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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

Strengthening the Internal Market for Mobile TV

Impact Assessment

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Lead DG: Directorate-General for Information Society and Media

Other services involved: Secretariat-General; Legal Service; Competition; Internal Market; Enterprise; Education and Culture; Trade; Health and Consumer Protection; Research

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1. PROCEDURAL ISSUES

1.1. Organisation and timing

This Impact Assessment describes the options considered by the Commission services in the preparation of a Communication on "S*trengthening the Internal Market for Mobile TV*". The main objective of the Communication would be to support the introduction and take-up of the nascent market of mobile TV (M-TV) across the EU. The timing of the Communication was chosen in order to ensure that all conditions are in place for a successful take-up of the services in the EU.

Due to the cross-cutting nature of the subject, an interservice **Impact Assessment Steering Group** was established and met for the first time on 19 December 2006. The Group held one more meeting on 6 March and a last meeting on 12 April 2007. The following services were invited to participate in the interservice group: Secretariat-General; Legal Service; Competition; Internal Market; Enterprise; Education and Culture; Trade; Health and Consumer Protection; Research, Taxation and Customs.

The Communication and its associated Impact Assessment relies on work carried out in the relevant institutional fora as well as consultation with industry and other stakeholders.

1.2. The opinion of the Impact Assessment Board

On 23 May 2007 the Impact Assessment Board in its final opinion recommended the following improvements:

Weighing cost and benefits of the options should be strengthened; if possible with more quantification. Impact tables in the Annex should be brought in line with the Analysis of impacts sections and special attention to medium and long term impacts on innovation, interoperability, environment, job creation and administrative costs.

The objective of supporting the introduction and take-up of mobile TV in the EU seems to go beyond the issues raised in the problem definition.

Uncertainties surrounding the future development of mobile TV should be better addressed avoid assuming excessively optimistic scenarios on the benefits of mobile TV and restrict itself to EU related aspects.

"The IA report should state whether and how consumer organizations and other potentially interested non-industry stakeholders have been consulted and if this was not (yet) done this should be justified."

In response to these comments, the analysis of impacts has been further substantiated with the requested elements (Chapter 6 and Annex), the link between problems and objectives better explained (Chapter 4) and the uncertainties around mobile TV market forecasts are now mentioned in different parts of the document. Additional quantification, especially that of impacts was not possible in the current IA. However, in view of the policy option selected, more substantial quantification efforts will be put into the future Impact Assessment accompanying EU intervention if and when this would be judged necessary.

With regard to stakeholder consultation, it has to be stressed that it was designed to be as wide and inclusive as possible (see chapter 2.). The EMBC was in principle open to any interested party, and it was unique in its nature to gather an extremely wide array of stakeholders from sectors that have traditionally not been in dialogue. However, the main topics covered technical aspects and spectrum which have not attracted the attention of consumer organisations. It should also be recalled in this context that the RSPG public consultation on multimedia services has not seen any responses from consumers. At this stage of market development, consumers have little experience with Mobile TV. The role of consumer organisation and non-industry stakeholders will gain more importance in the upcoming market and service take-up monitoring phase.

2. CONSULTATION AND EXPERTISE

Mobile TV (M-TV) represents an emerging service for which economic forecasts are widely diverging but generally optimistic. It is also a very complex area encompassing several regulatory areas at once and affecting various groups of stakeholders. Therefore, DG Information Society and Media has considered the outputs of the widest possible relevant fora.

2.1. Consultation with Member States

Consultation with national authorities took place through institutional fora and committees. These include notably, the work carried out in the context of the *Radio Spectrum Policy Group* and the *Radio Spectrum Committee* on developing spectrum policy for mobile multimedia broadcasting[1]. Broadly, consultation supports some degree of allocation of radio spectrum frequencies to new mobile multimedia services such as mobile TV, notably in the context of digital switchover.

The *Authorisation Sub-Group of the Communications Committee* was used to consult the Member States on the regulatory and licensing aspects related to mobile TV. A presentation by the Commission's services and an exchange of views also took place in November 2006 in the context of the *Contact Committee of the Television without Frontiers Directive.*

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[1] Radio Spectrum Policy Group: RSPG 06-143 adopted on 25 October 2006 and "Opinion on the introduction of multimedia services in particular in the frequency bands allocated to the broadcasting services": (http://rspg.groups.eu.int/doc/documents/meeting/rspg11/rspg06_143_final_rspg_opinion_multimedia_services.pdf); Radio Spectrum Committee*:* Mandate on the L band: (http://ec.europa.eu/information_society/policy/radio_spectrum/docs/current/mandates/EC%20Mandate%20to%20CEPT%20on%20L_Band%20Oct%202006.pdf)

2.2. Consultation with industry

Stakeholders have been extensively consulted. Already in February 2006 a pubic workshop on mobile TV and spectrum issues was organised by DG INFSO services, in order to gather information and allow Commission services to assess the political relevance of this issue and the problems at stake.

DG INFSO services have facilitated the setting up of an industry umbrella group, the **European Mobile Broadcasting Council (EMBC)** which gathered together all main industry players concerned, including broadcasters, manufacturers, content providers and telecom operators. The Commission participated in the work of this group and in its Secretariat as an observer[2]. The EMBC held two plenary meetings in July and October 2006, and established three working groups on regulation, technology and spectrum which worked until the end of January 2007 on industry recommendations. The final EMBC recommendations were issued in March 2007[3]. The Communication on Mobile TV and this Impact assessment draw, inter alia, on EMBC results. As a multi-stakeholder group, the EMBC responded to the consultation with diverse views reflecting interests from across the industry. Moreover, due to the consensus principle adopted by EMBC only rather generic conclusions were adopted.

Beyond work carried out in the context of the EMBC, evidence base draws on other Commission consultations and studies, including in related policy areas.

Several multi-client studies and surveys touching upon Mobile TV are today available on the market. Prominent industry associations and fora, such as the *UMTS Forum*, *GSM Association* and *bmcoforum* have also established ad hoc working groups or fora on Mobile TV and issued reports on this subject. A detailed bibliography can be found in annex (Annex 2).

3. PROBLEM DEFINITION

When approaching policy issues related to new, innovative technologies such as Mobile TV, problem definition is of paramount importance. The purpose of this section is to clarify the definition of "mobile television" for the purposes of the Commission Communication and of this IA and to define their scope of application. The section also describes the state of technology, the market state of play in EU 27 and in other main regions of the world. It then explains why Mobile TV is an EU level issue and illustrates the main issues identified with EU relevance for a successful introduction of mobile TV services across Europe.

3.1. What do we understand by "mobile TV"?

In plain terms, "**mobile television" refers to the transmission of audiovisual content to a mobile device**. Such a transmission can take different forms, from live

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[2] Terms of reference of the EMBC: http://www.ebu.ch/CMSimages/en/tec_embc_technical_report_tcm6-50235.pdf , p.14.

[3] EMBC recommendations: http://www.ebu.ch/CMSimages/en/tec_embc_recommendations_tcm6-50233.pdf

TV to time-shifted or on-demand. Some examples of services are provided in the table below.

Table 1 - Examples of Mobile TV and related services

Audiovisual Broadcast Services

- Mobile TV
- Mobile Radio (including text, graphics and related advertising content)

Broadcast data services

- Mobile information services such as newspaper traffic information and point of interest tourist information
- Mobile file downloading (clips, games, software upgrades and other applications)

Combined broadcast/interactive Broadcast Services (interactive part accessible only by devices with a interaction channel), e.g.

- Mobile TV/radio with file downloading and voting capability
- Mobile Radio with interactive services

Source: EMBC Technology Workstream Report, January 2007

Transmission of M-TV services can take place over various networks including cellular/mobile communications, terrestrial broadcast, satellite, and Internet-based. There is a **key distinction between unicast ("one to one") and broadcast ("one to many") mobile TV services**[4]. Video on demand or time-shifted on demand transmissions are examples of unicasting, while traditional TV programmes are normally broadcast. Unicasting is today very common and most operators use the existing mobile communications cellular networks (2.5 or 3G/UMTS) to deliver TV content to mobile devices.

Consumers however are less concerned about the mode of transmission than having interesting content, at low costs and when and where they want. It is likely, therefore to meet these demands for flexible content packaging that commercial offerings of M-TV will combine both streamed and broadcast services. Nonetheless, from a policy and regulatory perspective the difference is important and it has been used here for defining the scope of application of this Impact Assessment, as it will be described later[5].

[4] A Mobile Broadcast Service is defined by the EMBC as "A service for simultaneous multimedia content distribution to many recipients (potentially) without knowing the recipient. (Technical Workstream Report, 2007).

[5] See Infra section 3.7.

3.2. Main Mobile TV Technologies

Currently in Europe there are three main radio technology families for delivering audiovisual content to mobile terminals:

1. In-band **cellular broadcast techniques** such as the **MBMS** (Multimedia Broadcast/ Multicast Service) extension to UMTS. As explained above, technologies which are based on cellular networks are different from broadcasting ones.

2. **Terrestrial digital broadcast networks** and their extensions, such as:

- **DVB-H** (Digital Video Broadcast transmission to Handheld terminals, based on DVB-T standards)[6],
- **T-DMB** (Terrestrial Digital Multimedia Broadcasting, based on T-DAB standards)[7],
- **MediaFLO** (Media Forward Link Only).

3. **Hybrid satellite/terrestrial systems**, such as **DVB-SH** which is a system consisting of DVB-H adapted for S-band and the hybrid (satellite/terrestrial) operation concept[8].

It should also be mentioned that the DAB family of standards also includes **DAB-IP** which is based on **Internet Protocol** (IP) and currently used in the UK[9].

DVB-H, an ETSI standard, was developed with the support of funds under the EU RTD Framework Programme. **DVB-H is currently the standard more widely used** in the EU with trials and/or commercial offerings in 15 Member states. DVB-H is the only standard ensuring backwards compatibility with DVB-T, the standard used for digital terrestrial television in the EU.

T-DMB is also an ETSI standard while MediaFLO has applied for ETSI certification.

Developments are today taking place within the DVB and DMB which are both developing new versions of their M-TV technologies: DVB-H2 as well as a new version of DMB which could operate in UHF 8 MHz channels. This indicates DMB's intention to position itself as a suitable candidate for the digital dividend UHF spectrum. It is also worth noting that some activities are under way to achieve

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6 The open standard DVB-H is supported, inter alia, by manufacturers such as Nokia, Motorola, Philips, Sagem, Pace, Sony, Ericsson as well as by mobile operators such as Vodafone, O2 and T-Mobile. In April 2007, Nokia and Samsung agreed to cooperate in developing devices on the basis of DVB-H.

7 DMB, co-developed at its very beginning by research institutes in Europe, has subsequently been adapted mainly by manufacturers and mobile operators outside Europe, such as LG, Perstel, JVC, Panasonic, Ienovo, Pantech, Sansui, Mercury, Zen Networks, Cowon, and Hyundai Autonet. Samsung, initially developing products on the basis of DMB only, agreed in April 2007 with Nokia to cooperate in developing devices on the basis of DVB-H.

8 This concept was developed under strong impulse of Alcatel.

9 Currently used in the UK in the VHF Band.

a common framework for the transport mechanisms, such as the DXB[10], which require developing common IP-based protocol stacks and can achieve considerable interoperability of M-TV standards. However, it is not possible to predict at this point in time if and when these developments will hit the market.

The main characteristics of the principal broadcast Mobile TV technologies currently used in European pilots and/or commercial launches are summarised in the table below[11].

Table 2 - M-TV Broadcast Technologies: main technical characteristics

	DVB-H	**DMB/DAB-IP**	**MediaFLO**
Base technology	DVB-T	DAB (Eureka 147)	FLO
Spectrum	UHF band L band S band (under development DVB-H version 2)	L band Band III (under development DMB version 2 suited to UHF band)	700 MHz
Channel bandwidth	5 to 8 MHz	1.7 MHz (under development 8 MHz)	5 to 8 MHz
Transmission signal modulation	CODFM	CODFM	CODFM

3.3. Market state of play in EU 27

Today, the Mobile TV market is still at a very early stage of development. However, we experience some momentum in the introduction of services. 2006 was a key year in terms of pilots and announcements. 2007 is expected to become the year of commercial launches, with nationwide launches planned in Germany, France and Spain. **2008 is for industry a target date** for M-TV services due to important sports events such as the European Football Championship and the Olympic Games that will provide an important incentive for new customer to test

[10] Digital Extended Broadcasting. The DXB project coordinated by the German Ministry for Education and Research (BMBF) seeks to harmonise DVB-H, DAB/DMB and MBMS so as to prevent fragmentation in the market for multimedia content and receivers. See http://www.irt.de/en/activities/programme-distribution/nobrmobile-broadcastnobr-nobrdvb-hnobr-dmb-dxb.html.

[11] Technology comparisons can be found in several reports including Enders/Analysis 2007, UMTS Forum 2006, Juniper Research 2006.

mobile TV services. From the end user perspective, the possibility to receive the service is increasing. According to consultants of IDC[12] the 2006 record sales of mobile handsets (1 billion worldwide) was largely fuelled by replacements to converged devices, with a 42% increase in the sales of such phones worldwide and 29% in Western Europe. 2007 is seen by IDC[13] as the critical year for widespread integration of mobile TV technologies.

As of today, three Member States have already started commercial operations for broadcast M-TV services: Italy, Germany and the UK. In **Italy,** all mobile operators launched commercial services. *3 Italia* launched nationwide services in May 2006, both *Telecom Italia Mobile* and *Vodafone* in December 2006. In **Germany**, *Mobiles Fernsehen Deutschland* launched the commercial T-DMB service "Watcha" in June 2006, in time for the World Cup 2006. The service is now available in 22 cities and counts some 9,000 subscribers. Vodafone, T-mobile and O2 have recently announced the creation of consortium of operators to the German national competition authority. They plan to provide from spring 2008 some 16 TV programmes over DVB-H.

In the **UK,** *Virgin Mobile* started its M-TV service October 2006 relying on BT's *Movio* wholesale product using DAB-IP based technology. Subscriber numbers in January 2007 were around 10,000, but for the time being *Virgin Mobile* sells only one type of phone that is capable of receiving the service. In Finland, the first EU country to test M-TV over DVB-H in 2004, the license was attributed in March 2006 to *Digita* and the launch of commercial services took place in June 2007. Other European countries are expected to follow shortly.

Table 3 - M-TV Broadcast Technologies used in the Member States

Technology	**Member states in which technology is in use**	
	Trials	**Commercial launch**
DVB-H	AT, BE, CZ, DE, ES, FR, HU, IE, LT, LU, NL, PT, SE, SI, UK	**IT, FI**
DMB/DAB-IP	FR , IE, NL, UK	**DE, UK**
MediaFLO	FR, UK	

3.4. Main EU partners

Mobile TV has experienced lively interests in all developed mobile markets around the globe. In **South Korea**, SK Telecom launched its satellite based DMB service in June 2005. Competitors LG Telecom and KTF have launched terrestrial services, which they have pushed heavily with the help of the traditional broadcasting companies. At present, there are more than 4 million users in South Korea: 1.01 million are using satellite DMB and 3.14 million are using terrestrial DMB,

12 http://www.idc.com/getdoc.jsp?containerId=prUS20578607
http://www.idc-cema.com/newsletters/March07/WE_Mobile_handsets.html

13 http://www.ameinfo.com/108550.html

representing yearly revenues in excess of € 400 million[14]. The growth of M-TV on the basis of DMB, the standard favoured by national manufacturers, in Korea has also to be attributed to determined government policy providing significant financial incentives to industry/consumers.

In April 2006, **Japan** launched mobile broadcast TV on the Japanese ISDB-T standard[15] in the main metropolitan areas. The new service experienced rapid take-up and gained 500,000 users within the first weeks[16]. By February 2007, 3.4m handsets in Japan were ISDB-T ready[17]. Although Japan is initially offering a free service on its ISDB-T network, experts predict that it will start charging for the service in 2008 The Japanese market is expected to account for an important share in global mobile TV market; reaching some $ 2.9bn out of a total $11.7bn by 2011.

In **China**, the government is pushing for Mobile TV availability in the Beijing area for the 2008 Olympic Games. The State Administration of Radio, Film and Television backs the development of a China Multimedia Mobile Broadcasting (CMMB) standard and is advocating its adoption as China's main mobile TV technology. The goal is to deploy nationally CMMB in the first half of 2008[18].

In **India**, public broadcaster *Prasar Bharti* has teamed with Nokia to make a M-TV service available as from May 2007 on the basis of DVB-H. In **Singapore,** *TVMobile* uses DVB technology to broadcast live news, entertainment and music content directly to over 1500 Singapore Bus Service buses islandwide, along with various other indoor and outdoor locations. Also **Indonesia, South Africa and Russia** are running trials based on DVBstandards.

Outside Asia, the **United States of America** constitutes the largest market for mobile TV, with expected revenues of $1.8bn by 2011. U.S. mobile TV subscriptions are expected to top 30 million in 2011[19]. The major operators *Verizon Wireless* and *AT&T* have selected Qualcomm's MediaFLO standard for providing mobile TV, making it the de-facto standard for mobile TV in the US. Launch of AT&T's broadcast service is expected for late 2007, while *Verizon* has still to decide on the commercial launch of its broadcast offer, expected in Q3/2007[20].

3.5. Market forecasts

The market players have visibly high expectations from this nascent form of digital convergence, its real market potential is however, difficult to assess: estimates for

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14 http://kr.w2forum.com/i/Officla_No_of_Mobile_TV_subsribers_in_Korea

15 Integrated Services Digital Broadcasting – Terrestrial

16 http://evolaris.bravestone.at/ewo/webobsession.servlet.go?app=bcms&page=view&mask=download&nodetitleid=2014

17 http://analytica1st.com/analytica1st/labels/Data%20services.html

18 http://www.eetimes.com/showArticle.jhtml;jsessionid=CT01NKEOT50PYQSNDLOSKHSCJUNN2JVN?articleID=198700962

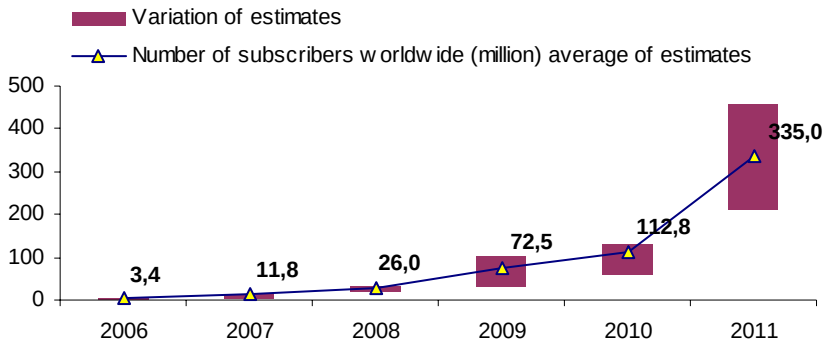
19 ABI Research, June 2006

20 http://www.qualcomm.com/press/releases/2007/070212_att_selects_s.html, http://news.com.com/Verizon+offers+live+TV+on+cell+phones/2100-1039_3-6147908.html

subscriber numbers and revenues vary widely as shown in the chart below. Most of the available research addresses global markets and provides case-studies for only some EU Member states. Moreover, very often broadcast M-TV revenues are considered as part of revenues and subscribers for all data services.

The figure below summarises estimates for subscriber uptake contained in recent reports from analysts. It is interesting to note that the variation between estimates increases with time. In other words, while all expect a steady take-up of the services between now and 2011, the predictions for the absolute size of the take-up differ considerably.

Broadcast Mobile TV Subscriber Uptake: Perplexity among Analysts



Estimates by: In-Stat, ABI, NSR, Datamonitor, Informa Telecoms&Media, eMarketer, Strategy Analytics, Gartner

Most research however foresees a **steep increase in demand in 2009** and ambitious estimates predict the worldwide mobile broadcasting market reaching a 20 billion € turnover in 2015 (*McKinsey*) and some 7-9 billion € around 2010-11[21]. Indeed there are some developments that encourage ambitious estimations. Since the commercial launch of *3 Italia* in June 2006 more than 400,000 customers have subscribed to the service[22]. At the same time business models to reach these figures are not clear yet. *Gartner*[23] research regards it even as questionable that mobile TV can be charged for as a separate service. Most current business models rely on offering mobile TV as part of a service package.

Specific European forecasts are rare, but *Informa Telecoms & Media* predict impressive 68.7 million subscribers in Europe for 2011. Juniper sees the big turn in favour of mobile TV coming already in 2009, when revenue and subscriber figures of mobile TV rocket and overtake 3G, while Europe maintains a lead position in the mobile entertainment market, producing an estimated share of 32% of total worldwide mobile entertainment revenues in 2011.

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21 http://www.juniperresearch.com/shop/products/whitepaper/pdf/MobileTV_II_White_Paper%20_2_.pdf

22 "Our 'world-first', with the launch of DVB-H Digital Mobile TV in June 2006, has been a success with over 250.000 customers in the first six months." Vincenzo Novari, CEO, 3 Italia http://www.mobiletv-news.com/content/view/301/2/

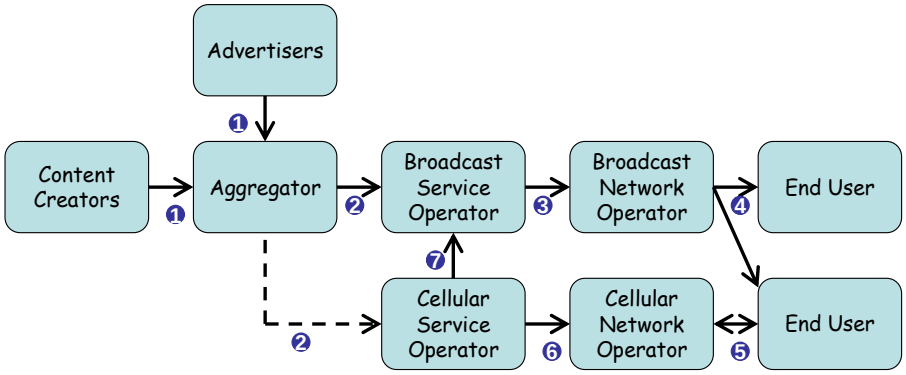
23 Gartner: Dataquest Insight: Revenue Model for Mobile TV Needs Tuning, March 2007

Notwithstanding uncertainties in predictions, there seems to be solid indications that there is a **potential multi-billion new market about to open up in Europe**. We already start seeing the impact of this new market on handset and equipment manufacturers and mobile operators and broadcasters are expected to follow in short. This new technology platform is also likely to increase and diversify the demand for television programming, including that produced locally by SMEs, and opens the way to new forms of advertising. These "spillover" effects on related industries are not quantifiable at this stage and their actual realisation is heavily dependent on the future technological, business and regulatory environment.

3.6. Actors in the M-TV value chain

Mobile TV brings together industry players coming from at least three different worlds: **content creation, broadcasting and e-communications**. It is important to keep this complexity in mind when referring to mobile TV stakeholders, value chain and business models. The fact that the "stakeholders" are not a homogeneous group makes any assessment of the potential impact of proposed measures complex.

The EMBC Technical Workstream has illustrated the relationships between M-TV players in the figure below with reference to a content flow associated to the revenue flow.



Role relationship model in a mobile broadcast system. Source: EMBC Technology Work stream report 2007

Table 4 – Role definition

Role	Description
Content creators	Source of content to be consumed by end users. Such content can be A/V programs (streams or files), executable files, TV channels, etc. This actor provides the content to the Aggregator.
Advertisers	Source of content aimed at promoting products, services, etc. Such content can be in form of A/V, pictures, etc. This actor provides the content to the Aggregator.
Aggregator	Point of multi-dimensional (time, channel, region) combination of the various sources of content in order to form a consumable media. This role also takes care of the legal agreements with the content providers. This role gets the content from the Content Creators and Advertisers, and

	provides (the access to) the aggregated content to the Broadcast Service Operator.
Broadcast Service Operator	Point of technical aggregation of the various sources of content. This actor multiplexes the content into a bitstream provided to the Broadcast Network Operator. A possible role is being in charge of the management of non-connected devices for billing, authorisation and so on, that are marketed to the end-users.
Broadcast Network Operator	Role consisting in providing geographical coverage of the broadcast bearer. It gets the bit stream to be broadcast from the Broadcast Service Operator, for the End Users.
Cellular Service Operator	Role in charge of the cellular services such as voice, data, messaging, portals, billing, authentication, etc that are marketed to the end users.
Cellular Network Operator	Entity in charge of the coverage for the cellular network where the cellular services are available. The Cellular Network Operator makes available services of one or more Cellular Service Operators over predefined areas.
End User	Point of content acquisition, consumption and possibly interaction with the system

Source: EMBC, Technical Report, January 2007

3.7. Scope of application of the Impact Assessment

The previous Sections have attempted to describe the varied new world of "mobile TV", the different technologies used, the market state of play and outlook and the actors involved in the M-TV value chain. This Section narrows down the focus of the present analysis and explains the rationale behind the decisions that have been made concerning the scope of application.

We have seen in the sections above that in terms of technology, M-TV can be provided over various types of networks: cellular, broadcast or Internet-based. Due to convergence between the telecom and the audiovisual worlds, M-TV is a cross-policy subject, covering several policy areas and issues.

The Communication, and therefore this associated IA, focuses on issues belonging to the regulatory framework for e-Communications, such as standards, authorisation regimes and spectrum policy related to broadcast mobile TV in the EU.

3.7.1. "Mobile TV" as a broadcast service

For the purposes of this Impact Assessment and of the Communication, **Mobile TV (M-TV) refers to broadcast mobile TV.** Transmission of audiovisual services over cellular networks, notably 3G/UMTS is not covered by the present analysis and assessment of policy options.

The main reason for this choice lies in the fact that the policy and regulatory framework for services over 2.5 or 3G is already in place. 3G communications were

introduced in the EU on the basis of a 1998 Commission Decision, the UMTS decision[24], and have been the subject of two Commission Communications in 2001 and 2002[25]. Audiovisual services over 3G are already part of offerings of most mobile operators in Europe. On the other hand, broadcast mobile TV technologies are based on separate networks to deliver M-TV services. They are new technologies and, according to the majority of analysts and stakeholders, they will be essential for mass market take up of M-TV in the long term as they enable delivery of the same content to a multitude of customers simultaneously.

3.7.2. Exclusion of issues related to content

The successful deployment and take up of mobile TV will crucially depend on **content availability**. It has to be recalled that the transmission of audiovisual content and the content itself fall under two separate sets of rules at EU level: e-Communications policy and content policy. The present document relates to the e-Communications aspects of standards, spectrum and authorisations. This does not mean that there will not be a need to present new initiatives in the areas of mobile TV content and in due course.

The proposed new directive on **audiovisual media services** is expected to create a modernised framework also for Mobile TV content, whether broadcast or provided on-demand.

Problems of promoting the portability of content in the EU are strongly highlighted by Mobile TV. A key challenge will be to offer valuable, premium MTV content on a flexible basis that transcends platforms and borders. **Copyright and related issues,** to extend existing rights to allow the enjoyment of mobile TV anytime anywhere and on any device would require a new approach to the "territorialisation" of rights, perhaps through pan-European rights licensing. However, these issues, while more acute for mobile services, are not restricted to Mobile TV, and should be tackled in the more general approach to IPR in the European Information Space.

3.8. Mobile TV as an EU level issue

Mobile TV is a new convergent technology which brings together, in particular, two major EU industry sectors: **mobile communications and audiovisual**. In this respect it has a potential for growth and jobs in the EU not only for the industry sectors primarily involved but also for several related industries, such as the content and advertising industries.

Mobile TV is also expected to bring significant benefits to EU consumers, as it enables them to access TV programs in any place and at any time as well as to have access to rich, diverse and personalised audiovisual content. This would result in

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[24] Decision No 128/1999/EC (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:017:0001:0007:EN:PDF)

[25] COM(2001) 141. (http://ec.europa.eu/information_society/policy/ecomm/doc/info_centre/communic_reports/mobile/com2001_141en.pdf) and COM(2002) 301 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2002:0301:FIN:EN:PDF)

new ways of using and interacting with audiovisual content which could make of Mobile TV a new lifestyle rather than just a new technology platform[26].

However, the introduction and take-up of M-TV services to the EU have been slow and Europe risks losing its competitive edge in mobile communications and a major opportunity for growth and innovation unless a sufficient degree of coordination is achieved. The key to a wide take-up of these innovative services in the EU lies in setting the right conditions that will enable players to reap the benefits of the EU Internal Market and, in particular the **economies of scale** needed.

This is why the Commission has identified the need for an **EU strategy in the field of M-TV** which will contribute to shape the action of industry, national authorities and all stakeholders.

In particular, the Commission services have identified **three main areas** which are important for the successful introduction of mobile TV to the EU: 1) technology and standards, 2) the regulatory environment, in particular authorisation regimes, and 3) spectrum availability and harmonisation.

The **Internal Market dimension** is relevant in all domains. In terms of **technology**, it is clear that whenever we talk about a wireless technology there is a cross-border dimension at stake. European consumers increasingly expect to use devices that can function across the EU. It is therefore important that industry develops interoperable consumer devices, services and applications. Technology is also key to reach economies of scale that allow business to reap the benefits of the Internal Market. From a **regulatory point of view**, new innovative services such as M-TV need an environment which is conducive to risk-taking and investment. The EU has an interest to act in order to ensure that national authorisation regimes do not put undue regulatory burdens over these new services. There is also a need to ensure legal certainty and a level playing field across the EU. **Spectrum availability** is key to the take-up of any wireless service and some degree of coordination is needed within the EU to have a European market for such services. M-TV is critically dependant on new spectrum being made available for new mobile multimedia services, which in turn is related to the use of the so called "digital dividend", i.e. the spectrum capacity that will be freed up by the switchover to digital transmission in terrestrial television. This calls for coordinated action at EU level.

3.9. Problems identified

This Section identifies in more detail the issues with EU relevance which are covered by this Impact Assessment and as outlined above in the Section on "Mobile TV as an EU issue".

3.9.1. Technology and Standards

As described in the market state of play above, the EU landscape today is characterised by the presence of several M-TV transmission standards. **The problem we face is potential market fragmentation arising from the multitude**

[26] See for instance the societal analysis carried out by M. Franco in "Movisao", November 2006, www.mario-franco.net.

of technical options for mobile TV. Similar issues have been raised in the past in relation to mobile communications, interactive television and High Definition TV interoperability and were addressed in different ways, ranging from harmonisation of standards (GSM, UMTS) to promotion of industry agreements (the "HD ready" label). **A fragmented European market is likely to result in loss of economies of scale, slower service take-up and more expensive equipment.** In the case of new technologies such as Mobile TV, reaching a critical mass in a reasonable time is crucial for take-up and deployment. In particular, equipment manufacturers will not be in a position to produce terminals unless numbers are significant enough. Opportunities for businesses and consumer benefits in the Internal Market would be missed. Moreover, the absence of a single European standard may seriously **hamper EU competitiveness** on the global marketplace. It should be recalled that one of the greatest strengths of the European mobile communications industry has been the implementation of the GSM standard which has been successfully exported around the world.

Potential market fragmentation has to be addressed primarily at the level of transmission standards. This is also a first essential step to ensure interoperability. On top of these transmission standards, there may be different technical solutions for elements like the Application Programme Interface and the associated facilities such as the Conditional Access. However, issues of interoperability at the service and application layers are inherent in all broadcasting systems and are not specific to M-TV.

3.9.2. Authorisation regimes

Mobile TV is a new convergent technology which lies at the crossroad between electronic communications and media. This can give rise to uncertainty regarding the applicable legal framework as well as the competent authority. In fact, in most of the EU Member states the competence for telecommunications is separate from the one for audiovisual with the exceptions of Austria, Italy and the UK where a **single regulator** deals with both aspects.

When we look at the current situation in the EU in terms of national authorisation regimes for M-TV, it is clear that this is a key area to be addressed. The situation at Member State level is not homogeneous and national approaches to the authorisation of M-TV services vary considerably. This lack of common approaches may raise in some cases Internal Market concerns.

The Commission services launched a fact finding exercise in 2006. This was carried out through a questionnaire on regulatory regimes for mobile broadcasting services which was sent to the Member States via the **COCOM Subgroup on Authorisations.** The replies to the questionnaire provided a comprehensive overview of the regulatory situation in EU 27 and helped to identify potential regulatory issues to be tackled[27].

[27] The results are available on the Commission Website at: http://preprod.europa.infso.cec.eu.int/information_society/policy/ecomm/todays_framework/digital_broadcasting/mobile_tv/index_en.htm

In the majority of Member States there is no specific regulatory framework for M-TV. In some others, existing regulations are interpreted and applied to M-TV. In a number of countries the technologies for mobile broadcasting fall under the broadcasting regulatory framework[28]. In several Member States where existing media legislation does not contain specific provisions on mobile TV, discussions are ongoing and in some modifications to existing legislation are foreseen. So far, there is little experience with broadcasting services using exclusively mobile transmission (i.e. not having a terrestrial, cable or satellite programme licensed under media law).

Whilst it is clear that the licensing decision remains a national prerogative, industry also expects a clarification of the prevailing licensing framework and seeks to obtain a reasonable level of certainty on the matter, especially in view of **launching services with coverage wider than a single Member State**. In the future, such a cross-border and even pan-European dimension of mobile TV services may gain importance. Licensing regimes must make sense in terms of the internal market that will govern the deployment of Mobile TV infrastructures, and the aim should be to strive for a **level playing field** allowing the various actors to compete on similar conditions. Some degree of consistency in regulatory approaches across the EU is needed in order to clarify applicable regulation and create a regulatory environment conducive to investment and innovation. Traditional broadcast obligations (e.g., must carry) should not automatically applied to new services.

3.9.2.1. Network infrastructure sharing

Infrastructure sharing implies the joint construction of some elements of a network by a group of network operators or the use on a regional basis of infrastructure rolled-out by other network operators. Such agreements have been in place in some markets in the context of GSM and/or UMTS infrastructure. The scarcity of suitable spectrum and the essential economic characteristics of Mobile Broadcast transmission networks are likely to mean that operators and other network providers who compete in a downstream market will often need to share transmission facilities in the upstream market in order to provide new mobile broadcast services and/or to provide greater coverage for customers. Competition law applies to infrastructure sharing. The European Commission made a number of rulings[29] on proposals for mobile network operators to share some elements of their transmission infrastructure, and national competition authorities have also considered applications on a case by case basis. This issue is likely to be of relevance also in the context of M-TV.

3.9.3. Spectrum

A key factor influencing the successful deployment of mobile TV is **timely access to radio spectrum.**

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28 M-TV on 3G networks is generally covered by existing 3G licenses.

29 COM(2003) 65: http://ec.europa.eu/information_society/eeurope/2005/doc/all_about/acte_sector_en.pdf. E.g. O2 Germany, T-Mobile vs. European Commission (OJ C 275, 15.11.2003) (http://eur-lex.europa.eu/LexUriServ/site/en/oj/2003/c_275/c_27520031115en00520053.pdf)

Radio spectrum requirements vary significantly for each M-TV system, depending on several parameters such as the type of application[30], the specific technology standard[31], and the type of delivery infrastructure[32]. There is some level of flexibility in the type of spectrum that can be used by different systems but this flexibility itself is limited by the signal propagation characteristics which are specific to each frequency band.

In addition, spectrum available to match the existing requirements is constrained by local and national legacy situations (existing users) as well as by the different national approaches to the digital switchover which may restrict the amount of frequencies available at a given time.

Taking into account the diversity of spectrum needs resulting from the wide range of candidate technologies and systems, a key challenge at this stage of the innovation cycle is to ensure that the required types of radio spectrum resources can be made available without delay in all regions of Europe. In order to achieve this goal, the key challenges are to:

- identify critical spectrum resources without further delay;

- assess any need for harmonisation, or coordination, on European level, amongst others to facilitate cross-border use and economies of scale;

- anticipate the future demand for these identified spectrum resources, in quantitative and qualitative terms, as well as to match these with the evolution of national and European spectrum availability.

At this stage, the following two main spectrum bands have been identified as relevant for M-TV and as requiring consideration at EU level:

- **UHF spectrum** (470-862 MHz, part of digital dividend): this part of spectrum is considered by a majority as the preferred spectrum as it can accommodate the requirements of several technologies and applications. It is however constrained by the various national policies regarding the digital dividend and by a lack of EU coordination. The Commission's services have suggested to identify a sub-band for mobile TV within the digital dividend;

- **L-band** (1452-1492 MHz): this band can constitute a fall-back solution in several markets where there is no other spectrum available. However, this band is currently limited to the use of the DAB/DMB standard as it is subject to the Maastricht 2002 Plan[33]. The Commission's services have suggested to modify the

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30 For example: mass market versus closed community groups, or pay versus Free-To-Air TV.

31 E.g. DMB and assimilated, DVB-H and associated, MediaFlo, wireless IP TV.

32 There are two main possible types of transmission infrastructure to broadcast mobile TV to handheld devices:
1.digital transmission via traditional terrestrial broadcasting ("low power" cellular or "high power/high tower" transmitters);
2.digital transmission via satellite coverage, or hybrid systems involving satellite transmission combined with terrestrial ground repeaters (Common Ground Components) to enable non "line-of-sight" coverage.

33 CEPT Special Agreement registered in ITU

situation to accommodate a wider range of technologies and to harmonise the band on a technology neutral basis via an EC implementing measure[34]. This would enable a range of open standard technologies to also have access to the band.

EU level coordination for **satellite-based mobile TV services** has recently been achieved, through a Decision on the 2 GHz band for Mobile satellite services. The need for EU level coordination was obvious in this case as the satellite coverage extends to several Member States[35]. It has to be recalled that a critical factor for availability of UHF spectrum is **switch-off** of analogue terrestrial TV transmission in this part of the spectrum. The EU deadline of 2012 for the switch-off of analogue terrestrial TV broadcasting was endorsed by the Council and the European Parliament[36]. Switch-off of analogue terrestrial TV has already taken place in Luxemburg, the Netherlands and in several areas in Germany. It is clear that **by the end of 2010 the switchover process will be well advanced in the EU as a whole**. A **Commission Communication on the Digital Dividend**, planned for Q4 2007, will set out the Commission strategy for the use of the spectrum resulting from the switch-off, and will address in particular the UHF Band.

The tables below summarise current information on Digital Switchover and Analogue Switch-off in EU 27.

Table 5– Roll out of Digital Terrestrial TV in Member States

Year of launch	Member states
2004 and before	BE, BG, DE, EE, ES, IT, NL, FI, SE, UK
2005	CZ, EL, FR
2006	DK, LT, LU, MT, AT, PL, SI
2007	HU, LV ,PT, SK
2010	CY

Table 6 – Switch off dates of Analogue Terrestrial TV in Member States

Year of switch off	Member states
2006	NL, LU
2007	FI, SE

34 Through the Radio Spectrum Committee.

35 C(2007) 409 - OJ L, 15.2.2007 (http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_043/l_04320070215en00320034.pdf)

36 See http://ec.europa.eu/information_society/policy/ecomm/todays_framework/digital_broadcasting/switchover/national_swo_plans/index_en.htm

2008	DE
2009	DK
2010	BE[37], ES, MT, AT
2011	FR
2012 (EU deadline)	CY, CZ, EE, EL, HU, IT, LV, PT, RO, SI, SK, UK
2013 and beyond	BG (2015), LT, PL (2014)

Source: Information from Member States regarding roll out of digital terrestrial TV and switch off of analogue terrestrial TV[38]

4. OBJECTIVES

The objectives of the present IA and the Communication have to be seen in the context of the **i2010 Commission initiative**[39] and of the **EU regulatory framework for electronic communications**. The aim of i2010 is the creation of a Single European Information Space by 2010 that would offer affordable and secure high bandwidth communications, rich and diverse content and digital services.

The main objective of this Communication is to **support the introduction and take-up of mobile TV in the EU** , which contributes to the Lisbon goals and i2010 in the following ways:

- By facilitating the development of an internal market in mobile TV it contributes to the development of a Single Information Space in Europe;

- the introduction and take-up of this new innovative service strengthens the climate for further innovation in this dynamic area and it provides potential for keeping and creating jobs in the sector and entailing growth;

- the high level of mobile penetration combined with convergence can improve the connectedness and access to information for the European citizen and enhance Europeans' participation in the information society, serving inclusion as well as general quality of life.

The Commission has a key role to play in encouraging the take-up of new innovative service such as M-TV and for that, at this early stage of development of mobile TV, the above mentioned three areas have been identified as the most important factors for the introduction and take-up of services in the EU and for the development of an internal market in mobile TV.

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37 In Flanders.

38 Information on swithover in the Member States: http://ec.europa.eu/information_society/policy/ecomm/doc/todays_framework/digital_broadcasting/switchover/cocom05_51final_corr_digital_tv_update1.pdf

39 i2010 / COM(2005) 229 (http://ec.europa.eu/information_society/eeurope/i2010/docs/communications/com_229_i2010_310505_fv_en.pdf)

As regards **technology**, a critical input to production, the Commission can act as a facilitator of industry-led solutions. Self-regulation and, possibly co-regulation, are needed to help this new market to take off in Europe. The Commission can also decide to opt for regulatory intervention where self-regulation has failed and where this is justified by the common interest.

In terms of **regulatory environment**, as authorisation regimes constitute an essential condition for service provision but also have significant consequences on business operations, it is important that the Commission prompts national authorities to put in place regulatory regimes which are conducive to investment and innovation and which can create a level playing field across the EU.

In the field of **spectrum policy**, there is also a need for action at EU level in order to ensure that sufficient and appropriate frequencies are made available for new innovative services such as M-TV. This would require, in particular, actions aimed at coordinating national policies on the use of the digital dividend, i.e. the spectrum freed by switchover to digital transmission. The Commission view in this respect will be outlined in the abovementioned Communication on the Digital Dividend.

5. POLICY OPTIONS

There are three main policy areas that will be addressed by the Communication: 1) **technology aspects related to standards and interoperability**, 2) the **regulatory environment**, notably authorisation regimes and 3) issues related to **spectrum availability**. For each of these areas, three main policy options have been identified and are summarised in the table below.

Table 7: Policy options

	Issue/Policy area	**Technology**	**Authorisation regimes**	***Spectrum***
Policy Options	**Policy Option 1**	Immediately Mandating a Single Standard for M-TV Broadcasting in the EU	One EU-wide authorisation	*EU Harmonised allocation*
	Policy Option 2	Encouraging Industry agreement on a common standard, with a common standard being made mandatory in the	Non binding framework	*"Soft Law" measures*

		absence of agreement		
	Policy Option 3	*Maintain current situation*	*Do nothing (i.e. take no specific action)*	*Do nothing (i.e. take no specific action)*

5.1. Technology

The presence of several standards on the market and the lack of interoperability between technologies and consumer devices may prevent the successful introduction of mobile broadcasting services in the EU. Three main policy options are considered.

In the *first option*, the Commission could make the implementation of one open standard for mobile TV mandatory across the EU. This option could take the form of a Commission proposal of a binding measure such as a Decision or a Regulation.

In the *second option,* industry would be given some time to agree on a common open transmission standard, with active Commission support and monitoring, with the possibility for a standard to be mandated after a defined period if there was no industry agreement. Such a co-regulatory option would require co-ordination and close work with industry to deliver agreements on transmission standards as well as to promote and maximise interoperability for the benefit of consumers, through a voluntary process.

The *third option* would be to maintain the current situation, whereby each market player makes an independent assessment of the best mobile TV technology to use.

5.2. Authorisation regimes

Three main policy options are considered. In the *first option*, the Commission could make implementation of an authorisation regime for mobile TV mandatory in Europe. This could be done, for instance, through putting in place a pan-European authorisation for M-TV services. Such an authorisation, would be valid across the whole territory of the Union.

The *second option* would entail non binding, "soft law" measures, such as a Commission Recommendation, under which the Member States could be urged to provide for the implementation of a Common Framework for authorisation of M-TV services in order to establish a level playing field at European level. Such a Framework could cover various elements related to the authorisation process and to the rights attached to the authorisation, including issues related to network infrastructure sharing. This could be accompanied by support actions, such as encouraging the exchange of best practice between national authorities.

The *third option* maintains the current situation, where each Member state responds to the regulatory issues posed by M-TV in a non coordinated manner. It has to be recalled that all these options refer to authorisation in the context of the e-communications regulatory framework, i.e. for networks and services, content issues being dealt with in other regulatory actions.

5.3. Spectrum

Three main policy options can be considered. In the *first option*, the Commission could proceed to frequency allocation for mobile broadcasting in Europe (e.g., to provide a minimum of spectrum to allow for initial launch of service on a European scale). The *second option* entails the use of "soft law" instruments under which Member States should make available spectrum in harmonised bands for mobile broadcasting. The *third option* maintains the current situation. A combination of the previous options is also possible. The first two options are described hereafter in more detail.

– Under the *first option*, the Commission could proceed with specific **frequency allocations** for mobile broadcasting in Europe The objective would be to provide a minimum of spectrum to allow for initial launch of services on a European scale. This approach could for example include EU harmonisation of conditions of use of the L-band to accommodate the widest possible range of mobile broadcasting technologies and services. In this context, CEPT studies have already been initiated under an RSC Mandate[40].

The *second option* would entail adopting **"soft law" measures** to encourage the Member States to make available spectrum for mobile broadcasting in harmonised bands and/or common zones of spectrum as soon as it becomes available. This approach may be a suitable way to ensure a sufficient level of consistency between national policies regarding the implementation of mobile TV in the UHF band/digital dividend. This option is currently the subject of technical studies by the CEPT, also under an RSC mandate.

The issues described above have been the subject of separate consultations with:

– The Member States, via the RSPG Opinion on the introduction of multimedia technologies[41];

– The general public, via the consultation organised by the RSPG in the context of the above Opinion;

– Industry, as part of the consultations undertaken with the EMBC during 2006.

6. ANALYSIS OF IMPACTS

6.1. General considerations

The analysis of impacts of the above mentioned policy options takes into consideration economic, social and environmental aspects. Some general considerations as to the overall impact of M-TV are developed below. However, it

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40 With reference to the 2GHz satellite band a Commission Decision has recently been taken on harmonisation of the conditions of use to ensure flexibility, including access to satellite base mobile broadcasting technologies (http://ec.europa.eu/information_society/policy/radio_spectrum/docs/current/ong_consult/2ghz_mss/2ghzmss_cons_paper_fin.pdf)

41 RSPG 06-143 adopted on 25 October 2006.

should be borne in mind that due to the immature nature of this market some impacts are difficult to assess and predict.

Global market dynamics are also an important dimension to be taken into account. The brief description of the M-TV state of play in the main markets outside EU made in above shows that the situation is rather fluid. This means that a quantitative assessment of impacts on the global marketplace is not possible today. Qualitative assessments are also to be taken with some caution.

6.1.1. Economic Assessment

- Market players. In the M-TV context, this is a heterogeneous group including, among others, manufacturers, broadcasters and platform operators and infrastructure providers, mobile operators and service providers[42]. A successful uptake of mobile TV could influence positively their financial performance, in particular in light of the declining revenues from traditional services. For services of a nascent technology, it is important not to impose a disproportionate administrative burden on the sector. However, members of this group differ significantly in their assessment of the minimum necessary level of regulation.

- Economy as a whole. The successful introduction of mobile TV services could create new markets and contribute to employment and competitiveness. It would increase Europe's ability to compete in third countries. In addition, M-TV can contribute to the development of the local and regional economic fabric. The efficient application of ICT is a core element of the Commission's i2010 initiative.

6.1.2. Social Assessment

The positive economic effects related to the introduction of M-TV to the EU are expected to create positive social impact in terms of employment. Mobile TV can also contribute to the promotion of cultural diversity, as it provides the opportunity for new and diverse audiovisual content offers. Social benefits to consumers will have to be assessed once the services are more widely distributed and the market has reached a more mature stage.

6.1.3. Environmental Assessment

Some negative effects could be considered with reference to the possible installation of a greater number of radio masts in cases when there is a need to build new networks specifically for M-TV. However, as in the case of the roll-out of third generation mobile networks**,** network sharing solutions could be envisaged, subject to competition law, and it is not excluded that technology development will bring more efficient solutions in this field., which also coincides with environmental as well as business interests/

Concerning potential waste resulting from the introduction of new terminal equipment on the market, there are no elements indicating that the speed of adoption of Mobile TV could accelerate the already average short life-cycle of mobile terminal equipment (+/- 2 years).

[42] See Section 4.3 above.

6.2. Technology and standards

6.2.1. Technology Option 1 – Immediately Mandating a Single Standard for M-TV Broadcasting in the EU

The first scenario contemplates the possibility of **making one transmission standard for M-TV mandatory across the EU**. This would be done through binding acts such as a Regulation or a Commission Decision Obligation to use a specific standard would imply that M-TV systems using other standards would not be able to operate in the EU. Transition periods could be foreseen to solve legacy issues and allow for adaptation to the chosen standard.

Under the 2002 e-Communications framework a specific procedure is available to make the use of standards mandatory (Article 17 Framework Directive). This would require a two-step approach: first, a standard has to be included, upon consultation of the Communications Committee, in the official list of standards[43] and if an insufficient implementation of that standard is demonstrated across the EU it could justify making its implementation mandatory.

In the past, there were different measures which had the effect of establishing a common standard across the EU. In the case of GSM, a Directive reserved the spectrum bands for those services and other additional measures were introduced to ensure that only GSM-compliant equipment could the put on the EU market. Later on, when introducing third generation mobile communications or "3G" to the EU the Commission adopted a Decision setting out the legal framework for the coordinated introduction of UMTS services in the EU. The UMTS standard was not made mandatory but Member states were bound to attribute at least one licence to players operating in that standard in order to ensure seamless communications throughout the Union.

In the field of broadcasting the agreement over a single standard is very common. Today, for each digital broadcasting platform in Europe the **DVB standards** are used: DVB-S and DVB-S2 for satellite broadcasting, DVB-C for cable and DVB-T for digital terrestrial. On top of these transmission standards, there may be different technical solutions for elements like the Application Programme Interface and the associated facilities such as the Conditional Access. The transmission techniques however, are based on the corresponding DVB standards, everywhere in Europe. For this reason, the mobile television standard based on DVB, the DVB-H, would appear to be today the most suitable candidate to become a common standard across the EU as it is fully compatible with the DVB-T standard.

6.2.1.1. Arguments in favour

The worldwide success of GSM, which has given Europe a leading role in mobile communications, demonstrates the advantages of all players agreeing on the development of a new service over a single standard.

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[43] List of standards and/or specifications for electronic communications networks, services and associated facilities and services.

- *Economies of scale* - A single standard for mobile broadcasting across Europe could deliver significant **economies of scale**, thus providing benefits for industry as well as for consumers. The cost advantage thus achieved would also allow the EU market for M-TV to reach critical mass in a rather short time thus providing the conditions for Europe to remain competitive on global markets. A relatively early adoption of one technology can keep sunk costs low by avoiding further investment into competing technologies and allows investments to flow into other areas of business than standards competition.

- *Industry* - a common EU standard would provide all actors in the M-TV value chain (equipment manufacturers, application developers, broadcasters, content aggregators, mobile operators) with legal certainty concerning technological decisions. This would lead to further investment in equipment production and development of services and help achieve economies of scale for mobile television. Availability of equipment and services and decreasing prices due to economies of scale are expected to stimulate demand. Increased demand would allow M-TV equipment and services to attain critical mass. This will help to ensure the sustainability of services, assuming that consumers' interest in M-TV services maintains the level experienced in trials. Benefits are expected to be particularly relevant to equipment manufacturers which need economies of scale to produce terminals in sufficient quantities. A common standard would allow avoiding typical "chicken and egg" situations whereby operators cannot launch the services because of lack of equipment and manufacturers do not develop the terminals because of the small size of the market.

- *Consumers* – Consumer will have advantages in the first place in terms of cheaper terminals. Moreover, services will be available sooner and on wider scale. Consumers are likely to benefit from a common standard as it would imply greater interoperability of services and applications. Content creation is also likely to be easier and less expensive for a market where a common standard is in use. However, one should bear in mind that a single standard is not synonymous with universal receiver.

- *EU competitiveness* – a common standard across the EU is likely to increase EU competitiveness on the global marketplace.

6.2.1.2. Arguments against

- *Costs of migrating to a single standard* – mandating a single standard, at the exclusion of others, would imply costs for certain parts of industry to migrate to the new standard (legacy issues). As market players along the value chain have already started developing solutions based on different technologies, the imposition of a single standard would imply a loss in investment and additional, non negligible costs, in particular if a standard is chosen which is not widely used. These can however be kept low if migration happens at a relatively early stage of market development coupled with a relatively mature stage of technology development. In the case of Europe, while several technologies are present on the market, a growing number of industry players is engaging in one technology, which is DVB-H. Moreover, handset and component manufacturers are currently working on devices supporting multiple technologies. At the silicon

level[44], chips with multi-standard functionalities are already been developed and part of industry has invested considerably in this. It should be mentioned that DVB and DMB have set up cooperation on developing interoperable solutions for both technologies.

- *Effects on competition and innovation* – in the short term a single standard can encourage development of the market, but in the longer term a mandatory single standard could limit the emergence of other innovative technologies[45]. In the case of UMTS, there has nevertheless been further technological innovation e.g., the emergence of protocols such as HSDPA[46], HSPA[47] and LTE[48] based on UMTS. In addition, efficiency driven innovation is not affected by a single standard, and the cost advantage through avoiding sunk costs can help investments flow into other areas of innovation freeing up resource for companies to compete in other fields for example on the level of quality of service or price.

- *Industry* - Currently different market players favour different technologies for various legitimate reasons[49]. At the same time, there are also some signs of migrating towards DVB-H[50].

- *Administrative burdens and immediate compliance costs*: adherence to a single standard can present an administrative burden on Member States and industry at the start. However, its impact is reduced taking into account other aspects, such as authorisation regimes where costs are expected to be lower due to simpler procedures. Its absolute amount is difficult to quantify at this stage.

6.2.2. Technology Option 2 - Encouraging industry agreement on a common standard, with a common standard being made mandatory in the absence of agreement

In the *second option* the Commission would not take the decision to mandate a specific standard now but would take initiatives to encourage industry to find an agreement. This option would involve co-ordination and close work with industry for delivery of agreements on standards. Publication of one standard, such as DVB-H, in the Official Journal would give a clear signal to the industry of the need to make progress. The Commission would maintain the right to step in with legislative proposals in case this approach proves to be ineffective.

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44 Juniper Research p. 14.

45 Juniper Research, p. 13.

46 High Speed Downlink Packet Access.

47 High speed packet access.

48 Long Term Evolution.

49 EMBC members considered that "*At this early stage in the development of mobile broadcasting a pragmatic approach to issues of interoperability and harmonisation is considered preferable to the mandating of a single standard. As individual market players will select the technologies that they feel are the most appropriate to the needs of their markets, they will also determine what level of interoperability and harmonisation is necessary and desirable.*" EMBC recommendation report (http://www.ebu.ch/CMSimages/en/tec_embc_recommendations_tcm6-50233.pdf

50 http://www.ftd.de/technik/it_telekommunikation/:Wettbewerbsh%FCter%20Handy%20TV/199468.html

The objective of maximising interoperability should however continue to be promoted even when there is wide agreement on one transmission technology. This will enable to address legacy situations in the transmission layer, i.e. existing services using other transmission standards. Also for applications and service layers common implementations need to be encouraged to achieve maximum benefits for users.

6.2.2.1. Arguments in favour

This option would present the same or similar advantages as *Option 1* in terms of **economies of scale** and reaching critical mass, with some additional advantages.

- *Responsiveness to technological change* - This kind of process is likely to be more flexible and apt to respond to technological change in a timely manner than a government-led approach.

- *Industry support* - Likely to gain wide industry support, thus facilitating synergies and a smoother introduction of M-TV services in the EU.

- *Signalling might be sufficient*- to minimise legacy/sunk costs from investment into competing technologies and thus regulation with its administrative burdens can be avoided.

- *Administrative costs:* if consensus is reached administrative costs can be avoided, if not they are postponed.

6.2.2.2. Arguments against

- *Uncertainty about outcome and timing* – the main disadvantage of such a process would be delay on achieving certainty concerning the outcome in the immediate future. In the case of the mobile TV industry, stakeholders are not a homogeneous group which makes agreement or consensus more difficult. The EMBC experience in the area of standards and interoperability is an example of the difficulties that an industry-led approach can encounter.

6.2.3. Technology Option 3 – Maintain current situation

In this scenario, market players would decide about the technology solutions which better suits their business model on a case by case and individual basis. This option would leave it up to industry to develop the European mobile TV market on the basis of commercial considerations. The degree of interoperability between technologies and consumer devices will be decided by market dynamics. The major drawback of this option is that it entails the risk of creating **technology islands** across the EU and offerings of services and applications to EU consumers which are not interoperable.

6.3. Authorisation regimes

6.3.1. Option1: pan-European Authorisation for Mobile TV services

In this scenario, the Commission would propose introducing a **pan-European authorisation** for M-TV services. Such an authorisation would be valid across the

whole of the EU. Where a service has a pan-European scope or internal market relevance, one authorisation granted in one Member State should be valid throughout the EU and be a sufficient condition to provide the service in all Member States, once all the conditions and requirements for the provision of such a service have been agreed. This would considerably facilitate the access of such services to the market and reduce the administrative burden of obtaining authorisations.

At the moment, there are no mechanisms in place to grant pan-European authorisations. The issue, however, is going to be considered in the context of the current review of the e-communications regulatory framework.

6.3.1.1. Arguments in favour

- *Legal certainty* – a single authorisation with pre-determined characteristics and requirements which are the same across the whole of the EU would provide the highest degree of legal certainty to business.

- *Less red tape*- a single EU authorisation would simplify regulatory requirements for business in an area of new emerging services. This choice would be in line with the principles of administrative simplification and better regulation.

- *Internal Market* - Promote the development of services on a pan-European basis. A single authorisation model would encourage the development of M-TV services across Europe, which in turn would strengthen the Internal Market for these services. Potential for a more rapid opening up of trans-border content markets that serve similar linguistic communities and to help open up trans-border markets Arguments against

6.3.1.2. Arguments against

- *National nature of the TV market* - A single authorisation model for M-TV would be less suited for any peculiarities of national markets. For the time being M-TV is likely to remain predominantly a national market for consumers at least until copyright negotiations and content roaming agreements can open up the ability to watch home programmes abroad. These issues relate more to content rules than authorisation regimes.

6.3.2. Authorisation regimes Option 2: Common, non binding EU framework

Under this option, the Commission would work together with the Member States towards a **common framework for the authorisation of M-TV services**. Such a framework would leave the Member States flexibility as to the implementation but would provide some common features across the EU. This could be done, for instance, through a Commission Recommendation setting out common rules and may include provisions on licensing procedures, network infrastructure sharing and other conditions attached to the authorisation. Such a framework could be

accompanied by other measures such as encouraging the exchange of best practice between national authorities[51].

To facilitate deployment and to avoid inconsistent application between Member States, the Commission should monitor national developments in this area and provide guidance on the likely considerations for approval of infrastructure sharing in the M-TV market as it may be needed[52].

6.3.3. Authorisation regimes Option 3: status quo/do nothing

In this scenario the Member States will continue to develop national regulatory regimes for mobile TV independently and in an un-coordinated manner. Existing divergences will continue to exist and the regulatory landscape for the authorisation of mobile TV services will be characterised by 27 potentially different national regimes. In some cases, where M-TV is not addressed at the national level, a **legal vacuum** will persist. This would create a high degree of uncertainty concerning the applicable rules and the competent national authority.

Fragmentation in regulatory approaches would mainly have an effect in terms of discouraging business in more than one country or on a pan-European basis. Moreover, industry players operating M-TV in several EU Member States would face higher costs related to red-tape. Legal uncertainty would have the effect of discouraging investment and delaying the introduction of these services to the EU. This may ultimately result in missed business opportunities and a global loss of competitiveness for the EU on the global scene.

6.4. Spectrum

6.4.1. Spectrum Option 1: EU harmonised allocation of bands for M-TV

This approach – frequency harmonisation at EU level - would allow operators to offer services throughout the single market, early on if needed, and thereby benefit the achievement of critical market size and economies of scale.

This could be done on the basis of two complementary approaches aimed at having **harmonised frequencies of the L-band** opened up for mobile multimedia services in the short term and then, in the medium term, **harmonised UHF bands** which will be freed following the switchover to digital broadcasting ("digital dividend)[53]. In particular, this would address the need to achieve consistency between national policies regarding the implementation of mobile TV in the UHF band/digital dividend.

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51 As with the Mobile Satellite Services model currently under consultation. (http://ec.europa.eu/information_society/policy/radio_spectrum/docs/current/ong_consult/2ghz_mss/2ghzmss_cons_paper_fin.pdf)

52 EMBC Regulatory group report (http://www.ebu.ch/CMSimages/en/tec_embc_regulatory_report_tcm6-50234.pdf)

53 Subject to technical feasibility.

Such a harmonised allocation approach at EU level could be combined with pre-agreed authorisation/licensing modalities, in order to ensure the practical availability of these solutions in all Member States within relatively short time frames (e.g. by end 2008).

There should not be any negative impact on existing market participants as the suggested approach would in fact remove constraints on existing frequencies and their conditions of use without imposing any additional restrictions on existing users of these frequencies (L band) and/or rely on new frequency resources freed as a result of the digital switchover (UHF band).

6.4.2. Spectrum Option 2: "Soft Law" measures

This approach could provide most of the benefits of a "harmonised approach" under EU spectrum regulation, like *Option 1*, such as economies of scale and interoperability of devices, while maintaining a degree of flexibility to adapt to national constraints and specificities. It however presents the risk of being too slow and/or not sufficiently consistent across Member States to reach the objective of quick and cost-effective deployment. In addition, the technical feasibility is still under study, in particular in the UHF band.

6.4.3. Spectrum Option 3: status quo/do nothing

The current situation is characterised by a **high degree of fragmentation** of approaches between Member States, which in turn will prevent economies of scale, render interoperability more expensive, potentially increase the cost of deploying networks because of a lack of receivers' performance and **reduce the potential for large scale service penetration** in the short to medium term. These obstacles could deter investments and stifle innovation. In addition, the "status quo" has the disadvantage of maintaining the current regulatory uncertainty in those Member States which have not yet defined a strategy for the introduction of mobile broadcasting.

7. COMPARING THE OPTIONS

This section balances the identified policy options for each area - technology, authorisation regimes and spectrum - on the basis of the analysis carried out above.

7.1. Comparing options related to technology

A common standard across the EU would have advantages in terms of economies of scale, rapid take-up of M-TV, cheaper terminals and EU competitiveness. In reaching this objective, an industry agreement on a common standard, backed up by the threat of legislative action after a specified period of time as suggested in *Option 2*, would appear to be more proportionate than an immediate administrative decision (*Option 1*). A process involving industry would better adapt to technology change and is likely to reduce the impact of "migration costs" – i.e. the cost for industry players which have already invested in different standards or in multi-standard. Moreover, it would reduce administrative burdens for the EU and national authorities.

This could also be accompanied by support and promotion actions by the Commission and by elements of co-regulation if needed, such as publication of standards in the Official Journal. The Commission would regularly monitor progress made by industry in this respect and assess whether the progress towards a common standard is satisfactory[54].

Maintaining the current situation as described under *Option 3* does not seem to respond to the objective of creating a successful Internal market for M-TV in Europe. It entails a high risk of creating a fragmented M-TV market in Europe, where technology islands make it impossible to reap the benefits of the Internal Market, with the potential consequence of a loss of opportunities for industry and consumers and a loss of EU competitiveness on the global marketplace.

7.2. Comparing the policy options related to authorisation regimes

The approach described under *Option 1*, a pan-European authorisation for M-TV, would theoretically be the best option to ensure a level playing field across the EU. M-TV would be a good candidate as it is a new, emerging service which has not been regulated so far. However, at present there is no legal mechanism to put in place such a pan-European authorisation system. The Commission proposals in the context of the current Review of the e-Communications regulatory framework include, inter alia, provisions in that respect. However, if approved, such proposals would enter into force too late to be applicable to M-TV. Such an authorisation would not cover content.

Regulatory *Option 3 (do nothing)* seems to be the worse case scenario in terms of legal certainty and of creating a positive regulatory environment for M-TV services across Europe. A fragmented EU regulatory landscape, characterised by diverging national approaches and situations of legal vacuum has clearly little chance of being conducive to investment and innovation.

On balance, it would appear that *Option 2* whereby the Commission would set in place, through non-binding measures, a framework for the authorisation of M-TV services, is the best suited to attaining within a short time period the objective of a level playing field and ensuring legal certainty for M-TV services in Europe.

7.3. Comparing the policy options related to spectrum

An EU harmonised approach to the identification and allocation of spectrum bands for M-TV (*Option 1*) would have the advantage of providing EU-wide certainty as to spectrum availability for these services and hence offering the potential of tapping into a large market from the outset. This in turn would greatly strengthen the business case for M-TV as spectrum is a critical factor.

Where harmonisation is possible, action at EU level would appear to be the best solution, as it has been considered in the case of the L-Band. Where harmonisation may not be possible, at least during the initial phase, as in the case of the UHF band, then non-binding measures, such as "soft law" instruments (*Option 2*), would be

[54] See *infra* Section 8.

used in order to encourage the MS to take action in a coordinated manner. A *combination of Option 1 and 2*, depending on the spectrum bands concerned, would appear to best serve the objectives to be reached in the spectrum field, notably ensuring that suitable spectrum is made available across Europe for M-TV services.

8. MONITORING AND EVALUATION

Monitoring the rapidly evolving landscape of mobile TV services will take place, *in primis*, through the Commission services closely following market developments, commissioning independent studies, getting up to date with consumers' views through the *Eurobarometer* survey and with industry's views through regular consultations. The EMBC, as an umbrella group for industry, and the COCOM as a forum for Member States and regulatory authorities play an important role and feedback channel in this exercise. Regular consultation on spectrum policy aspects will continue to be carried out via he RSC and the RSPG.

Monitoring should continue beyond the take up of the services and include elements such as the distribution of users among age and social groups; the market structure and the proportion of cross border services.

Key elements to follow will include the development of standards by industry and the availability of spectrum, with special emphasis on avoiding fragmentation in the internal market for mobile TV services.

Concerning technology and standards, it will be monitored whether there is actual convergence towards a common standard in Europe. The evaluation of the success of this industry convergence will be carried out preceding any regulatory proposal for a mandating a standard in 2008.

The Commission will also review its strategy related to mobile TV as soon as the evolution of the above monitored factors show little or slow progress towards the achievement of the objectives set out in this document.

ANNEX 1 - IMPACT TABLES

Impact Table1 Technology Options

	Option 1: **One mandatory open standard for mobile TV in Europe**	**Option 2:** **Encouraging Industry agreement on a common standard, with a common standard being made mandatory in the absence of agreement**	**Option 3:** **Maintain current situation**
Economic			
Competitiveness of the industry (mobile TV value chain (mobile operators, broadcast network operators, content aggregators, content producers, etc)	+ SHORT term: + economies of scale (lower production costs for chips thus handsets, also other network equipment) + faster reach of critical mass -/- - LONG term: more difficult adaptation to technological change = does not in itself ensure an internal market in M-TV services (different spectrum, regulatory provisions) = does not in itself ensure interoperability (interoperability at the application and services layers is a complex matter in M-TV).	=/+ on the SHORT term: only moderate scale effects - reaching quickly critical mass and exploiting economies of scale is delayed +/= LONG term: better adaptation to technological change = does not in itself allow for an internal market in M-TV services =/+ questions of interoperability on the services and application layers can be addressed beyond the transmission technology layer.	- SHORT term: negative effect of fragmentation on market development and service take-up + LONG TERM: the market for technologies is allowed to mature and to select the technologically and economically best ones - fragmentation is likely to persist - most difficult to develop an internal market for M-TV services = interoperability can still emerge without one single standard, even without standards at all
Competitiveness of the other sectors of the economy or the economy as a whole	+ Increased EU competitiveness on global markets - However, the fact of not allowing other standards to	+ Increased EU competitiveness on global markets, reinforces European industry	- Fragmented market; EU industry unable to compete on global marketplace

	enter the EU market could lead to retaliation on key markets, such as China	+ Other standards are allowed to enter EU market. Potential advantages for EU industry/technology in other markets.	
Competitiveness of SMEs (e.g. content production)	+ content production is facilitated by same standard, as demand for content will probably be higher	+/= content production facilitated to the extent that agreement on standard is reached	- multiplicity of technologies makes content production more difficult/expensive
Competition	- short term: mandatory single standard would disadvantage a series of players who have started developing services and applications based on other technologies - even if on the long term one standard could encourage more competition among equipment producers, the above mentioned disadvantage may persist and lead to market distortions (and disadvantage European companies) + if acted quickly these legacy and sunk costs can be minimised	+ one standard encourages competition among equipment producers ++ sunk costs might be avoidable through signalling effect of option 2 thus creating more level field competition	+ as far as spectrum availability allows there is competition between technologies, there is more room for mobile operators to compete on different service offerings and select the business model that suits them best, providing greater value for the subscribers = The choice of operators is not likely to be determined by its superior quality to provide mobile TV services
Innovation	-/= Once a standard is mandated, at the exclusion of all others, incentives to research superior technologies may decrease = This does not seem to have been the case for UMTS. =/+ Innovation in other fields can more resources be	+ innovation of the transmission technology can continue for a longer period until market maturity =/+ Innovation in other fields can more resources be devoted to	+ more innovation friendly climate

	devoted to		
Public authorities	+ simplifies procedures - but increases administrative burdens in the beginning	+/= As in *Option 1* to the extent agreement on standard is reached.	- Multiple standards and technologies likely to increase administrative burden
Social			
Consumer prices	+ Cheaper handsets Not necessarily cheaper services and applications	++ As in *Option 1* but with more flexibility. Possibly better prices in the long term.	+ there is more room for mobile operators to compete on different service offerings and select the business model that suits them best, providing greater value for the subscribers
Consumer choice, quality of life	-less choice, not necessarily the highest possible quality of service + higher degree of interoperability in services and applications + continuity of service	=/- A consensus among industry is more likely to bring a compromise than the optimal technological solution for M-TV, which means lower than optimal service level for the consumer.	= The choice of operators is not likely to be determined by its superior quality to provide mobile TV services, thus there is not expected to be greater choice on mobile TV + The fact that the technology is allowed to mature would in future result in a better price/quality ration for consumers
Inclusion	- Risk to chose a technology which is not the most inclusive	-/= There is no guarantee that inclusiveness would be part of industry decisions	+ Disadvantaged groups are more likely to be served if there is a coexistence of different technologies with different characteristics (e.g. coverage capacities of remote areas, battery usage, different price/quality offerings)
Employment and	NI	NI	NI

labour market			

Key to impact of proposed changes: + positive overall impact; = same impact; - negative overall impact; NI impact not identifiable

Impact Table 2: Policy Options for Authorisation regimes

	Option 1: **one mandatory authorisation regime in Europe**	**Option 2:** **Common, non binding EU framework**	**Option 3:** **status quo**
Economic			
Competitiveness of the industry (mobile TV value chain (mobile operators, broadcast network operators, content aggregators, content producers, etc)	+/- Depending on the change in the level of requirements for authorisation; some countries and some operators would be advantaged, others disadvantaged compared to the situation before. Balance is unknown for the time being. + Economies of scale in authorisation for pan-European operators - Due to the time line in introducing EU-wide regulation (not yet available), economies of scale on authorisation might not be exploitable any more (too late)	+ Provide certainty while maintaining flexibility = A recommendation cannot guarantee uniform authorisation regimes throughout the EU + It can be implemented faster, thus positive impacts are likely	- Current situation entails legal uncertainty which is negative for investments. - differing authorisation regimes and requirements affect market players differently in countries EU-wide
Competitiveness of other sectors of the economy or of the economy as a whole	+ Legal certainty decreases risks of operations and service and product development + impact thought the whole value chain of M-TV	= NI	- legal uncertainty will also reflect on related industries
Competition	+ Relevant cost savings thus likely competitive	=/- If not all MS comply with the recommendation, competitive advantage is	- Differing authorisation regimes and requirements affect market players differently in countries

	advantage especially for Europe-wide operators.	less likely	EU-wide. That translates into competitive advantage for some.
Innovation	+ Legal certainty decreases risks of operations and service and product development	+ The national regulators are left with the flexibility to adapt the authorisation regime to the market specificities	- Higher regulatory risks deters from innovation, higher regulatory costs consume a part of resources that could be devoted to innovation
Public authorities	+/- Depending on the level of administration under the situation before harmonisation Where regulation has been absent, it would impose additional burden on PA	++ MS are free to weigh the costs and benefits of complying with the Recommendation	= on the short term - On the long term, countries with a legal vacuum will have to enact regulatory solutions, considering the negative impacts of uncertainty. In this case. Their administrative burden in the absence of without European coordination would be heavier.
Social			
Consumer safety and protection	+ + EU-wide assurance for consumers concerning their service provider through unified licensing control e.g. if also broadcasting license required; broadcasting regulation applies as well	+ Possibility for EU-wide assurance for the consumers concerning their service provider through some unified licensing control	=/- Short term impact very negative in countries with legal vacuum. Long term impact depends on the evolution of the licensing regimes in the MS.
Consumer prices	=/+ cost advantage of some operators might reflect in better pricing, but impact not identifiable	= See option 1 if there is a cost advantage for some operators	NI
Consumer choice, quality of life	= For the time being, consumers don't show much interest in pan-European services but this can change in future. impact not identifiable	= See *Option 1*	NI
Inclusion	=/+	=/+	-

	authorisation regime can take inclusion into account	recommended authorisation regime can take inclusion into account though no guarantee of implementation	Currently no specific provisions
Employment and labour market	NI	NI	NI

Key to impact of proposed changes: + positive overall impact; = same impact; - negative overall impact, NI impact not identifiable

Impact Table 3: Spectrum Options

	Option 1: **mandatory frequency allocation for mobile broadcasting in Europe**	**Option 2:** **Soft law instruments under which Member States should make available spectrum in harmonised bands for mobile broadcasting.**	**Option 3:** **status quo**
Economic			
Competitiveness of the industry (mobile TV value chain (mobile operators, broadcast network operators, content aggregators, content producers, etc)	+ The sector overall would gain international competitiveness as it should allow "champions" to accelerate roll-out on pan-European basis. =/- For the + impact to be secured, this option should be coupled with a measure on pan-EU authorisation.	+/= Competitive advantage of the EU industries dependent on the level and speed of implementation =/- See option 1 point 2	- Difficulty to access spectrum that is suitable for the best technology will result in adopting second best business models =/- No costs advantage for those operators implementing pan-European services =/- No economies of scale for equipment producers
Competitiveness of the other sectors of the economy or the economy as a whole	- / = There might be opportunity costs involved for alternative use of the same spectrum. Although this is unlikely due to the relative underuse of the suggested L-Band, it might however deprive other sectors partly from access to valuable resource. Impact is dependent on the characteristic of the economy in the MS	+ It leaves flexibility for the MS to find the solution that best suits the local economy, to the expense of reduced economies of scale.	=/+ Unclear benefits. The "status quo" constitutes a de facto advantage for DMB systems, the only standard which benefits from an existing allocation to DAB systems in the L-Band.
Competition	+/- Economies of scale thus competitive advantage for operators active in several EU countries and for (network and terminal)	+/- Economies of scale not certain to be realised	= No cost advantage for those operators implementing pan-European services. As explained under previous criterion, potential

	equipment producers + Potentially lower entry barriers for new entrants		competitive advantage to DAB-based systems because of the existing allocation to DAB in L-Band (lack technology neutrality)
Innovation	Favours early deployment and economies of scale		Risk to stifle innovation by a lack of availability of spectrum in major markets
Public authorities	- There is increased administrative burden at transition		
Social			
Consumer prices	=/+ Terminal equipment might become cheaper quicker.		- If the non-accessibility of the most appropriate spectrum band leads to second best business models, consumer prices will be higher. Risk of market failure.
Consumer choice, quality of life	+ Offers a wider range of service coverage possibilities from the outset (urban and rural via satellite)		=/- If the non-accessibility of the most appropriate spectrum band leads to second best technological choice and business model, quality might suffer.
Inclusion	NI	NI	NI
Employment and labour market	NI	NI	NI

Key to impact of proposed changes: + positive overall impact; = same impact; - negative overall impact; *NI impact non identifiable*

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