Network sharing in 3rd generation mobile telecommunications systems: mind the coverage gap and complying with EC competition rules

David GABATHULER, Directorate-General Competition, unit C-1 and Wolf SAUTER, formerly Directorate-General Competition, unit C-1

Introduction

In February 2002, T-Mobile and mmO2 notified two agreements that provided for the Parties to cooperate by way of network sharing in the build-out of their third generation (‘3G’) mobile telecommunications networks in the United Kingdom and Germany. The cases were considered as important precedents given the need to provide regulatory certainty in a fast developing but unsettled industry and therefore the Commission adopted two exemption decisions (¹) in April and July 2003 which set out how far mobile operators can cooperate through network sharing. This article describes the two agreements before going on to explain the Commission’s initial thinking on market definition in the 3G (²) mobile telecommunications environment and the competition issues raised by such cooperation.

Network sharing

Network sharing can be implemented at different levels of a mobile network. Ranked by the increasing degree to which the network is shared it is possible to distinguish between shared use of:

- sites, which ranges from sharing individual mast sites up to grid sharing (requiring a uniform layout of networks), and may include site support infrastructure, such as site support cabinets (‘SSC’);
- base stations [‘Nodes B’ (³)] and antennae;
- radio network controllers [‘RNCs’ (⁴)];
- core networks, including mobile switching centres [‘MSCs’ (⁵)] and various databases (⁶);
- frequencies.

Finally, national roaming concerns a situation where the operators concerned do not share any network elements but simply use each other’s networks to provide services to their own customers.

The Agreements: site sharing and national roaming

UK Agreement

T-Mobile and O2 UK divide the United Kingdom into three distinct areas: (i) the Initial Build Area (‘IBA’); (ii) the Divided Area (‘DA’); and (iii) the Remaining Area.

- In the IBA (i.e. urban areas covering about 30-50% (⁷) of the United Kingdom population), the Parties agree to site share (⁸) and to roam on each other’s respective networks where there are coverage gaps. The agreement also allows the Parties to look into more extended forms of site sharing (e.g. sharing antennae and Node Bs);
- In the DA (i.e. less populated urban areas as well as rural areas covering about 40-70% of the UK population), the Parties agree to site share on the basis of a common radio plan and roam


(²) 3G will provide transmission rates that have a maximum rate of up to 384 kbit/s (kilo bits per second) outdoors and possibly up to 2Mbs indoors – depending on the time and location of the call, the number of users within a cell and the applications used. Innovative multimedia services are expected to develop, such as mobile videoconferencing, mobile video/phone mail and various B2B applications.

(³) Nodes B receive and send data across frequencies and control a particular network cell.

(⁴) RNCs each control a number of Nodes B and are linked to the core network.

(⁵) MSC stores information about subscriber location and is responsible for directing calls to them.

(⁶) The core network is the intelligent part of the network that consists of MSCs, various support nodes, services platforms, client home location registers and operation and maintenance centres.

(⁷) Population ranges are provided due to the confidentiality of the exact figures.

(⁸) Sharing mast, site support cabinets, power supply, racking and cooling but not transmission equipment or antennae.
on each other’s networks. Each Party is responsible for rolling-out the network in a particular geographic area but not on an exclusive basis;

• In the Remaining Area (i.e. remote areas covering the remaining UK population), the Parties agree to roll-out their networks on the same basis as in the DA when market conditions allow.

The agreement also provides for each Party to benefit from some limited exclusivity over the sites of the other Party for a limited number of years.

The Agreement was amended in March 2003 and the IBA was subdivided into:

• a ‘core area’ consisting of 10 top cities in the United Kingdom covering approximately 32-38% of the population where both parties will separately roll-out their networks; (1) and

• a ‘residual area’ consisting of a further 13 cities covering less than 10% of the United Kingdom population where each Party is allocated a number of cities in which to roll-out the network (2).

German Agreement

T-Mobile and O2 Germany divide Germany into two areas each comprising around 50% of the German population. The primary area covers the most populated cities and regions and broadly corresponds to the area which each Party must separately cover by 31 December 2005 as part of its licence conditions. The secondary area covers the less populated urban areas as well as rural areas and remote parts of Germany where there is no regulatory coverage requirement.

The Agreement provides for the following cooperation:

• extended site sharing (3) within the primary area;

• RAN sharing (4) within the primary area;

• national roaming by O2 T-Mobile network across the primary area;

• reciprocal roaming by both parties on each others network in the secondary area.

The German agreement also contains a restriction preventing the resale of the other Party’s national roaming capacity to Mobile Virtual Network Operators (‘MVNOs’) (6) if such capacity is to be used for the provision of voice or voice-like services.

Market definition in 3G

The Commission’s analysis provides the first insight into how competition authorities may view market definition in mobile telecommunications markets in the new 3G environment. The Commission found that there are two directly affected markets in both cases. First, the market for sites and site infrastructure for digital mobile radio-communications equipment and secondly, the market for wholesale access to national roaming for 3G communications services. Markets for wholesale access to 3G services as well as downstream retail markets for 3G services are also affected albeit indirectly. However it is the possibility of defining separate markets for 3G services that is of most interest.

The Commission in its case law has not to date defined separate markets for 2G, 2.5G and 3G retail services nor distinguished between mobile voice services and mobile data services. However, the development of innovative and advanced services using 3G network capability may change this since 2G and 2.5G services are unlikely to be effective substitutes (7).

It is anticipated that ‘rich voice (services) over 3G networks’ may develop that consist of voice services integrated with data services such as consumer videophones and multimedia conferencing that go beyond the capability of 2G and 2.5G networks. It is therefore possible that distinct retail market for 3G enriched voice services – beyond

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(1) Greater London, Birmingham, Manchester, Glasgow, Leeds, Edinburgh, Liverpool, Nottingham, Newcastle and Bristol.
(2) Sheffield, Leicester, Brighton, Northampton, Cambridge, Southampton, Cardiff, Belfast, Coventry, York, Preston, Stoke-on-Trent and Oxford.
(3) Sharing mast, site support cabinets, power supply and possibly antennae, combiners and transmission links.
(4) Sharing Nodes B and RNCs but to conform with the German regulatory regime, they would need to be logically separate.
(5) The Agreement initially provided for roaming to be provided on a reciprocal basis only in the secondary area. The Agreement was modified to allow O2 Germany to roam on T-Mobile’s network (but not vice versa) in the primary area.
(6) MVNOs have their own mobile network code and an own range of mobile IMSI numbers, as well as a user numbering range, but that do not have a licence to operate wireless frequencies nor own any substantial network infrastructure. Their cost base and risk are by definition much lower than those of network operators as they do not have significant investments in network equipment.
(7) Any substitution is likely to be one-way, that is to say customers will substitute 3G services for 2G or 2.5G services but not vice versa.
simple 2G and 3G voice – will develop or indeed that 3G (rich) voice and data services will merge into a single market.

As regards data services, there is expected to be some overlap between 2.5G and 3G data services as 2.5G allows, for example, mobile e-mail, multimedia messaging and continuous Internet access, but it does not have sufficient data transmission rates to provide the high-end of data services that are expected to emerge on 3G networks. It therefore appears that there may be an emerging market for the provision of 3G mobile data services. The position is further complicated, however, by the development of other technologies such as wireless local area network services (WLAN) that allow limited mobility within a circumscribed area (1). As a result, the distinction between fixed and mobile data services may break down and instead of a separate market for 3G data services, a market for broadband wireless data communications may emerge.

**Competition restrictions**

The Commission’s analysis focuses on the two principal forms of cooperation, namely site sharing and national roaming.

Site sharing between mobile operators was found not to restrict competition in either of the cases: the cooperation extends only to basic network elements and the Parties retain independent control of their core networks including all intelligent parts of the network and the service platforms that determine the nature and range of services provided. Although more in-depth cooperation such as RAN sharing (Nodes B and RNC) could raise greater concerns, this was not specifically addressed since the Parties were not planning to implement the technology in the foreseeable future. Site sharing was also considered beneficial for environmental and health reasons.

National roaming between mobile operators was found to restrict competition at the wholesale level with potential harmful effects in downstream retail markets. (2) First, the extremely high if not absolute barriers to entry at the network level due to frequency scarcity, licensing requirements, and the level of investment prevent any form of new market entry. Second, roaming undermines infrastructure-based competition since it significantly limits competition on coverage, quality and transmission speeds. Third, it reduces the scope for price competition at services level since the operators face similar underlying costs and are limited to differentiating their customer offering on the basis of the services on offer, rather than on price or quality.

The Commission’s analysis of the competition issues raised by network sharing is also consistent with the regulatory position adopted by the United Kingdom and German regulators in their guidance notes (3).

As regards other potential restrictions:

- the limited exclusivity over sites in the UK agreement does not foreclose the market for third party operators since there is no general lack of sites and for particular problem areas there was a tailor-made regulatory solution in the Framework Directive (4);
- the restriction in the German agreement on reselling capacity to voice MVNOs is a resale restriction which could restrict output and limit price competition.

**Exemption**

National roaming allows operators to provide better coverage, quality and transmission rates for their services and within a shorter timeframe. In rural and particularly in remote areas, the economic incentives to roll-out a high quality network are low and national roaming can allow 3G services to be made available more quickly and enables the new technology to be much more widely accessed. It is therefore likely to be beneficial in the majority of cases provided the Parties retain the economic incentive to build out separate networks when the market for such services takes off. In urban areas, the economic incentives to build-out separate networks are high and competition between competitors will be critical in determining the competitiveness of the market. Roaming between established operators is therefore the exception rather than the rule and can only

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(1) The highest bandwidth 3G data services may be deliverable only under conditions of optimal coverage with very low or no mobility.

(2) In the German network sharing case, O2 Germany has lodged an application for annulment with the Court of First Instance (T-328/03) arguing inter alia that national roaming does not constitute a restriction of competition.


be justified for a limited period, such as to help promote competition during the initial roll-out phase of a network and the commercial launch and early take-up of 3G services.

In the two decisions, the Commission exempts roaming in rural areas until 31 December 2008. The markets affected by the restrictions are still emerging and it was not possible to evaluate their likely effects for a period much beyond five years.

In urban areas, the Commission’s position reflects the different market positions of the operators in the United Kingdom and Germany. In the United Kingdom, the Parties are both well-established operators and roaming is limited to the ‘residual area’ of the IBA covering less than 10% of the UK population until 31 December 2007. In Germany, O2 is the smallest operator in the 2G market with less than 10% share of the retail market and the roaming across urban areas allows it to launch better and earlier 3G services and thereby compete more effectively against the established operators. Roaming in urban areas is nonetheless to be phased out in accordance with a strict timetable by 31 December 2008.

As regards the restriction on resale of the other Party’s data capacity to MVNOs in the German agreement, the Parties provided calculations which show that without this provision they would not offer each other roaming capacity at all since the possible erosion of retail prices for voice services through the use of, for example voice over IP would wipe out any gains made from the agreement. This would therefore limit the opportunity for O2 Germany to be a strong nationwide competitor. This restriction was therefore exempted in these specific circumstances for a period commensurate with the exemption for roaming.

**Conclusion**

The two decisions provide clear guidance on what forms of network cooperation by mobile operators are compatible with the EC competition rules and helps operators plan how best to develop powerful network capability that will allow new and innovative content and applications to be launched. It is expected that further network sharing arrangements will be entered into by other EU operators in the future.