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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Reaping the full benefits of the digital dividend in Europe:  
A common approach to the use of the spectrum released by the digital switchover**

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**Reaping the full benefits of the digital dividend in Europe:  
A common approach to the use of the spectrum released by the digital switchover**

(Text with EEA relevance)

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## 1. THE PROMISE OF THE DIGITAL SWITCHOVER: THE “DIGITAL DIVIDEND”

The switchover from analogue to digital terrestrial TV by the end of 2012<sup>1</sup> will free up an unprecedented amount of spectrum in Europe as a result of the superior transmission efficiency of digital technology. This spectrum is known as the “**digital dividend**”.

The digital dividend is a **unique opportunity to meet the fast growing demand for wireless communications services**<sup>2</sup>. It opens up sufficient spectrum for **broadcasters to significantly develop and expand their services** while at the same time ensuring that **other important social and economic uses**, such as broadband applications to overcome the “**digital divide**”<sup>3</sup>, have access to this valuable resource. The digital dividend therefore potentially creates a “**win/win**” **situation** for all interests. Action in this area would support the i2010 initiative<sup>4</sup>, part of the renewed **Lisbon strategy**, which emphasises the importance of ICT in delivering growth and jobs as a major driver of innovation and productivity gains.

However, the benefits of the digital dividend can only be fully reaped if the focus is on seeking the most valuable applications for the spectrum without preconditions. This Communication thus proposes coordinated action **at EU level** in order to ensure **optimal use of the dividend** from a combined **social and economic** perspective.

## 2. WHAT IS THE DIGITAL DIVIDEND?

The digital dividend can be described as the spectrum **over and above** the frequencies<sup>5</sup> required to support existing broadcasting services in a fully digital environment, including current public service obligations<sup>6</sup>.

### *More TV channels with less spectrum*

Commercially available digital compression systems already allow the transmission of between 6 to 8 standard digital TV channels in the spectrum previously used by one analogue TV channel<sup>7</sup>, and such efficiency gains are expected to continue increasing in the future. The UK for example is planning to provide 45 TV channels in much less spectrum than previously used for the equivalent of 7 national analogue broadcasting channels<sup>8</sup>, and is considering the introduction of up to twenty additional TV channels in the excess frequencies. In other terms, the digital dividend should exceed the spectrum currently available for GSM systems in most Member States.

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<sup>1</sup> COM(2005) 204 — Communication on “Accelerating the transition from analogue to digital broadcasting”.

<sup>2</sup> As also recognised by the European Parliament, see EP Resolution “Towards a European policy on the radio spectrum” (14/02/2007).

<sup>3</sup> COM(2006) 129 on “Bridging the Broadband Gap”.

<sup>4</sup> COM(2005) 229 on “A European Information Society for growth and employment”.

<sup>5</sup> Part of the spectrum from 174 to 230 MHz (VHF) and 470 to 862 MHz (UHF).

<sup>6</sup> In addition, several Member States have identified the so-called “interleaved spectrum” (or “white space” between two TV coverage areas) as a potentially important complement to the digital dividend.

<sup>7</sup> In the case of High Definition TV, spectrum gains are reduced since more information is transmitted. However, it still requires less spectrum than analogue television.

<sup>8</sup> Before digitisation, there were 5 national channels in the UK and some limited regional channels amounting to the spectrum equivalent of one to two national channels.

### *Spectrum of “premium” quality*

Not all spectrum bands offer the same physical characteristics: higher frequencies do not carry signals as far, and do not penetrate buildings as easily, and lower frequencies have capacity limitations and create more interference. The spectrum of the digital dividend is particularly attractive because it is part of the “best” spectrum located between 200 MHz and 1GHz, offering an optimal balance between transmission capacity and distance coverage. Its good signal propagation characteristics entail less infrastructure to provide wider coverage, which reduces cost and improves service, particularly in ensuring communications inside buildings and reaching out to remote populations in rural areas.

### *But currently highly fragmented*

The spectrum making up the digital dividend is currently highly fragmented into relatively narrow bands, scattered over many frequencies, and intertwined with digital broadcasting channels. This is a consequence of spectrum planning options adopted at the ITU Regional Radiocommunication Conference, which produced an international plan, the Geneva 2006 agreement, on the basis of traditional broadcasting use<sup>9</sup>. Some flexibility is provided in the Geneva agreement to open up the spectrum to other uses. However, this flexibility is limited under the existing technical conditions and, in practice, the current situation is not conducive to the allocation of this spectrum to more efficient alternative uses.

## **3. A RESOURCE WITH EXCEPTIONAL SOCIAL, CULTURAL AND ECONOMIC VALUE**

The digital dividend must also be seen in the wider context of the overall balance between supply and demand for radio spectrum. This is a persistently scarce public resource for which there is an ever growing demand in modern society: it underpins every type of wireless service from professional use such as radio-navigation, satellite systems or radar to consumer applications like broadcasting or fixed and mobile communications. It is estimated that the total value of electronic communications services that depend on use of radio spectrum in the EU exceeds €250 billion, which is about 2.2% of the annual European GDP. This essential role of radio spectrum as an enabler for growth was also recognised in the i2010 initiative, which stresses that more effective management of spectrum would boost innovation in ICT and help provide more affordable services to European citizens.

It is therefore in the public interest that the digital dividend is managed as efficiently and effectively as possible to satisfy the maximum demand, and that obstacles to its efficient use be removed. This objective is one of the fundamentals of EU spectrum policy and forms part of the main Commission proposals in the current review of the regulatory framework for electronic communications services.

If the digital dividend is properly organised, the range of possible uses is very wide, as virtually all common wireless applications could make use of this part of the spectrum. However, the most promising of these potential uses belong to the category of **electronic communication services**<sup>10</sup>. There are at least three broad categories of services for which the

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<sup>9</sup> COM(2005) 461 on “EU spectrum policy priorities for the digital switchover in the context of the upcoming ITU Regional Radiocommunication Conference 2006 (RRC-06)”. Details on the Conference at <http://www.itu.int/ITU-R/conferences/rrc/rrc-06/index.asp>.

<sup>10</sup> As illustrated in the report of the French "Commission consultative des radiocommunications" dated 10/10/2007, available at [http://www.arcep.fr/uploads/tx\\_gspublication/rapport-ccr-151007.pdf](http://www.arcep.fr/uploads/tx_gspublication/rapport-ccr-151007.pdf).

spectrum of the digital dividend would be well suited. Some are already being considered by several Member States:

- (1) **Wireless broadband communications.** “Ubiquitous broadband access for all” is the next challenge for the information society. Wireless access is probably the most promising means to bridge the “broadband gap” and overcome the “**digital divide**”, especially in remote and rural areas<sup>11</sup>. Access to broadband communications can have a significant impact on the **competitiveness** of the European economy<sup>12</sup> in terms of productivity gains and social impacts. Wireless also provides an alternative platform that would increase competition and speed up broadband deployment. Wireless broadband communications also have the potential to support EU-wide interoperability of essential **public safety** applications such as public protection and disaster recovery (PPDR) services. The same spectrum could also be shared to improve **mobile communications coverage**, and in the longer term to address growing demand for **high-speed mobile data** services. Broadband communications could also be used for future innovative broadcasting services.
- (2) **Additional terrestrial broadcasting services.** Broadcasting is entering a period of intense transformation and high innovation as it makes the transition to digital and high-definition services. Increasing the number of broadcasting channels holds out prospects for increased **media pluralism**, growth in **media content production**, and **higher-quality, more interactive services for viewers**. It is therefore appropriate that broadcasters should be able to claim a fair stake in the digital dividend in return for their efforts and investment in the digital switchover.
- (3) **Mobile multimedia.** Among the **most innovative application areas** in the ICT sector are **mobile TV** and satellite-related broadcasting services, which have impressive prospects<sup>13</sup>.

In addition there are other categories of use that already operate or could operate in the frequencies covered by the digital dividend, such as unlicensed use of spectrum<sup>14</sup> (e.g. short-range low-power devices that use very little bandwidth such as medical telemetry, hearing aids or, in particular, RFID, for which Europe’s current spectrum allocation in the UHF bands could limit growth and new applications in the coming years).

The digital dividend needs to be viewed for what it is: a public resource with an exceptional social, cultural, as well as economic potential; for example, the gains recently estimated for the UK economy alone are between €7.5bn and €15bn over 20 years<sup>15</sup>.

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<sup>11</sup> On average, in EU25, broadband was available to more than 90% of urban population, but was limited to 71% of rural population (Commission estimates, January 2007).

<sup>12</sup> Broadband is the basic infrastructure of the knowledge economy and has significantly contributed to the economic impact of ICT, driving half of productivity gains in modern economies in the past decade.

<sup>13</sup> For example, the estimated market value for mobile TV alone is between €7 to 20 billion by 2011, reaching between 200 and 500 million customers worldwide (McKinsey Quarterly, March 2006).

<sup>14</sup> Provision should also be made for certain analogue applications currently operating in the UHF band: e.g. Programme-Making and Special Events (PMSE) services or wireless microphones.

<sup>15</sup> Ofcom, UK Digital Dividend Review project. Estimate quoted as “conservative”.

#### 4. ONLY EU COORDINATION CAN UNLOCK THE FULL POTENTIAL OF THE DIGITAL DIVIDEND

Europe is confronted with the need to ensure that optimal use is made of the digital dividend. Decisions taken in the coming months and years on organising, allocating and assigning the dividend will impact not only on the competitiveness of Europe's information and media sector, but also on Europe's ability to innovate in order to meet its societal and economic challenges.

##### *The digital dividend knows no borders*

Radio waves are not bounded by national borders: the more powerful the transmitting power, the further signals can travel away from the intended coverage area, risking interference to other systems operating in the same, or neighbouring, spectrum bands. Avoiding interference is the technical justification for spectrum management and cross-border coordination. This was also the reason for negotiation of the Geneva 2006 agreement on an international scale.

##### *Removing technical barriers to unlock the full capacity of the digital dividend*

As noted above, the UHF bands affected by the digital dividend are currently scattered in narrow segments across this large body of spectrum, reflecting the spectrum plan of the Geneva 2006 agreement. It is therefore difficult or impossible to make alternative uses of the dividend. The spectrum bands liberated are often too narrow to be really cost-effective for new services and the scope for their development is further reduced by the fragmented implementation of the Geneva 2006 agreement at national level. As a result, innovative uses of the dividend, if possible at all, would be impeded by low spectrum efficiency and require specific adaptations of operating equipment to local conditions.

The public consultation held by the **Radio Spectrum Policy Group** in the preparation of its opinion on the digital dividend<sup>16</sup> has revealed that **many potential uses of the dividend will simply not occur if access to spectrum is not better coordinated across Member States**. This will in turn reduce the overall value of the digital dividend. Overcoming this major hurdle calls for **“tidying up” the spectrum of the digital dividend** in order to make it more usable and **more consistent across borders**. This can be achieved under the **Geneva 2006 agreement** in a manner compatible with international agreements with neighbouring countries and with minor adaptations to meet internal EU requirements. But this is **only possible if Member States work together** and if the **EU dimension of spectrum planning** for the digital dividend is reinforced.

Moreover, reinforced EU spectrum coordination would facilitate **EU-wide interoperability**, thus reducing **distortions** of competition in the single market that favour certain sectors or market players and creating opportunities for existing and new entrants to launch innovative wireless services.

##### *Economies of scale and scope are critical for many potential uses of the digital dividend*

Most investments in new wireless technologies are now conducted on a European or global scale. In the case of the digital dividend, many potential applications are mass market services for which an effective **internal market** brought about by European coordination is critical to stimulate the necessary investment in new technology deployment. **Innovation**, one of the

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<sup>16</sup> RSPG Opinion on EU spectrum policy implications of the digital dividend. Full text available at [http://rspg.ec.europa.eu/doc/documents/opinions/rspg07\\_161\\_final\\_op\\_digdiv.pdf](http://rspg.ec.europa.eu/doc/documents/opinions/rspg07_161_final_op_digdiv.pdf).

cornerstones of the “Lisbon strategy”, will be fully supported only if Member States move together to open up access to the digital dividend under consistent and more flexible conditions. Coordination would create a positive momentum to stimulate new and robust industrial and business developments and provide a boost to the economy. A fragmented digital dividend is likely to give rise only to new local or “niche” applications, which may not have the scale required to be successful. A coherent approach across the EU will also help decreasing regional disparities in established EU policies, such as e-health, e-education and other services of public interest.

#### *A comparison: digital dividend developments outside Europe*

The significance of the digital dividend has also attracted much attention outside Europe and has already been recognised by several governments in other regions of the world:

- In the US, about half of the UHF spectrum will be released by broadcasters after the switch-off of analogue TV in 2009, and has already been reserved as a digital dividend for redistribution to new services, mainly via technology-neutral auctions due in January 2008. In addition, regulatory plans are underway to allow “intelligent” devices to use the so-called “white space” left between TV-station coverage areas.
- In Japan, significant amounts of broadcast spectrum have been vacated or are being considered for technology-neutral release via auctions<sup>17</sup>.

The above steps will allow those economies to provide new and innovative services and applications (e.g. mobile multimedia, broadband wireless access, integrated infrastructures for Public Protection and Disaster Recovery), giving a competitive edge to their respective industries.

A common approach to the digital dividend will reinforce the overall competitiveness of Europe in the global marketplace and strengthen the position of its telecommunications and IT sectors. It will also ensure that the digital dividend spectrum is tailored to European requirements, and not “imposed” by successful applications elsewhere in the world.

Europe cannot afford to stay on the sidelines. It is critical to address strategically the key issues underlying the digital dividend.

## **5. MOVING TOWARDS COMMON SPECTRUM PLANNING**

### *“Tidying up” the digital dividend spectrum*

Adequate spectrum planning is essential to ensure optimal use of the digital dividend and to remove any technical barriers to a level playing field between potential users.

Earlier technical studies<sup>18</sup> initiated by the Commission have clearly shown that, due to interference problems, standard digital broadcasting services and other services delivered via fundamentally different communications networks cannot be “mixed” in the same spectrum bands. This can be overcome by identifying contiguous or closely related **spectrum bands** to create “**clusters**” of services using a similar **type of communications network**. However,

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<sup>17</sup> Approximately 50 to 60 MHz.

<sup>18</sup> CEPT Report in response to the Commission Mandate on technical considerations regarding harmonisation options for the digital dividend (Part A and Part B).



the current fragmentation of the digital dividend does not allow clustering in common bands. Only a concerted effort by all Member States could permit such clustering, as there is a high degree of spectrum planning interdependency across borders.

#### *Acting together*

Accordingly, the Commission is proposing to move towards a **common spectrum plan at EU level**. This would increase **spectrum efficiency** above what could be achieved at national level, thus enhancing the overall capacity and range of uses of the digital dividend.

#### *Preserving flexibility to address variances at national level*

The Commission recognises that the spectrum situation may vary in each Member State depending on the specific broadcasting environment, in particular the extent of reliance on terrestrial TV, notably to support public service obligations. There are also clear differences of timing and strategy in national plans regarding the digital switchover which need to be considered. The common spectrum plan would therefore have to be **phased in** with sufficient **flexibility** to accommodate legitimate national specificities, such as local social and market needs. Considering the fast evolution of technology, any common spectrum planning should also remain under constant review so that appropriate adjustments could be made as required.

#### *Preparing the ground*

To pave the way for a harmonised clustering of spectrum bands, the Commission proposes to undertake preparatory work to address a number of **important challenges**. This includes determining the size, boundaries and access conditions of each sub-band hosting a particular type of network and associated cluster of services, as well as assessing the timing and means required to achieve a flexible and realistic transition to harmonised clustering. The preparatory work should also address the identification of the administrative and technical costs involved in displacing services to new frequency bands, when required, and the need to minimise these costs when unavoidable. It will also be important to pave the way for a safe and responsible deployment development and deployment of infrastructure solutions and to study their impact over the long-term.

Having prepared the ground for the move to a harmonised approach, the Commission would then use a binding Community law instrument to adopt a clustering decision.

#### *Establishing “application clusters” in common spectrum bands*

The proposed clustering of spectrum should apply to the main part of the digital dividend, the UHF band<sup>19</sup>. It would constitute a “top-level” spectrum organisation upon which national and EU-wide plans can be developed, defining the bounds within which national flexibility can be exercised by allowing for different levels of EU harmonisation for each cluster.

Concretely, the clustering should be based on **three sub-bands** for the three most common types of networks:

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<sup>19</sup> The digital dividend spans the VHF and the UHF bands. The VHF band is much smaller than the UHF band, less attractive in terms of spectrum propagation, and hence less prone to spectrum scarcity. The VHF band could therefore be optimised without EU coordination.

Type of networks in each sub-band	Degree of spectrum planning coordination
1) <b>Unidirectional high power networks:</b> (i.e. mainly for fixed broadcasting services): this part of the UHF should be used both to ensure the <b>continuation of existing TV programmes</b> in digital format <sup>20</sup> (which is formally outside of the scope of the digital dividend) as well as to deploy appropriate resources to accommodate <b>new broadcasting needs</b> fitting this traditional structure of networks.	<p><b>National management</b> (national part of the dividend + continuation of national TV channels).</p> <p>The technical conditions of use of this part of the UHF would <u>not</u> be subject to formal EU harmonisation. It will therefore continue to be subject to individual national management, in compliance with the Geneva 2006 agreement.</p> <p>Whenever possible, TV channels currently operating outside of this sub-band would progressively have to be relocated within this agreed common sub-band, using the amendments mechanisms of the Geneva 2006 agreement.</p>
2) <b>Unidirectional medium to low power networks</b> (i.e. typically for mobile multimedia services, and newer forms of converged broadcasting and communications services).	<p><b>National management, combined with optional EU coordination.</b></p> <p>Sub-band to be available on a non exclusive basis to Member States electing to take advantage of larger economies of scale and easier spectrum coordination for applications fitting this type of networks. It should also ensure natural convergence over time of similar services in similar frequencies. It could provide an opportunity for cost-effective deployment of <b>mobile TV</b><sup>21</sup></p>
3) <b>Bi-directional low power networks:</b> (i.e. typically for fixed and mobile broadband access services): this cluster could also possibly include other applications such as innovative low power broadcasting services.	<p><b>EU harmonisation on flexible basis,</b> gradual implementation to cope with national constraints.</p>

For illustration purposes only, the overall clustering could look as outlined below:

Common spectrum sub-bands (clusters)

470 MHz <-----UHF band-----> 872 MHz

SPECTRUM UNDER EXCLUSIVE NATIONAL MANAGEMENT

SPECTRUM COORDINATED AT EU LEVEL

<p><u>Spectrum used for the continuation of existing TV and radio services</u></p> <p><u>Vacant spectrum</u> for use as the national part of the digital dividend</p> <p>Example of services: more TV services, possibly HDTV</p>	<p>Example of service: narrow-band mobile TV</p>	<p>Example of services: wireless broadband access, high speed mobile data access</p>
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Unidirectional Networks  
(high power)

Unidirectional  
networks  
(low to medium power)

Bi-directional  
networks  
(low power)

<sup>20</sup> It is also this part of the UHF which should be used in priority to fulfil current and future public service obligations.

<sup>21</sup> For details on the Commission's proposals regarding mobile TV, please refer to the Commission Communication COM (2007) 409 on Strengthening the Internal Market for Mobile TV, 18.7.2007.

—— part constituting the actual digital dividend.

## **6. CONCLUSION**

The digital dividend resulting from the switch from analogue to digital broadcasting is a unique opportunity to give impetus to the whole of the wireless communications industry as well as the broadcasting industry. It can significantly contribute to the Lisbon goals of competitiveness and economic growth and satisfy a wide range of the social, cultural and economic needs of European citizens.

The full benefits of the digital dividend can only be realised with the support and active cooperation of Member States and all stakeholders, and if a common approach is adopted to spectrum planning.

In the light of the digital dividend becoming already available in some Member States and with the EU transition towards digital TV expected to be completed by 2012, there is urgency to initiate the decision process on the common approach to the use the digital dividend.

### **Member States are therefore invited to**

- Facilitate the introduction of new services by working together and with the Commission to identify common spectrum bands in the digital dividend that can be optimised by application clusters.

### **The Commission will:**

- Prepare the required measures to reserve and coordinate the common bands at EU level.

The European Parliament and Council are invited to discuss the common approach set out in this Communication and to endorse the proposed actions.