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ERG-RSPG Report on radio spectrum competition issues

ERG-RSPG report on the management of radio spectrum in order to avoid anticompetitive hoarding

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1. Introduction

A situation is emerging where the distinction between different infrastructure access methods is becoming less important given that similar electronic communication services can be provided over a number of different platforms. In many cases, there is no longer any fundamental difference between fixed and wireless networks when they offer similar services (or similar user experience despite differences in access methods).

Convergence, in infrastructure as well as services, digitalisation and technological advance, call for a new regulatory approach allowing more freedom for radio spectrum ("spectrum") users including service and technology neutrality and trading of spectrum usage rights. This will support innovation and competition through the provision of new and better services. But it requires convergence in policies and regulatory approach and a common view and approach between regulators. Market regulation and spectrum policy have to be discussed not only in parallel but together.

Many of the issues on the agenda for the Radio Spectrum Policy Group (RSPG) are directly or indirectly competition related and the reverse is also true, many of the issues on the European Regulators Group (ERG) agenda are spectrum related. Spectrum management and market regulation will increasingly intertwine in the future. Many policy and regulatory aspects related to a new, more flexible, approach would likely involve the ERG as well as the RSPG. This process leads to regulatory challenges and a number of questions that need to be answered. What tools are needed for regulators and spectrum management authorities tomorrow?

The origin of the request for this joint work of the ERG and the RSPG is the joint meeting between the RSPG and the ERG in Gothenburg, in early 2008. From the joint meeting the respective chairpersons of the RSPG and ERG took upon themselves the task of elaborating the potential areas of cooperation. The goal was to provide strategic guidance and advice on issues raised by sector specific regulation and spectrum management in order to ensure promotion of competition. To carry out this work a joint working group between the RSPG and the ERG was set up to produce a joint report focusing on the area of spectrum and competition aspects.

As a basis for discussion and in order to provide a starting point for the group's work on this report, a study was commissioned from Professor Martin Cave on Anticompetitive Behaviour in Spectrum Markets[1]. Prof. Cave's study provides a background to the issues and in some cases a more in-depth discussion on topics such as technical substitution possibilities and their relevance for spectrum markets and end user

[1] Link to Martin Cave's study

markets, the risks of hoarding in relation to several such markets, and the risks and advantages of different remedies. The study is available on the web sites of the ERG[2] and the RSPG.[3] A questionnaire was also sent out to national regulatory authorities and administrations regarding experiences with anticompetitive issues in spectrum management and how such issues have been taken into account.

Three other areas where further analyses were considered necessary were also identified – market definitions, transparency and risk of use of spectrum to establish a dominant position in markets. The joint working group will deal with these areas separately.

[2] www.erg.eu.int
[3] http://rspg.groups.eu.int/

2. Regulatory environment

The regulatory environment for the use of spectrum is extensive and complex. This report deals with competition issues arising from the transition towards more flexible spectrum management for Electronic Communications Networks and Services, focusing on ways to avoid possible anti-competitive use of spectrum.

In frequency bands already used or available for electronic communications services, where the technical conditions to use spectrum have been defined by a Commission Decision under the current Radio Spectrum Decision process or in other bands, individual authorisation of spectrum at a national level can lead to potential competition issues. Due to different national contexts within the markets affected by spectrum, such as number of operators or range of frequency bands, the problems may vary among member states.

National Regulatory Authorities ("NRAs") have various tools to solve potential competition issues. These tools are established in several pieces of European legislation but foremost is the European regulatory framework for electronic communications networks and services and general competition law. Changes in electronic communications technology, market structure and services necessitate a comprehensive view on the application of these regulations.

2.1. Regulatory background to authorisation of spectrum

There are four main areas in spectrum management - spectrum planning[4], spectrum engineering[5], spectrum authorization[6] and spectrum monitoring and compliance[7]. At the global level, governance of spectrum use is the responsibility of the International Telecommunication Union (ITU), in particular to ensure rational, equitable, efficient and economic use of the radio frequency spectrum by all radio communication services. While the global framework for the utilization of the radio frequency spectrum is contained in the ITU Radio Regulations, there is considerable flexibility within this framework for the establishment of spectrum policies at regional and national level. At the national level spectrum management is usually

[4] The allocation/assignment of spectrum to certain uses taking into account international agreements, technical characteristics and national priorities and policies.

[5] The development of criteria for sharing of radio frequencies between users in the same or adjacent frequency bands and between different radio communication services, and the development of electromagnetic compatibility standards for equipment that emits or is susceptible to radio frequencies.

[6] Granting of access under certain specified conditions to the spectrum resource to specific users.

[7] The monitoring of the use of the radio spectrum and the implementation of measures to correct interference and control unauthorized use.

undertaken by a spectrum regulator within the government or by an independent regulator, normally established by statute, with specified powers and responsibilities.

Historically, regulators have issued licences to specific users for specific purposes, thereby limiting who can access radio spectrum and how it may be used.[8] Such administrative assignment is still in force via the national table of frequency allocations and through national regulatory regimes for radio communication services.

Over the last decade however massive growth in spectrum demand from both existing and new electronic communications services, combined with the convergence of platforms used to deliver services, has resulted in the need for a more flexible approach to spectrum management introduced under the current European regulatory framework for electronic communications networks and services. The advantage of such market based and flexible approaches is that for many frequency bands under individual authorisation spectrum licensees have a greater scope to innovate and deliver better services to consumers. Market based approaches also facilitate easier and more rapid access for new spectrum users, resulting in new entrants and a more competitive market for electronic communications. This does not however mean that innovation and technical development cannot happen under administrative assignment, which is still generally used for significant parts of the spectrum.

A third approach to spectrum management is licence-exemption or general authorisation. This is more appropriate for applications such as short-range devices, either because the devices seldom interfere with one another due to the nature of their use or because new technologies can be employed which are capable of dealing with interference as it happens.

Regulators need to find the right balance among the three approaches based on such parameters as the general scarcity of spectrum, the resources available to the regulator, the types of use and opportunities for innovation and competition. The report focuses on competition aspects under individual authorisation, where market players individually or jointly could accumulate spectrum (“spectrum hoarding”) with detrimental results to competition.

2.2. The European regulatory framework for electronic communications networks and services

The provision of electronic communications networks and services is regulated by the European Union regulations[9] and directives in this sector.

[8] European Directive 87/372/CEE (GSM Directive), European Directive 90/544/EEC (Ermes Directive), etc.
[9] Regulation 2000/2887/EC on unbundled access to the local loop.

The European Directives of particular significance for spectrum issues are the Framework Directive[10], the Authorisation Directive[11] and the Access Directive[12]. In addition, the European regulatory framework for electronic communications networks and services consists of the Commission guidelines on market analysis and assessment of significant market power[13] and the Commission Recommendation on relevant product and service markets.[14]

The European regulatory framework for electronic communications networks and services entered into force in 2002. The regulatory framework is market based, meaning that obligations should only be imposed where they are deemed necessary for competition to work. To assess the necessity of imposing obligations the National Regulatory Authorities (NRAs) must define the relevant markets, assess the competitive situation in the relevant markets and, if competition is deemed inadequate, identify dominant operators and find appropriate remedies.

In the current review of the European framework for electronic communications services and networks the European Commission has proposed an evolution of spectrum policy principles.[15] These policies are intended to promote innovation and competition, resulting in greater choice, quality and value for money for European consumers. The proposals are currently under discussion in the European Parliament and Council and new Directives are expected to be adopted during the course of 2009.

According to the current European regulatory framework for electronic communications networks and services national authorities (NRAs) are

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[10] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services.

[11] Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services.
Directive 2002/19/EC of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities.

[12] Directive 2002/19/EC of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities.

[13] Commission guidelines of 11 July 2002 on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services.

[14] Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services.

[15] COM(2006) 334 final, Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, on the Review of the EU Regulatory Framework for electronic communications networks and services.

responsible for regulating and managing spectrum for electronic communications. As individual national approaches to spectrum management may vary among member states this has implications for the single European market and free trade principles as defined in the Treaties. Key to this is to promote opportunities for harmonisation in order to enable economies of scale to be exploited and to facilitate interoperability and roaming opportunities. EU radio spectrum policy is conceptually developed in dialogue with Member States, the European Parliament and spectrum users in order to ensure co-ordinated use of radio spectrum, modernisation in the regulation of radio spectrum in the Community and to contribute to horizontal policy objectives such as the completion of the internal market and development of competition.

The coordination of European policy approaches with regard to the availability and efficient use of the radio spectrum is carried out through the process defined in the Radio Spectrum Decision[16]. The Radio Spectrum Decision provides the foundation for a coordinated radio spectrum policy within EU. The main objectives of radio spectrum policy is to ensure co-ordination of radio spectrum policy approaches, achieve harmonised conditions for the availability and efficient use of radio spectrum in particular to support specific Community policies, the provision of relevant information on spectrum usage and the co-ordination of Community interest in international negotiations in relation to existing EU policies such as in electronic communications, transport, R&D or broadcasting.

Radio spectrum policy involvement at Community level, based on the Radio Spectrum Decision, contributes by harmonizing the use of spectrum[17], working towards more efficient use of spectrum[18] and improving information about use of spectrum, plans for spectrum usage and availability of spectrum.[19] The Radio Spectrum Decision does not however cover the authorisation of spectrum. Authorisation issues are dealt with under the Authorisation Directive of the European regulatory framework for electronic communications and services and are generally the preserve of Member States acting within the scope of this Directive.

2.3. General competition law

As a complement to the European regulatory framework for electronic communications services and networks, general competition law "regulates", directly or indirectly, the use of spectrum. Competition law and competition regulation apply simultaneously in the electronic communications sector. The European regulatory framework for electronic

[16] Radio Spectrum Decision (676/2002/EC) adopted by the European Parliament and the Council on 7 March 2002.
[17] See various EC Decisions; SRD, UWB etc.
[18] See various EC Decisions.
[19] see EC Decision on EFIS.

communications services and networks, with its objective to promote competition, is targeted to assist liberalization when there is a market failure or where markets are not competitive.

When competitive conditions have been established competition law is intended to take over and maintain competitive conditions. The main objective of competition law is to prohibit measures which restrict competition unjustifiably and serve as a response to unfair economic behaviour. Regulation, although its primary objective is to promote competition, can be designed to promote other objectives, e.g. to protect consumers. Competition law could however also be used to achieve essential regulatory objectives.

General competition law in Europe can mainly be found in Articles 81, 82, 86 and 87 of the Treaty, and in Regulation 1/2003/EC which are either directly applicable or are reflected in most member states' national competition laws.

Competition law and the European regulatory framework for electronic communications services formally exist independently of one another but may be viewed as complements. According to the European regulatory framework for electronic communications networks and services, NRAs are responsible mostly for regulating and asset-handling of spectrum for electronic communications. As individual national approaches to spectrum management may vary among member states this has implications for the single European market and free trade principles as defined in the Treaties.

3. Anti-competitive use of spectrum – definition and impact on the electronic communications markets

Radio spectrum is an essential input for electronic communications. Spectrum available for electronic communications services is a limited resource with a limited number of license holders in each frequency band. Due to certain characteristics of frequency bands and regulatory constraints such as limitations on allowed usage, relatively few licenses may be available for a particular type of electronic communications service. [20] A limitation of the amount of spectrum available and the number of players who have access to spectrum may also create market power in the electronic communications markets. However, market power in upstream spectrum usage rights does not necessarily imply market power in downstream markets. But it should be noted that spectrum access is an essential input for many communication services.

Maximising the opportunities for spectrum-using industries requires that spectrum is fully and efficiently used and that no firm is able to hoard or use market power in spectrum licences with the effect of foreclosing or limiting competition in end-user markets. The development in recent years of the use of market methods, permitting change of use and secondary trading to allocate and assign spectrum in place of more traditional administrative methods, has focussed attention on the risks of anti-competitive conduct in the newly created spectrum markets.

When looking at anti-competitive use of spectrum it is of utmost importance that the focus is on uses that are truly anti-competitive. When we use expressions such as “hoarding” we have to distinguish between hoarding that is anti-competitive, in object and effect, and hoarding that has neither the object nor effect of restricting competition on the market. One example of the latter is an operator acquiring spectrum with the intention of providing services in a few years time with new technology. In such a case it could be argued that spectrum, at least in the short term, is not efficiently used as another operator may be able to use it more rapidly An expression used is “speculative hoarding”, i.e. acquiring spectrum for speculative reasons. Speculative hoarding can occur without anti-competitive reasons or effects and can even be pro-competitive, but the reverse can also be true if the intent or the effect of the acquisition is anti-competitive.

[20] The transition towards more flexible radio spectrum management may reduce regulatory constraints. As described in the report of Professor Cave and the RSPG-ERG report on Transitional issues, this transition may reduce scarcity as well.

3.1. Anti-competitive use of limited resources

3.1.1. What is it?

In addition to radio spectrum, a number of similar inputs used in the production of goods and services can be said to be limited, such as land ownership rights, airline take-off and landing slots and mineral prospecting and extraction rights. Anti-competitive use of limited resources in a wide sense could be described as hoarding and/or blocking efficient use of a limited resource in such a way as to harm competition in a downstream market for services for which that resource is used as an input.

Anti-competitive use of limited resources could - at least in theory - be contrary to EC competition law if undertakings which are individually or collectively dominant in a relevant market *inter alia* limits production, markets or technical development by such use to the prejudice of consumers, or if groups of undertakings share sources of supply (Articles 81 and 82 of the EC Treaty).

Here, one could distinguish between *intent* and *effect* even if it could be difficult to do so in practice. It could be argued that an although an action taken by an undertaking - such as hoarding of a limited resource - may have led to a lessening of competition, that effect was not the primary intent of the undertaking (it may have done so for speculative reasons, for example) and therefore the action was not anti-competitive in nature. This report, however, focuses on the *effect* of the action, i.e. whether the outcome is harmed competition, regardless of intent.

3.1.2. Airline take-off and landing slots

Airlines using European airports are subject to an EU ”use it or lose it” rule on take-off and landing slots. The purpose of the rule is to act as a counterweight to national carriers’ legacy advantage (so-called ”grandfather rights”). If the holder of a particular slot uses it less than 80 percent of the time it must be returned to a pool where it is available for other airlines. This limited resource is so valuable that airlines will fly near-empty aircraft to hold on to attractive slots in order to comply with the 80 percent rule. The rule may nevertheless create some incentives for slot trading. Prices for attractive slots can still be high as evidenced by the $209 million paid by an American airline for four Heathrow slots.

The European Commission has suspended the 80 percent rule in times of crisis for the airline industry: after the September 11 2001 terrorist attacks, and during the Sars health crisis in 2003. It has also proposed that the rule be suspended in order to alleviate the effects on airlines of the current economic crisis.

Regulation of take-off and landing slots in the airline industry could be used as analogies with the telecommunications industry. However, due to differences between the industries, solutions suitable for one industry, such as the implementation of a “use it or lose it” provision, might not be suitable for another.

3.1.3. Mineral rights

The South African Mineral and Petroleum Resources Development Act, 2002 came into force on 1 May 2004. Pre-2004, South Africa had a relatively secure system of mineral rights, based on private ownership. Rights were of unlimited duration, could be used as security by the rights holder without restriction, could be leased to third parties for value and could be freely disposed of and transferred for value. On the other hand, as mineral rights could be held in perpetuity with no minimum work commitments, it was possible for companies to sterilise mineral resources.

So-called "New order" rights are of limited duration (up to eight years) and may be cancelled at the Minister of Minerals and Energy’s (“the Minister’s”) discretion. They will only be granted if the holder will exploit that right within a limited period from the grant of the right (according to the ”use it or lose it” principle) and may only be disposed of or transferred with the Minister’s consent. One conclusion in a 2005 report from the Fraser Institute was that the implementation of post-2002 legislative reform appears to be inhibiting mineral exploration in South Africa, largely because the new Act was seen by industry as having created an unpredictable regulatory environment.

This example shows how restricting access to scarce resources could inhibit industrial development. The mining industry in this example is affected by new regulations that shorten the available time for return on investment (ROI) in mining rights and introduce the obligation to exploit the resource. However, by imposing a “use it or lose it” condition in mining rights, the Minister has sought to ensure that the resource will be exploited, in order to generate investment and jobs.

In both the airline and the mining industries, hoarding of usage rights to limited resources can create entry barriers. Experiences from other industries can provide useful insights into the nature of the issues with anti-competitive use of scarce resources, and could be taken into account when deciding on whether or what measures are needed to address anticompetitive use of spectrum. However, spectrum and its downstream markets have relatively specific characteristics, and tools which are effective in order to address problems in one industry may not be available or useful in another.

3.2. Anticompetitive use of spectrum

3.2.1 What is anticompetitive spectrum hoarding?

Anticompetitive spectrum hoarding could be described as market players individually or jointly acquiring or retaining spectrum quantities greater than their foreseeable technical needs, with the effect of distorting competition.

3.2.2 Spectrum hoarding and competition on end-user markets[21]

Access to radio spectrum is a prerequisite for operators wanting to deliver wireless electronic communications services to end-user markets. Access to certain "high value" frequencies[22] are particularly important for such operators. Limiting competitors' access to spectrum can inhibit their ability to perform on end-user ("downstream") markets. This depends on, *inter alia,* to what degree wireless services to end users in one band are viewed by those users as substitutable by services delivered through the use of another band, or by fixed-line alternatives. If there is sufficient substitutability between those services, they belong to the same relevant downstream market.

If the entire spectrum that can be used to deliver a particular service on a downstream market is held by one or a small number of players – and there is no fixed-line alternative – new entry to that downstream market becomes impossible. If one or a small number of market players holds a large share of the spectrum, competitors may not be able to provide the same type of service in terms of *inter alia* the quality of service level or price.

A monopoly-like situation in some frequency bands could lead to a similar competitive structure on the down-stream markets. For example when the entire 900 and 1800 spectrum is held by incumbents, new entry as a network operator on the GSM service market is not possible. Taking into account the fact that this situation does not per se warrant a competitive problem, one method for addressing a lack of effective competition in the mobile access market is to impose remedies according to the regulatory framework in place, such as, as applicable, MVNO access to existing networks.

As a consequence of the above, hoarding of spectrum in a band used for the provision of a particular downstream service may not result in a competition problem because that service can be substituted in some circumstances by other services in other bands, or through a fixed line. On the other hand, if – for example – a service to end users could be provided using both a fixed and a wireless alternative, competition in the relevant

[21] This topic will be further discussed in a forthcoming ERG-RSPG report on market definitions.
[22] For example the 900 and 1800 MHz GSM bands.

market as a whole could hypothetically be adversely affected by the hoarding of spectrum used as input for that service.

3.2.3 Blocking the reorganisation of spectrum for optimal use

Reorganisation of a particular band can aim to free spectrum for the benefit of a new entrant or to allow the development of new technologies in the band. If large shares of spectrum are unused or used inefficiently by their rights holders, rather than returned to the spectrum authority or sold in the secondary spectrum market, the possibility to reorganise spectrum is inhibited, postponing or rending it impossible to prepare new bands for new services. Incumbents may be tempted to resist reorganization in order to preserve their competitive advantage. While there can be legitimate reasons for this, resistance may also occur with an anti-competitive intent.

In many cases the licensees have control over when a network is shut down and hence over the spectrum it uses can be freed. If a licensee is able to keep the licence as long as it is used and wants to delay the return of spectrum, it can slow down the process of migrating customers to an alternative network. Moreover, especially where the anterior regulatory decision on entry is combined with a burden of proof on the entrant, incumbents have incentives to engage in procedural stratagems to delay competition (eg by raising an excessive number of questions and demanding unnecessary protection against harmful interference). Those stratagems may be limited in some cases, for instance by the introduction of easements like ‘overlay’ rights, as done in the US in personal communications services (PCS): while pre-existing point-to-point microwave uses continued in the 1850-1990 MHz band, new licensees were allowed to start their operations (although the incumbent users had priority); over time, those frequencies were cleared, with new entrants paying incumbents to speed migration to higher bands.

Limiting competitors’ access to spectrum can inhibit their ability to deliver services on end-user markets. If all the spectrum that can be used to deliver a particular service is held by one or a limited number of players, new entry to the market may become impossible. If large shares of unused or inefficiently used spectrum are kept by their rights holders, the possibility to reorganize spectrum is also inhibited, postponing or rendering it impossible to prepare new bands for new services.

4. Anti-competitive use of spectrum – problems, practical experiences and remedies

4.1. Anti-competitive use of spectrum – initial assignment of spectrum

This section examines anticompetitive issues which may arise at the time of the initial assignment of spectrum. Initial assignment in this report refers to when spectrum is awarded by the spectrum authority (NRA, national administrations or equivalent) to rights holders, either by auction or a comparative selection procedure.

4.1.1. Problems

Under an administrative spectrum management regime, where spectrum usage rights are distributed according to a first-come-first-served principle and the administrative charges are low, the incentives to hoard could be expected to be rather high. An explanation is that the cost for the individual rights holder of acquiring and holding spectrum is low, at least compared with the opportunity cost of the spectrum. In addition, because auditing information about the level of spectrum use is normally limited, and at best confined to the licensee, the pressure to return unused spectrum is low.[23] On the other hand, hoarding need not be an issue when first-come-first-served principles only apply to non-scarce spectrum. In addition, also in such cases, there could still be an obligation to use the spectrum (see 4.3.3).

However, under an administrative spectrum management regime, unlike a market-based one, the structure of industry is determined to a large degree by the spectrum regulator. There are at most as many firms as the regulator issues licences to provide a particular service, although more can be added by subsequent licensing.[24] The number of competitors may be (further) limited by regulatory policies in favour of a low tolerance of interference, for example by leaving a large number of adjacent channels vacant to protect services from interference.[25] The spectrum authority has to weigh such policies against the need to ensure and/or foster competition.

A market-based, more flexible approach, to spectrum management introduced under the current European regulatory framework for electronic communications networks and services facilitates easier and more rapid access for new spectrum users, resulting in new entrants and a more

[23] Examples can be found in the public sector.
[24] See for instance the history of GSM.
[25] This regulatory arrangement is relatively common in radio and TV broadcasting; in fact, it has been challenged in a number of controversies, e.g. the one over low power FM radio in the US (where some operators tried to have some vacant channels released for commercial activities).

competitive market for electronic communications. At the same time a market-based approach, while making it easier to acquire spectrum, can make the anti-competitive problems more severe. Scarcity of spectrum could lead to a situation under which a small number of existing operators would find it to their advantage, acting either unilaterally or collusively, to hoard spectrum, or to engage in the purchase of unneeded spectrum at auction, as a means of creating a barrier to entry by newcomers or to expansion by rivals.

To what degree this could occur depends on the extent of the restrictions (and hence of the scope for entrants) and on the nature of the interactions among the members of the oligopoly. If the latter collude they might willingly share the joint cost of hoarding, or might seek to impose covenants on spectrum sales which restrict purchasers from competing in specified downstream markets – though this would be transparent. If, conversely, their rivalry is intense, then each may prefer to hoard than to sell to a rival. In either case, competitive pressures may be weakened.

One analogy is the decision by a mobile network operator (MNO) whether to contract with one or more mobile virtual network operators (MVNOs), which would sit on its network and retail their services separately. Several NRAs have reached provisional or final conclusions to the effect that MNOs have exercised joint dominance (exhibited tacit collusion) by refusing to enter into MVNO agreements. Such an agreement would have some similarities with a decision whether or not to lease or sell spectrum to a competitor. Another analogy which may resemble the spectrum situation more closely – as it directly concerns another naturally limited resource – is the area of duct sharing where there is a lot of experience of problems with refusal to share. Both by selling spectrum to a rival and by sharing ducts with a rival, an operator loses full control of a limited resource, which eventually leads to a lessening of possible market power for that operator.

4.1.2. Practical experience

Generally, respondents to the survey conducted among Member States have observed few competition problems that were *direct consequences* of spectrum assignment procedures. Historically, in many or even most cases, authorities have considered possible competition problems and tailored the assignment in such a way as to mitigate the risk of such problems.

Many Member States have used spectrum auctions as a means of allocating limited frequencies. The basic idea is to have bids that correspond to what the bidders are willing to pay, which in turn reflects the economic value attached to the use of the resource. Provided that the bidders act in a rational manner, the auction can be expected to result in an efficient allocation and use of spectrum. However, competition problems in auctions do arise where one company – eg. a strong incumbent – or several companies (as further discussed below) during the auction try to prevent

other companies from obtaining additional spectrum (relatively weak incumbents) or entering the market (newcomers). From the point of view of a market player, spectrum hoarding can be seen as a rational strategy if the benefit of keeping other companies out of the market or without additional capacity exceeds the cost of hoarding.

Both auctions and comparative selection procedures have given rise to competition-related concerns at the assignment stage. It is not necessarily the case that there are more competition-related concerns in auctions than in beauty contests but rather that it may be easier to identify the competition issues in auctions. This may be due to that in practice beauty contests to a certain extent are administrative procedures with limited transparency whereas auctions are transparent with criteria clearly specified and quantified in advance. Ways to mitigate potential competition problems at the assignment stage ("ex ante") are discussed below.

4.1.3. Ex ante remedies

This subsection examines possible ex ante measures for the purpose of avoiding that the initial assignment phase results in or contributes to anticompetitive use of spectrum. "Ex ante" in this report refers to measures taken in conjunction with the initial assignment, before any anticompetitive use takes place.

The preferred "ex ante" solution to spectrum-related competition problems and in particular hoarding, is – as acknowledged in several responses in the questionnaire to Member States – to make more spectrum available to market players. Making spectrum "as available as possible" in this sense means applying minimal conditions which are similar between different bands. Regulatory restrictions are always a second best. At the same time, the reality in several bands is that demand exceeds supply, so that it would not be possible to fulfil all requests from all market players.

Firstly, the **nature of the usage right** matters. Rights that are fixed in time rather than indefinite naturally make hoarding more difficult in the long term. On the other hand, the more limited in time a usage right is, the more difficult it will be to trade it.

Generally, a spectrum regulator designing a new award has an unrepeatable opportunity to intervene to influence a sector's development. This is especially true where licences are neither tradable nor convertible into other uses because the regulator then effectively decides the size and shape of the market. The **number of rights** in a particular selection procedure fundamentally affects competitive outcome (this relates i.a. to spectrum caps, which are discussed further below). By creating x licences, the spectrum regulator has a reasonable chance of creating x operators.

There are exceptions. In 1990, the UK government decided to issue three so called PCS licences at 1800 MHz for entrants. Subsequently, two sought and were granted permission to merge. In the 2000 3G licence auction in the Netherlands, five licences were awarded to successful bidders, but take-overs in 2005 and 2006 led to three remaining mobile network operators. In Germany, by contrast, the 3G auction was designed with a view to making the market structure partially endogenous: depending on the pattern of bidding, between four and six successful licensees could have emerged. In the UK and Italy 3G spectrum auctions, the number of licences available (5) was determined on the basis that it exceeded the number of 2G operators (4), thus making room for at least one new entrant. In the recent US 700MHz spectrum auction, one licence carried with it an obligation to give others access to the relevant spectrum.

The risk of anti-competitive behaviour will normally already have been taken into account in the **choice of selection method** (auction or comparative selection procedure), while competition related issues may just be one of several factors in making that choice.

Having chosen auction as the selection method, a major concern is to prevent collusion before and during the procedure. UMTS licence bidders have as one of the **conditions for participation** also been explicitly forbidden to enter into agreements about the auction with [other] holders of mobile licences. Specific **requirements** have also been put **on candidates**, such as in a Danish UMTS-auction *i.a*. that a potential bidder must not be under the common control of two or more GSM undertakings. In recent Italian auctions all bidders had to be independent from each other (with competition law rules on corporate control), and where some licences were reserved for new entrants, specific rules for the definition of such entrants were applied. [26] In Portugal, GSM and UMTS operators were excluded from participating in the tender for the 450-470 Mhz band.

Collusion has also been prevented by **auction design,** *inter alia* by the use of sealed-bid (one round) auctions and differing degrees of transparency. Normal rules on transparency in public procedures and decision making may need to be set aside when the auction is ongoing, to the degree that this is necessary in order to achieve a competitive outcome. There could for example be reasons for not revealing what specific party has made a particular bid until after the auction.

A **spectrum cap** can be seen as an auction design component and is a direct method of limiting spectrum hoarding and is easy to enforce.

[26] For example, in a 2008 WiMAX auction a bidder for a license reserved for new entrants had to be independent from mobile operators, but a mobile operator could have a minority stake (without exercising control) in an ad-hoc consortium of enterprises set up for participating in the auction (so i.e. apportioning experience to the consortium).

Generally its disadvantage is that it cannot take into account the specifics of each situation, and determine whether consumers would be made better or worse off with greater or less concentration of ownership. This is further elaborated below.

Looking at the usage of spectrum caps in the EU gives a diverse picture among Member States. In some cases, caps have been in their “pure” form, others used what in practice amounts to a cap by a combination of limiting the number of available rights of use and allowing only one per operator, or by reserving some spectrum for a new entrant. In some awards in the United States bids from small firms and from minority entrepreneurs have been given advantages in the process. This has not always achieved the intended objective, as the privileged bidders sometimes sold on their licences to larger operators soon afterwards. In Canada one licence in the recent 700 MHz band was pre-assigned to a new entrant on favourable terms, in order to promote new entry in a tight three-firm market (these examples could also be seen as requirements for participation; see above). In Sweden’s 2.6 GHz auction a relatively large spectrum cap of 140 MHz (of the available 190 MHz) was set in order to avoid a “worst case-scenario” but expectations of fierce competition in the auction were confirmed by the outcome of five bidders winning between 10 and 50 MHz each. To take another example in the same band, Germany is not planning caps in its 2.6 GHz auction. In the UK, there is a bias against using spectrum caps given the risk that they reduce the efficiency of the spectrum allocation in the primary award. However, caps have been used in the UK in some cases where the efficiency effects of imposing a cap (in terms of constraints imposed on potentially efficient uses) are either small or can be justified. In the UK, where caps are deemed as having the potential to significantly reduce efficiency, they have only been considered where there are strong reasons to suggest these are needed to meet other objectives.

Economic or social market engineering such as spectrum caps can be readily accomplished when the use of the spectrum to be awarded is pre-ordained. In a more liberalised market context, however, especially where licences are assigned in an auction process which, in the interest of flexibility of use, is not calculated in advance to achieve any particular number of winners in any category of provider, specific interventions are harder to accomplish. But it is still easily practicable and (normally) legally unimpeachable to place a limit on the proportion of any new award which can be assigned to a single operator. The restriction can be removed immediately post-auction (which could lead to speculative trading); or it can endure for a specified period, say two years; or it can last for ever (caps on the amount of spectrum one can hold are discussed under 4.2.3). Imposing such a cap will likely often, but not invariably, reduce revenues, but this is at most a countervailing disadvantage.

Caps at spectrum awards are thus seen by some as offering an effective form of intervention in the competitive process which can, under the right

circumstances, benefit end users. In the case of a significant award- for example the release of spectrum at 2.6 GHz or of the digital dividend spectrum, carrying out a one-off competition analysis of this kind is likely to be justified. However, difficulties arise in large part from the "natural oligopoly" aspect of the wireless communications sector. Depending on the nature of the competitive interactions currently observed, there is a real risk that a small number of operators will tacitly co-operate to acquire between them all the spectrum in the new award, even if they do not need it, and thereby prevent a new entrant from playing a maverick role in the downstream market or introducing a disruptive new technology.

With spectrum caps there is however also a risk of over-controlling the outcomes of a spectrum auction in a liberalised environment. These essentially revolve around excessive "entry assistance". If end users would have benefitted from having more services provided by a firm which is prevented from doing so by limits imposed at the auction, the net effect is to harm their interests. What is required is a kind of risk assessment. Yet the process of conducting it is difficult, and- unlike a traditional cap on the stock of spectrum held- has to be repeated at each significant award to take account of its particular circumstances. It would involve examining the substitutability of different frequencies in the provision of different services, calculating the shares of different operators across substitutable bands in each use, and estimating the consequences, and the probability of occurrence, of any lessening of competition- which itself requires an assessment of competitive interactions. At the same time, the down side risk of detriment to end users would have to be estimated.

The point of maximum risk of anti-competitive outcomes arises when markets are limited to small amounts of spectrum and highly regulated. After that period has been passed, the risks should decline and need for caps should go.

A milder rule, which could be said to relate to spectrum caps, consists of requiring bidders to submit a usage concept prior to the auction. In order to obtain the desired number of bidding rights, interested parties will have to deliver a frequency usage concept explaining how they will use the spectrum. This method does not fully preclude strategies to squeeze other companies out of the market. If combined with rollout requirements, however, it can help to credibly threaten and enforce the revocation of unused spectrum (see also the discussion on "use it or lose it"-clauses under 4.3.3).

A couple of regulatory authorities point out that **coverage or rollout obligations** – either attached to rights being auctioned or in a comparative selection procedure – tend to make it less attractive to hoard spectrum. For the same reason, however, spectrum with coverage or rollout obligations attached to it may be less attractive for other (non-hoarding) potential buyers as well and can act as a barrier to entry.

In Italy, each 3.5 GHz auction winner must accept any reasonable spectrum access request on commercial terms from any third party in geographical areas – outside of the mandatory coverage plan – where it has not used the frequency after a given time, unless it proves that the reason why the spectrum was left unused was not depending on its will.

In Canada, the government in 2008 implemented rules designed to prevent new market entrants from selling their spectrum licenses to the incumbent ”Big Three” wireless telecoms providers. The 10-year licenses awarded to firms that won spectrum at a government auction cannot be resold to any company that does not meet the criteria of a new entrant in the wireless industry for five years. The Canadian government has also stated that it expects that those who won licenses will put the spectrum they have to "its highest productive use."

In a **comparative selection procedure** such as a beauty contest the **criteria** can be weighted in such a way that preference is given to applicants whose entrance to the market would promote competition between networks.

Administrative Incentive Pricing (AIP) is an annual fee, payable by spectrum users and based on opportunity cost, which seeks to encourage users to make efficient use of spectrum. As such AIP may be considered likely to help prevent anti-competitive behaviour as, depending on the level of the AIP, users might be discouraged from hoarding spectrum as they would have to pay an annual fee approximately equivalent to the opportunity cost of the spectrum they are holding. However, while AIP may represent an effective means of preventing some hoarding, it seems unlikely to prevent hoarding which has anti-competitive intent or effect. This is because the potential rewards of such behaviour are likely to be greater than the AIP.

Finally, it should be considered that anti-competitive effects from spectrum hoarding could possibly be remedied through regulation of downstream markets under the European regulatory framework for electronic communications.

4.1.4. Ex post remedies (General competition law)

Behaviour in assignment procedures could fall under Article 81 of the EC Treaty. According to Article 81(1) of the EC Treaty, agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition are prohibited. An arrangement where competitors commit between themselves to dividing up a limited resource between them could constitute such a concerted practice whose object or effect is the prevention, restriction or distortion of competition, and which would therefore be

prohibited by EC law. This would apply also within the context of a selection procedure.

It is also at least hypothetically possible that Article 82 of the EC Treaty – which deals with abuse of a dominant position – could apply in the context of a selection procedure.

In the near to medium term demand is likely to exceed supply in key bands. The best assignment-stage remedy against spectrum-related competition problems is to make more spectrum available and apply least restrictive terms (similar and minimal conditions). Where this does not suffice, various remedies could be used at the initial assignment stage to prevent anti-competitive outcomes, all of which to some degree have a cost and may not be able to solve all problems. Over time, as more spectrum becomes available with least restrictive usage terms, the need for such remedies could diminish.

4.2. Anti-competitive use of spectrum – spectrum trading

4.2.1 Problems

Radio spectrum can be assigned on a “first-come-first-served” basis. When relevant spectrum bands are considered a limited resource the licences are often awarded to a limited number of organizations following an administrative review or auction. Previously the transfer of spectrum usage rights has been restricted. However, under the European regulatory framework for electronic communications networks and services, Member States may make provision for undertakings to transfer the rights to use radio frequencies with other undertakings. If secondary trading of radio spectrum is allowed by Member States it will be easier for licensees to transfer rights to other users. There is increasing pressure from the industry for governments to allow the creation of secondary markets for the trading of spectrum. This is also reflected in the current review of the regulatory framework for electronic communications and services, where more flexibility in trading has been proposed.

As spectrum trading is allowed by Member States the expected profitability of anti-competitive conducts could be reduced. As more spectrum becomes tradable and subject to change of use, and as restrictions on technology diminish, blocking entry or expansion becomes more expensive. Moreover, because entry deterrence is an investment for firms (in the case of spectrum hoarding the acquisition of and possibly the holding of spectrum usage

rights costs money), yielding long term returns, they are less likely to do it if they think that those returns will be diminished by a regulatory change.

It is likely that when spectrum markets are fully liberalised, the prospect of success for anti-competitive action is diminished. However, spectrum markets are not fully liberalised, the amount of spectrum tradable is small the restrictions on use are still significant. There is still a potential risk of operators engaging, through unilateral or collective action, in anti-competitive use of spectrum.

4.2.2 Practical experience

It could be debated whether spectrum trading plays in favour or against anti-competitive hoarding. It allows players to release unnecessary spectrum on one hand, while it on the other hand can encourage them to purchase spectrum with the effect of lessened competition. Overall experience with spectrum trading is limited. Many Member States are still in or at the beginning of the process of opening up bands for trading. For a given band there is in the short to medium term often not a vast number of market players standing at the sidelines with the means to take over the spectrum and use it efficiently. Often the potential buyers are more or less restricted to those who are already using spectrum in that band. This would seem to make it all the more important to apply safeguards to spectrum hoarding. However, as bands are opened up for use with least restrictive conditions, there could be more buyers and more trade could be seen.

Experience with competition issues is available in particular with transfers of UMTS licences – but also other licences for mobile communications and FWA – where the main question for the authorities has been the effect on competition. In several cases, such transfers were blocked or only partially allowed. Procedures applied in such cases are discussed further below.

4.2.3 Ex ante remedies

Vetting of secondary trades: A spectrum regulator can operate in a framework of sector-specific legislation which gives it the power to approve or disapprove any trade. Since such a trade has to be registered to be effected, there is a notification procedure onto which an approval process can be grafted. The question is where this is appropriate and what criteria should be used by the regulator.

One possibility would be to apply the approach of competition law to the area of spectrum. This would essentially involve establishing whether the trade leads to a “significant lessening of competition” (SLC). As is the case with intermediate inputs in general, the interest would lie in the impact on the downstream market. Thus if firms using wireless technologies were fully constrained in their conduct by firms using wireline technology, such an SLC

would not occur in the downstream market, and the trade would not be objectionable.

A de minimis rule could be introduced to avoid examination of insignificant trades. In other cases, however, the analysis of upstream and downstream markets could be quite time-consuming. Accordingly, this type of proposal has been found by some spectrum regulators, notably Ofcom, to be less preferred than a combination of competition law and (sometimes) spectrum caps. However, where such caps can be waived or are “soft caps”, as described below, the boundary between vetting of trades and use of caps becomes rather porous.

In many of the Member States responding to the questionnaire, prior approval of the regulatory authority or the ministry is a precondition for a trade to take place. A key criterion for approval concerns the effect on downstream competition. No standard methodology or criteria for how the competition assessment is made are identifiable, but national competition authorities are normally involved to some degree as advisors. In Denmark, according to the new draft law ex ante approval is needed from the regulator only for the partial transfer of a license issued after an auction or comparative selection procedure, and only in order for the regulator to assess the continued ability to fulfil the license terms resulting from the auction or comparative selection procedure (such as roll-out requirements or requirements regarding coverage).

In the UK trading is at present not permitted in relation to the spectrum held by the mobile operators in the UK. However, proposals are currently being consulted on to liberalise licences at 900 and 1800 MHz and introduce spectrum trading in these bands. In Spain, in some cases (UMTS, 3.5 GHz), licenses cannot be transferred to holders of licenses in the same band or for a given time (4 or 5 years)

Spectrum caps (on the stock of spectrum any firm can hold): Spectrum caps involve the imposition of a limit to the amount of spectrum licences which any one operator, or separate operators in the same group, can hold.

The best known spectrum cap was that employed in the United States between 1994 and 2003. That cap placed a limit of 45 MHz on the Commercial Mobile Radio Spectrum (CMRS) which a single entity could acquire in any geographical area of the United States. The cap was raised to 55 MHz in 2001 and abolished in 2003. The rationale for introducing the cap in the US was linked with the then relatively early stage of development of services and competition in services. At the time, each US metropolitan area had an analogue duopoly. Prices were high and rollout was slow. To ensure that more than two competitors would emerge after the release of substantial amounts (180 MHZ) for digital services, the regulator - the FCC – imposed a limit of 45 MHz, thereby ensuring the presence of at least four digital mobile competitors in each locality. In fact, most areas ended up with five or six competitors. By the end of the 1990s, however, the market was

both more mature and highly competitive. At the same time, the new chairman of the FCC introduced the novel policy of eliminating unnecessary regulation, and spectrum caps (which could in any case be waived) were first extended and then removed. This was expected to be, and was, associated with consolidation in the market, reducing the number of national wireless services from six to four.

Spectrum caps have also been proposed or implemented in other American countries, such as Canada, Guatemala and Mexico, but have not been used in Australia, where they were rejected by the Productivity Commission in Australia in its 2002 review of spectrum policy.

Generally at this point in time, regulatory authorities are in the process of trying to introduce and secure sustainable competition in electronic communications markets. However, as indicated above, spectrum caps may at least in the longer term prevent a firm gaining market share by the traditional virtues of providing its customers with innovative services of high quality at low prices. If such a firm were subjected to a cap, it might find itself either unable to meet demand, or only able to do so by accepting a cost penalty; being forced to re-use frequencies, it would have to reduce power and install extra base stations.

Moreover, there is a clear way of distinguishing an operator's organic growth, which is more to reflect favourable consumer reaction, from growth by acquisition. A merger or acquisition will clearly be subject to the merger regulations in the relevant jurisdiction, and it will often be the case that in the European Union a merger of two mobile companies will qualify for review – because of the size of the firms involved - by the European Commission. There would only be a need for a spectrum cap as a means of avoiding significantly lessened competition arising from mergers if the relevant competition authority were falling down on its job.

There is a further difficulty with spectrum caps intended to be in place for an extended period. Over that period demand for existing services might grow and new services would come into play. If a market based system of allocation is working properly, the consequence should be more spectrum allocated to the providers in question. If, as is likely, there are economies of scope in providing services, existing operators might be best placed to meet the new demand. This would involve either a reconfiguration of the cap to express it in terms of a percentage of spectrum in use to supply a particular group of services or fairly frequent reviews of the cap.

This suggests that caps on the stock of spectrum an operator can hold have the potential to harm end users. This can be mitigated by imposing so-called **soft caps**, which are like a waiver. Whereas a "hard cap" imposes an absolute ban on an operator, preventing it from taking its spectrum holdings beyond a certain level, under a 'soft' cap exceeding the quota simply triggers a licence condition, which might, for example, entitle the spectrum

regulator to undertake an investigation and require divestment of spectrum if it is not satisfied that either there were no competition problems or that they were being addressed. As noted above, this is a selective ex post application of the vetting of trades considered above.

In the UK such a cap has been proposed in relation to the award of the digital dividend spectrum. The logic behind the proposal is that concentration of ownership of sub 1 GHz spectrum suitable for mobile broadband could limit competition in mobile broadband in the future as it may be more costly to provide high quality coverage for high data rate services using higher frequencies. A soft cap could endure after the award, either on the amount of spectrum granted under the award, or on any operator's total holdings of sub 1 GHz licences suitable for mobile broadband.

Both this case and the US experience discussed above suggest that there are close links between a cap on the stock of spectrum an operator can hold and caps on the flow of additional spectrum with which an operator can augment its holdings in a primary award. Not only can a spectrum cap play an essential role in determining the outcome of an award but a licence conditions can be attached to awards which de facto create an enduring cap on total spectrum of a particular kind which any operator can hold.

In Denmark competition aspects of spectrum accumulation are currently only considered at auctions, comparative selection procedures and transfers of licences. However, new legislation has been proposed containing a sector specific competition rule to complement general competition regulation (the latter is discussed further below). The rule specifies that a license holder is not allowed to establish a significant market position which could limit competition through inefficient use of spectrum. The proposed rule seeks to prevent the build up of a significant market position.

Administrative Incentive Pricing (AIP): see 4.1.3.

Merger regulation remedies: In cases where a licence falls out of use the spectrum regulator is often able to reclaim and reissue the spectrum or, alternatively and more commonly, split the spectrum amongst active operators. If a merger takes place, one party's spectrum licence may be forfeit and the spectrum reassigned to a new party, or the merged entity may be allowed to keep both assignments, or the spectrum may be split among all surviving operators- again normally at the discretion of the regulatory authority. In other words, the administrative operation of the regime provides a potential remedy against anti-competitive conduct, although it may not be effectively used.

In Europe, the general rule is that mergers take place between undertakings, which means that the acquisition of a spectrum licence - which is not an undertaking - is not subject to European merger regulations.

This implies that the acquisition of spectrum licences alone at primary issue or by secondary trading does not qualify as a merger (while acquisition of an undertaking with a spectrum licence clearly would do so).

Transfers of UMTS and GSM licenses due to mergers and take-overs were considered by the competition authorities in *inter alia* the Netherlands and Sweden. The KPN-Telfort take-over was being considered by the national authority; the T-Mobile – Orange merger by the competition authorities in Brussels. Both were approved on the basis of extensive market-analysis. In Sweden, GSM-900 operator Tele2 in 2006 acquired the smallest GSM-900 operator. The acquisition was tried by the competition authority. The two entities jointly had around 35 percent of the relevant market, defined as mobile telecommunications services, with the smaller operator contributing less than 1 percent in market size. Competitors worried that the merged entity would hold a disproportionate amount of spectrum, and pointed to the future possibility of using UMTS in the 900 MHz band. The competition authority stated that the extra acquired spectrum gave Tele2 a certain advantage, but that it currently was not possible to use the 900 MHz band for anything else than GSM and that the GSM licences would expire in 2010. Consequently, the competition authority found that the fact that Tele2 acquired control over the other company's GSM-900 frequencies would not create or reinforce a dominant position in any relevant market. In Portugal, clearance by the national competition authority of Sonaecom's failed takeover bid for Portugal Telecom was subject to the observance of commitments such as surrending the FWA frequencies held by Sonaecom or PT within a certain period; surrendering radio spectrum frequency rights and the associated licences in order to allow the entry of a new mobile network operator; and divesting antenna sites.

Other ex-ante type remedies: In New Zealand, the Radiocommunications Act deems management rights and spectrum licences to be assets of a business for the purposes of the Commerce Act of 1986, which prohibits the acquisition of management rights or spectrum licences if the acquisition would have, or would be likely to have, the effect of substantially lessening competition in a market.

In drafting the Telecommunications Act of 2001, the Government's decision on radio spectrum policy was that competition issues for spectrum usage rights will continue to be addressed by the Commerce Act and by way of Government policy decisions at the time that spectrum usage rights are allocated. The costs of "use it or lose it" provisions (further discussed under 4.3.3) were seen to strongly outweigh their benefits.

India is considering encouraging spectrum consolidation through sales, sharing of spectrum and mergers without giving away windfall gains to new GSM/CDMA and 3G licensees. In addition to trading charges, the buyer would pay a one-time transfer charge on per MHz basis on the occasion of a sale/merger/sharing of spectrum, received as start-up spectrum or on

subscriber linked criteria. The transfer charge should limit windfall gains without being so large that it rules out consolidation of spectrum.

4.2.4 Ex post remedies (general competition law)

The conduct of a firm using spectrum as an input is subject to European competition law. For example, if a mobile operator, or a group of operators, were using their holdings of spectrum to foreclose a downstream market, action under Article 81 or 82 might be appropriate. If in the latter case an abuse were found, the competition authority could accept undertakings relating to the disposal of spectrum licences, or similar provisions.

As noted above, markets for mobile communications services are usually characterised by a small number of firms. Accordingly, any dominance is likely to be joint dominance, and demonstrating such conduct presents a significant challenge under EU law. This has the consequence that action is unlikely to be forthcoming. This can of course be interpreted as a good outcome, in the sense that intervention should be subject to a high burden of proof. Yet those who are convinced that the problem of anti-competitive conduct based on spectrum holdings is a serious one will be inclined to seek remedies elsewhere.

In at least one Member State, the regulator's general presumption is at present to rely on competition law to deal with any competition issues that might arise following a spectrum trade.

> As in the initial assignment stage, several remedies could be used against spectrum hoarding through trading. All come at a certain cost. Any regulatory interference into spectrum trading and rights holding raises the opportunity cost of potentially beneficial trading, and should be weighed against the risks of deteriorating competition.

4.3 Anti-competitive use of spectrum – other issues and remedies

4.3.1 Problems

Inefficient use of spectrum – i.e. holding on to spectrum for which one has no or little efficient use – can occur because the cost of inefficiency to the rights holder is lower or equal to the cost of returning the spectrum. Holding on to the spectrum may be free or very inexpensive. Even if the rights holder has to pay to keep the spectrum, this cost may be lower than the cost of the spectrum ending up in the hands of a competitor. In either situation, holding on to the spectrum could reduce the scope for competition in a downstream market for which that spectrum is used as an input.

In cases where licence conditions allow voluntary radio coordination between adjacent spectrum holders in order to use the frequencies more efficiently, one licence holder could inhibit the efficient use of the neighbouring licence by refusing to coordinate. This would theoretically be most advantageous for a licence holder with a large spectrum block beside a neighbour with a significantly smaller spectrum block, since in this case the refusing licence holder could still use parts of the spectrum block further away from the block edge.

4.3.2 Practical experience

To date, there is little experience with clear *competition problems* arising from the type of situations described above. As for inefficient use, there are a number of examples where spectrum usage rights holders have had to give up those rights because the spectrum was not being used. This is discussed further below.

4.3.3 Remedies

“Use it or lose it” licence conditions are in a direct sense attractive means of combating hoarding. The licence contains a condition according to which a penalty is enforced if the spectrum is not used. The penalty can in principle be anything, such as a fine, but the most frequently discussed penalty, as the name suggests, is surrender of unused spectrum.

Some issues can be identified with this approach. First, it might discourage or prevent the legitimate acquisition in advance of spectrum intended to offer new services, especially by newcomers to the industry, which by definition would be unable seamlessly to switch spectrum from a previous to an innovative use. This reflects the fact that there may be good reasons - and not anti-competitive ones - to acquire spectrum ahead of use. Having guaranteed access to spectrum may be a precondition for making more substantial investments in technological development or equipment needed to provide the service. Prohibiting it in such circumstances would delay new services and end user benefits.

The problem would disappear if innocent prior acquisition of spectrum could be distinguished from hoarding designed to create a barrier to entry or expansion. However, it is not clear how such discriminations could be made to a standard of proof necessary to impose a relatively harsh remedy.

It is also be necessary to define a threshold level of use. As described in 3.1.2, take-off and landing slots at congested airports often remain with their current holders provided that they are used more than 80% of the time. This condition is easy to verify using flight data, which are collected for other purposes. It does, however, lead to the consequence that planes with no passengers frequently leave Heathrow Airport, especially in the winter, and fly to a nearby airport, returning some hours later to occupy the landing slot.

Generally, with a “use it or lose-it” clause, the current licensee will keep the licence if the cost of returning it is higher than the cost of “using” it (as defined in the licence conditions - whether efficiently or not - see further discussion below).

In the case of spectrum, where usage data are monitored, they often show low levels of utilisation. However, in order to enforce a “use it or lose it” licence condition, efficient episodic utilisation needs to be distinguished from authentic under-use or over-provisioning. Moreover, the threshold would have to be published, making it easier for licensees to meet the minimum requirements (likely at lower cost than airlines can meet their slot use obligations). In addition, a nationwide frequency assignment might also make the assessment whether the frequencies are being used or not more difficult. There are examples in Germany where assignees with a nationwide frequency assignment have been using the spectrum only in a few big cities. For these reasons, it could be questioned whether the problem of anti-competitive hoarding can be solved by “use it or lose it”-regimes.

In several Member States so-called “use it or lose it”-conditions have nevertheless been attached to spectrum usage rights in all bands or bands where demand exceeds supply. In at least one Member State a general “use it or lose it” rule is seen as the recipe for a lighter-touch regime without build-out (“build it or lose it”) requirements and with fewer restrictions on types of use.

There are also a number of examples where spectrum usage rights holders have had to give up those rights because the spectrum was not being used. However, in some Member States, use-it-or-lose-it provisions tend not to be imposed any longer as they are considered potentially difficult to enforce for reasons related to the discussion above.

Monitoring and follow-up of “use it or lose it”-clauses, where such are in force, is important in order to be able to detect and mitigate potential spectrum hoarding. In the German UMTS auction of 2000, interested parties had to deliver a frequency usage concept explaining how they would use the spectrum. When imposing “use it or lose it” clauses it is necessary to carefully assess the time that will be required for rollout, as applicable, in order to render it proportionate with the other obligations in the context of the selection procedure. If the imposed timeframe is too short, the rights holder may find this as an investment disincentive and may choose later not to roll-out – and possibly lose access to the resource – rather than to begin investing. In this sense the assignment via auction should in general contribute to lessen this risk.

In France, for less strategic bands where the “first come-first-served” principle is used, the regulatory authority is able to demand that applicants provide proof of intensive use of their current resources before they can be granted new resources. In such a case, additional spectrum may be issued

based on justification of need and usage and as per relevant defined conditions.

A concept for a ”modified” use it or lose it-rule has been discussed in Sweden, where a candidate buyer of a particular spectrum resource is denied purchase by the current owner. The candidate buyer would report this to the NRA, which would assess the current usage level in relation to the price offered by the buyer. If the NRA finds that the current and planned use is of a significantly lower value than the offered price, the NRA would be able to reclaim the spectrum and redistribute it.

In several Member States, so-called “use it or lose it”-conditions have been attached to spectrum usage rights, and there are a number of examples where spectrum usage rights holders have had to give up those rights because the spectrum was not being used. At the same time, several issues can be identified with such an approach, not least the difficulty of enforcement and the risk that it might prevent legitimate acquisitions of spectrum under certain circumstances.

5. Conclusions

Radio spectrum is an essential input for electronic communications. Limiting competitors’ access to radio spectrum can inhibit market players’ ability to deliver services on end-user markets. New entry to the market may also become impossible. If large shares of spectrum are unused by their rights holders, the possibility to reorganize spectrum is also inhibited, postponing or rendering it impossible to prepare new bands for new services. The aim of this report has been to examine possible methods for avoiding such a situation while ensuring there is no distortion of competition.

It should be noted that to date there is limited practical experience with competition issues resulting from the accumulation of or holding on to unused spectrum. Experiences from other industries can provide useful insights into the nature of the issues with anti-competitive use of limited resources. However, spectrum and its downstream markets have relatively specific characteristics, and tools which are effective in order to address problems in one industry may not be available or useful in another.

As detailed in the report, in the near to medium term demand is likely to exceed supply in key bands. In prime spectrum, where demand will be high, avoiding distortion of competition will be imperative. The best remedy against spectrum-related competition problems is to make more spectrum available and apply least restrictive terms (which are similar between bands

and with minimal conditions). When sufficient quantities of spectrum are available competition issues should diminish. The transitional period will present it own set of distinctive problems and this is addressed in a separate ERG-RSPG report.

Where still necessary, a number of instruments are available to deal with radio spectrum competition issues. As described in the report any regulatory interference raises the opportunity cost of potentially beneficial spectrum acquisitions. The risk of deteriorating competition should be weighed against those costs. Furthermore, such instruments may not be able to solve all problems. Over time, as more experience is gained, it should be easier to draw conclusions as to the appropriateness of the different remedies for anticompetitive spectrum hoarding.

This report is the first attempt by the joint ERG-RSPG expertise to examine the issues with anticompetitive spectrum hoarding. It may be useful to revisit this topic at a point in time when markets have evolved and more experience has been gained of working with radio spectrum competition issues.