unbundled access to their local loops and related facilities under transparent, fair and non-discriminatory conditions, and must charge prices for unbundled access to the local loop and related facilities on the basis of the principle of cost-orientation. The basis of this *Regulation* is the Commission's finding that the local access network remains one of the least competitive segments of the liberalised telecommunications market and that alternative infrastructures such as cable television, satellite, and WLL do not currently offer the same functionality and ubiquity as unbundled local loops.⁶

Prior to the adoption of the *Regulation*, the Commission, in its 1999 *Telia/Telenor* Decision, had already identified a wholesale market for **operator access to local loop networks**.⁷ According to the Commission, a distinct market for the provision of new loops with high capacity optical fibre directly to major users may also be developing.⁸

I.2.A. Demand-side Analysis

In *Telia/Telenor*, the Commission concluded that, from the demand-side, there do not appear to be any viable substitutes for the unbundled local loop.

According to the Commission, just as end user subscribers require access to the incumbent operator's local loop network in order to make outgoing, and to receive incoming, calls, other operators also need to interconnect with the incumbent operator's local loop network to provide services to their customers. However, the ubiquity and technological capability of the incumbent operator's PSTN network, as well as the lack of substitutability of other access platforms (*i.e.*, cable TV networks, electricity cables, fixed radio links), means that, from a competitor's point of view, access to the incumbent's local loops provides the only viable entry option in the short term.⁹ A similar conclusion was voiced by the Commission in its 1999 *Communication on the Unbundling of the Local Loop*, where it found that although alternatives to the PSTN for providing high speed communications services to residential customers exist (including fibre optic networks, wireless local loops or upgradeable cable TV networks), none of these alternatives may be considered to constitute a full substitute to the fixed local loop infrastructure.¹⁰ Nonetheless, in *@Home Benelux*, the Commission took the view that future innovative and technological changes might justify different conclusions in appropriate circumstances.¹¹

Specifically with respect to cable TV networks, the Commission observed in *Telia/Telenor* that the traditional design of cable TV networks creates some significant disadvantages for the provision of telephony services as compared to local loops. According to the Commission, cable TV networks were typically designed to transmit traffic in only one direction and,

⁵ Regulation of the European Parliament and of the Council on unbundled access to the local loop, 2000/0185 (COD), Article 2(c), OJ L 336, 30/12/2000 (*Unbundled Local Loop Regulation*).

⁶ *Unbundled Local Loop Regulation*, recitals 3, 6.

⁷ *Telia/Telenor* Case IV/M.1439.

⁸ *Unbundled Local Loop Regulation*, Recital 5.

⁹ *Telia/Telenor*, para. 36.

¹⁰ *Communication from the Commission - Unbundled access to the local loop*. See Chapter 3.2: Market analysis - market power of incumbents - the local loop's key role.

¹¹ *@Home Benelux B.V.* Case No IV/JV.11, para. 31.

therefore, have a “trunk and branch” or “cascade” structure. As a result, the “trunk” connections within the cable network risk being overloaded by return telephone traffic when the network is used to provide telephony services. By contrast, in a traditional telephone network, an individual local loop connects each subscriber within the local exchange, and this loop only carries the subscriber’s traffic. As a result, copper loop wires are less likely to be overloaded, no matter how many subscribers are simultaneously using their phones.

The Commission noted, however, that it is technically possible to upgrade cable networks to accommodate the transmission of telephony services. Such upgrades require the following:

- (i) reserving some of the bandwidth on the cable to create an outward and return path for telephony traffic;
- (ii) reconfiguring the system in order to break it down into separately served units of 500 to 1,000 subscribers (this will ensure that the arterial routes are not overburdened at times of peak demand);
- (iii) creating more capacity in the key trunk lines by installing extra cables or replacing the copper coaxial system with fibre optics in order to enable the system to accommodate all the traffic (this upgrade also requires further investments in the electronics in order to “light up”, *i.e.*, to bring into operation, the optical fibres); and
- (iv) installing cable modems at each of the lines.

For all of these reasons, the Commission concluded that existing cable networks (without upgrades) are not an immediate substitute for the PSTN network, but can in theory become viable substitutes with some investment and upgrades.¹²

With regard to electricity cables, the Commission concluded in *Nortel/Norweb*¹³ and in *Telia/Telenor* that the technology to be used for the conveyance of traffic over electricity cables entering the subscriber's premises have not yet been commercially developed.¹⁴ In particular, the Commission noted in *Nortel/Norweb* that it is not yet technologically possible to conduct broadband transmission over power lines below a capacity of 1 MHz.¹⁵

Finally, with regard to fixed radio links or WLL systems, the Commission observed that such networks require the use of high frequency radio signals beamed at receiving/transmitting equipment located at the subscriber's premises. According to the Commission, the disadvantage of this technology is that it uses very short wave radio signals which require line of sight transmission. As a result, the use of radio-loop systems are typically limited to rural areas as opposed to built-up town and city centres, or to businesses with high buildings or aerial masts on which receiving antenna can be placed. The Commission further observed that the use of radio frequencies might generate unacceptable levels of interference with other equipment. Finally, the Commission stated that significant investments must be made in the equipment at the subscriber's end of the line. For these reasons, the Commission does not consider fixed radio links or WLL systems to be substitutable for local loops at this time.¹⁶

¹² *Telia/Telenor*, para. 32.

¹³ *Nortel/Norweb* Case No. IV/M.1113.

¹⁴ *Telia/Telenor*, para. 34; *Nortel/Norweb*, para. 8.

¹⁵ *Nortel/Norweb*, para. 8.

¹⁶ *Telia/Telenor*, para. 35.

I.2.B. Supply-side Analysis

On the supply-side, the Commission observed in *Telia/Telenor* that the significant costs and long time periods required to build local alternative networks provides new entrants with a huge disincentive to enter the market in this manner.¹⁷ By contrast, incumbent PSTN operators have typically deployed their existing local loop infrastructure over substantial periods of time and have financed their networks while their companies were public sector bodies.

I.2.C. Relevant Geographic Market

The Commission generally has considered subscriber access services to be national in scope since the telephone operators supplying these services have not been able to provide them outside or across national borders.¹⁸ For this reason, the market for operator access to local loop networks has been considered by the Commission to be national in scope.¹⁹

Conclusions:

- 1. The Commission regards access to the local loops of any PSTN operator as essential in order to make end users “contestable” because the “last mile” of network to the customer is unquestionably a bottleneck, having been developed over a long period of time under monopoly conditions with the benefit of an existing large customer base. Control of the last mile allows incumbent PSTN operators to leverage their traditional market power into other developing new downstream services, especially those requiring the use of higher bandwidths.**
- 2. According to the Commission, it is foreseeable that competitive alternatives to the PSTN network can develop over time, although the timing for the full availability of such network alternatives is unclear. Moreover, especially as regards the growing deployment of cable TV networks in a number of EU Member States, it is arguable that the working premise of the *Unbundled Local Loop Regulation* – the existence of a monopoly at the level of local access infrastructure – might no longer be valid. This may result in different patterns of competition developing across the EU Member States relative to the extent of cable TV network deployment.**
- 3. It is arguable that in those Member States where there is little likelihood of viable alternative local access networks being deployed within a reasonable period of time, the “essential facilities” doctrine²⁰ can legitimately be invoked by NCAs to open up a local PSTN operator's local loops under *ex post* competition rules.**
- 4. The Commission considers the relevant geographic market to be national, as competitors seek access to as many customers as possible across the national territory with respect to which they are licensed.**

¹⁷ *Telia/Telenor*, para. 18.

¹⁸ *Telia/Telenor*, para. 121.

¹⁹ *Telia/Telenor*, para. 122.

²⁰ Notice on the application of the competition rules to access agreements in the telecommunication sector, 98/C265/02, at para. 68.

I.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

Fixed network access to end users involves the ability of operators to access and use their own fixed facilities or the fixed facilities of another operator in order to reach and provide retail services (*i.e.*, both “narrowband” and “broadband” services) to their end user customers.

The typical way one defines a relevant product market at the wholesale level is to begin with retail markets, which usually establish the parameters of the corresponding wholesale markets. However, in the case of wholesale fixed network access to end users, the incumbent PSTN operators’ historical monopoly over local copper loops (which when conditioned with xDSL technology can be used to provide a broad range of retail applications), as well as the lack of viable alternative ubiquitous delivery platforms (*i.e.*, cable TV networks, fibre, electricity cables, WLL systems, mobile, satellites) which can provide network operators with access to end users via physical facilities under their own control, has reversed the process.

Thus, in the absence of widespread retail offerings of broadband services by PSTN operators and in the face of a widespread reluctance of PSTN operators to upgrade their networks with xDSL technology, certain retail service “markets” were slow to develop in the late 1990s. Regulators considered themselves to be, therefore, compelled to intervene at the wholesale level in order to facilitate competition in future markets for retail services.

I.3.A. Elements Indicative of the Relevant Market

a. Demand-side Analysis

(i) Substitutable Alternatives

On the demand side, the relevant product market for wholesale fixed network access to end users appears to consist of access to the incumbent PSTN operator’s local copper loop. The incumbent has such access. From the new entrant operator’s perspective, there are no other access delivery platforms currently available which can provide it with the same infrastructure-based access to the end user with control over physical facilities.²¹

As will be discussed in greater detail in the supply-side analysis to follow, it is not currently feasible for many new entrants to either “make” or “buy” alternative access delivery platforms. First, it is not commercially feasible for new entrants to build and deploy their own facilities due to the high costs and long lead times in doing so. Second, “buying” access to an alternative delivery platform at wholesale is not a viable option for new entrants because current technological limitations or availability does not make them viable substitutes for the local loop.

While cable networks can self-supply a form of fixed network access, they currently have technical constraints which limit their ability to be “unbundled” in the same way as local loops and, therefore, are not a viable option for new entrants’ wishing to provide access

²¹ In the view of the Study Team, bitstream is a communications service, rather than providing infrastructure-based access to end users over physical facilities controlled by the provider.

services to end users over facilities that they control. Meanwhile, alternative platforms such as WLL, fibre-to-the-home, electricity cables, mobile and satellite are currently in the embryonic stages of development and not ubiquitously deployed. Therefore, from the new entrant's perspective, they are not viable substitutes for the local loop at this time.

Access to end users over facilities controlled by another party (*i.e.*, where the new entrant resells the access services of the owner of the network) are also not viable substitutes because the actual control over the physical facilities themselves is critical to the new entrant's ability to provide an appropriate range of services, including competitive broadband Internet access services to the end user. The reasons include the following: (1) control over the physical facilities ensures that the operator will be able to configure and manage the entire length of the end user connection; (2) control over the physical facilities allows the operator to choose and design the most appropriate offerings for its customers, rather than simply reselling the identical retail offering made available by the network owner; and (3) pricing issues related to the resale of the network owner's access services may preclude the operator from entering the market and establishing a customer base (and revenue stream) to allow the development and provision of new services.

The local loop provider is clearly able to self-supply such services, but unbundled local loops are the only means of access to end users that enable new entrants to ubiquitously and expeditiously provide, over physical facilities under the control of the provider, a broad range of services to end users (especially those services requiring the use of higher bandwidths) made possible through the upgrading of copper loops using xDSL technology. Under existing Community law, service providers are entitled to *full* access to the unbundled local loop from fixed operators notified as having SMP. Full unbundled access entitles new entrants to use the full frequency spectrum of the twisted metallic copper pair to be able to provide both voice and more bandwidth-intensive services to end users.

For service providers which do not wish to provide voice services, Community law also requires fixed SMP operators to provide new entrants with *shared* access to the unbundled local loop. Shared unbundled access would allow the new entrant to use the higher non-voice band spectrum of the twisted metallic copper pair (should it desire to do so), with the incumbent continuing to provide voice telephony services over the lower frequency portion of the loop. Thus, with shared unbundled access, new entrants not wishing to provide both voice and services requiring access to a broader bandwidth can still offer their own ADSL services and not simply resell the ADSL service of the incumbent.

(ii) *Impediments to the Development of the Unbundled Component of the Product Market*

While incumbents use their own loops to self-supply fixed network access to end users, recent data indicates that, despite the regulatory measures at both the EU and Member State level to facilitate local loop unbundling, significant impediments continue to exist in terms of the pricing and provisioning of unbundled local loops which threaten the ability of operators to provide services over local access facilities under their control.

Appropriate local loop pricing is a key issue in ensuring that fair conditions of access are granted to new entrants. New entrants only will purchase unbundled local loops from incumbent operators if the price at which they purchase them allows them to provide services to end users at a profit.

Under existing Community law, fixed operators notified as having SMP are required to charge cost-oriented prices for full unbundled access to local loops and related facilities (*i.e.*, collocation, cable connections and relevant information technology systems).

Disagreement as to the proper inputs in a “cost-oriented” methodology and the lack of a uniform approach to “cost-oriented” pricing across the EU has resulted in varied prices for unbundled local loops and associated facilities in the Member States. For example, as of June 2001, prices for unbundled local loops ranged from as low as €8.23 /month in *Denmark* and €9.3 /month in *Sweden*, to as high as €16 /month in the *United Kingdom* and €16.6 /month in *Luxembourg*.²²

In addition to the cost of the loop itself, the related costs associated with collocation are significantly driving demand for unbundled local loops. Collocation space is needed by new entrants to interface with the main distribution frame of the SMP operator. Collocation is subject to minimal regulatory oversight in most Member States and, in countries such as *The Netherlands*, the regulators have taken the view that the cost of collocation is outside its ambit of competence. As a result, the rental cost of collocation space is often very high and a deterrent to unbundled local loop entry.

Another significant factor affecting demand for unbundled local loops is the lengthy lead times for provisioning and delivery of loops and collocation in many of the Member States. Recent figures demonstrate that provisioning of unbundled local loops can take as long as eight or more months in *Belgium*. In contrast, it can take as few as seven or eight working days in *Austria, France, Germany, Italy* and *The Netherlands*. Provisioning of collocation space can take as long as three or four months in certain Member States (*Belgium, France, The Netherlands, the United Kingdom*), if space is not currently available for a new entrant and new space must be constructed.²³

b. Supply-side Analysis

(i) Building Duplicative Local Loop Facilities

The option of building their own duplicative local loop, cable, fibre or other facilities is always available to new entrants. However, this is not currently a commercially feasible option in most cases. It requires new entrants to make a very large initial sunk investment in the facilities before they develop a customer base to justify or fund such expenditure. On top of this, building new facilities takes months or years, thereby delaying market entry and postponing the benefits of local access competition for consumers.

(ii) Access to Alternative Platforms

From a supply perspective, the most significant consideration is the fact that although a number of delivery platforms other than local loops are currently used to provide network access (to varying extents) in different Member States, these platforms can either not be provided to new entrant operators on an “unbundled access” basis, or are currently so limited in their availability and coverage so as not to be viable substitutes for, or exert competitive

²² Pricing issues in relation to unbundled access to the local loop, ONP Committee, ONPCOM 01-17, 25 June 2001.

²³ “Cross-Country Tables on Unbundling of the Local Loop”, Cullen International, 7 June 2001

pressure or the supply of, local loops at this time. Consequently, new entrants have no option but to rely on unbundled local loops to provide the voice and data services their customers demand over access facilities under their control. With incumbent PSTN operators still holding a monopoly position over the local loop in most Member States other than in certain cities or sub-national geographic regions, new entrants have only one source for this critical facility on a national basis.

As noted above, unbundled local loops allow new entrants to provide both voice and more bandwidth-intensive services to end users using local loops over which they have physical control. Other platforms do not, at present, provide new entrants with the same opportunity to control the physical means of access to the end user and to provide nation-wide ubiquitous coverage.

Cable Networks

For example, cable networks, although more ubiquitous than any of the other alternative delivery platforms in many Member States, allow cable operators to self-supply fixed network access to end users, but cannot be “unbundled” in the same way as local loops. As a shared medium with a nodal architecture, the provision of “network access” on coaxial fibre networks amounts to something quite different to local loop unbundling of the PSTN. The network architecture means that the loop below the node (generally with 500-1500 subscribers) cannot be separated into “lines” for individual subscribers. Subscribers share the total capacity of the loop. As a result, competing operators would only be able to acquire facilities-based access over facilities under their control if they are able to acquire either control of an upward and a downward channel (for their sole use) or have capacity designated for their exclusive use (and managed) by the network operators. As the Study Team understands it, the first alternative is currently not possible without substantial re-engineering of the networks, while the second alternative requires management and network operation software and tools that have not as yet been developed. As such, cable networks do not currently provide a technically viable alternative to unbundled local loops and, therefore, are not substitutable at this time.

Nevertheless, cable operators in a number of Member States, including *The Netherlands*, are at present actively investigating how a form of local network access could be provided to cable networks. Efficiency, asymmetric spectrum allocation, lack of end-to-end management systems and capacity management questions, make this a complex issue.

Fibre

Fibre is generally not a viable option because it would require the costly installation of fibre facilities (“own build”) to the premises of each customer (“fibre to the curb”). As such, the construction of fibre as a means of gaining and controlling access to the end user is simply not a cost-effective or efficient option for serving mass market customers.

For these reasons, fibre is not used in the “local loop” to a significant extent in any Member State and therefore is not a viable substitute. In the limited instances where it is used as such, it is used to provide access and service for non-residential customers in limited geographic areas (*e.g.*, CBDs). Consequently, the viability of offering fibre-to-the-home is, as of yet, untested.

In this context, it is relevant to note that the Dutch Government is funding a pilot fibre-to-the-home project in the third quarter of this year.²⁴ Such alternative “loop facilities” may become viable over time if the revenues to be generated can support the business case to construct such alternatives.

Wireless Local Loop

Wireless local loop (WLL) has not proved to be an effective option because of delays in licensing, technical limitations (*i.e.*, use of short wave radio frequencies requires line-of-site transmission and is at risk of generating unacceptable levels of interference with other equipment). Moreover, the potential coverage of WLL facilities is, in most Member States, regional (given the manner in which licences have been awarded).

For these reasons, buildout of WLL has been very limited and WLL has not lived up to its potential to become a PSTN local loop bypass mechanism. A notable exception is Sonofon, which has announced plans to provide WLL access to 95% of the Danish population.²⁵ It is possible that this initiative (and others like it) may alter the infrastructure-based access alternatives over time. However, at present, WLL is not a viable substitute for the local loop.

Electricity Cables

The conveyance of traffic over electricity cables entering subscribers’ premises has not yet been developed commercially and, therefore, cannot be considered to be substitutable for local loops at this time.

Satellite

There are significant commercial and technical differences between satellite and fixed lines. In any event, access via satellite does not have large consumer demand (although in areas outside the EU, where fixed line penetration is much lower, arguably satellites have a greater role to play in the delivery of broadband one-way service offerings) and is not ubiquitously offered. It is, therefore, not a substitute for the local loop at this time.

Mobile

Mobile networks are still in the early stages of development for non-voice access on a large scale and there are, in any event, legitimate concerns that UMTS is not suitable for the transmission of large amounts of data. Consequently, mobile data networks are not a viable substitute for local loops at this time.

However, as and when any of these alternative platforms are deployed to provide viable alternative means of access to end users over facilities under the control of the access provider (not only for the network operators but also, in unbundled form, to others), it is possible that the relevant market may embrace these alternative platforms in certain Member States.

²⁴ Ibid.

²⁵ “Dutch, Swedes vote subsidies for broadband”, Joanne Taafe, Communications Week International, 18 June 2001.

c. Geographic Scope

The commercial drivers for the provision of access to unbundled local loops create an environment in which the competitive conditions are nationally homogeneous, with service providers seeking wholesale access to the maximum number of end users across a national territory. Incumbents generally have deployed a nation-wide local loop infrastructure, with this infrastructure being subject to a national licensing regime in all EU Member States.

It is possible that, if alternative local loop infrastructures (*e.g.* WLL or fibre) are deployed with any degree of ubiquity, they might provide viable, but less than national, means of acquiring access to end users over facilities controlled by operators, at least for the operators of such networks. In such circumstances, the relevant geographic market may be smaller than national and actually be definable by reference to regional or city-based geographic scope. However, the presence of alternative networks in regions or cities is unlikely to exert pressure on unbundled local loops offered by national PSTN operators unless the non-discrimination obligation imposed on such operators is interpreted to require that the terms and conditions of unbundling (including costs) be offered on the same basis across the entire network. Such a uniformity of price causes current competitive conditions to converge at the national level.

Cable networks, which are currently deployed in most Member States on a regional or franchise basis, cannot presently provide own-controlled facilities-based access to any entity other than the network operator. As such, they do not exert competitive pressure on entities providing unbundled local loops in any manner that would narrow the scope of the relevant geographic market to be regional or linked to the relevant franchise area.

d. Competitive Dynamics

With the “last mile” of the network continuing in the foreseeable future to be a bottleneck dominated by incumbent PSTN operators, access to unbundled local loops is regarded as critical to the expansion of competition in local markets. In addition, despite Community law requiring PSTN operators with SMP to provide new entrants with full and shared access to unbundled local loops, a number of these SMP-designated operators have been slow in their compliance with the EU’s loop unbundling requirements. Thus, new entrants have found that using unbundled local loops to serve customers is difficult, limiting competition in the local loop market. Empirical research from July 2001 indicates that, of the over 201 million “contestable” exchange lines across the 15 EU Member States, only 452,507 unbundled lines have been made available to date.²⁶

Nonetheless, rising recent consumer demand for ADSL services has accelerated this process, with new entrants making increasing requests for unbundled local loops and regulators and competition authorities becoming more aggressive in protecting such new entrants from discriminatory treatment by incumbent PSTN operators. As a result, after a slow beginning, ADSL services had begun to take off in mid-summer 2001, with demand slowly catching up

²⁶ See ECTA Latest DSL Scoreboard – July 2001 at: http://www.extaportal.com/ecta2001/ecta_home/dsl_july01.htm (website last visited on 13 August 2001). The Study Team notes, however, that statistics for available loops may be subject to rapid change in the immediate future.

with supply. However, recent figures show that, in most EU Member States, incumbent DSL lines continue to far outpace the number of unbundled lines requested by new entrants.²⁷

Recent figures reveal total or near-total control of all DSL lines by national PSTN incumbents in *Austria, Belgium, France, Germany, Ireland, Italy, Portugal, Spain* and *Sweden*. In the *United Kingdom*, where 20 or so operators originally signed up to collocate in BT's exchanges, most have pulled out, leaving only a handful of competitors seeking copper lines.²⁸

Meanwhile, in the *United States*, efforts by the FCC and state regulators to ensure that the leasing of unbundled local loops is a viable market entry option for new entrants for both voice and xDSL services have met with mixed success. Ongoing disputes between the incumbent fixed line operators and competitive local exchange carriers (CLECs) with regard to the pricing of unbundled local loops, geographic deaveraging, co-location, the quality levels of loops offered, and technical difficulties and delays in ordering and provisioning, have contributed to minimising CLEC interest in stand-alone loops. Where CLECs have succeeded in entering markets through the purchase of unbundled network elements (UNE), it has been through the so-called "UNE-platform", which permits CLECs to purchase the loop and local switch in combination, thereby eliminating many of the interconnection and technical issues inherent in purchasing just the stand-alone loop. With respect to the provisioning of xDSL services, new entrants in the *United States* claim to have experienced numerous difficulties in obtaining from the RBOCs a "clean" copper loop that is capable of supporting DSL services.²⁹

I.3.B. Elements Capable of Narrowing or Broadening the Market Definition

The construction of new networks clearly adds to the market. If the technical issues that currently surround the "unbundling" of existing or new alternative platforms (*i.e.*, cable) are resolved such that there is clear substitutability between access using alternative platforms controlled by the access provider and unbundled local loops, it is likely that facilities-based access over additional platforms will become part of the fixed facilities-based wholesale access market to end users. The technical reviews and commercial negotiations that are currently underway in a number of Member States (*e.g.*, *The Netherlands* and the *United Kingdom*) suggest that in the medium-term a form of wholesale access over cable may become technically viable. However, it is clear that any such access will be, to a large extent, technically (and, probably functionally) different to access through the incumbent's local loop. In addition, the deployment of additional networks based on WLL, fibre or electricity wires

²⁷ For example, as reported in July 2001, across the EU Member States incumbents PSTN operators' DSL lines outpace other service providers' DSL lines by nearly 19 to 1. Stated another way, in total across the 15 EU Member States, other service providers only control 5.01% of the total DSL lines. Only in *Denmark* and *Finland* have other service providers accomplished significant xDSL penetration (*i.e.*, in *Denmark*, out of a total of 45,000 DSL lines, incumbent's have 23,000 and other service providers have 22,000; in *Finland*, out of a total of 25,000 DSL lines, incumbent's have 14,000 and other service providers have 11,000). Thus, if the DSL totals from *Denmark* and *Finland* are removed, incumbents' DSL lines outpace other service providers' DSL lines by nearly 32 fold. See also "Competition in the last mile remains elusive", *Financial Times*, 18 July 2001, at FT Telecom 4. See also "ECTA Latest Scorecard – July 2001" at www.ectaportal.com. It appears that 7 lines have been unbundled in *Belgium*, 22,000 in *Denmark*, 11,000 in *Finland*, 405,000 in *Germany*, 400 in *Italy*, 13,000 in *The Netherlands* and 1,100 in *Sweden*.

²⁸ "Competition in the last mile remains elusive", *Financial Times*, 18 July 2001, at FT Telecom 4.

²⁹ "Mass. Attorney Gen. Urges FCC to Deny Verizon Entry", *FCC Report*, 23 Feb. 2001; *Communications Daily*, 28 Aug. 2000.

may provide, in the medium to long-term, forms of access that are functionally equivalent to unbundled local loops.

It is worth recalling, in this context, that the proposed access and interconnection regime contemplates that all entities operating on a competitive relevant market should negotiate access terms. As such, the obligation to negotiate in good faith should create market conditions for facilities-based wholesale access over facilities other than unbundled local loops. Where the market is not competitive, and proportionality and consideration of maintenance of incentives to invest lead NRAs to impose obligations on operators with SMP in the relevant market, the market position of operators of such alternative networks will be considered and, to the extent that they have SMP, obligations may be imposed on them.

It is premature to attempt to anticipate the impact of, as yet not deployed, UTMS networks on the scope of the relevant product market. Given that the market is being driven by retail demand for bandwidth-intensive services, wholesale access that is substitutable for access over unbundled local loops must be able to provide such retail services. It is not yet clear that UTMS will be able to do so. As such, it is not clear whether UTMS will exert competitive pricing pressure on entities operating in the relevant product market for fixed network access to end users.

Conclusions:

- 1. A distinct relevant product market can be identified at the wholesale level for fixed network access to end users. Currently, the local loops of PSTN operators are the only viable nation-wide delivery platforms available to the operators or through which service providers can gain access to end users using physical facilities under their full control. It is not economically efficient for service providers to duplicate local loop infrastructure when they enter the market, although cable operators have already made a competitive impact in some Member States at a sub-national (*e.g.*, regional) level, and self-provide fixed network access. However, cable networks cannot currently be “unbundled” to provide any entity other than the cable operator with control over the access facilities. As additional forms of competitive infrastructure are deployed, this competitive dynamic will evolve.**
- 2. Given the role of retail bandwidth-intensive services as a driver of wholesale fixed network access to end users, both full unbundling and shared access (or line sharing) fall within the relevant product market definition. The current poor retail take-off of ADSL services in most Member States may be, at least in part, attributable to the absence of wholesale inputs that allow new entrants to compete with incumbents in the provision of downstream retail services.**
- 3. The relevant geographic market is national because incumbent PSTN operators have deployed nationwide local loop infrastructures and because the competitive conditions under which service providers seek access to end users is essentially national.**

II. ACCESS TO DEDICATED CAPACITY

Summary:

1. EU Member States generally have identified separate and distinct relevant product markets for retail and wholesale leased lines, and Member States generally have concluded that the geographic scope of these markets is national, except, in the case of wholesale leased lines, where it is judged that point-to-point or region-to-region traffic is characterised by its own distinct conditions of competition. There appears to be a developing consensus among Member States that it is appropriate to sub-divide the wholesale leased lines market into smaller market segments or sub-markets, although the scope of these market segments or sub-markets vary among Member States in terms of capacity or distance (or in terms of terminating and trunk segments in the *United Kingdom*).
2. In its administrative practice under Article 81 EC and the *Merger Regulation*, the Commission also has identified a wholesale product market for carrier services. More recently, in its *Leased Lines Sectoral Inquiry*, the Commission narrowed its market definition of wholesale leased lines, finding that the national leased lines market could be defined to include separate product markets for leased lines over short and long distances, and possibly also according to capacity of the relevant circuits. In the *Sectoral Inquiry*, the Commission concluded that the geographic market for national leased lines may be narrower than national given the geographically unequal development of competition in most Member States, where the geographic market for international leased lines appears to be at least European, if not global.
3. The Study Team concludes that retail and wholesale markets for local dedicated capacity continue to be dominated by incumbent PSTN operators. By contrast, the Study Team finds that long distance and international dedicated capacity at both the wholesale and retail levels are highly competitive.

II.1 EU MEMBER STATE ANALYSIS

Issues:

1. The extent to which retail leased line offerings reflect particular supply and demand characteristics which are independent of other aspects of “dedicated” services.
2. The extent to which wholesale leased line offerings can be segmented and the degree to which those segments can be identified as “relevant markets”.

II.1.A. Retail

a. Summary of Main Relevant Markets Identified by Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|---|---|--|
| Retail leased lines (<i>France</i> , ³⁰ <i>Spain</i> , ³¹ the <i>United Kingdom</i>). | None. | National. |
| International Private Leased Circuits (low and high capacity) (the <i>United Kingdom</i>). | None. | Paired country routes or possibly groups of countries. |
| Vision circuits (the <i>United Kingdom</i>). | None. | None identified. |

b. Relevant Product Markets

(i) General Conclusions

Three EU Member States (*France*, *Spain*, the *United Kingdom*) have identified a very broad relevant product market for **retail leased lines**. This product market consists of dedicated access facilities leased by large businesses to transmit voice and data communications. In addition to this market, Oftel in the *United Kingdom* has also identified separate product markets for **international private leased circuits** and **vision circuits**.

Three EU Member States (*Italy*, *Portugal*, *Spain*) also have identified a separate relevant product market for **private voice telephony services**, which usually are provided via leased lines.

Beyond these express “market definition” approaches, the remaining Member States have regulated the leased line offerings of incumbent PSTN operators as a direct reflection of Community law requirements under the existing ONP regime.

(ii) Specific Analysis

In the *United Kingdom*, Oftel has distinguished between retail and wholesale leased line markets and has identified a broad national market for **retail leased lines (end-to-end leased lines)**, which it describes as permanent connections (which may be provided at a variety of bandwidths) between two customers’ premises dedicated to the individual customer’s exclusive use. These leased lines are “final” services; in other words, the customer does not use them as an input in the provision of other telecoms services to other customers. Oftel has undertaken a market analysis of the retail leased lines market and has concluded that, on the demand side, switched data services (*i.e.*, frame relay and ATM services) are not good substitutes for retail leased lines in cases where customers require leased lines for voice applications. On the supply side, Oftel has found that an increase in the price of retail leased

³⁰ The ART in *France* has identified this market specifically as “the retail market for leased lines that link several sites of large business firms (or public authorities, other telecoms operators, ISPs/data carriers) within an urban area”.

³¹ In *Spain*, the CMT has identified this market specifically as “the retail market for leased lines for business customers or corporate networks”.

lines would be unlikely to encourage other operators to switch their existing resources in order to supply retail leased lines.

Oftel has also identified separate product markets for **international private leased circuits (IPLCs) (low capacity and high capacity)** and **vision circuits**. According to Oftel, IPLCs consist of the leasing of international digital circuits for international services and include both a retail and wholesale component. “Vision circuits” are private circuits used to carry broadcast sound and visual services, and which constitute a separate market from other forms of private circuits because there is a choice of suppliers in the market for vision circuits and considerable buying power – two factors which restrain prices.

In *France*, the ART has defined the retail market for **leased lines that link several sites of large business firms within an urban area**. Other potential customers in this market include public authorities, as well as other telecoms operators and service providers (such as ISPs and data carriers).

In *Spain*, the CMT has defined the relevant market for leased lines consistent with the terms of the *Leased Lines Directive* (92/44/EC) and has distinguished between the **retail market for leased lines for business customers or corporate networks** and the **wholesale leased lines market for telecoms operators**.

The CMT also has identified a specific national market for **closed user group services** provided over corporate leased lines, which includes telephone corporate services such as IBERCOM, CENTREX, inter-LAN connections and ISDN access. A similar market has been defined in *Italy* on the basis of the *Services Directive* (90/388/EC), while legislation in *Portugal* has defined a market for a similar concept, namely, **private voice telephony services**.

c. Relevant Geographic Markets

The general consensus among EU Member States is that the retail markets for leased lines and private voice telephony services are national in scope.

With regard to IPLC services, Oftel in the *United Kingdom* has considered that it is appropriate to look at paired country routes as separate IPLC markets because the delivery of a call to one country is not generally a good substitute for the delivery of a call to another country. Oftel has suggested, nonetheless, that because it is possible that indirect transmission services may provide effective supply side substitutes, it may be more appropriate to treat a group of countries as a single geographic market at one end of a route rather than looking at individual routes to each country.

d. Relevant Product and Geographic Markets Identified Outside the EU

Outside the EU, the DoJ in the *United States* has identified a relevant market for **dedicated services** in the context of a merger-related complaint, which includes “local private line services” (dedicated lines connecting multiple locations of an end user within a given metropolitan area). The DoJ has concluded that this market is local in geographic scope, since consumers of dedicated services in a given metropolitan area cannot turn to providers who do not provide dedicated services in that area.

The DoJ has also identified **international private line services** as a relevant product market with a national geographic scope. These services are dedicated international circuits provided to a customer to use in any manner and with any hardware that the customer chooses. The services are used predominantly for data traffic, but can carry voice communications also. The DoJ has also identified a national market for **interLATA private line services and interLATA X.25, ATM and frame relay data network services**, which are private line services and data networks that can be used to transmit data files between computers connected to a local area network or wide area network.

Meanwhile, in *Canada*, the CRTC has identified two relevant product markets for Interexchange Private Line (IXPL) services: **voice grade and other analogue (VGA) services** and **high capacity services and digital data systems (DDS)**. The latter market involves digital services and is geared to customers who demand higher quality and speeds greater than available with VGA services. For the purposes of its forbearance analysis, the CRTC has concluded that each route should be considered as a distinct relevant geographic market for IXPL services because these types of services are offered and provided on a route-specific basis and customers require these services on one or more routes.

The CRTC has also identified **digital network access (DNA) services** as a relevant market for forbearance purposes, which are used to support a broad range of data access services, including packet switching, frame relay and long distance dedicated services. Customers that operate in more than one location typically use high capacity DNA to interconnect their local area networks and wide area networks. The CRTC has identified the wire centre as the appropriate geographic unit for the purposes of forbearance from regulation of DNA services.

Finally, although the CRTC has not specifically identified **wide area network services** as a “relevant market”, it has identified the geographic scope of these services for forbearance purposes as national or regional in scope rather than route-specific as in the case private line services. According to the CRTC, although in certain situations WAN services may be an alternative to private line services, there are considerable differences between WAN and private line services, namely: (i) WAN services are neither priced nor offered on a route-specific basis; and (ii) private line services involve dedicated lines on specific routes for the physical transport of voice and data traffic between sites, while WAN services involve networking amongst interconnected sites on lines that are not dedicated.

Conclusions:

- 1. There is a common understanding across the EU Member States that the provision of leased lines is directed towards business end users whose volume of traffic is sufficiently high to warrant the expense of leasing a dedicated line.**
- 2. The relevant geographic market is understood to be national, although the *United States* considers it to be local, given the regulatory restrictions on certain operators providing service outside their service territory.**
- 3. Some Member States have also chosen to identify separate product markets for private telephony services which are provided to large business customers over leased circuits. When these services are of the international variety, the general consensus appears to be that it is appropriate to treat pair country routes as separate geographic markets, unless the competitive characteristics of a group**

of country routes dictate that they be treated as a single geographic market (this approach presumes the existence of re-routing options on the supply side).

II.1.B. Wholesale

a. Summary of Main Relevant Markets Identified by Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|---|--|---|
| Wholesale leased lines (<i>Austria, Belgium, Denmark,³² Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, Sweden, the United Kingdom</i>). | <ul style="list-style-type: none"> • International (analogue and digital) leased lines (<i>France</i>). • Long distance leased lines (<i>France, Italy</i>). • Local leased lines (<i>France</i>); short distance or “urban” (less than 5 km) leased lines (<i>Italy</i>). • Low bit rate leased lines (<i>France</i>); low capacity leased lines (<i>Ireland</i>). • High bit rate leased lines (<i>France</i>); high capacity leased lines (<i>Ireland</i>). • Wholesale trunk segments (the <i>United Kingdom</i>). • Wholesale terminating segments (the <i>United Kingdom</i>). • Smaller than 2 Mb (<i>The Netherlands</i>). • 2 Mb (<i>The Netherlands</i>). • Greater than 2 Mb (<i>The Netherlands</i>). • 2 Mb or greater (<i>Finland</i>). • Permanent Virtual Circuits (<i>The Netherlands</i>). | Generally, national, although the <i>United Kingdom</i> recognises that smaller local markets may exist for wholes terminating segments in future if geographic deaveraging occurs. The NRA in <i>Belgium</i> is currently examining whether the market should be defined on a route-by-route basis. In <i>Ireland</i> , the NRA considers it appropriate to distinguish between international and national leased lines. |
| Backhaul circuits of STMS-1 level (155 megabits) and above (the <i>United Kingdom</i>). | None. | |
| International Private Line Circuits (low and high capacity) (the <i>United Kingdom</i>). | None. | Paired country routes or possibly groups of countries. |

³²

In *Denmark*, the NCA has identified a broad national market for access to fixed networks (“fixed network subscriptions”), which appears to include access to leased lines. Meanwhile, the NRA has identified a wholesale market which includes leased lines sub-markets.

b. Relevant Product Markets

(i) *General Conclusions*

On the wholesale side, the majority of EU Member States (*Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, Sweden, the United Kingdom*) have identified a general **wholesale market for leased lines**.

Six Member States (*Denmark, France, Ireland, Italy, The Netherlands, the United Kingdom*) have further sub-divided the broad market for leased lines into smaller segments, although the scope of these segments varies among these Member States in terms of capacity or distance (or in terms of terminating and trunk segments in the case of the *United Kingdom*).

(ii) *Specific Analysis*

In *Greece* and *Portugal*, the respective NRAs have identified one broad **wholesale market for leased lines** in the process of incorporating the relevant Community directives, and this market includes all types of leased lines – analogue, digital and high capacity lines, international leased lines, and leased lines via satellite. Meanwhile, in *Germany*, the TKG has recognised the existence of an overall market for leased lines which is presently delineated on the basis of the technical provisions contained in Annex II of Community Directive 92/44/EC (*Leased Lines Directive*). In *Spain*, the CMT has defined a leased lines relevant market for the purposes of imposing obligations on operators with SMP on the basis of Community Directives 98/10/EC (*Revised Voice Telephony Directive*) and 97/33/EC (*Interconnection Directive*).

In *France*, the ART has distinguished between various leased line markets based on distance and capacity, and has identified six distinct leased line markets:

- (i) international (analogue and digital) leased lines
- (ii) leased lines between metropolitan France and overseas departments (DOMs) and between DOMs
- (iii) long distance leased lines
- (iv) local leased lines
- (v) low bit rate leased lines
- (vi) high rate leased lines.

The ART has indicated that further market segmentation on the basis of available high bit rate leased lines might be possible.

Meanwhile, in *Italy*, the NRA has sub-divided the wholesale leased lines market only according to distance: (i) **short distance or “urban” (less than 5 km)**; and (ii) **long distance or “backbone” circuits**.

In *Ireland*, the ODTR has identified a market for leased lines services based on Community law. In identifying this market, the ODTR has focused on capacity and has considered that, from a demand perspective, **high and low capacity lines** are unlikely to be substitutes for a large number of customers; from a supply perspective, it would be difficult and costly to convert multiple low capacity lines into the equivalent of a high capacity line. Therefore, the ODTR has determined that it is appropriate to identify distinct markets based on the basis of high and low capacity. The ODTR has decided not to distinguish between analogue lines and

low capacity (64 kbit/s) digital lines, however, because analogue lines could be converted to low capacity digital lines at a low cost, and digital lines could be used to provide carrier services for analogue signals.

Similarly, the leased lines market in *The Netherlands* (which Dutch legislation defines consistent the leased lines market identified in the *Interconnection Directive* (97/33/EC)) has been segmented according to capacity. The District Court recently ruled, in an appeal by KPN of OPTA's Decision designating it as an operator with SMP, that OPTA should sub-divide the market for leased lines into market segments for leased lines **smaller than 2Mb**, **2Mb, greater than 2Mb**, and for **Permanent Virtual Circuits**. OPTA has since recognised that KPN does not have SMP in the market for leased lines greater than 2Mb.

Oftel in the *United Kingdom* has adopted a somewhat different approach. It has defined a leased line as an "input" or an "intermediate service" used "in the provision of another telecoms service that is purchased at the retail level by the final customer" and has distinguished between the **market for wholesale trunk segments** (with a trunk segment defined as capacity between the serving centres for leased lines located at trunk exchanges which are generally at the DMSU level of an operator's network) and the **wholesale market for terminating segments** (with a terminating segment defined as capacity between a customer's premises, through a serving local BT exchange, to a point of interconnection at any of BT's DMSU centres used for routing leased lines to that serving exchange). Oftel has declined to distinguish between markets for high and low bandwidth terminating segments, and instead prefers to define one market for the terminating segments of all bandwidths, because the costs of providing such segments are not dependent on bandwidth.

Oftel has also identified a distinct market for **backhaul circuits of STMS-1 level (155 megabits) and above** as a separate and distinct product market, which consists of high capacity inland circuits that connect a cable landing station and an operator's existing domestic infrastructure (usually the operator's international switching centre). In its last price control review of BT's retail prices, Oftel also has identified a separate market for **IPLCs (low and high capacity)**, which includes the supply of international digital circuits for international services to retail customers as well as to other operators.

In *Finland*, the NCA has recognised the provision of leased lines and subscriber-network connections to form a relevant market for **network services**, which is subsumed by the broader market for local telecommunications services. It also appears that competition authorities in *Finland* recognise a specific and distinct market for the provision of network subscriber connections for **transmission capacity requirements of 2Mb or greater**.

In *Denmark*, the NRA distinguishes between an end user and wholesale market and has identified within the wholesale market sub-markets for lower transit (between the local centre and the first level transit centre), higher transit (between two transit centres) and international links.

c. **Relevant Geographic Markets**

Seven Member States (*Austria, Belgium, Greece, Italy, The Netherlands, Portugal, Spain*) have described the wholesale market for leased lines as being national in scope, with the Italian NCA and NRA explaining that the provision of leased lines is conditioned by the existence of a national authorisation regime, and requires the existence of a national telecoms infrastructure. The NRA in *Belgium*, however, is currently examining whether certain

elements of the wholesale leased lines market should be defined on a route-by-route basis (e.g., the Brussels-Antwerp route). In *Ireland*, the ODTR has considered it appropriate to distinguish between international and national leased lines and has stated that, because some operators may be able to offer leased lines with termination points in only limited areas, a further distinction between geographical sub-markets might be required in the future.

Meanwhile, Oftel in the *United Kingdom* has defined a national geographic market for wholesale terminating segments, but recognises that separate smaller local markets might exist in the future, particularly if geographic deaveraging occurs. With regard to the geographic scope of the wholesale IPLC market, Oftel has applied the same analysis as it does at the retail level, concluding that it is appropriate to view paired country routes as separate markets, although a group of countries may be treated a single market if indirect transmission services provide effective supply side substitutes.

d. Relevant Product and Geographic Markets Identified Outside the EU

Outside of the EU, *Australia* and the *United States* both have identified relevant markets for wholesale leased line services.

In *Australia*, the ACCC has defined a market for **domestic transmission capacity service**, with each inter-capital city route being a separate geographic market. Inter-capital city transmission capacity service is used as an input by access seekers to provide fixed line long distance and international call services, mobile and data-related services, and IP-based services to end users. Capacity can be carried by a number of technologies, including terrestrial fibre optic cable (potentially using existing electricity utilities infrastructure, satellite, digital microwave and submarine cables). This market is considered by the ACCC to have an equivalent wholesale and retail level.

In the *United States*, the FCC has identified a relevant market for **international transport**, which includes submarine cable facilities and satellite systems, and provides users with an international physical transmission path over which they may offer any services (i.e., switched voice telephony or data traffic). The FCC has decided to adopt a regional approach to analysing this market, even though the geographic market is more accurately described as a series of point-to-point markets, because international submarine cables tend to serve entire regions (i.e., Atlantic, Pacific and Caribbean/Latin America).

Meanwhile, the DoJ in the *United States* has identified a relevant market for **dedicated services** in the context of a merger-related complaint, which includes “special access” services (the provision of dedicated lines carrying traffic from the premises of high-volume end users to the end user’s long distance carrier, or between a given long distance carrier’s PoP). The DoJ has concluded that this market is local in nature, largely for regulatory reasons.

Conclusions:

1. There appears to be a consensus developing that different “markets” for wholesale leased line offerings are configuring around the following criteria: (i) up to 2Mbits and those over 2Mbits; (ii) “short” or “urban” leased lines; and (iii) “long distance” or “backbone” leased lines. Given that the bandwidth division roughly maps the division between short and long distance leased lines, there may be clear patterns of supply and demand developing along such lines.
2. Some Member States have segmented leased line offerings even further, although the Study Team takes the view that this further segmentation might be unnecessary in light of the broader bandwidth/distance market distinctions recognised by many Member States. A key issue raised by the *United Kingdom* approach is whether the terminating segments of leased lines should be dealt with as distinct and separate market segments to the trunk segments of leased lines.
3. It is arguable that backhaul also currently constitutes a separate and distinct relevant market, as has been recognised by the *United Kingdom’s* Oftel.
4. There is a growing tendency to treat point-to-point long distance routes as constituting separate product markets (*e.g., Belgium, Germany, Australia*) because of the availability of competitive alternatives. Where rerouting possibilities exist for very long-haul routes, it is even feasible that point-to-point routes can be better expressed on a region-to-region basis (*e.g., the approach taken by the FCC in the United States*).
5. The relevant geographic market for leased lines will usually be national, except where it is judged that point-to-point or region-by-region traffic is characterised by its own distinct conditions of competition. The growth of pan-European trunk (or carrier’s carrier) services will mean that some relevant geographic markets may already be pan-European or international.

II.2 ANALYSIS UNDER EU COMPETITION RULES

Under the Commission’s competition law analysis of mergers and joint ventures under Article 81 EC or the *Merger Regulation*, leased line offerings have generally been examined within the context of the broader wholesale market for carrier services³³ or, more particularly, international carrier services.³⁴

In *Phoenix/GlobalOne*, the Commission defined the market for carrier services as comprising “the lease of transmission capacity and the provision of related services to third-party

³³ *Phoenix/GlobalOne* Case IV/35.617, para. 10; *Unisource* Case IV/35.830, para. 28; *GTS-Hermes Inc./HIT Rail BV* Case IV/M.683, para. 12

³⁴ *BT/AT&T* Case IV/JV.15, paras. 74-75.

telecoms traffic carriers and service providers.”³⁵ According to the Commission, demand for such services has been increasing, “driven by domestic alternative carriers in liberalised countries concerned at entrusting their international traffic to the incumbent TO (telephone operators) for reasons such as technical dependency and commercial sensitivity of customer information”, and therefore seeking an alternative to the incumbent to handle their international traffic.³⁶ The most relevant carrier services are:

- **switched transit** (i.e., the transport of traffic over bilateral facilities between the originating carrier, the transit carrier and the terminating carrier);
- **dedicated transit** (i.e., leased line offerings for the transport of traffic through the domestic network of the transit carrier);
- **traffic hubbing offerings** (i.e., where the provider takes care of all or part of international connections); and
- **reseller services** for service providers without international telecoms facilities of their own.³⁷

In subsequent Decisions, the Commission has reconfirmed the existence of a separate relevant market for carrier services, but has left open the question of whether the provision of carrier services should be looked at in terms of country pairs (similar to how the Commission has historically looked at the provision of international direct transmission services – i.e., wholesale IDD and IPLCs services) or on a more global basis.³⁸ According to the Commission, it could be argued that the provision of carrier services (for instance through the leasing of telecoms capacity) between any given pair of countries or territories constitutes a separate relevant market. Alternatively, it has been explained to the Commission that with the availability of satellite telecoms and transiting through third countries or territories, bilateral routes could be regrouped in wider categories for the purpose of defining relevant markets. In *BT/AT&T*, the Commission took the view that the increasing importance of switched or dedicated transit, re-origination, least-cost routing and hubbing services possibly allows analysis of the relevant product market for carrier services without reference to a distinct origin or destination pair.³⁹ However, the question of how to define the market for the provision of carrier services between pairs of countries or territories has often been left open by the Commission because the precise market definition has not been critical to its competitive analysis.⁴⁰

In the wake of its case-law experience and a series of informal complaints filed with the Commission during 1999 alleging limited or unfavourable conditions of access to networks and services in some particular market segments, including the leased lines market, on 27 July 1999 the Commission launched a Sectoral Inquiry into the provision and pricing of lease lines

³⁵ *Phoenix/GlobalOne*, para. 10.

³⁶ *Phoenix/GlobalOne*, para. 10; *BT/AT&T*, para. 75.

³⁷ *Phoenix/GlobalOne*, para. 10; *BT/AT&T*, para. 75.

³⁸ *BT/AT&T*, para. 78.

³⁹ *BT/AT&T*, para. 74.

⁴⁰ *BT/AT&T*, para. 78; *France Telecom/Equant Case IV/M.2257*, para. 17.

in the EU Member States.⁴¹ On 8 September 2000, the Commission summarised its main provisional findings of the Inquiry in a Working Document⁴² as follows:⁴³

- Competition is growing in certain markets, and there appears to be a powerful competitive pressure at the retail level.
- Demand is dramatically increasing, with the biggest driver being the Internet.
- Supply is growing and will further increase once Wireless Local Loop is commercially provided and alternative infrastructure is further deployed.
- There is a correlation between the number of suppliers in a given market, and the level of prices.
- Domestic leased lines revenues vary from below 1% to above 17% of the total revenues for selected EU fixed line incumbent operators.
- A benchmarking exercise for international leased lines confirms that prices among different Member States diverge widely, and that this divergence cannot be explained exclusively by variations in distance. The comparison of prices of national leased lines confirmed very divergent ways of pricing leased lines by the fixed line incumbents in different Member States.
- The most important non-price related problems seem to include potentially abusive strategic discounting and discriminatory delays in the provision of leased lines.

More particularly, the Commission also noted that the market definitions used prior to the Inquiry should be improved and narrowed. Accordingly, on the basis of the findings of the Inquiry, the Commission found that national leased line markets could be defined more narrowly, distinguishing at least between short distance leased lines and long distance leased lines. Different product markets might also be distinguished according to the capacity of the relevant circuits.⁴⁴

However, in the Working Document, the Commission left open the question of whether Managed Data Network Services (MDNS) and virtual private network offerings could form part of the same broader market for carrier services or constitute distinct product markets, since it considered that further data regarding substitutability needed to be collected.⁴⁵ In *France Telecom/EQUANT*, for example, the Commission identified the provision of cross-border MDNS as a separate market within the wider category of global telecoms services.⁴⁶

⁴¹ See Commission Press Release, IP/99/786.

⁴² Commission Working Document on the initial results of the Leased Lines Sectoral Inquiry, 8 September 2000.

⁴³ *Ibid.*, pp. 3-4.

⁴⁴ Commission Working Document, p. 11.

⁴⁵ Commission Working Document, p. 11.

⁴⁶ *France Telecom/Equant*, para. 23.

II.2.A. Demand-side Analysis

In its *Phoenix/GlobalOne* and *Unisource* Decisions, the Commission concluded that the demand for carrier services is increasingly driven by alternative carriers, which include both established and emerging carriers. Among the emerging carriers, the Commission distinguished between facilities-based carriers on the one hand, and non-facilities-based carriers and service providers on the other. Both groups of emerging carriers seek to preserve a competitive advantage by avoiding dependence on a local operator for international client traffic.⁴⁷

Subsequently, in its Working Document in the Leased Lines Sectoral Inquiry, the Commission considered that the main customers of leased lines include mobile telephony network operators, which require leased lines to connect their network equipment and to terminate calls on the incumbent's fixed network in any given Member State. However, since liberalisation, there is also an increasing demand from new fixed operators wishing to purchase wholesale transmission capacity (generally providing advanced data services to businesses around large urban areas or to ISPs).⁴⁸

On the retail side, the Commission noted that demand for international leased line offerings comes principally from business users (mostly MNCs). In this respect, the Commission considered that demand exists from MNCs both for the package of end-to-end sophisticated telecoms services (including telephony, data services, IP connectivity, videoconferencing, full customer service and technical assistance, *etc.*) and for individual services purchased separately. The Commission further stated that national or domestic leased lines are primarily required by a variety of business users, such as banks, financial services providers, stores, information service providers and so on, which wish to construct or purchase various enhanced and value-added telecoms services.⁴⁹

II.2.B. Supply-side Analysis

On the supply-side, the Commission concluded in its Working Document in the Sectoral Inquiry that that class of suppliers of wholesale leased lines, both domestic and international, has increasingly diversified into a variety of carriers and service providers, as well as third-party market participants. Moreover, according to the Commission, there is a growing number of "carrier's carriers", including not only incumbent telecoms network operators with strong market positions, but also new carriers constructing alternative infrastructure.

Leased line capacity is also offered on a retail basis by many telecoms service resellers which do not operate their own facilities. In *Telia/Telenor*, the Commission recognised that long distance connectivity may also be obtained from providers of network infrastructure by using leased lines and/or network transport services. The providers of such data communications services assemble the offers from these various elements, and present them to the customer as one "seamless" package.⁵⁰

⁴⁷ *Phoenix/GlobalOne*, para. 11; *Unisource*, para. 28.

⁴⁸ Commission Working Document, p. 7.

⁴⁹ Commission Working Document, p. 7.

⁵⁰ *Telia/Telenor* Case IV/M.1439, para. 104

The Commission also noted that companies have emerged which offer transmission capacity for purchase or which lease on a spot market or on a commodity basis, known as “bandwidth exchanges”. Some of the most significant price decreases for leased lines, both retail and wholesale, have come from such “bandwidth exchanges”, and there is likely to be an increased supply of leased lines by such exchanges not only from exchange providers themselves, but also from alternative capacity providers (such as electric utilities) in the future. Leased line capacity may be offered not only for lease, but also for purchase, *e.g.* customers may buy Indefeasible Rights of Use (IRUs) to a given capacity for a given period of time, which was formerly only available to public telecoms operators. Finally, wholesale leased line offerings vary greatly among different Member States and along different routes, depending on network architecture and the availability of alternative infrastructure.⁵¹

II.2.C. Relevant Geographic Market

With respect to the question of whether the geographic scope of the leased lines are global, EU-wide or narrower, the Commission’s latest Decisions conclude that both the supply and demand for carriers services are at least cross-border regional and possibly global.⁵² By contrast, in its earlier *Phoenix/GlobalOne* Decision, the Commission stated that supply and demand for carrier services are by nature international and, in its *Télecom Développement* Decision, the Commission identified the particular market for the provision of carrier’s carriers services in that case as being national in scope.⁵³

In the Working Document on the initial results of the Leased Lines Sectoral Inquiry, the Commission concluded that although the geographic markets for national leased lines, given the existing licensing regime, appears to be national, it is likely to be narrower (*i.e.*, possibly consisting of large “metropolitan” and “rest of country” segments) given the geographically unequal development of competition in most Member States. Meanwhile, for international leased lines, the geographic markets appear to be at least European, if not global.⁵⁴ Nevertheless, the Commission noted that it is necessary to conduct a more detailed geographic market definition, taking into account the wide variation of tariffs for international leased lines, depending on the place of origin.⁵⁵

Conclusions:

- 1. The Commission identified, in its Leased Lines Sectoral Inquiry, different patterns of substitutability for leased lines over short and long distances.**
- 2. The Commission’s administrative practice in its review of strategic alliances under Article 81 EC (formerly Article 85 EC) and the *Merger Regulation* has identified distinct product markets for carrier’s carrier services and, more recently, for cross-border Managed Data Network Services (including Virtual Private Network offerings).**
- 3. National leased lines are targeted at a variety of business users, including**

⁵¹ Commission Working Document, pp. 8-9.

⁵² *Unisource*, para. 32; *BT/AT&T*, para. 90.

⁵³ *Phoenix/GlobalOne*, para. 16; *Télecom Développement* Case IV/36.581, para. 15.

⁵⁴ Commission Working Document, at p. 11.

⁵⁵ Commission Working Document, at p. 11.

banks, financial service providers, stores and so forth.

- 4. A distinctive market has developed for carrier's carrier services.**
- 5. As regards geographic market definition:**
 - **leased lines are primarily available on a national basis, although a division is appearing in terms of "metropolitan" and "rest of country" availability;**
 - **some transnational carriers are providing international leased lines on a pan-European basis, and a growing number of new entrants are purchasing capacity on a pan-European basis;**
 - **carrier's carrier services are at the very least regional (pan-European), and often global;**
 - **route-to-route markets are discernible, although rerouting options suggest that even these routes may need to be included in broader geographic markets (e.g., point-to-region, region-to-region).**

II.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

Access to dedicated capacity (e.g., leased lines) is a key building block for alternative carriers being able to self-provide domestic, international or combined telecoms services to customers, and for large corporate customers being able to provide enhanced and value-added telecoms services for themselves. Access to dedicated capacity refers to the ability of alternative carriers (at the wholesale level) or large corporate users (at the retail level) to acquire the right to use a defined amount of unswitched capacity over the telecoms infrastructure of a network owner in order to carry traffic between two points.

Because of the very high sunk costs which would otherwise need to be incurred by operators seeking to provide a competitive alternative network to that of national PSTN operators, the fundamental inputs required by most competitors and large business users are either leased lines from the incumbent PSTN operator or other forms of dedicated capacity, whether provided in the form of IRUs or dark fibre (wholly unmanaged capacity) or even virtual private networks (VPNs) (which require a very high degree of management). In between these two extremes, leased lines (which include an element of management) provide most operators and business users with their fundamental needs in terms of a platform over which to self-provide services or to provide integrated communications services to corporate customers. Thus, it is essentially the bandwidth input that is used to provide the whole range of end user services, in the necessary customised mixes.

The process of defining relevant markets for access to dedicated capacity begins on the retail side, where demand for dedicated capacity from (largely non-residential) end users, and the ability of different operators to satisfy this demand, establish the parameters of the corresponding wholesale markets.

II.3.A. Elements Indicative of the Relevant Market

a. Demand-side Analysis

An assessment of the conditions of demand for dedicated capacity at both the retail and wholesale levels needs to take into account the following factors:

- the importance of bandwidth;
- the role of distance and geography;
- the evolution of demand at national and international levels;
- the relevance of local tail segments; and
- price evolution at national and international levels, and of local tails.

While there is clearly both wholesale and retail demand for local, long distance and international dedicated capacity, in almost all Member States there are currently few explicit wholesale offers.⁵⁶ It is likely that regulatory pressures exerted by NRAs will remedy this situation in the short term.

At the retail level (*i.e.*, where the capacity is not being used as an input into the provision of some other telecom service), the demand for leased lines comes from large corporate customers which use leased lines to self-provide private communication links between their facilities and various enhanced and value-added telecoms services.

At the wholesale level, the demand for capacity comes from telecoms operators and others wishing to provide either or both domestic and international telecoms services or Internet services to their customers. The main customers are: (i) mobile telephony operators, which require leased lines to connect their network equipment and terminate calls on the incumbent's fixed network; (ii) new entrant fixed telecoms operators, which wish to purchase wholesale transmission capacity to provide services to (generally corporate) customers around large urban areas or to ISPs; and (iii) ISPs, which use leased lines to provide the capacity that they need to provide Internet services to their end users.

Dedicated capacity differs from switched services in a number of key respects: (i) it can only be used to provide services between the points connected by the lines; (ii) the acquirer is able to provide the services that it wishes to provide in the combinations and mixes of its choice; (iii) pricing is linked to capacity, not usage; and (iv) pricing is not linked to the nature of the services provided over the leased capacity. As a result, switched services rarely provide a substitute for dedicated capacity.

(i) Importance of Bandwidth

Capacity (including leased lines) is required (and supplied) in various amounts of bandwidth and is a fundamental input for entities providing such Internet and e-commerce services. The explosive growth of the Internet and e-commerce, and the corresponding demands of users for access to ever greater amounts of capacity, have fuelled the surging demand for dedicated (unswitched) capacity at both the retail and wholesale levels. Between different bandwidths, there appears to be limited substitutability due to differences in pricing, provisioning time and

⁵⁶ BT now provides a wholesale leased line offer, following intervention by Ofcom. Deutsche Telecom is expected to be required to offer wholesale leased lines in the short-term.

traffic volume. While the market appears to be quite fragmented, in terms of the range of different bandwidth offerings, there appears to be a break point in demand at 2 Mbps (*i.e.*, the vast majority of the leased line market is accommodated at or below this bandwidth). For example, in the *United Kingdom*, 86% of leased lines and 53% of leased lines revenue were accounted for by lines up to 2 Mbps in the year 2000; an additional 13.5% of lines and 41% of line revenues were accounted for by 2 Mbps lines.⁵⁷ A number of commentators have predicted that demand for leased lines will polarise around lines up to and including 2 Mbps and lines of 34 Mbps (*i.e.*, E3).

While the supply of dedicated capacity historically has been dominated by incumbent PSTN operators, many new entrant and end user acquirers of capacity have claimed that they were unable to acquire the bandwidth that they required (*e.g.*, either they were forced to acquire bandwidth in blocks of capacity other than those sought, or were unable to acquire the amount of bandwidth sought). Over the past few years, the growth of new entrants and the trading of IRUs and dark fibre on bandwidth exchanges, however, has made bandwidth more readily available (in both blocks and absolute volumes sought) to both retail and wholesale customers, providing entities without infrastructure (or an interest in infrastructure) with the sort of access to capacity that (in the past) was accessible only to cable owners and members of cable consortia.

(ii) *Role of Distance and Geography*

Aside from bandwidth, capacity is also described and categorised by acquirers in terms of distance and geography. For example, **local** leased lines (also called “tails”) are generally no more than five kilometres long⁵⁸ and are used to connect end user premises with the infrastructure of communication service providers (including carriers and ISPs), public traffic exchange points (*e.g.*, Internet exchanges), or to provide the local tails for longer distance leased lines. Dedicated capacity is also acquired **nationally** (*e.g.*, between metropolitan areas and as city loops around major population centres). National capacity is also described by distance (generally 50km and 200 km). The third geographic classification, **international** capacity, includes intra-European and intercontinental capacity.

(iii) *Evolution of Demand for National and International Capacity*

The nature of wholesale demand for national and international capacity is still evolving. New entrants are increasingly seeking to ensure that they are not dependent on incumbents’ networks for the carriage of their international traffic. By acquiring international capacity that they can manage, new entrants (which may include facilities-based new entrants, mobile carriers and cable network operators) and ISPs are able to achieve greater efficiency and control over the transport of their customer’s international traffic.

Demand for national and international dedicated capacity continues to rise sharply. Between 1995 and 1997,⁵⁹ private line capacity between the United States and the EU rose at an annual rate of 172.6% (compared to an annual increase of international switched traffic of 18.7%). Moreover, in 1995, leased lines accounted for only 17% of active capacity between the United

⁵⁷ “National Leased Lines: Effective competition review and policy opinions”, Oftel, 2000.

⁵⁸ In some Member States, tails may be longer than 5 kms. However, the slight variations in distance should not substantially affect the regulatory questions at issue.

⁵⁹ The 1995 to 1997 period saw the first substantial commercial use of Internet in the U.S. and elsewhere.

States and OECD countries, whereas in 1997 it had increased to 51.8%.⁶⁰ Significantly, 1997 was the first year in which dedicated capacity volumes surpassed public switched telecoms services, globally.

(iv) *Local Tails and Unbundled Loops*

Local tails (known as terminating segments in the *United Kingdom*) are acquired both in their own right and as a necessary input (as the means to acquire local access) for the wholesale provision of, and retail self-provision of, both national and international leased lines. Many non-residential end users use local tails as their permanent access connection. In the vast majority of cases, neither wholesale nor retail customers can acquire such local connections from any entity other than the PSTN incumbent. However, wholesale acquirers of local loops have the option of acquiring unbundled local loops for circuits of up to 2 Mbps capacity (they may, in fact, provide significantly less bandwidth). If local loop unbundling and roll-out of xDSL technologies are used *increasingly* to provision the local access segment of the leased line market, retail traffic would concentrate at DSLAMs or other well defined hand-over points (such as regional points of presence). As such, the use of xDSL technology could have the effect of focussing the wholesale market for the provision of leased lines at those points, thereby facilitating retail competition. Of course, such unbundled local loops must, in the vast majority of cases, also be acquired from the incumbent. In the overwhelming majority of cases, and given the existing capacity constraints, local tails are the most appropriate means of acquiring end-to-end circuits for most providers of wholesale dedicated capacity.⁶¹

(v) *Price Evolution*

National and International Capacity

Comparing national and international dedicated capacity pricing is an inherently difficult task. While leased lines were initially priced at a discount on PSTN switched prices, their pricing structures have evolved over time in a manner that is, in some cases, almost impenetrable. In many cases there are at least four different sources of, and variations on, pricing for national and international dedicated capacity:

- Standard list or retail price (usually published for a circuit or half circuit). Few customers pay this rate in a market on which there is competition.
- Discounted list or retail price (negotiated by the customer). The range of discounts which customers can negotiate varies enormously.
- Discount prices from new entrants competing with the incumbent.
- Spot rates for leased lines on a capacity exchange (*e.g.*, Band-X).

⁶⁰ Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 8.

⁶¹ It should be noted that a number of analysts have suggested that operators may be behaving strategically in their introduction of xDSL services (particularly symmetrical SDSL services) in an attempt to avoid cannibalisation of their short-haul leased lines revenues: *see* "Broadband Access: Symmetrical Services – Carriers weigh SDSL services", Communications Week International, 13 August 2001. Similar strategic behaviour in relation to the unbundling of local loops would deprive competitors of an input that they would require to provide such services themselves at the retail level (competing with the incumbent's leased lines offerings).

To the extent that it is possible to generalise about dedicated capacity pricing, it appears that distance is relatively unimportant as compared to density, as a factor determining national and international leased line prices. In its Sectoral Inquiry, the Commission found widely divergent ways of pricing national and international leased lines (by fixed line incumbents) in different Member States. Overall, the Commission found that the pricing of international leased lines is higher than for national leased lines of comparable length and bandwidth. The Commission noted that this may be the result of tariff imbalances caused by incumbent operators historically pricing international leased lines much higher than national leased lines in order to subsidise other services (especially network access).⁶²

Prices for international leased lines have been falling for certain bandwidth and distance (and geographic) categories. The key drivers in this trend appear to be supply-side competition (either from alternative infrastructure or bandwidth exchanges). In its Sectoral Inquiry, the Commission found a direct correlation between the number of providers in a Member State and the overall level of prices of leased lines, with prices generally lower in countries (and on routes) with many providers. However, the Commission's analysis also found that sheer numbers of suppliers does not invariably result in a larger nominal reduction of prices (as compared to potential and actual price reductions in markets with fewer carriers).⁶³

Across all Member States, price competition has been consistently strongest for capacity between major cities. There is also evidence to suggest that many incumbents have been rebalancing leased line charges by raising short distance prices, while lowering long distance charges. This can be seen particularly in relation to 2 Mbps international half-circuits.⁶⁴ Prices for national leased lines have also decreased across the full range of service offerings. Between 1992 and 1998, the average price of a 2 Mbps national leased line greater than 50km in length in OECD countries fell by 30%. Prices for IRUs or dark fibre (either on a capacity exchange or from the infrastructure operator) will also be taken into account by consumers in making pricing assessments.

Moreover, some of the most significant price decreases for capacity in recent years have been driven by bandwidth exchanges. Most bandwidth exchanges track prices for services in their markets using indices. For example, Band-X operates three indexes which track capacity sales (a UK Index launched in September 1997 and a US Index launched in December 1997, and the Band-X Bit Index which tracks the price of wholesale bandwidth). Between September 1997 and December 1998, the UK Index minute rates fell by 35.6%. The falls on the Band-X Bit Index have been even more spectacular: in its first five months of operation, the Composite World Index declined by 16.6% and the European Index declined by 26.9%. Similarly, RateXchange's European Index fell 40% between June 1998 and January 1999. This trend has continued across Europe. For example, the wholesale price for an STMI from London to Paris was US\$ 6.99 million in 1998. By 1999, this dropped to US\$ 3.49 million, and in 2000 was US\$ 1.67 million. Yankee Group predicted that prices would continue to fall at a rate of approximately 50% per year until the year 2002, when it may ease slightly to 40% per year.

⁶² Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 13.

⁶³ Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 8.

⁶⁴ Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 13.

Local Tails

It is clear that the prices of local tails (particularly lower capacity lines, *e.g.*, 2 Mbps or the 9.6 kbps used by many corporate customers as their permanent local connections) have not followed the trends exhibited by national and international capacity. In fact, prices of leased line tails have actually increased since 1992.⁶⁵ They reached their peak in 1998, but have only slowly declined since then. For example, EU average prices for 2km lines reduced 6%, 9% and 2% in 1998, 1999 and 2000 respectively for 64 kbps lines. Over the same period, 50km and 200 km 64 kbps lines reduced by 7%, 10% and 4%, and 7%, 11% and 6%, respectively. EU average prices for 2km lines reduced 7, 10 and 8% in 1998, 1999 and 2000 respectively for 2 Mbps lines. Over the same period, 50km and 200 km 2 Mbps lines reduced by 7%, 8% and 14%, and 9%, 13% and 13%, respectively. The OECD and the Commission have both noted what appears to amount to rebalancing of tariffs by incumbents (*i.e.*, lowering long distance charges and increasing short-distance charges). The OECD has noted the potential for local leased lines to become a bottleneck.⁶⁶ Local loops are, in many cases, functional substitutes for up to 2 Mbps capacity local tails and, in many Member States, would appear to be substantially cheaper on a line by line basis (the Study Team has no data to indicate the cost differential if co-location and other costs of local loop unbundling are allocated to individual local loops).

b. Supply-side Analysis

Supply-side substitutability for the provision of dedicated capacity is assessed in terms of:

- the evolving sources of supply;
- the impact of substantial discounts on pricing data; and
- the relevance of processing delays

(i) Evolving Sources of Supply

The vast majority of dedicated capacity is still provided by PTOs. However, new infrastructure providers are emerging which construct and sell (largely wholesale) national and international capacity. As a result, the sources of supply of both national and international capacity have become increasingly diversified over the past decade. For example, a recent study estimated that Colt, Energis, KPNQwest and WorldCom, collectively, have about 10% of the approximately €160 billion Western European business market (including dedicated capacity).⁶⁷ A number of telecoms service resellers also have emerged, which do not own their own facilities but simply resell capacity from other network operators.

In addition, in the last few years a number of alternative sources of capacity have entered the market. In particular, there are a growing number of companies that offer transmission capacity for the purchase or lease on a spot market or commodity basis (*i.e.*, “bandwidth

⁶⁵ Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 14.

⁶⁶ “Building Infrastructure Capacity for Electronic Commerce Leased Line Developments and Pricing”, OECD Directorate for Science, Technology and Industry, Committee for Information, Computer and Communications Policy, Aug 1999 p. 24.

⁶⁷ “Alternative Trans-Border Telecoms Service Providers in Western Europe”, Benchmark-IT Performance, July 2001.

exchanges”). The growth of bandwidth exchanges since 1997 has been substantial.⁶⁸ For example, Band-X opened its IP capacity exchange in New York in October 2000 and had also acquired positions in Hong Kong and Frankfurt by February 2001. It had 14,000 members in February 2001.⁶⁹ As noted by the Commission in its Sectoral Inquiry, there is likely to be increased supply of leased lines by such exchanges.⁷⁰ Sellers at capacity exchanges are infrastructure operators (*e.g.*, carrier’s carriers), entities with their own facilities wishing to dispose of excess capacity, and resellers. Buyers include other facilities providers, resellers and corporate end users. Bandwidth exchanges trade minutes, leased capacity (between cities or countries), dark fibre and IRUs. They either operate as “brokers”, through which sellers place offers and/or buyers bid for particular services or as “spot markets”, allowing entities connected to their facilities to acquire or dispose of minutes or capacity from or to other entities similarly connected. Apart from facilitating the disposal of excess capacity without an adverse impact on revenues, bandwidth exchanges can significantly cut wholesalers’ transaction costs (estimated to average 15% of revenues).⁷¹ Bandwidth exchanges are essentially anonymous, allowing infrastructure providers to differentiate pricing without the knowledge of users, partners or competitors. They also allow major end users to dispose of excess capacity (on either a short or long-term basis). Essentially, they increase transparency and reflect actual market prices in a timely fashion.⁷²

Bandwidth exchanges are also diversifying the types of platform whose capacity they trade. For example, in January 2001, RateXchange and the London Satellite Exchange entered into an agreement that allows both exchanges to sell fibre and satellite bandwidth to their customers.⁷³

The increasing availability of IRUs (particularly through bandwidth exchanges) has made it significantly easier for operators to acquire and supply small amounts of cable capacity. By removing the need for entities to actually participate in cable consortia, negotiate termination and/or capacity with the other ends of cables and inject capital into cable construction, access to IRUs has significantly increased the competitiveness of the environment in which dedicated capacity (particularly international dedicated capacity) is provided. IRUs constitute entirely “unmanaged” capacity. While leased lines do not provide significant degrees of management, they generally provide far more than IRUs. As a result, IRUs generally are not substitutable at the retail level. While there is little retail demand for IRUs (or, for that matter, dark fibre), the increased availability of IRUs at the wholesale level has had a clear impact on competition (and pricing) on routes where they are publicly traded. The significant increases in capacity over the last few years is generating a market in which, on particular routes, supply will exceed demand.⁷⁴

⁶⁸ Market analysts have predicted that the online bandwidth trading market will be worth between US\$ 150 billion and US\$ 400 billion a year in the next few years. “Europe holds key to online bandwidth trade”, Total Telecom, 25 September 2000.

⁶⁹ “Band-X adds voice traffic to New York Exchange”, Total Telecom, 20 February 2001.

⁷⁰ Commission Working Document on the Initial Results of the Leased Lines Sector Inquiry, p. 8.

⁷¹ “Trading Places”, Total Telecom, 7 February 2000.

⁷² See “Being Served?”, *Capacity*, July/August 2001, pp. 13-17 (describing the shorter term, more flexible contracts, the faster provisioning times, and the more certain pricing, offered by so-called “bandwidth trading.”)

⁷³ “Online bandwidth traders team to offer fibre and satellite”, Total Telecom, 11 January 2001.

⁷⁴ “Iaxis collapse reflects bandwidth oversupply”, CWI Online, 25 September 2000.

(ii) *Substantial Discounts*

The effect of both liberalisation and new services can be seen in recent pricing developments in relation to traditional dedicated services provided. Substantial and varying discounts increasingly are offered by both incumbent operators and new entrants in many Member States, particularly *Finland, The Netherlands, Spain* and possibly *Luxembourg*. These discounts are granted by dominant operators to retain important customers and pre-empt market entry, and are offered by new entrants to poach exactly those customers. Such discounts are usually not based on cost-based criteria and the issue of whether they constitute anti-competitive behaviour has, in some cases, been referred to the competition authorities.⁷⁵

c. *Geographic Scope*

Retail and wholesale national capacity is generally available on a national basis. National leased lines are, for example, subject to a national licensing regime. Therefore, there are no regulatory barriers to the classification of the relevant geographic market as national in scope. However, route-specific markets may be appropriate where competitive alternatives to the incumbent operator are available. For example, specific city-to-city markets may be justified where alternative infrastructure providers are able to provide capacity between the two ends of a route. Moreover, region-to-region or even big metropolitan/rest of country markets may be justified where the development of competition in a Member State justifies such a distinction. However, the growth of hubbing and refiling (using an indirect route to reach the ultimate destination) has the potential to erode the route-specific nature of these competitive dynamics; the benefits may become more widespread.

The relevant geographic market for retail and wholesale international capacity could be global, EU-wide or narrower. A route-specific market may be appropriate where there is a non-liberalised regime at one end of the route, thereby eliminating any prospect of entering the end market or for substituting other routes. A route-specific market for international leased lines may also be justified in instances where available capacity is limited along a route, or terms of access are relatively unattractive compared to those available to members of the cable consortium.

The relevant geographic market for local tails is national because, although tails are physically required at a local level, they nevertheless need to be provided nationally at a wholesale level as a natural complement to the trunk segment of the leased line (indeed, in many Member States it is offered as a bundled service).

d. *Competitive Dynamics*

Competitive pressures facing operators providing dedicated capacity are appreciably different among the Member States. In addition, even in the Member States where the provision of either or both of international and national capacity is or is becoming competitive, the provision of local tails is significantly less competitive.

⁷⁵ For example, in 1998, the NCA in *Spain* imposed a fine on Telefónica regarding such unfair discounting practices in connection with leased lines.

(i) *Transparency*

Historically, the market for capacity has been opaque. National and international capacity list prices were rarely actually charged by incumbents, largely as a result of the heavy use of discounts that were generally individually negotiated. New entrants used significant discounts as a technique for market entry, attempting to poach incumbent's customers. This generated further discounting from incumbents, as they fought to retain their customers. The development of bandwidth exchanges and regulatory action requiring incumbents to make wholesale offerings have significantly increased the level of transparency on the wholesale market. However, there is still little transparency in relation to the pricing and provisioning of tails, whether at the wholesale or retail levels. Few PSTN incumbents are required to unbundle their pricing to ensure that competitors have non-discriminatory access to local tails.

(ii) *Market Maturity*

Long distance national and international leased lines have been provided, more or less competitively, for at least four years in most Member States. However, the market for national and international dedicated capacity has been significantly affected more recently by a range of different developments, primarily at the wholesale level. As such, the provision of wholesale dedicated capacity at national and international levels is undergoing rapid change. This has had a knock-on effect on the competitiveness of the retail market. However, neither the retail nor the wholesale provisioning of local tails reflects a similar trend. In all Member States, the incumbent remains the *de facto* monopoly supplier.

(iii) *Churn Costs*

It is clear that, at the wholesale level, provisioning delays and costs have operated as substantial barriers to entry in the past. However, both delay times (with their resultant costs) and the absolute costs of provisioning new lines are falling, as new entrants exert pressure on incumbents at both the retail and wholesale levels. In addition, bandwidth exchanges are removing a large element of switching costs at the wholesale level.

It appears that the reductions in time and cost have been less significant for local tails.

II.3.B. Elements Capable of Narrowing or Broadening the Market Definition

a. *Local Capacity*

For retail local access capacity of up to 2 Mbps, the development of xDSL appears to be broadening the market definition. However, xDSL services have some specific technical limitations which, when compared to leased lines, somewhat limit their substitutability for local tails, in some circumstances. *First*, xDSL services have distance limitations (*i.e.*, ADSL is not available on copper loops of greater than 5 km and, even within that distance, suffer from bandwidth attrition) which may restrict the provisioning of xDSL services to certain customers. Leased lines have no such distance requirements. *Second*, provisioning of xDSL services depends on a new entrant's ability to purchase an unbundled local loop from the incumbent operators. The pricing and provisioning lead times of unbundled local loops and associated collocation spaces have, to date, hindered the development of the market for deployment of xDSL services across the Member States. *Third*, many "flavours" of xDSL

which are likely to be required by business customers (*i.e.*, HDSL and SDSL) are not yet available over the unbundled local loops provided by incumbent operators.

b. *New Sources of Supply*

IRUs and dark fibre have been a growing source of national long distance and international capacity for some time. However, they have only recently started to be considered for metropolitan dedicated capacity. Yankee Group predicts that the metropolitan IRU markets in the twenty top European metropolitan areas are set for rapid growth, noting that payback periods for such IRUs can be as short as one year. In addition, Yankee Group found that 9% of European multinational corporations surveyed intend to acquire metropolitan dark fibre by the year 2003.⁷⁶

c. *VPNs and Other Managed Services*

For leased lines of 2 Mbps and above, there are a number of services and facilities that could potentially become substitutes, including virtual private networks (VPNs) and managed network services (X.25, frame relay, ATM, managed bandwidth (SMDS/SHDS) and Internet and IP Network Services). There is some evidence that VPNs (particularly IP VPNs) and other managed services will increasingly be adopted by corporate (both large and small) customers in place of raw capacity. The consultants Analysys anticipate that the IP VPN market will represent 10% of all telecoms revenue, growing at 30 to 40% annually, by the year 2006.⁷⁷ While the managed services sector is the current primary target of VPN service providers, analysts anticipate that VPNs will begin to encroach an unmanaged service provision.⁷⁸ However, these services and facilities have limitations which limit the extent to which they are substitutes for dedicated capacity. For example, frame relay and ATM services do not allow the provision of voice services without significant additional investments and, in most cases, the quality of voice service is inferior to that over leased lines. In addition, they are more “managed” than services such as leased lines.

⁷⁶ “Europe’s Wired Cities: the Dark Truth Beneath the Streets”, Yankee Group Europe, June 2001.

⁷⁷ “Market Realities of IP-VPNs”, Analysys July 2001.

⁷⁸ “User Plans for VPN products and Services, US/Canada 2001”, Informatics Research May 2001.

Conclusions:

1. **Dedicated capacity is acquired both by other telecoms operators and end user (generally non-residential) customers. However, pricing structures and similarities in demand patterns of retail and wholesale customers are such that it is difficult to identify clearly distinct retail and wholesale markets.**
2. **National long distance and international dedicated capacity is becoming increasingly competitive, initially with the entry of a range of competitive providers and, over the last four years, with the explosive growth of bandwidth exchanges (making available minutes, IRUs, dark fibre and IP capacity).**
3. **The supply of local dedicated capacity in all Member States continues to be dominated by incumbent PSTN operators. It is possible that increased penetration of xDSL services (particularly services provided by new entrants using unbundled local loops) may exert some competitive pressure on the terms of supply of lower capacity leased lines. However, there is virtually no competition for the incumbent on dedicated capacity above 2 Mbps, since few if any new entrants have replicated local facilities with fibre or other higher capacity networks.**
4. **As networks evolve towards an IP-based architecture and more end users replace unmanaged (or less-managed) services with VPNs and IP VPNs, it is possible that reliance on dedicated capacity will decrease. There appears to currently be some residual service differentiation based on the degree to which a service is managed.**
5. **The relevant geographic market for retail and wholesale national dedicated capacity is national in scope, while the relevant geographic market for retail and wholesale international dedicated capacity is possibly global, EU-wide or narrower. However, route-specific markets may be appropriate for both national and international dedicated capacity (on both the retail and wholesale sides) where competitive alternatives to the incumbent operator exist, and regulatory forbearance may be appropriate in these particular markets. Lastly, the relevant geographic market for local tails is national.**

III. FIXED INTERCONNECTION SERVICES

Summary:

1. In general, Member States have tended to aggregate fixed interconnection services into a broad product market for “national interconnection”, consistent with the existing regulatory standard contained in the *Interconnection Directive*. However, a number of Member States have sought to apply a competition-based analysis to interconnection services, and have characterised the terminating and originating legs of interconnection as constituting separate product markets (or sub-markets) subject to distinct patterns of competitive pressure in terms of both supply and demand. The same market actors often supply both services, but this is not always the case.

The competitive environment in which interconnection services (*i.e.*, local, long distance and international) are offered is generally homogeneous across the national territories of Member States, largely as a result of regulatory obligations. One particular aspect of “international” interconnection is the provision of access to cable landing rights and backhaul facilities, where Member States’ practice has been progressively to require that such services be respectively offered as part of a fixed incumbent’s Reference Interconnection Offer or its leased lines offering.

2. At Community level, whether in terms of its administrative practice under Articles 81 or 82 of the EC Treaty or the *Merger Regulation*, the Commission has had little opportunity to investigate the dynamics of interconnection. A number of interconnection settlements have taken place pursuant to a formal complaint. Where it had the opportunity in *Telia/Telenor* to explore the dynamics of an interconnection “market”, the Commission took the view that a fixed incumbent with a historical monopoly had little economic incentive to offer cost-efficient interconnection tariffs and would be capable of degrading connections. A comprehensive regulatory framework setting out pricing principles and governing technical elements of interconnection is set out in the *Interconnection Directive*, as supplemented by the Commission’s *Communication and Recommendation*. Insofar as “best practices” for interconnection pricing were recommended in those instruments, they are limited to tariffs for termination services.
3. Interconnection is not readily susceptible to a “relevant markets” analysis, as it has functioned since the inception of the liberalisation process under the framework outlined above. Nevertheless, there appear to be clear patterns of supply and demand for:
 - separate wholesale markets for termination and origination; and
 - wholesale termination at local, long distance and international levels. (As such, some termination services include transit services.)

As a general rule, fixed termination markets are more susceptible to market failure than are origination markets, with competitive pressures increasing on the

provision of termination above the local level (*i.e.*, less likelihood of leverage of the local access monopoly which might exist in many Member States). Whether or not origination services are significantly competitive is a matter which needs to be assessed cautiously on a Member State-by-Member State basis, it being generally accepted that indirect access provides a substantial entry incentive for the provision of origination which would discipline the fixed incumbent should it wish to raise its prices significantly beyond the short term.

4. It appears that the relevant geographic market for interconnection product markets will generally be national in scope because the competitive conditions under which interconnection is sought will be similar across any given Member State.

III.1 EU MEMBER STATE ANALYSIS

Issues:

1. The extent to which EU Member States have identified a market for fixed interconnection services in the course of implementing the *Interconnection Directive*.
2. The extent to which Member States have defined specific interconnection services as distinct sub-markets or market segments.

III.1.A. Summary of Main Relevant Markets Identified by the Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|---|---|-------------------------------|
| Interconnection services (<i>Austria, Belgium, Denmark, Finland</i> , ⁷⁹ <i>France, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, Sweden, the United Kingdom</i> ⁸⁰). | <ul style="list-style-type: none"> • Fixed telephony networks and/or services (<i>Portugal</i>). • Leased lines or transit (<i>Portugal, Spain</i>). • Termination services (<i>Finland, Spain</i>). • Origination Access services (<i>Finland, Spain</i>). | National. |

⁷⁹ The NCA in *Finland* has identified the market for “interconnection at the local exchange level”, which is within the broader market for the provision of local network services.

⁸⁰ Danish legislation identifies, for the purposes of designating SMP operators, a “total market for fixed network and mobile communications services”, which is equivalent to the Community national market for interconnection.

| | | |
|---|-------|-----------|
| Call termination in the fixed public telephone networks offered by new entrants (“reverse interconnection”) (<i>Italy</i>). | None. | National. |
| Interconnection circuits (<i>Italy</i>). | None. | National. |

III.1.B. Relevant Product Markets

a. General Conclusions

The majority of EU Member States have identified, in the context of imposing obligations on operators with Significant Market Power (SMP), a national relevant market for interconnection services (*Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, Sweden, the United Kingdom*). Generally, Member States have defined this market in compliance with the terms of the *Interconnection Directive* (97/33/EC) and its implementing regulations.

Of these Member States, the majority, as well as the *United Kingdom* (which does not specifically identify interconnection services as a broader relevant market), distinguish between different interconnection services. Only three Member States (*Finland, Portugal, Spain*), however, have concluded that certain types of interconnection services constitute separate and distinct sub-markets or market segments.

In addition to a broader general market for interconnection services, the authorities in *Italy* have identified two further interconnection-related markets:

- (1) the interconnection market for call termination on the fixed public telephone networks of new entrants (the so-called “reverse interconnection” market), which consists of the provision of termination services by new entrants to the incumbent; and
- (2) the market for interconnection circuits, which is part of the larger market for intermediate assets for the provision of voice telephony services, and is comprised of the dedicated circuits provided by the incumbent for linking its network to a new entrant’s network for the purpose of establishing a point of interconnection.

b. Specific Analysis

In *Italy*, the NRA and the NCA, for the purposes of identifying operators with SMP, have identified a market for interconnection services and have defined this market as the national market for the termination of all calls (originated nationally or internationally, either from fixed or mobile networks) onto either fixed or mobile networks, including self-provided termination services (*i.e.*, the termination services that are necessary for an operator to convey calls onto its own numbers; *i.e.*, so-called “internal interconnection”). This definition is consistent with the definition for interconnection services set forth in the *Interconnection Directive*. Nonetheless, in contrast to most other Member States, the Italian NRA has explicitly excluded from this market (and from the Reference Interconnection Offer) interconnection for local access and the interconnection of leased lines. The Italian NRA has also distinguished the market for international interconnection services from other interconnection markets.

A market for interconnection services has also been identified in *France* by the Conseil de la Concurrence and the ART. The Conseil de la Concurrence has specifically identified this market in the context of designating SMP operators and, in contrast to *Italy*, has stated that this market includes not only interconnection to fixed and mobile networks, but also interconnection between leased lines. The Conseil de la Concurrence defines the market for interconnection to be the market for the supply and demand of infrastructures, where those supplying and those demanding are operators seeking to satisfy the demand of end users.

Meanwhile, the ART has differentiated between the following interconnection services, although it has not gone so far as to identify any of them as being distinct interconnection markets:

- termination of traffic on specific networks;
- interconnection offers for the transmission of Internet versus voice telephony traffic;
- direct versus indirect interconnection services;
- interconnection offers for the transmission of traffic to short numbers; and
- interconnection offers for the transmission of traffic to shared revenue services.

In *Portugal*, legislation defines interconnection services consistent with the *Interconnection Directive* and identifies a relevant market for interconnection services. According to the NRA, the market for interconnection services includes:

- termination;
- transit;
- origination;
- international traffic;
- interconnection of leased lines; and
- possibly data interconnection.

Unlike the majority of Member States, the NRA in *Portugal* has defined distinct sub-markets for purposes of identifying operators with SMP within the broader market for interconnection services. These interconnection sub-markets are: (i) fixed telephony networks and/or services; (ii) leased lines; and (iii) mobile telephony networks and/or services.

In *Spain*, the NRA identified in its 2000 Annual Report a market for interconnection services which can be sub-divided into segments for access, termination and transit.

In *Belgium*, the NRA has identified a market for interconnection services for the purposes of identifying SMP operators and has defined this market, consistent with the *Interconnection Directive*, as the market for the termination of all calls (originated nationally or internationally, either from fixed or mobile networks), including self-provided termination services, and the interconnection of leased lines. The NRA has explicitly excluded from the scope of the interconnection market transit interconnection services and collecting interconnection services. The Belgian NRA has expanded the scope of its Reference Interconnection Offer to include the following interconnection services:

- terminating access services;
- collecting access services;
- access services for calls to particular value added services of the “other licensed operators”;

- interconnect link services; and
- transport interconnect services.

In *Ireland*, legislation has identified a national market for interconnection for the purposes of designating SMP operators. This market complies with the specific market identified in the *Interconnection Directive* and the *Leased Lines Directive*. Nonetheless, the NRA in *Ireland* concluded, in a 1999 Consultation Document, that it is not clear that there is a market for interconnection *per se*, or even that it is necessary for such a market to be identified: “[b]y considering each network market separately and identifying the different sources of demand, and by defining separate markets for call termination and call origination at the services level, market power in interconnection can be captured.”

The NRA has distinguished between different interconnection services, specifically those supplied by fixed operators (*i.e.*, double tandem interconnection, single tandem interconnection, primary interconnection (call termination)), and those supplied by mobile operators. The NRA takes the view that, unlike fixed interconnection services, mobile networks cannot be unbundled due to the nature of those networks (*i.e.*, it is not currently possible to self-supply some of the conveyance and switching activities that mobile operators undertake).

Similar to other Member States, the NRAs in *Greece* and *The Netherlands* have identified a separate relevant market for interconnection services for the purposes of designating operators with SMP. These services are defined by Greek legislation and the respective Reference Interconnection Offers consistent with the *Interconnection Directive*.

In *Denmark*, legislation identifies a “total market for fixed network and mobile communication services” for the purposes of designating SMP operators, which is equivalent to the national market for interconnection defined in the *Interconnection Directive*. The NCA in *Denmark* has identified a market for the interconnection of fixed networks and has noted that the incumbent has a dominant position in this market.

In *Finland*, the NCA has identified a market for “interconnection at the local exchange”, which is within the broader market for the provision of local network services. The NCA has concluded that interconnection services can be separated into at least two sub-markets:

- the market for termination services (the provision of a local network to route traffic from the network of the party requesting termination to end users with subscriber access connections to the local network being provided); and
- the market for origination services (the provision of transmission capacity on a local network to route traffic to a requested point of interconnection).

In the *United Kingdom*, Ofcom has not identified a broad market for interconnection, but has distinguished between interconnection services in the context of deciding the applicability of the current charge control regime (which was due to end on 30 September 2001). Ofcom has divided interconnection services into four categories of competitiveness – competitive services, new services, prospectively competitive services, and non-competitive services – and has applied network charge controls to interconnection services that are non-competitive or prospectively competitive. The non-competitive interconnection services include:

- call termination (a service that allows the originating operator to terminate a call on another operator's network);
- call origination (a service that allows operators to provide retail call services);
- local tandem conveyance (a service that provides conveyance between the Digital Local Exchange (DLE) and the Digital Main Switching Unit (DMSU) and the switching at the DMSU);
- single transit (a conveyance service provided by BT to convey calls from one network to another when the networks are not interconnected to each other); and
- interconnect-specific services (defined as interconnection circuits provided by BT to other operators for physical interconnection with its own network).

The prospectively competitive interconnection services include:

- inter-tandem conveyance (a service that provides conveyance between two DMSUs and the use of switching at one of them); and
- inter-tandem transit (a service that consists of the provision of conveyance between two DMSUs and switching by both of them).

Finally, in *Germany*, the RegTP has refrained from identifying a relevant market for interconnection because its competence to regulate interconnection rates is not based on a finding of a position of market dominance. Nevertheless, the *Telecoms Act* of 1997 provides for the *ex ante* regulation of interconnection.

c. Cable landing rights and backhaul capacities

One particular aspect of international interconnection has been subject in the past to bottleneck concerns in a number of Member States. For example, at Community level, it had not been entirely clear the extent to which current regulations, particularly the *Interconnection Directive* and the *ONP Leased Lines Directive* (as amended) mandate access to or interconnection with components of cross-border submarine cables and backhaul facilities and cable landing rights. A Commission study completed in 1999, entitled “*Study on Submarine Cable Landing Rights and Existing Practices for the Provision of Transmission Capacity on International Routes*”,⁸¹ concluded that the respective application of the *Interconnection Directive* to cable landing stations and the *Leased Line Directive* to backhaul facilities should be clarified, to harmonise the diverging practices among Member States at the time.

Subsequently, a number of Member States have implemented specific rules for submarine cable in an effort to clarify the situation. For example:

- In a number of Member States such as *Belgium* and *the Netherlands*, the general interconnection and leased lines regime is applicable, but the fixed incumbents are not

⁸¹ Prepared by Hogan & Hartson, the Study is available at: <http://europa.eu.int/ISPO/infosoc/telecompolicy/en/subcables.pdf>.

required to include terms and conditions for the provision of access in their respective RIOs.

- By contrast, in *Italy*, the fixed incumbent operator is obliged to include unbundled terms and conditions for the provision of access to landing sites and backhaul facilities by virtue of Decision N. 10/00/CIR of 18 October 2000. The conditions for access to landing sites are included in the Reference Interconnection Offer, and backhaul circuits must be offered under the same terms and conditions as leased lines. In addition, according to a study published in May 2001 on competition in the Italian market for international interconnection,⁸² access to Telecom Italia's landing sites was considered by alternative operators to be the major infrastructure bottleneck in the market for international interconnection.
- In *Spain*, Telefónica's RIO now includes the right for other public network operators (either owning capacity in submarine cables or operating landline facilities) to access Telefónica cable head-ends which were constructed and landed at the time that the RIO was modified to include this service (25 May 2000). This service has been treated as an interconnection service which was deemed to require regulation due to Telefónica's effective monopoly over backhaul from submarine cables to international switching centres (Telefónica controlled all Spanish submarine cable stations).⁸³ Access to submarine cables themselves is not regulated.⁸⁴ Access to other new cables not covered by this provision will be subject to review by the CMT according to competition law principles, on a case-by-case basis.⁸⁵ Backhaul capacity is categorised as leased line capacity which is subject (in the case of Telefónica) to cost-oriented pricing. However, there is no regulated offer for this service.
- In the *United Kingdom*, OFTEL has obliged BT to publish conditions for access to cable landing stations as part of its RIO. Additionally, in 1997, OFTEL obliged BT and Mercury (as it then was) to provide access to submarine cable facilities on cost-oriented terms. Such provision should also be transparent (*i.e.*, the publication of interconnection tariffs) and non-discriminatory.

III.1.C. Relevant Geographic Markets

In a number of Member States, the market for interconnection services has been found to be national in scope. As explained by the NCA in *Italy*, interconnection services should be considered to be national because:

⁸² See “*Analisi delle Condizioni di Concorrenza nel Mercato Italiano dell'Interconnessione Internazionale*”, which can be found at the official site of the Italian Communications Authority: www.agcom.it.

⁸³ The RIO does not regulate the terms of such access to cable head-ends (which must, therefore, be negotiated between the parties). It does, however, establish deadlines for the agreement of the relevant technical project (30 days) and the implementation of the connection (a further 120 days).

⁸⁴ The CMT is currently considering a request for such access to be regulated, but has not yet published any Decision in this regard. It has indicated in its decision of August 2001 on the latest modifications to the RIO that it will treat such access as analogous to access to leased lines and has left open the possibility of including the service in the RIO.

⁸⁵ The CMT carried out a public consultation on submarine cables in 1999, the conclusions of which were published on its Website in September 1999.

- the deployment of telecommunications infrastructures necessary for the provision of these services is subject to a national licensing regime;
- the extension and coverage of the telecommunications networks that are used to provide these services is national; and
- the scope of end users that can be reached through interconnection under similar and economically viable conditions is national.

The Conseil de la Concurrence in *France*, although recognising that the market for interconnection is national in scope, has stated that any future analysis concerning the geographic scope of this market should be extended to areas with large amounts of traffic in which competition for call termination is limited and where SMP operators can be identified.

III.1.D. Relevant Product and Geographic Markets Identified Outside the EU

Outside the EU, none of *Australia*, *Canada*, *New Zealand* or the *United States* have identified a relevant market for something as broad as interconnection services. Instead, they have taken entirely different approaches to ensuring that networks are interconnected.

In *Australia*, access regulation applies to *all* operators, both as access seekers and access providers. To fall within the access regime, particular services must be “declared” by the ACCC. Achieving any-to-any connectivity is a principal objective of the access regime. Accordingly, any service that is necessary to achieve any-to-any connectivity is declared under this regime. Consequently, interconnection services have been declared by the ACCC, which means that interconnection obligations are imposed on all operators.

In *Canada*, the CRTC has taken a similar approach, having established a regulatory framework in which *all* local exchange carriers are required to interconnect with each other and with all long distance carriers and wireless service providers. Within exchanges, the costs of interconnection are shared equally.

In *New Zealand*, the current absence of telecommunications-specific regulatory regime and the Commerce Commission’s dilatory approach to resolving complaints has resulted in competition developing at an extremely slow pace. The introduction of a new telecoms-specific regulatory regime and the new role of the Commerce Commission as the telecoms regulator is likely to lead to the imposition of specific interconnection requirements on carriers.

In the *United States*, legislation provides the vehicle for interconnection. The 1996 *Telecommunications Act* imposes a general duty on *all* telecommunications carriers to interconnect with the facilities and equipment of other telecommunications carriers, and also specifically requires incumbent local exchange carriers to negotiate interconnection agreements with their competitors and to interconnect at any technically feasible point within their own network at cost-based and non-discriminatory tariffs.

Conclusions:

- 1. The majority of EU Member States have identified a broad relevant product market for fixed interconnection services, in the context of designating SMP operators. In general, this market has been defined to be consistent with the scope of the “national market for interconnection” prescribed in the *Interconnection Directive*.**
- 2. While distinguishing between different types of interconnection services for a variety of purposes, the majority of Member States do not characterise individual interconnection services as distinct markets or sub-markets. Where such distinctions have been drawn, markets have been generally broken down in terms of termination and origination. Additional markets (or sub-markets) have been identified in a minority of Member States. In addition, the provision of local, long distance and international interconnection services is likely to be subject to different competitive dynamics.**
- 3. The market for interconnection services is viewed by a number of Member States as being national in scope, on the basis that the telecoms infrastructure necessary to provide interconnection services is national in coverage and is subject to a national licensing regime.**
- 4. Member States have progressively subsumed regulation of cable landing rights and backhaul facilities into the prevailing regulatory frameworks for interconnection (including inclusion in a RIO) and leased lines, respectively.**
- 5. Countries outside of the EU reviewed by the Study Team have, in general, not identified a market for competition law purposes as broad as interconnection services, most likely because interconnection is specifically and expressly provided for in applicable law and regulations.**

III.2 ANALYSIS UNDER EU COMPETITION RULES

Aside from the Commission’s Decisions taken under the *Merger Regulation*, there is very little relevant market analysis of interconnection services in investigations under the competition rules. The most likely reason for this is that, since the introduction of liberalisation, the requirements for, and the conditions of, interconnection between and among fixed and mobile operators have been specifically determined by the terms of the *Interconnection Directive*.⁸⁶ (The opportunity to review comprehensively the competition law implications of interconnection policy arose in complaint heard in the late 1990s against Telecom Eirann, Ireland’s first incumbent, which ultimately did not result in a published decision by the Commission.)

⁸⁶ Directive 97/33/EC of the European Parliament and of the Council 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) OJ No L 199 p. 32, 1997/07/26 (*Interconnection Directive*).

Adopted in 1997, the *Interconnection Directive* is aimed at, *inter alia*, establishing a regulatory framework for securing the interconnection of telecommunications networks and, in particular, ensuring the interoperability of services.⁸⁷ Accordingly, the *Directive* subjects operators to asymmetric regulatory obligations, depending on the scope of their activities and whether they have been designated to have SMP.

The *Interconnection Directive* defines “interconnection” as “*the physical and logical linking of telecommunications networks used by the same or a different organization in order to allow the users of one organization to communicate with users of the same or another organization, or to access services provided by another organization. Services may be provided by the parties involved or other parties who have access to the network*”.⁸⁸

In general, the *Directive* states that all operators authorised to provide public telecommunications networks and/or publicly available telecommunications services have the right, and when requested by organisations in that category an obligation, to negotiate interconnection.⁸⁹ However, operators designated as having SMP, whether fixed or mobile, are obliged to meet all reasonable requests for access, including special access (*i.e.*, access at points other than the network termination points offered to the majority of end users).⁹⁰ These obligations may only be limited on a case-by-case basis where there are technically and commercially viable alternatives to the interconnection requested, and where the requested access is inappropriate in relation to the resources available to meet the request.⁹¹

In addition, under the *Interconnection Directive* and other relevant Directives, designated SMP operators are subject to a number of further obligations, including: transparency; non-discrimination; accounting separation; publication of a Reference Interconnection Offer; cost-orientation; sufficiently unbundled tariffs; quality of service; and provision of additional facilities.⁹²

Some of the issues dealt with in the *Interconnection Directive* are explained in greater detail in a series of “soft law” instruments; namely:

- Commission Recommendation 98/195 of 8 January, as amended,⁹³ is aimed at providing guidance to NRAs on ‘*best current price*’ call termination interconnection on the basis of the recommended ‘*best current practice*’ interconnection charges. The data relating to ‘best current practices’ are structured in three price bands covering interconnection at

⁸⁷ *Interconnection Directive*, Article 1.

⁸⁸ *Interconnection Directive*, Article 2(1)(a).

⁸⁹ *Interconnection Directive*, Article 4(1).

⁹⁰ *Interconnection Directive*, Article 4(2).

⁹¹ *Interconnection Directive*, Article 4(1); see also Directive 98/10/EC of the European Parliament and of the Council of 26 February 1998 on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment OJ No L101 p. 24, 1998/04/01, Article 16(1) (*Revised Voice Telephony Directive*).

⁹² *Interconnection Directive*, Articles 6-8, 15(1); *Revised Voice Telephony Directive*, Article 15(1).

⁹³ Commission Recommendation of 8 January 1998 on interconnection in a liberalized telecommunications market, OJ No L073 p. 42, 1998/03/12. See also Commission Recommendation of 29 July 1998 amending Recommendation 98/195/EC on interconnection in liberalized telecommunications market (Part 1 – Interconnection pricing) OJ No L228 p. 30, 1998/08/15 and 00/263/EC: Commission Recommendation of 20 March 2000 amending Recommendation 98/511/EC on interconnection in a liberalized telecommunications market (Part 1 – Interconnection pricing), OJ No L083 p. 30, 2000/04/04.

three different levels within the network: *local interconnection*, *single transit interconnection*, and *double transit interconnection*, at peak rates.

- As regards accounting separation, Commission Recommendation 98/322/EC⁹⁴ sets out guidelines on implementing accounting separation, with respect to local access networks, core networks, retail business and other activities. In particular, this recommendation provides common rules with respect to the transfer charges, principles and methodology of cost allocation, operating cost of capital employed, revenues and reporting requirements.
- The Commission's approach regarding interconnection pricing issues, including the derivation of '*current best practice*' prices and other related issues, was summarised in a Commission Communication of 1998.⁹⁵

The only reference to a "market" for interconnection in the *Interconnection Directive* is contained in Article 7(2), where reference is made to the "national market for interconnection". Nevertheless, no further identification of a relevant market nor market analysis is provided in the Directive, nor provided by the Commission in any of its administrative Decisions.

The Commission's most expansive discussion of interconnection is contained in its *Telia/Telenor* Decision,⁹⁶ where it defined interconnection as being "the means by which two separately owned networks exchange traffic between one another", and then discussed the pre- and post-liberalisation models of interconnection. The Commission explained in *Telia/Telenor* that, under monopolistic market conditions, calls which had to be switched between local and transit exchanges, or to international gateways, were switched entirely within the network of the national PTOs. According to the Commission, in this pre-liberalisation context, "interconnection" would have had relatively little meaning, since the price of the service paid by the subscriber, being a combination of the fixed rental charge and a usage charge for individual calls based on their duration, destination and perhaps time of day, would be a bundled charge which covered all the necessary switching activities within the network.⁹⁷ As regards the financial relationship between international operators dealing with one another, the Commission noted that this was governed by the accounting rate system, under which the price for a call to the telephone companies involved reflects the agreements reached between the two countries concerned, with the terminating operator being paid the

⁹⁴ Commission Recommendation 98/322/EC of 8 April 1998 on interconnection in a liberalized telecommunications market (Part 2 – Accounting separation and cost accounting) (Text with EEA relevance), OJ No L141 p. 6, 1998/05/13.

⁹⁵ Commission Communication on interconnection pricing in a liberalized telecommunications market, OJ No C084 p. 3, 1998/03/19 Notice 98/C84/03.

⁹⁶ *Telia/Telenor* Case IV/M.1439.

⁹⁷ *Telia/Telenor*, para. 38.

same tariff irrespective of how far the call has to travel on its network to reach its intended subscriber.⁹⁸

The Commission recognised that, in a liberalised market, there is a need for new competing networks entering into a domestic incumbent's territory to be interconnected with the incumbent and, of course, with one another. Since the vast majority of a new entrant's subscribers would probably wish to make calls to subscribers which are not on the new entrant's network, interconnection was found to be of critical importance for new operators.

The Commission also noted that the model used for domestic interconnection differs slightly from the accounting rate model used still in international calls: the originating operator usually pays the receiving operator a minimum set-up charge for each call, as well as a per-minute charge for the termination of traffic sent over the physical points of connection between the two networks. More particularly, the per-minute usage charge may vary depending on the time of day at which the traffic is being sent, and also on how far it has to be transmitted over the receiving network from the physical point of interconnection.⁹⁹

Conclusion:

The specific requirements of the *Interconnection Directive* and the conditions which it prescribes for interconnection between and among network operators, particularly the operators designated to have SMP, has resulted in the competitive dynamics of interconnection services as a relevant market being virtually ignored, whether in the Commission's Decisions under Articles 81 and 82 of the EC Treaty or under the *Merger Regulation*.

⁹⁸ In general, the accounting rate system is based on a price which has been agreed between the two national telephone operators concerned, and the originating operator (the operator whose subscriber initiated the call) pays an agreed percentage, usually 50% of the accounting rate, to the other operator for delivering, or terminating, the call. As there is usually a two-way exchange of traffic between the two operators, the accounting rate is usually accompanied by a settlements system, in which the net flows of traffic between the two operators over a period are counted, and payments in one direction or the other made at regular intervals on the basis of any imbalance. Accordingly, the physical cable structure between the two PTOs would be considered as being owned by each PTO up to a notional mid-point (either on their common border or on the mid-point of an undersea cable), and the subscriber making the call would pay his operator the full price of the call (which in theory should be relate to the accounting rate, but might not), and the operator on whose network the call began would then generally pay the terminating operator an agreed proportion, usually 50% of the accounting rate, to terminate the call on the receiving network. The fact that traffic might be roughly in balance between the two operators concerned, and that payments would be subject to a settlement regime, means that the actual amounts of money changing hands between the two operators would be relatively small compared with the overall traffic volume. *Telia/Telenor*, paras. 39 and 40.

⁹⁹ *Telia/Telenor*, paras. 41 and 42.

III.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

III.3.A. Elements Indicative of the Relevant Market

a. *Service Definition*

Fixed interconnection is a form of wholesale access which entails the physical and logical linking of public electronic communications networks used by the same or a different undertaking in order to allow the users of a network provided by one undertaking to communicate with users of a network provided by the same or another undertaking, or to access services provided by another undertaking (whether services are provided by the parties involved or other parties with access to the network). Unlike other forms of wholesale access, however, which in general involve requests for access to specific elements of a network or to customers, competitive interconnection is the essential precondition to the functioning of a true communications market because it is the means through which to ensure that “any to any” connectivity is achieved. As such, it has no direct equivalent; without it, the competitive provision of any retail services downstream would be rendered impossible.

Within the broad basket of interconnection services, a call termination service¹⁰⁰ entails the delivery of a call, by the interconnection service provider, from the point of interconnection (PoI) of the party seeking interconnection, to the called party. A call origination service¹⁰¹ entails the carriage of a call from the calling subscriber to the PoI of the party seeking interconnection. The service consists of the provision of a channel between the calling party and the PoI for the duration of the call. In both cases, the connection between the interconnected networks may be set up at different network levels. The extent of the service required from the interconnection provider depends on the number (and type) of the network elements that the provider needs to “produce” the conveyance service between the subscribers in question. It is also important to recall that it is not only switched services which require inter-connection services to achieve end-to-end connectivity. Where a new entrant acquires dedicated capacity from an incumbent fixed operator (*e.g.*, local tail), the new entrant must interconnect the part of the circuit acquired from the incumbent with the part of the circuit that it is self-provisioning.

It is widely accepted that there should be a correlation between charges for interconnection services and the network elements used. Positing element-orientation is therefore central to an efficiency-oriented pricing structure. Element-based charges ensure that the level of charges rises with the extent of network usage, removing distortions in the incentive for companies to build their own core network infrastructure. Building their own network enables operators to scale back their interconnection costs by providing elements themselves and by reducing the extent to which they are reliant on an interconnection provider's network.

¹⁰⁰ References to a “call” should, in principle, cover all forms of traffic (*e.g.*, data and voice), and therefore all forms of termination.

¹⁰¹ “Origination”, in the context of data transmissions, is subject to a different dynamic to a typical voice call because of the different retail charging methods used and because, aside from Internet access (a particular form of origination), the bulk of data traffic is transmitted using dedicated capacity. Cable operators have, for example, traditionally acquired double transit interconnection for their backhaul leased lines.

(i) *Levels of interconnection*

The European Commission Recommendation on Interconnection Pricing distinguishes between:

- *local level interconnection, i.e.*, interconnection at the local exchange to which the called (or calling) subscriber is connected;
- *single transit interconnection, i.e.*, interconnection at an exchange bundling the calls from subscribers in a metropolitan region such as a large city; and
- *double transit interconnection, i.e.*, interconnection at an exchange beyond the metropolitan region in which the called (or calling) subscriber resides.¹⁰²

Adopting this terminology, the network elements required for interconnection within the PSTN architecture are as follows:

- *Local level interconnection*: this is the local exchange and in many cases, involves transport in the access network¹⁰³ between the remote concentrators and the exchange, using the concentrator to bundle the subscriber traffic; one subscriber-facing port; switching matrix; central processor; one port to the core network, if not covered by the rate for the provision of interconnection ports; and transport elements in the access network.
- *Single transit level*: there is, in addition to the local level components, an exchange providing transit functionality and, usually, a trunk between the local and the transit exchange, routed in the transport network using the elements used for local level interconnection; plus one port at the local exchange to the backbone network; a transmission line from the local exchange to the associated transit exchange; one port at the transit exchange; a switching matrix; and the central processor of the transit exchange.
- *Double transit level*: requires a further transit exchange (two altogether) and a further trunk (likewise, a total of two).¹⁰⁴ Double transit call termination uses local exchange components, including those for transport in the access network; two transmission lines (transit exchange to transit exchange, and transit exchange to local exchange); and two transit exchanges (2 outgoing ports, 1 incoming port, 2 switching matrices, 2 central processors). Double transit call origination uses local exchange components, including those for transport in the access network. The use of other network elements depends on the routing of traffic which is conveyed via the hierarchical route, with the network

¹⁰² Additional distance-sensitive differentiation in charges can be considered where the length of the transmission path varies greatly.

¹⁰³ The term “access network”, as used in this document, does not refer to the network segment between the subscriber’s terminal equipment and the main distribution frame, but the segment linking the remote main distribution frames to the local exchange. Aspects of routing are disregarded here as all traffic is routed to the local exchange.

¹⁰⁴ This definition is only valid when routing is strictly hierarchical. In reality, therefore, it must be qualified: when traffic is sufficiently heavy, a direct route from a local exchange to a transit exchange established when the former is not located in the catchment of the latter. Double transit interconnection does not always use two transit exchanges and two separate trunks. This must be taken into account. It only does so when a direct route either does not exist or cannot handle any more traffic, and this traffic overflows onto an alternative route (here, the final trunk group or the hierarchical route).

elements used being: two transmission lines, and an additional transit exchange (1 incoming port, 1 outgoing port, 1 switching matrix, and 1 central processor).

This is represented in diagrammatic form in **Table V.1**, below:

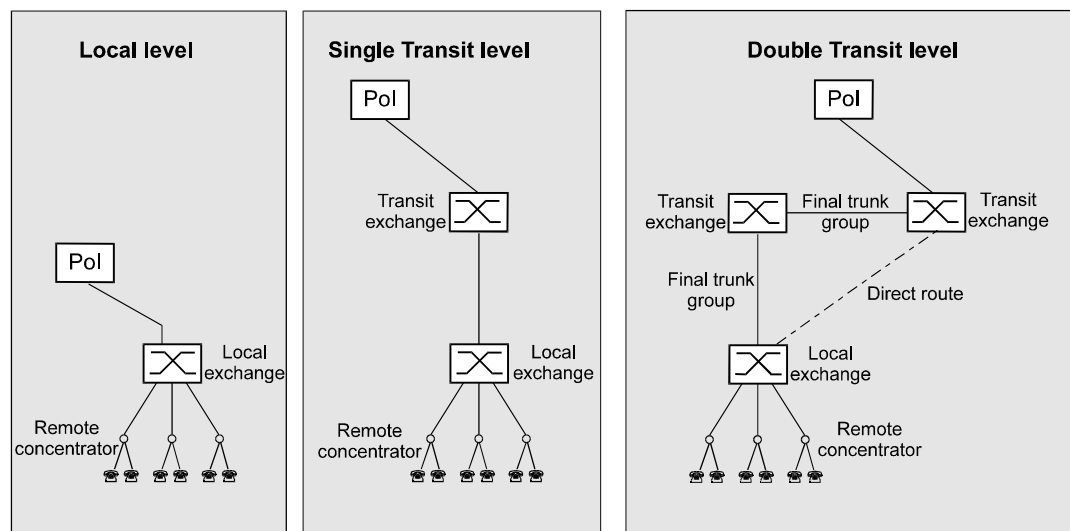


Table V.1

(ii) *Evolving Demand For Interconnection Services*

It is important to recall that network architectures are evolving and the interconnection requirements for the provision of new services differ from conventional voice and data services. Fixed incumbent operators in all Member States are in the process of replacing circuit switches with hybrid switches and a number have indicated to the Study Team that they anticipate that their networks will become packet-switched in the medium-term. It is clear that market definitions for interconnection services will need to reflect any relevant changes flowing from changes to network architecture (including hierarchical and routing changes).

In the last five years, the entry into the market of large numbers of, for example, Internet service providers with new interconnection requirements has created new patterns of demand for interconnection (particularly origination).¹⁰⁵ The impact of such new demand patterns has been most extreme in Member States where unmetered retail Internet access service offerings are available. The competitive provision of such retail services drives demand for wholesale (*i.e.*, interconnection origination) services. In the *United Kingdom*, for example, BT was required by Ofcom in May 2000 to provide Flat Rate Internet Access Call Origination

¹⁰⁵

In addition to creating new patterns of demand for origination, it should also be noted that the retail charging models used by many ISPs also impact on the acquisition of wholesale termination. For example, end users have a contractual relationship with an ISP, but normally do not select (and cannot identify) the entity terminating calls. The ISP selects the terminating operator(s) and pays the terminating charge (which is built into the overall retail charge). As such, ISPs have strong incentives to attempt to reduce the terminating charges that they pay.

(FRIACO), made up of unmetered transmission from the end user to BT's local exchanges (DLE) and convergence from the DLE to the points of connection of the requesting ISP; in February 2001, BT was required to provide single tandem FRIACO (*i.e.*, unmetered traffic handed over by BT to the new entrant at BT's single tandem switches).

Oftel extended the FRIACO obligation to the DMSUs (*i.e.*, requiring the provision of unmetered transmission between BT's DLEs and its single tandem switches), having made the assessment that: (i) it was unrealistic to expect all operators to interconnect at the DLE; (ii) that BT remained dominant in the provision of transit between BT's retail competitors interconnected with BT at the DMSU layer of its network; and (iii) interconnecting operators needed an unmetered wholesale service to this layer to be able to compete at the retail level (to provide services to customers connected to the BT network).

Given developments in both the German and Italian markets relating to flat-rate (retail and wholesale) services, it may be that similar market developments may occur in other Member States.

It is important that obligations to provide unmetered origination services (particularly in relation to any prescribed prices) are imposed after full consideration of capacity constraints, the costs of and time required for traffic migration and the procedures for allocating port capacity to competing providers. All of these factors will have an impact on demand for, and the development of, such services.

(iii) *Policy Drivers*

There are two key barriers to a possible lack of infrastructure competition that have been addressed by interconnection regulation:

(1) the line externality¹⁰⁶ (*i.e.*, as more people join the network, those already on the network are able to communicate more widely, deriving a benefit), the presence of which suggests both a need for mutual access to customers on different networks and the likelihood that the normal market mechanism will not take full account of the resulting benefit to customers; and

(2) the existence of operators with market power, many of which have had a position of historical monopoly, which may not have commercial incentives to offer interoperability with other (smaller) operators where there is actual or potential competition between operators, given the discrepancy between their customer-base and that of new entrants (*i.e.*, the asymmetry that results when the smaller operator needs access to the existing ubiquitous network to be able to compete with the operator of that ubiquitous network, while at the same time the larger operator does not have any incentives to improve its commercial position by allowing such access).¹⁰⁷

Effective interconnection arrangements are designed to address these barriers. As such, they are the necessary prerequisite to the facilitation of viable infrastructure competition. In many

¹⁰⁶ The benefit or cost conferred on customers by the activities of other customers.

¹⁰⁷ That commercial incentive changes, however, as the ex-monopolist's market share begins to fall significantly below 100%. In these situations, there is an increasing tendency to view interconnection as having mutual benefits. In the Internet environment, the reciprocally advantageous nature of interconnection is reflected in the existence of "peering" arrangements, which are the equivalent of "bill and keep" arrangements.

countries, the availability of a reasonable price and conditions for interconnection is the key determinant of the extent to which competition emerges. Appropriate interconnection arrangements also promote efficient infrastructure development (providing sustainable incentives for operators to make decisions to build their own networks or use parts of other networks).¹⁰⁸ Indeed, insofar as new entry is successfully promoted, interconnection arrangements (which currently account for a significant portion of the operator's total costs) may take the form of what is known as a "bill and keep" system (popularised thus far in the *United States*, and according to which operators with similar traffic flows forego financial compensation for the exchange of the promise to terminate traffic on one another's networks).

b. Demand Drivers

(i) Demand for Interconnection at Various Points in the Network Hierarchy

Interconnection is acquired at a number of levels in the network hierarchy.¹⁰⁹ Demand for interconnection reflects a fundamental "make or buy" decision: to either construct a second network (possibly using leased capacity) or to acquire connectivity through interconnection with another network. Some operators carry international traffic to a single international interconnection point in the relevant country and hand-off their traffic for termination to either a carrier providing national services (and local¹¹⁰ termination through interconnection with the fixed incumbent) or the fixed incumbent. Any operator from a WTO member country who wants to carry traffic into the EU for terminating interconnection should be treated as though it were an operator from another EU Member State requesting cross-border interconnection for termination.¹¹¹ In principle, this means that operators in Member States compete to provide international landing and transit interconnection to operators outside the EU. However, the number of operators using this model continues to decrease in terms of its relative importance. New entrants are increasingly competing with incumbents to receive and provide transit for incoming international traffic. Until recently, single correspondent (or "bi-lateral") relations between the incumbent operator in each country were the standard for transit and termination of international calls. In the last few years, the growing impact of liberalisation has meant that these arrangements have been used much less.¹¹² However, the speed at which, and extent to which, incumbents are losing share in the transit market varies widely between Member States (*e.g.*, more than 30% in *Germany* and the *United Kingdom* to *de minimis* in *Greece* and *Portugal*).

¹⁰⁸ "Trends in Telecommunication Reform Interconnection Regulation 2000-2001", ITU, 2001.

¹⁰⁹ As noted above, these levels reflect the demarcation found in other telecommunications markets between local, long distance and international services.

¹¹⁰ The term "local" is used in this text to include local/regional calls and access. As such, in countries that no longer maintain the local service distinction, including *Luxembourg* and *Sweden*, it includes all of these services.

¹¹¹ The EC's national treatment obligation under the GATS is to apply the *Interconnection Directive* not only to EU-internal interconnection (*i.e.*, for interconnection of traffic between MS), but to apply it equally to all operators be they outside the EU. This is consistent with the EC's Additional Commitments to ensure that major suppliers within the Community provide non-discriminatory interconnection, including to third country operators, as envisaged in point 2.2 of the Additional Commitments.

¹¹² On non-liberalised international routes some countries that liberalised early assigned a proportion of incoming traffic to new entrants, in proportion to the route specific traffic that they originated (called '*the proportionate return rule*'). Indeed, the rule still operates in some cases. Where it does, competition is mainly pushed into the market to originate calls.

Entities that construct their own networks do not require double-tandem interconnection. Entities with a national core network generally require single-tandem interconnection (at their increased number of PoIs).

Local interconnection at multiple points, both for origination and termination, is still required by virtually all market entrants.¹¹³ Very few market entrants self-provide local fixed services, save in those areas where cable TV penetration is relatively high and the systems have been upgraded to carry communications services. Only in the *United Kingdom* have “new entrants” thus far acquired greater than *de minimis* market share in any local access markets.¹¹⁴

While technological and regulatory developments have increased opportunities for entry to the local market, the inherent unprofitability of the local service market is critical to the creation and maintenance of competition.¹¹⁵ Despite the significant changes in the competitiveness of the provision of national and international services, competition in the local service market has not developed and the local market remains the main market segment in which fixed incumbents maintain positions of market dominance.¹¹⁶ In addition, it is generally accepted that the size of the investments that would be required to duplicate the local loop, given the technology that is currently available, effectively erect large barriers to entry in many Member States. Finally, the fact that number portability, carrier pre-selection and facility sharing (for local calls) were not introduced contemporaneously with other liberalisation measures in a number of Member States, has had a significant impact on the extent to which the regulatory environment encouraged market entry across the EU. As a result of all of these factors, local termination (and, to a large extent, origination) is provided almost entirely by the fixed incumbent. As such, other network operators must interconnect with the incumbent fixed line operator to acquire wholesale access to local termination and origination services.

There are some concerns about the potential of the requirement in some Member States that new entrants have a minimum number and geographic distribution of interconnection points (once traffic exceeds a basic minimum volume), to distort demand for local interconnection.¹¹⁷ Such requirements, when coupled with geographically-based rates, clearly have the potential to force new entrants not only to choose between interconnection at additional points, but also at locations other than where they wish to interconnect, and even compel interconnection higher up the incumbent’s network hierarchy (thereby forcing them to

¹¹³ The absence of the possibility of interconnection below the single tandem level is a major source of complaint from new entrants in *Luxembourg*, for example. The incumbent offers interconnection at only two point, citing its historic network architecture (set up for national and international traffic only) and the substantial modifications that would be required for it to introduce local interconnection.

¹¹⁴ It is calculated that 18% of the *United Kingdom* local market has been acquired by new entrants: see “Interconnection and Local Competition”, OECD Directorate for Science, Technology and Industry, Committee for Information, Computer and Communications Policy, Working Party on Telecommunication and Information Services Policies, 7 February 2001. The ART announced that it would open the provision of local calls to France Telecom’s competitors on 1 January 2002, on 25 July 2001.

¹¹⁵ The local service market will provide sufficient margins for new entrants providing service through interconnection with an incumbent’s local loop, for either or both origination and termination, only if they can recover their costs. If retail tariffs are not fully rebalanced and interconnection charges are not cost-oriented, new entrant local service providers risk being put in a price-squeeze situation.

¹¹⁶ *Op.cit.*, p. 6. In contrast, in *Sweden*, for example, 95% of households have two connections (including mobile connections). Nevertheless, Telia has not lost as much fixed local service traffic to competitors as has BT.

¹¹⁷ See national report on *Germany*, at [Annex V](#).

acquire more transit services than they require, at higher cost). It is difficult to see how such requirements can be justified, whether on grounds related to the protection of network integrity or otherwise.

In cases where a new entrant provides network access to its end users (*e.g.*, over an alternative platform to the PSTN or if it has fully unbundled the incumbent's local loop), the incumbent and other new entrants also need to interconnect with the operator providing network access to terminate their traffic. Where the incumbent is acquiring such termination services, both the incumbent and the new entrant are paying for termination on each other's network. Where a second new entrant acquires termination from another new entrant, it has to pay for the access provided by that new entrant for termination and may also have to pay the fixed incumbent for origination (if it is not itself an access provider).

In this context, it is clear that the “single network vs. all functionally substitutable networks” market definition debate that has to date been primarily an issue in the mobile sector is equally significant in at least the local component of the fixed sector.¹¹⁸ This debate is described at some length in Chapter VI of this Study. The Study Team notes that the imposition of pre-selection across all networks under the new regulatory regime may well affect the scope of the relevant origination market(s). It may also, if network operators’ economics for origination are affected, have a knock-on effect on competitive conditions and relevant markets for termination.

(ii) *Demand for Interconnection for “Value-added” and “Non-basic” Services*

In addition to network-based services, interconnection is also a necessary input for the provision of supplementary or “value-added” services and features. In contrast to essentially network-based services (*e.g.*, where market-oriented or formal standards have led to the adoption of common or compatible signalling systems), supplementary or value-added services tend to entail more technical differentiation. As a result of these distinctions, network services (including those which have some degree of innovation, such as call waiting, call diversion and 3-way calling) are fully interconnected where interconnection is necessary to provide the services and technical interface data is made available. In contrast, interoperability for supplementary (or enhanced) services requires a case-by-case analysis of the requirements of the interconnecting parties in order to assess the varying technical (and market power) issues which might arise.

There remain a number of Member States where the incumbent's Reference Interconnection Offer does not include a number of network services, (such as ADSL/bitstream access or network-based value-added services).¹¹⁹ In addition, services such as collocation and pre-selection have been omitted from the Reference Interconnection Offers of a number of fixed incumbent operators.¹²⁰ There is also a great deal of inconsistency among the Member States in relation to the inclusion of access to IP networks (and services) in Reference Interconnection Offers. For instance, there is a debate currently between BT and Ofcom over

¹¹⁸ The subsequent issues associated with identifying and addressing market power of different operators may suggest that different regulatory responses are appropriate for the fixed and mobile sectors. However, these are not material at the market definition phase.

¹¹⁹ See Belgacom, RIO.

¹²⁰ See Portugal Telecom, RIO.

the extent to which BT should be forced to provide an IP call origination service within the scope of its Reference Interconnection Offer.

The key issue that the adoption of new (and increasing numbers of) platforms and protocols running over the same (or almost the same) physical network infrastructure raises is access to (and at) different network “layers”, rather than “points”. There are substantial differences between access at, for example, the service layer and access to the underlying individual fibres or frequencies used for carriage. Competition and sector-specific regulators should take careful note of the potential for different platforms and protocols to alter the nature of the service to which access is sought (where it is sought at or above that layer of the network), rather than to merely redescribe the architecture of the underlying physical network (*e.g.*, describing a single physical network as possessing many different structures, depending on the nature of the access sought – one architecture for ATM, another for FR and a third for TCP-IP). The issue of the network layer at which access must be provided is one that has received little attention to date. Similarly, the possible justifiable differences in access linked to the transmission, platform or protocol have not as yet been explicitly discussed by regulators. For example, the Study Team has reservations about the approach that Ofcom appears to be adopting in the context of interconnection disputes involving BT, where it appears to be moving the boundary of the local access network, in response to different access requests.

(iii) *Price*

The structure and level of interconnection charges often determine whether competitors will be financially viable. For example, up to 50% of the total costs of some European long distance operators stem from the payment of local interconnection charges.¹²¹

Operators notified as having SMP in a relevant market (as currently set out in Parts 1, 2 and 3 of the *Interconnection Directive*) are required to follow the principle of cost-orientation. It is widely acknowledged that allowing incumbent operators with market power to set interconnection rates as high as possible would have a detrimental effect on the development of infrastructure-based competition. However, the real pricing implications of the cost-orientation principle are complex.

The interaction between competition in the provision of local services and interconnection is also important in the pricing context. The trend in tariff rebalancing¹²² and the increased “postalisation”¹²³ of retail telecommunications service pricing have enlarged the value of the local market (*i.e.*, increases in monthly subscription charges and local call charges have made the local market more attractive). Importantly, when most fixed incumbents rebalance retail

¹²¹ “Trend in Telecommunications Reform”, *op cit.* p. 20.

¹²² The OECD notes that in the period between 1990 and 1998, average local access charges have decreased only by approximately one seventh, while average charges for calls up to 27 km in length have dropped and then increased to be 20% above the 1990 starting rates, while average rates for calls over both 110 and 490 km have halved. It also notes that similar trends are reflected in the EU: a 4% increase in ten-minute local calls and a 7 and 15% decrease in regional and long distance calls, respectively, between 1998 and 1999.

¹²³ The OECD notes that, since 1990, calls over distances above 110 km have not only dropped to between a quarter and a third of the rates in 1990, but they have become flat-rated.

tariffs, they raise short-distance prices while bringing down the prices for longer distances.¹²⁴ This trend is also reflected in their interconnection rates. Over the last two to three years, charges for double tandem conveyance have fallen significantly, charges for single tandem conveyance have not changed significantly and charges for local carriage (origination and/ or termination) have also remained relatively unchanged.¹²⁵ New entrants are increasingly seeking interconnection at the local level, significantly increasing the revenues generated at this level. In this context, it must be acknowledged that, to some extent, the various interconnection charges reflect regulatory policy decisions of NRAs regarding economic incentives and signals (*e.g.*, to ensure that investment in alternative networks is encouraged).

Until recently, there remained some anomalies in the interconnection pricing structures used across the Member States. For example, DT's interconnection tariffs (set by the RegTP) until 1 June 2001 were distance-based, rather than element-based. It was therefore difficult to compare the German interconnection tariffs with either the best practice benchmark or charges in other Member States. However, the "Regio 200" tariff substantially exceeded the best practice benchmarks for single transit and double transit, and the long distance tariff substantially exceeded the double transit benchmark. Traffic carried on the basis of these tariffs made up only a small part of the interconnection traffic carried by DT but, for new entrants, was quite significant.

Where a new entrant cannot interconnect in the fixed incumbent's local switching area, it must interconnect at the incumbent's single tandem switch. As such, the new entrant is required to pay higher interconnection charges, thereby further reducing its margins (between the revenue from call charges and expenditure on interconnection).

Another significant pricing issue for local interconnection arises out of the combined effect of the boundaries of "local" areas and reciprocal call termination obligations. If the local call zone corresponds to the service area of a local switch, reciprocal charges may not harm new entrants. However, if there is a significant difference between a local call zone and the service area of a local switch, reciprocal interconnection charges could impose a significant burden on a new entrant. There are currently significant differences in the treatment of reciprocal termination arrangements in the Member States. In *France, Germany and The Netherlands*, for example, there is no reciprocity of rates requirement, leaving new entrants free to offer their own termination charges to the incumbent. In *Austria, Germany and the United Kingdom*, interconnection charges for call termination must be reciprocal.

¹²⁴ There are clear exceptions to this rule. However, these appear to be the result of regulatory intervention. The charges for origination (where the calls are single or double tandem traffic) of each of the local fixed network operators within the Finnet Group were capped by the Finnish Ministry at 60% of the retail rates for such calls. These rates have not significantly increased since the regulatory restriction was lifted in June 2000.

¹²⁵ It must, of course, be recognised that at least some of these changes are driven by the regular publication of "best practice" rates by the European Commission. However, this trend is reflected across a number of Member States, including *Spain, Belgium* (where a 20% decrease in double tandem charges occurred in 2000), *Austria* (where a 30% decrease in double tandem charges occurred in the year to March 2000), *Denmark* (10%, 20% and 25% reductions for local, single transit and double transit interconnection charges, respectively from 1 May 2000; in addition, an NTA Decision in May 2000 led to a 70% reduction in TeleDanmark's transit prices).

(iv) *Terms of Interconnection*

The rapid development of competition at the international and national (long distance) levels, through the entry of competitive network operators and traders in switched capacity at those levels, has exerted significant pressure on the interconnection terms offered by fixed incumbent operators for national and international termination.

Eligibility criteria for local interconnection services continue to raise concerns among regulators in some Member States, as they appear to operate in a manner that precludes new entrants seeking to acquire local interconnection from doing so. For example, DT's new local interconnection offer continues to raise concerns for new entrants, particularly because the local tariff is only available under far more restrictive conditions than in the majority of other Member States (e.g., new entrants are required to have a large number of PoIs to be able to acquire the advantageous terms for local interconnection). *Portugal* and *Spain* are the only Member States with more restrictive conditions. However, the new Spanish metropolitan interconnection service, together with per-minute charging of local metropolitan interconnection and single transit for voice telephony, may have redressed a number of the problems with the Spanish regime. The Portuguese offer requires 21 points of interconnection in the relevant region. Such eligibility criteria make it difficult to assess the true level of "demand" for local interconnection.¹²⁶

New entrants are aided in their assessment and comparison of interconnection terms and conditions by the transparency and non-discrimination obligations (both in terms of either discriminating between new entrants and between new entrants and elements/affiliates of the incumbent) imposed on fixed incumbents. In addition, such requirements preclude fixed incumbents from playing new entrants off against each other. They also contribute to the development of, and adherence to, industry standards, benchmarks and best practices (across a range of operational and administrative issues).

(v) *Technical Issues*

Incumbent operators are required to permit interconnection at any technically feasible point. There is a range of possible interconnection points, but trunk interconnection points of local and national tandem exchanges appear to be the most common points of fixed interconnection. The roll-out of new technologies (e.g., IP networks and xDSL) is creating demand for additional interconnection points (and at different layers).¹²⁷ However, there is anecdotal evidence from a number of Member States that fixed incumbents may be (and may historically have been) imposing technical requirements to delay or limit the activities of competitors. (The situations in *Germany*, *Portugal*, and *Spain* are discussed above). There are additional Member States such as *France*, where new entrants are required to establish a point of interconnection in each of the country's 18 local government jurisdictions.

An additional key regulatory issue for new entrants is dialling parity and pre-selection, as the means by which end users access their services as easily as they can access those of the incumbent. It is essential for new entrants that incumbents be required to install the

¹²⁶ This also raises the broader issue of whether such conditions might be justified in individual Member States because of particular historical network configurations or distinctive traffic flows based on unique demographic criteria.

¹²⁷ See discussion above, at Section II – Evolving Demand for Interconnection.

appropriate software (and reprogramme their equipment) and modify their operating procedures to facilitate dialling parity. Where call-by-call selection is used, there are three main enabling requirements: a numbering plan that allocates numbers fairly (*i.e.*, similar access codes); access to basic signalling services (*e.g.*, CLI data); and billing and auditing requirements. Where pre-selection is used, it is also important that the switch software identifies each customer's pre-selected carrier and routes and bills all calls accordingly.

It is consistently argued by new entrants that such a facility must be made available on non-discriminatory and transparent terms.¹²⁸ As such, there are concerns when incumbents do not include such provisions in their Reference Interconnection Offers,¹²⁹ or provide them at all.

Conclusions

1. **The provision of interconnection services is the subject of distinctive patterns of supply and demand. The form of the current “market” for interconnection services is, however, largely the result of regulation at Community level. While there is little doubt that a market for interconnection services would have otherwise developed, in the absence of the conditions and charging methodology prescribed in the *Interconnection Directive* and the Commission’s *Communication and Recommendation* on interconnection, it is likely that the dynamics of that market would differ from those that currently exist.**
2. **The *de facto* benchmarking of interconnection rates at the levels of the SMP-designated fixed incumbent has meant that the only real source of price pressure is the cost-orientation obligation imposed on the SMP-designated PSTN operator.**
3. **There appear to be distinct markets or sub-markets for fixed origination and termination. Both services can be acquired separately and the conditions of supply and demand for each service differ, and because the fixed incumbent’s commercial incentives for exploiting price-inelasticity for the terminating services are more significant (given that originating services may be subject to competition). In some Member States, a requirement for reciprocity in termination rates has skewed or nullified this effect.**
4. **It appears that termination at the local level is the least competitive interconnection service. Fixed incumbents retain control over the vast majority of fixed network termination points and the provision of single tandem and local termination in all Member States. In the absence of a technical means to achieve widespread competition for such termination points (*e.g.*, cable telephony penetration has not reached that point and competitive provision over unbundled local loops is *de minimis*) the fixed incumbent’s local loop remains the primary means to obtain local call termination.**

¹²⁸ On the other hand, it has been argued with equal force that the blanket application of the non-discrimination obligation may also be responsible for ensuring that there is no effective “competition” beyond the tariff benchmark set by the fixed incumbent.

¹²⁹ See Sixth Implementation Report, at p. 16.

5. **The provision of long distance termination services has evolved substantially in most Member States in the last two years. Increasing numbers of new entrants are offering such services, at least regionally. As a result, there is increasingly less reliance on the double-transit services of the incumbent. However, alternative providers continue to require local termination from the fixed incumbent. As a result, care should be taken in reviewing the regulatory obligations imposed on providers of long distance termination services. Incumbents still retain the ability to leverage their control over network termination points into long distance termination and remain the sole provider of long distance termination services in some regions. In addition, the small number of current competitors suggests that keeping markets open for future entry though *ex ante* regulation may be of great importance in many Member States.**
6. **It appears that, aside from those Member States where alternative infrastructures have not been built, there are few remaining competitive issues related to the provision of interconnection in the provision of cable landing rights and backhaul facilities. There are usually many alternatives to the fixed incumbent's offering. Moreover, cable landing rights have gradually been incorporated by NRAs into the broader interconnection regulatory regime, with specific service offerings now finding their way into Reference Interconnection Offers (and backhaul provided by fixed incumbents is being drawn within leased line obligations). However, it should be noted that, as a result of underlying cost differences and quality-of-service issues, the fixed incumbent is often the preferred alternative for such services.**
7. **It is arguable that indirect access obligations have rendered it unnecessary to impose other call origination-related obligations in some Members States. However, care should be taken in assessing the situation in each Member State.**
8. **Patterns of demand for interconnection services, reflecting retail service evolution, are changing the nature of, and leading to be introduction of new, interconnection services in a number of Member States. Care should be taken in considering the appropriate *ex ante* regulatory measures in each Member State.**

IV. WHOLESALE ACCESS TO FIXED NETWORKS FOR THE PROVISION OF VOICE AND LOW-SPEED SWITCHED SERVICES

Summary:

1. A number of EU Member States have not sought to further break down the provision of voice telephony services at the retail level into local, regional, national and international services. This approach appears largely to reflect the dominant presence of the fixed line incumbent in the provision of all of these service offerings. A breakdown of voice services has occurred in some EU Member States (such as *Denmark, Finland, France, Ireland, Spain* and the *United Kingdom*), largely as a result of increased regional infrastructure-based competition in those jurisdictions, which has meant that more distinct patterns of supply and demand have become apparent for voice services on a local, national and international level (supplemented by distinct tariff packages for such services). Outside the EU, the identification of sub-markets for voice services based on the distance of a call is much more commonplace. Of all the EU Member States, only *France, Germany* and the *United Kingdom* have identified specific voice markets on the basis of particular geographic routes.
2. The further identification of sub-markets along business/residential lines has been observed in EU jurisdictions such as *Denmark, Finland, France,* and the *United Kingdom*, although these sub-markets have in most instances been identified in competition-related proceedings and have not been material in terms of *ex ante* regulation.
3. All except five Member States (*Denmark, France, Ireland, Italy,* the *United Kingdom*) appear to take the view of the *United States* that retail fixed voice access services form part of the broader market for fixed public voice telephony services.
4. In its administrative practice under the *Merger Regulation*, the Commission has recognised the existence of separate relevant product markets for local, long distance and international calls. This differentiation has been based on the different features and characteristics of each service, the different levels of competition that have developed in each market, and the different tariff regimes which apply to each of these distanced-based voice services. At the retail level, there is no further market segmentation into terminating and originating elements of a call, as these individual elements are provided as a service bundle. This type of segmentation is justified at the wholesale level. Subscriber access is considered to fall within the broader relevant product market for calls.

Fixed access (both direct and indirect) for voice services over the PSTN or new fixed entrants' networks is substitutable with access provided over upgraded cable networks, wireless local loop and unbundled local loops. Although there are indications that mobile access is perceived to be a substitute for fixed access for voice calls among particular segments of the population, the vast majority of

consumers continue to see fixed and mobile services being applied in a complementary manner, rather than as full substitutes for one another.

5. The Study Team's market analysis suggests that there are likely to be relevant product markets at the retail level for:

- local voice calls (if carrier selection is available for local voice calls);
- national voice calls;
- international voice calls; and
- access for voice services.

There appear to be clear patterns of supply and demand in terms of tariffs, rebalancing, the use of calling plans, the extent of alternative network provision and the impact on tariffs. Substitution possibilities for international calls (and to a lesser extent long distance calls in larger Member States) exist for business customers using leased lines, although the precise extent of substitution may vary significantly between Member States. The availability of carrier selection appears to be a key factor in defining the scope of relevant voice services markets. Where carrier selection is not available to subscribers for local voice calls, it would appear that there is a single market for access and local voice calls.

Mobile calls do not, as yet, appear to fall within the same relevant retail product market as fixed calls. The services provided still appear to be more complementary than completely interchangeable. Moreover, substitution is often one-way (*e.g.*, mobile replacing fixed for voice calls). However, substitution is beginning to occur at the margins as a result of the increased use of mobile tariff packages, but this is further fragmented by factors such as the time of day/particular day/ frequency of use and so forth. This degree of disaggregation would be inappropriate for the purposes of *ex ante* regulation. The Study Team also anticipates that, at some point in the future, a significant degree of substitutability between fixed wireline and fixed wireless services on the one hand, and VoIP services provided over various platforms on the other, will develop.

6. In general, the conditions of competition in the provision of local, regional, national and or international calls are national in scope. The lack of availability of carrier (pre)selection in some Member States may result in narrower geographic markets at the local or regional level.

It is clear that certain national bilateral routes for international calls may be subject to distinct patterns of supply and demand so as to warrant a relevant geographic market definition based on the country pairs in question (*e.g.*, *Germany – Turkey*).

IV.1 EU MEMBER STATE ANALYSIS

Issue:

The extent to which a market analysis of the provision of fixed voice telephony services can be further segmented into relevant product markets characterised by distance, user group, or in terms of communications between distinct geographic locations.

IV.1.A. Summary of Main Relevant Markets Identified by the Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|---|--|--|
| Fixed public voice telephony services (<i>Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Portugal, Spain, Sweden</i>). | <ul style="list-style-type: none"> Local calls/services (<i>France, Ireland, Spain</i>). Further sub-divided into residential and professional/business markets (<i>France</i>). Provincial calls (<i>Spain</i>). Inter-provincial calls (<i>Spain</i>). National calls (<i>Ireland, Denmark</i>). Further sub-divided into residential and business markets (<i>Denmark</i>). International calls (<i>Denmark, Ireland, Spain</i>). Further sub-divided into residential and business markets (<i>Denmark</i>). Long distance and international services (<i>France</i>). Further sub-divided into residential and professional business markets (<i>France</i>). | National (although a number of separate geographic markets for specific international routes identified in <i>France</i>). |
| Calls over fixed networks (the <i>United Kingdom</i>). | <ul style="list-style-type: none"> Local calls (the <i>United Kingdom</i>). National calls (the <i>United Kingdom</i>). | National. |
| Local teleservices (<i>Finland</i>). | <ul style="list-style-type: none"> Residential (<i>Finland</i>). Large corporate entities (<i>Finland</i>). | Areas in which local operators were granted unlimited operating rights. |
| Long distance teleservices (<i>Finland</i>). | None. | National. |
| International retail services (<i>Finland, the United Kingdom</i>). | <ul style="list-style-type: none"> Residential (the <i>United Kingdom</i>). Business (the <i>United Kingdom</i>). | <ul style="list-style-type: none"> Country pairs (the <i>United Kingdom</i>). National (<i>Finland</i>). |

| | | |
|---|--|------------------|
| Access (<i>Denmark</i> , ¹³⁰ <i>France</i> , ¹³¹ <i>Ireland</i> , <i>Italy</i> , ¹³² the <i>United Kingdom</i> ¹³³) | <ul style="list-style-type: none"> Residential (<i>Denmark</i>, <i>France</i>). Professional/business (<i>Denmark</i>, <i>France</i>). | National. |
| Fixed public telephone networks and fixed public telephone services (<i>The Netherlands</i>). | None. | Likely national. |
| Voice over the Internet (<i>Italy</i>). | None. | National. |

IV.1.B. Relevant Product Markets

a. General Conclusions

The majority of EU Member States (*Austria*, *Belgium*, *Denmark*, *France*, *Germany*, *Greece*, *Ireland*, *Italy*, *Portugal*, *Spain*, *Sweden*) have identified a relevant product market for retail **fixed voice telephony services**, which is distinct from the markets for fixed data services and mobile voice services. As described in detail in the section on retail mobile services,¹³⁴ Member States have in general concluded that this product market is distinct from the market for **mobile voice telephony services**, based on important differences between fixed and mobile services in terms of price, functionality, coverage, inferiority and quality of service, which means that mobile services are not fully substitutable for fixed services.

Of those Member States that have identified a market for fixed voice telephony services, however, there is little agreement on whether this market consists of any sub-markets or market segments. Indeed, a number of Member States (*Austria*, *Belgium*, *Germany*, *Greece*, *Italy*, *Portugal*, *Sweden*) have concluded that the market should not be further segmented based on such criteria as distance (*i.e.*, local, national and international calls) or types of customers (*i.e.*, residential or business customers).¹³⁵ In contrast, other Member States (*Denmark*, *France*, *Ireland*, *Spain*) have identified specific sub-markets or market segments for **local**, **national** and/or **international calls** (or variations thereof), with two Member States (*Denmark*, *France*) even segmenting further so as to distinguish between **residential** and **professional/business users**.

Meanwhile, in *Finland* and the *United Kingdom*, instead of defining a broad market for fixed voice telephony services and then segmenting this market into sub-markets or market segments, Oftel and the Finnish NRA have chosen to identify specific primary markets based on the criteria of distance. In the *United Kingdom*, Oftel has identified a market for **calls over fixed networks**, which contains a sub-market for **local calls** and **national calls**, and a market for **international retail services**, which contains sub-markets for **residential** and **business users**.

¹³⁰ The Danish terminology for this market is “fixed network subscriptions”.

¹³¹ The ART in *France* calls this market the “retail local loop access” market.

¹³² The NCA in *Italy* calls this market the market for “access to and use of the public switched network”.

¹³³ Oftel in the *United Kingdom* defines this market as the market for fixed access, which includes connection to the network and line rental.

¹³⁴ See Chapter VI.

¹³⁵ Although in *Germany*, the RegTP has distinguished between local and long distance/international calls and between business customers and private end user customers in the context of price cap regulation.

In *Finland*, the NRA has identified a market for **local teleservices**, which the NRA has said is closely entangled with the provision of the physical network infrastructure (*i.e.*, network services) for the wireline subscriber connection (because the operator that controls the existing network subscription connections also controls the local wireline network and the services provided on such network), and includes dial-up access to the Internet. The Finnish NRA has segmented the local teleservices market into separate sub-markets for **residential** and **large corporate customers**. The NRA in *Finland* has also identified distinct and separate markets for **long distance** and **international teleservices**.

Meanwhile, *Italy* has identified a market for **voice over the Internet**, which is separate from the market for fixed voice telephony services.

Five Member States (*Denmark, France, Ireland, Italy, the United Kingdom*) have distinguished the retail market for **access** from the general market for fixed voice telephony services, with *Denmark* and *France* segmenting this market between **residential** and **professional/business customers**.

b. Specific Analysis

(i) Fixed voice telephony services

As noted above, the Member States differ with regard to whether the market for fixed voice telephony services should be segmented into narrower submarkets or market segments. In *France*, for example, the authorities have identified a general market for **fixed public voice telephony services** and, within this broader market, distinguish further between the market for **local communications** and the market for **long distance and international communications**. For both of these sub-markets, the French authorities have further distinguished between the market for **residential** subscribers and the market for **professional/business** subscribers. With respect to the market for **local communications services**, the ART has specifically distinguished this market from the market for **Internet access communications services**.

Similarly, in *Spain*, the regulatory authorities have identified four distinct markets for basic fixed voice telephony services, namely:

- local calls;
- provincial calls;
- inter-provincial calls; and
- international calls.

The Spanish NCA also has defined a separate relevant market for fixed telephony services for the purposes of imposing obligations on operators with SMP.

In the *United Kingdom*, Oftel has identified a market for **calls over fixed networks**, which it has distinguished from the market for **access**. Within the call market, Oftel has distinguished between separate calls for **local** and **national calls**. According to Oftel, it is appropriate to distinguish between local and national calls because the price of local calls cannot constrain the price of national calls (and vice versa), since customers do not regard either type of call as being a direct substitute for the other.

Oftel has also identified a separate market for **international retail services**, which it has further sub-divided into separate markets for **business** and **residential** customers because, according to Oftel, suppliers of international retail services are able to (and, in practice, do) discriminate on price between residential and business customers, by offering separate prices and distinct packages to these two distinct groups of customers. In Oftel's view, international private leased circuits are included in the international retail services market in so far as they provide a substitute for international retail calls for large corporate customers.

Similarly, in *Ireland*, the ODTR has identified **local calls**, **national calls** and **international calls** as candidate markets at the retail level in its most recent market definition exercise in October 1999. According to the ODTR, there is distinct demand for data and voice services and, on the supply side, the substitutability of voice and data services depends on switching equipment, which may not be able to cater for both voice and data traffic.

In *Denmark*, the NCA has identified sub-markets for **national** and **international telephony services**, and has further identified market segments for **business** and **residential users for each of these primary markets**, due primarily to the fact that business users have specific requirements and needs.

By contrast to these Member States, the NRAs in Member States such as *Austria*, *Belgium*, *Germany*, *Greece*, *Italy*, *Portugal* and *Sweden* have defined a broad relevant product market for **fixed public voice telephony services** but have not sought to segment this market further. In *Belgium*, *Greece*, *Ireland* and *Italy* (and *The Netherlands*), this market has been defined in compliance with the relevant definition adopted under the *Interconnection Directive*.

In *Germany*, for example, the RegTP acknowledged the different market conditions for local and long distance/international calls, and for business and private end user customers, but declined to further break down the **public voice telephony** services market into sub-markets except in one unique circumstance (*i.e.*, the provision of **voice telephony services to Turkey**, which is a highly competitive market as compared to the provision of voice services to other countries). Specifically, for international voice telephony services, the RegTP noted that the same sales and marketing strategies apply with equal force to business and mass market customers.

In *Austria*, the **fixed public voice telephony** market is explicitly defined to include national and international calls. In *Sweden*, the relevant product market is defined to include the transmission of telefax messages and data communications using low-speed modems.

OPTA in *The Netherlands* has to date not specifically identified a market for public voice telephony services, but only the broad market for **fixed public telephone networks and fixed public telephone services** within the context of designating the incumbent as an operator with SMP. OPTA has declined to distinguish between the markets for fixed public telephone services and fixed public telephone networks because of the incumbent's overwhelming market share in both sectors.

With respect to **voice over the Internet**, only *Italy* among the Member States has identified this service as a separate market from other fixed voice telephony services. In *France* and *Spain*, the NRAs have not yet recognised Internet voice telephony as a distinct market from fixed voice telephony services, but have identified factors that suggest that the two services are substitutable. For example, in *Spain*, a recent decision of the Ministry of Science & Technology held that notifications for services using voice over IP technology should be

subject to the same licensing as standard fixed voice services, suggesting that there is a high degree of substitutability between the two services and that they belong in the same market. The ART in *France*, however, has noted that there are certain barriers to the growth of Internet voice telephony services that simply do not exist for fixed voice telephony services – such as, quality of service, absence of directories, resistance of the public due to lack of ease, transparency, and the cost of terminals.

(ii) *Local Access*

Five Member States (*Denmark, France, Ireland, Italy, the United Kingdom*) have distinguished between the retail market for **access** and the general market for fixed public voice services.

In *France*, the ART has characterised the **local loop access** market (also referred to as the “local market”) as consisting of direct access by operators to end users, and has sub-divided this market according to the type of services supported and customers targeted, namely:

- the local loop market for the provision of voice telephony services
- the local loop market for the provision of Internet communications services
- a residential local loop market
- a professional local loop market

The ART has distinguished separate **local loop access** markets for **residential** and **professional customers**, and has further segmented the residential local loop access market depending on the needs of subscribers (*i.e.*, residential customers who are likely to be interested in a second line, and residential customers with a high level of consumption of voice telephony traffic).

According to the ART in *France*, a distinction between the market for local loop access and the market for the provision of local voice communications is justified, based on the fact that the profitability of a local loop operator, unlike a provider of fixed voice telephony services, is not limited to the income and costs pertaining to the line and local traffic, but results from all traffic generated by the line, including long distance and international calls.

In the *United Kingdom*, Oftel historically has distinguished between access and call markets because, “[a]lthough network access and call services have traditionally been supplied by the same network operator, applying the market definition approach ... would lead to the conclusion that the price of call services would not constrain the price which a monopoly operator of a local network could charge for access.” Moreover, call markets are inherently different to access markets because, in order to provide call services, there is no necessity to build a network to the customer’s premises as there is with access services (*i.e.*, indirect access providers). Thus, the entry barriers for the provision of calls are much lower than for the provision of access.

Applying a relevant market analysis to fixed access, Oftel has concluded that, on the demand side, there are no adequate substitutes for fixed access. According to Oftel, the most likely substitute is mobile access. But Oftel has relied on evidence which suggests that mobile access is not completely substitutable for fixed access, at least from the consumer’s point of view.

On the supply side, Oftel has stated that the relevant consideration is whether a firm without a local access network could enter the market and develop its own network. According to Oftel, mobile operators and those operators with long distance transmission networks are the most likely candidates to do so. On the other hand, Oftel has concluded that because the significant sunk costs of building a new local network, plus the fact that the process of installing local access infrastructure is time consuming, supply-side substitution is unlikely. Thus, Oftel has identified a separate market for **fixed access**.

In *Italy*, the NCA has identified a market for **access to and use of the public switched network**, which consists of the provision of access to the public switched network to end users through any means.

In *Ireland*, the ODTR has identified **access** as a retail market distinct from the local call market.

IV.1.C. Relevant Geographic Markets

The majority of the Member States (*Austria, Belgium, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden, the United Kingdom*) have generally identified, or have simply assumed, that the geographic scope of their respective markets for basic fixed voice telephony services is national in scope based on, among other reasons:

- the provision of public voice telephony services is subject to a national licensing regime or other national regulatory framework;
- the national coverage of the incumbent's network; and
- the national scope of offers made by operators.

In *France*, the ART has generally considered long distance/international services to be offered competitively on a national basis, but has identified a number of separate geographic markets for some specific international routes (*e.g.*, calls between metropolitan France and the Overseas Department and Territories).

In the *United Kingdom*, Oftel now considers individual country pair routes to constitute separate international retail services markets. Apparently, on the demand side, Oftel does not view substitution between different country routes to be feasible since a call to one country is not a good alternative for a call to another country.

In *Finland*, which historically has had numerous different local operators, each of which provides local services in and dominates a particular local area, the NRA has concluded that the relevant geographic market for local teleservices is the area for which the local operator in question was granted unlimited operating rights until 31 December 1993.

In *Italy*, the ICA has considered the market for voice over IP to be national in scope in light of the fact that the provision of this service is subject to a national authorisation regime and is based on the developments of informatics programmes in the Italian language.

With respect to the retail access market, Oftel in the *United Kingdom* and the NRA in *Italy* have concluded that the market is national in scope. According to Oftel, although there may be differences in competitive conditions between regions, BT's charges for access are

geographically uniform, which means that any response to competitive pressure in one area in the form of lower prices would apply throughout the country.

IV.1.D. Relevant Product and Geographic Markets Identified Outside the EU

Regulatory and competition authorities outside the EU have also generally identified a relevant product market for fixed voice telephony services, but have adopted a variety of approaches:

In *Australia*, the ACCC has identified a national market for the **supply of fixed voice telephony services** and has distinguished between markets for **local** and **long distance (national and international) telephony services**. The ACCC has accepted that there are likely to be separate residential and business markets for long distance services, but has not yet taken a definitive position on this issue.

In *Canada*, the CRTC has identified separate relevant markets for **toll services, toll free services** and **international telecommunications services**. The CRTC has concluded that the relevant geographic markets for toll and toll free services are national, rather than regional or local, because most toll and toll free services are available nationally and marketed nationally. Meanwhile, the CRTC has identified the “Canada-overseas market accessible by customers located in Canada” as the appropriate relevant geographic market for **international telecoms services**. As regards **local exchange services**, the CRTC has not specifically identified local exchange services as a relevant market, but this market can be implied from its decisions and its efforts to open these services to competition.

In *New Zealand*, the courts have identified a broad national market for **switched telecommunications services**, but the fixed line incumbent’s clear dominance in this market has meant that the issue has not been considered in great detail and is far from settled.

In the *United States*, the FCC has identified **local exchange and exchange access services** as falling within a single relevant product market, and has segmented this market into two further relevant product markets: (i) **mass market** (residential and small business); and (ii) **large business market** (medium and large businesses, plus government). The FCC has also defined a separate relevant market for **interstate, domestic, interexchange services** (again, segmented into the mass market and large business market) and **international long distance services for end users** (segmented into the mass market and large business market). The FCC has further stated that a separate relevant market may develop for local exchange and exchange access services bundled with long distance service, prompted largely by the imminent entry by the RBOCs into the provision of long distance services and long distance carriers into local markets.

With regard to the geographic scope of these markets, the FCC has considered the geographic market(s) for local exchange and exchange access services to be discrete local areas because customers dissatisfied with their local exchange service cannot substitute a local exchange service from a different area. Meanwhile, the FCC and DoJ have treated the relevant geographic market for interstate, domestic, interexchange services to be a single national

market,¹³⁶ despite the fact that the geographic market is more accurately defined as a series of point-to-point markets, because of “*geographic rate averaging and rate integration, price regulation of exchange access services, and the availability of interstate transport capacity cause carriers to behave similarly in each domestic point-to-point market.*”

Finally, with respect to international long distance markets, the FCC has found that each international route between the *United States* and a foreign country to be a single geographic market for international long distance services, while the DoJ takes a different approach, designating the *United States* as a single geographic market because mass market international long distance services are offered throughout the *United States* and the prices of these services are generally the same throughout the country.

Conclusions:

- 1. A number of EU Member States have not sought to further break down retail voice telephony services into local, regional, national and international services. This approach largely reflects the dominant presence of the fixed line incumbent across all of these service offerings (and the fact that, with the exception of *Finland* historically, there have been no regulatory restrictions on the geographic scope of operators’ services, as has occurred in *Canada* and the *United States* between international, national and local calls).**
- 2. A further breakdown of voice services has occurred in some EU Member States such as *Denmark, Finland, France, Ireland, Spain* and the *United Kingdom*, largely as a result of increased infrastructure-based competition in regions of those Member States, which has meant that more distinct patterns of supply and demand have become apparent for voice services on a local, national and international level (supplemented by distinct tariff packages for such services). Outside the EU, the identification of sub-markets for voice services based on the distance of a call is much more commonplace.**
- 3. The further identification of sub-markets along business/residential lines has been observed in EU jurisdictions such as *Denmark, Finland, France* and the *United Kingdom*, although these sub-markets have in most instances been identified in competition-related proceedings and have not been material in terms of *ex ante* regulation. Outside the EU, the *United States* identifies separate business and residential markets for each of its fixed voice markets, and *Australia* also accepts that there are likely to be separate residential and business markets for long distance services, but has not yet taken a definitive position on this issue.**
- 4. All except five Member States (*Denmark, France, Ireland, Italy, the United Kingdom*) appear to take the view of the *United States* that retail fixed voice access services form part of the broader market for fixed public voice telephony services.**

¹³⁶ For RBOC interLATA affiliates and independent LECs, the FCC has concluded that the relevant geographic interexchange market should be sub-divided between in-region and out-of-region markets because these LECs’ control of the local bottleneck “constitutes credible evidence that there could be a lack of competitive performance in point-to-point markets that originate in-region.”

5. **Of all the EU Member States, only *France, Germany* and the *United Kingdom* have identified specific voice markets on the basis of particular geographic routes. *Germany*, however, has rejected the designation of point-to-point markets in a number of cases, but has endorsed the approach that the *Germany-Turkey* route displayed distinctive competitive features. The point-to-point market approach is more frequently deployed in the *United States*, where the FCC has found each international route between the *United States* and a foreign country to be a distinct market for international long distance services.**

IV.2 ANALYSIS UNDER EU COMPETITION RULES

Beginning with the *TBT/BT/TeleDanmark/Telenor* Decision,¹³⁷ the Commission generally has recognised separate relevant product markets for voice and data services, and has further split these markets into domestic and international segments.¹³⁸ In *Telia/Telenor*, the Commission identified the market for subscriber access to telephone services, which could be further subdivided into markets for local, long distance and international calls.¹³⁹

IV.2.A. International Voice Telephony Services

a. Demand and Supply-side Considerations

The Commission specifically analysed the market for international voice telephony services in its *British Telecom/MCI (II)* Decision.¹⁴⁰ According to the Commission, international direct dialled (IDD) calls account for the largest share of international voice telephony services (at least as of 1997, the year of the Decision), and customers for IDD services lie either at the wholesale or retail level. Wholesale customers are principally telecoms companies who buy switched interconnection with international transmission facilities owned by existing facilities-based operators. Retail customers, meanwhile, are both business and residential end users.¹⁴¹ The Commission noted that international voice telephony services are also provided to customers through the use of international private leased circuits (IPLCs) hired from facilities-based operators.¹⁴²

In *British Telecom/MCI (II)*, the Commission further considered the question of whether satellite services are substitutable for fixed line services (*i.e.*, provided over undersea cables) for the purposes of delivering international calls, or whether they should be considered to constitute a separate product market. The Commission concluded that it is appropriate to consider satellite services as being separate and not substitutable for the provision of

¹³⁷ *TBT/BT/TeleDanmark/Telenor* Case No IV/M.570, para. 34.

¹³⁸ Although the Commission in *TBT/BT/TeleDanmark/Telenor* did not consider it necessary to further define these markets because the proposed concentration did not give rise to the creation or strengthening of a dominant position.

¹³⁹ *Telia/Telenor* Case IV/M.1439, paras. 84-92.

¹⁴⁰ *British Telecom/MCI (II)* Case No IV/M.856, para. 13.

¹⁴¹ *British Telecom/MCI (II)*, para. 14.

¹⁴² *British Telecom/MCI (II)*, para. 15.

international voice telephony services (at least for the purposes of the proposed merger) because provision over satellite networks can result in greater signal propagation delay time, echo effects, and susceptibility to environmental or climatic conditions such as heavy rain.¹⁴³

b. *Relevant Geographic Market*

The Commission has considered the relevant geographic market for international voice telephony services to be the individual call traffic routes between any country pairs, since different international routes cannot be considered as viable demand substitutes.¹⁴⁴ Accordingly, the Commission has considered that two distinct geographic markets can be identified within any international route, each comprising the originating bilateral traffic from the countries concerned.¹⁴⁵

Furthermore, at least for the purposes of assessing in *British Telecom/MCI (II)* the possibility of re-routing traffic through third-countries (“hubbing”), the Commission did not view hubbing as a viable commercial possibility from the supply side since, under the existing system of accounting rates and proportionate returns, it would be more expensive than using direct routes. The Commission also found that some opportunities exist for customers to take advantage of price differentials between any pair of countries (for example, through calling cards and call-back services), although these alternatives were not seen to represent a significant competitive constraint on domestic fixed incumbent operators.¹⁴⁶

IV.2.B. *Subscriber Access to Telephone Services*

a. *Demand and Supply-side Considerations*

In *Telia/Telenor*, the Commission identified the relevant product market for subscriber access to telephone services, which includes distinct markets for local, long distance and international calls.¹⁴⁷

In general, the Commission recognised that basic telephony services consist of incoming and outgoing calls, which can be classified according to whether or not the call is “local” (*i.e.*, whether they originate and terminate on the same local exchange network), or “long distance” (*i.e.*, whether they have to be sent to, or are received from, somewhere else in the country), or “international” (*i.e.*, whether they have to be sent to or received from a foreign country).¹⁴⁸

The Commission concluded, however, that although the nature of the origination and termination of a call is fundamental to whether that call is characterised as being local, long distance or international, call origination and call termination at the retail level do not of themselves constitute separate markets. According to the Commission, the basis for the argument that they are separate product markets is that, in theory, a subscriber facing local loop competition could rent separate lines for incoming and outgoing calls, thereby allowing him to buy different services from two different providers. The Commission noted, however,

¹⁴³ *British Telecom/MCI (II)*, para. 13.

¹⁴⁴ *British Telecom/MCI (II)*, para. 19; *BT/ESAT Case No COMP/M.1838*, para. 19.

¹⁴⁵ *British Telecom/MCI (II)*, para. 19.

¹⁴⁶ *British Telecom/MCI (II)*, para. 19.

¹⁴⁷ *Telia/Telenor*, para. 84.

¹⁴⁸ *Telia/Telenor*, para. 84.

that such a choice would result in two charges (rather than one) for fixed line rentals and, therefore, would be unlikely to be less costly than having just one line for both incoming and outgoing calls.¹⁴⁹

Moreover, subscriber access to telephone services is generally offered on the basis of a bundled product for both call termination and call origination, and it is difficult to unbundle the individual price elements of the services for a final user. According to the Commission, this further suggests that incoming and outgoing calls should be treated as falling within the same relevant product market.¹⁵⁰

Specifically with respect to its analysis of local, long distance and international calls, the Commission found that, on the demand side, it is the subscriber who decides whether he or she wishes to make a local, long distance or international call. However, if the various layers of the telephone hierarchy are separated among carriers, then the supplier of local services may not necessarily be able to offer long distance or international calls directly to the subscriber and may have to refer the call to another operator. For these reasons, the Commission has built its relevant market analysis around these conventional splits of services and has concluded that local, long distance and international calls can be treated as separate markets.¹⁵¹

For long distance calls, the Commission has considered that where an operator is vertically integrated, the transition from local to long distance merely involves switching between different exchange levels and, in such instances, there is no discernable difference between the demand for local and long distance services. However, where the local and long distance networks are segregated, a long distance operator needs to interconnect with the local loop network on which the call originated in order to accept the call and carry the traffic to somewhere else in the country or region. In such instances, there exists a clear demand for “long distance” services. The Commission has also stated that there is demand for long distance services where local loop operators need to send traffic to, or receive traffic from, an international gateway or access point leading to the international public switched network, or when traffic has to be routed to a mobile network.¹⁵²

The Commission has viewed resale, carrier pre-selection and carrier call-by-call selection as means for the introduction of competition for the carriage of both long distance and international calls, since such services allow customers to access another operator or reseller who will handle the call for them. However, the Commission has highlighted that such services generally apply only to higher margin services such as long distance or international calls, and are not used for purely local calls.¹⁵³

b. Relevant Geographic Market

The Commission has generally considered subscriber access services to be national in scope since these service offerings have tended in the past to be nationally limited, mostly because

¹⁴⁹ *Telia/Telenor*, paras. 85-87.

¹⁵⁰ *Telia/Telenor*, para. 86.

¹⁵¹ *Telia/Telenor*, para. 88.

¹⁵² *Telia/Telenor*, para. 89.

¹⁵³ *Telia/Telenor*, para. 91.

the telephone operators supplying them have not been able to provide services across national borders.¹⁵⁴

Conclusions:

- 1. In its administrative practice under the *Merger Regulation*, the Commission has recognised the existence of separate relevant product markets for local, long distance and international calls. This differentiation has been based on the different features and characteristics of each service, the different levels of competition that have developed in each market, and the different distanced-based tariff regimes which apply to each of these voice services.**
- 2. At the retail level, there is no further market segmentation into terminating and originating elements of a call, as these individual elements are provided as a service bundle. This type of segmentation may, however, be justified at the wholesale level.**
- 3. Subscriber access is considered to fall within the broader relevant product market for local voice calls.**
- 4. According to the Commission, the relevant geographic markets for local and long distance services are national in scope, while the geographic market for international voice telephony services can be identified in accordance with individual call traffic routes between any given country pair.**

¹⁵⁴ *Telia/Telenor*, para. 121.

IV.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

There is a range of wholesale services that should be susceptible to a relevant market analysis under the broader umbrella of *access to the fixed network for the provision of switched voice services and switched call services* under a standard analogue connection. These services facilitate the provision of the following retail services:

- access to the fixed telephone network for the provision of switched voice services (also referred to as “access” or “subscription”);
- local voice and fax/data communications (local calls);
- long distance voice and fax/data communications (national calls - possibly to subscribers of other fixed networks);
- international voice and fax communications (international calls); and;
- calls to special service numbers.

In essence, entities providing such retail services require both a means of ensuring that end users have access to a fixed network and the wholesale service inputs necessary to provide such retail services.

IV.3.A. Relevant Product Market

a. Fixed End User Access

(i) Demand-side Substitutes

End users access for fixed voice services may be provided in a variety of ways – over networks under the control of the service provider or over networks controlled by another entity (using indirect access, whether on a call-by-call basis or as a preselected carrier). There are a number of different fixed access networks that can be used by voice service providers in most Member States to provide access for voice services, including: copper,¹⁵⁵ co-axial fibre and fibre access lines as parts of traditional switched telecommunications networks (increasingly, these networks are becoming packet – switched or, as an intermediate phase, hybrid), so-called “Siamese” copper co-axial access (in *Ireland* and the *United Kingdom* only), and electric power-lines.

Where cable networks offer fixed access for the provision of voice services, the degree of substitutability with access provided by traditional telecommunications networks will depend on what customers demand of this access, and whether cable networks can provide a service that is a substitute (in terms of both price and quality) for access for voice services acquired over other fixed wireline and wireless networks for a sufficient number of subscribers. In the

¹⁵⁵ Copper lines are also used to provide ISDN and xDSL access (with some technical enhancement). ISDN is already used (to varying degrees in different Member States) to provide voice service access; xDSL could be used to provide voice service access (when a number of residual technical issues are overcome).

view of the Study Team, access for voice services over bi-directional, upgraded cable networks is substitutable for access provided over fixed wireline and wireless networks, and both therefore fall within the same relevant product market.¹⁵⁶

In addition to these “wireline” platforms, there are a number of wireless local loop (WLL) platforms (using various frequency bands) that provide fixed access for the provision of voice services. These platforms are used to both augment and backfill wireline access, and to compete with wireline access. The ubiquity of such platforms varies so as to reflect the range of such uses. Access for the provision of voice services over WLL platforms is substitutable for access provided over fixed wireline networks.

Finally, the Study Team notes that unbundled local loops are used in jurisdictions outside the EU to provide access to support voice services (in addition to data services). For example, in the *United States*, many operators acquiring unbundled local loops initially did so in order to provide such access. As yet, few acquirers of unbundled local loops in the EU provide voice services (or the associated access services). However, such access is clearly substitutable for access over local access facilities operated by the network operator.

It appears that the terms and conditions (including charges) for access over these competing platforms are relatively similar (when offers to the same or similar customer groups are compared). This is at least in part the result of the historic regulation of fixed line incumbent operators, in so far as:

- they are required to geographically-average their tariffs;
- many of them require regulatory approval of tariff changes (particularly for tariffs for residential services and services that are part of their universal service obligations); and
- in many cases tariff rebalancing (which required increases in the range of hundreds of percent for access charges) is not yet, in reality, complete.¹⁵⁷ As a result, access charges display a limited potential for downward price pressure resulting from the entry of new access providers (since the costs of even efficient new entrants are unlikely to be sufficiently low to leave a margin on the revenues generated on access provision that will provide them with the return on capital that they require).

As a result, there is little competition in relation to the terms and conditions of retail access. Retail Competition is focused on the services provided using the access acquired.

There is an extensive discussion of wholesale fixed network access to end users in Section I of this chapter. In essence, providers of voice services (or a cluster of voice services) have the means described above to provide direct access to their end users. In addition, they can provide voice services using indirect access codes, obviating the need to acquire direct end user access (over facilities that they control) at the wholesale level.

¹⁵⁶ Clearly, such access cannot be provided over uni-directional cable networks.

¹⁵⁷ For example, the German rebalancing is often described as a “soft” rebalancing. In addition, the Member States that were granted derogations have not yet completed fully the rebalancing process.

(ii) *Supply-side Substitutes*

xDSL is currently marketed and provided as a technology for data and Internet services. However, xDSL technology provides a means to offer multiple services (including voice) over a single copper line. In addition, such services could, theoretically, be provided for a flat-rate monthly fee. There are, however, a number of fundamental requirements that will need to be met before voice over xDSL becomes a viable alternative access and voice-service delivery platform (in addition to the economics of rolling the technology out to residential and small business subscribers):

- voice call priority, to ensure quality and reliability (when compared to existing PSTN services);
- automatic detection of and line speed adjustment for modem and fax calls (allowing existing analogue modems and faxes to work together);
- the use of standards-based network interfaces; and
- the ability to use widely-deployed standards-based transport technologies (like TCP/IP).

In addition to the platforms discussed above, it is possible that mobile access may become a substitute for fixed access. A mobile connection is currently a poor substitute for a fixed connection for two reasons:

- *Data rates:* GSM mobile networks so far have been confined to a data rate of no greater than 9.6 kbit/s and, therefore, mobile networks do not provide access at a rate able to support fax communications. They only support voice communications. However, with the inevitable GPRS upgrade, GSM networks will be able to provide data rates up to a level that is comparable with single channel ISDN (64 kbit/s), thereby allowing voice and fax communications.
- *Prices:* Prices for a package of mobile telecommunications services are typically significantly higher than for a corresponding package of fixed telecommunications services.

The Study Team has appraised the various elements of a substitutability analysis between fixed and mobile service at Section III.2.C of Chapter VI of this Study. NRAs have also attached a significant premium to the convenience afforded by mobility, which is said to result in fixed and mobile voice services not being functionally interchangeable from a consumer's perspective. However, it should be recalled that it is the likely response of marginal users, and not the average user that is important for market definition purposes (*i.e.*, whether a sufficient number of users would switch to either mobile or fixed voice substitutes in response to a hypothetical price increase).

It appears that, on the margin, some competition is occurring between fixed and mobile operators for subscriptions (*i.e.*, to provide access) in some Member States. The latest pan-European Member State information about the numbers of households that have a mobile phone but not a fixed line phone, comes from a Gallup survey conducted around mid-1999. This survey suggests that, for households with PSTN access, Member State figures range from

1% to 18% for those who have a mobile phone only.¹⁵⁸ On the margin, the competition between fixed and mobile to provide access for the provision of voice services is thus more pronounced in *Finland* (18%) and *Portugal* (12%) than it is in *Germany* and *Luxembourg* (both 1%). The Gallup survey indicates that, in each Member State, competition between fixed and mobile networks to provide access for the provision of voice services can be narrowed down to a percentage of the country figure for “mobile only” subscribers who would have a fixed wire telephone subscription if mobile telephony were not available. The Gallup figures are shown in **Figure V.2** below.

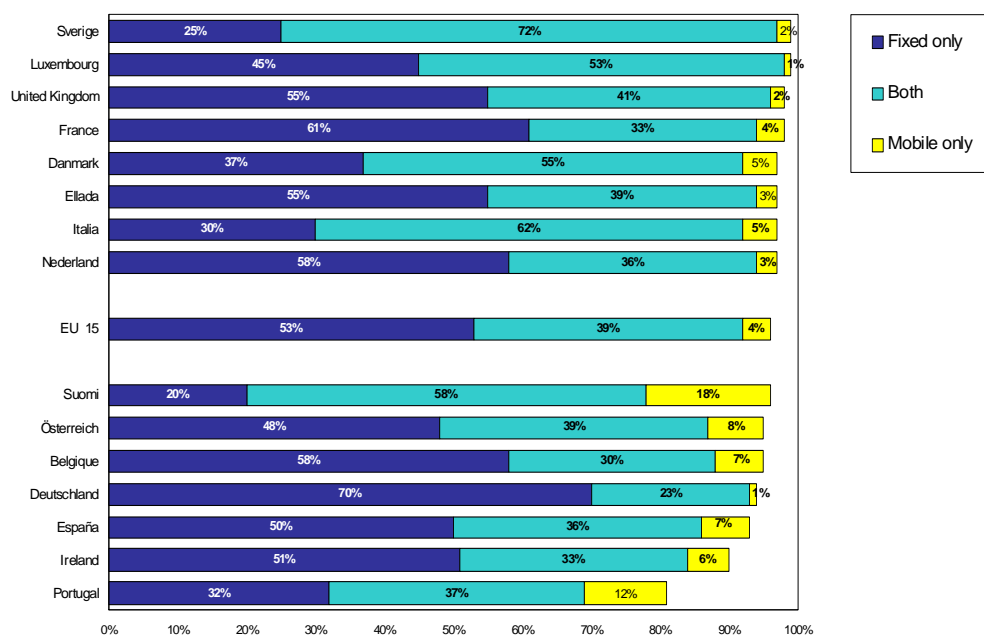


Figure V.2: Telephony services used at home (Source: Gallup, 1999).

The Gallup research indicates that “mobile only” subscribers perceive this purchase choice to reflect a “price/quality package”. There is growing evidence to suggest that the customer segment making this choice is becoming increasingly clearly differentiated as mainly young people who move residence relatively frequently. It would appear that it is largely the principal attribute of mobile telephony (*i.e.*, mobility) that is of most importance to “mobile only” subscribers, with many of these customers being unlikely to have a private PSTN subscription in the absence of mobile phones not being available to them.

A number of analysts have generated empirical support for the proposition that fixed and mobile voice services do not fall within the same product market but that, today, most customers use their fixed and mobile phones in a complementary way. For example, the price for a package of mobile telecoms services is significantly higher than for a corresponding package of fixed telecoms service. The price disadvantage exists for both voice and data communications. The analysts add that the low degree of substitutability between fixed and

¹⁵⁸ We are unaware of the availability of data about sampling numbers or any “confidence intervals” being published with this survey, which means that the Study Team cannot state the margin for error that should be attached to these figures.

mobile connections (as distinct from usage) is reflected in their relative penetration levels. In the face of substantial increases in the mobile levels of penetration, for example, the penetration level for fixed telephony has decreased minimally in some Member States, while in some cases it has even increased (if we count the number of lines associated with ISDN connections in a Member State such as *Germany*). Full substitution only occurs in the case of one-person-households. Some mobile operators (such as VIAG Interkom in *Germany*) offer “homezone” products which provide tariffs similar to fixed voice telephony once the subscriber is in a predefined “homezone”. While “homezone” products have attracted one-person-households, the overwhelming share of customers continue to use a fixed and a mobile connection in a complementary way (this may also, at least in part, explain why such ‘converged’ service offerings have not by and large proven to be commercially successful).

Rather different conclusions were reached as a result of the market research conducted by the analysts NOP, which indicates that:

- consumers in the *United Kingdom* are now choosing to make one in three of their calls to mobiles from mobiles, rather than from fixed lines. Since 1998, the percentage of inbound calls to mobiles from fixed lines as a proportion of total inbound traffic has significantly fallen, and this percentage continues to fall on an annual basis;
- approximately 32% of those with both fixed and mobile access at home “often” or “sometimes” use their mobile phone instead of their fixed lines, while this percentage increases significantly in the workspace where 58% of those with both fixed and mobile access at work “often” or “sometimes” use their mobile phone instead of their fixed lines; and
- approximately 27% of users reported a decrease in their household fixed phone usage following the acquisition of a mobile phone.

While competition for subscribers between fixed and mobile networks will develop further in the future, the Study Team believes that, even in countries with a relatively high number of mobile only subscribers, mobile access is not (yet) sufficiently substitutable for fixed access for a sufficient number of marginal users.¹⁵⁹

It is likely that in the medium- to long-term, additional (and a wider range of) technologies is likely to be used to provide access for the provision of voice (and fax-grade) services.

Conclusions:

- 1. Fixed access for voice services over the PSTN or over new entrants’ networks is substitutable both with access provided over upgraded cable networks, wireless local loop and unbundled local loops.**
- 2. Although there are indications that mobile access is perceived as a substitute for**

¹⁵⁹ As the full development of 3G services are probably two years off in most Member States, we are not in a position to consider whether and to what extent 3G service might modify or alter change this conclusion.

fixed access for voice calls among particular segments of the population, enough consumers at the margins see fixed and mobile services as being complements, rather than full substitutes for one another, rather than being complements.

b. Call Services

Demand-side Substitutes

There are a number of substitutes for fixed wireline circuit-switched voice and fax services, including fixed wireless circuit-switched voice and fax services (both terrestrial and satellite) and fixed wireline and wireless packet-switched voice and fax services. In addition, there are a number of partial or uni-directional (or partial) substitutes, including satellite and terrestrial mobile voice and fax services, fixed voice over IP (VoIP), and fax over IP (FoIP) services.

c. Local, long distance, international voice services

(i) Demand-side Factors

European voice calls have historically been, and continue to be, provided as local, national (or long distance) and international calls. The retail terms and conditions, and the competitive conditions, of supply (including charges) differ between these types of calls. In addition, subscribers do not consider any of these three types of calls to be substitutes for each other. There is the possibility of very limited substitution for business subscribers (*e.g.*, using leased lines to complete the international leg of a call and breaking out into the termination PSTN at the end of the leased line), but the Study Team does not have any evidence that the effects of such a practice are anything other than *de minimis*.

As a result of the European liberalisation package, international voice service provision was the first specific voice service to become competitive. Not only have incumbents lost market share (in some cases, significantly so), but retail rates have also dropped substantially. It should be recalled that international calls, prior to tariff rebalancing, were used to cross-subsidise access and local call charges, largely for social and political reasons. As a result, there were substantial margins built into the retail charges for such calls. Accordingly, new entrants entered the market, initially operating as ISR operators,¹⁶⁰ providing call-back services¹⁶¹ or tromboning traffic via the *United States* and elsewhere).¹⁶² While the reduction in charges resulting from increased competition and the spread of jurisdiction have effectively driven call-back and tromboning operators from the various Member State markets, ISR (and variants of ISR) continue to exert competitive pressure on operators with local access facilities. It appears that there is still scope for further competition on many intra-European routes. A number of analysts reports have focussed on both the absolute and relative levels of national and intra-European charges. For example, soon after final liberalisation, Compass noted that,

¹⁶⁰ ISR operators arbitrage the per/minute retail call charges levied by the incumbent against the per/minute cost of leasing circuits (where there is sufficiently high volume on the circuits).

¹⁶¹ Call-back operators arbitrage the cost of calls in one direction against the cost in the opposite direction (*e.g.*, the customer in country A places an uncompleted call to country B. A computer at the call-back operator in country B places a call back to the caller, asking for the destination number. It then connects the call between the numbers.)

¹⁶² Traffic is tromboned when it is originated using indirect access (call-by-call selection or preselection) by a distant operator who terminates it within the same region or zone where it was originated, taking advantage of beneficial termination rates that they have obtained.

unlike the relationship between U.S. inter-state and intra-state calls, inter-Member State calls remained substantially more expensive than longer distance intra-Member State calls.¹⁶³ Similarly, there remain routes to countries outside the EU that are not yet competitive.

Since 1998, national (long distance) services have become increasingly competitive across the majority of Member States.¹⁶⁴ Service providers (both pure resellers and those adding more value-added elements to their services) have had an impact on the provision of national voice services. The level of national call charges was highlighted by the scale of reductions during 1998. For example, in November 1998 (some 10 months after liberalisation), Deutsche Telekom dropped its long distance rates by up to 63% on some routes.¹⁶⁵

Despite the increasingly competitive nature of the provision of various voice services in many Member States, it is clear that there remain differences in the levels of competition across the Member States. The Gallup survey, for example, asked residential subscribers questions about operator recognition. In twelve Member States (and across the EU, as an average) at least 90% of respondents mentioned only the PTO as a supplier of fixed services. In *Sweden*, 73% mentioned only Telia, 19% mentioned Telia and new entrants and 9% mentioned only new entrants. In the *United Kingdom*, 81% mentioned only BT, 3% mentioned both BT, Kingston and new entrants and 16% mentioned only new entrants.¹⁶⁶ In February 1999, BT had lost 16% of its overall share in the provision of all voice services.¹⁶⁷

Calling Plans

The nature of retail calling plans clearly has the potential to affect subscriber demand, and especially to affect the extent to which subscribers have incentives to acquire different services from different providers. There is significant variation across Member States in relation to tariff plans and packages. An increasingly wide range of tariff plans (and packages) are being made available to subscribers (largely linked to calling patterns and volumes). However, the Gallup report indicates that there is real take-up of special tariffs and discount plans in only a few countries, and that discount plans are the most widely used form of special tariff. In 1999, less than 10% of residential subscribers took advantage of such plans in five Member States. In only one Member State, the *United Kingdom*, did more than 50% of subscribers use such plans. Even there, 56% of those using a calling plan were only on a discount package.¹⁶⁸ As such, it appears that tariffs plans are not yet creating a “re-aggregation” of voice service acquisition from a single provider.

Carrier (pre)Selection

The availability of carrier (pre)selection has been the key facilitator of competition. It allows customers to acquire voice services from an entity who is not the access provider. Depending

¹⁶³ Compass, “Smart Negotiation for Telecom Bargains”, September 1998.

¹⁶⁴ Certain Member States, such as the *United Kingdom*, have seen competition in the national market since 1984 (a duopoly), and opened the market completely in 1991. At the other end of the spectrum, the Member States which were granted derogations opened their markets to competition at various dates after 1998 (with *Greece* finally permitting competition on 1 January 2001).

¹⁶⁵ “Telephony, ISR and Call-back : The Deregulated European Market 1998-2003”, op cit.

¹⁶⁶ Gallup Europe, *op cit.*, at Section 2.5.

¹⁶⁷ “Telephony, ISR and Call-back: The Deregulated European Market 1998-2003”, Insight Corp, February 1999.

¹⁶⁸ Gallup Europe, *op cit.*, at Section 2.3.

on the Member State, this may be for all calls, or just for non-local calls.¹⁶⁹ Carrier selection allows for a significantly higher intensity of competition in the provision of calls than in the case where competitors have to provide access and calls jointly (*i.e.*, to build their own access networks and network segments that enable them to connect to trunk networks).

It appears that the availability of carrier selection for a particular type of call has a significant impact on the scope of potential relevant markets. For example, there is limited availability of selection for local calls in virtually all Member States. (The *United Kingdom* is currently one of very few Member States where it is available, and where its provision is anything other than *de minimis*. Most recently, it has been mandated in *France*).

Calls to Special Service Numbers

Entities providing services accessed through special service numbers are able to use NTS and reseller arrangements with infrastructure operators to originate, carry, switch and deliver those calls. The market is either competitive or potentially competitive, depending on the specifics of existing regulation in each Member State.

(ii) *Supply-side Substitutes*

Mobile has traditionally been thought of as being complementary to the fixed network, through generating more voice calls, some of which terminate on mobile networks, and others which originate on mobile networks and terminate on the fixed network. A large proportion of these voice calls would not have been made at all had mobile networks not existed. However, mobile voice services are becoming increasingly substitutable for fixed voice services.

When one turns to the types of calls made using mobile phones, it is clear that this has had a considerable stimulating effect on the total number of calls originated on fixed networks, and on the number of calls terminated on fixed networks – both of which are additional sources of revenue for fixed networks.¹⁷⁰ The complementary aspect of mobile is being whittled away, as increasing numbers of calls are made on mobile networks which would have been made on fixed wire line networks, but for the existence of mobile networks. This is, at least in part, the result of users making calls that are not time-sensitive (and would previously have been made on their fixed connection) on their mobiles. In some residential areas of one or two Member States, local call minutes at non-peak periods originated on fixed wireline networks appear to be demonstrating a downward trend due, in part, to substitution by mobile calls.

When one puts the issue of competition for subscribers (access) between fixed and mobile networks to one side, the issue is whether calls using mobile phones are imposing sufficient competitive pressure on fixed wireline services for them to be considered to fall in the same relevant product market, *i.e.*, a market for local (and perhaps long distance, and perhaps international) calls, originated on either mobile or fixed networks. It appears that the likelihood of calls from mobile phones providing sufficiently good substitutes for calls over the fixed network will depend on factors such as:

¹⁶⁹ In the *United Kingdom*, local calls have been included in the (pre)selection regime since it was initiated. The ART recently issued a decision requiring FT to extend (pre)selection to local calls from 1 January 2002. The German federal administrative court (ruling in Muenster) ordered DT to give its competitors access to its network into subscribers' homes.

¹⁷⁰ Where they are not at the 'busy hour', there are virtually no costs.

- the level of mobile penetration;
- the extent of subscription to tariff packages that offer very cheap or 'free' off-peak calling for mobile subscribers;¹⁷¹
- regulatory measures that allow the incumbent to adjust the balance between prices at different times of the day, in response to mobile pricing practices.

It appears that the current potential for substitution is limited, given the price disadvantage of mobile calls. However, as noted, increasingly innovative tariff packages may well be shifting this position. In the event that an evaluation of the above factors were to include mobile calls in the same product market as calls over a fixed network, the tariff packages and usage patterns are likely to be such that there would not only be a product and geographic dimension to the market, but also a time-of-day / day-of-week segmentation might be required.

VoIP

VoIP can be provided over any of the access platforms discussed above, including, in principal, those using wireless technologies. It is thus not a physical access competitor, but a competitor to circuit-switched services. Although VoIP is relatively insignificant at present,¹⁷² and often of poor quality, it seems clear that it will have a significant competitive impact on traditional switched voice services in the next few years. However, its provision by competitors to the fixed line incumbent does not yet exert any effective competitive pressure on a hypothetical monopolist supplying switched voice services.

Conclusions:

- 1. There are likely to be relevant product markets at the retail level for:**
 - **local voice calls (if carrier selection is available for local voice calls);**
 - **national voice calls; and**
 - **international voice calls; and**
 - **access for voice services (where carrier selection is available for local voice calls).**

This is the result of, *inter alia*, clear patterns of supply and demand in terms of tariffs, the use of calling plans, the extent of alternative network provision and the degree to which tariff rebalancing has been effected.
- 2. The availability of carrier selection appears to have been a key factor in defining the scope of relevant voice services markets. Where carrier selection is not effectively available to subscribers for local voice calls, it would appear that**

¹⁷¹ We suggest that a likely condition for this would be relatively vigorous competition between networks providing mobile telephony. It is also unlikely that such cheap calls are available for calls to other networks. Moreover, these may be strategies adopted by large mobile networks which give rise to network benefits which cannot be matched by smaller networks.

¹⁷² An estimated 3% of global switched voice traffic last year was VoIP. However, it is estimated that this may grow to 40% in the next 5 to 6 years – COLT, speech at VIB “Telecoms Regulation and Competition Law 2001” conference, 17 October 2001.

- there is a single market for access and local voice calls (with separate retail markets for national and international voice calls, which are disassociated from the access element).
3. **Substitution possibilities for international voice calls (and to a lesser extent long distance calls in larger Member States) exist for business customers using leased lines, although the extent of substitutability may vary significantly between Member States.**
 4. **Mobile calls do not as yet appear to fall within the same relevant retail product market as fixed wireline calls. The services provided still appear today to be more complementary than interchangeable. Substitution is currently often one-way. However, substitution is beginning to occur at the margins, as mobile calling patterns and tariff packages develop. However, it remains fragmented by factors such as the time of day/particular day/ frequency of use and so forth. This degree of disaggregation would arguably be inappropriate for the purposes of *ex ante* regulation.**
 5. **The Study Team anticipates that, at some point in the future, a significant degree of substitutability between fixed wireline and fixed wireless services on the one hand, and VoIP services provided over various platforms on the other, will develop. The timeframe within which such substitution will occur is, at least, at this stage in the evolution of the industry, highly conjectural from the viewpoint of market analysis. It is likely, however, to be of more immediate effect when assessing SMP.**

IV.3.B. Relevant Geographic Market

a. Access

In high revenue-generating central business districts like the Cities of London, Paris and Frankfurt, the economies of scale involved enable more than one firm to offer competing fixed (fibre or otherwise) access, generally to business customers, in those areas. Indeed, 5, 6 or 7 firms could conceivably compete to provide access to customers who are high-volume users of services. Outside central business districts, there may be CATV and/or WLL access offered (to both residential and business customers) in addition to the access provided to the PSTN. However, in other areas it may not be economic for another provider to compete in the provision of access. In some Member States, therefore, there may be geographic markets for access which are quite narrowly defined (*e.g.*, the Frankfurt financial district, La Defence in Paris or the City of London).

In the residential context, the Gallup survey noted that there is actually little variation in the mean number of access lines across the EU flowing from the degree of urbanisation (*e.g.*, the rural mean numbers of lines is 1.13, the urban number is 1.15 and the metropolitan number is

1.17).¹⁷³ As a result, it appears that geographic location is more relevant to the number and nature of competitors rather than fragmenting the relevant geographic market.

Market delineation may also depend on whether Member States' regulations enable incumbent operators to respond to access competition in specific areas by adjusting the terms and conditions offered in those areas, while continuing with previous arrangements in other areas. The requirement that incumbents nationally average their tariffs means that, in most Member States, the incumbent establishes uniform national prices and conditions for access. Accordingly, where competitors force the incumbent to adjust its terms and conditions of supply in a particular area, to be able to compete with new entrants (even if competitive entry only occurs in limited regions), it also makes this adjustment outside the area where it faces competition, to the benefit of all subscribers acquiring access (whether or not the incumbent fixed line operator faces competition).

Where there is no requirement that the incumbent nationally average its tariffs, it might respond to competition (and different cost and revenue patterns) by adjusting prices only where it faces competition (*i.e.*, not adjusting rates for the whole country). This is likely to create a different competitive dynamic as a result of which it might be legitimate to configure a market regionally in geographic terms. The market for the provision of access is likely, where the PSTN operator is permitted to adjust its terms of supply sub-nationally, to be regional or local, since the provision of access depends on the operator being physically present with a local network (or an unbundled local loop) at the customer's location.

Where carrier selection is not available for local calls, each geographic market is likely to include both access and local calls.

b. Local Calls

Except where carrier selection is available for local calls, local calls and access are likely to fall within a single geographic market. Where carrier selection is available for local calls, the comments below in relation to national calls are equally applicable to local calls. Where carrier selection is not available, the market is likely to be regional or local.

c. National Calls

The availability of carrier selection allows customers to use a provider of long distance voice calls that does not also provide them with access. This tends to point toward a market for long distance calls that is national. However, Member State regulations may differ in the ease with which new entrants are able to 'originate' calls on the incumbent's network. For example, national regulations may make it unattractive for new entrants to originate calls over longer distances. This may result in a percentage of rural subscribers being unable to access alternative carriers. In such cases, whether there is a single national market for long distance calls will depend on the extent to which the incumbent operator is required to adjust its national call tariffs nationally. The expectation of the Study Team is that, in most Member States, this market will be national. Moreover, the availability of carrier selection for local calls tends to include local calls in this market (*i.e.*, a single national market for local and long distance calls).

¹⁷³ "The Situation of Telecommunications Services in the Regions of the European Union – Residential", Gallup Europe, 1999.

d. International Calls

Carrier selection allows customers to acquire international voice call services independently of access. Carrier selection codes are Member State-specific (*i.e.*, a code for selection in one Member State cannot be used outside that Member State). This suggests that the market for international calls is national. However, call-back, tromboning and similar techniques have eroded this national-specific geographic character, at least in some Member States. It is a question of fact as to the impact that the provision of such services has had on the identification of the relevant geographic market in any given Member State.

Some individual country-pair (or city-pair) routes may be markets in themselves for international outgoing calls. High levels of competition on particular routes have led to such geographic markets becoming more clearly differentiated. However, the increasing use of intelligent network platforms which automatically route calls over the “least-cost route” suggest that such divisions may well become increasingly difficult to sustain (at least in fully liberalised environments).

Conclusions:

- 1. In general, the conditions of competition in the provision of local, regional, national and or international calls are national in scope. The lack of availability of carrier (pre)selection in some Member States may result in narrower geographic markets, at the local or regional level.**
- 2. Some national bilateral routes for international calls may be subject to distinct patterns of supply and demand so as to warrant a relevant geographic market definition based on the country pairs in question (*e.g.*, *Germany – Turkey*). By the same token, the greater use of least-cost routing and intelligent methods may result in the collapse of bilateral routes as distinct geographic markets.**

V. NARROWBAND AND BROADBAND ACCESS SERVICES

Summary:

1. Because of significant delays in the deployment of xDSL services by PSTN operators, regulators have sought to facilitate meeting retail demand for these services by first opening up wholesale access to the unbundled copper loops over which they operate. However, delays in the provisioning of wholesale broadband offerings (and unbundled copper loops) have inhibited the ability of operators other than ex-incumbents and cable network operators to provide access services to meet retail demand. Empirical data indicates that a very high degree of chain substitutability (which currently characterises demand for broadband services), coupled with the slow commercial development of broadband services (which might require substantial bandwidth for their delivery), has resulted in the slow development of distinctive speed- or bandwidth -defined access services. Consequently, at present there appears to be only a single relevant product market for such access services.
2. Distinct patterns of supply and demand suggest that there may be separate residential and non-residential segments of this broader market.
3. In the future, the emergence of true “broadband” content may drive fragmentation of this product market along bandwidth lines, which would be characterised by distinctive narrowband and broadband offerings. At this stage, however, the services provided are, and the market within which it appears that they are provided is, embryonic.
4. The commercial drivers for the provision of such access services suggest that this market is national in scope.

V.I EU MEMBER STATE ANALYSIS

Issue:

The extent to which Member States have identified separate retail markets for narrowband and broadband access services in light of the prevailing demand for high-speed Internet access services.

V.I.A. Summary of Main Relevant Markets Identified by the Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|--|---|-------------------------------|
| Internet access services (<i>Belgium</i> , ¹⁷⁴ <i>Finland</i> , <i>France</i> , <i>Germany</i> , ¹⁷⁵ <i>Greece</i> , <i>Italy</i> , <i>The Netherlands</i> , <i>Portugal</i> , <i>Spain</i> , ¹⁷⁶ the <i>United Kingdom</i>). | <ul style="list-style-type: none"> Narrowband (low-speed) access services (<i>France</i>, <i>Germany</i>, potentially <i>The Netherlands</i>). Further sub-divided into residential and business markets (<i>France</i>).¹⁷⁷ Broadband (high-speed) access services (<i>France</i>, potentially <i>The Netherlands</i>). Further sub-divided into residential and business markets (<i>France</i>).¹⁷⁸ High-speed Internet access services via ADSL technologies (<i>France</i>). Provision of retail Internet services (<i>Spain</i>, the <i>United Kingdom</i>)¹⁷⁹ | National. |
| xDSL services (<i>Belgium</i> , <i>Germany</i> , <i>Italy</i>). | None. | National. |

V.I.B. Relevant Product Markets

a. General Conclusions

The majority of Member States (*Belgium*, *Finland*, *France*, *Germany*, *Greece*, *Italy*, *The Netherlands*, *Portugal*, *Spain*, the *United Kingdom*) have identified a general retail market for **Internet access services**. Most Member States have declined to segment this market according to bandwidth. However, three Member States (*France*, *Germany* and *The Netherlands*) have distinguished between **narrowband** and **broadband access services** and identified them as separate sub-markets. One Member State (*France*) has further sub-divided these sub-markets according to whether they are provided to **business** or **residential** customers.

In the *United Kingdom*, Ofcom has identified a market for **retail dial-up Internet access (metered and unmetered)**, including ISDN (residential and business).

¹⁷⁴ The Belgian Competition Council defined a market for Internet access, expressly declining to define a market for high-speed Internet access, on 23 August 2001 in the *Telenet Bidco N.V.* Case.

¹⁷⁵ *Germany* has not specifically identified a market for “Internet access services”, but rather distinct markets for “narrowband connections to the Internet up to 128 Kbits (via twisted copper pair)”, “ADSL connections” and “fixed connections/SDSL connections”.

¹⁷⁶ *Spain* has not specifically identified a market for “Internet access services”, but rather individual markets for “access from the end user to the ISP” and “Internet access through the PSTN or ISDN”.

¹⁷⁷ The ACCC in *Australia* also includes two discrete customers segments (residential and business) in the market for low bandwidth (up to 2 Mbps) services.

¹⁷⁸ The ACCC in *Australia* has described the market for high bandwidth carriage services as a single market with separate but overlapping residential and business segments.

¹⁷⁹ In the *United Kingdom*, this market consists of the provision of dial-up Internet access.

Finally, three Member States (*Belgium, Germany, Italy*) have identified a retail market for **xDSL services** which appears to be separate to and distinct from the broader market for Internet access services.

b. Specific Analysis

In *The Netherlands*, OPTA and the NMa published a Consultation Document on 20 March 2001 which distinguished between the “downstream” retail market for **Internet access services** (Internet access services provided by ISPs to consumers and businesses) and the “upstream” wholesale market for **network access services** (the access of ISPs to networks over which they can offer Internet access services).¹⁸⁰ For the retail market, the Dutch authorities distinguished between **narrowband** and **broadband access** markets, and provisionally found that narrowband and broadband Internet access services constitute separate relevant markets. The basis for this segmentation was said to be based on the following considerations: (1) differences in speed that can possibly be realised (bandwidth); (2) differences in intended use (functionality); (3) differences in price; and (4) the cost of switching from narrowband to broadband and vice-versa. Of these factors, the Consultation Document concluded that speed and price seem to be the crucial factors in the choice for narrowband or broadband Internet access, and noted that an important factor in the development of a separate broadband Internet access market is the availability of Internet applications that are specific to broadband, which the Consultation Document stated are currently lacking.

The Consultation Document also addressed whether separate markets exist based on the type of user and concluded that such distinctions are not appropriate because, apart from large-scale business users which usually need a lot of bandwidth and therefore use leased lines, residential consumers and small and medium-sized businesses generally are offered the same broadband Internet access by ISPs. With respect to narrowband access, the Consultation Document stated that it does not make sense to differentiate according to type of user because narrowband access is not generally a real option for actual commercial use of Internet applications.

In *France*, the ART and the Conseil de la Concurrence have identified a distinct market for the provision of Internet access and have sub-divided this market into low-speed and high-speed Internet access services because of the important differences in terms of usage between the two services, as well as their different tariff structures and levels. The French authorities also have identified sub-markets for business and residential users. With respect to high-speed Internet access services, the ART and the Conseil de la Concurrence have identified a distinct relevant market for the provision of high-speed Internet access services via ADSL technologies on the basis that neither satellite nor Wireless Local Loops (WLLs) are currently readily available in the market, and cable and ADSL are characterised by significant differences which render them not directly substitutable. These differences in *France* include the following competitive dynamics:

- cable is targeted to residential markets, while ADSL is distributed via telephone networks to residential, professional and business subscribers;

¹⁸⁰ The market for network access services is discussed in more detail in the discussion of “Wholesale Fixed Network Access to End users” at Section I.

- Internet cable access offers are bundled (*e.g.*, they include access to cable TV as well as Internet access and usually do not allow the subscriber to choose the Internet access provider), while ADSL Internet access allows subscribers to choose their specific Internet Protocol services;
- penetration of cable is low and cable networks need to be updated (which requires costly investment) to allow for high-speed Internet access, while ADSL relies on existing, ubiquitous infrastructure.

In *Germany*, the RegTP has defined three distinct national markets for the provision of Internet access services to end users:

- narrowband connections to the Internet up to 128 kbit/s (via twisted copper);
- ADSL connections;
- fixed connections/SDSL connections.

According to the RegTP, the market for ADSL connections includes other technical platforms which are able to provide ADSL-type connections – *e.g.*, TV-broadband cable, satellite services, powerline, fibre-to-the-home, WLL, and UMTS. Although these platforms are technically different from ADSL connections and are not currently a competitive threat to ADSL services via the twisted copper pair, the RegTP has concluded that they are sufficiently similar so as to be included in the same relevant market.

Meanwhile, with respect to the market for fixed connections/SDSL connections, the RegTP has stated that these services differ from narrowband and ADSL connections because they are tailored for large amounts of data flows on both the uploading and downloading channel and are technically different from ADSL connections because in practice they do not support the simultaneous use of voice and data (although this is technically possible).

In *Belgium*, the NRA has defined retail **Internet access services** to be data services which involve the provision of a connection to the public Internet. The NRA views the continuing regulation of Belgacom's retail tariffs for the provision of Internet access services as necessary to ensure a certain degree of competition in the market. Similarly, the Competition Council defined a market for Internet access, expressly declining to find a market for high-speed Internet access, in the *Telenet Bidco N.V.* Case on 23 August 2001. Meanwhile, the Interconnection Chamber in *Belgium* has decided that there exists a specific market for **ADSL services**, in which Belgacom holds a *de facto* monopoly position.

In *Italy*, the authorities have defined distinct markets for **Internet access services** and **xDSL services**. The Internet access services market has been defined by the NCA to consist of the provision to end users of access to the Internet through any technological platform (*e.g.*, through PSTN, ISDN, xDSL, dedicated circuit and mobile networks). Meanwhile, the xDSL services market has been described to have both retail and wholesale components, and has been the object of PSTN operator monitoring and intervention by both the NRA and NCA (for example, the incumbent has been required to provide a high degree of unbundling of its retail services).

In *Spain*, the Competition Authority, the TDC, has defined separate complementary retail markets for **information services provided by the ISP** and **access from the end user to the ISP**. The CMT, meanwhile, has defined a separate relevant market for **Internet access through the PSTN or ISDN**. The CMT has distinguished this latter retail market from the

market for access services through leased lines based on its technical characteristics (*i.e.*, lower speed and fewer electronic mail accounts) and the nature of the use (*i.e.*, occasional use and lower overall consumption). It is presently unclear whether the various regulatory authorities draw a distinction between access through ADSL technology (which has higher capacity and speed than an ordinary connection through PSTN, or ISDN) and other access technologies, but such technology differences could affect consumer demand patterns and result in the identification of a separate market.

In the *United Kingdom*, Oftel has recently concluded a review of **dial-up access** to the Internet.¹⁸¹ In that review, it found that most residential consumers and SMEs in the UK use a PSTN dial-up connection or an ISDN dial-up connection to access the Internet. Oftel identified two main components to the “Internet access” service:

- access to the network and convergence of calls; and
- linking the consumer to the Internet and services such as email, content and billing in this respect Oftel acknowledges that these parts can be supplied separately or together, but considers that they are both parts of a single retail Internet access market.

In addition, Oftel identifies two upstream, related wholesale markets:

- call origination; and
- Internet call termination.

In Annex A of its review, Oftel notes that it considers that narrowest market definition is the retail market for low-speed (*i.e.*, up to 128 kbps) Internet access. It states that there is little empirical evidence on usage patterns and price elasticities between “low-speed” and other forms of Internet access (it should be noted that Oftel has, elsewhere, defined “broadband” as access over 384 kbps, and does not address the gap between 128 and 384 kbps in its market definition process in this review).

In *Portugal*, the NRA historically has treated Internet traffic as the same as other fixed telecoms services, but has now moved towards identifying a distinct market for **Internet traffic**, which includes both wholesale and retail Internet services. According to the NRA, Internet traffic presents “substantially different characteristics to voice traffic.” Meanwhile, the Council of Ministers has launched an Internet initiative and has identified the accelerated introduction of ADSL services as one of the priorities for the development of the Information Society.

In *Greece*, the market for **Internet access services** includes both dial-up and dedicated services and, in part because the market is so small, no distinctions have as yet been made between Internet call origination and termination, and Internet access services provided to consumers and businesses.

Finally, in *Finland*, the NCA has identified a relevant market for the **provision of subscriber access to the Internet**, which comprises the provision through wireline or wireless connections of switched access or dedicated line access to the Internet. Specifically, with respect to dial-up Internet access services, the NCA in *Finland* has stated that these services cannot be viewed as constituting a separate relevant service market from other local telecoms

¹⁸¹ “Oftel’s 2000/01 effective competition review of dial-up Internet access”, 30 July 2001.

services because the provider of these services cannot control whether the connection is used for voice or data transmission.

V.I.C. Relevant Geographic Markets

The general consensus is that the geographic market for retail Internet access services is national in scope. As explained by the NCA in *Italy*, the market is national in scope because the provision of Internet access services is subject to a national authorisation regime and requires the existence and use of a national infrastructure. Meanwhile, in *The Netherlands*, OPTA and the NMa have identified the relevant geographic market for narrowband Internet access services to be national, but have not made a definitive decision on whether broadband Internet access services constitute a regional/local or a national market.

V.I.D. Relevant Product and Geographic Markets Identified Outside the EU

Outside of the EU Member States, NRAs and NCAs have also identified relevant markets for retail Internet access services.

In the *United States*, for example, the FCC and FTC have specifically identified **residential high-speed (broadband) Internet access services** as a relevant product market.¹⁸² Currently, this market currently encompasses several different technologies through which high-speed Internet access is available, including cable, xDSL, fixed terrestrial wireless and satellite. The FCC has not yet resolved whether Internet access services available through each of these different technologies and media constitute one or several distinct markets.

The FCC has identified the geographic scope of this market as being local, explaining that a consumer's choices for high-speed Internet access services are limited to those companies that offer these services in his/her area and their only option is to obtain different services by moving. The FCC has not specifically identified a market for **residential narrowband Internet access services** (e.g., dial-up services), but has stated that these services are distinct from high-speed (broadband) Internet access services, thus implying they constitute a market in their own right.

In *Canada*, the CRTC has identified two relevant markets for Internet access services:

- **lower speed access services** (services allowing data access at speeds no greater than 64 Kbps using a voice grade line and various modem technologies); and
- **higher speed access services** (services which offer transmission speeds above 64 Kbps).

According to the CRTC, lower speed and higher speed access services are not substitutes because of the limited availability of higher speed access services, the fact that these services are in their early stages of development, and the price differential between the two types of services. The CRTC has not defined the geographic scope of these markets, although the CRTC Decision identifying them as relevant markets applies nationally. Meanwhile, the Competition Bureau has identified dedicated high speed and lower speed dial-up services and ADSL and cable modem high speed services as separate relevant markets. The Competition

¹⁸² The Department of Justice has defined a somewhat broader market – “the aggregation, promotion, and distribution of broadband” content and services, which includes not only the transmission facilities used for the distribution of broadband content, but also the portals that aggregate and market that content.

Bureau has concluded that both markets are national in scope, as a number of significant operators offer these services at uniform prices across *Canada*, thereby thwarting any one company from raising and maintaining higher prices in narrow regional or local markets.

In *Australia*, the ACCC has suggested the following relevant markets: (i) a national market for the supply of high bandwidth carriage services by service providers to end users; and (ii) a national market for the supply of low bandwidth (up to around 2 Mbps) services to end users.¹⁸³ According to the ACCC, the market for low bandwidth services includes at least two discrete customer segments, namely, residential and business subscribers. With respect to the high bandwidth market, the ACCC has declared that there appear to be three key dimensions for service substitutability: (i) bandwidth; (ii) bit error rate; and (iii) downtime. Meanwhile, the ACCC has stated that high bandwidth services should be described as being supplied in a single market with separate but overlapping residential and business segments, as services targeted at residential users may also be targeted at particular business customers.

Conclusions:

- 1. There are widespread differences in approach both within the EU and outside the EU as to the precise scope of retail markets which exist for “narrowband” and “broadband” access for obtaining fast access to the Internet, whether expressed in terms of:**

- relevant bandwidth measurements; and
- a distinction between business and residential customers.

In some cases, different segments of the market have been identified but their competitive relevance has been assessed within the context of a broader product market (e.g., *Australia*).

- 2. Generally speaking, NRAs across the EU have taken a broad view of the concept of technology neutrality in determining the extent of access alternatives to the Internet.**
- 3. With the sole exception of the *United States*, the general consensus is that the geographic market for Internet access services is national (regulatory restrictions on the operations of telecoms operators in the *United States* would appear to be the underlying reason why this difference in approach should persist between the *United States* and other jurisdictions, rather than any particular market-driven rationale).**

V.2 ANALYSIS UNDER EU COMPETITION RULES

Internet access services in general have been defined by the Commission as consisting of the supply to subscribers of an Internet address, the provision of the relevant software to enable messages to be sent and received in the correct electronic format used for Internet traffic, and

¹⁸³ The ACCC also identifies a national market for the supply of high bandwidth (*i.e.*, 2 Mbps plus), high reliability services.

the guarantee of “connectivity” (*i.e.*, access to all other networks which together make up the Internet). Additional features of an Internet access package may include search engines, gateways and content services,¹⁸⁴ as well as the hardware, software, network configuration, customer support and billing services which are necessary for customers to make full use of their Internet access.¹⁸⁵

In a number of decisions, the Commission has identified a distinct retail market for Internet access services.¹⁸⁶ Within this market, the Commission, beginning with the *Telia/Telenor* Decision,¹⁸⁷ has distinguished between Internet access services offered to different subsets of customers. In particular, the Commission has identified separate product markets for dial-up/narrowband Internet access (*i.e.*, where the user is connected to the ISP through a dial-up connection over a public switched telephone circuit), which are targeted at residential and small and medium-sized businesses, and dedicated Internet access (*i.e.*, where the user is connected to the ISP by means of a dedicated private/leased line), which are targeted at large corporate customers.¹⁸⁸

In more recent Decisions,¹⁸⁹ the Commission has also found evidence of the existence of a developing demand among residential and small business customers for the provision of broadband (“always-on”) Internet access services, and has stated that a distinction may be possible between the provision of dial-up/narrowband access and broadband Internet access via an upgraded cable network or an upgraded telephony network (*i.e.*, xDSL connection). However, in these Decisions the Commission did not find it necessary for the purposes of its assessment to conclude whether a separate broadband Internet access market exists, or whether xDSL, cable and other forms of fast Internet access belong to the same relevant product market.¹⁹⁰

V.2.A. Narrowband Access

a. Demand-side Analysis

From a demand perspective, the Commission has concluded that dial-up access and dedicated access do not appear to be substitutable services because dial-up access is predominantly targeted at lower usage residential and business customers (*i.e.*, small and medium-sized enterprises), while dedicated access is requested mainly by large corporate customers.¹⁹¹ Therefore, from the demand side, the Commission has concluded that dial-up and dedicated access appear to be separate product markets.¹⁹²

The Commission has also indicated that it may be possible to distinguish between the provision of dial-up access to residential and to business (small and medium-sized)

¹⁸⁴ *Telia/Telenor/Schibsted* Case No. IV/JV.1, para. 17.

¹⁸⁵ *WorldCom/MCI* Case No. IV/M.1069, para. 61.

¹⁸⁶ *Telia/Telenor/Schibsted*, para. 17; *AOL/Time Warner* Case No. COMP/M.1845, para. 33; *UGC/Liberty Media* Case No. COMP/M.2222, para. 12; *BT/ESAT* Case No. COMP/M.1838, para. 7.

¹⁸⁷ *Telia/Telenor* Case No. IV/M.1439, para. 60.

¹⁸⁸ *Telia/Telenor/Schibsted*, para. 17; *AOL/Time Warner*, para. 33; *UGC/Liberty Media*, para. 12; *BT/ESAT*, para. 7.

¹⁸⁹ *AOL/Time Warner*, paras. 38-41; *UGC/Liberty Media*, paras. 12-13.

¹⁹⁰ *AOL/Time Warner*, para. 41; *UGC/Liberty Media*, para. 14.

¹⁹¹ *BT/ESAT*, para. 7; *Telia/Telenor /Schibsted*, para. 17; *UGC/Liberty Media*, para. 12; *AOL/Time Warner*, para. 33.

¹⁹² *AOL/Time Warner*, para. 33; *BT/ESAT*, para. 7.

customers.¹⁹³ In *AOL/Time Warner* and *BT/ESAT*, the Commission considered that such a distinction for dial-up access might be possible because the provision of business dial-up access involves more sophisticated dial-up mechanisms than residential dial-up access. Nonetheless, the Commission in both Decisions did not find it necessary to reach a definitive conclusion whether residential and business dial-up access constitute separate relevant product markets.¹⁹⁴

The Commission also has addressed whether other data transmission protocols might be substitutable for dial-up access. For example, in its *WorldCom/MCI* Decision, the Commission concluded that the provision of Internet access over other data transmission protocols is not significantly substitutable for dial-up access because other protocols *may* not be capable of providing subscribers with permanent, unfettered access to the community of Internet users, which is their main purpose for buying the service. Instead, these other data transmission protocols allowed subscribers to reach the limited number of users who subscribe to that protocol.¹⁹⁵

The Commission also has considered whether Internet access through digital TV set-top boxes might be considered to be substitutable for dial-up access. Based on differences in transmission capabilities, usage and characteristics, the Commission has found that data access services delivered via digital TV set-top boxes and via personal computers *might* constitute separate relevant product markets.¹⁹⁶

Finally, the Commission has suggested that a distinct market *might* be developing for dial-up access to the Internet via mobile telephones (whether or not WAP-enabled).¹⁹⁷ More particularly, the Commission has found that users of second generation (*i.e.*, GSM or DCS) mobile networks and WAP handsets have the ability to access the Internet and to send emails. This ability will be further developed with the future implementation of technological advances such as GPRS, and the rollout of new 3G networks will further enhance the range of service provision. However, given the rather limited size and capabilities of mobile handset screens and the current, plus the limited data transmission capacity of mobile networks, the Commission has found that accessing the Internet via mobile phones is unlikely at this stage to be a substitute for existing methods of accessing the Internet through a personal computer.¹⁹⁸

b. Supply-side Analysis

In *Telia/Telenor*, the Commission noted that insofar as an ISP has dial-up customers, it requires connection to the local loops of the PSTN in order to be able to reach those customers.¹⁹⁹ Presumably, therefore, other data transmission protocols are as yet not considered by the Commission to be viable substitutes with respect to the provision of dial-up access services to those customers.

¹⁹³ *UGC/Liberty Media*, para. 12; *BT/ESAT*, para. 7.

¹⁹⁴ *BT/ESAT*, para. 8; *AOL/Time Warner*, para. 33.

¹⁹⁵ *WorldCom/MCI*, para. 61.

¹⁹⁶ *UGC/Liberty Media*, para. 12; *Vodafone/Vivendi/Canal+* Case No. COMP/JV.48, para. 34. In neither Decision did the Commission reach a definitive conclusion on this issue.

¹⁹⁷ *UGC/Liberty Media*, para. 12; *Vodafone/Vivendi/Canal+*, para. 22. Again, in both Decisions the particular facts did not require the Commission to reach a definitive conclusion on this issue.

¹⁹⁸ *Vodafone/Vivendi/Canal+*, para. 32.

¹⁹⁹ *Telia/Telenor*, para. 60.

c. Relevant Geographic Market

The Commission has considered that the geographic market for dial-up access services is essentially national in scope, based on the need for local loop access across a national territory, the availability of free-phone/local call rate numbers to the nearest point of presence and the existing regulatory structure. According to the Commission, these characteristics of dial-up access limit the extent to which existing access markets could be wider than national.²⁰⁰ The widespread reliance of dial-up providers on free-phone/local call rate numbers, which cannot be accessed (at the same rates) internationally, precludes dial-up subscribers from acquiring these services from, and providers from supplying to, other Member States. In addition, most international interconnection agreements currently provide origination and termination rates which preclude international operators from offering local access rates that are competitive with those offered by domestic service providers.

Conclusions:

- 1. The Commission’s administrative practice under the *Merger Regulation* indicates that its approach to “narrowband” access has differed from that of the NRAs acting under sector-specific legislation. The Commission’s *ex post* practice has taken the view that access to the Internet via fixed lines, mobile and digital TV are not essentially interchangeable because of their different transmission capabilities, particular usages and physical characteristics. This fragmentation is also reflected at the customer level, with a distinction being drawn between residential and business users of “narrowband” access services.**
- 2. Despite this tendency towards market fragmentation, in most instances the Commission has not been obliged to take a definitive position on product market definition because the merger reviews conducted under the *Merger Regulation* were often concluded in the first stage of investigation (*i.e.*, so-called Phase I reviews).**
- 3. Although “narrowband” services are consumed locally, the relevant geographic market in which the providers of such services compete is national in scope.**

V.2.B. Broadband Access

As noted above, the Commission in a number of Decisions has drawn a specific distinction between the markets for dial-up/narrowband and dedicated access,²⁰¹ and has identified the developing demand for residential (and small business) broadband Internet access (*i.e.*, via xDSL and cable modem).²⁰²

²⁰⁰ *AOL/Time Warner*, para. 34; *Telia/Telenor*, para. 126; *BT/ESAT*, para. 8; *UGC/Liberty Media*, para. 12.

²⁰¹ *See, inter alia, Telia/Telenor/Schibsted*, para. 17; *Telia/Telenor*, para. 60; *Blackstone/CDPQ/ Kabel Baden Württemberg* Case No. COMP/JV.50, para. 26; *Blackstone/CDPQ/ Kabel Nordrhein – Westfalen* Case No. COMP/JV.46 (19 June 2000), para. 26.

²⁰² *AOL/Time Warner*, para. 38; *UGC/Liberty Media*, para. 13.

a. Demand-side Analysis

As stated above, the Commission has concluded that from a demand perspective, dial-up access and dedicated access constitute separate relevant markets because of the different customers they target.²⁰³ Moreover, with respect to Internet access via xDSL and upgraded cable networks, the Commission has highlighted the fact that broadband access through these technologies is not yet widely available in Europe and is generally more expensive than dial-up access.²⁰⁴

With regard to the substitutability of the various means of broadband access (*i.e.*, via upgraded cable TV networks, xDSL), the Commission has concluded that these different access platforms are generally substitutable from the end user's perspective.²⁰⁵ However, in the *AOL/Time Warner* Decision, the Commission did not find it necessary to decide whether DSL, cable and other forms of high-speed Internet access belong to the same relevant product market.²⁰⁶ In *UGC/Liberty Media*, the Commission also left open the question of whether the provision of broadband services or a "triple play" of digital services (*i.e.*, broadcast TV (analogue and digital), high-speed data in both directions and interactive TV services) provided over cable networks constitute a separate relevant product market.²⁰⁷

Finally, the Commission has considered that certain customers may demand Internet access in the future via multiple access platforms, such as personal computers, mobile telephones and digital set-top boxes. Operators in the future may also wish to bundle or tie sales of mobile telephony services with pay TV services, using the same portal as a common factor. Nevertheless, the Commission has concluded that this convergence at the services level should not lead to the conclusion that access provided across different platforms has become substitutable, since a service provider wishing to provide a multiple access service would still need to gain access to each of the Internet access mechanisms.²⁰⁸

b. Supply-side Analysis

In *WorldCom/MCI*, the Commission recognised that dedicated Internet access is simply the provision of a dedicated connection between the ISP and the end user, and that there is a range of options for the provision of this connection, including self-provision, obtaining a leased line from a telephone company or other utility, or perhaps from the ISP itself. Thus, those in the market for the supply of the dedicated connection might be telephone companies or any other undertaking which can lease out or develop the necessary capacity.²⁰⁹

However, in cases where dedicated access to a customer is only possible via xDSL technologies, the Commission has recognised that the incumbent's control over the local loop infrastructure presents particular hurdles to other operators which may wish to offer competing services. First, competing operators must wait for the incumbent to install the

²⁰³ *BT/ESAT*, para. 7; *Telia/Telenor/Schibsted*, para. 17; *UGC/Liberty Media*, para. 12; *AOL/Time Warner*, para. 33.

²⁰⁴ *AOL/Time Warner*, para. 39.

²⁰⁵ *UGC/Liberty Media*, para. 13.

²⁰⁶ *AOL/Time Warner*, para. 41.

²⁰⁷ *UGC/Liberty Media*, para. 15.

²⁰⁸ *Vodafone/Vivendi/Canal+*, para. 36.

²⁰⁹ *WorldCom/MCI*, paras. 58-59.

enabling technology, and hence their technical offerings are limited by the equipment which the incumbent installs. Second, they must interconnect somewhere further up the telephone network hierarchy, further away from the main distribution frame, and thus expect to pay higher interconnection charges for the use of more of the incumbent's network. Third, competing operators are vulnerable to the incumbent's policy on the pricing and/or quality of its interconnection. Thus, if the PSTN incumbent operator increases its prices for interconnection or degrades it, a competitor's xDSL offering may become uncompetitive.²¹⁰

In *Telia/Telenor*, the Commission further found that an impediment to the supply of xDSL access services is that the local loop infrastructure must often be upgraded to make use of xDSL technologies and the substantial costs of replacing the local loop infrastructure represent a disincentive, even for the incumbent, to upgrade the links.²¹¹

c. Relevant Geographic Market

The Commission does not appear to have made any determinations regarding the geographic scope of the market for dedicated Internet access. With respect to residential or small business broadband Internet access services, the Commission has concluded that the market appears to be essentially national in scope or possibly more narrow (the relevant cable franchise area), based on the need for the installation of a physical connection (*i.e.* telephone line for xDSL, cable for cable modem) between the customers and the ISP. However, the Commission has not yet found it necessary to reach any definitive conclusions regarding relevant geographic markets.²¹²

Conclusions:

- 1. The Commission's administrative practice under the *Merger Regulation* suggests the identification of a distinction between "narrowband" and "broadband" access to the Internet. However, the dividing line between those two markets has not been clearly drawn on the basis of bandwidth capabilities or other clear criteria, as the Commission has not been required to take a definitive view in this regard in the context of its merger review procedures.**
- 2. In its more recent administrative practice, the Commission appears to have shifted its focus from distinguishing between dial-up and dedicated access services (*i.e.*, both approaches are treated as being simply different forms of access) to identifying whether residential "broadband" Internet access (via xDSL and cable) constitutes a separate relevant product market. To the extent that such different modes of access are seen to reflect different customer behaviour (*e.g.*, residential and business), it might still be appropriate to maintain a distinction between dial-up and dedicated access in a merger review context or in the application of *ex post* competition rules, but not necessarily in an *ex ante* regulatory framework.**
- 3. The relevant geographic market is likely to be national in scope.**

²¹⁰ *Telia/Telenor*, para. 69.

²¹¹ *Telia/Telenor*, para. 67.

²¹² *AOL/Time Warner*, para. 41; *UGC/Liberty Media*, para. 13.

V.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

Retail narrowband and broadband access services involve the physical connection between the final end user and the Internet or other sources of data or video content. Low bandwidth access services are usually provided via a dial-up connection over a public switched telephone circuit. High bandwidth access services may be provided over a dedicated private lines, ordinary copper telephone lines upgraded by xDSL technology, upgraded cable networks, or any other platform capable of supporting the two-way transmission of data at high speeds.

Distinct low bandwidth and high bandwidth access services markets have been slow to develop at the retail level because of a combination of factors: (1) the significant delays in the deployment of xDSL technology by PSTN operators; (2) the slow emergence of alternative broadband access platforms (*i.e.*, cable networks, fibre, electricity cables, WLL systems, mobiles, satellites); and (3) the relative lack of discernible “broadband” content offered at the retail level requiring high bandwidth access. Regulators have attempted to facilitate meeting retail demand for broadband services by opening up wholesale access to the unbundled copper loops of PSTN operators. However, despite the increasing demand (both retail and wholesale) for access, supply of true “broadband” content remains limited at this time, suggesting the possible existence, at most, of an embryonic market for broadband access services whose characteristics are discernibly different from their narrowband access service counterparts.

V.3.A. Elements Indicative of the Relevant Market

a. Demand-side Analysis

(i) Services Acquired Using Bandwidth Access

At present, there are very few true “broadband services”²¹³ that actually require substantial bandwidth capabilities for their delivery.²¹⁴ Until it was declared illegal by the courts in the *United States*, the music trading programme Napster was the exception to this rule, demonstrating the potential for high-speed access and illustrating the importance of “killer applications” for the development of a discernible broadband world.²¹⁵ The key role that a single application can play is also illustrated by the content figures of CanalWeb (in *France*),

²¹³ Such services would include streaming video and audio, video email, interactive advertising and video conferencing (*see* the discussion at paragraphs 35 and 38 of *AOL/Time Warner* Case No. COMP/M.1845).

²¹⁴ Current services are limited to “high speed” Internet access services, interactive services inherently linked to broadcast content (*e.g.*, player profiles carried on other broadcasting channels that can be accessed by the viewer by changing channels) which are difficult for any party other than the broadcaster to create, and stand-alone interactive services such as transactional and banking services (*contra* the markets defined in the *BIB/Open* Decision). At present, both types of “interactive” services are delivered as digital television services. However, there is no barrier to the provision of such services over the Internet, in most cases. For example, the ntl services in the *United Kingdom* use html and Java protocols, namely, “open” standards which do not preclude the use of alternate platforms.

²¹⁵ “Internet & E-commerce: AT&T’s Dorman says broadband still a tough sell,” Total Telecom, 22 August 2001, at: <http://www.totaltele.com/view.asp?articleID=43053&Pub=TT&categoryid=626&kw=broadband>.

showing that 43% of all data downloaded using their access services were media files.²¹⁶ As the President of AT&T said on 22 August 2001, “consumers do not really have much reason to go “broadband” yet ...[t]here is an issue of need [for] applications ... what the average person can do with [the Internet] hasn’t been compelling”. He went on to note the role of Napster in showing “that there are killer apps out there” and that the operators are “... really looking for the killer applications to spur take-up rates by consumers”. Also on 22 August 2001, the marketing director of Hewlett-Packard Asia Pacific made the following observations about the role of content: “... You need to have high-quality, high demand content before wide acceptance is going to happen... Streaming video is expected to popularise broadband ...but widespread availability of Hollywood blockbuster movies...is unlikely as the film industry grapples with copyright issues...one reason for the slower-than-expected take-up was that [current] services are often indistinguishable ... apart from speed”.²¹⁷

Given this context, the Danish government’s review of development in the sector has concluded that government focus on the broadband should be directed towards content development, since content rather than infrastructure and access is the slowest facet of the sector to develop.²¹⁸

Recent growth in ADSL and cable modem subscriptions is attributed to Internet service subscribers. While it appears that significant unmet demand for ADSL will continue to drive market growth in the short-term,²¹⁹ analysts widely anticipate that future growth will be driven by image-rich and video-rich applications. As a result, current service offerings have neither been able to generate consumer demand nor to drive the supply of “broadband access services”. In addition to the views on this issue from network and hardware providers (see AT&T and Hewlett Packard references above), the timing estimates for service launch from content producers are significant. On 16 August 2001, Metro-Goldwyn-Mayer, Paramount Pictures, Sony Pictures Entertainment, Universal Studios and Warner Bros announced a joint on-demand movie service that will offer releases over the Internet in the U.S. Service launch is “some months away”.²²⁰ The studios have acknowledged that they will price the service to compete with pay-per-view services (at between \$3 to 5 per movie), which will initially require heavy subsidisation. In addition, as both Napster and Pressplay have demonstrated, copyright issues (where the would-be content provider is not the music publisher, for example, and does not hold the rights to distribute) are further hampering the provision of audio and video streamed content.²²¹ Until these (and related) issues are resolved, image and video-rich services, which will drive demand, will not be widely available.

²¹⁶ See “Perspective – Hollywood helping Napster to help Broadband”, Chris Marsden, Communications Week International, 7 May 2001.

²¹⁷ See “Context Hinders Asian broadband take-up-Experts”, Total Telecom, 22 August 2001. See also “Network Infrastructure: Lack of Services mean DSL continues to fall short”, Total Telecom, 28 August 2001 (quoting a DSL analyst for consulting firm TeleChoice Inc.: “The biggest factor is the lack of services - the lack of something that’s going to really draw in the mass market”).

²¹⁸ Similarly, in *The Netherlands*, OPTA has noted that infrastructure providers had been complaining that there are no services from which to generate revenue at this stage. See paragraphs 24, 138 ad 139 of Joint consultation document of NMa and OPTA defining and identifying markets for Internet Access.

²¹⁹ The Analysys Report “IP Local Loop: Key Facts”, April 2001, identifies significant unmet end user demand.

²²⁰ “Studios to launch joint on-demand film service”, Total Telecom, 16 August 2001.

²²¹ “Internet music service Pressplay to launch after September”, Total Telecom, 25 July 2001.

(ii) *Speed*

As noted above in Section I, a minority of Member State NRAs (and NCAs) have drawn a distinction between “broadband” and “narrowband” access that is based largely on “speed” or a combination of speed, charging models and the “always on” (rather than the “on-demand”) nature of certain services. The “speeds” identified range widely, from 2 Mbps²²² down to 128 kbps (*i.e.*, ISDN2 speed).²²³ While “speed” is the most obvious hypothetical benefit to the user of access over a broader bandwidth connection, an environment where there is little content that inherently requires such bandwidth for delivery will mean that access speed will have little effect on end-to-end network speed.²²⁴ The Study Team has no evidence that there is a clear change in demand for access above a particular speed (*i.e.*, that there is a bandwidth “bright line” at which the characteristics of demand alter). There appears to be a small group of marginal “adapters” who focus on additional speed, largely for its own sake, for whom the expense of such discretionary buying is not particularly important.

(iii) *Dedicated and Dial-up Access*

At both the Community and at the Member State levels, a distinction has been drawn in part between dedicated (“always on”) and dial-up access. This distinction has evolved in an environment where dedicated access could be provided only over leased lines, resulting in a pricing differential between dedicated and dial-up access that effectively precluded residential and many non-residential end users from acquiring such services. However, it is now the case that access over both ADSL and upgraded bi-directional cable networks is dedicated. As such, distinctions between dial-up and dedicated services that have been drawn by reference to the residential or non-residential nature of customers are increasingly of questionable validity. End users increasingly focus on the price-quality of service trade-offs discussed below.

(iv) *Price*

The evidence available to the Study Team (from both cable and PSTN/ISDN/ADSL providers) suggests that the most important demand-side driver for mass residential end user access selection, where the choice relates to bandwidth, is price. Residential end users are sensitive to perceived “value for money”. The history of bandwidth access across the EU has been characterised by an end user trade-off between price and speed (and quality). As such, the price points for flat rate dial-up, ISDN, cable and ADSL are the single most important factor in choosing the appropriate access platform (and, indirectly, the access speed). For example, the pricing of ISDN access (relative to other access services) in the *United Kingdom* and

²²² Of tel’s glossary of terms defines broadband as “...a service of connection allowing a considerable amount of information to be conveyed, such as television pictures. Generally defined as bandwidth greater than 2 mbps”. In addition, it should be noted that the proposed definition of universal service in Article 4 of the Universal Service and User’s Rights Directive refers only to “data rates that are sufficient to permit Internet access”.

²²³ For example, OPTA and NMa. See Joint consultation document of NMa and OPTA defining and identifying markets for Internet access. Similarly, Of tel’s recent dial-up review adopted a narrow definition of dial-up “low-speed” (*i.e.*, up to 128 kbps). It notes that there is little empirical evidence either way as to whether the speed and reliability of access at greater than 128 kbps, with the price differential, indicates that there are separate markets here.

²²⁴ In other words, the overall “speed” achieved is only as fast as the slowest part of the full set of networks traversed by a single content “pull”. Deployment of content closer to the end user, using caching, mirroring, content delivery networks and other techniques will probably reduce delays, as less networks are traversed.

Germany has led respectively to the development of a large flat rate dial-up access customer base and a relatively small ISDN customer base in the *United Kingdom* on the one hand, and a large ISDN (both residential and non-residential) customer base and a *de minimis* flat rate dial-up customer base in *Germany* on the other. In *Belgium*, the Competition Council focussed particularly on the likely effect of pricing shifts, taken with relative speed, in identifying a single market for Internet access (*i.e.*, deciding not to follow in advice of the Competition Service to define a distinct market for broadband access).²²⁵

The cable operators in most Member States have significantly revised their retail packages and charges over the last twelve months to make their packages (including access) more attractive,²²⁶ and many ADSL providers are currently also reviewing and revising their prices.²²⁷ ADSL providers are attempting to ensure that their revised pricing models do not inhibit their ability to compete with cable operators.

Despite this pricing fluidity and the variation across Member States, the importance of pricing as a factor in subscriber choice requires an examination of the effect of an attempt by a hypothetical monopoly supplier of cable or of xDSL to sustain a small but significant non-transitory price increase for approximately one year. If such an increase cannot be sustained, the relevant market must be defined to include the other services that constrain such an increase. Only when the increase can be sustained (*i.e.*, the increased profit on infra-marginal customers outweighs the lost variable profits on marginal customers who switch when faced with the increase) have the boundaries of the relevant market been identified.

Turning first to dial-up prices in a sample of Member States, the cost of acquiring a dial-up subscription and approximately 20 hours time on line is approximately equal to that of acquiring an ADSL subscription in *Belgium*, *Denmark*, *The Netherlands* and *Sweden*.²²⁸ In *Germany*, the ADSL rate is equivalent to 37 hours dial-up access a month and 32 hours ISDN access a month (ISDN penetration for residential users in *Germany* is the highest in Europe). The UK flat-rate dial-up charges makes it impossible to compare ADSL dial-up in this way, as noted above. In *Belgium* and *Sweden*, the subscription charges for ADSL and cable Internet are within €2/month of each other.²²⁹ In *The Netherlands*, the *United Kingdom* and *Denmark*, cable Internet subscriptions and ADSL subscriptions are approximately €20/month apart (in *The Netherlands*, UPC Chello charges €45.36/month for cable, while KPN ADSL is €25.64/month; in *Denmark*, StofaNet charges €26.8/month for 340 mbps cable Internet access, while TeleDanmark's ADSL is €46.9/month; in the *United Kingdom*, Telewest charges €39.6/month for cable Internet access, while BT charges €55.5/month for ADSL). It is not yet possible to meaningfully compare German ADSL and cable rates, for the reasons noted above.

²²⁵ *Telenet Bidco N.V.* Case determined on 23 August 2001.

²²⁶ For example, Telewest and ntl in the *United Kingdom* announced a £25 Internet access service, available to digital television subscribers on 9 July 2001.

²²⁷ BT announced on 26 June 2001 a review of its ADSL prices (BT originally hoped to provide access at the equipment cost of £40 a month). It stated that the pricing review was driven by the failure of advertising and e-commerce revenues to generate anticipated revenues.

²²⁸ Belgacom (*Belgium*) dial-up subscription is €16.20/month, 2.46 peak and 1.02 off-peak €/hour; Belgacom ADSL is €39.54/month. TeleDanmark (*Denmark*) dial-up peak and off-peak rates are €2.22 and €1.08, respectively (no subscription charge); its ADSL rate is €46.9/month. KPN (*The Netherlands*) dial-up subscription and first four hours of usage are €2.95; every hour thereafter is €1.13/hour. KPN's ADSL rate is €25.64/month. Telia's (*Sweden*) dial-up subscription is €13.3/month; and /hour (peak and off-peak), its ADSL rate is €26.6/month.

²²⁹ Coditel and Telenet Internet cable subscriptions are approximately €37-38/month. UPC Chello (in *Sweden*) Internet cable subscription is €24.4/month.

It is worth noting that BT and TeleDanmark have the most expensive ADSL rates of the sampled Member States, StofaNet has the cheapest cable Internet access (with a significant bandwidth usage limitation) and UPC Chello (*The Netherlands*) has the most expensive cable Internet access rates. The wide absolute variations between rates (on the same platforms) across the sample suggest that a number of operators are engaging in strategic pricing; or, at the very least, that operators do not take the same view about customers' perceptions of service differences.

While non-residential end users are also price-sensitive, the evidence reviewed by the Study Team suggests that these customers are consistently prepared to trade price for (guaranteed) service quality and support.

(v) *Service Quality*

Cable network operators do not currently “guarantee” a minimum “access speed” or other indicia of quality for residential customers. Similarly, ADSL providers are also unable to guarantee the speed at which their customers will obtain access, given the variables introduced by factors including distance from the exchange.

Cable operators do guarantee minimum “access speed” for non-residential customers (paying a premium for the guarantee). Such a guarantee requires that the operator either “reserve” channel capacity for an individual end user (something that is rarely done, and is only ever done for end users acquiring extraordinary capacity) or to ensure that there is sufficient unused capacity on the network (below the node) to ensure that end users (sharing the loop) do not degrade each other's access. These types of end users are effectively offered service level guarantees (the form of which differs between Member States).

b. *Supply-side Analysis*

(i) *The Platforms*

A number of platforms are currently used to provide network access, at varying bandwidths, which enable subscribers to access the available services. (Dial-up) PSTN, ISDN, FWA, cable networks, MWS, ADSL, fibre and satellite are all currently used in varying degrees in different Member States. It is difficult to identify the access speeds or bandwidth capacity of each of these alternatives with precision, as they vary with the number of subscribers sharing access at any one time (*e.g.*, cable networks) and distance from the local exchange (*e.g.*, ADSL). However, the following provides a working guide to the possible capacity of the different platforms:

| WAP | Slow dial-up PSTN | Fast dial-up PSTN | Slow cable modems (e.g., Casema in The Netherlands) | ISDN 2 | ADSL Fast cable modems |
|-----|-------------------|-------------------|---|--------|------------------------|
| 7.6 | 28 | 56 | 64 | 128 | 512 |

Table V.3

Of the above, (dial-up) PSTN access service is the only residential fixed dial-up, rather than “always on”, access service. FWA, MWS, satellite²³⁰ and fibre access are, in most Member States, used to provide access to non-residential customers. However, the Dutch government is funding a project to test the viability of offering fibre-to-the-home, which will commence in the third quarter of 2001. Similarly, Sonofon has announced that it intends to provide FWA coverage to 95% of the Danish population.²³¹ ISDN does not have a large non-residential subscriber base in a number of Member States.²³² Cable²³³ and ADSL are both targeted at residential and non-residential subscribers. In this context, it is useful to recall that different access channels need not constitute separate markets.²³⁴ Given end user price sensitivity and the current conditions on the capital markets, the appropriate platforms for delivery of access in any given circumstances are those that allow cost-effective delivery at acceptable quality levels.²³⁵

A number of empirical studies concerning the growth potential for both ADSL and cable “bandwidth” access services have been conducted recently. Kinetic Strategies identified 9.3 million subscribers at the beginning of June 2001, with 70% of subscribers acquiring cable modem access. Kinetic Strategies' figure indicate that Q1 2001 cable modem subscriptions matched Q4 2000 subscriptions, despite predictions to the contrary. In contrast, ADSL subscriptions were down. In addition, IDC has predicted strong cable modem growth, with the total number of subscribers rising eight-fold to 17.7 million (Europe-wide), representing

²³⁰ The Analysys “IP Local Loop: Key Facts” report identified the potential for point-to-multipoint fixed wireless systems (at various frequencies) and existing and planned satellite ventures to provide access alternatives to fixed wire or cable network modem access.

²³¹ This announcement from Sonofon in prompted TeleDanmark to increase its ADSL coverage target to 95% of the Danish population by mid-2002. See “Dutch, Swedes vote subsidies for broadband”, Joanne Taafe, Communications, Week International, 18 June 2001.

²³² Despite this, there are 7 million ISDN subscribers in the EU, according to Pyramid Research. See “Broadband: Cable in Europe – Cable companies look to consumers”.

²³³ It should be recalled that only upgraded (digitised) bi-directional cable networks can be used for either narrowband or broadband access. As such, the cable networks in a number of Member States cannot be used to provide such services (e.g., the 90% of German cable connections that are still analogue).

²³⁴ See further @Home Benelux; although cf. Telewest.

²³⁵ See Analysys “IP Local Loop: Key Facts”.

31% of the market, by 2005. IDC attributes recent growth in cable modems (to 1.0 million in 2000) to “power Internet users”. IDC and Cahners anticipate that, in the longer term, cable modems will lose market share to xDSL technologies. The consultancy Ovum does not share this view. It is generally accepted that the long-term competitive viability of cable modem access hinges on cable network operators addressing scalability, installation²³⁶ and network management issues. Similarly, ADSL providers need to overcome the current poor end user perception of ADSL installation that resulted from early installation problems.

(ii) *End user Terminal Equipment*

Pricing is far more significant than the underlying technical infrastructure. In a similar vein, the evidence suggests that end users do not have a technical preference for access using a cable modem or through a PSTN/ISDN/ADSL connection. Given the current state of technical development, cable operators must provide end users with a modem, a broadcasting set-top box and equipment required for voice telephony services separately, depending on the type(s) of access to be acquired by each end user. At present, there does not appear to be an end user preference for any of these competing forms of terminal equipment. It should be noted that, given the current relatively low levels of service penetration, most access providers are stimulating service take-up through free, subsidised, rented or long-term payment schemes for end user equipment.

(iii) *Standards*

There are few standards issues inhibiting market development. ADSL providers are developing specifications and standard procedures to test interoperability of (essentially proprietary) ADSL equipment (*e.g.*, DSLAMs and CPE). The procedures will be accessible from officially recognised (independent but commercial) test centres. Interoperability of equipment from approximately 40 vendors has already been demonstrated, and problems that have resulted from implementing systems using equipment from different vendors are being overcome. The procedures test network performance to ensure that equipment meets performance standards and has the ability to carry particular types of traffic.²³⁷ As web site designers and operators begin to optimise their systems and services for true broadband content, standards-building consortia such as the MPEG7 committee, the Internet Streaming Media Alliance and the Broadband Content Delivery Forum will become increasingly important. In addition, network operators will also need to carry out related optimisation, to facilitate the development of broadband service provision.²³⁸

²³⁶ Note, for example, the UPC initiative to develop “plug and play” installation.

²³⁷ *Ibid.*

²³⁸ “Perspective – Hollywood helping Napster to help broadband”, Communications Week International, 27 May 2001.

(iv) *Commercial Factors Influencing Substitutability*

In order to access the extent to which narrowband and broadband access services are susceptible to any enduring market failure which might require *ex ante* regulation, the degree of substitutability among access services needs to be evaluated in terms of:

- relative market maturity;
- growth and changes in market shares; and
- the existence and possibilities of churn.

Market Maturity

While PSTN, ISDN and FWA-based access services have been on the market for some time, cable modem and ADSL-based access services are in the embryonic stages of development. Nonetheless, the market for bandwidth access services is rapidly evolving. In many Member States, the aggregate penetration of both cable modem and ADSL-based services is less than 5%.²³⁹ As such, penetration is still, in most Member States, *de minimis*. Most providers are still in the process of substantially reviewing and realigning their packages and services offerings to meet demand and to match or better competing access services provided over the same or different platforms.

Market Growth

Market growth (for both cable modem and ADSL-based services) is occurring at significantly different speeds in all Member States. In a number of Member States, ADSL take-off has gone from minimal penetration to above 100,000 subscribers in a matter of months. For example, ADSL penetration in *The Netherlands* increased from close to zero (as at 1 January 2001) to over 100,000 by July 2001. Similarly, ADSL penetration in *Belgium* grew from 43,810 in January 2001 to 110,000 on 15 July, and Belgacom is estimating 200,000 subscribers by the end of 2001. In contrast, cable penetration growth started from a much higher base and is increasing at a slower relative rate. The same potential for rapid swings in market growth is present in the many other Member States, where the unstable growth patterns are similar.

Churn Costs

Because the deployment of both ADSL and cable modems requires new end user terminal equipment, almost all subscribers acquired by both ADSL and cable access providers in the short to medium-term will be “new” customers, rather than subscribers churning from other operators (whether using the same or different platforms). Until the market becomes more mature (with higher and more stable penetration) few subscribers are likely to churn between platforms. As such, the “cost” of churn is not a factor in the provider choices currently being made by subscribers. If unbundled local loops become more prevalent over this timeframe, it is likely that some degree of competition between ADSL access providers will develop. However, the recent U.S. experience in competitiveness between ADSL operators is instructive. The problems experienced by new entrant operators (*e.g.*, the numerous filings for Chapter XI protection) have damaged end user confidence in new entrants; over 80% of

²³⁹ Pyramid Research estimates that only 3.3% of European homes have either a cable or ADSL connection. See “Broadband: Cable in Europe – Cable companies look to consumers”, Joanne Taaffe, Communications Week International, 13 August 2001.

ADSL subscribers are currently customers of the Baby Bells,²⁴⁰ and indicators suggest that this percentage figure will remain high (possibly even escalating).

However, it should be remembered that inter-platform churn costs are unlikely to be borne by the end user during this timeframe. Terminal equipment promotions and subsidisation packages (discussed above) will significantly reduce end user disincentives. The potential “lock-in” effect of the cost of equipment acquisition is thus often effectively negated.²⁴¹

A Strategis Group Study has examined the potential for churn in the (somewhat more mature) U.S. market.²⁴² The Study found that, of the 55% of bandwidth access acquirers with a choice between cable modems and ADSL, 60% are choosing ADSL. However, satisfaction of ADSL users is lower, and their potential churn rate is higher. In contrast, 48% of cable modem users reported being “extremely satisfied” with service, compared to 43% of ADSL subscribers.

(v) *Geographic Scope*

Cable network penetration has reached a maximum of 95% across few Member States (*i.e.*, *Belgium* and *The Netherlands* only). In most Member States it is less than 50% (although the networks pass more houses than there are current subscribers), while in others it is virtually non-existent (*e.g.*, *Greece* and *Italy*). Cable modem penetration is a *de minimis* (albeit rapidly growing) fraction of these numbers. Similarly, FWA, fibre, MWS and satellite access are not available to the majority of subscribers. However, dial-up PSTN access services and ISDN are available to all subscribers (with the appropriate terminal equipment) in all Member States. ADSL penetration is embryonic but rapidly growing. However, it is, as yet, unclear how widely available ADSL will become.

In a number of Member States, cable network “franchises” were initially granted exclusively on a regional basis. This is no longer the case. As such, there is no regulatory barrier to the greenfield expansion of existing cable networks or, for that matter, the construction of new networks. In contrast, there are a limited number of FWA, MWS and other wireless licences utilised across all Member States. In addition, such licences tend to be regional (or smaller). As a result, there is a regulatory barrier to expansion, incremental or otherwise, for existing networks or for the construction of new networks.

The majority of PSTN, ISDN and ADSL access customers continue to acquire access services from the incumbent PSTN operator. In practice, these operators geographically-average their tariffs. As a result, competing access providers using the same technology (irrespective of the geographic size and scope of their operations) set their prices in line with the incumbent's pricing (*i.e.*, it becomes the “*de facto* price to beat or match”). Given the evidence of end user price sensitivity, it is clear that alternative network operators providing access must also position their offerings to match or better the fixed incumbent's pricing. While non-residential customers may be less price-sensitive, the evidence suggests that wireless, satellite and cable operators providing bandwidth access services to these end users also use the incumbent's ISDN and ADSL pricing as a guide to pricing.

²⁴⁰ See Kinetic Strategies, June 2001.

²⁴¹ See data and discussion in “The Incentives of Cable Operators to Carry Multiple ISPs”, Besen, DeBraba and Woodbury, 1 December 2000.

²⁴² Strategis Group, “Broadband Users: Cable vs. DSL”.

Consequently, despite the existence of some sub-national “regionalising” factors on the supply-side, the commercial drivers for the provision of service create an environment in which the competitive conditions are nationally homogeneous.

V.3.B. Elements Capable of Narrowing or Broadening the Relevant Market Definition

a. Changes in Pricing Structures

If the current end user price sensitivity continues as the market matures and the pricing evolution of the level of alternative platforms develops in such a way that there develops a clear price-driven divide between these alternative platforms, it is likely that the current broad retail markets embracing both narrowband and broadband access will fragment into a number of narrower relevant product markets for access, and the distinct boundaries of broadband access services may become clearer.

b. New Content Offerings Requiring “Minimum Access Speeds”

Evidence suggests that the lack of true broadband content in the market, which has contributed to the weak consumer demand for broadband access services, has caused operators to have little enthusiasm to offer broadband access.²⁴³ Moreover, virtually all web site designers and operators design and optimise their systems and services for dial-up PSTN customers, and equipment manufacturers tend to build their specifications towards narrowband applications.²⁴⁴

Developments in the richness and bandwidth-hungry nature of the content provided to end users relying on the current available access services is likely to have a significant narrowing effect on the scope of the relevant product market and, as such, will clarify the boundaries of the emerging broadband market. For example, it is widely anticipated that video-streaming with TV quality will require access capacity of at least 700 kbps. At present, cable network modems are unable to deliver such content. ADSL and fibre-to-the home access, however, should be able to support such applications. Currently, only satellite platforms can provide a guaranteed 700 kbps capacity.

In the view of the Study Team, the emergence of a true “broadband access market” will reflect closely the creation and development of demand for broadband content (*i.e.*, content that inherently requires capacity to be accessed, rather than content that may merely be accessed more quickly if end users have higher access speeds). Ultimately, network access of a particular sort is only relevant if there is a discernible type of content which can be provided to a customer once access becomes available. In the Study Team’s view, both the demand drivers and supply-side factors identified above are likely to vary in their intensity over time, reflecting the level and scope of the development of such content.

²⁴³ “Internet & E-commerce: AT&T’s Dorman says broadband still a tough sell”, Total Telecom, 22 August 2001, at: <http://www.totaltele.com/view.asp?articleID=43053&Pub=TT&categoryid=626&kw=broadband>.

²⁴⁴ The prevalence of Windows-based applications (dial-up) over Linux-based applications (“always on”, faster speed) is illustrative of the current position. See Dvorak, “The myth of broadband”, 4 June 2001.

c. Mobile Platforms

Although at the moment access provided over mobile terminal equipment (*e.g.*, using WAP) is significantly slower, of lower quality, less reliable, more expensive and can support fewer and less attractive content than access provided over fixed platforms, GPRS and UMTS have the potential to create viable mobile access alternatives in the medium-term (*e.g.*, by the year 2003-2004). Pricing and the nature and format of available content are likely to have a significant impact on end user perceptions of substitutability and, growth in access requests. The GSM Association has launched a standards initiative that is intended to provide terminal manufacturers and service platform providers with guidelines that will allow operators to provide a consistent set of mobile data services and WAP services over interoperable hardware and software. Applications developers, able to work to a consistent set of specifications, will only need to create an application once (and have it work across multiple networks and platforms). Such initiatives may also further stimulate the development of potentially substitutable mobile access platforms.

d. Evolution of xDSL and Cable Networks, and the Development of New Technologies

ADSL technology is the first of the xDSL family of technologies to be deployed by PSTN operators. HDSL and VDSL technologies are already under development. VDSL, for example, is designed, in part, for the provision of video streaming services. As such, there is clearly potential for a significant impact from new xDSL technology in the medium-term.

By way of contrast, much of current cable network architecture across the EU is unable to support the commercial supply of true “broadband” content. However, to a large extent, this could be remedied by the cable network operators, many of whom are currently upgrading their networks. At present, fibre is only found above the level of the nodes (each node supports between 500-1,000 subscribers). Cable operators could either reduce the number of subscribers supported by each node or replace the network beyond the node with fibre (thereby becoming closer in form to another fibre-to-the-home product). Any such decision by a cable network operator will be driven by the perceived likelihood of recovering the upgrade investment through revenues (*e.g.*, the provision of content for which subscribers pay more or which generates revenues through mechanisms such as transaction-based charges).

Finally, it should be noted that advances in compression techniques and improvements in compression technology will both reduce the bandwidth required to access content and increase the content that can currently be acquired through *all* existing forms of access.²⁴⁵

Conclusions:

- 1. At present, the empirical evidence available to the Study Team suggests that there appears to be a single relevant product market encompassing both broadband and narrowband access services. However, it appears that an embryonic broadband access service market, the boundaries of which are, as yet, difficult to define, may be beginning to emerge.**

²⁴⁵ See “Less data, greater efficiency”, Bob Emmerson in ROAM, 1 June 2001 and “Improved version of MP3 unveiled”, Elizabeth Biddlecomb in Total Telecom, 15 June 2001.

2. Available empirical evidence suggests that access provided across delivery platforms, from PSTN dial-in to cable, ADSL and fibre, currently act as chain substitutes in the embryonic markets developing in a number of Member States. The degree of price interdependence and the apparently strong degree of substitutability suggest that cable modem-based access constrains and is constrained by dial-up (and ISDN) and constrains ADSL pricing in the majority of Member States. However, the Study Team understands that, in some Member States, the chain of substitution may be broken (*e.g.*, in Member States where not all platforms are in operation).
3. The development of true “broadband” content is likely to drive the fragmentation of the market along bandwidth lines, as end users increasingly require access that enables the acquisition of particularly key forms of content, which inherently require access over platforms with particular characteristics.
4. There appear to be distinct patterns of supply and demand emerging which suggest that there may be separate residential and non-residential segments of the relevant access market being addressed. This demand appears to be the result of the price/quality trade-offs currently being made by different groups of end users. Whether this split generates a narrowband/broadband market segmentation will depend, in large measure, on the scale, speed and diversity of development of broadband content.
5. The increasing competition between xDSL and cable modems is exerting further pressure on traditional access methods against which cable modems originally competed. It is also leading PSTN operators to make strategic decisions about the manner in which and the pace at which they encourage existing dial-up and ISDN customers to migrate to ADSL services (in an effort to reduce the number of customers churning to cable modem-based access).
6. Despite the existence of some sub-national “regionalising” factors on the supply-side, the commercial drivers for the provision of network access services create an environment in which competitive conditions are nationally homogeneous. Consequently, although access is acquired locally, the conditions of competition under which it is offered exist in the context of a national geographic market.

VI. INTERNET CONNECTIVITY

Summary:

1. Internet connectivity is a type of interconnection which refers to the ability of ISPs providing Internet access services to end users to interconnect with other ISPs and to thereby satisfy their customers' expectations that they will be able to access all addresses on, and content available over, the public Internet (frequently called "universal connectivity"). ISPs can achieve Internet connectivity through the negotiation of transit or peering arrangements with other ISPs, or combinations of both types of agreements, at a national, regional and international level.
2. The end user's desire to obtain universal connectivity has meant that certain types of Internet connectivity are achieved through the transmission of signals over larger "backbone" Internet connectivity providers. The largest of these providers of so-called Internet backbone services are based in the *United States*, where the public Internet was first developed commercially.
3. A combination of technical and commercial developments over the past few years has meant that individual transmissions increasingly do not need to traverse the network of a US "backbone" provider. The development of data storage techniques such as caching and mirroring, the growth of Content Delivery Networks (CDNs), the growth of secondary peering practices, and the increasing volume of European content, has meant that Internet traffic originating and terminating in Europe is increasingly independent of the larger *United States* backbone providers.
4. The relevant product market for Internet connectivity appears to include a number of substitutes to interconnection with the largest U.S. ISPs (*i.e.*, those that have virtually complete routing tables) which are sometimes referred to as "Tier 1 IBPs", and may be as broad as "Internet connectivity" to and from all ISPs. However, as the market for a more narrowly defined market – "connectivity to Tier 1 of the Internet"- is sufficiently competitive, we have concluded that neither "Internet connectivity" nor "connectivity to Tier 1 of the Internet" display any of the characteristics of market failure, actual or potential, which would warrant *ex ante* regulation.

VI.1 EU MEMBER STATE ANALYSIS

Issue:

Aside from the more general issues of whether Internet access services (*i.e.*, interconnection) are available at the wholesale level, the question arises as to the extent to which Member States have jurisdiction over any aspect of Internet universal connectivity.

VI.1.A. Summary of Main Relevant Markets Identified by the Member States

| Product Markets Identified | Sub-Markets or Market Segments Identified | Geographic Markets Identified |
|--|---|--|
| Internet connectivity (<i>Germany</i> , the <i>United Kingdom</i>). | None. | National. |
| Packet or switched data transmission services (<i>Spain</i>). ²⁴⁶ | None. | None identified, although likely national. |

VI.1.B. Relevant Product Markets

To the extent Member States have identified relevant product markets for wholesale Internet connectivity, they have, for the most part, been concerned with markets that consist of services connecting ISPs to their end users rather than services that provide connectivity between ISPs. This is principally because the *United States* was historically the hub of ISP-to-ISP Internet connectivity and, therefore, the Member States never regarded this kind of connectivity as a national issue.

For example, four Member States (*Finland*, *France*, *Italy*, the *United Kingdom*) have identified markets for **Internet access services**, which consist of services offered by local network operators that provide connections between the ISP and its end users. In *Italy*, the NCA has identified a market for **Internet wholesale connectivity**, but this market is defined as consisting of wholesale integrated national and international connectivity services offered to ISPs to connect them to end users.

Only in *Spain* and the *United Kingdom* has the NRA defined a relevant product market in terms of services connecting the ISP to the Internet network.

Oftel, in the *United Kingdom*, has issued a consultation document reviewing effective competition in the provision of **Internet connectivity**, which it defines as the link from the ISP to the wider Internet and which is an essential component of all retail Internet service

²⁴⁶ As noted below, other Member States have not expressly concerned themselves with inter-ISP relations.

provision services, regardless of the method of access (*i.e.*, dial-up, leased line, or ADSL).²⁴⁷ While Oftel acknowledges that Internet connectivity is an input to many types of Internet services, it has only examined connectivity with respect to wholesale dial-up Internet access services. It has not, for example, sought to explain how the relative levels of maturity of different means of access may be relevant to the broader assessment of the competitiveness of connectivity relationships. According to Oftel, Internet connectivity constitutes a distinct product market because, from the demand side, there is no substitute for Internet connectivity if a hypothetical monopolist raised the price of Internet connectivity significantly and non-transitorily. Moreover, on the supply side, no supplier of other goods would be able to switch to the production of Internet connectivity profitably in the short term, if a hypothetical monopolist raised the price of Internet connectivity significantly and non-transitorily, because these alternative suppliers would not have sufficient interconnection arrangements to ensure that any Internet destination could be reached.

In *Germany*, the NRA has defined a market for access services via fixed networks to on-line services and the Internet where ISPs are the customers.

The CMT in *Spain* has defined this market as the market for **packet or switched data transmission services**, which consists of the connection of the ISP to the public Internet. This relevant market is part of the wider market for communications and information services, which includes, in addition to the market for packet or switched data transmission services, the complementary markets for access services provided from the end user to the ISP, and information services provided by the ISP.

VI.1.C. Relevant Geographic Markets

Oftel has stated that the national market for Internet connectivity should be considered the starting point, because Internet backbone operators roll out their networks at least at the national level. Oftel has concluded that because buying Internet connectivity outside the *United Kingdom* does not provide a reasonable alternative to buying it within the *United Kingdom*, and because *UK* ISPs without their own infrastructure and *UK* peering arrangements would face lower quality buying connectivity in the *United States* (because all *UK* Internet traffic would have to travel to the *US*), the market should be deemed to be national. Oftel has therefore defined the relevant market in terms of “Internet connectivity provide via interconnection with an Internet backbone in the *UK*.” Meanwhile, in *Germany*, the Internet connectivity market identified by the NRA has been held to be national in scope.

Although the CMT in *Spain* has declared the market for Internet access to be national in scope (because ISPs may contract for nationwide connection), it does not appear to have defined the geographic scope of the market for connectivity between ISPs and the Internet network.

²⁴⁷ Oftel's approach is based on the premise that “BT's services allow ... ISPs to connect their customers to the Internet and combine two or more wholesale products – call origination, Internet call termination and Internet connectivity ... Internet connectivity is a wholesale service that provides ISPs with access to one of the backbone networks that comprise the Internet.” This approach indicates that Oftel believes that, to achieve end-to-end connectivity, an ISP must acquire at least three separate services – *i.e.*, Internet access, Internet connectivity to a backbone and carriage across a backbone. As such, it would appear that Oftel's focus on connectivity to a backbone means that Oftel is examining a service different to that examined by the Merger Task Force (and the majority of other regulators). The Study Team has seen no evidence to suggest that Internet transport is further fragmented in the manner proposed by Oftel.

VI.1.D. Relevant Product and Geographic Markets Identified Outside the EU

Outside the EU, the FCC in the *United States* has identified a relevant market for **Internet backbone services**, which consists of the transportation and routing of packets between and among ISPs and regional backbone networks. Meanwhile, the DoJ has identified **Tier 1 Internet backbone services** as a relevant product market. Tier 1 Internet backbone services refer to the transit services sold by the large Internet backbone providers (*i.e.*, Tier 1 Internet backbone providers) to substantial numbers of ISPs and the dedicated Internet access sold by Internet backbone providers directly to corporate customers or other enterprises. Both the FCC and the DoJ have identified these markets to be national in scope.

Meanwhile, in *Australia*, the Productivity Commission released a report in 2001 which analysed the wholesale segment for Internet service provision, and reported that there currently exist four providers of backbone services in the country, with Telstra accounting for more than half of that market.

Conclusions:

1. Except for *Germany, Spain, and the United Kingdom*, NRAs and NCAs in the EU Member States have to date been concerned with Internet connectivity issues only insofar as they affect access to local infrastructure concerns, which can usually be addressed by appropriate local loop unbundling, leased lines and interconnection policies. Where the competitive relationships regarding Internet access go beyond the issue of local access, there appears to be a recognition that the provision of Internet connectivity is an issue which otherwise has pan-European or global characteristics.
2. The approach taken in the *United Kingdom* (where the manner in which the relevant product market has been defined has led to the adoption of a national geographic market) and *United States*, whereby the relevant geographic market has been identified as being national, is not wholly consistent with the geographic market definition adopted by the European Commission in *WorldCom/MCI* and *MCI WorldCom/Sprint* (identifying the relevant geographic market as being global in scope).

VI.2 ANALYSIS UNDER EU COMPETITION RULES

The Commission analysed the market for Internet connectivity services in its *WorldCom/MCI* and *MCI WorldCom/Sprint* Decisions, and has identified a specific and distinct market for the provision of “top-level” or “universal” Internet connectivity.²⁴⁸ The Commission considered “universal” Internet connectivity to be coterminous with connectivity to Internet backbone networks in the *United States*.

²⁴⁸ *WorldCom/MCI* Case No. IV/M.1069, paras. 62-70; *MCI WorldCom/Sprint* Case No. COMP/M.1741, paras. 52-53.

VI.2.A. Demand-side Analysis

From a demand perspective, the Commission highlighted in *WorldCom/MCI* and *MCI WorldCom/Sprint* that a principal reason the provision of top-level or universal Internet connectivity is a separate and distinct market is that end users expect their ISPs to be able to send and receive messages to and from anywhere and everywhere on the Internet. Therefore, an ISP cannot afford to build up its connectivity offering on an incremental basis (*i.e.*, through bilateral peering arrangements),²⁴⁹ but instead must immediately obtain connectivity from an Internet backbone provider which has complete global reach directly or indirectly across the entire Internet at appropriate standards of quality, speed and reliability.²⁵⁰

According to the Commission, the only organisations capable of providing complete Internet connection are “top-level” or “top-tier” Internet connectivity providers, which supply connectivity entirely through peering agreements with other top-level networks or internally over their own networks.²⁵¹ The Commission stated that the only top-tier providers that have emerged thus far have their centres of operation in the *United States*.²⁵²

By contrast, secondary Internet connectivity providers (“second-tier” providers), in providing universal connectivity, are able to provide some Internet connectivity through peering agreements, but will most likely have to supplement this with transit bought from top-level networks.²⁵³ Therefore, the Commission concluded that in no case can connectivity offered by a second-tier ISPs be a sufficient substitute for the connectivity provided by the top-tier networks, and second-tier providers are unable to provide a competitive constraint on the prices charged by top-tier providers.²⁵⁴ Similarly, resellers of connectivity are dependent on top-tier and second-tier providers for their supply and, therefore, are unable to exert competitive price pressure on, or constrain the behaviour of, top-tier providers.²⁵⁵

Finally, the Commission noted that the Internet connectivity offered by second-tier providers might not be substitutable for the connectivity offered by the first-tier providers because their networks typically route messages in a way that requires many “hops”, which decreases the standard and quality of their services.²⁵⁶

For these reasons, the Commission concluded that top-level Internet connectivity must be a separate and distinct market.²⁵⁷

²⁴⁹ Moreover, the Commission noted that attempting to establish universal connectivity through bilateral peering arrangements would be formidable given the capital investment in backhaul, the negotiation of thousands of individual interconnection agreements, the risks of failure of negotiations, etc.; *WorldCom/MCI*, para. 63.

²⁵⁰ *WorldCom/MCI*, para. 63.

²⁵¹ *WorldCom/MCI*, paras. 65-66; *MCI WorldCom/Sprint*, para. 53.

²⁵² *WorldCom/MCI*, para. 82.

²⁵³ In 2000, the Commission’s market investigation in *MCI WorldCom/Sprint* maintained that top level providers continue to rely among themselves on settlement-free peering at private peering points while, on the other hand, second-tier providers continue to rely on national or regional peering agreements; *MCI WorldCom/Sprint*, para. 54.

²⁵⁴ *WorldCom/MCI*, paras. 68-69; *MCI WorldCom/Sprint*, para. 53.

²⁵⁵ *WorldCom/MCI*, paras. 62-63; *MCI WorldCom/Sprint*, para. 53.

²⁵⁶ *WorldCom/MCI*, para. 64. In this regard, refer to the discussion on “Quality” in section 3 below.

²⁵⁷ *WorldCom/MCI*, para. 66.

VI.2.B. Supply-side Analysis

From a supply-side perspective, the Commission found that the only organisations which are capable of delivering complete Internet connectivity entirely on their own account are top-level Internet connectivity providers. As noted above, while top-level Internet connectivity providers are capable of offering global connectivity entirely on their own through peering arrangements with other top-level providers, second-tier ISPs have to supplement their peering-based connectivity with transit bought from top-level providers and resellers must buy their connectivity from a combination of first and second tier providers.²⁵⁸ Therefore, second-tier providers and resellers cannot offer fully substitutable Internet connectivity services.

In *MCI WorldCom/Sprint*, the Commission concluded that, despite the emergence of content delivery networks (CDNs), regional peering arrangements, and greater use of mirroring, caching, and multi-homing technologies have reduced ISPs' and Internet content providers' reliance on the United States-based top-level Internet backbone providers, in its view there still exists a distinct market for the provision of top-level Internet connectivity.²⁵⁹

VI.2.C. Relevant Geographic Market

The Commission in *WorldCom/MCI* found that the market for the provision of top-level Internet connectivity is global because ISPs are vertically integrated and a rise in prices for access to the top-level networks would affect customers everywhere in the world.²⁶⁰ The Commission endorsed this view in its *MCI WorldCom/Sprint* Decision, finding that despite an increase in the availability of regional (European) content, the entry of a number of new entrants in Europe and the use of mirroring, caching and multi-homing, second-level ISPs continue to be dependent on a limited number of top level network providers for global connectivity, which means that the demand for Internet connectivity continues to be universal or global.²⁶¹

Specifically, the Commission noted that, although its investigation has shown that there has been a change in traffic flows and that there is less traffic originating in Europe which is sent to the *United States*, European Internet network providers continue to send between 50 and 80% of the Internet traffic originating on their networks to the *United States*; as a result, there will continue to be strong dependence on U.S.-based top-level connectivity providers to obtain global connectivity, in the view of the Commission.²⁶² Moreover, the Commission stated that much of the traffic originating in Europe and not travelling to the *United States* will continue to be sent to U.S.-based network providers' affiliates in Europe. Thus, according to the Commission, the dependence on U.S. top-level Internet connectivity providers will continue.²⁶³

²⁵⁸ *WorldCom/MCI*, para. 65.

²⁵⁹ *MCI WorldCom/Sprint*, paras 56-60.

²⁶⁰ *WorldCom/MCI*, para. 82; *MCI WorldCom/Sprint*, para. 97.

²⁶¹ *MCI WorldCom/Sprint*, para. 97.

²⁶² *MCI WorldCom/Sprint*, para. 58.

²⁶³ *MCI WorldCom/Sprint*, para. 59.

Conclusions:

1. Pursuant to existing Commission administrative practice under the *Merger Regulation*, a defining element in market definition for Internet connectivity lies in the distinction between peering and transit relationships. The economic and functional distinction between peering and transit is not a defining element in the *United States* for market definition purposes.
2. A “top-tier” of Internet connectivity providers of so-called “backbone” services has been identified by the Commission as a relevant product market, on the basis that these operators obtain their connectivity exclusively through peering with one another. The market has been segmented along similar lines in the *United States* by the Department of Justice, but on the basis of different (yet overlapping) criteria.
3. “Universal” Internet connectivity has been defined by the Commission as being coterminous with connectivity to *United States*-based Internet backbones. This characterisation does not consider that the increasing percentage of Internet traffic originating (and traversing Internet backbones) in Europe (and elsewhere) and never travelling to the *United States* is material to the market definition issue.

VI.3 MARKET ANALYSIS FOR *EX ANTE* REGULATION UNDER THE NEW REGULATORY FRAMEWORK

Internet connectivity is a form of interconnection which refers to the ability of ISPs providing Internet access services to end users to interconnect to other ISPs and thereby satisfy their end users’ expectations that they will be able to access all open addresses on, and content available over, the public Internet.

At a wholesale level, demand for Internet connectivity services is substantially derived from demand in the retail market for Internet access services, whereby ISPs provide end users with access to the public Internet.

The main concern of the Study Team is whether there appear to be competition concerns in relation to achieving connectivity on the Internet that would require the identification of a market that may attract some form of *ex ante* regulation. There is little disagreement that competition among ISPs to provide services to end users is very competitive.

Observers have, in the recent past, been concerned about the level of competition at the “top-level” of the Internet; those very large ISPs who can peer with virtually anyone with which they choose to do so, *i.e.*, they have virtually complete routing tables. This is a group made up of a limited number of firms comprising about six or seven Internet backbone providers (IBPs), often referred to as Tier 1 IBPs or Tier 1 ISPs. Although active in other parts of the world, all of these operators have substantial national networks in the *United States* and, indeed, access to the “top-level” of the Internet in the *United States* is considered essential for all ISPs regardless of where in the world they operate.

Given the Commission's focus in 1998 and 2000 on “top-level” Internet connectivity services (*i.e.*, U.S. Tier 1 ISP services), it seems to be appropriate to conduct an analysis of whether there is a relevant product market which warrants *ex ante* regulation, centred on the top level of the Internet.

In fact, the Study Team consider that the relevant product market is likely to be rather broader than U.S. Tier 1 ISP services. However, given the complex nature of the Internet and the implications that this has for the longevity of any identification of a relevant product market, the Study Team has considered at length whether there appears to be any market failure or market power concerns in the relevant market (however defined).

By exploring both market definition and market power issues with respect to the Internet, a more complete picture of the commercial Internet can be obtained, thereby putting regulators in a better position to identify any significant competitive concern that may require *ex ante* regulatory intervention in the near future (*i.e.*, over the next two years).²⁶⁴

In the analysis which follows, we address the question of whether a separate and distinct relevant market exists for “top-level” Internet connectivity services (*i.e.*, Tier 1 ISP services).²⁶⁵ Conceptually, in order to do this, one needs to analyse whether a hypothetical monopolist U.S. Tier 1 ISP could profitably raise the price of access. To answer this question, one needs to understand whether and to what extent substitutes for Tier 1 connectivity exist, and whether the degree of substitutability between Tier 1 connectivity and these 'other' services occurs to such a degree that they should fall within the same market as connectivity provided by Tier 1 ISPs.

Having conducted a preliminary substitution analysis, we will also turn to the additional question of whether, assuming the existence of a narrow candidate market defined in terms of a market for U.S. Tier 1 connectivity services, such a market is sufficiently competitive (*i.e.*, is unlikely to require some form of *ex ante* regulation).

The ability of a hypothetical monopolist U.S. Tier 1 ISP to sustain a small but significant increase in the price of transit is constrained to the extent that ISPs can switch to services provided by other operators that substitute for Internet connectivity from Tier 1 ISPs. As explained below, the possible range of substitutes includes:

- Those services that enable ISPs to contain traffic within regions (secondary peering, storing content on caches and mirrors, and delivering the traffic flows using content delivery networks).

²⁶⁴ There are several potential public policy issues concerning the internet, involving scaling issues, such as IPv4 address shortage, growth in AS number and route tables, and economic and technical issues relating to congestion management on the next generation Internet. These are discussed in WIK's study for the Commission entitled, “The economics of IP networks – market, technical and policy issues related to Internet backbone services”.

²⁶⁵ In its *WorldCom/MCI* (1998) and *MCI WorldCom/Sprint* (2000) Decisions, the Commission's Merger Task Force considered that such a market existed. However, it appears that the analysis conducted in each of those cases was of the provision of U.S. Tier 1 ISP services.

- The ability of Tier 2 ISPs to carry inter-regional traffic (where network resources are present), and for other long distance carriers to deliver their own U.S.-destined traffic from Europe to the U.S. and interconnect with one or more Tier 2 ISPs in the U.S.²⁶⁶

For the reasons described below, the Study Team considers that there is a range of substitutes for top-level Internet connectivity services that render the relevant market significantly broader than connectivity provided by U.S. Tier 1 ISPs. Perhaps even more importantly, a relevant market defined in this way is sufficiently competitive so as not to warrant some form *ex ante* regulation.

VI.3.A. Elements Indicative of the Relevant Market

a. Demand-side Analysis

The Study Team has identified three key factors which drive the demand for Internet connectivity services and which, therefore, influence significantly the parameters of the relevant market, namely: (1) the various forms of available connectivity and access to content; (2) quality of service; and (3) price.

(i) Connectivity

The Internet is a “network of networks”. Accordingly, the *sine qua non* of the Internet is connectivity. Retail Internet end users require their ISPs (who provide them with Internet access services) to provide them with connectivity to any other Internet end user, ISP, content provider, application service provider, data centre or any means of reaching content at any point on the Internet (as distinct from connectivity to all physical locations on the Internet). Although these parties seek Internet connectivity for different commercial reasons, they are in essence requiring the provision of the same service. Accordingly, ISPs providing Internet access services to such end users must acquire the capability to provide universal connectivity (*i.e.*, connection and access to all addresses on, and content available over, the public Internet, no matter where those addresses are located). No single ISP is currently able to self-provide universal connectivity completely. As a result, all ISPs, to a greater or lesser extent, need to acquire connectivity from other ISPs. As the Commission recently noted, “...*approximately 300 networks providing Internet connectivity operate long distance transmission networks that, together, form the global Internet’s international ‘backbone’.*”²⁶⁷

There are currently two basic ways in which ISPs obtain connectivity across the Internet:

²⁶⁶ The Study Team interviewed one major European carrier who explained that it prefers to do this rather than purchase transit for this traffic in Europe.

²⁶⁷ See *MCI WorldCom/Sprint*, para. 16. In its *WorldCom/MCI* and *MCI WorldCom/Sprint* Decisions under the *Merger Regulation*, the Commission variously referred to universal connectivity, global connectivity, national and regional and European connectivity, and universal (global) connectivity. In addition, the Commission suggested that all of these variants are services provided by “top-level Internet connectivity providers” (See *WorldCom/MCI*, paras. 62-70; *MCI WorldCom/Sprint*, para. 53). However, it has not yet been argued (or found) that only “top-level” connectivity providers are able to provide connectivity or that other ISPs only wish to acquire connectivity from such entities. There is currently a case pending before the Court of First Instance concerning the Commission’s market definition and approach in assessing the market dynamics of the Internet in *MCI WorldCom/Sprint* where many of those issues should be resolved. (T-310/00, *WorldCom v. Commission*, Application before the Court of First Instance).

- transit; and
- peering.

Transit and peering are effectively different contractual terms and conditions (including pricing) for the acquisition of connectivity.²⁶⁸

Transit arrangements are commercial transactions between network operators in which one network operator acquires, for a fee, access to the other network and to the networks with which the second network has peering or transit relationships. Transit is the principal means through which most ISPs obtain global connectivity.²⁶⁹ Prices for transit have dropped significantly and rapidly during the last two years.²⁷⁰

Peering relationships are essentially barter arrangements for the exchange of traffic between two networks.²⁷¹ In contrast to transit arrangements, peering arrangements only permit the exchange of traffic destined for customers of the peered networks, not for customers of a network to which the peered networks may be otherwise connected. The essential characteristic of peering relationships is reciprocity. Reciprocity does not necessarily require peering partners to be of equal size or to have the same number of customers. Rather, it requires that both network operators incur roughly comparable costs in routing and carrying each other's traffic. Thus, as may occur when a larger and smaller ISP agree to peer in a particular region, the peering arrangement will not usually require the larger ISP to agree to provide access to all its customers on a sender-keeps-all arrangement. Rather, the larger ISP will agree to open an approximately equivalent number of addresses as the smaller ISP opens to the larger ISP. In this way, the smaller ISP does not get a "free-ride" on the larger ISP's network.

Although no monetary payments are made or received in a pure peering relationship, peering has an implicit price (*i.e.*, the cost of providing the reciprocal service).²⁷² In addition, peering partners historically only have promised to undertake "best efforts" to terminate traffic, rather than guarantee a level of performance in delivering packets of received traffic. This is beginning to change as the public Internet matures (*see* Quality of Service discussion below).

There are two underlying types of peering relationships:

- public; and

²⁶⁸ There are differences between termination of Internet traffic and traffic on the PSTN, not least the implicit payment by end users to both send and receive traffic (rather than payment by the sender for traffic received by end users). These differences have knock-on implications for connectivity provision.

²⁶⁹ At paragraph 2.3 of Oftel's recent review of Internet connectivity, Oftel states that the topology of the Internet is such that the only operators able to provide access to the whole Internet without buying transit are the U.S. Tier 1 operators. This statement is, however, not supported by the evidence of which the Study Team is aware *i.e.*, that many U.S. Tier 1 operators acquire connectivity through transit for a range of countries.

²⁷⁰ For example, a European ISP interviewed by the Study Team noted that, in the three years to March 2000, transit prices had dropped by 90% and this pricing pressure is anticipated to continue.

²⁷¹ In the traditional telecoms environment, peering is referred to as a "bill and keep" relationship, which is often found in the *United States*, largely because: (i) the liberalisation of the sector is still a relatively new phenomenon in Europe; and (ii) the imposition of a mandatory cost-orientation model across the EU for interconnection has made it difficult for operators to conclude such agreements.

²⁷² There is, however, a hybrid form of connectivity known as "paid peering", which is becoming increasingly popular.

- private.

Public peering occurs at public peering points, or so-called Network Access Points (NAPs, also known as Metropolitan Area Exchanges (MAEs) in the *United States*), where a number of networks exchange traffic. NAPs are geographically dispersed and peering partners use “hot-potato routing” to pass traffic to each other at the earliest point of exchange. Private peering differs from public peering to the extent that it occurs at a point agreed by the two interconnecting network operators.

Private peering may have developed partly in response to traffic congestion at the NAPs, and because private peering is often more cost-effective for the operators involved (*e.g.*, for traffic originating and terminating in the same city but on different networks, there is no need for the traffic to be carried elsewhere to a NAP to be handed-off).²⁷³ The Study Team’s empirical analysis suggests that the bulk of all exchanged Internet traffic in the EU is now exchanged through private peering. The same percentage of Internet traffic was estimated to have been exchanged through private peering in the *United States* just a few years ago.²⁷⁴

There are reasons to believe, however, that private peering will not render the centralised model used by NAPs obsolete. First, while public peering points have suffered quality of service problems in the past, this appears to be improving with recent liberalisation measures and the introduction of amendments in the routing protocol (BGP4). Moreover, the switching of NAPs to advanced switching technologies may have also contributed to this improvement. Second, a network structure of point-to-point bilateral connections (*i.e.*, private peering) does not have good scaling qualities. By contrast, a centralised model with multiple interconnection points requires fewer circuits, thereby improving scalability and reducing costs.

In order to reduce the (infrastructure) costs of connecting directly with every other core ISP peers in several places in the US, a new NAP type model is now being deployed. There are already four sites in use, and eight are planned. No one is excluded from interconnecting at these points. The Study Team understands that large content providers like Yahoo are likely to connect to two, three or four IBPs at these locations and to switch traffic between them through the use of their own routers.

Peering can take place between any combination of so-called “backbone” operators and between local and regional ISPs. Peering between the latter types of operators is known as “**secondary peering**” and has increasingly become an important means of acquiring

²⁷³ “The Digital Handshake: Connecting Internet Backbones”, Michael Kende, OPP Working Paper No. 32, p. 6.

²⁷⁴ Michael Gaddis, CTO of SAVVIS Communications in “ISP Survival Guide”, [inter@active](#) week online, 7 December 1998.

connectivity for local and regional European ISPs.²⁷⁵ It enables these smaller ISPs to access end users and content and application service providers' services of similarly-situated ISPs.²⁷⁶ The growth of secondary peering has prompted the emergence of a new class of "connectivity aggregators", whose function is to combine the traffic of smaller ISPs acquiring connectivity from larger ISPs. These very important and fairly recent developments in secondary peering (and multi-homing) can be largely explained by fairly recent amendments to the BGP4 routing standard, which has made the alternatives to hierarchical routing "drastically cheaper" than they were previously.²⁷⁷

Transit and peering are differentiated in two main ways. First, in a transit arrangement, one connectivity provider pays another for interconnection. Second, unlike a peering relationship, the connectivity provider selling transit services will route traffic from the transit customer to its peering partners.

It should be emphasised that, to the best of the knowledge of the Study Team, no ISP acquires connectivity either entirely through self-provision or through a single peering or transit arrangement. They enter into multiple arrangements (both transit and peering) with different network operators to secure access to the customers of their peering partners and to the networks and peering partners of their transit suppliers.

(ii) *Quality of Service*

Quality of service is becoming an increasingly important demand-side driver in the acquisition of Internet connectivity. In the year 2000, the Commission noted that service level agreements were offered as a distinguishing feature of WorldCom's (UUNet) service.²⁷⁸ By September 2000, C&W and AT&T had also begun to offer service level commitments. Service level agreements typically guarantee a minimum latency, availability, packet loss rate, fault repair times and, increasingly, automatic credits to the relevant ISP's account for the breach of these commitments. The submissions from Internet connectivity providers to the Study Team indicate that quality of service is becoming increasingly important in the price/quality trade-offs made by ISPs.²⁷⁹

²⁷⁵ For example, entities such as AboveNet, Digital Island, InterNAP and SAVVIS peer with hundreds of regional providers. AboveNet, the architect of the global one-stop Internet Service Exchange™ (a network delivering connectivity and collocation for high-bandwidth, "mission critical" applications) has more than 420 peering relationships. See also the 17 May 2001 announcement of a peering arrangement at a peering point in London by Jazztel, Completel, Song Networks and Versatel Telecom. The combined networks cover eleven Member States, using a 15,000 kilometre backbone and 6,100 kilometres of local access extensions. See "Jazztel: Leading European Alternative Carriers Form Internet Peering and Interconnection Partnership", Press Item, 17 May 2001 (<http://www.jazztel.com/eng/prensa/notas/971507.htm>). The companies intend to add additional peering points in other European cities. Similarly, Data Telecom considers that its IP network competes with those of the large number of carriers who operate between the IP hubs of Europe.

²⁷⁶ In this context, it should be noted that Oftel's approach, which speaks of the "... many interconnected IP networks ... known as Internet backbone networks...", by implication acknowledges that regional networks are also "backbone" networks. However, without any further qualification, Oftel goes on to omit such networks from its market definition by focusing its review on large U.S. Tier 1 providers.

²⁷⁷ See Besen, Milgrom, Mitchell and Srinagesh (2001), "Advances in routing technologies and internet peering agreements", *American Economic Review*, Papers and Proceedings, Vol. 91(2): 292-296.

²⁷⁸ See *MCI WorldCom/Sprint*, para. 28.

²⁷⁹ We are told that latency guarantees of 100% are the industry norm, even though it is not possible to meet this, and IBPs must therefore make occasional compensatory payments to their customers.

The advent of alternative content delivery networks (*see* below) has also meant that, by bringing content closer to end users, quality of service can be improved. By using such networks, ISPs are substituting away from transit and connectivity with U.S. Tier 1 ISPs. In addition, content delivery networks also provide a means to reduce the number of hops traversed by packets. As such, they are a way addressing the quality issues that the Commission has raised in connection with the number of “hops” traversed by Internet communications.²⁸⁰

The Study Team also understands that round trip times for packets traversing a particular number of hops have also been reduced as a result of the new BGP4 protocol. Indeed, when congestion, accidents and outages inevitably occur, multi-homing improves average service quality for end users.²⁸¹

(iii) *Price*

Large ISPs that provide transit services are competing on both price and quality. It is difficult to conduct any empirical analysis of pricing given that the terms of peering agreements are ordinarily subject to confidentiality and non-disclosure obligations, and because prices are likely to be negatively correlated to QoS standards such that both would have to be analysed in combination. It should be recalled that the cost of peering (which is essentially a barter relationship)²⁸² to each party is an amount equivalent to the cost of terminating and/or originating traffic for the peering partner. Other values are also relevant when ISPs are considering whether or not to peer, including the number of addresses available on each others’ network, and expected monthly traffic loads. As such, even if contract terms were publicly available, “price” would not be transparent and, in any event, would vary on an operator-by-operator basis.

Moreover, it should be noted that despite the increasing commercialisation of the Internet and the attempt of a number of “backbone” providers of late to formalise their peering practices,²⁸³ pricing is still largely about impressions of value.²⁸⁴ There is no formalised model known which can measure the values involved.

The ability of core ISPs to extract a premium for interconnection as a result of their position at the top of the network hierarchy has been reduced as secondary peering has increased. Indeed, in their recent paper in the *American Economic Review*, Besen *et al.* (2001) state that

²⁸⁰ In this context, the events of 11 September 2001 have led a number of companies to review the geographic dispersal of their Internet operations, realising that basing all of their operations in one country was an inherently unreliable strategy. For example, Zentek International has noted that it has acquired a number of new webhosting and dedicated server hosting clients in Asia.

²⁸¹ “Multi-homing” refers to the situation where an ISP buys transit from two or more providers and thereby has multiple “upstream” providers. Generally, ISPs multi-home in order to ensure connectivity to the Internet when one connection is disrupted and have the capability of routing traffic to any particular destination over connections that offer better service.

²⁸² Paid peering arrangements are, clearly, also not the subject of such barter arrangements.

²⁸³ Refer to public peering policy statements of C&W and WorldCom, respectively, at http://www.cw.com/th_05.asp?ID=US_10_02 and <http://www2.uu.net/peering/>.

²⁸⁴ In this regard, *see* WIK’s study for DG Information Society, entitled, “Study on the economics of IP networks – market, technical and policy issues relating to internet backbone services”.

*“[i]ncreases in the extent of secondary peering are similar to reductions in the market share of a dominant core ISP.”*²⁸⁵

Transit prices have declined significantly over the past three years.²⁸⁶ This decrease appears to be due to a number of factors, including reductions in prices of leased lines (that are used by many transit providers), commercial and technological developments allowing increased transit competition between Tier 1 providers and ISPs, and solutions that move content to the “edges of the Internet”. Indeed, Oftel has confirmed that prices seem to have reduced substantially recently. It considers that costs are likely to fall as new technologies and economies of scale are exploited. It concludes that active price competition, supported by the low cost of acquiring information on prices in trading exchanges, suggests that excess profits can be competed away rapidly and that prices are around the competitive level.²⁸⁷

b. Supply-side Analysis

From the supply-side, Tier 1 ISPs appear to face increasing competitive pressures from firms not considered part of the core backbone. The competing services include: secondary peering, transit competition from Tier 2 ISPs, and various services that move content to the “edges of the Internet”. These services do appear to have significantly reduced the reliance of regional and national ISPs on connectivity to top-level ISPs and, this being the case, would be likely to influence market boundaries. It appears to the Study Team that there is a very real possibility that empirical research would confirm that this competition is sufficient to form a “chain of substitute services” and thus put them in the same relevant product market as transit services provided by US Tier 1 ISPs. In this regard, the proportion of Internet traffic that traverses the Atlantic has apparently been declining for several years, with at least one U.S.-based provider of backbone services in Europe claiming to send 30% less traffic to the United States today than it did two years ago. In addition, Telegeography recently identified London, Amsterdam and Paris as three of the world's four biggest Internet cities.²⁸⁸

(i) Content Delivery and Distribution Technologies

In at least one fundamental respect, the Internet differs from the traditional telecoms network connectivity model of connecting two geographically distant users. It allows end users and ISPs to “pull” information closer to them and content providers to “push” information closer to end users (and the ISPs that serve them), rather than the traditional two-way real time communications of the switched telecoms world. As such, end users, content providers and ISPs have it in their power to reduce the geographic distance (and the number of networks) that separate them. This is made possible by the nature of traffic on the Internet, and the fact that Internet ‘connections’ are defined statistically rather than in terms of circuits (as occurs with traditional voice telecoms). There are essentially three “types” of Internet traffic (the first two of which account for what is calculated to be more than 90% of all traffic):

²⁸⁵ See Besen, Milgrom, Mitchell and Srinagesh (2001), “Advances in routing technologies and internet peering agreements”, *American Economic Review*, Papers and Proceedings, Vol. 91(2): 295.

²⁸⁶ In Oftel’s current review of Internet connectivity, it notes (at paragraph 3.14) that 45 Mbps transit prices at the Band-X London exchange more than halved between November 2000 and June 2001.

²⁸⁷ Paragraph 3.16 of “Effective Competition Review of Internet Connectivity”, Oftel, 31 August 2001.

²⁸⁸ “Surprising shift in Net traffic routes – European cities are now world’s Internet backbone”, FTMarketWatch, 7 November 2001.

- (1) stored traffic (including web pages, email, MP3, audio and video streaming, dynamic backgrounds and newsgroups);
- (2) one-to-many traffic (including audio and video broadcasting); and
- (3) real-time interactive traffic (including chat, Internet telephony and video conferencing).

As such, approximately 90% of Internet traffic involves the distribution or retrieval of “stored” information. Memory and processing techniques allow ISPs to move this stored information to regions so that requests for the information can be satisfied without going to the site of the actual content provider, who may be located in another continent. Three techniques are used to achieve this:

- (1) caching;
- (2) mirroring; and
- (3) content delivery networks (which combine elements of caching and mirroring).

A **cache** is a network computer that intercepts requests from end users to “objects” (such as web pages) that are located on other networks. The cache retrieves the requested content and then stores it, in case the object is requested again by the same or other end users on the same or proximate networks. If the cache already contains the requested object, it will recognise that fact and deliver the object from its store to the ISP serving the requesting end user (without the request going any further).²⁸⁹ Pre-fetching caches do not need to wait for requests, being programmed to download content regularly from a distant website in anticipation of requests. The reduction in inter-network traffic that results from caching is significant. There is a significant body of evidence that caching is now widely used by content providers.²⁹⁰

Mirroring is very similar in its effect to caching, but is used with respect to information that requires more regular updating. Effectively, an ISP copies distant content that is, or will be, repeatedly requested and stores it on servers that are located closer to end users, thereby “mirroring” the content available on the distant server (again, reducing the amount of inter-network traffic). The content of the mirrored sites is updated frequently in order to ensure that it is current. This technique does not entirely eliminate inter-network traffic, since upgrades must generally be performed across networks. Mirroring is becoming increasingly widespread in Europe and is being used especially to store content of U.S. origin that is often accessed by European consumers.

Content delivery networks (CDNs) operate by locating caches, mirrors or similar devices on multiple networks in diverse geographical locations. They evolved in 1999 to “...address the fact that the internet is not designed to handle large transmissions of web content over long distances”.²⁹¹ There are two slightly different types of CDNs. The first, “content-centric” CDNs, are used by content providers to accelerate delivery of their content in order to please end users and prevent them from defecting to competitors.²⁹² The customers of these type of CDNs are content providers (rather than ISPs). Content-centric CDNs proactively replicate at their servers and deliver the content that the content providers specify (generally popular or

²⁸⁹ More sophisticated caching techniques, such as satellite caching/content distribution, are being used by entities such as Edgix and Cidera. These services use very large caches placed in ISP networks that are connected to satellite networks. When one cache stores a new object, a copy of it is transmitted over the satellite network to all other caches.

²⁹⁰ The input of one large ISP to this Study has confirmed that it makes extensive use of caches.

²⁹¹ Business Communications Review International, May 2001, p. 52.

²⁹² Akamai, Digital Island and Speedera are “content-centric” CDN providers.

bandwidth-intensive content) from caching servers that are co-located in data centres. They then provide their content provider customers with software that redirects requests for their content to the CDN server that is either closest to the requesting end user or best able to deliver the content most quickly to the end user. In some cases, hosting providers resell CDN services and receive a share of revenues. Access ISPs and backbone carriers do not receive a share of the revenue, even though they carry the content to the end user. “Access-centric” CDNs²⁹³ are paid by ISPs to provide popular content from caches close to the ISPs' subscribers. By caching frequently-accessed content near users (regardless of who owns the content), access ISPs can reduce significantly the bandwidth that they use. In addition, the provision of popular content faster assists ISPs to retain their customers. All CDNs reduce inter-network traffic by moving the “location” of the content onto the networks of end users. The content on CDNs is selected by the content provider (*i.e.*, it is “pushed” to the edges of the Internet rather than being “pulled” by end user requests).

Clearly, caching, mirroring or CDNs are not perfect substitutes in all cases for connectivity, because these techniques cannot be used for certain types of Internet traffic and they do not remove the need for backbone connectivity in the delivery of the remainder of the traffic that has not been shifted to the Internet's edges.²⁹⁴ However, according to a recent joint study by JP Morgan H&Q and McKinsey, almost half of Internet backbone traffic is expected to flow through “edge aggregation points” by the year 2005.²⁹⁵

(ii) *Standards*

The Internet operates on the basis of open public standards. The process for developing, adopting and revising standards is elaborate and transparent, with safeguards to perpetuate the open nature of the Internet. The IETF (Internet Engineering Task Force), the primary body responsible for standards governing the transfer of information across the Internet, represents consumer and industry interests. The Commission recently confirmed the open nature of the Internet standards-setting process and the critical role of the IETF and other regional and international bodies in maintaining open standards and reasserted its commitment to ensure that the “...existing neutrality of Internet specifications between alternative operating systems and other platforms is maintained and enhanced, particularly in view of the growing interest on the part of users in Open Software.”²⁹⁶

(iii) *Geographic Scope*

In *WorldCom/MCI* and *MCI WorldCom/Sprint*, the Commission defined the geographic scope of the relevant market as global.²⁹⁷ However, the Commission's analysis in both Decisions centred on backbone networks based in the *United States*. In its analyses, the Commission neither considered Internet backbones in the European or Asian regions to be relevant to the

²⁹³ Degix, Orblinx and Skyserv are “access-centric” CDN providers.

²⁹⁴ Indeed, more recently, providers of Internet ‘backbone’ services have themselves sought to extend the quality of their connectivity through their own deployment of CDNs.

²⁹⁵ See “The Enemies of access: Hackers grab the headlines. But Infrastructure weakness may be a bigger threat to the net”, FT.com, 24 July 2000, at: <http://news.ft.com/ft/gx.cgi/ftc?pagename=View&c=Article&cid=FT3M6BPXJPC>

²⁹⁶ Communication from the Commission to the Council and the European Parliament, The Organisation and Management of the Internet, International and European Policy Issues 1998-2000, COM(2000)202, para. 4.1.

²⁹⁷ See *WorldCom/MCI*, para. 82; *MCI WorldCom/Sprint*, para. 97.

issue of market definition or market power, nor sought to consider market power issues in the broader context of all of these regions combined.

It is clear that an increasing volume of Internet traffic that originates in the EU no longer requires access to Internet networks based in the *United States*. Network capacity in the EU is now such that traffic originating in the EU and terminated in the same or another Member States is much less frequently routed through the *United States*.²⁹⁸ Improvements in cost, technology, competition and capacity (largely as a result of the success of liberalisation in the EU)²⁹⁹ have enabled other options to substitute for such routing practices.³⁰⁰ For example, almost 50% of the traffic travelling across Deutsche Telekom's Internet backbone is not handed off to an "extra European" network. The result is that Internet end users across the EU are becoming less dependent on U.S.-housed content.³⁰¹ Member State websites are beginning to rival U.S. sites in the tables of "number of hits", and caching, mirroring and other alternative delivery networks are making much U.S.-generated content accessible on EU-based Internet networks, without any need to access a site physically located in the United States on a U.S.-based Internet network.³⁰²

Nevertheless, top-tier ISPs based in the *United States* are still the only source for full routing capability.³⁰³ Moreover, in regions that do not have an ISP with a full routing table, traffic originating and terminating in the region and having no out-of-region content may still be routed through the *United States*. Connectivity with a U.S.-based network will also remain

²⁹⁸ Telegeography 2002, cited in "Surprising shift in Net traffic routes – European cities are now world's Internet backbone", FTMarketWatch, 7 November 2001.

²⁹⁹ Prices for leased lines have dropped significantly in the last few years, but may still be substantially higher in many EU Member States than they are in the *United States*. However, complex comparability problems mean that simple price comparisons have little merit. These issues are discussed in detail in WIK's report to the Commission in 2000 that was part of DG InfoSociety's Sectoral Enquiry.

³⁰⁰ For much of the 1990s, purely regional traffic tended to go through the *United States* because, among other reasons, the *United States* was where the networks historically went, was where most full routing tables were found, and the quality of service obtained by sending the traffic on *United States* backbones was significantly better than could be obtained over alternatives networks.

³⁰¹ Thus, the *United Kingdom* and *Germany* host almost 10% of worldwide content, respectively; both *France* and *The Netherlands* host approximately 3% of worldwide content, respectively. Cerba Mathew Zoot, Internet Software Concession 2000.

³⁰² At paragraphs 2.15 to 2.20 of its review of effective competition in Internet connectivity, Oftel has taken an initial view that it is possible to identify a separate U.K. geographic market for Internet connectivity (defined as Internet connectivity provided via interconnection with an Internet backbone within the U.K.). It notes that ISPs with an Internet backbone within the U.K. may buy connectivity within the U.K., elsewhere in Europe and in the U.S. It then notes the low cost of Internet connectivity in the U.K. (making it comparable with or cheaper than other major European cities), and refers to the cost of international capacity from London to those of Internet connectivity. Oftel concludes that U.K. ISPs wishing to purchase connectivity outside the U.K. face a substantial additional cost for international connectivity. However, it is not clear how Oftel reconciles these findings with its conclusions relating to a "glut of bandwidth" across Europe, putting downward pressure on prices for many carrier services (at paragraph 3.14 of the same document). Nor is there any discussion of the pricing pressure exerted by trans-Atlantic carriage coupled with interconnection in the U.S.

³⁰³ Full routing capability is the intermediate output that enables ISPs to provide the full range of services to end users. In the historical vertical routing hierarchy, full routing tables are situated with top-level ISPs. This economises on transaction and routing costs and avoids the need for all ISPs to peer with each other, which is beyond the financial resources of most existing ISPs. Instead, smaller ISPs do not provide full routing tables themselves but rely on transit arrangements with top-level ISPs. Developments in routing standards, while arguably not fundamentally changing the vertical hierarchical structure of the Internet, have undermined the position of top-level ISPs to an extent and have substantially reduced competition concerns.

important so long as end users demand access to English language content.³⁰⁴ In addition, the provision of e-mail and similar services requires ISPs to have truly global connectivity.³⁰⁵

c. Competitive Dynamics

In order to assess the extent to which Internet connectivity is susceptible to any enduring market failure which might require *ex ante* regulation, the dynamics of the competitive space in which Internet connectivity relationships are concluded needs to be evaluated in terms of:

- relevant market maturity;
- growth and change in market shares;
- barriers to entry; and
- the existence and possibilities of churn.

(i) Market Maturity

Since 1995, the Internet has experienced unprecedented growth and, despite speculation by some observers, “is not shrinking, nor does it appear to be slowing yet in growth.”³⁰⁶ Indeed, analysts estimate that IP traffic is growing annually by over 300% in both Europe and the United States³⁰⁷ and that the rise in peak Internet backbone traffic (an indicator of the capacity required in the networks) year-on-year is growing tenfold annually. In North America alone, it is anticipated that peak Internet backbone traffic will reach 5.6 Tbps in 2001 and will grow to 73.3 Tbps in 2002.³⁰⁸

Not surprisingly, this level of growth (and expectations of even greater future growth) in Internet backbone traffic has been matched by a large increase in the number of Internet backbone networks around the world. For example, *Boardwatch* identified 48 networks with hubs in at least five U.S. States, spanning both coasts and peering at the major NAPs.³⁰⁹ Moreover, Caspian Networks identified in August 2001 as many as 19 tier 1 ISPs in the United States.³¹⁰ In addition, there are now 15 pan-European Internet networks in Europe,³¹¹ and competition among these networks has resulted in a substantial drop in backbone prices in Europe over the past five years. The increase in the number of networks has been facilitated by dramatic increases in the availability of fibre optic capacity (both through upgrades to, and augmentation of, existing networks and the development of completely new IP-based networks).

As a result of the increasing competition for Internet backbone traffic, the average offer price per MBits per year dropped over tenfold between 1995 and 2000 and the average offer price

³⁰⁴ For example, consideration should be given to the English, Portuguese and Spanish language connections between Europe, Asia and the Americas.

³⁰⁵ See “US Internet IP Traffic Growth”, Caspian Networks, 15 August 2001.

³⁰⁶ See “U.S. Internet IP Traffic Growth”, Caspian Networks, 15 August 2001. The Report further concluded that much of the recent growth in Internet traffic is from corporations moving from private networks to the Internet.

³⁰⁷ “All change”, Roy Rubenstein, Communications Week International, 5 February 2001.

³⁰⁸ RHK Inc, quoted in Communications Week International, 5 February 2001.

³⁰⁹ Boardwatch Magazine's Directory of Internet Service Providers, 1999.

³¹⁰ “U.S. Internet IP Traffic Growth”, Caspian Networks, 15 August 2001.

³¹¹ *Ibid.*

during 2000-2001 was nearly 200 times higher than the lowest offer price during that period.³¹²

This extraordinary growth is the result of collective migration to IP networks (*i.e.*, entities moving to packet data as soon as possible), with increased fibre deployment. Increasing PC penetration in Europe and further telecoms liberalisation across the world, increasing direct and indirect network effects, coupled with the future deployment of UMTS and the growth in broadband content, means that the volume of traffic on the Internet is still very much in its formative stages, with its potential for growth being significant.

(ii) *Market Shares*

It is extremely difficult to identify an appropriate manner in which to quantify the absolute size of the Internet connectivity market, or the narrower market known as U.S. tier 1 ISP services, let alone the relative shares of the entities operating on either of such markets. End user revenues are a crude proxy, but where we are interested in wholesale services, they would appear to be less than useful. In terms of the alternative very narrow market definition (US tier 1 ISP services) traffic sent or received (in terabits) per month will provide one measure of market share. Total transit revenues per month will also provide a form of market share measure, assuming that peered traffic cancels each other out. There is no meaningful way of placing a revenue value on Internet connectivity *per se*, given the inherent “barter” quality of peering. It is also technically very difficult to determine the amount of traffic being exchanged between operators, since it requires *inter alia* the adoption of uniform measurement methodologies, accommodation for systems that “count” traffic in different ways, the collection of representative samples, a means of quantifying the traffic being replaced by caches and mirrors that facilitate local delivery of content, and the inclusion of traffic that is not exchanged (*i.e.*, where the operators provide their own connectivity, for “on net” traffic). It is not therefore surprising that an accurate and widely agreed upon method for measuring absolute market size has not yet been developed.

The Commission has attempted to calculate market shares on a number of occasions.³¹³ The methodologies adopted have not addressed the problems raised above, and have always cited alternative market share measurements with large ranges. However, the Commission's calculations showed that the market shares of the largest “top-tier” providers shrunk by approximately 10% between 1998 and 2000 (at either end of the range of shares calculated),³¹⁴ while smaller providers increased their shares and new entities had entered the market. The market shares calculated by the Commission show relatively unstable market shares for the larger connectivity providers.

d. *Barriers to Entry*

The Commission has identified the fact that peering is only available on the satisfaction of certain conditions (e.g., the need to have a sufficient number of customers, volume of traffic, and points of presence across the *United States*) as a barrier to entry.³¹⁵ While it is true that

³¹² See “Traffic Exchange: Global Networks”, presented by Richard Cawley, European Commission, at the OECD Workshop on Internet Traffic Exchange, Berlin 7-8 June 2001. Available at <http://www.oecd.org/dsti/sti/it/cm/index.htm>.

³¹³ See *WorldCom/MCI*, paras. 84-114; *MCI WorldCom/Sprint*, paras. 103-123.

³¹⁴ See *MCI WorldCom/Sprint*, paras. 103-123.

³¹⁵ See *MCI WorldCom/Sprint*, paras. 57, 141, 165 and 178-179.

conditions designed to maintain the roughly comparable costs in routing and carrying the exchanged traffic are imposed, these may in fact be efficiency-enhancing.³¹⁶ The conditions imposed by different providers are never exactly the same. In addition, the “reciprocity” principle that drives peering means that smaller providers can peer with each other. It is peering among such operators that has driven the growth in secondary and regional peering, which in turn has led to the aggregation of traffic by certain operators which can serve as the basis for even broader peering relationships. In addition, the focus on peering conditions ignores the availability of transit arrangements and the reduced reliance on connectivity that has resulted from the increased use of caching, mirroring and other alternative delivery mechanisms. In the view of the Study Team, barriers to entry are low and, although it appears that there are economies of scale which assist in entering into some peering arrangements, these do not constitute barriers to entry (for the reasons discussed above).

In the view of the Study Team, one of the only barriers to entry has been the high pricing of international leased lines,³¹⁷ which form the key building block for backbone providers. Even a large Internet backbone provider such as WorldCom bases its Internet network primarily on leased lines, rather than its own dedicated infrastructure. While barriers to entry are present in the form of significant sunk costs, they do not preclude entry, as is illustrated by Sprint’s recent deployment of a pan-European backbone in a matter of a few months at relatively little cost³¹⁸ and Verizon’s much publicised plan to spend \$1 billion over five years to assemble an international communications network around the world, including Europe, where it will buy unused network capacity from other carriers in six markets.³¹⁹ In the *United States*, regulatory restrictions on the RBOCs entering into long distance has limited the total number of market actors providing backbone services. However, RBOCs in principal have the ability to provide such services if they open up their local area markets to competition in accordance with the criteria set forth under the *Telecommunications Act*.³²⁰ In addition, to the extent that an RBOC is merely reselling the “interstate” portion of the connectivity for a customer, it is arguable that it can overcome the restriction on an RBOC providing long distance services.

d. Churn Costs

There is no evidence that ISPs cannot and do not switch connectivity providers.³²¹ In this context, the widespread use of “multi-homing” should be noted. Whether it is used by entities to provide back-up and redundancy or to maximise buyer control over a number of providers, multi-homing requires the maintenance of multiple connections, each of which is capable of carrying all of the multi-homed entity’s traffic. As such, multi-homing is illustrative of the low cost of actually establishing and maintaining multiple connections. In addition, its

³¹⁶ Theoretical insight obtained under quite conservative assumptions suggests that, due to supply-side substitution, incentives are such that peering standards may in practice be easier now than they were a few years ago.

³¹⁷ In this regard, refer to the Sectoral Inquiry on Leased Lines and the prosecutions regarding international leased line prices which arose therefrom. See Working Document on the initial results of the Leased Lines Sector Inquiry, 8 September 2000.

³¹⁸ “Corporate Solutions: Sprint looks to consolidate European toehold,” *Total Telecom*, 18 April 2001.

³¹⁹ “Network Infrastructure: Verizon to spend US\$1 billion on global network”, *Total Telecom*, 7 February 2001.

³²⁰ Refer to Annex V on *United States*.

³²¹ Contracts, for example, are not long term, and there is no entrenched ‘first-mover’ there is growing empirical evidence that the ability of a backbone provides to keep its Internet traffic on-net is not related to market share.

widespread use to switch traffic between connectivity providers, to share traffic between connectivity providers and to split inbound and outbound traffic between providers, illustrates the lack of other “costs” associated with switching connectivity providers.

VI.3.B. Elements Capable of Narrowing or Broadening Market Definition

ISPs are keeping an increasing proportion of their total traffic requirements at a regional level. Their means of doing this include: secondary peering; caching; mirroring; CDNs, and in general the greater use of an increasingly meshed Internet network. For most if not all ISPs, however, there will be a large percentage of their traffic that will inevitably come from, or be handed over to, US Tier 1 ISPs. In order to delineate a relevant product market, one question which needs to be answered is whether a hypothetical US Tier 1 monopolist could discriminate between this ‘captured’ traffic and other traffic for which it competes with Tier 2 ISPs along with firms that move content closer to the edges of the Internet.

In delineating a relevant product market, we need to have a better understanding of where the market power concerns are centred, including the types of substitute services that are involved. The evidence suggests that a significantly lower proportion of total Internet traffic is passing at some stage over the core backbone than was the case a few years ago, even though the total amount of traffic is growing rapidly. It is not even necessary, however, for these events to have broadened the relevant product market, although it does appear likely. To come to a definitive decision about the dimensions of the market requires us to provide an answer to the following questions:

- Is the proportion of traffic that has substituted away from US Tier 1 ISPs and now remains within regions, something that Tier 1 ISPs could have done little to prevent, as the cost / QoS of the new substitute services are such that competition from a Tier 1 ISP hypothetical monopolist could not have significantly affected the outcome? If this were the case, there would be no (or little) margin where caches, CDNs *etc.*, compete with Tier 1 ISPs; *i.e.*, firms that move content to the edges of the Internet would not be in the same relevant product market for connectivity with Tier 1 ISPs. This would imply, however, that a hypothetical monopolist US Tier 1 ISP would have lost the share of the total Internet packets that Tier 1 ISPs have in fact lost,³²² whatever its competitive response, yet may still have been able to use its market power with respect to the remainder of its traffic to raise its transit prices.
- Do Tier 2 ISPs (*e.g.*, those ISPs with sufficient peering arrangements to have, say, 30%, 40% or 50% complete routing tables) compete with Tier 1 ISPs to transit and terminate traffic and, if they do, what level of competition do they provide? Is this competition such as to put them in the same relevant product market as Tier 1 ISPs? Perhaps more importantly, what is the degree to which a hypothetical Tier 1 monopolist could profitably raise transit prices in regions where Tier 2 ISPs were not present?
- Even if the substitution provided by “edge content providers” and Tier 2 ISPs is found to be inadequate to have them fall within the same relevant product market, substitution is frequently cumulative, as it would appear to be in this case, such that 2 (or more)

³²² Loss in market share does not, of course, necessarily imply that total packets handled by the Tier 1 ISPs has not increased.

inadequate substitutes can together provide a sufficient level of competitive pressure to require a broadening of the market definition.

These are all ultimately empirical questions. However, from our knowledge of this industry, we would be surprised to see results that showed other than a significant margin of competition between Tier 1 ISPs and Tier 2 ISPs, and Tier 1 ISPs and edge content providers. There is still, for example, a large proportion of traffic handed over from Tier 1 ISPs that could be housed closer to the edges of the Internet, and the impression of the Study Team is that Tier 1 ISPs are competing to try and retain this traffic.

Because the Commission has only reviewed the issue of international connectivity on the public Internet in the context of the *Merger Regulation*, its treatment of universal connectivity was assessed essentially in terms of connectivity of European ISPs to U.S. backbone providers. In the view of the Study Team, the relevant product market analysis should, for the purposes of an *ex ante* regulatory approach, be subject to a review of the following competitive dynamics:

- True “universal” connectivity should, in principle, entail access to all international websites, regardless of their physical location, and the primacy of the English language may even assist in this broadening of the scope of the relevant market (with many websites in the English language being housed in potentially large markets such as India).
- The connectivity sought, especially insofar as local content is developed and alternative content delivery mechanisms are deployed, might become increasingly regionalised, with access to U.S. backbones (or Asian backbones, for that matter) constituting a separate line of enquiry for regulators as to whether that route displays the elements of a relevant “market”. This regionalisation would also be facilitated by the growth in secondary peering that has already taken place.
- The growth in alternative connectivity relationships and the continued growth in alternative content delivery mechanisms may render the identification of a “top tier” of providers of Internet connectivity meaningless from a “relevant market” *ex ante* regulatory standpoint, yet nevertheless still relevant from the standpoint of assessing SMP in any relevant product market. Moreover, as alternative content delivery technologies become increasingly widely used and increasingly more effective, they have a large potential to reduce significantly any reliance of ISPs on any given backbone provider and, accordingly, the volume of interconnected traffic. As noted above, approximately 90% of current Internet traffic is of the one-to-many variety. If new services or types of content are developed, this classic traffic balance may alter significantly, with the substitutability of connectivity and connectivity bypass services being affected accordingly. It is not clear how soon or in what form such services will need to develop to have such an effect. However, it should be remembered that CDNs were only commercially developed in 1999.
- More sophisticated Protocols, which would develop the functionality already available with MPLS ISVP, will allow for a greater degree of traffic segmentation. Such segmentation is likely to evolve into another price/quality paradigm. It could fragment the market (*e.g.*, less expensive than non-guaranteed traffic, and premium priced guaranteed delivery). However, it is not clear exactly what, if any, effect any such segmentation would have on the scope of the relevant market analysis, since such segmentation could

occur in relation to all of the means of acquiring connectivity or by-passing the need for connectivity.

Conclusions:

1. The various forms of peering and transit that are currently available appear to form part of the relevant wholesale market for Internet connectivity.
2. Caching, mirroring and content delivery networks are mechanisms that relocate many types of content closer to end users, thereby significantly reducing the reliance on connectivity of ISPs providing service to these end users.
3. The ability of a hypothetical monopolist U.S. Tier 1 provider to sustain a small but significant increase in price appears to be constrained by substitutes which include secondary peering, transit through Tier 2 ISPs, and services that move content from the core to the edges of the Internet (CDNs).
4. Even assuming the appropriateness of the narrow market definition put forward in *MCI WorldCom* and *WorldCom/Sprint*, namely, U.S. Tier 1 ISP services, there appear to be no significant competition concerns on this market that would warrant *ex ante* regulation.
5. The so-called U.S. Tier 1 ISP market, as with other Internet markets, has grown explosively over the last five years. Market shares have changed rapidly during that time. New providers have entered this market over the last three years.
6. The Study Team envisages that the relevant geographic market for the provision of Internet connectivity can have both a regional (*i.e.*, pan-European) or a global dimension. The geographic market definition utilised by the Commission in its existing administrative practice under the *Merger Regulation* might have some theoretical basis in an *ex-post* environment, depending on the impugned commercial practice in question, but does not appear to be appropriate in an *ex ante* examination of relevant markets.
7. The competitive space in which Internet connectivity providers compete in the EU does not appear to be characterised by any of the bottleneck tendencies flowing from network externalities which characterise other services, nor by problems of historical incumbency which are the basis for *ex ante* concerns in various downstream markets. Moreover, given that fundamental wholesale inputs for ISPs are already regulated in a way which lowers entry barriers (*e.g.*, leased lines, unbundled local loops), further *ex ante* regulation of Internet connectivity does not appear to be a proportionate regulatory initiative.