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ERG-RSPG Report on transitional radio spectrum issues

**ERG-RSPG report on competition issues arising from the
transition towards more flexible radio spectrum management for
electronic communications networks and services**

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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. Especially from a user perspective there is no fundamental difference between fixed and wireless networks when they offer similar services, or a similar user experience despite differences in access methods.¹

Convergence, in infrastructure as well as services, digitalisation and technological advance call for a new regulatory approach allowing more freedom for radio spectrum ("spectrum") licensees² including service and technology neutrality and trading of spectrum rights. This will support innovation and competition through the provision of new and better services. But it requires convergence in policies and regulatory approach as well and a common view and approach between regulators. In many situations 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 a joint work of the ERG and the RSPG in this area 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 and innovation. 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.

One of the areas identified where further analysis is considered necessary is the possible approaches to avoid competition distortions between users,

¹ In many situations, however, there are still differences between fixed and wireless services.

² Either under individual or general authorisation regimes.

both between existing users and new entrants, due to the transition to a more flexible spectrum management system, i.e. transitional issues.

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. 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 transitional issues in relation to individual authorisations.

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, individual authorisation of spectrum at a national level can potentially lead to competition issues such as transitional 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. NRAs have various tools to solve potential competition issues raised by the transition process.

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 closer ties between these regulations.

2.1. Regulatory background to authorisation of spectrum usage

There are four main areas in spectrum management - spectrum planning³, spectrum engineering⁴, spectrum authorization⁵ and spectrum monitoring and compliance⁶. At international level, the ITU Radio Regulations (RR) describes the various radio communications services for specific telecommunications purposes and regulatory coordination and notification procedures. The RR table of frequency allocations identifies the relevant spectrum allocations to various radio communications services. This allocation governs the development of national table of frequency allocations which identify the various opportunities for spectrum use at national level. While the RR identifies relevant spectrum allocations to

³ The allocation/assignment of spectrum to certain uses taking into account international agreements, technical characteristics and national priorities and policies, at international, European and national level.

⁴ 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.

⁵ Granting of access under certain specified conditions to the spectrum resource to specific users.

⁶ The monitoring of the use of the radio spectrum and the implementation of measures to correct interference and control unauthorized use.

various radio communications services 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 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, such as electronic communications networks and services, thereby limiting access to radio spectrum and how it may be used.⁷ This was a result of an overall strategic European initiative which also linked the standardisation of the relevant radio systems by the recognised European Standards Organisation (ETSI).⁸ Administrative assignment for electronic communications 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 initially introduced under the current European regulatory framework for electronic communications networks and services. The advantage of more flexible and market based approaches⁹ 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 used for a significant part of the spectrum.

The licence-exemption or general authorisation 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.¹⁰

Regulators need to find the right balance among the approaches based on such things as the general scarcity of spectrum, the resources available to

⁷ European Directive 87/372/CEE (GSM Directive), European Directive 90/544/EEC (Ermes Directive), etc.

⁸ See GSM and ERMES standards.

⁹ For an explanation of this concept, see the Commission Communication on a market-based approach to spectrum management in the European Union (COM 2005(400)).

¹⁰ See the RSPG Collective Use of Spectrum opinion (RSPG08-244).

the regulator, the types of use and opportunities for innovation and competition. As the report focuses on transitional issues under individual authorisation, where one of the challenges faced by spectrum regulators and managers is the reallocation of spectrum where rights of use have been already granted to electronic communications services.

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 regulations¹¹ and directives in this sector. The European Directives of particular significance for spectrum issues are the Framework Directive¹², the Authorisation Directive¹³ and the Access Directive¹⁴. 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 power¹⁵ and the Commission Recommendation on relevant product and service markets.¹⁶

The European regulatory framework for electronic communications networks and services entered into force in 2003. 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

¹¹ I.a. Regulation 717/07/EC on international roaming.

¹² 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.

¹³ 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.

¹⁴ Directive 2002/19/EC of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities.

¹⁵ 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.

¹⁶ 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.

proposed an evolution of spectrum policy principles.¹⁷ 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 European regulatory framework for electronic communications networks and services currently in force, NRAs are 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 European 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 coordinated 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 Decision¹⁸. 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 spectrum¹⁹,

¹⁷ 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.

¹⁸ Radio Spectrum Decision (676/2002/EC) adopted by the European Parliament and the Council on 7 March 2002.

¹⁹ See various EC Decisions; **2004/545/EC** on 79 GHz automotive short-range radars (SRR), **2005/50/EC** on 24 GHz automotive short-range radars (SRR), **2005/513/EC** on 5 GHz RLAN as amended by Decision **2007/90/EC**, **2005/928/EC** on the 169 MHz band (ex-ERMES), **2006/771/EC** on harmonisation of the radio spectrum for use by short-range devices (SRD), **2006/804/EC** on harmonisation of the radio spectrum for radio frequency identification (RFID) devices operating in the

working towards more efficient use of spectrum²⁰ and improving information about use of spectrum, plans for spectrum usage and availability of spectrum.²¹ 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. They do not conflict but rather complement one another in several ways. The European regulatory framework for electronic 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, based on an ex-ante approach with a relevant market analysis and a medium term perspective.

When competitive conditions have been established competition law is intended to take over and maintain competitive conditions with an ex post approach. The main objective of competition law is to prohibit measures which restrict competition unjustifiably and serve as a response to the breach of fair economic behaviour. Regulation, although its primary

ultra high frequency (UHF) band, **2007/98/EC** on the harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of systems providing mobile satellite services (MSS), **2007/131/EC** of 21 February 2007 on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community, **2007/344/EC** on harmonised availability of information regarding spectrum use within the Community, **2008/294/EC** on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft (MCA services) in the Community, **2008/411/EC** on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, **2008/432/EC** amending EC Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices (SRD), **2008/477/EC** on the harmonisation of the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, **2008/673/EC** amending EC Decision 2005/928/EC on the harmonisation of the 169,4-169,8125 MHz frequency band in the Community, **2008/671/EC** on the harmonised use of radio spectrum in the 5875 - 5905 MHz frequency band for safety related applications of Intelligent Transport Systems (ITS).

²⁰ See various EC Decisions above.

²¹ See EC Decision 2007/344/EC on harmonised availability of information regarding spectrum use within the Community.

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 complementary.

3. Transitional issues – what, why and where?

The present (and future) European regulatory framework requires that procedures for assigning spectrum usage rights be objective, non-discriminatory, transparent and proportionate in order to ensure effective competition in the sector. There is a need to look at possible approaches to avoid competition distortions between spectrum users, both between incumbents and new entrants, due to the transition to a liberalised spectrum management system. However, the regulatory framework for electronic communications and services can also cover asymmetric regulation mechanisms to support introduction of new entrants.²²

Ensuring effective competition does not necessarily imply that all competitors should have access to equivalent amounts of spectrum. Asymmetric holdings of spectrum rights of use do not necessarily create competition distortions but under an individual authorisation regime the transition to a liberalised spectrum management system can create a risk of such distortions.

3.1. What are transitional issues?

Further to the enforcement of the European regulatory framework for electronic communications networks and services, it is becoming increasingly common under an individual authorisation regime to grant new awards of spectrum for electronic communications, whether through auction or beauty contest, with minimum conditions attached. This gives maximum flexibility to those granted access to spectrum through the award to deliver the services which are most wanted by consumers and users. It also encourages innovation, allowing the successful applicant to develop new technologies, to use spectrum more efficiently and offer improved quality, choice and value for money to consumers. These principles of technology and service neutrality, already in force under the current regulatory framework for electronic communications and services are further strengthened in the Commission's proposals for new Directives covering the electronic communications sector, which also intend to facilitate the secondary trading of spectrum.²³

These same principles of technology and service neutrality can also be applied to existing users of spectrum for electronic communications

²² One example is the 2x5 MHz reserved for new entrants in the 4th 3G call for tender in France.

²³ These proposals are currently under discussion in the European parliament and the European council, see chapter 3.

services. Removal of regulatory constraints²⁴ that may have become unnecessary imposed through existing licence conditions can:

- offer new opportunities to network operators that are currently using spectrum by defining new and less restrictive technical conditions for spectrum use, taking into consideration current and future technical evolution foreseen by the industry in a given frequency band (for example see 900 and 1800 MHz bands)
- reduce spectrum scarcity by removing unnecessary constraints on the way in which spectrum can be used;
- avoid distortions arising between existing and new users of spectrum (relevant if only the latter would be able to operate under more flexible conditions); and
- reduce the risk of distortion of competition as barriers to entry will be lowered and potential bottlenecks removed. This will allow easier access to spectrum for new entrants and reduce the risk of a spectrum user being able to establish a position of market power in downstream markets as a result of the spectrum they hold.

In many cases the removal of unnecessary constraints from existing licences should be relatively straightforward. In particular, where rights relate to relatively small holdings of spectrum (such as for business radio) it is difficult to imagine circumstances where the removal of constraints would lead to distortions of competition. However, in relation to more extensive holdings it is possible to envisage scenarios where the removal of constraints could raise concerns, including in relation to competition.²⁵

Finally it is worth noting that transitional issues, by nature, are relevant in connection with the transition from one situation to another and so their effects tend to decrease in the long run.

3.2. Why do transitional issues arise?

Removing constraints from existing authorisations for electronic communications is likely to offer benefits to the licensee as they will have more freedom to offer a wider range of services and/or technologies. Consumers may also benefit from the availability of new and improved services or from cheaper equipment.

²⁴ Drivers for removal of regulatory constraints can range from licence expiry, market demand, and scarcity of spectrum to implementation of EC decisions.

²⁵ There are examples where new services were introduced without modification of the individual authorisations, see the GSM evolutions such as GPRS and EDGE.

However, while licensees and consumers may benefit from a wider range of services, providers offering similar services may find they are facing increased competition. Generally such increased competition should be beneficial in terms of being a driver of innovation, greater choice, higher quality and lower prices. However, if the impact is actually to distort competition then this would be a major cause for concern. In particular, if competition is distorted consumers would risk being disadvantaged as competitive pressures are likely to decrease in the longer term.

The most likely reason that concerns may arise is as a result of the different mechanisms under which licences have been granted and the different rights and obligations associated with such a license. For example, in the past licences were often allocated by beauty contest, an administrative or first-come-first-served basis and were specific to particular services or even technologies. In a few cases auctions²⁶ were employed. Independently of allocation mechanisms, the rights of spectrum use could include specific constraints. If some technology or service restrictions are subsequently removed from the rights of use, the licensee could find itself with access to some extremely valuable spectrum which can be used to provide a much wider range of services or the same services with more efficient technologies reducing relevant costs to deliver services and therefore create conditions for a potential competitive advantage. Such restrictions are progressively disappearing from licences as the European framework evolves towards a more liberalised approach. Therefore, new authorisations conditions would tend to have minimally restrictive conditions, giving more freedom to licensees to offer innovative services.

Someone else wishing to access such spectrum and provide these or other services would either need to acquire spectrum rights through the market (secondary trading) or, if there is unused spectrum, through a primary award. In both cases the amount of money they would need to pay could be extremely high.²⁷

3.3. What concerns do transitional issues raise?

It is worth noting that the benefit that accrues to the existing licence holder – known as a “windfall gain” – does not necessarily represent a competition problem. In particular, NRAs are concerned with getting best use of the spectrum and in such cases the removal of restrictions enables a better use to be realised. This is therefore likely to lead to a positive outcome. The fact

²⁶ GSM 1800 auction process in some EU countries by 1998 – 2003, ECC report 65 page 10

²⁷ It should be noted that the time to develop new radio solutions usually is considerably higher than in most other fields of product development. Therefore, there is often no viable substitution to spectrum access..

that the existing licence holder has also benefited is a separate issue which may not in itself raise concerns.

Of course other licensees offering similar services may take a different view, especially if they have paid or will have to pay substantial sums to secure access to spectrum, either through the secondary market or through a primary award. Such situations will need to be considered on a cases-by-case basis to assess if competition issues arise. As previously mentioned, market regulation also offers tools to address these issues.

A particular problem may arise if the spectrum from which conditions have been lifted has particular qualities, or if the availability of similar spectrum is limited, which is often the case.

- The removal of constraints may give the existing licensee an unfair competitive advantage, for example if they alone (or with a very limited set of competitors) are able to provide services either more cheaply or to a higher quality than others, simply because they have access to preferential spectrum. In such cases competition may be distorted as the operators with access to preferential spectrum may be able to exert power in the downstream markets.
- New technologies may require larger bandwidth to operate. An example is UMTS that requires 5 MHz while LTE requires practically from 5 to 20 MHz to deliver the potential of the technology. Modulation techniques may also differ.
- Availability of spectrum may limit the number of networks using the new technologies in parallel with the legacy network during a limited transitional period, and may lower the quality of service provided to end users in legacy networks. On the other hand, market pressure and competition may help ensure quality of service during the transition period mixing legacy and new technologies.

3.4. Where exactly?

Where individual authorisations for electronic communications have been granted, transitional issues are most likely to arise in the most sought after parts of the spectrum, especially in bands up to 2700 MHz. Inside this range, unused spectrum is extremely scarce as well as being extremely useful for a range of high value services.

It is worth noting that this issue is a transitional issue because spectrum scarcity is, at least in part, caused by the restrictions that are currently imposed through licences. Currently the most contentious and well known competition concern with the removal of existing conditions is in relation to the 2G GSM licenses at 900 and 1800 MHz. As restrictions are removed all

licensees will have more freedom to deliver a wider range of services, meaning that it should be more difficult for one or more licensee to dominate the provision of a particular service as a result of their rights of access to particular spectrum. Nonetheless, although the potential problem is expected to diminish in the longer term, it will still be necessary for regulatory authorities to maintain sufficient powers to deal with any competition issues that may arise. In particular, technical restrictions in order to avoid harmful interference will continue to be necessary and, due to great demand, there will be spectrum scarcity in certain key bands.

4. Areas where there is a potential case for transitional problems (transitional issues in practice)

The working group found that the member states' individual inputs were necessary for taking the work forward. Therefore, a questionnaire was distributed trying to focus on the areas best suited to pursuing the objectives of the joint working group. The inquiry focused on the identification of the transitional issues – regarding services, technology and national particularities. The following five questions were asked.

1. In what contexts are transition issues arising in your country? (e.g. 2G liberalisation; allowance of mobile services in 3.6GHz band)
2. What concerns are being raised? (e.g. distortion of competition, windfall gains, incompatibility with expectations at time of auction).
3. What analysis (if any) have you done of these concerns? Please provide links to any published analysis.
4. What options for addressing these concerns have been proposed or identified (if any)?
5. What analysis (if any) have you done of these options? Please provide links to any published analysis.

Replies to these questions were received from a large number of NRAs and Member States. The replies in general mostly described specific cases where there are transitional issues, most notably in the 900 MHz and 1800 MHz bands but also in some other bands. The answers to the questionnaire are presented in the Annex.

4.1. The 900MHz and 1800MHz bands

The most contentious and well-known competition concern relating to the removal of existing conditions is in relation to the GSM licenses in the 900 MHz and 1800 MHz bands. In most European countries this spectrum is currently used for, and restricted to use for, 2G mobile services – that is the provision of voice, text and lower speed data services. This position is the result of the existence of the European GSM Directive which covers the 900 MHz band and limits the technology that can be deployed in Member States. Currently, in most Member States technical restrictions included in existing GSM licences prevent the deployment of alternative technologies such as UMTS. Several European countries would like a swift adoption of a Directive amending the former GSM Directive allowing the 900 MHz band to be used for other services, including mobile broadband using 3G (in particular UMTS) and other technologies.

The European mandate for liberalisation has moved forward with the recent publication by the European Commission of a new draft Directive that would amend the GSM Directive and which is expected to be adopted in the summer of 2009. A number of Member States are currently trying to address the removal of technical restrictions from the existing 900 MHz and 1800 MHz licenses. This is a complex exercise in the light of the history of spectrum licensing as in many Member States the spectrum holdings of the mobile network operators are asymmetric and the availability of unused spectrum in the GSM 900 MHz, 1800 MHz and 2.1GHz bands varies from one administration to the other. Moreover, the 900 MHz band offers considerable advantages over higher frequencies in terms of building penetration and coverage: in particular the number of base stations required to build out a network is a lot smaller.

In some cases all of the band, particularly in the 900 MHz range, will be allocated and licensed to specific operators with little scope for making more spectrum available for new services. In such cases, allowing network operators with access to 900 MHz spectrum to deploy, for example, UMTS technologies, may give them a competitive advantage over operators that either do not have access to any spectrum in that band or have access to less spectrum in that band.

In other instances there may be some spectrum still available which provides an opportunity, for example, to introduce new market entrants or to assign further spectrum to existing operators. In such cases, renewal of 900 MHz authorisations could be an opportunity to ensure that a new entrant would benefit from the same right of use as incumbents. However, even where spectrum remains available it may not always be suitable for 3G for example if it is too fragmented. In such cases some regulators are considering a re-organisation of the relevant bands.

Many regulators are facing the challenge of how to ensure continuity of existing services while refarming the bands to facilitate new services. Typical objectives of regulators in dealing with the transition to new services may be to promote the reduction of costs, a greater choice and quality of services for consumers, and to facilitate new market entrants.

The particular spectrum rights of use holdings of the mobile network operators will be different in each Member State. Moreover licence conditions, including the expiry of existing licences (which could have implications for the timing and nature of new awards), will be specific to each Member State. This means that, although some issues may be common across a number of countries, solutions in response to the specific conditions and circumstances will likely need to be developed and applied at national level.

In many countries these issues are still under consideration and solutions have yet to be identified. Some of the possible ideas that are under consideration by the different Regulatory Authorities include:

- commercial agreements between the operators concerned;
- mandating spectrum release from existing 2G operators;
- new awards of spectrum at 900 MHz, in some cases reserved to new entrants;
- 3G infrastructure sharing;
- 3G roaming at 900 MHz;
- doing nothing for the time being and awaiting the expiry of existing licences.

A number of Member States are currently considering and/or consulting upon these and other issues. While solutions may be developed based on one, or a combination of the ideas above, it is equally possible that alternative proposals may be developed in order to meet the particular circumstances in individual Member States.

4.2. Other bands

Even though the vast majority of replies to the questionnaire from Member States identified transitional issues in the 900MHz and 1800MHz bands, potential transitional issues were also raised in response to the questionnaire, in the bands 450-470 MHz, 790-862 MHz, 2.6 GHz and 3.4-3.8 GHz.

The **450-470 MHz band** has been licensed in Member States for PMR land mobile services and currently heavily used by such networks and governmental services. Assignment restrictions have been used by some Member States for competition purposes, for instance by preventing operators with licences in certain bands from acquiring spectrum in this band.

The **790-862 MHz band**, generally associated with the digital dividend, could be described as spectrum over and above the frequencies required to support existing broadcasting services in a fully digital environment, including current public service obligations. The switchover from analogue to digital terrestrial TV by the end of 2012 will free up spectrum in Europe as a result of the superior transmission efficiency of digital technology. Part of the digital dividend could be used for wireless communications services. Some Member States have already reserved the relevant 72 MHz to be

granted, including for mobile communications networks. This is a reforming issue at national level.

A Commission communication²⁸ emphasises the urgent need for support and active cooperation of Member States and all stakeholders and a common approach to be adopted for spectrum planning to reap the full benefits of the digital dividend in Europe. This includes identification of common spectrum bands and coordination of the common bands at EU level with a focus on seeking the most valuable applications for the spectrum without preconditions and with maximum flexibility. An opinion on these issues is also foreseen in the 2009 Work Programme of RSPG.

The **2.6 GHz** band was addressed by the Commission in the decision²⁹ on the harmonisation of the 2 500-2 690 MHz frequency band. The Commission has supported a more flexible use of spectrum in a previous communication³⁰, which, inter alia, addresses the band. Technological neutrality and service neutrality have been underlined in the RSPG WAPECS opinion³¹ as important policy goals to achieve a more flexible use of spectrum. In the decision, the Commission states that the designation of the band for systems capable of providing electronic communications services is an important element addressing the convergence of the mobile, fixed and broadcasting sectors and reflecting technical innovation.

The **3.4-3.8 GHz band** has in a number of Member States been licenced for FWA (Fixed Wireless Access) or BWA (Broadband Wireless Access). A Commission decision (2008/411/EC) provides the technical conditions for the harmonisation of 3,4-3,8 GHz for terrestrial systems capable of providing electronic communications services within the community. These frequencies have often initially been envisaged for use by operators providing fixed Internet access to businesses and households. It has been proposed that the restriction limiting the service to “fixed” could be removed in line with the principle of service neutrality. By removing the restriction to the fixed service, licensees would additionally be able to offer mobile applications and thus potentially compete with other mobile communications networks.

²⁸ Reaping the full benefits of the digital dividend in Europe: A common approach to the use of the spectrum released by the digital switchover ([COM \(2007\)700 final](#)).

²⁹ Commission decision of 13 June 2008 on the harmonisation of the 2 500-2 690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, OJ L 163/37.

³⁰ Communication on Rapid access to spectrum for wireless electronic communications services through more flexibility, COM(2007) 50.

³¹ RSPG opinion on Wireless Access Policy for Electronic Communications Services (WAPECS) of 23 November 2005.

Implementation of the Commission decisions³² also provides a justification for the removal of unnecessary constraints in the existing licences. Otherwise the new licensees could gain an unfair competitive advantage. (The decisions on the harmonised use of the given frequency bands do not directly mandate the review of the existing licences but it is recognized in the Decision 2008/411/EC, Recital 10, that there may be a need to undertake measures to prevent distortion of competition.)

There may be significant consumer benefits from the removal of such a service restriction through the potential for increased competition with, for example, the mobile network operators. The licensees would also benefit from being able to make better use of the spectrum and provide services which are more valued by consumers. It is however possible to envisage scenarios under which some existing operators may have concerns given the different ways in which licenses have been awarded (eg auction, beauty contest and licence variation) for the provision of similar mobile services.

There are similarities between the more imminent problems NRAs and Member States foresee and face in the 900 and 1800 MHz bands and the possible problems in other bands. However addressing transitional issues in these bands may be premature now, and some more experience should be developed.

³² Commission Decisions 2008/411/EC and 2008/477/EC on the harmonised use of the 3400-3800 MHz band and 2500 - 2690 MHz.

5. Conclusions and possible implications

5.1. General

There are considerable benefits from the adoption of more flexible spectrum policies for European consumers. In particular, the removal of constraints on the way in which spectrum can be used can promote innovation and competition by giving spectrum users more flexibility over the technologies they can deploy and the services they offer.

Member States are at various stages in implementing the type of policies that have been described above. Many regulators are facing the challenge of how to ensure continuity of existing services while refarming the bands to facilitate new services. Typical objectives of regulators in dealing with the transition to new services may be to promote the reduction of costs, greater choice and quality for consumers and to facilitate new market entry.

Member States have identified potential transitional issues in some important spectrum bands. As is identified in Annex, most Member States point to the 900 and 1800 MHz band as the spectrum bands where the potential transitional issues are currently most serious and critical.

5.2. Issues

While the adoption of more flexible spectrum policies are expected to bring significant benefits overall there are regulatory challenges that need to be overcome. One such issue concerns approaches to avoid competition distortions between users (both between existing users and new entrants) due to the transition to a more flexible spectrum management system.

Such issues can arise because constraints included in licences when issued become unnecessary over time. As constraints are removed this allows licensees to use spectrum more efficiently and provide new or better services to consumers. Although this can have significant benefits, it can give some operators an advantage over others. If such advantage is unfair then this can result in competition distortions.

Regulators must also take care when awarding new spectrum that it does not result in competition distortions.

It is likely that such issues will continue to arise over the foreseeable future in key spectrum bands where demand exceeds supply. However, the particular spectrum holdings of operators such as mobile network operators will be different in each Member State. Moreover, licence conditions, including the expiry of existing licences (which could have implications for the timing and nature of new awards), will be specific to each Member State. This means that, although some issues may be common across a

number of countries, solutions in response to the specific conditions and circumstances will likely need to be developed and applied at national level.

5.3. Solutions

Tools available to Member States to deal with such transitional issues and ensure effective competition fall under two areas: ex ante provisions available under the regulatory framework for electronic communications networks and services and ex post provisions under competition law.

There are a range of different options that Member States are considering when dealing with transitional issues, such as

- commercial agreements between the operators concerned,
- mandating spectrum release from existing operators,
- renewal or change of duration of the authorisation ,
- new awards of spectrum, possibly reserved for new entrants
- infrastructure sharing,
- asymmetric regulation which could benefit new entrants,
- roaming arrangements between operators,
- doing nothing for the time being and awaiting the expiry of existing licences,
- sector-specific competition regulation on downstream markets (as necessary),
- relying on general competition law measures (as necessary).

Ensuring effective competition does not necessarily imply that all competitors should have access to equivalent amount of spectrum. Mechanisms can be employed to ensure effective competition even when spectrum holdings are unequal. These might – as indicated above – include roaming arrangements or commercial agreements between operators (which may or may not be imposed through regulations), such as MVNO arrangements. Mechanisms for imposing such arrangements by regulation of downstream markets are available under the European regulatory framework for electronic communications.

It would appear, however, that at this point is too soon to give a definite solution to or present best practices to problems identified by NRAs and

Member States on how to handle future transitional problems. The main reason for this is that while regulators are considering different ways to handle transitional issues, there is still little actual practice as such. This report should be seen as a contribution how to deal with these issues and point to available options. The issue in the 900/1800 band is stressing in many Member States and in due course more experience will be available, and further conclusions can be drawn on how to best deal with transitional issues.

Finally, even if not only economic considerations are to be taken into account in solutions to transitional issues, there would seem to be a need for further economic analyses of the costs and benefits of the various options available, for example measuring the value of windfall gains and the costs of any decrease in competition.

Annex: Examples of transitional issues in Member States

	In what context are transitional issues arising?	What concerns are being raised?	What analyses of concerns/options have been done?	Contact person
Czech Republic	<p><u>Transitional issue:</u></p> <p><u>Frequency band:</u></p> <p><u>Context:</u></p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ In the Czech Republic, no changes in the GSM 900 MHz with 2G services are intended for the time being. Two 3G networks are being operated in the 2 GHz band, however the UMTS 2 GHz licensees are not utilised fully because new UMTS networks are being deployed or planned by the operators. ▪ Windfall gains 	<ul style="list-style-type: none"> ▪ Periodic market analyses are carried out by the CTO in close cooperation with the Czech Office for the Protection of Competition, remedies are imposed in cases of competition distortions. Prepared or intended measures, adopted decisions and overview/summary of remedies and measures are available on the CTO website. ▪ A public discussion on the digital dividend http://www.digitalni-dividenda.cz/en/ 	
Denmark	<p><u>Transitional issue:</u> Reforming of the 900 and 1800 MHz bands</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> Refarming to</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ A forth 3G provider who does not hold any 900 MHz spectrum, and who has already launched a 3G network in the 2100 MHz 	<ul style="list-style-type: none"> ▪ Denmark has yet no published analysis on this subject. 	<p>National IT and Telecom Agency, NITA</p> <ul style="list-style-type: none"> ▪ Mette Schiøtz Sørensen,

	<p>enable the spectrum to be used for GSM, UMTS and other IMT2000 technologies. The spectrum is licensed to the three GSM operators, which are already developing 3G-networks in the 2100 MHz spectrum.</p>	<p>spectrum.</p> <ul style="list-style-type: none"> ▪ Distortion of competition between existing GSM operators and non-GSM operators. ▪ Demand from new entrants. 		<p>Deputy Head of Mobile Division</p> <ul style="list-style-type: none"> ▪ mss@itst.dk
<p>Finland</p>	<p><u>Transitional issue:</u> Digital dividend</p> <p><u>Frequency band:</u> 790-862 MHz</p> <p><u>Context:</u> Assignment of the upper UHF band for the provision of mobile broadband services</p> <p><u>Transitional issue:</u> Refarming of the 900 MHz band and future liberalisation of the 1800 MHz band</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> Re-organisation of the 900 MHz band, which included mandating</p>	<ul style="list-style-type: none"> ▪ Review of (technical terms and conditions attached to existing individual licenses, adequate level of technology neutrality and technical conditions (interference-free use) and geographical restrictions. ▪ Inefficiencies in the spectrum market which may disrupt the electronic communications markets? ▪ Windfall gains ▪ State aid issues ▪ Reassignment of individual rights (licenses) in a liberalized band ▪ Transitory periods ▪ Legacy issues 	<p><u>Analyses:</u></p> <ul style="list-style-type: none"> ▪ Transitional issues have been considered in internal working groups since 2005 ▪ The Ministry of Transport and Communications has published a report "A proposal for a model for market-based frequency management" (LVM 43/2008) http://www.lvm.fi/web/fi/julkaisu/view/559574 ▪ A decision on the refarming of the 900 MHz band http://www.ficora.fi/en/index/viestintavirasto/lehdistotiedotteet/2007/P_10.html ▪ Government Decision of June 2008 on Digital Dividend, based on the outcome of RRC06 & WRC07 and national consultations: 470 – 790 MHz for digital broadcasting, 790 – 862 MHz for broadband mobile communication <p><u>Options:</u></p> <ul style="list-style-type: none"> ▪ Auctioning, when current licenses expire ▪ Administrative incentive pricing together with a renewal of existing licenses ▪ Spectrum caps ▪ Sufficient powers of the NRA ▪ Review of the conditions attached to the existing licenses, removal of unnecessary constraints 	

	<p>spectrum release, will be completed by the end of 2009. From 1 January 2010 three network operators will have symmetric amounts of spectrum in the 900 MHz band and equal possibilities for UMTS.</p> <p><u>Transitional issue:</u> Refarming of the 2500-2690 MHz band (previously allocated to radio links)</p> <p><u>Frequency band:</u> 2500-2690 MHz</p> <p><u>Context:</u> Spectrum will be re-assigned for the provision of electronic communications services, on a technologically neutral basis, after a spectrum auction (foreseen in 2009).</p> <p><u>Transitional issue:</u> Allowance of mobile services in the 3.4-3.6 GHz band</p> <p><u>Frequency band:</u> 3.4-3.6</p>	<ul style="list-style-type: none"> ▪ Time frame for opening spectrum bands for trading ▪ Suitability for market-based mechanisms 		
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	<p>GHz</p> <p><u>Context:</u> Together with the implementation of Commission Decision 2008/411/EC the holders of existing FWA licences were provided a possibility to apply for a change in the licence conditions, to facilitate the use of mobile applications.</p>			
<p>France</p>	<p><u>Transitional issue:</u> Reuse of the 900 and 1800 MHz bands for UMTS</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> Renewal of 900 and 1800 MHz of 2 authorisations already effective including an obligation to leave spectrum in order that a new entrant access to a UMTS channel in the 900 MHz band. The third authorization under process</p>	<p><u>Concern:</u> 900/1800 MHz (remedies: an asymmetric regulation in 2,1GHz with a link to decisions in force in 900/1800 MHz introduced by renewal the authorisations of current licensees)</p>	<ul style="list-style-type: none"> ▪ ARCEP Decisions adopted on 5 July 2007 for the reuse of the 900 and 1800 MHz bands for 3G. ▪ A new entrant authorised in the 2.1 GHz band would be given access to a UMTS channel in the 900 MHz band. 	

<p>Germany</p>	<p><u>Transitional issue:</u> 2G flexibilisation</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> 4 network operators with access to spectrum at 900 MHz, 1,8 and 2 GHz with asymmetric amounts of spectrum at 900 MHz; two of them claim for more spectrum at 900 MHz to realise a 2G/3G simulcast at 900 MHz</p>	<p><u>Concern:</u> distortion of competition, if some players have significant cost-advantages due to access to 900 MHz spectrum</p>	<p><u>Publication:</u> Facilitating the flexibility of frequency usage rights in the 900 MHz and 1800 MHz bands</p> <p><u>Type of publication:</u> discussion paper</p> <p><u>Date of publication:</u> 19.11.2008</p>	<p>Federal Network Agency</p> <ul style="list-style-type: none"> ▪ Stefanie Wagner ▪ +49 228 14-1249 ▪ stefanie.wagner@bnetza.de
<p>Greece</p>	<p><u>Transitional issue:</u> 2G liberalization</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u></p> <p><u>Other transitional issues:</u></p> <p>Digital dividend, 2,6 GHz and 3,6GHz</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ unequal (asymmetric) spectrum rights of use ▪ No solution will be acceptable to all operators ▪ cross-border coordination 	<ul style="list-style-type: none"> ▪ A public consultation for the deployment of 3G networks in the 900MHz band has been conducted ▪ Consideration of the impact from the implementation of possible scenarios ▪ A number of options have been identified, although none of them has been thoroughly analyzed or formally presented to the market 	
<p>Ireland</p>	<p><u>Transitional issue:</u> Liberalisation of the 2nd generation frequency</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ Legitimate 	<p><u>Analyses (900 and 1800 MHz bands):</u></p> <ul style="list-style-type: none"> ▪ Document 09/14: Response to Consultation & Further Consultation: Liberalising 	

	<p>bands to facilitate the introduction of new wireless services.</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> Facilitating competition in provision of mobile services</p> <p><u>Transitional issue:</u> Introduction of mobility into the 3,4-3,8 GHz bands</p> <p><u>Frequency band:</u> 3400-3800 MHz</p> <p><u>Context:</u> Introduction of mobility in bands which until now have been designated for use by fixed wireless access services.</p>	<p>expectations</p> <ul style="list-style-type: none"> ▪ Competition issues ▪ Technology/service flexibility issues ▪ Licence duration ▪ Technical compatibility ▪ Distortion of competition. 	<p>the Future Use of the 900 MHz and 1800 MHz Spectrum Bands & Spectrum Release Options</p> <ul style="list-style-type: none"> ▪ Consultation document 08/57, “Consultation - Liberalising the Use of the 900 MHz and 1800 MHz Spectrum Bands” <p><u>Options (900 and 1800 MHz bands):</u></p> <ul style="list-style-type: none"> ▪ Document 09/14 responding to the earlier consultation in document 08/57 presents revised proposals on refarming of the 900 MHz band for consideration – lifting of restrictions on the technology and services that can be provided in the GSM bands, to increase the amount of spectrum available to users and options in relation to the award of new licences following the expiry of current licences in the 900 MHz bands. Responses are invited by the end of April 2009. <p><u>Options (3,4-3,8 GHz bands):</u></p> <ul style="list-style-type: none"> ▪ Document 06/17R5, “Revised Guidelines to Applicants for Fixed Wireless Access Local Area (FWALA) Licences” ▪ No options for analysis as yet. 	
<p>Italy</p>	<p><u>Transitional issue:</u> Refarming of the 900 and 1800 MHz bands</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ efficient use of spectrum ▪ windfall gains ▪ distortion of competition ▪ new entry 	<p><u>Analysis (900 and 1800 MHz bands):</u></p> <ul style="list-style-type: none"> ▪ A decision to pave the way to the refarming of the 900 and 1800 MHz bands (541/08/CONS) where all GSM operators should have the same total amount of spectrum in 900 and 1800 MHz with certain equality provisions to prevent windfall gains and ensure a more efficient use of spectrum, such as setting of usage fee and national 3 G roaming requirements, and provisions to allow new 	

	<p><u>Context:</u> A highly fragmented 900 MHz band assigned to 3 GSM operators with a limited part of the band free but practically unassignable</p> <p><u>Transitional issue:</u> Freeing up band previously used by the Defence</p> <p><u>Frequency band:</u> 3.5 GHz</p> <p><u>Context:</u> The band was previously used by the Defence that claimed a compensation for freeing up the band. Furthermore they claimed the need of an extended time to cease the use of some equipment</p>		<p>entry in the bands, ensuring more competition</p> <p><u>Analysis (3.5 GHz band):</u></p> <p>A decision with the assignment plan for the band, where the compensation for Defense was allocated to the State budget, ensuring no distortion in the 3.5 GHz band tender, and where a transitional sharing agreement was defined to ensure temporary coexistence with the Defense equipment.</p>	
<p>Portugal</p>	<p><u>Transitional issue:</u> provision of land mobile</p> <p><u>Frequency band:</u> 450 MHz</p> <p><u>Context:</u> In order to allow the entrance of new entities in the market for the provision of publicly available land mobile</p>	<p><u>Concern:</u></p> <p><i>General to all cases::</i></p> <p>Competition distortions</p> <p>Hoarding of spectrum</p> <p>Efficient use of spectrum</p>	<ul style="list-style-type: none"> ▪ The last Public Consultation was published in October 2007 http://www.anacom.pt/render.jsp?categoryId=255542&languageId=1 ▪ The operators already licensed for the use of the 900MHz, 1800 MHz and 2100 MHz were not allowed to participate in the tender. ▪ In order to foster competition and innovation the proposals are expected to include a commitment to support projects that contribute in particular to a sustainable information society which levers technological and economic development and, simultaneously, respects and strengthens the social, cultural and environmental balance. Additionally, it was decided to value proposals that include a wholesale offer (MVNO) to access to their networks. 	

	<p>services, a beauty context for the allocation of a frequency usage right in the 450-470 MHz band was opened. The assignment is done on a technology neutral basis, provided co-existence with other communications services and systems is guaranteed. Only one proposal was received and a finale decision is still pending.</p> <p><u>Transitional issue:</u> provision of mobile services in BWA frequencies</p> <p><u>Frequency band:</u> 3,4-3,8 GHz</p> <p><u>Context:</u> the goal is to give the possibility to provide mobile services in BWA frequencies, allocated on a technology neutrality basis.</p> <p><u>Other transitional issues:</u> Digital dividend, 2,6 GHz,</p>	<p><i>BWA:</i></p> <p>To promote widespread use of BWA, specially in remote areas, and increase number of market players.</p>	<ul style="list-style-type: none"> ▪ Some access restrictions are foreseen in order to allow new operators to enter the market - operators with existing rights of use in the band, operators designated with significant market power in the market of the wholesale provision of broadband access, and operators with existing rights of use for the provision of GSM/UMTS. ▪ The last Public Consultation for the 3.4-3.8 GHz band was published during 2007 where competition issues were raised. http://www.anacom.pt/render.jsp?categoryId=265662 	
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	2G liberalisation			
The Netherlands	<p><u>Transitional issue:</u> prolongation of licenses</p> <p><u>Frequency band:</u> 900 MHz</p> <p><u>Context:</u> 3 network operators with only two having access to spectrum at 900 MHz</p> <p><u>Other transitional issues:</u> 2,6 GHz and 3,5 GHz</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ The third operator, not having any 900 MHz spectrum at all (and an 1800 license expiring in 2013), feared to be disadvantaged ▪ distortion of competition ▪ public interest ▪ efficient use of spectrum 	<ul style="list-style-type: none"> ▪ Prolongation was proposed for 3 years (2010-2013) for two of the three remaining GSM operators. One of the two GSM license holders sold parts of its 900 spectrum ▪ A general goal of achieving more flexibility by offering more technological and service neutrality, for new and existing licenses ▪ A policy paper "Transitiekader" (Transition Framework) and a proposed amendment of the National Frequency Plan http://www.ez.nl/Onderwerpen/Betrouwbare_telecom/Frequentiebeleid/Beleid_in_voorbereiding/Flexibilisering_vergunningen_voor_mobiele_communicatietoepassingen 	
Lithuania	<p><u>Transitional issue:</u> Replanning of the 900 and 1800 MHz bands</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u></p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ 2G and 3G licences were granted on beauty contest ▪ Operators which have 2G licences also have 3G licences and competition possibilities are equal 	<ul style="list-style-type: none"> ▪ No analysis has been made yet. ▪ 2G/3G operators were asked to give the positions concerning replanning in the 900 MHz band. 	
Spain	<p><u>Transitional issue:</u> Use of the 900 and 1800 MHz bands for UMTS and other technologies</p> <p><u>Frequency band:</u> 900 and</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ Distortion of competition 	<p><u>Analyses:</u></p> <ul style="list-style-type: none"> ▪ Public consultation about the use of the 2.6 GHz frequency band and new modes of exploitation of the 900 MHz, 1800 MHz and 3.5 GHz bands. http://www.mityc.es/telecomunicaciones/Espectro/consulta/Paginas/consultas.aspx 	

	<p>1800 MHz</p>			
<p>Sweden</p>	<p><u>Transitional issue:</u> refarming of the 900 and 1800 MHz bands</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> 3 operators with access to spectrum at 900 MHz, 1,8 and 2 GHz with asymmetric amounts of spectrum. One operator has no 900 MHz spectrum.</p> <p><u>Other transitional issues:</u> 3,4-3,8 GHz, digital dividend, 2010-2025 MHz</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ Service continuity, how to enable that the services, the coverage and the infrastructure remain (primarily in the GSM-bands), ▪ Efficient migration to more modern technology with service continuity ▪ Legal issues about the possibilities to change specific licence conditions ▪ Incompatibility with expectations ▪ Distortion of competition if conditions are changed in already assigned licences ▪ Windfall gains not considered as a concern, unless they lead to distortion of competition. 	<p><u>Analyses:</u></p> <ul style="list-style-type: none"> ▪ Investigation about Digital Dividend (which would later lead to the decision to reform the 800 MHz-band) http://www.pts.se/upload/Documents/EN/Use_of_radio_spectrum_2006_35.pdf ▪ Analysis of the consequences of the 3,7 GHz BWA-decisions (in Swedish) http://www.pts.se/upload/Documents/SE/BWA_konsekvensutredning_remiss_070214.pdf ▪ Report (“Effective signals”), delivered to the Government in the summer 2008 (in Swedish with a summary in English) http://www.regeringen.se/content/1/c6/10/82/39/218d8063.pdf <p><u>Options:</u></p> <ul style="list-style-type: none"> ▪ Reassign frequencies when licences expire ▪ Renewal of licences based on rolling term ▪ To take back frequencies if they are not used (or misused) ▪ Use the technical conditions to address the concerns ▪ Other fees for frequencies <p><u>Solution for the 900 MHz band:</u></p> <ul style="list-style-type: none"> ▪ PTS approved a joint application from the operators TeliaSonera, Tele2, Telenor, Swefour and Hi3G on 13 March 2009. ▪ The proposals contained in the application entail five operators being able to supply services in the 900 MHz band instead of four operators, as is currently the case. ▪ PTS approved the application of these operators with a supplementary provision concerning coverage requirements to safeguard the current level of satisfactory mobile telephony coverage for consumers. ▪ The present licences in the 900 MHz band will be renewed ▪ The entire frequency space available in the 900 MHz band will be allocated, which will enable entry of a new stakeholder through PTS 	<ul style="list-style-type: none"> ▪ PTS ▪ Bo Andersson, Chief Economist ▪ +46 8 678 55 00 ▪ bo.andersson@pts.se

			<p>approving the transfer of frequency space to the operator Hi3G.</p> <ul style="list-style-type: none"> ▪ Mean that a larger proportion of the Swedish population can gain access to wireless broadband 	
Switzerland	<p><u>Transitional issue:</u></p> <p>Refarming of the 900 and 1800 MHz bands to allow GSM/UMTS</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u></p> <p>Market development and market demand call for a further flexibilisation of spectrum use. The spectrum is assigned to 4 GSM operators; 3 of them also have 2100 MHz UMTS licenses. 2 existing GSM operators do not have any or enough spectrum in the 900MHz band to offer UMTS.</p>	<p><u>Concern:</u></p> <ul style="list-style-type: none"> ▪ There is no specified mechanism foreseen for refarming during the license period. ▪ Current spectrum assignments are not symmetric across all players in the mobile market. ▪ Legal issues about the possibilities to change specific licence conditions 	<p><u>Analyses:</u></p> <ul style="list-style-type: none"> ▪ Internal analysis is ongoing 	
UK	<p><u>Transitional issue:</u></p> <p>liberalisation of the 2G licences in the 900 and</p>	<p><u>Concern:</u></p> <p>Potential for distortion of</p>	<p>Consultation on the application of spectrum liberalisation and trading to the mobile sector, published February 2009, available at:</p>	

	<p>1800 MHz bands</p> <p><u>Frequency band:</u> 900 and 1800 MHz</p> <p><u>Context:</u> 5 mobile network operators in the UK but asymmetric spectrum holdings – only 2 have access to spectrum at 900 MHz.</p> <p><u>Other transitional issues:</u> 3,4-3,8 GHz and potentially other bands where licence restrictions are being removed and/or licences were awarded through different mechanisms.</p>	<p>competition if some players have significant cost advantages in relation to the deployment of telecoms services as a result of their spectrum holdings.</p>	<p>http://www.ofcom.org.uk/consult/condocs/spectrumlib/</p>	
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