



## Assessment of spectrum needs in France by 2020



### DGMIC, DGCIS

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## SYNTHESIS

Whether related to audio-visual, telecommunications or emergency and safety services, consumption habits in France have undergone profound changes, driven by the rapid pace of technological progress.

In the **audio-visual** field, the service is changing under the impact of digital technology, both in terms of the increasing number of channels (made possible by the transition to Digital Terrestrial Television (DTT)) as well as the wealth of content (High Definition television - or HD TV, Ultra HD TV, 3D services, etc.) or the different types of services (on-line or on-demand services, interactive services, mobile services...).

There is also the end of the hegemony of terrestrial broadcasting, with a steady increase in the consumption of audio-visual services through new platforms, and particularly strong growth in televisions connected to a broadband or superfast broadband platform. The development of fibre network should further increase the penetration rate of IP television among French households. However, it does not seem possible that alternative modes of reception can marginalise DTT by 2020, given that the cost of migration to another technology appears prohibitive. Thus, DTT in this context will remain an essential platform for television broadcasting.

Furthermore, the radio will not escape the natural evolution of content digitisation. By 2020, this wave could see the start of Digital Terrestrial Radio (DTR). Thus, although the existence of a viable technical and economic model for the DTR is still under investigation in France, additional capacity of spectrum frequency should be put aside for the possibility of such migration. Indeed, its implementation requires a long period of simulcast of programs on analogue and digital networks.

In the field of **mobile radio communications**, the past two years have witnessed a considerable growth in data traffic, especially with the increasing popularity of smartphones. This growth will accelerate in the coming years with their widespread use and the rise of smart devices and terminals dedicated to Internet use, such as touchpads. Like the transformation experienced by fixed networks a decade ago, mobile networks have in turn seen the rapid development of the uses of mobile data and multimedia (web, music, videos) and the emergence of new services available on the move (mobile payments, geo-location, online games, social networks, cloud computing).

In addition, the French National NGA Programme (Programme National Très Haut Débit), which went public in June 2010, is itself part of a goal of deploying high-speed networks in France to cover 70% of the population by 2020 and 100 % by 2025. Mobile networks should contribute to the high-speed network coverage in France, especially in rural areas.

The **emergency and security networks**, traditionally reserved for use by voice and short messages on low-speed network, are now facing a growing demand for so-called broadband services, which are highly capacity-consuming (e.g. the reconstruction of a professional working environment in vehicles or the uploading of field data in real time).

For all the services analysed, the explosion of new uses is now real and measurable. However the expected level of consumption in the next decade is the subject of a number of uncertainties. In total, two key scenarios for audio-visual uses, three for electronic communications and two for the emergency and security services are considered in 2020 horizon to describe the range of possibilities.

- **Key scenarios for audio-visual uses:**

The scenarios for audio-visual uses are focused on the evolution of DTT service, since spectrum needs depend much less on the demand related to the take-off of personal mobile television (PMT) and DTR.

These scenarios are based on the increasing popularity of HD TV and the ability of a multiplex to accommodate six HD channels by 2020, through the coupling of the DVB-T2 broadcasting standard with two possible changes of compression standard: optimization of the MPEG-4 coding or the migration towards HEVC. They also assume a relatively stable market in television advertising, and consider that the emerging uses such as on-demand audio-visual media service, 3D, internet-connected TV, are not spectrum-consuming if accompanied by a more flexible management of spectrum within each multiplex.

- **Migration of DTT to all HD service**

Spectrum requirements for migration of current DTT (30 channels) to all-HD using applicable technologies in households in 2020 amount to about 245 MHz (75 MHz fewer than the currently allocated resource). In case of favourable cross-border negotiations, this need could fall to about 170 MHz (150 MHz fewer than presently allocated). However it seems difficult to achieve the objectives of these cross-border negotiations by 2020.

- **Migration to an enriched HD DTT service**

The spectrum requirements in the event of migration to an enriched HD DTT service in 2020 (which is equivalent to about forty channels HD DTT) amount to about 320 MHz (all of the currently allocated resource). However, if cross-border negotiations are optimised, this need could fall to about 245 MHz (75 MHz fewer than presently allocated).

- **Key scenarios for electronic communications uses:**

The key scenarios for electronic communications uses are based on the deployment of LTE mobile networks with a spectral efficiency of 3.3 times the spectral efficiency of 3G today. The scenarios foresee a continuation of frequency bands for 3G but a withdrawal of 2G networks. Finally, all scenarios include the use of femtocells or Wi-Fi to migrate part of the mobile traffic to fixed networks (between 20% and 40% of traffic).

As a precaution, the evaluations are performed without taking into account the frequency bands above 3 GHz because there is not so far any equipment commercially available to provide a mobile service.

- **Continuity of current growth in mobile usage**

If the current growth of mobile usage is sustained over time, spectrum requirements for services using the frequencies of electronic communications are compatible with the resources allocated or about to be allocated to mobile operators today.

- **Emergence of a wireless hyper connectivity**

In the event of widespread wireless hyper connectivity, an additional allocation of 450 MHz for the services using electronic communications frequencies is required. In this context, the more operators will have frequency bands below 1 GHz, the better the quality of service provided to consumers, particularly because of the quality of indoor penetration of these frequencies. The width of additional spectrum needed in this scenario is close to the amount of additional spectrum to be allocated to electronic communications as part of the "National Broadband Plan" introduced in early 2011 in the United States, which plans to allocate an additional 500 MHz to electronic communications by 2020.

- **Fixed-Mobile substitution in rural areas**

The use of a mobile network to deliver a fixed superfast broadband access in rural areas would require additional spectrum allocation below 1 GHz frequency to services using electronic communications frequencies in 2020. The additional amount needed ranges from 100 MHz, if the already allocated frequencies are used for superfast broadband access service, up to 200 MHz if the frequencies for the superfast broadband access service should be separated from the frequencies allocated to mobile networks.

- **Key scenarios for emergency and safety use:**

- **Use of electronic communications networks open to the public for the provision of broadband services**

Emergency and security services are already using small-scale electronic communications networks open to the public. An "industrialisation" of such use that would ensure the confidentiality of exchanges and allow temporary pre-emption of capacity if necessary could be a solution to meet the requirements without increasing the reserved spectrum.

- **Deployment of own network to provide broadband services**

The deployment of a dedicated infrastructure to meet the specific frequency of emergency and security services requires an allocation of 20 MHz in addition to the band currently used for narrowband services.