



EUROPEAN POLICIES SUPPORTING WIRELESS BROADBAND

Ken Pearson

Phillipa Marks

Plum Consulting Ltd, London

This paper discusses the recent development of European level policies regarding wireless broadband services, and in particular those adopted by the European Union. We address three main policy strands, namely broadband service provision in general, spectrum allocation and policies addressing competition issues in mobile markets. We find that the European Commission has successfully promulgated good practice spectrum management and encouraged greater flexibility, which allows harmonisation at a technical level but potentially some national variations in use. There has been growing centralisation of European policy making. Assuming that the demand for broadband services justifies further release of spectrum an inventory approach is necessary to identify potential bands for mobile broadband, and further centralisation of activity at European level seems inevitable given the need for harmonised allocations. Despite this, the prospect of a EU spectrum regulator is some way off given the opposition demonstrated by some national regulators.

INTRODUCTION

This paper discusses the recent development of European level policies regarding wireless broadband services, and in particular those adopted by the European Union. In a European context wireless broadband services are mostly delivered using mobile networks¹ and hence the focus of this paper is on policies that affect mobile broadband services. We address three main policy strands, namely broadband service provision in general, spectrum allocation and policies promoting competition in mobile markets.

The three policy areas are interrelated and we observe a general trend towards increasing use of spectrum allocation to achieve other policy objectives. Another key trend is greater centralisation of spectrum policy decisions moving from national to a European level. This can be seen as a response to European policy objectives to create a single internal market and also to consumer demand for low cost services and devices that operate seamlessly across borders. In addition, harmonisation of frequency allocations at a European level (or even wider) is necessary to achieve scale economies in competitive equipment production, services that can be used across Europe and to promote efficient spectrum use.

The paper is structured as follows. Section 2 describes the institutional arrangements for policy making at European level. Section 3 discusses overarching broadband policy under the umbrella of what is called the “Digital Agenda”. Section 4 discusses spectrum policy while Section 5 discusses policies aimed at promoting competition. Our conclusions are given in Section 6.

INSTITUTIONAL ARRANGEMENTS

Within the European Union (EU) there is a two tier structure for making policy and legislation in respect of electronic communications services, comprising an EU level and below that a national level. EU level legislation and policy must be agreed ultimately by the 27 Member States of the European Union². Once agreed, EU legislation must be implemented nationally by Member States within timescales that are specified in the relevant legislative measure. Implementation of legislation is monitored by the European Commission. There are several other bodies involved in the regulatory processes, and their involvement differs depending on whether issues concern the regulation of electronic communications services (which includes both fixed and mobile services) or spectrum regulation.

REGULATION OF ELECTRONIC COMMUNICATIONS

In the case of electronic communications services, the Body of European Regulators for Electronic Communications (BEREC)³ and its support office have an important role. BEREC was established in 2009 ([EC 11/2009](#)). It provides an interface between National Regulatory Authorities and the European Commission; it advises the Commission; and it develops and disseminates best practices with the overall aim of achieving consistent application and appropriate development of the EU regulatory framework.

During the decade before BEREC was established the European Commission made proposals for an independent European level regulator but these were repeatedly rejected by Member States and there has been an active academic debate on this issue ([Lehr and Kiessling 1999](#), [Broos et al. 2009](#), [Kiessling and Blondeel 1998](#)). In the 2007-2009 review of the EU regulatory framework, the Commission proposed that national regulators would continue to analyse their domestic markets, but that there should be a central European regulator having the final word on the regulation adopted at a national level ([Reding 2006](#)). Finally, a compromise position was reached in which Member States retain control of the Board of BEREC, but BEREC can comment on regulatory proposals from individual Member States and issue its independent opinion on regulatory issues.

SPECTRUM POLICY AND REGULATION

In the case of spectrum, responsibility for policy and regulation lies at the national level so that spectrum is allocated and assigned on a national basis⁴. However, there is a complex set of arrangements to achieve European spectrum harmonisation. In addition to the European Commission and national spectrum management organisations, there are three European bodies that are particularly important.

Firstly there is the European Conference of Postal and Telecommunications Administrations (CEPT) comprising 48 member countries (including all EU Member States) which develops spectrum harmonisation measures for Europe. Adoption of these measures by CEPT members is voluntary, unlike the case with EU harmonisation measures which are obligatory for EU Member States. Some of CEPT's work is in response to mandates from the European Commission and the outputs from this work provide the technical basis for EU harmonisation measures.

Secondly the EU Radio Spectrum Policy Group (RSPG) comprises representatives of the EU Member States and assists the European Commission on the development of spectrum policy. The third body is the Radio Spectrum Committee (RSC) which is also an EU body. It develops decisions on technical implementation measures for particular frequency bands which oblige Member States to harmonise their spectrum use.

In addition to the above, the European Telecommunications Standards Institute (ETSI) also has a role in developing European standards for all electronic communications services, including wireless services, and it also undertakes some work under mandates from the EU.

While BEREC and the RSPG address distinct areas of policy, they have recently cooperated to produce reports on competition issues relating to spectrum use. These include a report on competition aspects of the liberalisation of the technologies permitted to use the 900 MHz, 1800 MHz and other bands suitable for electronic communications services, and a report on infrastructure and spectrum sharing in mobile networks ([RSPG 2011a](#)). These documents provide factual information and discuss competition issues, but stop short of making specific policy recommendations.

A DIGITAL AGENDA FOR EUROPE

The overarching European policy context for the communications sector over the next 10 years is given in the Communication on the Digital Agenda published in 2010 ([EC 8/2010](#)). This document sets out a series of actions to be undertaken under the Europe 2020 Strategy. There is a strong emphasis on achieving economic growth through encouraging investment in ICT, and removing barriers to the use of services (e.g. lack of trust) and to the development of integrated single markets.

Actions relating to spectrum and competition issues are discussed in later sections. Here we focus on broadband policy proposals. The Digital Agenda proposes two specific targets for broadband access as shown in Table 1.

	Universal requirements. (accessible by all citizens)	Access to high speed broadband of 100 Mbps
2013	Basic broadband (speed not defined)*	No target
2020	Broadband with speed of at least 30 Mbps	50% of households
*National governments adopt their own definitions though there is often reference to 2 Mbps download and 256 Kbps upload. The European Commission uses a download speed of 2 Mbps when reporting on broadband take-up in the EU (EC 5/2010)		

Table 1 - EU broadband targets

While the role of wireless in achieving these broadband targets is acknowledged (particularly for rural areas) fibre to the home or possibly fibre to the cabinet/VDSL will be required if the objectives of achieving high-speed services are to be achieved. Although peak rates in wireless networks might achieve the lower end of this range using Long Term Evolution (LTE) technology in a fixed configuration, the target data rates of at least 30 Mbps are far beyond those of a fully loaded mobile LTE network (which are likely to be in the 5-10 Mbps range).

The financial cost of universal provision of a 30 Mbps minimum rate is likely to be very high. The European Commission has estimated that the total cost of achieving its high speed broadband targets would be around €270bn. This could be a significant underestimate of the likely cost. For example, a study undertaken by the Federal German Ministry of Economics estimates that the cost of fibre deployment for Germany would be €70-80bn ([Baujard 2011](#)). Germany is one of the more densely populated countries in Europe and accounts for almost a sixth of the EU population. A simple extrapolation suggests that cost estimates in excess of €500bn could be plausible.

A €7bn fund has been established by the European Commission to support investment in pan-European infrastructure over the period 2014-2020. This is arguably too small to have a significant effect on outcomes, although the Commission hopes this will stimulate private investment of €50-100bn through public private partnerships or other funding arrangements. The Commission expects the bulk of funding to come from the private sector and is at present exploring approaches that might provide appropriate incentives for this investment including preventing the price reductions for the main competing platform, namely, copper access

([Kroes 2011](#)). However, given the economic problems in many European countries a less ambitious target for affordable universal broadband is arguably more appropriate.

Even if substantial fibre deployments are achieved, broadband access will only be able to deliver economic benefits if broadband services are widely adopted and used. On current trends, and with current demand-side policies such as digital literacy initiatives, take-up of the broadband Internet will only increase slowly. In the EU 15⁵ it has been estimated ([Lewin 2010](#)) that from 2009:

- It will take eight years for Internet use among the 25-54 age group, who make up most of the workforce, to reach 90%
- It will take nearly 30 years to reduce the number of non-users from 60 million to 20 million.

To get non-users online, Member States could take advantage of current market trends such as the take-up of mobile broadband and smartphones, the introduction of Internet access via televisions and e-book readers, the move from browsers to applications and the trend towards cloud computing. These developments help lower the skill barrier to Internet use, improve accessibility for those with disabilities⁶ and reduce the cost of access. The Digital Agenda includes numerous measures aimed at making the Internet a safer place for consumers and producers and enhancing ICT skills. Arguably, there should be less focus on very high speed infrastructure and more emphasis on getting most people online – including the promotion of cheaper forms of delivery such as wireless broadband.

SPECTRUM POLICY

EU legislation on spectrum matters (often in conjunction with the regulation of electronic communications services) sets out broad principles for spectrum management, a framework for the development of harmonisation measures and includes specific harmonisation measures. In recent years, the policy and legislative measures have moved towards a more flexible approach to spectrum management. This includes technology and service neutral licensing, assignment processes that promote competition in final markets (e.g. in mobile markets) and promoting spectrum trading in certain bands where excess demand is evident ([Cave and Minervini 2009](#)). To support these measures a European Frequency Information System (EFIS)⁷ has been implemented to provide information on national spectrum allocations and assignments. By defining the use of frequency bands in terms of least restrictive technical conditions, Member States have the potential to deploy different applications in a given band providing they are consistent with ITU Radio Regulations. In practice however, the development of band plans means the choice of applications may be more limited than it first appears.

Closer co-ordination of spectrum policy is now envisaged in the proposed European Radio Spectrum Policy Programme (RSPP) which is an initiative in support of the Digital Agenda ([EC 12/2011](#)). The RSPP seeks to create a co-ordinated and strategic spectrum policy at the EU level.

The RSPP is due to run from 2012 to the end of 2015, though its principles and objectives will endure beyond that date. The final RSPP has the following main features.

- Member States are required to release the European harmonised “digital dividend” (790-862 MHz) by 2013. More generally tight deadlines will be set for authorising the use of harmonised spectrum.
- There will be a spectrum inventory conducted by the European Commission to identify potential bands in the frequency range 400 MHz to 6 GHz that can be harmonised for wireless broadband. The inventory is intended to identify bands that are currently used inefficiently and might be released on a harmonised basis across Europe.

- By 2015 the inventory aims to identify 1200 MHz of spectrum for wireless broadband services including existing wireless broadband allocations.
- The promotion of flexible spectrum use including collective and shared use. In support of this approach the EU is funding R&D activity around the use of cognitive radio for a range of applications including wireless broadband ([COST 2011](#)).
- Enhanced EU coordination in international spectrum negotiations.

The development of the RSPP has been contentious with some Member States resisting further intrusion into national control of spectrum policy. The spectrum inventory will, for example, require Member States to provide significantly more information to the Commission than is contained in EFIS and could involve the Commission in making judgements about the efficiency of national spectrum management policies. Some of the concerns, including those relating to information burdens and confidentiality have been reflected in a recent RSPG opinion on the RSPP ([RSPG 2011b](#)).

The incentives facing Member States are mixed. Where they want additional spectrum released for the same new services their incentives are aligned but each Member State will only agree to release those bands where the costs of migrating existing users are low. Even where bands are harmonised (e.g. for TV broadcasting) the costs of migration differ greatly between countries because of differences in the level of use of the bands and the availability of close substitute services (e.g. balance of cable, satellite, IPTV and terrestrial wireless reception of TV services). Finally, countries may also have divergent views over the appropriate future use of particular bands.

A LONG TERM SPECTRUM TARGET FOR WIRELESS BROADBAND

The basis for the RSPP target to identify 1200 MHz of spectrum for wireless spectrum by January 2015 has not been made public. It could relate to the overall broadband targets or to forecasts of mobile broadband traffic, but there is no evidence of this being the case. There may already be sufficient spectrum to meet the Digital Agenda broadband targets, given that wireless broadband will largely be used for access in rural areas where spectrum is plentiful. This suggests that additional spectrum is required to meet traffic growth in high demand areas. The inventory is expected to include a technology and demand assessment.

On the face of it the 1200 MHz target seems ambitious, given the inventory may not start until 2012/2013 and the Commission will need the support of Member States to assemble the relevant information on existing spectrum use of bands between 400 MHz and 6 GHz. However the 1200 MHz figure includes spectrum already planned to be assigned for wireless broadband across Europe which could total 610 MHz and there is an additional 400 MHz in the 3.4-3.8 GHz frequency range that could be used for the service⁸. This suggests that the objective is to find a further 200 MHz of spectrum. Frequency ranges used elsewhere in the world for IMT services could be candidates. These bands include 700 MHz, 1.5 GHz and 2.3 GHz but there are significant migration challenges, particularly for 700 MHz (which is currently used for TV broadcasting) and 2.3 GHz (which is used by a variety of military and aeronautical applications).

Some national regulators are taking the lead in identifying further spectrum for mobile broadband. For example Denmark, Ireland, Sweden and the UK all have plans to release spectrum in the 2.3 GHz band. CEPT is gathering information on the existing use of the band across Europe and has undertaken technical compatibility analysis between broadband wireless services and existing uses in the 2.3 GHz and neighbouring bands ([ECC 2011](#)). These are all necessary inputs to developing a European position on the future use of the band.

The European reaction to these initiatives is mixed. All agree on the need for harmonisation, but national interests present challenges in some instances. Some centralisation of harmonisation policy should help move implementation forward but the timescales remain challenging and the cooperation of national regulators is needed. In the meantime, many

national regulators are still focussed on the release of spectrum at 800 MHz and 2.5 GHz bands.

SPECTRUM RELEASE IN THE SHORT TERM

The RSPP proposal to mandate the release of 2 x 30 MHz of digital dividend spectrum in all Member States follows from an earlier move to ensure that the harmonised 2.5 GHz band is designated for mobile broadband use. As of January 2012, auctions of the 2.5 GHz band have already been completed in 15 of the 27 EU countries, and six of these have also awarded the 800 MHz digital dividend (see Figure 1). In 2012 a further four countries plan to release 2.5 GHz spectrum and nine countries plan to release 800 MHz spectrum, which means that the majority will have achieved the deadline set in the RSPP.

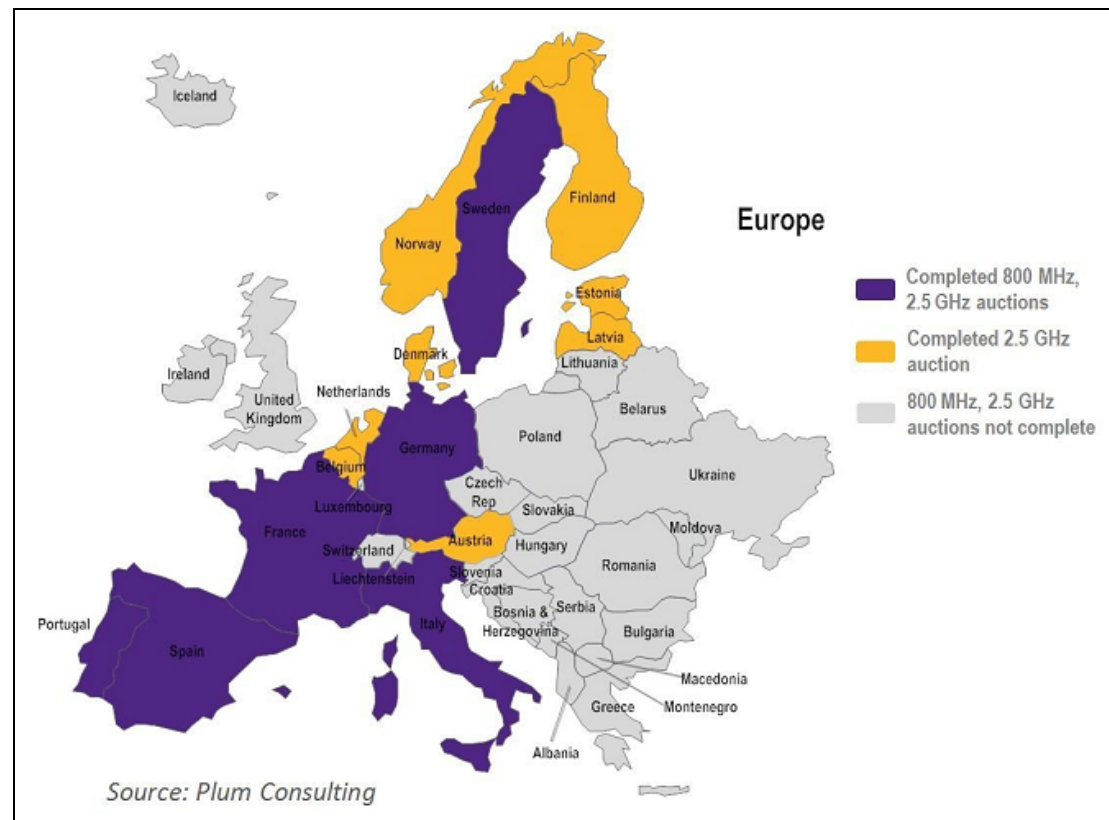


Figure 1 - 800 MHz and 2.5 GHz band awards in Europe as of January 2012

Prices paid for spectrum in these bands have varied over a wide range from €0.41 to €0.81/MHz/pop (i.e. per person) for the 800 MHz band and €0.001 to €0.17/MHz/pop for the 2.5 GHz band. The wide range in values can be attributed to differences in the competitiveness of mobile markets and the specific circumstances of spectrum supply in each country.

Despite the deadlines and need for spectrum to support mobile broadband, some countries have had less success in getting auctions underway. For example, the UK has been embroiled in legal moves regarding measures to safeguard competition in the auction design. In contrast, commercial LTE based services have already been launched in Finland, Germany and Sweden.

ENHANCING MOBILE BROADBAND COVERAGE

The 800 MHz and 2.5 GHz spectrum releases will reduce capacity constraints in urban areas. The 800 MHz spectrum will enable more cost effective provision of mobile coverage in rural

areas and deeper in-building coverage which accounts for the higher prices paid in auctions for this band.

However, access to sub-1 GHz spectrum is only part of the problem regarding delivery of mobile broadband services in rural areas. Operators must also be persuaded to roll out services in rural areas as doing so could reduce their profits. Some national regulators are addressing this point with coverage obligations. Some examples are as follows:

- In Germany, 800 MHz licensees (offering LTE services) must first build coverage for 90% of the population in villages having less than 5,000 inhabitants then progressively provide coverage to larger towns. The spectrum can only be used in cities once all towns having 50,000 population are covered. The approach has been successful in stimulating rollout; Deutsche Telekom plans to roll out 2500 sites by the end of 2011 (Deutsche Telekom 2011) and Vodafone claims to have already covered seven million German households (Vodafone 2011).
- In Sweden one 800 MHz licence has obligations to provide coverage to the 1,000-2,000 premises that lack access to broadband. There is a subsidy of SEK300m available to fund this rollout.
- In the UK, Ofcom has proposed that one of the 800 MHz licences carry an obligation to deliver services to 90% of the UK population.

In the absence of specific European targets, extending the footprint of mobile broadband is largely dependent on such national initiatives.

COMPETITION ISSUES

Regulation of mobile services in Europe now comprises a range of measures aimed at addressing specific market failures. The measures are summarised in Table 2. Direct price regulation has reduced termination and roaming rates, while the average time period for mobile number portability in the EU has been shortened from 8.4 days in 2007 to 4.1 days in 2009 and under the Universal Service Directive 2009 it must be cut to 1 day. In addition, regulators have sought to promote competition in mobile markets through spectrum assignment policy, i.e. outside the ambit of competition law which require standard competition tests for assessing the need for regulatory intervention.

	Measure and basis	Key points
Mobile termination rates	Ex ante price regulation under the Recommendation on Relevant Markets (EC 2007)	Charges to be set based on long run incremental costs (EC 5/2009)
Mobile number portability	Required under the Universal Service Directive (EC 18/12/2009 USO)	Numbers must be ported within one day and charges set at cost oriented tariffs
MVNO access	Regulated access may only be imposed if operator has significant market power in national market as per the Framework Directive (EC 18/12/2009 Framework)	A few countries have regulated MVNO access e.g. Cyprus, Ireland, Spain
International roaming – voice and data services	Price caps set by the EU, as price/cost relationship not as in a competitive market. Regulation is under review (see below)	Caps apply only to roaming in the EU. Note national regulators do not have powers to regulate international roaming.

Table 2 - Competition measures implemented by the European Commission

We discuss the competitive measures implemented in spectrum policy later. First we discuss some proposed changes in roaming regulation.

ROAMING

Roaming rates are one of the ‘Key Performance Targets’ for attaining the Digital Single Market and the target is that ‘the difference between roaming and national tariffs should approach zero by 2015’. Regulation in this area is currently under review. Wholesale mobile data charges are currently regulated as shown in the second column of Table 3.

Retail price caps (Euro cents)	Current	Proposed – July 2012	Proposed – July 2013	Proposed – July 2014
Data (per MB)	None	90	70	50
Voice calls made (per minute)	35	32	28	24
Voice calls received (per minute)	11	11	10	10
SMS (per SMS)	11	10	10	10
Wholesale price caps (Euro cents)				
Data (per MB)	50	30	20	10
Voice (per minute)	18	14	10	6
SMS (per SMS)	4	3	3	2

Table 3 - Price caps for international EU mobile roaming

The current regulation (“Roaming II”) expires in June 2012, and the European Commission has consulted on what should replace it. In its December 2010 public consultation in December 2010 ([EC 12/2010](#)), the Commission identified two sets of options for regulating the EU roaming markets from July 2012:

- A series of options which involves continued price regulation covering the same services that are currently regulated plus regulation of retail data charges
- A series of options designed to promote competition either by structural remedies or by introducing wholesale access for MVNOs and reseller.

Based on responses to this consultation and a report by BEREC ([BEREC 2011](#)) in December 2010, the Commission then developed a draft of the Roaming III Regulation to run from July 2012 to June 2022. This draft Regulation ([EC 7/2011](#)) proposes:

- Reducing price caps at both the retail and wholesale levels on EU roaming for voice, SMS and data until 2014
- Obligations on EU mobile operators to structurally separate roaming services from national services from July 2014, so that end-users can purchase roaming services from a separate supplier
- Retention of wholesale price caps at 2014 levels until 2022 (i.e. these are in essence safeguard price caps) and removal of the 2014 retail price caps in 2016
- Provide wholesale access to regulated prices to MVNOs and resellers.

These proposals in effect replace price regulation with a structural remedy from 2014 that is aimed at addressing the cause of lack of competition in international roaming, namely that

this service is for most consumers a small part of their overall mobile usage and so does not influence their choice of provider. With the possibility of having a separate roaming services provider greater competition should be fostered. On balance this appears to be a better outcome for operators than continued (and potentially tighter) price regulation, and has the advantage of reducing regulatory burden on the sector.

COMPETITION AND SPECTRUM

At the national level, spectrum policy is being used to encourage and/or maintain competition in mobile networks even in markets which are perceived to be reasonably competitive. In some cases, the spectrum policy intervention (e.g. spectrum caps in auctions) is intended to forestall future competition problems while in others it is to address existing problems (e.g. reservations of spectrum for new entrants). These various measures aim to ensure that cost advantages do not arise between operators as a result of differences in spectrum holdings and to encourage competition particularly at the network level.

ADDRESSING EXISTING COMPETITION PROBLEMS

Interventions that accompanied the liberalisation of 900 MHz and 1800 MHz bands appear to address a perception that the existing allocation of spectrum between operators is a problem. Under the EU Directive that liberalised the permitted use of the 900 MHz and 1800 MHz bands, National Regulatory Authorities were required to take account of competitive aspects of the liberalisation and if necessary redistribute spectrum between operators when the spectrum was liberalised ([EC 9/2009](#)). In practice this has led to numerous adjustments in spectrum holdings. For example, France has provided access to the 900 MHz band for the third operator. Spain and Denmark too have recovered spectrum and auctioned it to the remaining operators. More radical still, Ireland and the Netherlands plan to auction the incumbent operators' entire spectrum holdings at 900 MHz and 1800 MHz upon licence expiry. It is unclear how this requirement to redistribute spectrum amongst operators sits with requirements to show operators have significant market power before intervention on competition grounds is justified.

More direct measures such as setting aside spectrum for new entrants have been rare; one exception being the Netherlands where new entrants have had first call on the 2.5 GHz spectrum (taking all the paired spectrum), and 2 x 10 MHz is reserved for new entrants in the 800 MHz band. More generally, market entry at the network level is seen as unlikely since take-up of mobile services exceeds 100% in all EU27 markets and there is a current trend towards consolidation and network sharing.

Instead of increasing the number of network operators some countries foresee a vibrant Mobile Virtual Network Operator (MVNO) market as the most effective means of ensuring that competitive services are offered to consumers. For example, Portugal has placed MVNO access obligations on 800 MHz and 900 MHz licensees. France has gone further still and included operators' willingness to accommodate MVNOs as one of the two assessment criteria for 800 MHz and 2.5 GHz licence award (the other being price)

FORESTALLING FUTURE COMPETITION PROBLEMS

A major mobile competition issue across Europe is the need for all existing operators to have access to sub-1 GHz spectrum to enable cost effective provision of mobile broadband in rural areas and good in-building penetration. Most Member States have implemented spectrum caps in sub-1 GHz bands to guarantee access for more than one operator and many have also applied spectrum caps in the 2.5 GHz band. In countries where all operators have access to 900 MHz spectrum, this issue is less acute. However it is a major issue in the UK and Ofcom's current plans for the 800 MHz and 2.5 GHz auction are to ensure that at least four operators will have access to sub-1 GHz spectrum. So far all attempts at introducing remedies into the auction rules have prompted legal action by operators and delays to a process that

first started in 2006. France had a similar measure for the 2.5 GHz band in the recent auction in late 2011 where 2 x 15 MHz was guaranteed for each of the four operators so long as they applied.

CONCLUSIONS

This paper provides a high level overview of European wireless broadband policy. It addresses three policy areas: overall broadband service provision, spectrum allocation and a range of policies aimed at promoting competition in mobile markets.

We find that broadband targets at the EU level may be overly ambitious. Achieving high speed broadband on a universal basis requires extensive fibre rollout and this is unlikely to be economically justifiable. Instead, universal access objectives should be developed around the actual needs of those who have not yet adopted basic broadband services. Targets oriented around the average performance of ADSL systems today would require a broader consideration of low cost technologies, including wireless, and stronger synergies with mobile broadband networks.

With regard to spectrum management, the European Commission has successfully promulgated good spectrum management practices (e.g. transparency, release of information, non-discriminatory access etc.) and encouraged greater flexibility which allows harmonisation at a technical level but potentially accommodates some national variations in use. The digital dividend is a good example – the EC set a period of only six years for agreement of technical characteristics for the 800 MHz band and for release of the band in all Member States. In addition, the band plan for 2.5 GHz was first proposed by CEPT and has now become a globally harmonised band.

One area where national regulators can be expected to take different approaches is with regard to competition interventions, since the competitive environment differs from country to country. Although mobile markets in the EU are often considered competitive, there remains a concern that differences in spectrum access can result in competitive distortions (even if not apparent in market analysis). Hence national interventions have been commonplace in spectrum auctions and tenders.

The range of interventions to promote competition is expanding and these are likely to continue because of concerns over further network consolidation. As networks consolidate, service- and device-level competition becomes more important. In future, we could see expansion of MVNO access provisions and regulations aimed specifically at promoting net neutrality.

There has been growing centralisation of European policy making as evidenced by the activities of the RSPG, the creation of BEREC and the RSPP initiative. Assuming that the demand for broadband services justifies further release of spectrum, an inventory of current use of a range of bands is necessary to identify candidate bands that can be released in a cost effective manner. Further centralisation of activity at European level seems inevitable given the need for harmonised allocations to meet consumer needs and for efficient spectrum use. Despite this, the prospect of a EU spectrum regulator is some way off given opposition by some national regulators.

REFERENCES

- Baujard, Olivier. 2011. 'Converging and doing things differently'. Broadband World Forum 2011. 27-29 September 2011. Accessed 12 December 2011. Available from: <http://www.slideshare.net/ceobroadband/olivier-baujard-deutsche-telekom-group-bbwf-2011-keynote-day-2>

- BEREC. 2011. 'International Mobile Roaming Report', Body of European Regulators for Electronic Communications. December 2010. Accessed 12 December 2011. Available from: http://erg.eu.int/doc/berec/bor_10_58.pdf
- Broos, L C P; Heldeweg, M A; Wessel, R A. 2009. 'European organization of telecom regulators and the impact on the pace of telecom innovations: Is EU modesty hampering innovation in telecom? Think global, act local...'. Second annual conference on competition and regulation in network industries. Centre for European Policy Studies, Brussels, Belgium.
- Cave, M; Minervini, L. 2009. 'Monitoring EU Telecoms Policy: Spectrum Policy'. *Monitoring EU Telecoms Policy*. NEREC. September 2009. Accessed 12 December 2011. Available from: http://www.nerec.es/wp-content/files/NEREC_report.pdf
- COST. 2011. 'Cost Action IC0905 TERRA puts smart environment sensing Cognitive Radio (CR) on a trial'. [Internet]. European Cooperation in Science and Technology. 16 August 2011. Accessed 12 December 2011. Available from: [http://www.cost.eu/library/newsroom/CR_trial/\(glossary\)/off](http://www.cost.eu/library/newsroom/CR_trial/(glossary)/off)
- Deutsche Telekom. 2011. 'Telekom starts 4G offensive - mobile broadband for the Gigabit Society'. [Internet]. Press release: 15 February 2011. Accessed 12 December 2011. Available from: <http://www.telekom.com/dtag/cms/content/dt/en/596270?archivArticleID=989654>
- EC. 2007. 'Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation'. European Commission. 17 December 2007. Accessed 12 December 2011. Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:344:0065:0069:EN:PDF>
- EC. 9/2009. 'Directive 2009/114/EC amending Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the community'. European Commission. 16 September 2009. Accessed 12 December 2011. Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF>
- EC. 5/2009. 'Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU'. European Commission. 7 May 2009. Accessed 12 December 2011. Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF>
- EC. 11/2009. 'Regulation (EC) No. 1211/2009 of the European Parliament and of the Council'. European Commission. 25 November 2009. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/policy/ecomm/doc/121berec.pdf.
- EC. 18/12/2009a Framework. 'Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services as amended by Directive 2009/140/EC'. European Commission. 18 December 2009. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/policy/ecomm/doc/140framework.pdf
- EC. 18/12/2009b USO. 'Directive 2002/22/EC on universal service and user's rights relating to electronic communications networks and services as amended by Directive 2009/136/EC'. European Commission. 18 December 2009. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/policy/ecomm/doc/136univserv.pdf
- EC. 5/2010. 'ICT Country Profiles'. Vol 2. European Commission. 17 May 2010. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/digital-agenda/documents/countryprofiles.pdf
- EC. 8/2010. 'Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A

- Digital Agenda for Europe'. European Commission. 26 August 2010. Accessed 12 December 2011. Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:EN:PDF>
- EC. 12/2010. 'Consultation on a review of the functioning of the Roaming Regulation (EC) No 544/2009'. European Commission. December 2010. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/activities/roaming/regulation/consult2011/index_en.htm
- EC. 7/2011. 'Regulation on roaming on public mobile communications networks within the Union'. European Commission. 6 July 2011. Accessed 12 December 2011. Available from: http://ec.europa.eu/information_society/activities/roaming/docs/roaming_recast11.pdf
- EC. 12/2011. 'Press release 3134th Council Meeting Transport, Telecommunications and Energy'. European Commission. 12th and 13th December 2011. [Internet] Accessed 11 January 2012. Available from: http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/eu_policy/rspp/index_en.htm
- ECC. 2011. 'Draft ECC Report 172, Broadband Wireless Systems Usage in 2300-2400 MHz'. Electronic Communications Committee. 11 November 2011. Accessed 12 December 2011. Available from: <http://www.cept.org/ecc/tools-and-services/ecc-public-consultation>
- Kiessling, T; Blondeel, Y. 1998. 'The EU regulatory framework in telecommunications'. *Telecommunications Policy* 22 (7), 571-592.
- Kroes, N. 2011. 'Incentives to invest in the future: creating an open, competitive telecoms market'. Speech to European Competitive Telecommunications Association (ECTA), Brussels on 28 November 2011. Accessed 12 December 2011. Available from: <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/11/815&format=HTML&aged=0&language=EN&guiLanguage=en>
- Lehr, W; Kiessling, T. 1999. 'Telecommunication Regulation in the United States and Europe: The Case for Centralized Authority'. *Competition, Regulation and Convergence: Trends in Telecommunications Policy Research*, S. E. Gillett and I. Vogelsang (Eds.). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Lewin, D. 2010. 'Demand-side measures to stimulate Internet and broadband take-up'. *The Vodafone Policy Paper Series* 10. March 2010. Accessed 12 December 2011. Available from: http://www.plumconsulting.co.uk/pdfs/Plum_March09_Demand-side_measures_to_stimulate_Internet_and_broadband_take-up.pdf
- Reding, V. 2006. 'From Service Competition to Infrastructure Competition: the Policy Options Now on the Table'. Proceedings of the European Competitive Telecommunications Association Conference 2006. Brussels. 16 November 2006. Accessed 12 December 2011. Available from: <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/697&format=HTML&aged=0&language=EN&guiLanguage=en>
- RSPG. 2011a. Opinions. [Internet]. Accessed 12 December 2011. Available from: http://rspg.groups.eu.int/rspg_opinions/index_en.htm
- RSPG. 2011b. 'Draft RSPG Opinion on Review of Spectrum Use'. Radio Spectrum Policy Group. 16 November 2011. Accessed 12 December 2011. Available from: http://rspg.groups.eu.int/consultations/consultation_spectrum_review_111121/rspg11_391_opinion_spectrum_review.pdf
- Vodafone. 2011. 'Drolshagen-Dumicke jetzt an die Datenautobahn angeschlossen'. [Internet]. Press release: 11 November 2011. Accessed 12 December 2011. Available from: http://www.vodafone.de/unternehmen/presse/pm-archiv-2011_195335.html

ENDNOTES

1. There are around 300,000 fixed wireless broadband (terrestrial and satellite) subscribers in the EU15 as compared with 139m mobile broadband subscribers i.e. subscribers with a 3G phone or 3G/LTE data card.
2. The Council of Ministers (for the 27 Member States) makes the final decisions, though the process also involves the European Parliament.
3. BEREC has a Board comprising the heads of the 27 National Regulatory Authorities.
4. One exception has been a recent EU-wide award of licences for mobile satellite services though even here operators must obtain frequency licences from Member States.
5. The 15 EU member states before expansion in 2004.
6. Through applications that address some of the needs of the disabled including voice activation, colour naming, barcode scanning and position sensing applications.
7. Available at <http://www.efis.dk/>
8. Particularly in the 3.4-3.6 GHz range.

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