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IMPACT ASSESSMENT

Accompanying document to the

Proposal for a

DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

establishing the first radio spectrum policy programme

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Disclaimer:

This report commits only the Commission's services involved in its preparation and does not prejudice the final form of any decision to be taken by the Commission

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MODIFICATIONS FOLLOWING THE OPINION OF THE IMPACT ASSESSMENT BOARD

In response to the suggestions of the Impact Assessment Board (Opinion dated 2 July 2010), and in addition to specific modifications based on a quality assessment carried out prior to the Board's deliberations, the following changes have been introduced in the text of the final report.

- (1) The problem definition has been developed to clarify the functioning of the current radio spectrum framework;
- (2) Better explanation of the link between two main identified problems, i.e. suboptimal use of spectrum and mismatch between demand and available spectrum resources, and the objectives of the programme;
- (3) The preferred option in relation to climate change has been clearly identified;
- (4) The importance for the internal market of issues covered by an extension of the programme beyond electronic communications services has been explained.
- (5) Noting the importance attached to the need to accompany follow-up measures that are likely to have significant impacts with separate impact assessments, an indication is provided of those follow-up measures for which it is already clear that such an impact assessment will be required. Information is also provided in chapter 6.7 regarding those measures for which the need of a further impact assessment will have to be examined, based on the guidelines developed in the Commission, once preparatory work has been completed and the form of possible action identified;
- (6) Changes have also been introduced with regard to the presentation of the report.

1. BACKGROUND, CONTEXT AND CONSULTATION

1.1. Background and context

Radio Spectrum is an essential resource for many services: mobile, satellite and fixed wireless communications, TV and radio broadcasting, transport, navigation systems (GPS/Galileo), and many other applications (medical equipment, alarms, remote controls, hearing aids, microphones, etc.). Radio technology supports public services such as defence, security/safety and scientific activities (e.g. meteorology, Earth observation and monitoring, radio astronomy and space research). The European mobile industry supports 3.5 million jobs, generates around €130bn in tax revenues for European governments, and contributes €140bn directly to European GDP.ⁱ

As a measure of the importance of these wireless applications and services to society and the economy, access to radio spectrum has become essential in efforts to promote economic recovery and growth, to ensure high-quality jobs and long term EU competitiveness, and to bridge the digital divide. Developing a co-ordinated radio spectrum policy is therefore a matter of strategic importance for the European Union, as this is needed to enhance a genuine single market for wireless services and equipment, while creating new opportunities for innovation and maximising the efficient use of the resource. An effective EU spectrum policy will amplify the positive impact of these wireless services and equipment on economic recovery and social integration across the EU.

This Impact Assessment accompanies a proposal for an EU radio spectrum policy programme which sets out policy orientations and objectives for the strategic planning and harmonisation of the use of radio spectrum to achieve these goals. Implementing such a policy will be instrumental to the forthcoming 'Digital Agenda for Europe' and the role it has to play in fulfilling the targets of the 'Europe 2020' initiative, the European strategy for smart, sustainable and inclusive growth.

The envisaged Programme takes its inspiration from the recently adopted legislation on the regulatory framework for electronic communicationsⁱⁱ. This states that the Commission may submit a multi-annual Radio Spectrum Policy Programme (RSPP) to be adopted by the European Parliament and Council. The general goal to be achieved by the RSPP is stated in Article 8a(3) of the amended Framework Directive: "Such programmes shall set out the policy orientations and objectives for the strategic planning and harmonisation of the use of radio spectrum in accordance with the provisions of this Directive and the Specific Directives." The Programme will therefore set out the guiding principles and the objectives to be followed by Member States and EU institutions in the field of radio spectrum and will indicate the initiatives that will be taken to allow a swift implementation of these principles and objectives.

1.2. Consultation and expertise

1.2.1. Overview of main consultations of external stakeholders

Interested parties were given several opportunities to provide their input through the consultation process conducted by the Commission, which has played an integral part in the development of the radio spectrum policy programme and of this impact assessment:

- The Spectrum Summit organised jointly by the European Commission and the European Parliament on the 22-23 March 2010, which was a significant and high profile consultation exercise. It demonstrated a clear understanding amongst EU institutions, Member States' representatives and stakeholders of the need for significant efforts and some difficult decisions in order to ensure that more radio spectrum will be accessible for the applications having the highest social and economic impact (summary of results attached in Annex 1),
- Public consultation on the draft proposals set out in a consultation document entitled "Public Consultation/Call for Input in preparation for the Radio Spectrum Policy Programme"; this closed on 9 April 2010 and generated over 100 contributions (summary of results attached in Annex 2).

As well as the public consultations and discussions with stakeholders, and in line with the Framework Directive, the Commission requested the Radio Spectrum Policy Group (an advisory body established by the Commission, composed of high-level officials from the Member States) to provide a formal opinion on the Programme, which was subject to a separate public consultation (draft attached in Annex 3). The Commission shall take utmost account of this Opinion in finalising the draft proposal.

The Commission has complied with the minimum consultation standards laid down in the impact assessment guidelines as the consultations have lasted a total of eight weeks (4 each) and a further possibility was given to stakeholders to express their views at the Spectrum Summit.

1.2.2. Internal consultations

Regarding internal consultations, other services of the Commission with a policy interest in the subjects involved have been associated in the development of this analysis. An Impact Assessment Steering Group including all relevant services was established, and met first on 9 February 2010 to discuss the roadmap for this impact assessment. The Interservice Steering Group was also intended to facilitate the identification of areas where radio spectrum can contribute to attaining the political priorities of the European Union, which might include new areas and/or areas of strategic importance. A second took place on 12 April 2010 to discuss this impact assessment.

The Inter Service Steering Group was drawn from the existing Spectrum Inter Service Group, however further representatives of policy areas were invited to reflect the strategic scope of the Radio Spectrum Policy Programme, together with other Directorates of DG INFSO. Together with other units in DG INFSO, DG ENTR, DG MOVE (former DG TREN), DG SANCO, DG EMPL, DG AGRI, the services of JRC in Ispra, the Legal Service and the Secretariat General were represented at, or have contributed to, the meetings.

1.2.3. Main conclusions from the consultative process

Summary of results of the Spectrum Summit

At the Spectrum Summit there was agreement on the need to be ambitious in the implementation of spectrum policy at EU level. The Summit recognised the importance of spectrum in supporting EU policy initiatives to foster economic growth and social inclusion, especially through the development of wireless broadband, but also for the development of broadcasting, smart energy grids and applications for public safety, amongst other applications outside the realm of electronic communications services. The efficient use of

spectrum was a key principle that met with unanimous support, and which in the future could be facilitated through effective and regular reviews of spectrum use. The fact that economies of scale cannot be created in Europe without EU co-ordination and, where necessary, harmonisation, was a recurring concern. Some diverging views were expressed, and there was a clear acknowledgment that difficult decisions would have to be taken because of the difficulty of reconciling competing needs and interests in the use of the scarce resource that is spectrum. Further details of the main points of discussion of the Summit are given in Annex 1.

Summary of the Public Consultation

In total over 100 contributions were received from a wide range of stakeholders responding to the questions raised in relation to a range of topics envisaged to be address in the Radio Spectrum Policy Programme. The answers received represent a valuable input to the Impact Assessment and are duly taken into account; moreover in some cases the input received is specifically mentioned in sections 5 and 6 of this document. The majority clearly addressed spectrum issues related to the digital dividend, which appears presently to be the area in which radio spectrum policy can have the largest impact on economic growth and social inclusion. There was widespread agreement that spectrum should be used efficiently, in particular where demand is high. Several respondents proposed to review the efficiency of spectrum use, while others emphasised the need for stability of investment. Another important aspect for many respondents was the need for action to develop broadband for all.

A summary of contributions received is attached in Annex 2. Views were most divergent in relation to potential European coordination of assignment procedures, where a significant number of stakeholders have called for further coordination at European level, but Member States insist in maintaining this competence at national level. Another area in which there was a significant difference of opinion was in relation to the possible identification of a second sub-band for electronic communications services in the digital dividend spectrum below 1 GHz. On this issue there were significant divergences of views between stakeholders and between national administrations.

1.3. Structure of this Impact Assessment

This impact assessment follows as far as possible the guidelines by the SG and is structured accordingly:

- Chapter 2 gives the problem definition by explaining the issues and challenges concerning spectrum that arise from EU policy goals and political priorities, and in light of the current inefficiencies in the management and usage of radio spectrum.
- Chapter 3 identifies general principles and objectives to be established in response to those EU policy goals and political priorities.
- Chapter 4 examines the policy options for spectrum to be addressed by the RSPP and sets out the link between the problem definition, the general principles and objectives and the subsequent analysis of specific initiatives.
- Chapter 5 assesses the potential impact of choices to be made regarding a spectrum policy programme, including issues regarding the format and scope of the RSPP.

- Chapter 6 assesses the impact of different types of initiative related to spectrum policy to be retained for the first RSPP.
- Chapter 7 examines the monitoring and evaluation requirements of the RSPP.

2. PROBLEM DEFINITION

2.1. Fundamental challenges associated to radio spectrum management

Radio spectrum is a scarce resource, the use of which is limited by the laws of physics and the rate of technological progress. The demand for high quality and cost effective spectrum bands is rapidly growing. Scarcity is present when the demand for spectrum usage exceeds the spectrum resources available, and this is most obvious when new technologies pave the way for new usages and applications that compete for spectrum. Scarcity can also be induced or amplified by inefficient management of spectrum (a regulatory issue), particularly when management models have been developed in a time of less demand and less scarcity, or by inefficient technical usage of spectrum (a technical issue).

The ITU has estimated the future spectrum bandwidth requirements for the development of IMT-2000 and IMT-advanced systems (i.e. 3G and 4G mobile communications) as amounting to between 1280 and 1720 MHz in 2020 for the commercial mobile industry for each ITU region including Europe (ITU Report ITU-R M.2078). In the same vein, considering the important increase in data traffic volumes, reports indicate that spectrum needs per operator might multiply by up to 8 times within the next decade. Such an increase will impose significant constraints on wireless operators and require the freeing of additional spectrum.

The highest growth rate in the EU broadband market is indeed in mobile broadband, where take-up increased 115% in the last year¹. Wireless technologies are increasingly important in the push for innovation and growth, and particularly in meeting the need for broadband communications services in combination with the mobility function which is relevant for a growing number of applications². Wireless broadband also constitutes an economic access platform in areas where fixed broadband access cannot be realised at bearable costs.

As an illustration of the challenge for wireless broadband, it should be considered that for 4G mobile communications, while 2x5 MHz are necessary for speed of 38 Mbps, 2x10 MHz are necessary for 75 Mbps, and 2x20 MHz for 150 Mbps. Globally, mobile data traffic will double every year through 2013, increasing 6 fold between 2008 and 2013.

Capacity requirements per application

<i>Application</i>	<i>Capacity</i>
Mobile voice call	6-12 kbps
Text-based email	10-20 kbps

¹ Jan 2009 to Jan 2010, See *Europe's Digital Competitiveness Report*, 2010. Mobile data volumes have corresponding large increases with, for example, OFCOM estimating a UK volume growth of 2300% in the past 2 years.

² Beyond general internet access, broadband wireless communications offer a significant usage potential in areas such as eHealth, assisted Living, ePayment, multimedia entertainment, social networking, location based services etc.

Medium-quality music stream	128 kbps
Basic high speed internet	1 Mbps
Internet video	1 – 2 Mbps
Standard definition TV	2 Mbps
high speed internet	5 Mbps
High definition TV	7.5 – 9 Mbps
Multimedia web interaction	10 Mbps
Enhanced high speed internet	10-50 Mbps up to 100 Mbps

Source: Based on Rysavy Research, 2010.

As demand for wireless services increases, the key priority will be to make effectively available to users those frequencies that have already been earmarked through harmonised allocations, including radio spectrum to be released from the digital dividend and from the reutilisation of frequencies hitherto reserved for second generation (GSM) services. It must also be ensured that sufficient and appropriate spectrum for both the coverage and the capacity needs of wireless broadband technologies is designated and made available to achieve the target set above for 2020. The positive effects of these measures on broadband development can be amplified by concerted efforts by Member States to maintain and promote effective competition by introducing spectrum trading and by taking measures to prevent potential distortions when modifying existing licences.

In view of the above, two main problems can be identified:

- Suboptimal use of spectrum with regard to the potential economic, social and environmental benefits.
- A mismatch between the growing demand for new wireless services and available spectrum resources.

In both cases inefficiencies in the distribution and use of spectrum create costs, lead to wasted opportunities for business and society, reduce the take-up of innovative technologies and services and may result in both public and commercial services not being available. Minimising these problems requires developing a stronger and more coherent vision of the manner in which spectrum is to be used, in order to be able to make the increasingly sensitive choices that need to be made on the use of spectrum.

The increasing significance of spectrum use as an enabler for sustainable growth, competitiveness and productivity in the European internal market, and in important European sectoral policies, needs to be taken into account. Coupled with the fact that not all demand for spectrum can be satisfied, this means that priorities need to be defined which ensure that spectrum is allocated and used in an efficient and effective way, taking into account the policy objectives of the European Union and ensuring the avoidance of harmful interference.

As well as tackling inefficiencies, therefore, setting priorities in the RSPP will also help to improve and streamline the management of spectrum so that the impact of scarcity is mitigated as much as possible. This will facilitate the development of technical implementation measures under the remit of the Radio Spectrum Decisionⁱⁱⁱ.

It should also help to identify where there may be added value in EU-wide harmonisation even in regard to assignment of spectrum, in justified cases.

2.2. Factors intrinsic to radio spectrum management

2.2.1. Technical characteristics of spectrum

Radio spectrum is a resource which is not consumed when being used. However, several users occupying the same frequencies may affect each other's operations. This is called interference and results in a limitation of available spectrum resources at a given moment and location.

Spectrum is not only exemplified by scarcity, but the physical characteristics of spectrum changes over the frequency bands, typically the higher the frequency band the more difficult it is for signals to travel over distance. Moreover, very low frequencies have limitations in terms of capacity, making them less attractive to broadband services. Therefore, the bands between 300 MHz and 3 GHz are considered to be the most valuable part of spectrum. It has to be recognised that the allocated frequency band has a large impact on the costs associated with an application or service, especially in the case of mass market services where coverage, capacity as well as operational costs are important. Therefore there is higher demand for lower parts of the spectrum. Likewise some parts of the spectrum are less suited for some applications or users due to the characteristics of particular frequencies.

With scarcity comes the constant potential for interference between different signals on the same or adjoining frequencies, which can degrade or completely block one or both signals, in which case it becomes harmful interference. Allowing harmful interference reduces or nullifies the efficient use of spectrum. But in a number of cases an application can to a certain extent tolerate interference without significantly degrading the underlying service quality. Hence, the impact of interference on a service needs to be considered on a case by case basis.

Interference is a key parameter for users of spectrum, as it determines the viability of a wireless application (e.g. guaranteeing a certain quality of service). Since interference can be mitigated in many cases by technical means, interference translates into costs.

Another characteristic of radio spectrum is that radio emissions do not stop at borders. As a consequence interference is an important issue not just within the EU, but also at borders to third countries of the EU, which necessitate bilateral and/or EU level negotiations with third countries depending on the circumstances.

2.2.2. Characteristics of allocation and assignment of frequency bands to users

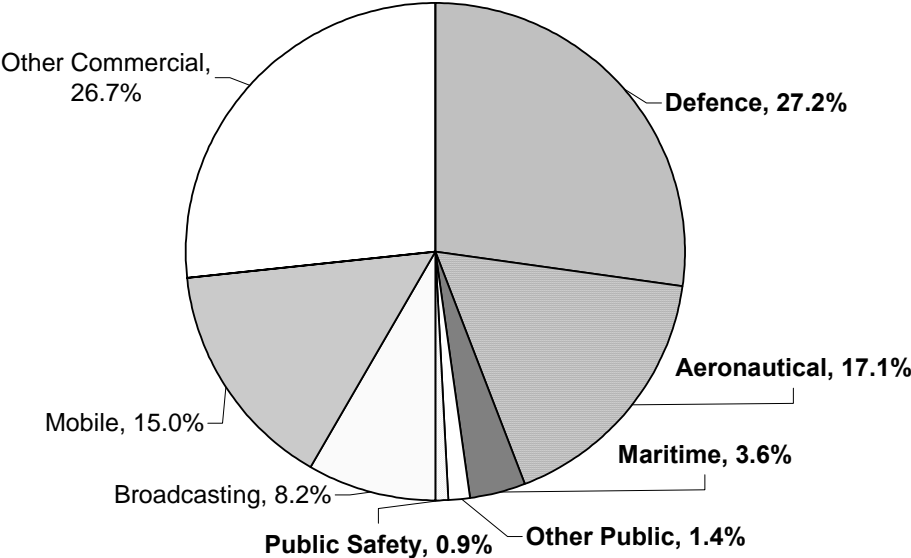
Spectrum management is a task of distribution of a scarce resource under determined usage conditions. From a political point of view, the target is to maximise the socio-economic and environmental benefits inherent to radio spectrum.

Management involves two steps: allocation of spectrum bands and assignment of spectrum usage rights.

Through allocation decisions, administrations responsible for spectrum management determine the usage conditions for specific frequency bands, e.g. by specifying channel plans, maximum emissions permitted etc.. In certain cases, bands are reserved for specific usages (e.g. frequencies used for radio astronomy or meteorological services) or types of networks (e.g. satellite networks, terrestrial cellular networks etc.). Allocation is one important factor

which determines the suitability of specific spectrum bands for interested users while potentially affecting scarcity and spectrum supply.

Spectrum allocations by sector (108 MHz – 6 GHz) in a typical EU country³



Wik, 2008

In order to be able to use spectrum, spectrum usage rights need to be available. This is called assignment of usage rights.

Two types of usage rights can be distinguished, depending on the degree of ownership. Since the type of usage right determines the number of users of a spectrum band, it not only affects the efficiency of spectrum usage but also determines the responsibility for preventing interference.

- Assigning *individual usage rights*, either on an exclusive basis or to a small number of users. Through these individual usage rights the user is guaranteed a generally high level of protection against interference, since potential interferers are barred from using the same spectrum.
- *Shared usage rights* by opening a spectrum band to a usually undetermined number of users within the generic technical limits set out in the allocation to limit the risk of interference. However, an interference free environment is not guaranteed and the burden

³ The figures include the main harmonised allocations plus national assignments applicable to the UK. Harmonised allocations account for over 90% of public sector spectrum allocations (in bandwidth terms). Note that to avoid double counting we have assumed that all spectrum used by the civil aviation and maritime sectors is classed under those sectors, even where this spectrum is also used by the Defence sector. Where spectrum is widely used for commercial applications but is also used by the Defence sector (e.g. the 5 GHz WLAN bands), this has been classified as commercial.

is on the user to take adequate measures to protect his usage of the spectrum from interference.

These notions are further developed under par. 2.2.3 on spectrum management models.

The methodology of selecting of usage right holders (primary assignment) determines the hurdle for a potential spectrum user to access radio resources and also the usage he can make of it (availability of spectrum, costs, time frame; local or wide area usage etc). It is hence a central issue to efficient spectrum management as it directly impacts on whether the spectrum users selected are the ones making the most efficient use of the resource. It is also critical to determine the degree of competition between spectrum users.

Decisions on spectrum assignment can have an effect on competition as they can change the role and power of market players. Generally there is the risk that incumbent users can receive an undeserved competitive advantage and that competition is distorted. Any application of the flexibility principle must also take into account legacy situations and ensure that competition is not distorted. Spectrum can create a barrier to entry for new services, applications, and therefore can hamper the take-up of innovation. At the same time legacy rights exist for incumbent users. The rapid changes in technology, as well as user demand, mean that innovation must be facilitated and not hampered by spectrum policy, while taking into account legacy situations and legitimate expectations of existing users in the specific frequency bands.

There are different degrees of motivation and incentives to use spectrum efficiently. The issuing of spectrum rights by itself does not a priori guarantee efficient use, either in technical terms or in drawing the maximum socio-economic benefits from radio resources. One way of promoting efficiency is to establish payments for the commercial usage of spectrum corresponding to its value, either at the moment of assigning usage rights (e.g. via auctions) or as permanent payment by usage right holders (e.g. via administrative incentive pricing).

Such market incentive mechanisms do not traditionally apply to non-commercial usages of spectrum, such as defence, or public protection and disaster relief (PPDR). The Public sector is a substantial user of spectrum, with assignments representing 40-50% of the valuable frequencies below 15 GHz, and spectrum assignments in the public sector are often viewed as permanent and in most cases, without cost; leading to the situation that efficiency of current use is rarely challenged. This can create an incentive for public sector organisations to seek spectrum resources beyond their needs for current use, holding spectrum for the possibilities of future use leading to spectrum hoarding. Spectrum hoarding in turn by its nature leads to inefficient use of spectrum. Furthermore often there is a lack of transparency and information on spectrum allocation so that the extent of public use of spectrum is not always known by either the national spectrum regulator or by the spectrum users. Public sector agencies may not face sufficient incentives to make the most economically efficient use of their spectrum assignments (e.g. through sharing with other compatible uses), or to give back spectrum to the spectrum management authority if they no longer need it.

There are applications which may require exclusive use of bands, such as for safety of life purposes. Other applications can operate in different bands, but the nature of the application requires special arrangements (e.g. certain services such as relief services (PPDR) need to access spectrum immediately and with priority).

Furthermore there is a significant international dimension to spectrum management, as international coordination of spectrum allocation takes place at global level through the International Telecommunication Union (ITU), a UN body. The next World Radio Conference organised by the ITU is planned for 2012, at which negotiations will be held on several radio spectrum allocations, and where European interests will have to be defended in the competitive negotiating environment at global level for a range of frequency bands.

Functioning of the current framework

Radio spectrum policy and management, as they apply to electronic communications, are dealt with by the Framework Directive 2002/21/EC and the Authorisation Directive 2002/20/EC as amended by Directive 2009/140/EC. The latter introduced significant regulatory improvements to ensure flexible and efficient use of spectrum, remove unnecessary rigidity in spectrum management and put in place measures to deliver easier access to spectrum. Furthermore, the Radio Spectrum Decision already allows for harmonisation of technical conditions for the use of spectrum relevant to existing EU policies depending on spectrum for the use of spectrum relevant to existing EU policies depending on spectrum necessary for the internal market in Community policy areas such as electronic communications, transport and research. As expressed in recital 4 of the Radio Spectrum Decision, "this decision is based on the principle that, where the European Parliament and the Council have agreed on a Community policy which depends on radio spectrum, committee procedures should be used for the adoption of accompanying technical implementing measures".

Commission Directive 2002/77/EC (the "Competition" Directive) also aims at eliminating exclusive and special rights in the use of frequencies and requires that assignment of spectrum be based on objective, transparent, non-discriminatory and proportional criteria. The so-called R&TTE Directive 1999/5/EC governs the placing on the market, free movement and putting into service in the Community of radio equipment and telecommunications terminal equipment, including the fulfilment of essential requirements such as the avoidance of harmful interference.

Spectrum use has increasing significance as an enabler for sustainable growth, competitiveness and productivity in the internal market not only for electronic communications but also for other important EU policy areas. Since not all demand for spectrum can be satisfied, priorities need to be defined which ensure that spectrum is allocated and used in an efficient and effective way, taking into account EU policy objectives. Such EU policies include electronic communications with the objective of offering broadband communications for all, broadcasting, transport, applications such as alarms, remote controls, hearing aids, microphones and medical equipment, research, environment protection and fight against global warming, safety, health, Earth observation, Global Monitoring for Environment and Security (GMES), and GALILEO, the independent European satellite navigation system. Decisions on spectrum use clearly have economic, safety, health, public interest, cultural, scientific, social, environmental and technical implications, and clearly go well beyond the sphere of electronic communications.

Legal Basis - Art 114 TFEU

It is therefore appropriate to go beyond Article 8a of the Framework Directive and to base the Decision on Article 114 TFEU, considering the importance of the availability and efficient

use of radio spectrum necessary for the establishment and functioning of the internal market as a whole, for electronic communications as well as for other EU policy areas.

Description of stakeholders:

1) Industry:

- manufacturers of radio equipment (equipment using frequencies) and other applications of non ECS use like radars;
- mobile and fixed wireless communications services providers;
- radio and television broadcasters;

2) Non commercial users- public sector: mainly social and environmental added value

- Military uses,
- public protection and disaster relief (PPDR), police, fire brigades,
- radio astronomers,
- maritime and aviation transport;
- truck and taxi fleet;
- programme making and special events (wireless microphones for public performances in theatres, shows);

3) Citizens using radio equipment/applications to receive services

- wifi
- large variety of short range wireless devices
- radionavigation;
- handicapped and sick persons through improved medical wireless devices, hearing aids, social alarms (for social inclusion purposes in particular) etc.

4) Different level of regulators and public spectrum management authorities:

- international level, mainly the International Telecommunications Union, to allocate spectrum between various types of uses, in order to avoid harmful interference
- EU level: harmonisation of technical conditions for the use of spectrum and coordination of certain policy aspects to the extent required by the completion of the internal market.
- national level: national frequency authorities have the main competence on spectrum regulation and management. In some cases there are separate national regulatory authorities responsible for the authorisation / licensing of spectrum usage in the electronic communications and in the broadcasting domains.

Potential newcomers, new entrants and beneficiaries of EU spectrum policy

The EU RSPP should not only allow existing spectrum users to benefit from increased capacities and better coordinated and hence valuable spectrum, it should also allow new users to develop. This would include new wireless services operators, new digital television and radio broadcasters, public protection and disaster relief users, scientific researchers, maritime

and air transport, utilities such as electricity and gas providers, and citizens who make daily use of all types of wireless devices including handicapped and sick people.

2.2.3. *Spectrum management models*

Three models of spectrum management can generally be identified:

- *the administrative model* where public authorities decide on the allocation of spectrum and the assignment of spectrum usage rights and no secondary trading is permitted;
- *the market-based model* where, after initial assignment of usage rights by a public authority, market forces determine the use of spectrum as well as the actual users of the spectrum, through the possibility to trade rights and to adapt the use of the spectrum;

these two models are particularly relevant for the assignment of individual spectrum usage rights -

and

- *the unlicensed model* where users share spectrum and anybody has access to spectrum subject to certain minimal requirements set out in the allocation such as technical usage conditions.

Where individual usage rights are required and where demand for spectrum exceeds supply, administrative decisions are now increasingly replaced by competitive bidding procedures conducted by administrations to evaluate applications against pre-determined selection criteria or by auctions on the consideration that the market can best identify the most efficient user.

On the contrary, shared spectrum usage does not require the issuance of individual rights and sets a very low barrier to access spectrum, albeit at the price of having to share the usage of spectrum with potentially many other users; as a consequence, such model applies primarily to short range transmissions where the density of users is low and creates additional costs to mitigate interference from other users.

Sharing of spectrum is likely to emerge as a key method to ensure technically efficient use of spectrum; this will require to meet regulatory challenges (e.g. to manage interference, ensure equitable access to spectrum, solve competition issues, manage information on spectrum usage and deal with existing legacy usage rights). It is made increasingly possible through recent technological developments allowing to better handling interference. Innovative solutions are appearing, such as *dynamic* spectrum access; this allows each user to get part of the spectrum band according to his actual immediate needs, allows other users to use the remaining part of the band, makes spectrum usage possible for a much larger user community and allows individual and exclusive rights to be granted to meet temporary needs, thereby creating a real-time spot market for spectrum rights. Certain spectrum bands can also be shared in their so-called white spaces, i.e. parts of the band which are kept unused for the avoidance of interference between the main users of the band such as broadcasters. Spectrum sharing is also possible where radio transmitters can adapt themselves with so-called software-defined radio or cognitive radio to find unused frequencies and adapt transmission power levels.

Advantages of the various management models are marked as (+) if minor or (++) if major, while disadvantages are marked (-) if less significant or (--) if more significant.

"Unlicensed" approach

Regulatory burden	An unlicensed approach allows delivery of various services (++) and permits different technologies to be used. (++)
Access	Anyone can access and use the spectrum (++) . New technologies can access spectrum, but there may be an issue of managing generational change (+)
Interference	The necessary technologies to implement interference management are today available for short range communications (+) Technologies for managing interference are a constraint on product design and require industry agreement and licensing (-) Longer range communications can as yet not be managed in this way (- -) In future this may move to a (+)
Innovation	It may enable innovation and investment in services, as well as increased competition (++)

"Market-based" approach

Regulatory burden	Allowing secondary trading of spectrum usage rights between users would deliver some benefits by simplifying transfers (+), further increased when combined with removal of restrictions on services and limitation of technical restrictions to the minimum (++)
Access	Secondary trading complements administrative issuance of spectrum rights (+); combined with neutrality, it allows the introduction of new technologies (++)
Interference	The definition of technical parameters of spectrum usage rights is crucial to interference management. Increased monitoring and enforcement are required to manage the expected "denser" use (+)
Innovation	This model encourages innovation and investment and removes artificial regulatory bottlenecks constraining competition (++) , with the risk however of hoarding (- -)

"Administrative" approach

Regulatory burden	The regulatory burden of the administrative approach can be diminished; this would benefit existing users (+)
Access	Access to spectrum for new entrants would remain unchanged (=) If regulatory burden is lowered, new technologies would have improved access provided this benefits existing users (+/=)
Interference	Interference management would remain at a high level (++)
Innovation	Innovation and investment would depend on administrative decisions. The limitation of competition would benefit operators and technology providers, but not consumers (-)

Evolution and the influence of market forces in services and applications using spectrum

With the review of the regulatory framework for electronic communications, the introduction of flexibility, the service and technology principles and the possibility to trade spectrum, the decision making power will shift somewhat from public administrations to the user and to the market forces. It will be a move from a command-and-control approach where public administrations decide how to use spectrum to a context where the decision on the use of the spectrum will be determined more and more by the market and by the user of the spectrum himself. The regulators will have to ensure that this occurs smoothly by ensuring that no harmful interference is occurring, that technical quality of the service is ensured, that health is protected, that spectrum is used efficiently, that general interest objectives may be fulfilled, that safety of life services are guaranteed, that social, regional and territorial cohesion is promoted, as well as cultural and linguistic diversity together with media pluralism.

This flexibility principle is slowly being introduced in the use of spectrum, and has been so under the notion of WAPECS (Wireless Access Policy for Electronic Communications Services). A study^{iv} contracted by the Commission in 2004 to Analysys, estimated that the introduction of flexibility combined with spectrum trading, could bring an additional EUR 9 billion per annum in consumer surplus relative to the status quo scenario.

2.3. Increased reliance on technologies that make use of spectrum

There is a wide range of uses for radio spectrum. Beyond electronic communication services (ECS) there are numerous other services, applications and users scattered across the spectrum bands, often sharing a common range of frequencies. Therefore there is a particular difficulty in dividing spectrum according to uses and in singling out those uses which relate to ECS.

The growing demand for spectrum is fuelled by the pervasive role of the internet, where data communication plays an increasing role for every citizen. Coupled with increasing mobility, nomadic working etc. wireless data services are currently increasing dramatically in usage terms but also in terms of data volumes and bandwidth arising from personal communications (voice and images), media consumption (audio, video, broadcasting), gaming, access to personal data, general information access, social networking, practical operations (e.g. banking, payment, interaction with administrations etc.). Consumers want to enjoy the benefits of competing wireless services as this drives services quality and affordability. Making available sufficient spectrum and a harmonised spectrum space can at EU level constitute the key challenges to satisfy these demands

A significant problem that results relates to the accessibility of a service using radio spectrum and the potential exclusion of certain potential users due to different factors. The digital divide refers to the divide between certain groups of people who have access to and/or make use of certain digital services and others who do not. The dividing line can be a function of a range of criteria, for example gender, age or socio-economic background. Furthermore one can identify a geographical divide in respect of access to a broadband service (whether wired or wireless), with some areas left without any broadband coverage. Consideration should be given to the quality divide that relates to access to the latest technologies and highest data rates, with some areas only having access to less advanced broadband services (this is likely to be strongly correlated to the geographical divide). Such a divide may result in a loss of socio and economic benefits for those who miss access.

Due to the lack of availability of mobile broadband coverage there is also a potential risk of broadband mobility divide, meaning the divide between the certain groups of people who have access to and/or make use of certain mobile digital services and others who have only access to and/or make use of digital services at a fixed location.

2.4. The EU dimension

Spectrum management is still largely a Member State competence, which should however be exercised in compliance with EU law. While the need of a certain level of coordination at EU level is generally acknowledged, this raises the question of why and to what extent specific EU actions on spectrum adds value.

According to the draft RSPG opinion on the RSP, spectrum is a national resource which should be managed in a coordinated manner by EU Member States in conjunction with the European Commission, within the international regulatory context. This demonstrates the general attitude of Member States to spectrum management.

Added value of EU coordination on balance

The following reasoning for action at national level can be applied:

- Some uses of radio spectrum, the markets for wireless services as well as needs for public services vary greatly amongst Member States. Spectrum management therefore needs to be differentiated to take into account the specific national conditions.
- Each Member State carries a legacy of spectrum management history. Aligning this legacy according to new EU prerogatives in terms of spectrum usage is difficult and costly, and requires time.

Today, there is only to a limited extent a coordinated "EU spectrum space", with the exception of the harmonisation of usage conditions (allocation) of certain bands on the basis of the Radio Spectrum Decision. The European Union framework for granting rights of use for spectrum in electronic communications is otherwise limited to general principles, and assignment in terms of methods and usage right conditions are not coordinated at EU level. Also, significant amounts of spectrum are used for activities outside of the competence of the European Union (defence and security).

As a result, the development of a co-ordinated internal market in wireless equipment and services remains limited. According to a study conducted in 2004, even if Member States individually took the most appropriate action to modernise their spectrum management, the effect would be that Europe would fail to realise 30% of the potential benefits unless the EU coordinated its efforts.^v There is a high potential for added value in attaining more efficiency in the use of radio spectrum within the European Union by addressing following potential drawbacks of a unilateral or uncoordinated approach by Member States.

- Lack of coherence of national approaches might hamper the usability of the spectrum and might lead to a fragmentation of the European internal market;
- Lack of economies of scale and Europe-wide coverage of services may hurt the European economy. The use by one Member State of a given frequency band will entail significant extra equipment and terminal costs, if the same equipment or application operates on a different band elsewhere. This prevents governments, operators and users from benefitting from economies of scale and hinders the development of the internal market.

- With a fragmented internal market industry faces a higher administrative burden in following applicable spectrum regulations and this poses also an additional barrier to entry for innovative applications since for each individual Member State administrative procedures and regulatory requirements need to be respected individually.
- It might lead to a missed opportunity in boosting the innovation potential at European level and in addressing potential bottlenecks relating to radio spectrum which could create a significant barrier to entry to innovative services and applications. Therefore this could lead to a possible delay in investments as incentives for investment could be far more limited for national Member States markets than for a coordinated European market where spectrum requirements are aligned
- Radio emissions do not stop at borders. Lack of EU coordination resulting in cross border interference might prevent Member States from allocating radio spectrum to its best uses; interference impairs significantly how the application relying on spectrum works and the quality of the service provided and might therefore have significant negative effects on functioning of the economy as such. Interoperability of applications and services would be endangered as consumers crossing the border might need different equipment and applications to receive the same kind of service. And again cross border interference results in higher costs for operators of the different applications and therefore leads to higher prices for consumers.
- A unilateral approach at Member States level might lead to an inefficient way of using spectrum and a suboptimal use of spectrum with regard to the potential economic, social and environmental benefits at European level.
- Coordination with third countries and international representation of common interests might be more difficult and less fruitful if Member States act unilaterally and not unified under the umbrella of the European Union with its economic and political weight;
- Lack of clear and measurable political priorities, agreed among the institutions, may delay important European initiatives that depend or benefit from strategic actions in the area of radio spectrum use.

Despite the above potential European added value, the EU's current role in spectrum policy is, as said, limited. Following the indication given by the amended Framework Directive, and based on Article 114 TFEU, a Radio Spectrum Policy Programme should therefore set out the guiding principles and the objectives to be followed by Member States and EU Institutions in the field of radio spectrum and indicate the initiatives which, in line with subsidiarity and proportionality, should be taken to allow a swift implementation of these principles and objectives.

Political acceptance of an RSPP with Council and the EP

The EP and Council have called for a general political assessment of spectrum management, beyond technical issues which are normally dealt with under the Radio Spectrum Decision.

As Recitals 4 and 5 of the 2002 Radio Spectrum Decision already provided, there is a need for EP and the Council to agree on EU radio spectrum policies. Any new policy of the European Union in that field should be agreed by the EP and the Council on the basis of a proposal from the Commission.

Building thereupon, Recital 28 of Directive 2009/140/EC, while recognising that spectrum management largely remains within the competence of the Member States, calls for harmonisation at European Union level which can help ensure that spectrum users derive the full benefits of the internal market and so that EU interests can be effectively defended globally. The EP and Council have therefore called upon the Commission to propose legislative multiannual radio spectrum policy programmes to set out the initiatives for the strategic planning and harmonisation of the use of radio spectrum in the European Union.

Recital 28 defines the possible content of such programmes as being initiatives referring to the availability and efficient use of radio spectrum necessary for the establishment and functioning of the internal market, referring, where appropriate, to "the harmonisation of procedures for the granting of general authorisations or individual rights of use for radio frequencies where necessary to overcome barriers to the internal market".

The Spectrum summit co-organised on 22-23 March 2010 by the EP and the Commission has shown strong support from the Members of Parliament, from Member States and from the industry for such a programme. Member States are also taking part in the exercise as the Radio Spectrum Policy Group, which gathers high representatives from each Member State. This group produces an opinion as to the future content of the programme, which the Commission takes fully into account in the preparation of the RSPP.

3. OBJECTIVES PURSUED BY THE RSPP

Setting out initiatives for the strategic planning and harmonisation of the use of radio spectrum, presupposes the identification of wider political priorities for which radio spectrum is identified to play a key enabling role with a clear EU perspective. Spectrum is essential for the development and use of wireless technologies and applications that foster growth, public safety and security, and therefore comes into play to established political priorities of the European Union.

Reflecting this role of radio spectrum, there are already today regulatory principles established in the EU regulatory framework for electronic communications services, as amended in 2009, as well as the goals already established in the Radio Spectrum Decision and its implementing measures.

The RSPP should therefore build on these provisions by reaffirming and further clarifying the guiding principles, such as the respect where possible of technology and service neutrality in the allocation and assignment of spectrum, and by gearing initiatives associated to radio spectrum at EU level towards common usage conditions where necessary, while otherwise ensuring full co-ordination across the EU, or strengthening co-operation between Member States, as appropriate.

Noting that the RSPP is multi-annual, it is possible to pick and focus on the most urgent and important issues now, while leaving other important issues for following programmes. Given the fast moving technical area, the envisaged scope should not lead to an exhaustive list of actions, but rather targeted a set of concrete and measurable goals to be achieved in a five year time frame, after which point in time the next RSPP would be drafted.

The first Radio Spectrum Policy Programme will outline at a strategic level how the use of spectrum can contribute to the current political priorities of the European Union from 2011 to 2015 and will set out the guiding principles and the objectives to be followed by Member

States and EU Institutions in the field of radio spectrum, indicating initiatives allowing a swift implementation of these principles and objectives. More specifically, and based on the problems described in chapter 2, the following objectives can be identified:

- **Support objectives relating to wireless broadband laid down in the EU2020 strategy and Digital Agenda for Europe through radio spectrum policy;** The EU 2020 initiative has established the high level strategic goals of European policy up to 2020. This strategy has identified a flagship initiative which directly is linked to the use of spectrum resources and where demand for spectrum is exponentially growing: the objectives related to coverage and speed requirements on broadband access. These objectives pose a challenge in relation to a main problem identified, namely the mismatch between the growing demand for new wireless services and available spectrum resources;
- **Promote efficiency of spectrum use in the areas of EU policy, in particular by fostering flexibility and competition;** Furthermore spectrum is a scarce resource which is too valuable to be wasted. This resource has to be managed efficiently in order to allow users to benefit from most valuable uses of spectrum. In the areas of EU competence therefore it is important to promote as far as possible the efficient use of spectrum;
- **Promote innovation at European level with a radio spectrum policy.** A fragmented European market can significantly hamper innovation as entry barriers are higher and also as incentives for investment are lower than for a functioning internal market. However innovation is crucial as innovation itself can support optimising the use of spectrum through the introduction of new and more efficient technologies and therefore can potentially contribute to decreasing the mismatch between demand and supply of spectrum.
- **Address weaknesses in the process and methodology of spectrum management within the limits of EU competency;** As explained in 2.2 there is a slow swift in spectrum management towards more market oriented approaches, however this trend is present in the different Member States to various degrees. As spectrum management is considered by Member States a national competence this is an important, but difficult area where nevertheless efficient use of spectrum could be further enhanced and therefore contributions could be made to addressing the problems of suboptimal use of spectrum and the mismatch between demand and supply of radio spectrum.
- **Support objectives relating to combating climate change and promoting energy efficiency laid down in the EU2020 and Digital Agenda for Europe through radio spectrum policy.** Applications exist which rely on the use of radio spectrum and which are tools to support the combat against climate change and to promote energy efficiency. The Commission has identified a few applications which have these features and there potentially spectrum availability at European level could pose a bottleneck to their full development. An example is the intelligent transport systems which ensure that travel routes are optimised and therefore less CO₂ is emitted. Again as high level political priority has been allocated to these objectives, also radio spectrum policy has to support these sectoral policies by eliminating any bottlenecks at the level of radio spectrum availability and by potentially ensuring spectrum with conditions harmonised at European level.
- **Protect European policy interests at international arenas and support Member States when dealing with third countries in relation to radio spectrum policy;** The European Union should use its economic and political weight in supporting European interests also

in relation to radio spectrum so as to limit cross border interference with third countries and therefore to ensure that radio spectrum use is further optimised with third countries and at an international level.

- **Contribute to promoting the internal market of equipment, services and/or networks.** The harmonised use of spectrum, or at least the coordinated use of spectrum at European level is an essential prerequisite of the establishment and functioning of the internal market for equipment and services which rely on spectrum use. Therefore only once the suboptimal use of spectrum and the mismatch between demand and available spectrum resources are addressed to a sufficient degree, will an internal market be possible for such equipment, services and/or networks which rely on spectrum resources use.

At this stage it is not possible to seek to engage in a fully detailed analysis of the impact an RSPP would have for each of the principles and objectives listed above, or the proportionality of each proposal. The aim of this impact assessment is rather to make the link between these specific objectives and initiatives in radio spectrum policy which would support their achievement.

The current impact assessment is hence at the same strategic level as the proposal it accompanies. This approach is in line with the spirit of the regulatory framework and the proportionality principle it advocates. Furthermore, it corresponds to the feedback received from the public consultation and during the Spectrum Summit emphasising the need to stick to a strategic direction of spectrum policy at EU level, rather than to take policy actions at EU level on an ad hoc basis without a frame of objective.

4. POLICY OPTIONS FOR THE ASSESSMENT OF THE RSPP

The institutional debate that will follow the Commission's proposal will allow a focused discussion on what are the areas in which further EU harmonisation and coordination could add value, and what measures can lead to a more efficient use of radio spectrum of benefit to stakeholders from an economic, social and environmental point of view.

The recently amended regulatory framework for electronic communications states that the Commission may submit a multi-annual Radio Spectrum Policy Programme to be adopted by the European Parliament and the Council. This regulatory framework relates to electronic communications services (ECS), but there are significant areas of spectrum use that fall outside the scope of ECS, including transport, scientific use, medical equipment etc. Because the majority of the usable spectrum is not devoted to ECS, it is already the case that neither the scope of the Radio Spectrum Decision nor the remit of the RSPG are limited to ECS, so extending the scope of the Radio Spectrum Policy Programme to uses in sectors beyond electronic communication services must be strongly considered.

As a result, it is necessary that, in this Impact Assessment, the scope of the proposal is examined. Three basic options have therefore been defined, as follows:

- The baseline scenario that the management of radio spectrum continues on the current basis, without setting out the guiding principles, objectives and initiatives in the form of a policy programme, and without linking current actions on spectrum to a wider context. (The amended Framework Directive makes it possible, but not mandatory, to act, as does the Radio Spectrum Decision for technical harmonisation measures.) ;

- A radio spectrum policy programme is developed with the limited scope defined in the Framework Directive, namely electronic communication services;
- A radio spectrum policy programme is developed addressing all sectors where radio spectrum is used, and where the EU has internal market or sectoral competence.

Once the scope of the proposal has been defined, the impact assessment will have to assess on a strategic level the following policy options responding to the objectives defined in chapter 3:

- No initiative identified to be addressed under the first Radio Spectrum Policy Programme;
- Identification of initiative in the form of further analysis, study and discussion.
- Identification of initiative in the form of concrete actions in terms of content or procedure;

In view of the political priorities at stake, objectives have been identified, resulting from the problem definition, taking full account of the Opinion of the RSPG as well as the results of the public consultation and the contributions at the Spectrum Summit. It is assessed in terms of the above policy options to decide whether the Radio Spectrum Policy Programme should, in fact, set out the guiding principles and the objectives to be followed by Member States and EU institutions in the field of radio spectrum, indicating the initiatives to be taken to allow a swift implementation of these principles and objectives. The links between the problem definition, the principles and objectives deriving from this, and the identification of policy options that result, are shown as follows.

Policy challenge or problem (see chapter 2)	Objectives (see chapter 3)	Resulting areas where the RSPP shall set out principles, objectives and initiatives (see chapter 6)
Mismatch between growing demand for new wireless services and available spectrum resources; Geographical divide in respect of access to broadband services	Enable sufficient progress to support overarching objectives relating to broadband access laid down in the EU2020 strategy and the Digital Agenda through radio spectrum policy	Contributing to Digital Agenda for Europe to enable "Broadband for all" at an appropriate speed
Suboptimal use of spectrum: Inefficient use of spectrum from a technical, economic and/or social point of view; as spectrum is a scarce resource efficient use of it is vital	Promote efficiency of spectrum use in all areas of EU policy, in particular by fostering flexibility and competition	Review of spectrum use; public use of spectrum; the first steps are to review how spectrum is currently used
Mismatch between growing demand for new wireless services and available spectrum resources: Spectrum being a potential bottleneck for innovation; Suboptimal use of spectrum: Inefficiencies in terms of spectrum allocation and assignment process	Promote innovation at European level with a radio spectrum policy	Equal and easy access to spectrum; entry barriers to spectrum use should be lowered for innovatory applications
Suboptimal use of spectrum: Inefficient use of spectrum from an environmental point of view; some applications which are very valuable from an environmental perspective might not have sufficient spectrum available to operate	Support overarching objectives in relation to energy efficiency and combating climate change laid down in the EU2020 strategy and the Digital Agenda through radio spectrum policy	Combating climate change and promoting energy efficiency by ensuring that those identified applications using spectrum that serve this purpose have sufficient spectrum available
Suboptimal use of spectrum: Interference at borders as radio emissions do not stop at borders	Defend European policy interests at international arenas and support Member States when dealing with third countries in relation to radio spectrum policy	Defending EU interests at international level; help Member States, when negotiating with neighbouring countries on spectrum matters

In chapter 3 an additional specific objective is defined in relation to the promotion of the internal market of equipment, services and networks. This, however, does not translate into one specific area, since any harmonisation measure for radio spectrum at European level has the potential to promote the internal market of equipment, services and/or networks by creating a bigger European market in that specific frequency band for that specific spectrum use. While realising this potential depends on several factors which are partially outside the scope of this exercise (e.g. the functioning of the internal market for equipment is examined by DG ENTR and is governed by the R&TTE Directive), a co-ordinated approach to spectrum can have significant benefits for a genuine internal market. The internal market dimension is discussed in each of the sections of chapter 6, if appropriate.

5. ASSESSMENT OF THE IMPACT OF THE SCOPE THAT CAN BE GIVEN TO THE RSPP

Quantifying the impacts of a strategic proposal such as the RSPP is very difficult even if, clearly, any subsequent initiatives undertaken on the basis of the programme in this area are likely to have an economic, environmental, social or cultural impact. However, there may also be tangible impacts arising from a decision not to identify a specific action, or from a failure to implement it. Impacts will vary according to the particular use of radio spectrum. The section will thus assess, in qualitative terms, the impacts of the basic policy options regarding the existence and scope of the RSPP.

5.1. Comparing the impact of the basic options

5.1.1. No Radio Spectrum Policy Programme

The problem definitions set out in section 2 can be addressed through measures and action carried out without the development of a Radio Spectrum Policy Programme. In this case spectrum management at national and European level would continue along the same lines as at the moment, and the Commission could make ad hoc proposals for initiatives it felt were necessary to support current policy objectives in line with the existing legal framework.

It is not possible to quantify the opportunity costs arising from the absence of a strategic proposal agreed by the main EU institutions, notably in terms of lack of predictability of policy initiatives, and a lack of legal certainty as well as weaknesses in the transparency of the decision processes overall. But the loss of credibility and the political cost if the Commission were not to make a proposal and consequently not involve the European Parliament and Council in a decision making process on spectrum policy could be immense. It could also give rise to a serious deficit in the development of specific policy initiatives relating to the development of wireless broadband, which could have a potentially significant negative economic and social impact. The amendment of the GSM Directive showed how the absence of awareness and discussion on strategic objectives can lead to considerable delays in the adoption process even for technical measures which had widespread support, and has a direct regulatory and economic impact. In this case it led to delays in the clarification and modification of operators' licences in a number of Member States at a crucial time for the development of 3G services. Such delays are detrimental to a rapidly developing, technology driven sector which is dependent of spectrum.

5.1.2. Policy Programme with a scope limited to electronic communication services

Compared to the option under 5.1.1, the benefits of preparing a strategic document setting out priorities of spectrum management at European level would ensure that actions in the area of spectrum are transparent and predictable. Furthermore the aim is to identify the most urgent needs for action, so that adequate time and effort is dedicated to appropriate planning of activities and foreseeing potential obstacles and problems of spectrum allocation beforehand.

As an example, the Spectrum Summit gave stakeholders an additional opportunity to raise any topic in this context which they considered important, and also allowed for a face-to-face debate between various stakeholders and with decision-makers. This event provided an additional possibility for the Commission to gather information on the demand for spectrum and on barriers that stakeholders face. Essential input was also received on what Members of Parliament consider vital for inclusion in the Radio Spectrum Policy Programme. Therefore the information gap between the European Commission dealing with spectrum policy and stakeholders using spectrum on a daily basis could be reduced, a deeper knowledge and better

understanding was achieved on the demand side. Through this extensive involvement of stakeholders the European Commission is also in a better position to actually respond to these needs and there is a higher likelihood that the initiative of the Commission will result in policy choices and priorities which are future proof and fit the needs well.

Moreover through the endorsement by the European Council and European Parliament of the Radio Spectrum Policy Programme, and the involvement of the RSPG through its opinion, any initiative retained will ensure a coherent approach and will command a high degree of consensus. This in turn creates higher certainty and stability in the regulatory environment for stakeholders, which should lead to greater success in achieving the policy objectives identified.

While high-level policy objectives are identified in documents such as the Europe 2020 strategy, the European Commission must subsequently analyse individual goals in depth and propose detailed measures to reach the stated aims. The Commission needs to undertake further effort in identifying the detailed steps necessary to achieve the high level objectives. The Radio Spectrum Policy Programme is one of these tools which provides for a more detailed strategy which in turn can ensure that a high level objective is achieved.

There are no direct costs elements which would accompany the elaboration of the Radio Spectrum Policy Programme, apart from administrative effort to develop this document. The Programme sets out the principles and the objectives to be followed by Member States and EU Institutions in the field of radio spectrum and indicates the initiatives to be taken to allow a swift implementation of these principles and objectives. It is not envisaged to create an exclusive and prescriptive list of actions to be implemented in the next 5 years. Such a list would limit to an essential extent the flexibility of the European Commission to act in the field of radio spectrum policy if circumstances change.

A Radio Spectrum Policy Programme proposed by the European Commission and adopted by the Parliament and Council engages the credibility of the European institutions and hence has a good probability of being implemented. There is a risk, however, that an overly ambitious policy programme fails, as Member States might not implement the proposals. Creating a Radio Spectrum Policy programme which does not provide sufficient vision or strategic perspective could lead to underperformance in terms of the potential that could be exploited. Therefore, it is important to reach a balance as regards ambition and practical feasibility.

Electronic communications and other type of services are scattered over a significant number of frequency ranges, which makes it difficult to single out non ECS uses and apply different spectrum management measures than for ECS. This would also lead to further inefficiencies in spectrum management and would lead to further administrative burden as spectrum management would become even more complex. Also as spectrum is a scarce resource, only addressing the problems identified for some uses, namely the ECS uses would be insufficient.

5.1.3. Policy Programme with a scope going beyond electronic communication services

When considering whether to propose a Radio Spectrum Policy Programme, the scope of the initiative needs to be defined. The initial legal basis, from which the impetus for the elaboration of such a strategic document originated, was the Framework Directive covering electronic communication services (ECS). However, as radio frequencies are used for far more than just telecommunications, it has to be examined whether limiting the Radio Spectrum Policy Programme to ECS is justified, and what scope is most beneficial.

In the public consultation a significant proportion of contributions related to services other than electronic communication services, and valuable input had been received which shows that stakeholders consider it important that other applications (where radio spectrum is used), are covered by the RSPP. (See Annex 2)

In the public consultation the following key issues (together with a set of questions for each topic) were identified in connection with the EU political priorities that were considered most relevant for the RSPP:

- a. Economic recovery and growth
- b. Social inclusion, services for citizens
- c. Environmental and health protection
- d. Space exploration, transport safety
- e. Effective coordination at international level and negotiations with third countries
- f. Refarming and competition

It is clear by looking at these themes that not all relate to electronic communication services (i.e. point d) or can cover both electronic communications services as well as services not related to electronic communications (i.e. points a, b, c, e, f).

Furthermore, the Radio Spectrum Policy Group refers several times in its draft opinion to objectives in other domains, and makes clear that the scope of the RSPP should not be limited to ECS: "All sectoral interests (e.g. ECS, broadcasting, transport, military, public use of spectrum, environment, space, etc.) should be considered. It is necessary to ensure that all stakeholders are consulted in a transparent way on the elaboration of spectrum allocation solutions, concerning new technologies in particular. This also requires clarity and certainty so that all stakeholders have a view on how their positions are treated and how spectrum decisions are made."

In addition, the Spectrum Summit provided a significant opportunity to receive feedback on the scope of the RSPP. There were no negative views expressed by participants on extending the scope of the Radio Spectrum Policy Programme so that all spectrum users are covered. On the contrary, in several interventions stakeholders stressed the importance of addressing spectrum uses outside of the electronic communication framework. (See Annex 1)

The reasoning put forward in section 5.1.2 on the benefits and costs of developing a Radio Spectrum Policy Programme, as opposed to continuing with ad hoc policy initiatives, are valid both for a RSPP whose scope is limited to ECS or one whose scope is wider.

Finally, and above all, addressing only ECS would hinder the implementation of efficient spectrum use, one of the main principles of spectrum management. Because there are many situations where spectrum use by ECS and non-ECS applications is shared or contiguous, any one-sided consideration would lead to a reduction of opportunities to implement this important and widely supported principle. Failing to deal with spectrum management on a coherent and unified basis could be detrimental to consumers and also to industry, which produces equipment using radio spectrum ranging from health applications to intelligent transport management.

As a conclusion, the reasoning above suggests that the best option is the development of a Radio Spectrum Policy Programme with a scope which ensures completeness and consistency for all users and services using radio spectrum, hence option 3 is the preferred option.

6. ASSESSMENT OF THE IMPACT OF THE POSSIBLE INITIATIVES UNDER THE RSPP

It has been determined in the previous chapter that the scope of the RSPP should cover all sectors using spectrum and for which the EU has competence. This chapter will analyze the options for defining initiatives established to respond to the general objectives arising for spectrum from EU policy priorities and susceptible to figure in the first RSPP.

There are 5 areas resulting from the problem definition and the related objectives. For each chapter examining the different areas of potential measures, options have been defined in the following way:

Option 1: No initiative identified to be addressed under the first Radio Spectrum Policy Programme;

Option 2: Identification of initiative in the form of further analysis, study and discussion.

Option 3: Identification of initiative in the form of concrete actions in terms of content or procedure;

These options differ in content depending on the area discussed. As areas of potential measures are relatively unrelated and deferring, in chapter 6.5 the above structure is not fully maintained, as the topic addressed relates to the protection of European interests in international relations where option 2 is less useful and therefore the analysis follows the structure used in chapter 5 establishing the options by scope of the RSPP.

6.1. Contributing to the Digital Agenda for Europe

The World Bank's Information and Communication for Development 2009 report suggests that the contribution of broadband to economic growth is substantial, and may be more profound than comparable narrowband or voice-based ICTs. Broadband not only plays a critical role in the workings of the economy, it connects consumers, businesses and governments, and facilitates social interaction. The Recommendation of the OECD Council on Broadband Development recognises this growing importance of broadband and its principles have been instrumental in fostering broadband development.^{vi}

In this context the Europe 2020 Strategy has set an ambitious target, which is being elaborated in the flagship initiative "A Digital Agenda for Europe", to deliver sustainable economic benefits from a Digital Single Market based on ultra fast internet and interoperable application, contributing to the objectives of broadband access for all by 2013, and access to much higher internet speeds of above 30 Mbps by 2020, including 50% or more of European households subscribing to internet connections above 100 Mbps.

A speed of 30 Mbps would mean being able to provide 2 or 3 HDTV channels to each home. It would also increase access to applications such as e-government and e-education (including distance learning), would enhance e-accessibility, and would enable and facilitate teleworking for

a larger proportion of the population. Applications like e-government have a crucial role in reducing administrative burden. The deployment of mobile broadband infrastructure would fully enable the use of e-Health applications, in particular telemedicine (health services at distance).

The Radio Spectrum Policy Programme should support the Digital Agenda for Europe, given that wireless services have a huge potential for ensuring that the objectives of the digital agenda are achieved.

As one prominent example, the Commission signalled the potential socio-economic benefits of the digital dividend, in its October 2009 Communication^{vii} and Recommendation to Member States building on the general analogue broadcasting switch off in 2012. Through the Radio Spectrum Policy Programme, the issues raised in the Communication can be highlighted, and appropriate follow-up can be given to the medium and long-term actions identified for the digital dividend.

Option 1: No initiative identified in the first RSPP

There seems to be a strong consensus in Europe on the importance of broadband access for citizens and business. Nevertheless under this option, the European Commission would not propose any further measure or action (even though a political commitment was made in the EU 2020 strategy to do so), but developments would continue along the line of national actions in line with the current regulatory framework. In this context it should be noted that:

- The data available^{viii} makes it clear that in most Member States the current coverage of both wired and wireless networks is likely to leave some areas and communities without broadband access. In addition, amongst users that receive internet/data services, some may only enjoy relatively low speeds (i.e. 128 kbps) compared to the best services available in a given Member State or even compared to the average service available.
- A number of Member States are developing and implementing ambitious plans to ensure full broadband population coverage within the next few years. This commitment is towards extending the coverage of broadband networks and improving the quality of service that users enjoy. Still the RSPG concludes that the relative roles of wired, terrestrial wireless and satellite networks in extending coverage and quality will depend on local circumstances and that a “one size fits all” approach to the digital divide is not suitable.
- The Commission has already taken a number of actions aimed at designating and making available spectrum for wireless broadband over the last two years. Four Commission Decisions (including the Decision on 800 MHz adopted on 6 May 2010) and one Directive currently designate a total of 860 MHz of spectrum within the EU, but a large portion of this spectrum still remains to be awarded at national level. In comparison the United States has designated (but also awarded) around 410 MHz of spectrum and has plans to designate a further 500 MHz in the coming years. Discussions at the Spectrum Summit often referred to the European leadership in mobile voice, but also warned against lagging behind other regions in terms of mobile broadband.
- The satellite industry can play an important role in reaching the objectives being established in the Digital Agenda, since this platform has the potential to reach all EU citizens at an economic and environmental cost that is lower than for terrestrial platforms. Users could be reached for which other technologies are not suited or it is not affordable and profitable. With the spectrum already allocated to satellite services at European and international level, satellite operators have the resources available to immediately bridge

the digital divide in Europe, contrary to other wireless technologies which require the rollout of more base stations to be able to deploy their complementary solutions. Sufficient steps have been undertaken in the past in relation to the allocation of spectrum for the satellite industry to enable them to step in to be able to achieve 100% coverage of Europe by 2013. The question, however remains, what this platform would be able to provide in terms of data rates and number of connections as well as at what price.

Option 2: Initiative identified in the form of further, analysis, study and discussion

The Radio Spectrum Policy Programme should facilitate the political priorities formulated in the Digital Agenda for Europe by setting out guiding principles and objectives (e.g. through specific targets), and indicating initiatives relating to radio spectrum over the next 5 years. This could also include preparatory work that could lead to concrete actions in a subsequent policy programme. Under option 2 it should be assessed whether further discussion, analysis and/or study is needed defining the way how to reach the above objective.

The RSPG noted in its position paper that there are limitations to the data that are available regarding broadband access and services in Europe. Specifically in relation to wireless broadband, the amount of statistical information available on coverage, adoption and quality of service is generally scarce. These data are central in understanding European broadband markets and in shaping informed policies for the future.

Stakeholders have noted the importance of harmonised conditions which are technology and service neutral in the public consultation. They also point to the EU wide and even global dimensions of these services, which necessitate long preparation periods to find harmonised spectrum bands at the global level. Work within the ITU^{ix}, which was done prior to the last World Radio Conference in 2007, came to the conclusion that by the year 2020 a total of between 1270 MHz to 1720 MHz of spectrum would be needed for a low and high user demand, respectively. These also took into account European studies^x on consumer demand for mobile services and foresaw the need of speeds around 30 Mbps in general with a possibility to use speeds up to 100 Mbps. WRC-07 did not identify such amounts and if there is to be any further identifications before 2020, studies on possible frequency bands would need to commence before 2015.

The lead times for identification of additional spectrum in the EU and even more so at global level can be long. In principle, there are risks that a delay in the identification of additional spectrum for a particular use could play a part in constraining market developments and reducing benefits to society, if studies are not started in a timely fashion.

This would also build on the review (and an inventory) of current spectrum use, in particular in the range 300 MHz to 3 GHz, with the aim of identifying old and inefficient technologies (both commercial and public sectors), unused assignments and sharing opportunities, as examined further in Section 6.3 below.

Consequently, further study or analysis could be undertaken of the needs and requirements for additional spectrum of terrestrial wireless broadband, based on comparable data on wireless broadband and with an aim of meeting the final target set by Europe 2020.

As regards satellites, their key characteristic is that, once in orbit, the service they provide is immediately available to all users under the satellite's footprint, at a known cost, subject to certain constraints in densely constructed urban areas. However at present the cost for a household or a business to use the services of satellites exceeds significantly the costs arising

if other wired or wireless technologies were available, mainly because of costly end-user equipment. Also, given the fact that the demand for broadband capacity is increasing exponentially, it is important to verify whether the satellite platform would be able to meet this growing demand. Furthermore in case that satellite industry needed further spectrum to be allocated to it for this purpose, the most suitable spectrum bands would have to be identified

Areas for further analysis and study in relation to the satellite industry could entail studying the provision of a harmonised satellite solution that will ensure the coverage of even the most remote areas of Europe with a broadband offering to access the Internet at a comparable price to terrestrial offerings.

Option 3: Initiative identified in the form of concrete action

The RSPG concludes in a position paper^{xi} that, in preparing for the future, Member States and the European Commission should be ready to take appropriate and timely action where a shortage in the availability of spectrum for wireless broadband is identified. This would be likely to involve identifying additional spectrum at European level. But before that, it is important to ensure that existing designated spectrum at EU level has been assigned to the full extent at national level and that rights of use that have been granted are actually used efficiently by network operators. Some respondents to the public consultation deplore the situation that spectrum bands, e.g. at 2.6 GHz, have not yet been assigned to network operators in a substantial number of MS. Full assignment of already designated spectrum would lead to 860 MHz being available across the EU under technology and service neutral conditions

A technical implementation measure covering the 2 GHz bands would bring the total spectrum designated to terrestrial ECS in Europe to 1015 MHz^{xii} at the moment. Further measures taking into account spectrum identified at WRC-07 could also be reassessed, although preliminary discussion with the MS in the Radio Spectrum Committee have shown some reluctance to opening bands at 450 MHz and 2.3 GHz. On the other hand, the RSPG Opinion on the RSPG encourages the further identification of bands where technology and service neutrality is applied (so called WAPECS bands).

The spectrum freed as a result of the digital dividend should be made available and usable without undue delay. The date of 2013 seems to be possible, subject to limited exceptions due to technical constraints until 2015 for Member States who can demonstrate such a need. The date of 2013 seems workable considering that Germany has already assigned spectrum in the 800 MHz band and that a number of Member States (including Spain, France, UK, Portugal, Austria, Netherlands, Denmark, Sweden, and Finland) have already clear plans to adopt 800 MHz band, and considering the high demand for such spectrum as evidenced in the results of the recent auction held in Germany for that band.

This would also build on the review and inventory of current spectrum use, in particular in the range 300 MHz to 3 GHz, with the aim of identifying old and inefficient technologies, unused assignments and sharing opportunities, as examined further in Section 6.3 below.

Consequently the initiative for terrestrial wireless broadband would be to:

a) Ensure that sufficient spectrum for coverage and capacity purposes is allocated within the EU so that all citizens have access to wireless broadband at a sufficient speed by 2015 and commence with all necessary steps to achieve at least 30 Mbps by 2020, this would include making available spectrum freed as a result of the digital dividend, examine the possibility to free further spectrum for example below 1 GHz and if necessary, the identification of

additional spectrum for terrestrial as well as satellite broadband communications, and encourage coverage of rural areas complemented, if necessary, by technical harmonisation measures under the Radio Spectrum Decision, accompanied where applicable by a further impact assessment.

b) Ensure that all spectrum designated by Commission Decisions 2008/477/EC (2.6 GHz), 2008/411/EC (3.4-3.8 GHz) and 2009/766/EC (900/1800 MHz) has been assigned by 1.1.2012 under authorisation conditions that enable consumers to easily access wireless broadband services. This date should be feasible as the deadlines for designating and making the spectrum available will all have expired (some having expired as early as December 2008). Therefore, taking into account the deadlines set by the Authorisation directive which are normally much shorter and the need to ensure efficient and effective use of spectrum, such deadline of 2012 is reasonable.

In order to reach the 100% coverage goal and the objective in relation to the speed of the connection, potential actions in relation to the satellite industry could entail designating harmonised spectrum bands for satellite broadband using the mechanisms of the Radio Spectrum Decision to give certainty for investment.

Comparison of options

For option 1 to be satisfactory, the Commission would have to be sure that the different market players providing broadband services would be able to deliver the services needed to achieve the EU2020 goals without any further regulatory measure in allocating or assigning spectrum for these purposes. In the case of there being no co-ordinated EU action, it is likely that differences between Member States are deepened and a geographical digital divide is maintained. Generally this would not be beneficial for the further development of a European internal market, nor for the competitiveness of Europe compared to other regions in the world. Nor would it promote the inclusion of European citizens as due to their geographic location many would continue to be disadvantaged in benefiting from digital services. It should be noted that there was broad support in the public consultation for a harmonised approach to making spectrum available at EU level and ensuring its assignment as soon as possible.

Not taking action would also not take into account the numerous responses in the public consultation which refer to the importance for Europe to

- remain a leader in mobile in the broadband era,
- cope with economic recovery and promote social inclusion through wireless technology and
- ensure that existing harmonised spectrum is assigned as soon as possible at national level and to look for further opportunities for harmonised spectrum use.

Moreover, the spectrum summit showed a political will to act urgently and to challenge the status quo, given the substantial impact these services can have on economic recovery and growth.

In conclusion, the initiative for terrestrial wireless broadband outlined **in option 3** represents an important step on the way to achieving the overall goals of EU2020 and should be included in the first RSPP. While the EU 2020 strategy covers the next 10 years, the RSPP addresses a shorter timeframe. Therefore, realistically, the first RSPP should try to achieve a provisional

target, which ensures that sufficient progress is made in ensuring adequate spectrum for coverage and capacity purposes so as to allow the overall objective to be attained in 2020. Further analysis in form of an impact assessment will be needed and conducted once concrete steps are identified. Additionally, it will be important to monitor the demand for wireless broadband based on comparable data, in order to act as appropriate in the second RSPP.

It has been recognised that the satellite industry can play an important and vital role in achieving the goals laid down in the EU2020 Strategy. However uncertainties remain, especially concerning the cost involved. While the satellite industry has the capability to help in meeting the 100% coverage target, it cannot provide a broadband service to 450 million EU citizens due to capacity constraints on existing and planned satellite systems^{xiii}.

Contributions to the public consultation have shown that there is a high potential that a significant drop in cost of customer premise equipment, which is needed to receive signals from satellites, can be achieved till 2015. This is an essential factor for the viability and feasibility of a satellite contribution or solution in achieving "broadband for all". Otherwise CPE equipment might need to be subsidised in order to remain affordable for consumers who do not have a choice between technologies due to their location and/ or who cannot pay for the difference in price between other technologies and a satellite solution. According to the European Satellite Operators Association, the public investment support needed may relate to the cost of the necessary ground equipment, which currently would amount to ca. 250-500 EUR per user.

Concerning satellite, it should be noted that allocations exist and operators are making use of spectrum and there is also substantial further capacity in the form of orbital slots which could be used to support further satellite offerings. Consequently, the focus could be on studying satellite capacities, in particular, to achieve social inclusion and the target of 100 % broadband coverage within the EU by 2013 and on the provision of satellite services at a comparable price to terrestrial offerings. More study is needed in order to assess the number of households that could be served with broadband services at speeds of 10 Mbps at a price comparable to terrestrial offerings. These studies should therefore show whether the allocation of additional (harmonised) spectrum to satellite operators would allow a more efficient use of the spectrum in question, taking in particular into account the EU2020 broadband objectives. Consequently, the studies reflected in Option 2 should be performed.

As long as there is no clarity on what the spectrum demand would be and how the target of broadband for all can be translated into spectrum needs of the satellite industry, it is premature to consider concrete measures. However, further concrete initiatives should not be excluded at this stage and, once studies have been undertaken, option 3 should be taken into consideration.

As regards the Digital Dividend, the Impact Assessment carried out in 2009 accompanying the above Communication remains valid in its entirety, and therefore this impact assessment does not repeat that analysis. However, there are two aspects which need further reflection as either progress has been made or as potential obstacles have come up:

1. The Commission has just adopted the 800 MHz Decision to ensure a harmonised approach to use of this sub-band in Member States that decide to re-allocate it. In the Commission's view it is important to agree on a common target date for the opening of the 800 MHz band in all Member States and on review mechanisms to assess the progress achieved on the efficient use of the digital dividend spectrum. At the spectrum Summit, significant support emerged for a mandatory target date of 2015 at the latest (but there were several requests for this to be achieved earlier). This is to be welcomed based on the detailed analysis

provided in the Impact Assessment accompanying the Communication in October 2009, which concluded that in case all Member States cleared and awarded the 790–862 MHz sub-band by 2015 in a format that enables it to be used for wireless broadband or other electronic communications services, between EUR 19 billion and EUR 46 billion over 15 years in net present value would be generated depending on the assumed level of demand for different services. Significant social benefits would be generated by greater access to broadcasting content and broadband services in sparsely populated areas and as well as for disabled and elderly people, and the possibility to ensure a European wide operability of services. With a non-mandatory approach some of the economic (on average EUR 2 billion) and social benefits would be lost.

Several Member States will be able to make the 800 MHz band available as early as 2012. In those cases, the social and economic benefits identified in the earlier Impact Assessment on the use of this band for wireless broadband services will accrue from an earlier date and will therefore be maximised. These early movers will also have a direct impact on the availability of equipment at an economically-acceptable price, as manufacturers move to satisfy demand in large Member States such as Germany. Early experience of the negotiations carried out by both France and Germany with all neighbouring countries indicates that frequency coordination can be conducted successfully with neighbouring Member States (where necessary, with EU support), with the result that further negotiations by other countries should prove increasingly straightforward. While due account will have to be taken of Member States that have ongoing co-ordination difficulties with neighbouring non-EU countries, as well as with those Member States that have just begun digital broadcasting in MPEG-2 format and will require a reasonable transition period of between 2 to 4 years after final analogue switch off in 2012, the economic and social benefit of having a significant majority of EU Member States designate the 800 MHz band for wireless broadband use from the end of 2013 onwards would be considerable.

2. There is limited quantitative evidence regarding the extent of potential interference from wireless broadband devices to cable receivers, so it has not been possible to include this cost in the modelling of the study on which the Impact Assessment based itself. Following adoption of the 800 MHz Decision, mobile uplinks (832–862MHz) may interfere with some nearby cable receivers. Nevertheless, the scale of the expected private value benefits for wireless broadband means that the cost of mitigating this interference would need to be very large in order to change the conclusions.

Several national technical studies in this matter have not led to definite conclusions so far, and a further discussion and exchange of study results was conducted in June at a second workshop organised by the European Commission. This workshop has shown good progress on immunity solutions for the cable equipment, so that there is strong indications that interference could be reduced to tolerable and manageable levels. This results from an invitation from the Commission to the standardisation bodies to revise and develop standards for the affected TV receiver equipment and to find mitigating solutions until new equipment is placed on the market. Some contributions to the public consultation have called for harmonising spectrum for the purposes of PMSE (Programme Making and Special Events); the assessment of this need had been carried out in the context of the Impact Assessment of the Digital Dividend in 2009. That impact assessment identified the risk of disruption of important services already making use of part of the UHF where the digital dividend spectrum is located. The main category of legacy services in the UHF spectrum, and therefore potentially interfering with the use of the digital dividend, is commonly referred to as wireless

microphones and services ancillary to broadcasting and programme making. Wireless microphone and similar ancillary services can use these particular frequencies (known as 'interleaved spectrum' or 'white spaces'). They are essential to a number of sectors of the economy, particularly broadcasting, content production and events organising (such as concerts and public speaking for instance). Any changes to the band should carefully consider the ability of these users to offer continuity of service as well as their financial viability and cultural importance.

Based on the issues mentioned above as well as the substantial political support expressed at the Spectrum Summit and in line with the results of the public consultation and considering the possibility to conduct an inventory of spectrum use as envisaged under section 6.3 below (see 1.2.3. for the summary for the results of the public consultation) the initiatives in the RSPP context are to:

a) Ensure that sufficient spectrum for coverage and capacity purposes is allocated within the EU so that all citizens have access to wireless broadband at a sufficient speed by 2015, and commence with all necessary steps to achieve at least 30 Mbps by 2020; this would include making spectrum available spectrum which will be freed as a result of the digital dividend, examine the possibility to free further spectrum for example below 1 GHz and if necessary, identify additional spectrum for terrestrial and satellite broadband communications, and encourage coverage of rural areas, accompanied if necessary by technical implementing measures under the Radio Spectrum Decision.

b) Ensure that all spectrum designated by Commission Decisions 2008/477/EC (2.6 GHz), 2008/411/EC (3.4-3.8 GHz) and 2009/766/EC (900/1800 MHz) has been authorised by 1.1.2012 under authorisation conditions that enable consumers to easily access wireless broadband services.

c) Agree on 2013 as a common target date for clearing the 800 MHz band in line with the existing technical harmonisation Decision, while ensuring an adequate derogation process in duly justified cases (until 2015), especially where co-ordination problems with third countries exist or where the complexity of the spectrum replanning for digital television requires a longer transition period. This will also require the establishment of a review mechanism to assess the progress achieved on the efficient use of the digital dividend spectrum;

d) Ensure that the expected impact of the digital dividend in terms of improving access to broadcasting content and broadband services in sparsely populated areas and for socially-vulnerable groups, including accessibility for disabled people, to ensure social inclusion in the EU, is fully realised and that PMSE and cable service requirements are taken into account.

e) Study the provision of a harmonised satellite solution that will ensure the coverage of even the most remote areas of Europe with a broadband offering to access the Internet at a comparable price to terrestrial offerings.

6.2. Facilitating easy and equal access, fostering flexibility and competition

Easy access to spectrum is about creating flexibility by removing regulatory barriers that could stifle innovation and market entry, such as restrictive conditions related to services and technologies. Equal access to spectrum touches upon issues related to an effective competitive environment as well as avoiding competitive distortions when a reassignment (refarming) of existing rights of use takes place.

Flexibility may relate to the way spectrum is assigned – through individual rights or general authorisations, through the possibility to easily trade spectrum rights – and to the way it is used – facilitated by the principles of service and technology neutrality.

Flexible use of spectrum and limited harmonisation of authorisations have been strengthened in 2009 by the revised regulatory framework for electronic communications which strengthened the principles of technology neutrality and service neutrality^{xiv xv}.

The 2009 revised framework also allows the common identification of bands for which usage rights may be made tradable. Since 2002, Member States have had the possibility to introduce spectrum trading as they see fit, and several Member States had done so already, but in different formats and bands. A prospective spectrum user therefore could not buy the same spectrum in all Member States according to a standard procedure. The rules established in the revised framework could be facilitated by more homogeneity of procedures and of similarity of rights to be purchased or leased.

In line with subsidiarity, harmonisation of authorisation conditions and procedures for spectrum use has until now taken the form of harmonisation recommendations of the Commission^{xvi}, which are not binding, except that pursuant to Article 19 of the Framework Directive, national authorities, must take the utmost account thereof and explain the reasons if they decide not to follow it. In one case though, regarding- mobile satellite communications (MSS) services - authorisation conditions and procedures as well as selection criteria and procedures have been harmonised through a binding Parliament and Council Decision^{xvii}.

Option 1: No initiative identified in the first RSPP Several bands have already been opened to more flexible use, e.g. the GSM spectrum for third generation mobile communications (UMTS) and soon to the fourth generation. Besides defining technical usage conditions, this requires an examination by Member States and the Commission of potential competition consequences. This issue is also examined by the Radio Spectrum Policy Group and the ERG/BEREC. The opening of the GSM 900 MHz band by the 2009 amended GSM Directive, for example, could possibly result in competitive distortion if certain mobile operators who have not been assigned spectrum in that band are disadvantaged compared to existing 900 MHz users who, as a result of the opening, would be automatically able to provide 3G services in that band. The opening of the digital dividend in the 800 MHz band in conjunction with the liberalisation of the 900 MHz band will also need particular attention. The Commission must ensure that national decisions are non-discriminatory and do not distort competition to the benefit of incumbent operators. However, Option 1 does not allow competition matters to be addressed from the EU perspective.

Under this option the Commission would not propose any measures to be undertaken in relation to spectrum trading and authorisation, despite the fact that the provision was expressly included in the revised regulatory framework, nor would it take into account the RSPG Opinion, which calls to the designation of more spectrum under a technology and service neutral regime.

Also no measures would be proposed at European level in relation to enhancing innovation through general authorisations, like the identification and allocation of spectrum under harmonised technical conditions for innovative applications as spectrum is considered by the Member States as a national resource.

Option 2: Initiative identified in the form of further, analysis, study and discussion

In order to reach a better balance between the application of different spectrum management models (i.e. moving away from the administrative approach towards the market approach and the collective use of spectrum approach), further analysis could be carried out in this field. Some evidence already was gathered through studies^{xviii} on the spectrum allocation models applied today in Europe, suggesting also measures to promote a better management of spectrum leading to a more efficient use of spectrum. The RSPG could continue its work on reports developed jointly with BEREC on competition and assignment issues and further develop its views on the common use of spectrum, with a view to identifying concrete initiatives to be launched at a later stage.

Option 3: Initiative identified in the form of concrete action

The existing principle of flexible use of spectrum has repercussions on authorisation conditions and procedures for access to spectrum. While the public consultation shows wide support for this principle several responses raise concern about delays and competition distortions at the level of national authorisations and would welcome EU guidance to the Member States in this respect.

Furthermore, there was widespread support in the public consultation for the imposition of common conditions so as to ensure a transparent and coherent approach, even where it is necessary and in the public interest to impose certain obligations or restrictions, for example coverage obligations below 1 GHz to facilitate rural coverage. During the consultation exercise, industry called for commonality across the EU, especially in the area of broadband communications, where economies of scale are being created outside of Europe. This is important to overcome barriers to the internal market, to avoid fragmentation resulting from diverging national authorisation policies, and to create new market opportunities for spectrum users and accelerating innovation.

The RSPP should state the principle of flexibility of spectrum use, including through the development of a co-ordinated approach to authorisation conditions, and to foster competition. The initiative in this respect would be to develop guidelines on authorisation conditions and procedures in order to maximise flexibility in the use of spectrum, with the aim of avoiding delays and competitive distortions and facilitating commonality across Europe. Such guidelines would be prepared by the Commission together with the Member States. Although not binding, they would call for a consensual cooperation of all Member States and ensure a smooth and thorough implementation. The recent negotiations of the Review of the regulatory regime of electronic communications indeed showed strong reluctance of Member States to allow the Commission to regulate these measures in a binding fashion, be it with the involvement of Member States in a regulatory comitology procedure. Of course, this would not rule out the possibility for the Commission to adopt Article 19 FD recommendations or to submit proposals for co-decision harmonisation measures on the model of the MSS Decision, should there be a need for binding solutions to be approved by both Parliament and Council.

These guidelines should include

- the establishment of coverage conditions for spectrum below 1 GHz which would oblige right holders to deploy their services in rural and less covered areas to achieve economic and social objectives, considering that one of the main justifications for freeing such spectrum as part of the digital dividend is its good propagation capacities over vast areas,

- allowing rights holders to offset the cost of such coverage obligations taking also into consideration the fees which would be charged for their licences.

Other issues to be addressed would include network sharing, the application of spectrum caps, preservation of competition in the assignment of (additional) spectrum to certain undertakings, avoiding spectrum hoarding and ensuring that operators have access to contiguous blocks of spectrum appropriate for broadband.

The new article 9b(3) of the revised Framework Directive allows the Commission to adopt comitology decisions to identify frequency bands for which rights to use radio spectrum may be made tradable or leasable, at the exclusion of spectrum used for broadcasting.

The bands where flexibility has been introduced according to the new WAPECS approach (e.g. the 800 MHz, 900MHz, 1800MHz, 2.5GHz to 2.69GHz, or 3.4 to 3.8GHz bands, which are open to wireless electronic communications services) should be addressed in particular. A study^{xix} contracted by the Commission in 2004, estimates that if flexibility is combined with spectrum trading, this could realise an additional EUR 9 billion per annum in consumer surplus relative to the status quo scenario.

Furthermore, RSPG pointed out in its opinion on the RSPP that in order to achieve a truly effective and efficient use of spectrum at European level it is of vital importance to facilitate the application of regulatory improvements like introducing service and technology neutrality and market mechanisms like secondary trading to remove unnecessary rigidity in spectrum management and put in place measures to deliver easier access to spectrum. In addition, the RSPG has advised the Commission to take all actions to designate more frequency bands under service and technology neutral regimes (i.e. WAPECS).

Therefore, in line with the revised regulatory framework, the Commission could adopt a Decision to make the bands 790-862 MHz (800 MHz band), 880-915 MHz, 925-960 MHz (900 MHz band), 1710-1785 MHz, 1805-1880 MHz (1800 MHz band), 1900-1980 MHz, 2010-2025 MHz, 2110-2170 MHz (2 GHz band), 2500-2690 MHz (2.6 GHz band), and 3.4-3.8 GHz (3.6 GHz band) subject to spectrum trading. Thus the initiative would be to take all actions to designate frequency bands under technology and service neutral regimes and ensure that those frequency bands where flexible use has been, and will be, introduced are tradable on the secondary market.

A concrete measure facilitating easy access to radio spectrum to boost innovation would aim to achieve the identification and allocation of spectrum for innovative applications using the mechanisms of the Radio Spectrum Decision. This would necessitate harmonised technical conditions for these applications subject only to general authorisations and therefore operating under collective use of spectrum model.

The seventh Framework Programme invests heavily into ICT research with several EUR billion being spent in the 2007 to 2013 time period. Those applications that are likely to have the largest economic impact and/or potential for investment (possibly in the areas of Cognitive Radio or eHealth), and which are in need of easy access to radio spectrum, should be identified taking into account technology and service neutrality principles.. Afterwards a study of spectrum bands that would be optimised for, without being limited to, use by these applications could be undertaken and using the mechanisms of the Radio Spectrum Decision harmonised technical conditions across Europe could be set. Other actions in this context could be the integration of cognitive radio technologies as well as an initiative to inform SMEs and research projects about and promote the availability of trial licences and already harmonised bands (e.g. under the Decision for Short Range Devices), which facilitate testing of new technologies and equipment.

The initiative could be to identify and allocate spectrum for innovative applications with the aim of promoting and accommodating at least three R&D initiatives that are foreseen to have a major socio-economic impact and/or potential for investment from SMEs. This should be done under harmonised technical conditions and subject only to general authorisations. .

Comparison of options

As negotiations for the 2009 review of the electronic communications regulatory framework showed, Member States do not easily accept harmonisation measures regarding conditions and procedures relating to spectrum authorisation, since they consider that spectrum management is basically a national competence. Member States will systematically resist and try to limit the impact of any measure proposed by the Commission to the strict minimum.

Nevertheless, there is strong support in the public consultation also for some elements related to assignment, such as coverage obligations for spectrum below 1 GHz, ensuring awards of wireless broadband spectrum take place by a certain date and providing guidelines to the MS on how to avoid competitive distortions.

The review of the telecom package was accompanied by an impact assessment for which the Commission had decided to contract external support to construct an econometric model to identify the impacts of certain policy choices.^{xx} It had been noted that building a verifiable econometric model was hampered by lack of comparable data or incomplete sets of statistics. To our knowledge, the econometric model developed for the current exercise in order to test the impacts of regulatory choices, was one of the first attempts to deliver an evidence-based impact assessment in the field of spectrum management.

The table below provides a summary on main likely impacts and risks arising from further coordination in spectrum trading compared to no change. The signs represent a scale of possible impacts vis-à-vis the “no change scenario”: **+** positive impact, **O** neutral impact, **-** negative impact.

Summary on the main impacts and risks

IMPACTS AND RISKS	Introduce the principle of technology and service neutrality and co-ordinated spectrum trading	No change
	ECONOMIC	
<i>Investment and innovation</i>	+ More flexible and co-ordinated spectrum management will significantly encourage investment and innovation. New entrants will be able to acquire spectrum through spectrum trading or operate in unlicensed bands (if technologies managing interference are available).	Does not facilitate cross-border investment and deployment of new innovative cross-border services. Differences in regulation do not particularly encourage operators to invest in other Member States.
<i>Competition</i>	+/- Introduction of co-ordinated spectrum trading could lead to more consolidation of the mobile/wireless market. Preventing spectrum hoarding through effective competition regulation will be crucial. Stronger competitive pressure on broadcasters. Gradual increase in competition from new entrants and new technologies as more unlicensed bands become available (i.e. development towards Scenario 1).	Limited competition, disadvantageous position for new entrants, and uneven development in Member States (some MS advanced in market opening and introduce more flexibility whereas others still rely predominantly on administrative model of spectrum management).
<i>Internal market, regulatory consistency</i>	+ Improvements removing the current fragmentation in national spectrum policies – through strengthened co-ordination mechanisms. More opportunities for development or cross-border or pan-European services using frequencies.	Inconsistent application of rules, slow progress based on voluntary co-ordination with lengthy and cumbersome procedures, risk of increasing differences between MS. Slow deployment of cross-border services.
<i>EU competitiveness</i>	+/- More flexibility and better co-ordination of spectrum management should strengthen competitiveness of the mobile/wireless industry. Risk of spectrum hoarding and oligopoly situations (i.e. operators with “deep pockets controlling the market) if competition law is not properly enforced.	Risk of gradual erosion of the mobile/wireless industry’s competitiveness vis-à-vis the rest of the world. Economies of scale and scope harder to achieve for mobile/wireless operators, slower uptake of cross-border services.
<i>Economic operators' costs and benefits</i>	+/- More opportunities for new entrants, challenges for incumbent operators and distributors of broadcasting (see more detailed analysis of stakeholder impacts in Table X.)	Reaffirmed position for the current spectrum holders, high barriers of entry for new service providers and new technologies, impact varies by national spectrum regime.
<i>Administrative costs, simplification</i>	+/- Overall reduction due to lower administrative burden and less regulation for operators. Less burdensome general authorisations will be used more often than more burdensome individual licenses. Some additional burden related to transition to a more flexible and co-ordinated system.	No change, no reduction of administrative burden for operators. Partial reduction possible in MS which decide to implement a more flexible spectrum regime.
<i>Consumer benefits</i>	+ More choice, more services, lower cost (especially if more unlicensed bands are used in the future).	Same choices as today, big differences between MS as regards service offerings and prices (not justified by differences in the underlying costs)
<i>Overall economic growth</i>	+/- Economic modelling using scenarios shows that more flexible and co-ordinated spectrum management has a significant and positive impact on GDP growth (the difference between the best-case and the worst-case scenario would be approx. 0.1% of the annual GDP growth)	Slower GDP growth than in Option 1 (scenario 3 shows the worst-case model for this option where MS withdraw from any EU co-ordination)

<i>SOCIAL</i>		
<i>Social and digital inclusion</i>	<p>➔/O Impact will depend on other factors, such as the future universal service concept. Positive impact of co-ordination on regulatory consistency should have positive effect on digital inclusion across the EU. More choice and cheaper wireless services should contribute to social inclusion and bridging the digital gap between regions.</p>	<p>Impact will depend on other factors, such as the future universal service concept. Wireless services generally less affordable and less available across the EU than in Option 1. However, big differences between MS can be expected.</p>
<i>Employment and labour market</i>	<p>➔/O Difficult to predict the outcome. Scenario modelling shows a positive impact on employment in knowledge industries. Positive spill-over effects to other sectors can be expected. Negative employment effect for market players who will not adapt to the change.</p>	<p>Only limited spill-over effects can be expected due to slower deployment of new wireless technologies and services.</p>

There are large potential economic benefits if flexibility is combined with secondary trading as outlined above. Even though in the accompanying impact assessment^{xxi} as best option, the compulsory coordination was identified, only a voluntary coordination was endorsed by Member States in this field. The Commission therefore aim for Option 3 and try to propose further small steps which lead into the direction of improved coordination without impeding the flexibility of Member States.

The adoption of an implementing measure to identify bands which should be made tradable in the whole EU in line with option 3 is preferable. The Commission also envisages proposing to adopt a recommendation on the harmonisation of the format and content of rights which would be made tradable. A first step in this direction has already taken place through Commission Decision 2007/344/EC, which requires Member States as of 1 January 2010 to publish information on rights of use, i.e. identity of the right holder, expiry date of the right, geographic validity and tradability in a common data format. In line with what is proposed with regard to flexibility earlier in this section, the recommendation should build on the information being made available by member States to set clear, generic and transparent conditions that should appear in such rights of use

Applications only subject to general authorisations (often also called "collective use of spectrum") already today have a large impact on society and business. A Commission study^{xxii} of 2006 suggests that the European market for products and services dependent on collective use of spectrum is currently around €25 billion. The economic importance of collective use is indicated by the economic benefits it provides in terms of system cost savings, productivity gains, reductions in congestion and accidents in transport networks, health and safety benefits, and user convenience. For example, public WiFi services depend entirely on collective use of spectrum. The RSPP should establish the principle that the EU should adopt wherever possible (starting in certain bands) a collective use approach to operate alongside the more conventional licensing of spectrum where harmful interference continues to be a policy concern, and the proposal would be developed further in a Commission Communication

Option 3 is the preferred option because of its added value in the removal of barriers in access to spectrum for innovative applications coming out of European research, which have the potential for a high economic, social and or environmental impact. Harmonised conditions across the EU have the potential to generate economies of scale to the benefit of these applications and they could strengthen the possibilities for SMEs, including municipalities and communes, which have neither the financial nor human resources to opt for individual rights of use.

6.3. Enhancing efficient use of spectrum

Efficient spectrum use is a principle laid down in the Framework Directive and the Radio Spectrum Decision. This key principle has broad support among stakeholders and regulators alike as is apparent from the public consultation, the RSPG Opinion and the discussion at the Spectrum Summit. Therefore, it is important to promote this principle, especially in spectrum bands that have the highest value in socio-economic terms, i.e. in the range from 300 MHz to 3 GHz.

Public sectors are substantial users of spectrum – with assignments representing 40-50% of the valuable frequencies below 15 GHz. Even a marginal efficiency gain that could be exploited at EU level could lead to valuable spectrum becoming available for new services with the possibility of sharing spectrum resources (normally without negative impact on pre-existing uses) or even state-of-the-art equipment, in order to lower costs. At the same time this sector also has requirements for new broadband services which have a high social value in terms of providing public safety. Public safety is assumed to comprise primarily police, fire and ambulance services, including the Public Protection and Disaster Relief (PPDR). Within the public safety field emergency services like PPDR play a vital role to society. At the moment the emergency services sector tends to be highly fragmented.

Option 1: No initiative identified in the first RSPP No action in this field would mean that especially in the spectrum range of high socio-economic value such as the range 300 MHz to 3 GHz opportunities would be missed to improve the quality of administrative decision making both at national as well as European level. Comprehensive information about whether or not this frequency range is actually being used as efficiently as possible would be missing as it is not available today.

Currently at European level, information on spectrum allocations and applications in all 27 Member States and some other CEPT countries is reported in the European Frequency Information System (EFIS), which is administered by the CEPT based on Commission Decision 2007/344/EC. There is considerable variation in the level of detail provided by individual countries. More importantly EFIS data is not providing sufficient information to be able to assess the efficiency of spectrum use, as no data is provided on several aspects like efficiency of equipment used in the respective frequency band, especially in the public sector.

If not to promote the efficient use of spectrum, the European Commission has no competence to deal with specific segments of public sector use of radio spectrum (e.g. defence), however in some areas like civil protection and transport the possibility exists to take certain measures at European level. Under this option the Commission however would not make any further steps and rely on harmonisation measures carried out in the past or ongoing in relation to transport.^{xxiii} In relation to Public Protection and Disaster Relief at the moment so called "TETRA" and "TETRAPOL" standards apply, which provide for harmonisation at a voluntary basis.

Option 2: Initiative identified in the form of further, analysis, study and discussion Participants at the spectrum summit, the RSPG and also studies^{xxiv} have called for a review or a periodic survey of current spectrum use and the evaluation of future needs based on consumer and business demands.

The RSPG has suggested in its opinion on the Radio Spectrum Policy Programme a proposal for concrete action on how to improve the efficiency of spectrum use. The RSPG believes that, with a view to release more “new” spectrum, the European Commission should take into

account an analysis of market and technology trends to identify developing and potential future significant uses of spectrum. The process should also identify possible target frequency bands, including frequency bands currently used by the public and commercial sectors, to promote intelligent sharing and compatibility solutions with other commercial or public sector services and to duly consider whether certain frequency bands will need to be made available.

Further analysis and study could be envisaged in the field of public use of spectrum especially as regards how potentially to incentivise the use of spectrum by public bodies, taking into account the limited European competence in this matter.

The initiative would be to conduct a review (and an inventory) of current spectrum use, in particular in the range 300 MHz to 3 GHz, with the aim of identifying old and inefficient technologies (both commercial and public sectors), unused assignments and sharing opportunities.

Actions could entail a study that identifies spectrum currently being used by old and particularly inefficient equipment or where use is limited in the first place. With the aim of finding those bands which have the lowest opportunity cost at the European level, the investigation would flag to Member States and industry where it is most effective to divest so that harmonised spectrum may emerge over a period of time. Such preparatory work might lead to further action in future Programmes.

Option 3: Initiative identified in the form of concrete action

Under this option concrete measures based on the review and inventory discussed in option 2 could lead to concrete initiatives in terms of technical implementing measures for new significant uses of spectrum taking into account market and/or social demands.

One example could be the following. According to a recent study^{xxv}, given the limitations in capacity of existing dedicated networks to deliver mobile broadband services for PPDR, it is considered likely that a new generation of solutions will be required across Europe in the next 5 to 10 years, to meet future public safety user demands, which will require additional spectrum to deliver the services required. In concrete terms this study concludes that there is a need for 2x10 MHz for harmonised spectrum across Europe for broadband PPDR applications. Noting the essential coverage requirements of these services, spectrum must be found below 1 GHz. The Commission would issue a Mandate to CEPT and possibly draft a technical implementation measure using the mechanisms of the Radio Spectrum Decision, since there is support from the public consultation for harmonised technical measures.

Comparison of options

It would seem appropriate that before taking any further action a review of efficient spectrum use needs to be carried out. This proposal is also benefiting from an immense political support by stakeholders, which facilitates its implementation once the details on scope of the review are defined. Further steps in promoting and ensuring the efficiency of the use of spectrum can and should follow once the information gap is closed or at least narrowed down.

According to a Study^{xxvi} conducted for the Commission, there is a good case for liberalising allocations to the public sector, so that where feasible, allocations are made more technology and service neutral in line with European Commission Policy in respect of communications services (e.g. WAPECS policy). The extent of liberalisation that is optimal varies from band

to band, depending in part on the nature of the spectrum band harmonisation necessary to meet requirements for cross border co-operation and coordination and in part on the scope for sharing between different applications.

More efficient and effective use of radio spectrum by the public sector could produce multiple benefits, including:

- More effective delivery of services by the public sector;
- A "new" digital dividend (spectrum currently used exclusively by the public sector might be either freed or else made available for sharing), which could bring additional economic and social benefit and can generate substantial economic spill-over;
- Increased speed and administrative efficiency and also less administrative burden in responding to spectrum needs that change over time.

In more concrete terms the following costs and benefits of harmonising spectrum for broadband public safety communications (PPDR) can be identified:

Benefits	Costs
PPDR as service with a high social value as it brings benefits to the whole society	Economic value of the harmonised band (opportunity cost of using spectrum) not properly reflected, potentially an alternative use could be considered more efficient from an economic point of view (A harmonised allocation of spectrum for broadband PPDR communications would not be determined by the market, as PPDR users do not have financial means to compete for the spectrum in the market (e.g. through auctions), therefore there is a market failure. In this case, the allocation of spectrum would rather be decided at the political level and would be based on the social value of PPDR.) In any case, the possibility for and consequences of measures under which all users would have to pay for spectrum, including public sector and providers of general interest services, , should be further analysed considering in particular their impact on the efficient use of spectrum and on the possibility for certain users to carry out their mission, as well as to the potential need for subsidies and the absence of state aids.
Cross-border interoperability (as emergency situations are often cross-border and/or involve multinational teams - e.g. natural disasters, terrorism or routine cross-border activities)	
Portability of PPDR equipment across borders	
Avoiding harmful interference (and thereby promoting efficient use of spectrum) within the EU	
Harmonisation of spectrum at EU level is laying down the foundation needed from a spectrum point of view to promote the functioning of the internal market	Restrictions on use for alternative uses in the frequency band assigned to PPDR even if spectrum assigned to PPDR is underused or unused

Creation of larger equipment markets	Restrictions on ability to refarm spectrum for new services
Economies of scale (e.g. in equipment manufacturing)	
Promoting competition between equipment suppliers	
By larger markets, economies of scale and competition, the cost for the equipment needed and therefore for the PPDR services should decrease	

Several contributions received in the course of the public consultation have pointed to the need for and supported more harmonised spectrum for PPDR.

In conclusion, the most important step will be to strengthen the guiding principle of efficient spectrum use by creating a detailed and transparent EU inventory, with the necessary safeguards to preserve secrecy regarding public defence and security, and by clarifying the level of utilisation by each user. Such an exercise would have the largest benefit in the range 300 MHz to 3 GHz, where the socio-economic value is the greatest. Following that exercise, future significant uses based on market and social demands should be identified with the aim of finding appropriate refarming or sharing solutions. One potential initiative in this area is the introduction of a harmonisation measure for PPDR, as this would be considered to be worthwhile and beneficial to European citizens.

Consequently the initiative to follow regarding PPDR, insofar as it relates to matters under EU competence, would be to ensure that safety related communications have access to appropriate spectrum to introduce innovative services for the benefit of EU citizens and to ensure that public sector use benefits from more effective and spectrally efficient technologies.

6.4. Contributing to combating climate change – action regarding transport and energy

The EU2020 strategy sets out objectives relating to sustainable growth and in achieving a sustainable, resource efficient and competitive economy. In this context resource efficiency should be improved by 20% and also the roll out of smart grids using ICTs should be accelerated. Furthermore the Commission should present proposals in relation to transport and energy saving through intelligent traffic management, in view to the further reduction of CO² emissions for passenger cars, for the aviation and maritime sectors.

Option 1: No initiative identified in the first RSPP The question is whether further measures are needed in spectrum policy to support these initiatives in the first Radio Spectrum Policy Programme or if, for the moment, the needs of stakeholders in this field are sufficiently covered.

1. “Intelligent Transport Systems” (ITS) refers to the application of Information and Communication Technologies (ICT) to transport, including wireless applications. These applications are being developed for different transport modes and for interaction between them.

The Commission's Action Plan for the Deployment of Intelligent Transport Systems in Europe^{xxvii} aims to accelerate and coordinate the deployment of ITS in road transport,

including interfaces with other transport modes. One of its priority areas is clean and energy-efficient transport. ITS applications have an essential role to play in the greening of transport, for example differentiated charging of vehicles by Electronic Toll Collection systems for circulating on certain routes is a way to influence traffic demand. In addition, ITS applications for journey planning and dynamic in-vehicle navigation contribute to congestion relief, to greener mobility and to less energy consumption.

ITS cooperative systems can be used to improve transport efficiency, as they can provide for more reliable real-time travel and traffic information, which will enhance efficient and flexible route planning, time savings and pollution control on sensitive parts of the road network. Such systems also rely on availability of and access to radio spectrum, as they are based on an exchange of information and communication between vehicles and with the road infrastructure and, when appropriate, a GNSS (Global Navigation Satellite System) positioning and time.

In relation to intelligent traffic management and the optimisation of traffic routes, significant steps have been undertaken in the past which ensure that spectrum is not a constraint and that sufficient spectrum is allocated to such measures. For the moment there are no indications on additional spectrum needs for ITS purposes, but any potential additional needs raising for access to adequate spectrum by future ITS applications has to be monitored on a regular basis.

2. Smart Grids and smart metering have the target of providing reliable and secure communications networks used to efficiently manage the electricity (and gas) networks (generation - transmission - distribution) and therefore contribute to achieving the goal to reduce energy consumption by 20% to combat climate change. This implies a significant amount of wireless devices and networks to cover remote sensing and control functions. The issue of a mass markets for such devices and interoperability must be taken into consideration.

In the current situation the use of spectrum is not harmonised at European level, instead individual frequencies are assigned by Member States for specific applications. Estimations by actors in the sector of the bandwidth required for smart grids suggest that between 15 and 30 MHz is needed ideally in a location below 1 GHz because of the excellent propagation characteristics of this spectrum including good coverage, in-building penetration and no clear line of sight required. However, these are the same characteristics sought by many applications, and spectrum could potentially be used up to 3 GHz.

Option 2: Initiative identified in the form of further, analysis, study and discussion In relation to “Intelligent Transport Systems” (ITS) the Commission continues to monitor as part of its ongoing activities the development of technology and therefore spectrum needs. Under this option a further discussion, study, analysis would be launched to assess spectrum needs.

The initiative would be to continue monitoring in its ongoing activities the development of technology and therefore spectrum needs to assess if further EU intervention on spectrum needs is required.

Recently a study has been published on potential spectrum harmonisation of smart grids.^{xxviii} Nevertheless further studies could follow to deepen the knowledge in this field to determine which bands could be considered for harmonisation, and whether dedicated spectrum would be necessary or sharing spectrum would be sufficient.

The initiative would be to consider an EU wide spectrum harmonisation for smart energy grids and smart metering on the basis of studies to deepen the knowledge in this field to

determine which bands could be considered for harmonisation, and whether dedicated spectrum would be necessary or sharing spectrum would be sufficient.

Option 3: Initiative identified in the form of concrete action As regards “Intelligent Transport Systems” (ITS) harmonisation measures have been undertaken in the past, however further measures might be envisaged even though no specific need had been flagged by stakeholders in this respect.

In line with the study mentioned above a technical harmonisation measure under the Radio Spectrum Decision could be proposed for smart grids and smart metering. Either one single (contiguous) frequency band or a set of bands could be harmonised to be used by smart grids and smart metering Europe wide. Given the requirement for high security and reliability of smart grids and smart metering applications, licensed spectrum and use of dedicated networks are recommended by the above study. It is acknowledged, however, that sharing of spectrum with military on geographic/ time basis should be also possible.

Comparison of options

1. For “Intelligent Transport Systems” (ITS), as harmonisation measures have been undertaken in the past which apparently fulfil current spectrum needs and since the Commission is presently monitoring technological developments and the evolution of spectrum needs in this field, the best option is option 1: to continue monitoring without specifying any further action in the framework of this first RSPP, possibly leading to the preparation of further action or measures in this area in a next RSPP.

2. For smart grids and smart metering as an action to combat climate change, EU-wide spectrum harmonisation would significantly support the mission-critical requirements of power supply including reliability, security and quality of service, and reflect the cross-border nature of electricity interconnected networks. It would also ensure good coverage of rural areas and reduce harmful interference also in border regions. Efficient use of spectrum would be further promoted by completing the internal market through economies of scale (e.g. in equipment manufacturing) and the creation of large equipment markets. Moreover, spectrum harmonisation would encourage wider harmonisation in non-EU neighbouring countries.

However, immediate harmonisation action might lead to suboptimal spectrum allocation if not considered carefully, and impose unnecessary restrictions for alternative uses in the frequency bands which would be assigned to smart grids. Therefore, option 2 has to be preferred for smart grids and metering.

6.5. Defending European interests at international level

The possible initiatives with an international dimension are analysed at the level of scope of the Radio Spectrum Policy Programme (basic options, discussed in section 5) as, from a methodological point of view, identifying an initiative in the form of further analysis, study and discussion is not a valid option for international negotiations. An analysis at the level of the scope of the RSPP seems more appropriate since it examines on what subject and how international negotiations should be sought at EU level.

Option 1: No initiative identified in the first RSPP in relation to external relations

The coordination of spectrum at a global level is the responsibility of the International Telecommunications Union (ITU), a United Nations agency with the mission to maintain and

extend international cooperation for the improvement and rational use of telecommunications of all kinds. Approximately every four years, the ITU holds the World Radiocommunication Conference (WRC), a process aimed at adapting the ITU Radio Regulations, the international treaty coordinating spectrum usage globally. The next WRC, the culmination of several years of preparatory work, will be held in Geneva in 2012, for which the agenda had been fixed.

The CEPT has traditionally developed European negotiating positions required for a technical-regulatory conference like WRC, and is likely to continue doing so where no *acquis communautaire* or EU policy is concerned. The WRC-12 agenda includes important topics with an effect on EU policies, for example as regards satellites. Autonomous, permanent and interference-free access to reliable information relating to environmental and security issues is of strategic importance for Europe. There are substantial environmental, economic and societal benefits associated with improved use of Earth observation- derived data, which is provided by a European programme called Global Monitoring for Environment and Security (GMES). GALILEO, an independent European satellite navigation system, will provide for precise and reliable positioning contributing not only to increased transport safety, but also to efficient and energy-saving running of transport systems. The added value and benefit created by these EU programmes have been shown.^{xxix} The spectrum bands needed for these applications to operate are assigned and secured, however might be renegotiated at a global level at WRC-12.

The possibilities to support an EU Member State in its relations with neighbouring states would by necessity be ad hoc, with the risks of fragmentation of policy that this entails.

Option 2: Initiative with a scope of ECS is developed in relation to external relations

If the RSPP was limited to electronic communications services, this would not limit the applicability of the procedure as the EU approach to international relations in spectrum policy derives from the Framework Directive Article 8a4 ("policy objectives" in the context of international spectrum negotiations), and not 8a3 (introducing the possibility to establish a strategic radio spectrum policy programme). It would however require a separate legal proposal to give effect to the common EU policy. This would be an unnecessary dispersal of resources.

In relation to cross border cooperation, the process described above can be anchored also in an RSPP with limited scope, but would be a major conceptual problem where the use is ECS on only one side of the border. It would also be difficult to support an application such as modernising Air Traffic Control which is an important EU policy goal but which is not ECS.

Option 3: Initiative on external relations with scope going beyond ECS

An initiative would be to reflect European Union policy priorities during the negotiations at the World Radiocommunications Conference in 2012 (WRC-12) with a particular aim of ensuring common European positions on sectorial policies and on more flexible spectrum use.

Space applications being a policy of the European Union would be defended accordingly.

A further initiative would be to give the European Commission a role in the negotiations at the WRC-12 that corresponds to its responsibility for spectrum matters in the EU, while actively ensuring that changes in the ITU Radio Regulations are supportive and complementary to the applicable principles of the EU regulatory framework.

The successful harmonisation and modernisation of spectrum usage within the EU inevitably create cross-border issues between EU Member States and neighbouring third countries. Where this is the case the European Union should support the involved Member States in their work to resolve such issues, and encourage the neighbouring state to consider a similar policy as adopted in the Union.

Furthermore an initiative would be to support the coordination of key spectrum bands such as the digital dividend and 3.4-3.8 GHz, with non-EU neighbouring countries through active participation by the European Commission.

Comparison of options

Spectrum harmonisation in Europe is a key enabler for the completion of the EU Single Market in goods and services, and on a wider level can foster international commercial exchanges by removing technical barriers to trade. The challenges of managing the radio spectrum effectively are often better addressed by cooperation between countries. Together with the value of economic activities - total value of spectrum-dependent services in the EU is between 2 % and 2.5 % of annual European gross product, i.e. in excess of EUR 250 € billion^{xxx}, – this explains why Europe as an economic area must give importance to international negotiations affecting radio spectrum usage.

Most WRC decisions have an impact and applicability over a long time frame (often 10 to 20 years after the conference). It is therefore important to ensure that agendas are sufficiently "future-proofed" to be able to address the spectrum requirements of important policies and trends. EU policies which are relevant in this context and which are likely to increase in importance over this period include sustainable development and climate change. Particular attention should be given to efforts undertaken to identify the spectrum requirements for future applications in this area and to ensure that they are anchored in a timely manner in the ITU process. In this context Europe will need to ensure its interests are safeguarded by an adequate protection and compatibility with satellite systems.

The RSPG recognises in its draft opinion on the Radio Spectrum Policy Programme that the joint formulation and efficient representation of European spectrum interests in international fora is necessary. In the view of the RSPG, increased importance should be given to ensuring that the ITU Radio Regulations provide sufficient flexibility, facilitate harmonisation at European level and do not constrain the EU from acting in the best interests of European consumers. Furthermore the identification of European spectrum interests and priorities shall be followed by the development of a programme for regular discussions on spectrum policies with non-EU countries and other regions. This programme should contain actions aimed at presenting EU spectrum policy goals and understanding those of non-EU countries and other regions in order to obtain their understanding and support to reach the EU policy goals. This may serve the promotion of European spectrum policy in countries at the EU borders and even globally in order to facilitate cross-border coordination, economies of scale and opportunities for European industry.

As regards cross border cooperation, an EU approach representing a coherent block of 27 Member States should wield greater influence in negotiations with third countries than in case of a bilateral approach by Member States. A bilateral approach might lead to further fragmentation in the use of key spectrum bands as different Member States might adopt different approaches and reach different compromises with third countries. In addition a bilateral approach might impede the avoidance of harmful interference in border regions

A case in point is the bands affected by the digital dividend. Due to its low frequency, the UHF broadcasting band (470 to 862 MHz) provides optimal signal propagation characteristics in terms of coverage and indoor penetration. Network infrastructures in the UHF band could thus be significantly more cost-effective than existing systems and could facilitate the deployment of mobile systems in sparsely-populated regions and highly built-up urban areas. However, because of the long distances travelled by signals transmitted in these frequencies, co-ordination and interference with neighbouring third countries are significant issues.

Wider access to broadband is an aim that most of the EU's neighbours share and a transition to similar technologies at the EU's external borders would greatly simplify cross-border coordination. A similar case could be made for the EU's efforts to modernise air traffic control and make flying within the EU safer still.

Given the difficulties that will arise if this area is not a central consideration of EU spectrum policy, the principle should be established that EU Member States will reflect European Union policy priorities during the negotiations at the World Radiocommunications Conference in 2012 (WRC-12). As the ECS regulatory framework calls on Member States, in applying the framework provisions on the management of radio frequencies, to respect the relevant international agreements, including the ITU Radio Regulations, for this reason much closer co-ordination of the positions taken by EU Member States in the WRC is required to ensure that any development of the Radio Regulations is in conformity with EU policies and objectives. We should therefore have a particular aim of ensuring common European positions on all relevant sectoral policies and on more flexible spectrum use, and of giving the European Commission a role in these negotiations that corresponds to its responsibility for spectrum matters in the EU. Furthermore, while respecting the ITU Radio Regulations, EU Member States should not accept changes in those regulations that would further constrain the applicability of the principles of the regulatory framework. Moreover the development and exploitation of space applications should be enabled with a particular focus on GALILEO and GMES, by ensuring availability and protection of the necessary radio frequencies. Option 3 is therefore the preferred option.

6.6. Assessing administrative burden

Introducing a Radio Spectrum Policy Programme is likely to have both positive and negative impacts on administrative costs.

On one hand, some initiatives identified in chapter 6 have significant positive effects on administrative burden, i.e. reduce administrative costs. Generally, the use of ICT plays an important role in reducing administrative burden as internal processes are made more efficient with the use of ICT. More specifically, e-government initiatives are widely accepted as contributing to the reduction of administrative burden. . Providing broadband coverage for all is essential to allow all citizens and businesses to benefit from the advantages of ICT in general and of e-government in particular so as to make their operations more efficient. Furthermore proposals on providing guidance on authorisations should rather simplify and facilitate authorisation procedures and therefore should contribute the reduction of administrative burden.

On the other hand some preferred options have potential negative effects on administrative burden, especially on public administrations such as the National Regulatory Authorities (NRAs) dealing with spectrum management. A proposal on a review or inventory of radio spectrum use might create some additional tasks for national administrations although these

tasks would normally fall within the overall need to ensure efficient use of spectrum; Also the potential introduction of a coverage obligation in a specific spectrum range would create the need for further monitoring whether coverage obligations are adhered to. These measures would both entail additional information obligations; however the benefits generated by the proposal would outweigh the additional administrative costs imposed.

6.7. Conclusions

Policy challenge or problem (see chapter 2)	Objectives (see chapter 3)	Resulting areas where the RSPP shall set out principles, objectives and initiatives (see chapter 6)	Conclusion on which initiatives the RSPP shall set out
<p>Mismatch between growing demand for new wireless services and available spectrum resources; Geographical divide in respect of access to broadband services</p>	<p>Define steps to take so as to enable sufficient progress to support overarching objectives relating to broadband access laid down in the EU2020 and the Digital Agenda for Europe through radio spectrum policy</p>	<p>Contributing to the Digital Agenda for Europe to enable "Broadband for all" at an appropriate speed</p>	<p>Agree on 2015 as a common target date for clearing the 800 MHz band in line with the technical harmonisation Decision and establishment of a review mechanism to assess the progress achieved on the efficient use of the digital dividend spectrum.</p>
			<p>Ensure that the expected impact of the digital dividend in terms of improving access to broadcasting content and broadband services in sparsely populated areas and for socially-vulnerable groups, including accessibility for disabled people, is fully realised and that PMSE and cable service requirements are taken into account.</p>
			<p>Ensure that sufficient spectrum for coverage and capacity purposes is allocated within the EU so that all citizens have access to wireless broadband at a sufficient speed by 2015 and commence with all necessary steps to achieve at least 30 Mbps by 2020</p>
			<p>Ensure that all spectrum designated under Commission Decisions 2008/477/EC (2.6 GHz), 2008/411/EC (3.6 4-8 GHz) and 2009/766/EC (900/1800 MHz) will have been authorised by 1.1.2012 under authorisation conditions that enable consumers to easily access wireless broadband services</p>
			<p>Studying the provision of a harmonised satellite solution that will ensure the coverage of even the most remote areas of Europe with a broadband offering to access the Internet at a comparable price to terrestrial offerings</p>

<p>Suboptimal use of spectrum: Inefficient use of spectrum from a technical, economic and/or social point of view</p>	<p>Reveal areas of inefficient use of spectrum and propose within the areas of EU policy measures to promote efficiency of spectrum</p>	<p>Review of spectrum use; public use of spectrum</p>	<p>Ensure that safety related communications have access to appropriate spectrum to introduce innovative services to the benefit of EU citizens</p>
			<p>Ensure that public sector use benefits from more effective and spectrally efficient technologies</p>
			<p>Introduce reviews (and an inventory) of current spectrum use, with the aim of identifying old and inefficient technologies (both commercial and public sectors), unused assignments and sharing opportunities</p>
<p>Mismatch between growing demand for new wireless services and available spectrum resources: Spectrum being a potential bottleneck for innovation; Suboptimal use of spectrum: Inefficiencies in terms of spectrum allocation and assignment process</p>	<p>Identify appropriate steps to promote innovation at European level with a radio spectrum policy and identify adequate steps to address weaknesses in the process and methodology of spectrum management within the limits of EU competency</p>	<p>Facilitating equal and easy access to spectrum</p>	<p>Develop guidance on authorisation conditions and procedures in order to maximise flexibility in the use of spectrum with the aim of avoiding delays and competitive distortions and achieving a maximum of commonality across Europe</p>
			<p>Ensure that those frequency bands where flexible use has been introduced are tradable on the secondary market</p>
			<p>Identify and allocate spectrum for innovative applications with the aim of promoting and accommodating at least three R&D initiatives that are foreseen to have a major socio-economic impact and/or potential for investment from SMEs. This should be done under harmonised technical conditions and subject only to general authorisations.</p>

Suboptimal use of spectrum: Inefficient use of spectrum from an environmental point of view	Define steps to take so as to enable sufficient progress to support overarching objectives in relation to energy efficiency and combating climate change laid down in the EU2020 strategy and the Digital Agenda through radio spectrum policy	Combating climate change and promoting energy efficiency	Continue monitoring the technological development and changing spectrum needs for “Intelligent Transport Systems” (ITS) to assess if further EU intervention on spectrum needs is required
			Consider an EU-wide spectrum harmonisation for smart energy grids and smart metering on the basis of studies to deepen the knowledge in this field to determine which bands could be considered for harmonisation, and whether dedicated spectrum would be necessary or sharing spectrum would be sufficient
Suboptimal use of spectrum: Interference at borders	Defend European policy interests at international arenas and support Member States when dealing with third countries in relation to radio spectrum policy	Defend EU interest at international level, help Member States, when negotiating with neighbouring countries on spectrum matters	Reflect EU policy priorities during the negotiations at the World Radiocommunications Conference in 2012 (WRC-12) with a particular aim of ensuring common European positions on sectoral policies and on more flexible spectrum use.
			Give the European Commission a role in these negotiations that corresponds to its responsibility for spectrum matters in the EU, while actively ensuring that changes in the ITU Radio Regulations are supportive and complementary to the applicable principles of the EU regulatory framework
			Support the coordination of key spectrum bands, such as the digital dividend and 3.4-3.8 GHz, with non-EU neighbouring countries through active participation by the European Commission

Follow up through the performance of more detailed impact assessments

Individual impact assessments should be prepared for measures that the Commission is called upon to propose as a follow up to the Radio Spectrum Policy Programme and which meet the criteria established by the impact assessment guidelines. In general, impact assessments need to be prepared for important Commission initiatives which have the most far-reaching impacts through their content, their scope and / or their legal form.

In regard to a number of issues identified in the draft programme, further study, information gathering and consultation needs to be undertaken before a decision will be taken as to whether concrete action is required and, if so, whether it is necessary to conduct an impact assessment. If so, these impact assessments will examine in greater detail economic, social and environmental impacts of potential measures identified in the RSPP including the question of administrative burden and of cooperation with third countries in the coordination of spectrum allocation.

Such measures requiring further examination include the following, from section 6.7 above:

- Further study or analysis of the needs and requirements for additional spectrum of terrestrial wireless broadband, based on comparable data on wireless broadband and with the aim of meeting the final target set by Europe 2020 so as to ensure that sufficient spectrum for coverage and capacity purposes is allocated within the EU .
- Studying the provision of a harmonised satellite solution that will ensure the coverage of even the most remote areas of Europe with a broadband offering to access the Internet at a comparable price to terrestrial offerings.
- Reviews (and an inventory) of current spectrum use, with the aim of identifying old and inefficient technologies (both commercial and public sectors), unused assignments and sharing opportunities.
- Ensuring that safety related communications have access to appropriate spectrum to introduce innovative services to the benefit of EU citizens.
- Identifying and allocating spectrum for innovative applications with the aim of promoting and accommodating promising selected R&D initiatives that are foreseen to have a major socio-economic impact and/or potential for investment from SMEs.
- Continue monitoring the technological development and changing spectrum needs for “Intelligent Transport Systems” (ITS) to assess if further EU intervention on spectrum needs is required.
- Considering EU-wide spectrum harmonisation for smart energy grids and smart metering on the basis of studies to determine which bands could be considered and whether dedicated spectrum would be necessary or spectrum sharing would be sufficient.

A few topics have been already been identified as requiring an impact assessment. A communication is planned to be developed on the collective use of spectrum in the EU. Once more information has been gathered, an impact assessment is envisaged that will provide an adequate and transparent basis for proposing any further measures in the context of authorisations and collective use of spectrum, including potential measures to design

authorisation schemes to contribute to low-carbon policy, safety services and public protection and disaster relief (PPDR), as well as scientific use.

Moreover the results of the inventory of use might lead to the detection of unused or inefficiently used frequency bands where a technological change or even a new allocation and assignment of spectrum use might be necessary. Depending on the significance of such findings of the inventory process the necessity of an impact assessment will be carefully evaluated and impact assessment will be carried out to establish the best use of such bands at European level if potential impacts are considered significant.

Technical harmonisation measures have not been subject to impact assessments in the past. The RSPP might subsequently give rise to harmonisation measures for PPDR, satellites, smart grids and, potentially, PMSE. Following a decision in principle that such measures will be prepared, these would only be subject to an impact assessment if it is considered that the impacts will be sufficiently significant, and if the usual steps undertaken in the preparation of a technical harmonisation measure (i.e. discussion with stakeholders, mandate to CEPT on technical compatibility studies, discussion with and opinion by RSPG, discussion at the level of the Radio Spectrum Committee) are not deemed sufficient to establish clearly the justification for the specific action.

In the area of wireless broadband, the Commission services hope to propose that the Commission adopts a further technical implementation measure harmonising the 2 GHz band currently used for UMTS. Noting that this band is already in use for wireless broadband today and that the aim would be to introduce the technology and service neutrality concepts as already dealt with in this impact assessment and in the impact assessment carried out when introducing these concepts into the legal framework, it is not expected that it will be necessary to perform a further impact assessment on this subject.

Further study or analysis is foreseen to be undertaken of the needs and requirements for additional spectrum of terrestrial wireless broadband, based on comparable data on wireless broadband and with an aim of meeting the final target set by Europe 2020. Additionally a Communication on "European Broadband: investing in digitally driven growth" is being developed by DG INFSO. Once further information is gathered it is envisaged to examine the necessity of an impact assessment on the spectrum requirements of such measures.

As regards the common target date for clearing the 800 MHz band in line with the technical harmonisation Decision and establishment of a review mechanism to assess the progress achieved on the efficient use of the digital dividend spectrum the Commission is considering putting forward a more ambitious proposal of setting 2013 as a target date. This would be highly beneficial as already examined and shown in the impact assessment on the digital dividend and is also the logical consequence of the analysis done in this impact assessment in chapter.

6.1.

7. EVALUATION AND MONITORING

Following the principle of proportionality and given the strategic nature of the Radio Spectrum Policy Programme proposal, the evaluation and monitoring requirements should equally remain on a general and strategic level. Therefore the particular difficulty in defining and specifying indicators for the purpose of monitoring and evaluation derives from the fact that the RSPP will not have a direct regulatory impact itself, but only once further legal instruments are put in place. Only intentions are expressed in the RSPP, but concrete actions which can be monitored and evaluated need to follow separately.

As regards evaluation requirements it is planned that a review is performed on the Radio Spectrum Policy Programme.

As regards monitoring of indicators concerning specific EU policies, it is the role of the respective policy units to set up indicators for monitoring. A more detailed evaluation and monitoring system should be anchored to the respective sectoral policy initiatives, e.g. in energy efficiency, space policy or the Digital Agenda. What remains to be monitored as regards radio spectrum is how and whether technological and also regulatory developments (both at national level and at international level) lead to a change in spectrum demand, in spectrum use and, furthermore, in the efficiency of spectrum use. This is part of the daily work of the Radio Spectrum Policy Unit, which regularly meets stakeholders, follows discussions at the CEPT and ITU level, and holds regular meetings and discussions with representatives of Member States in the framework of the Radio Spectrum Committee. Moreover, the Commission refers regularly to the RSPG. At a very general level, indicators relate to content, depth, direction and speed of change in demand for spectrum and use of radio spectrum, and in how spectrum is managed.

The link between the use of spectrum in Member States and its social and economic impact, either in specific application areas or in structural change, is too complex for aggregate measures of impact to be used as indicators of the effectiveness of the measures considered. It is therefore proposed to base the evaluation and monitoring on the specific objectives in the specific areas of focus.

Special attention will be paid to assessing progress in the following main areas addressed i.e.:

- The timeliness of measures taken in Member States for ensuring the complete switch-off of analogue TV by 1 January 2012;
- The progress in making the 790-862 MHz sub-band available for electronic communications under harmonised technical conditions in Member States;
- Progress in migrating to "best in class" technologies for the transmission of terrestrial broadcasting signals;
- The progress made in attaining the coverage target for "broadband for all" objective and data speed targets from the point of view of spectrum demand;
- The number of additional spectrum allocations under harmonised technical conditions for innovative applications subject to only general authorisations within the next 5 years;

- Progress made in implementing the Commission Decisions 2008/477/EC (2.6 GHz), 2008/411/EC (3.6 GHz) and 2009/766/EC (900/1800 MHz), so that spectrum use has been authorised by 1.1.2012 under authorisation conditions that enable consumers to easily access wireless broadband services;
- The progress made in EU coordination of spectrum use for PPDR application till 2015;
- Completeness of review of spectrum use (Percentage of spectrum for which detailed data was collected in the course of the review from Member States);
- The progress made in EU coordination of spectrum use for smart grids application till 2015;
- Number of EU policies depending on radio spectrum use for which the European position could be defended in the ITU context.

In line with the President's Political Guidelines and the working methods of the Commission on evaluation of existing policies, a general review of the progress towards the objectives set out in this document will be carried out in the context of the preparation of the subsequent RSPP (from 2015 onwards).

ANNEX 1: Summary of the outcome of the Spectrum Summit, 22-23 March 2010

The Spectrum Summit organised jointly by the Commission and Parliament was the first of its kind and attracted a total of 360 external participants. 70% of these external participants were stakeholders, drawn from a wide variety of sectors and representing 226 different entities, and 30% were from national institutions, including national Ministries, spectrum managers and national regulatory authorities as well as audiovisual regulators.

The idea of a Spectrum Summit came initially from the EP during the negotiations on the review of the regulatory framework. The principle aim was to allow a high level strategic discussion between decision-makers (and stakeholders) in order to identify the key issues to be addressed by spectrum policy initiatives at EU level. It was also intended to give MEPs a greater understanding of the issues involved, and to overcome frustrations previously expressed about a lack of EP involvement in key discussions on spectrum. With the inclusion in the final regulatory framework of the proposal for a Radio Spectrum Policy Programme (RSPP), the Summit took on added significance as a means of giving political guidance for preparations of this strategic initiative.

This note summarises the key results of the Summit, with a particular view towards the preparation of the RSPP. The key conclusions that can be drawn from the high level deliberations between MEPs, Member States, stakeholders and the Commission at this event are the following.

There was a **positive attitude of collaboration** between EP, MS and the Commission. Previous concerns over differences in expectations of EP and MS as to the level of detail that the RSPP should contain did not materialise. There was wide support for staying at the strategic policy level. No-one challenged the existing regulatory tools, i.e. the Radio Spectrum Decision and the regulatory framework, nor was there an attempt to limit the Commission's freedom to act on spectrum under these tools by proposing to make the RSPP an exhaustive list of actions. In general, there seemed to be a wide political momentum and a sense of urgency to challenge the status quo.

In view of the wide spread participation as well as judging by the issues raised it is clear that the **RSPP should also look at spectrum use which goes beyond electronic communications services**. In particular, the non-ECS issues of public sector use (including military), wireless microphones (and other equipment used for programme making and special events), and a sustainable environment (e.g. smart grids for electricity networks and Earth observation) were raised at the summit.

The **efficient use of spectrum** is a key principle which found unanimous support at the summit. Increasing efficient use in the future could be facilitated through effective reviews (and an inventory) of current spectrum use, with the aim of identifying old and inefficient technologies (both commercial and public sectors), unused assignments and sharing opportunities. **Other key principles** that received wide support at the workshop were the promotion of competition and flexibility through technology and service neutrality. The fact that, without EU harmonisation/consistency, economies of scale can not (and are not) created in Europe any longer was a recurring concern, but MS tended to emphasise coordination while stakeholders made a plea for harmonisation, in order to facilitate the functioning of the internal market and to create certainty for investment.

The main discussion at the summit focussed on the **digital dividend** in the broadcasting band (470-862 MHz). While there were still several concerns expressed in terms of the risk of interference into existing TV receivers (including cable) and who would pay for the possible mitigating measures and migration of wireless microphones, there was substantial support for taking an ambitious and consistent approach to the 800 MHz band (soon subject to a Commission Decision). In particular, the setting of a common date by which broadcasting should make way for new broadband technologies was seen as a urgent issue in order not to lag behind other regions where decisions have already been taken and services are developing. Further efficiency gains in the broadcasting band as well as an overall discussion of change in the importance of TV distribution platforms could facilitate further opportunities for new services (i.e. a second digital dividend) as long as a pluralistic broadcasting landscape is protected.

There was the important discussion on policy orientations and objectives for **wireless broadband** both in terms of economic growth and social inclusion. Wireless broadband will be a key aspect of the digital agenda and is to be seen in a wider context than just the digital dividend. Both terrestrial wireless and satellite platforms can contribute to making broadband available, accessible and affordable to EU citizens. Many interventions noted the need for concrete and ambitious policy orientations and objectives in light of the impact that other markets (US^{xxx}, Asia) would have on Europe. Participants also flagged the need to rapidly open existing spectrum bands that have already been harmonised at EU level (800 MHz, 900 MHz, 1800 MHz, 2.6 GHz and 3.5 GHz) as many MS have not yet done so. There was support for spectrum trading in general and in particularly in bands used for broadband access across Europe.

Several participants raised a particular interest in spectrum which is only subject to **general authorisations**, because of the easy and low cost access conditions, such as is the case for WiFi. They also supported the application of innovative technologies such as cognitive radio which have the potential of increasing spectrum sharing at the equipment level without the need for any intervention by regulators. In general it was felt that spectrum should be accessible to **innovative services and technologies** coming out of European research programs so as to increase the return in investment into R&D and to support industry.

On the issue of **international coordination** there was an uncontested plea for the European Union to adopt a united position in the context of the ITU as well as an enhanced role in the context supporting EU members in contacts with neighbouring third countries.

In the process of making spectrum use more flexible, several participants expressed concerns regarding **national reassignment of current rights of use** (so-called refarming). There were concerns about competitive distortions, coherent application of conditions (e.g. spectrum caps, network rollout) and award procedures (auctions) when incumbents were competing against newcomers. Also the question of "who will pay?" was raised.

Finally, in regard to several of the above issues, there was repeated acknowledgment that "difficult decisions would have to be taken" because of the competing needs and interests in the scarce spectrum resource.

ANNEX 2: Summary of responses to the public consultation

The public consultation on the RSPP gave rise to a substantial number of comments (over 100 responses) from many different stakeholders representing a wide range of spectrum users. The responses to the public consultation covered a wide range of topics. Nevertheless, the majority clearly addressed spectrum issues related to the digital agenda, which seems to be the area where radio spectrum policy can have the largest impact on economic growth and social inclusion.

Economic growth, social inclusion and services for the citizen

The extent and range of comments made on this subject clearly demonstrate the importance of wireless services in achieving the political goals set by the digital agenda. Many comments referred to the need for more spectrum in light of the targets set by the digital agenda, the exploding data traffic on existing mobile networks, and other regions challenging Europe's leadership in mobile communications. However, many comments also warned that existing EU harmonised spectrum for wireless broadband has not been fully assigned (awarded) at the national level and once assigned was not being used to the full extent.

The digital dividend was a main focus of submissions with a variety of views concerning its further development. In the first place, there was substantial support for a target date (ranging from 2013 to 2015) by which the 800 MHz band should be fully released for wireless broadband services. More controversial is the identification of further spectrum in the digital dividend, i.e. below 790 MHz, for wireless broadband. Stakeholders do not agree on the need for such action, while at the same time they would like certainty about the future of the band 470-790 MHz. Investments into terrestrial broadcasting networks will require parts of the digital dividend to accommodate new services (e.g. HDTV) in fixed as well as in portable/mobile environments and more experience with coexistence between broadcasting, mobile and cable networks should be gained first.

In any case, there is general agreement among all that spectrum should be used efficiently, in particular where the demand is high. Several respondents proposed to review the efficient use of spectrum, notably there was support to do so below 3 GHz.

Another important aspect is the political priority of broadband for all. The satellite industry provided substantial information about short term plans to augment satellite capacities significantly over Europe so as to make this platform a viable alternative for households and businesses in need of broadband connections. Terrestrial network operators also illustrated their coverage capabilities, which rely on spectrum below 1 GHz.

There were numerous comments supporting a coordinated approach to spectrum in Europe, which takes account of technology and service neutrality, but also ensures economies of scale and the avoidance of interference. Action or guidance at EU level was requested on several assignment issues related to more flexible use (refarming), such as avoiding competitive distortions, promoting network sharing, facilitating wider blocks of spectrum for broadband technologies and ensuring the coherent application of coverage obligations (below 1 GHz) and spectrum caps. There was general support for ensuring that frequencies that are used by wireless broadband are tradable.

Finally, there were contributions related to services for the citizen. In particular, the spectrum needs for Public Protection and Disaster Relief (PPDR), Programme Making and Special Events (PMSE), and general authorisations to facilitate networks operated by communes were flagged as needing attention under the first RSPP.

Other topics

The consultation also addressed other issues although it has to be said that these received less attention judging by the number of responses and the actions proposed.

Concerning the impact that radio spectrum policy could have on the environment and health the main issue to note is the need to facilitate smart grids. Further information was provided on the investments that wireless communication networks are making into energy savings, monitoring the Earth's surface etc, but, besides the need to protect existing use for interference, specific spectrum challenges that would need to be addressed in the first RSPP did not find wide support. Concerning health issues, while some citizens expressed concern about health effects arising from the use of radio equipment, several comments from industry pointed to the latest scientific opinion which does not point to any health risks. Member States should base national limits on scientific opinions and avoid non-scientific argumentation that could lead to fragmented approaches and more public concern.

Concerning space exploration and transport safety, there was support for efficient use of spectrum and an emphasis on protecting existing services from interference. Several users of these services expressed concern about the application of economic criteria to services in the general interest. Spectrum allocations for the relevant applications exist including for those linked to important EU policies such as SESAR and monitoring climate change. Currently all EU policy related applications seem to have spectrum, although some few respondents would like to augment their holdings based on certain capacity limits. Specific issues may need further study.

Concerning effective coordination and negotiation at EU level, the general view seems to be that Member States, the Commission, CEPT and stakeholders should jointly prepare for World Radio Conferences. The early availability of policy guidance would be useful for the preparatory process. A particular role for the Commission during WRCs was seen with respect to important agenda items such as the digital dividend and the agenda of the next conference. There was general support for the Commission to facilitate negotiations with neighbouring third countries, especially on the topic of the digital dividend.

ANNEX 3: Draft RSPG Opinion on the Radio Spectrum Policy Programme



EUROPEAN COMMISSION
Information Society and Media Directorate-General
Electronic Communications Policy
Radio Spectrum Policy Group
RSPG Secretariat

Brussels, 18 March 2010
DG INFSO/B4/RSPG Secretariat

RSPG10-323

DRAFT RSPG OPINION ON THE RADIO SPECTRUM POLICY PROGRAMME

Introduction

1. The Radio Spectrum Policy Group (RSPG) was created by a European Commission Decision in 2002, amended in December 2009, and it gathers high level governmental experts of the 27 EU Member States and a high level representative of the Commission. The RSPG provides the Commission with strategic advice on high level policy matters in relation to spectrum. The European Parliament and the Council can also request advice to the RSPG.
2. The new electronic communications framework legislation¹ calls for the Commission to elaborate a legislative multiannual radio spectrum policy programmes (RSPP) 'to set out the policy orientations and objectives for the strategic planning and harmonisation of the use of radio spectrum in the Community'. The Commission is required to take utmost account of RSPG's views when elaborating its proposals for RSPP.
3. This paper represents the RSPG's response to the European Commission's request for an Opinion on the RSPP.
4. Before transmitting this Opinion to the Commission, the RSPG decided to submit it to public consultations in order to increase transparency and allow participation of all stakeholders. At a more general level, the Commission has also launched a call for input to stakeholders including broader questions and issues in preparation for the RSPP.
5. The forthcoming policy programme covers the period from 2010 until 2015; however, given the nature of spectrum policy development, the RSPP shall reflect a longer term and forward-looking approach and envisage perspectives beyond 2015 as well.

¹ Directive 2009/104/EC of the European Parliament and of the Council

6. The RSPG should be continuously monitored including an assessment of progress at mid-term. This should include public consultation and stakeholder workshops.
7. As a response to the 'EU2020' strategic vision, this RSPG Opinion puts emphasis on contributing to the creation of a competitive, connected and greener European economy, especially through fostering the upgrade and interconnection of infrastructures and the acceleration of the market uptake on innovation. To achieve this strategic vision an improved cooperation between competent national authorities, the European Commission, CEPT and ETSI as well as the joint formulation and efficient representation of European spectrum interests in international fora are necessary.

I. Contribution to the EU2020 vision

8. It is the Opinion of the RSPG that one of the key objectives of EU spectrum policy is to enhance the quality of life of European citizens. This may be achieved through establishing strong links between spectrum policy and other EU sectoral policy objectives and furthermore through promoting enabling technologies and applications (e.g. broadband, cognitive radio technologies, digital broadcasting, telemedicine, navigation systems, safety, m-payment etc.) as well as promoting competition in commercial markets.
9. It is the view of the RSPG that spectrum should be managed in such a way so that it facilitates the achievement of overarching European policy objectives by a supportive spectrum policy approach. With its significant potential to act as a catalyst for innovation and growth, spectrum management can contribute considerably to European recovery from the economic crisis and deliver sustainable economic growth as well as create new jobs. Efficient and effective use of spectrum technologies could also stimulate carbon reduction in other sectors. The sector can also reduce its own greenhouse emissions with the help of greener ICT. In rural and remote areas infrastructure and network sharing can reduce the environmental impact. In line with European initiatives such as the Digital Agenda, spectrum management can contribute to efforts to bridge the digital divide through enabling ubiquitous broadband access.
10. The RSPG believes that increasing economies of scope and scale is also necessary at EU level through enhanced coordination and harmonisation, as appropriate. The utilization of the digital dividend shall be a key objective.
11. The RSPG underlines that all of the European stakeholders with an interest in the digital dividend, including the European Parliament, the Council of the European Union, the European Commission and the RSPG have recognised that there are significant societal and economic benefits to be gained from the unique opportunity of making available a digital dividend in the UHF band.
12. The 800 MHz band² in particular, which, on the basis of the previous RSPG Opinion³ should be subject to EU-wide coordinated approach based on the guiding principles of service and technology neutrality and harmonised standards, is ideal for extending coverage and improving in-building penetration. The RSPG therefore invites the European Parliament and the Council to consider that coordinated availability of the 800

² 790-862 MHz band

³ R.SPG09-291 - RSPG Opinion on the Digital Dividend

MHz band for ECS other than broadcasting should be achieved in all the EU Member States by 2015⁴.

13. The RSPG believes that, with a view to release more “new” spectrum, the European Commission should take into account an analysis of market and technology trends to identify developing and potential future significant uses of spectrum. The process should also identify possible target frequency bands, including frequency bands currently used by the public and commercial sectors, to promote intelligent sharing and compatibility solutions with other commercial or public sector services and to duly consider whether certain frequency bands will need to be made available. In such cases the consequences for existing and effected services should be thoroughly analyzed.
14. Such analysis shall have as its primary objective the continued promotion of efficient spectrum use. Regulatory and non-regulatory tools may also be applied in order to achieve this objective. Incentives, setting of fees and other tools, should aim at facilitating the introduction of new and innovative technologies and applications. These measures may also create opportunities for different spectrum usage (e.g. improved transmission and deployment schemes for broadcasting and intelligent spectrum sharing such as use of cognitive solutions, etc.).
15. The RSPG believes that the revised EU Directives on electronic communications contain significant regulatory improvements to remove unnecessary rigidity in spectrum management and put in place measures to deliver easier access to spectrum by such means as introducing service and technology neutrality and market mechanisms like secondary trading. It is of vital importance to facilitate the application of these new measures in order to achieve a truly effective and efficient use of spectrum at European level. These measures together with their implications for spectrum management in the longer term might also be subject to further assessment.

⁴ The set implementation date may have to be postponed in Member States facing frequency coordination issues with non EU countries until such issues are resolved in line with the policy recommended in this opinion. A similar need for postponement of implementation could arise in Member States where exceptional local circumstances would prevent the availability of the band.

II. Spectrum governance in the EU

16. It is the Opinion of the RSPG that, with the objective of improving efficiency in the use of spectrum, the management of spectrum for military and civil (commercial and non-commercial) should be reviewed to take account of best practice for each of the uses.
17. The RSPG acknowledges that spectrum is a national resource which, where appropriate, should be managed in a coordinated manner by EU Member States in conjunction with the European Commission within the international regulatory context.
18. The RSPG believes that the main objective of European spectrum governance shall be to facilitate the development and functioning of the internal market and to enable access to spectrum for applications and uses where demand is growing. The appropriate balance shall be assured between protecting existing uses and facilitating access to spectrum for new uses and applications. Thus spectrum shall be managed in a way as to reflect current and future demand.
19. In order to achieve this objective, the RSPG sees a strong need for enhanced cooperation between competent national authorities, the European Commission, CEPT and ETSI; coherence between their activities should also be further increased.
20. Firstly, cooperation shall be improved regarding the regulation of spectrum. The internal market will only continue to develop if regulation is limited to the necessary minimum, i.e. only the minimal and least restrictive conditions are imposed for spectrum use in a coordinated way across the EU. Based on the market and technology trend analysis mentioned in paragraphs 11 and 12, the conditions for spectrum use shall be adapted to the evolution of radio systems and sharing situations. In order to create a sound basis for this work, sufficient guidance and resources for market surveillance and enforcement that play a key role in ex-post regulation should be provided.
21. Secondly, all sectoral interests (e.g. ECS, broadcasting, transport, military, public use of spectrum, environment, space, etc.) should be considered. It is necessary to ensure that all stakeholders are consulted in a transparent way on the elaboration of spectrum allocation solutions, concerning new technologies in particular. This also requires clarity and certainty so that all stakeholders have a view on how their positions are treated and how spectrum decisions are made.
22. The RSPG believes that in the spectrum planning and coordination process, both flexibility regarding the use of spectrum and harmonisation of technical parameters are desirable. Thus the level of harmonisation should be assessed in relevant cases based on market demand and the benefits and drawbacks of such harmonisation.
23. The RSPG acknowledges that avoiding and controlling interference is key to effective spectrum management. The cumulative impact of the increasing volume and density of

wireless devices and applications combined with the diversity of spectrum use challenges the current approaches to interference management. These should be examined and reassessed; such an examination should include, inter alia, consideration of receiver characteristics. Where communications systems and devices are becoming more tolerant of interference, more sophisticated negotiated interference agreements are possible in adjacent areas. In order to cope with the challenges of increasing demands for access to spectrum and to exploit the full benefits of technological development, flexible regional and bilateral agreements within the EU that allow maximum usage of frequency spectrum should be facilitated.

24. The RSPG recommends that competent national authorities should be encouraged to share experiences and best practices, in particular where cases of technical issues have arisen during coordination activities. Specific cooperation among national authorities should be based on a 'collective support mechanism'. According to this mechanism, upon request of affected parties, a team of experts within RSPG would be set up with the mandate to provide an independent expert opinion.

III. External relations

25. It is the Opinion of the RSPG that the EU's interest in relevant international spectrum bodies, such as the ITU, should be driven at the political level. In order that the European positions on spectrum use are successfully represented in dynamic international negotiations, the European Commission, taking due account of the RSPG opinion, should identify areas of policy interest and priorities on forthcoming World Radiocommunication Conferences (WRC) agendas as soon as possible and should present policy objectives to the Council and the European Parliament at the earliest stage in the preparation of WRCs. In this process, where possible and desirable, an increased importance should be given to ensuring that the ITU Radio Regulations provide sufficient flexibility, facilitate harmonisation at European level and do not constrain the EU from acting in the best interests of European consumers.⁵
26. Within CEPT, Member States should actively contribute to the preparation of European Common Proposals (ECPs) for the WRCs on all agenda items. During the preparation of these proposals, it is essential to ensure that European stakeholders can voice priorities and views. Support should be sought with other regions on the European objectives and ECPs.
27. Furthermore, where a potential for conflict of interest between differing groups of stakeholders arises, the Commission should provide guidance on European priorities in regard to those WRC agenda items relevant to the EU. This guidance should be based on an evaluation of social and economic consequences which should be undertaken in parallel with the compatibility analysis conducted by CEPT. The assessment of the social and economic impacts for all stakeholders should be discussed with Member States through RSPG.
28. During the conferences, Member States should make their best efforts to coordinate the evolution of ECPs in line with EU and CEPT policy objectives and to find a balanced compromise on all WRC agenda items taking into account the relevant policy objectives.
29. The identification of European spectrum interests and priorities shall be followed by the development of a programme for regular discussions on spectrum policies with non-EU countries and other regions. This programme should contain actions aimed at presenting EU spectrum policy objectives and understanding those of non-EU countries and other regions in order to obtain their understanding and support to reach the EU policy goals. This may serve the promotion of European spectrum policy in countries at

⁵ R.SPG09-294 - RSPG Opinion on the Preparation of ITU World Radiocommunication Conferences

the EU borders and even globally in order to facilitate cross-border coordination, economies of scale and opportunities for European industry.

30. During bilateral negotiations with non-EU countries, including candidate and acceding countries, political and technical support should be provided for individual Member States requesting assistance for solving frequency coordination issues (e.g. on the 800 MHz band), in particular when several countries are faced with the same difficulties and EU policy is concerned. In the provision of such assistance, the EU should use all its legal and political powers to promote the implementation of EU policies. Given the political dimension of these negotiations, RSPG invites the European Parliament and the Council to consider whether such assistance could constitute an integral part of the EU's wider international engagements and policy.

IV. Spectrum policy objectives

31. Based on the considerations above, the RSPG is of the Opinion that the following high-priority spectrum policy objectives should form an essential part of the RSPP.

- Identify EU level policies that have a spectrum dimension and assess how to facilitate the achievement of such policies.
- Ensure that sufficient spectrum for coverage and capacity purposes is allocated within the EU so that all citizens could have access to ubiquitous high-speed broadband.
- Achieve coordinated availability of the 800 MHz band for ECS other than broadcasting in all the EU Member States by 2015⁶.
- Identify developing and potential future significant uses of spectrum taking into account market and technology trends.
- Take all actions to designate more 'new' spectrum and liberalise, where possible, currently used spectrum under service and technology neutral regimes (i.e. WAPECS).
- Make more spectrum available under a collective use model in order to facilitate rapid access to spectrum, promote innovation and competition⁷.
- Create appropriate regulatory mechanisms to foster more efficient use of spectrum, both for the commercial and public sector.
- Develop a spectrum policy approach for intelligent spectrum sharing which should, inter alia, promote the use of cognitive technologies, and enable the use of spectrum that is currently unused.
- Ensure that competent national authorities, the European Commission, CEPT and ETSI work towards the same objectives, enhancing collaboration and cooperation to reach those objectives, and clearly defining their respective roles and responsibilities.
- Ensure that European spectrum interests and policy objectives are promoted in all relevant EU and international fora and discussed with non-EU countries and other regions.

⁶ The set implementation date may have to be postponed in Member States facing frequency coordination issues with non EU countries until such issues are resolved in line with the policy recommended in this opinion. A similar need for postponement of implementation could arise in Member States where exceptional local circumstances would prevent the availability of the band.

⁷ RSPG08-244 - RSPG Opinion on Collective Use of Spectrum

- Ensure that all Member States are given the necessary assistance when negotiating with neighbouring countries on frequency coordination issues.

ANNEX 4: Glossary of abbreviations used in the IA report

BEREC	Body of European Regulators of Electronic Communications
CEPT	European Conference of Postal and Telecommunications Administrations
ECC	Electronic Communications Committee
ECO	European Communications Office
ECS	Electronic Communication Services
ERG	European Regulatory Group
FCC	Federal Communications Commission (in USA)
GMES	Global Monitoring for Environment and Security
HDTV	High-Definition TV
ITS	Intelligent Transport Systems
ITU	International Telecommunication Union
MCA	mobile communications in airplanes
MCV	mobile communications on vessels
MFN	Multi Frequency Networks
NRA	National Regulatory Authority
RSD	Radio Spectrum Decision, 676/2002/EC
RSPG	Radio Spectrum Policy Group
RSPP	Radio Spectrum Policy Programme
PPDR	Public Protection and Disaster Relief
UHF	Ultra High Frequency (band)
UMTS	Universal Mobile Telecommunications System
WAPECS	Wireless Access Policy for Electronic Communications Services
WRC	World Radio-communication Conference

Glossary

Cognitive Radio: A radio system employing technology that allows the system: to obtain knowledge of its operational and geographical environment; to dynamically and autonomously adjust its operational parameters and protocols so as to coexist with other users in the same frequency band. The sophistication of such systems depends on technological progress.

Flexibility Principle: Flexibility in spectrum management and access to spectrum is increased through technology and service-neutral authorisations to allow spectrum users to choose the best technologies and services to apply in frequency bands declared available for a type of application in the relevant national frequency allocation plans.

General Authorisations: Under the Authorisations Directive, a legal framework established by a Member State ensuring rights for the provision of electronic communications networks or services and laying down sector specific obligations that may apply to all or to specific types of electronic communications networks and services.

Harmful interference: Under the Authorisations Directive and the ITU Radio Regulations, interference which endangers the functioning of a radionavigation service or of other safety services or which otherwise seriously degrades, obstructs or repeatedly interrupts a radiocommunications service operating in accordance with the applicable Community or national regulations.

Service Neutrality: As part of the flexibility principle, service neutrality allows the provision of any service in a specific frequency band that has been identified for such use. However, for safety of life reasons a frequency band may be allocated exclusively for one particular service. Furthermore, a specific service may be made obligatory (without excluding other services) in justified cases, such as the promotion of social, regional or territorial cohesion, the avoidance of inefficient use of radio frequencies or the promotion of cultural and linguistic diversity and media pluralism.

Technology Neutrality: As part of the flexibility principle, technology neutrality allows the deployment of any technology in a specific frequency band that has been identified for such use. However, there can be restrictions that need to be justified by the need to avoid harmful interference (for example by imposing emission masks and power levels), to ensure the protection of public health by limiting public exposure to electromagnetic fields, to ensure the proper functioning of services through an adequate level of technical quality of service, to ensure proper sharing of spectrum, to safeguard efficient use of spectrum, or to fulfil a general interest objective in conformity with Community law.

Collective Use of Spectrum (CUS): Collective Use of Spectrum allows an undetermined number of independent users to access spectrum in the same range of frequencies at the same time and in a particular geographic area under a well-defined set of conditions. It complements the concept of individual rights of use where only one user holds the right to use a specific part of the spectrum.

ANNEX 6: List of references

- ⁱ Source: Mobile Industry Observatory 2009
- ⁱⁱ Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009
- ⁱⁱⁱ Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision)
- ^{iv} Analysys et al, Study on Conditions and Options in Introducing Secondary Trading of Radio Spectrum in the European Community, Final Report for the European Commission, available at http://ec.europa.eu/information_society/policy/radio_spectrum/activities/studies/index_en.htm
- ^v Analysys et al, Study on Conditions and Options in Introducing Secondary Trading of Radio Spectrum in the European Community, Final Report for the European Commission, available at http://ec.europa.eu/information_society/policy/radio_spectrum/activities/studies/index_en.htm
- ^{vi} Broadband Growth and policies in OECD countries, OECD 2008
- ^{vii} COM/2007/0700
- ^{viii} IDATE reports on Broadband Coverage in Europe; Data as of 31/12/2006 - http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_coverage_10_2007.pdf. Data as of 31/12/2007 - http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_coverage_2008.pdf. Data for Romania and Bulgaria, who joined the EU in 2007, are not available in these IDATE reports for the indicators considered here.
- ^{ix} See ITU Reports ITU-R M.2072 and ITU-R M.2078
- ^x Commission study on Future Mobile Services: <http://fms.jrc.ec.europa.eu/pages/documents.htm>
- ^{xi} See Position Paper on Wireless Broadband, 13 May 2009, Document RSPG09-284 link: http://rspg.groups.eu.int/_documents/documents/meeting/rspg19/rspg09_284_position_paper_wireless_broadband.pdf
- ^{xii} This includes spectrum available in the following frequency bands: 800 MHz band, 900/1800 MHz band, 2.6 GHz, 3.6 GHz and 2 GHz band.
- ^{xiii} As an example, Eutelsat one of the major providers in Europe, today has the capacity to serve 1 million European homes at speeds of up to 10 Mbps. By 2014 it plans to offer high speed broadband (50 or 100 Mbps) to French homes (the exact number of connections is not specified in the response to the public consultation).
- ^{xiv} to be implemented by Member States by 25 May 2011 for the rights to use spectrum assigned after that date, together with transitional arrangements for existing rights
- ^{xv} RSPG Opinion on WAPECS of 23 November 2005.
- ^{xvi} e.g. for RLAN in 5 GHz, mobile communications in airplanes (MCA) or mobile communications on vessels (MCV)
- ^{xvii} Decision 626/2008/EC on the selection and authorisation of systems providing mobile satellite services
- ^{xviii} 'Optimising the Public sector's Use of the Radio Spectrum in the European Union'; WIK Consult; 2008

And study on the Collective use of Spectrum

^{xix} Analysys et al, Study on Conditions and Options in Introducing Secondary Trading of Radio Spectrum in the European Community, Final Report for the European Commission, available at http://ec.europa.eu/information_society/policy/radio_spectrum/activities/studies/index_en.htm

^{xx} *Benchmarking Impacts of EU Policy Options for Economically Efficient Management of Radio Spectrum*, SFC Associates, 2006, available at: http://ec.europa.eu/information_society/policy/ecommlibrary/ext_studies/index_en.htm

^{xxi} See SEC(2007) 1472/3 Accompanying document to the Commission proposal for a Directive of the European Parliament and the Council amending European Parliament and Council Directives 2002/19/EC, 2002/20/EC and 2002/21/EC; Commission proposal for a Directive of the European Parliament and the Council amending European Parliament and Council Directives 2002/22/EC and 2002/58/EC; Commission proposal for a Regulation of the European Parliament and the Council establishing the European Electronic Communications Markets Authority {COM(2007)697, COM(2007)698, COM(2007)699, SEC(2007)1473}

^{xxii} Executive summary of study on economic, legal and technical aspects of "collective use of spectrum": http://ec.europa.eu/information_society/policy/ecommlibrary/radio_spectrum/document_storage/studies/cus/cus_exec_sum_fin.pdf

^{xxiii} Commission decisions 2004/545/EC and 2005/50/EC

^{xxiv} 'Optimising the Public sector's Use of the Radio Spectrum in the European Union'; WIK Consult; 2008

^{xxv} Report for the TETRA association: Public safety mobile broadband and spectrum needs, Analysys mason

^{xxvi} 'Optimising the Public sector's Use of the Radio Spectrum in the European Union'; Wik Consult; 2008

^{xxvii} COM(2008) 886 of 16.12.2008

^{xxviii} Study for European Utilities Telecom Council (EUTC): Options for a Harmonised Allocation to Support Utility Operations (Smart grids), 2209/EUTC/DR/v14, 16.03.2010, Aegis spectrum engineering

^{xxix} Impact Assessment on European Space Policy prepared in 2007

^{xxx} Analysys et al, Study on Conditions and Options in Introducing Secondary Trading of Radio Spectrum in the European Community, Final Report for the European Commission, available at http://ec.europa.eu/information_society/policy/radio_spectrum/activities/studies/index_en.htm

^{xxxi} Several stakeholders mentioned the recent US government initiative to make available an additional 500 MHz of spectrum for broadband.