

4  
Part

## CHAPTER 5

# Scarce resource regulation

One of ARCEP's main functions is to allocate numbering and spectrum resources to operators. This activity accounts for more than half of the decisions adopted by the Executive Board.

The freedom that wireless or radio technologies offer depends on the availability of physically limited frequency resources. Sharing is thus a key principle governing spectrum management: dividing the spectrum into bands dedicated to certain applications or, depending on the case, having the same band shared by several applications which technical studies have deemed compatible.

On the matter of numbering, ARCEP is responsible for establishing the national numbering plan and for assigning operators the numbering resources they need to exercise their activity<sup>1</sup>.

<sup>1</sup> - CPCE Articles L.36-7 and L.44.

This responsibility concerns the assignment of telephone numbers that can be used on the public switched telephony network (geographic, non-geographic, short and special numbers and prefixes), as well as the allocation of addressing resources for data networks and mobile numbers, for instance.

Each allocation of a block of numbers and award of a spectrum licence results in an individual decision adopted by ARCEP, as is the case with GSM (2G) and UMTS (3G) mobile licences.

The Authority is also responsible for collecting the taxes and fees required to be paid for the use of scarce resources: spectrum licence-holders are required to pay a fee for access to and management of the frequencies they use, while operators are subject to a tax on the use of the numbers they have been assigned. The totality of these sums is deposited into the State's general budget.

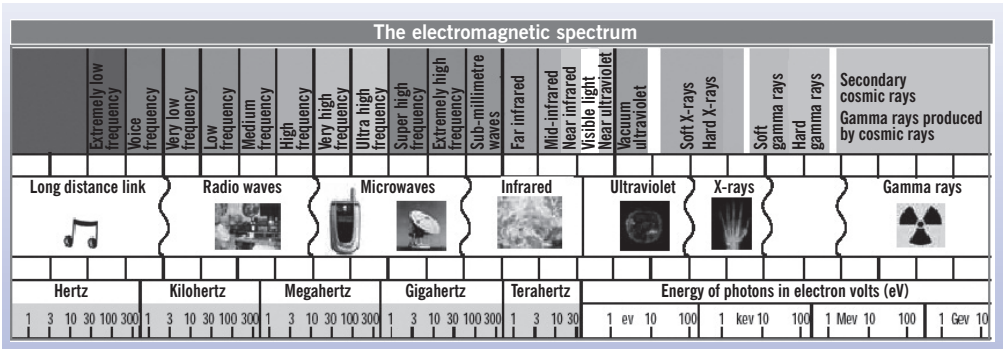
ARCEP is also responsible for ensuring the proper use of these numbers and the operational implementation of the structures needed to ensure this function (files, databases).

And, finally, the Authority monitors the technical and regulatory work being performed in Europe and internationally in the areas of numbering and spectrum.

## A. Spectrum management

The introduction of wireless technologies is based on the availability of physically limited spectrum resources. The increase in demand means that the regulator of this resource is confronted with a situation of potential scarcity that it must take into account when setting the terms for accessing the radio spectrum.

### Which frequencies for which types of activity?



### 1. Spectrum management at the national, European and international level

2 - Radio spectrum policy group, responsible for advising the European Commission on frequency policy matters, composed of a high level government expert from each of the Member States and a high-level Commission representative.

3 - Radio spectrum committee, made up of the Commission and the Member States, and responsible for measures aimed at achieving technical harmonisation of the terms that apply to the availability and efficient use of spectrum in the European Union.

Frequency planning for France, for which the Authority is responsible, is conducted within an international, European and national framework.

Global rules are set by the International Telecommunication Union Radiocommunication sector, or ITU-R. Their application in Europe is governed by the CEPT (European Conference of Postal and Telecommunications Administrations) and by the European Commission, assisted by the Radio Spectrum Policy Group (RSPG)<sup>2</sup> and the Radio Spectrum Committee (RSCoM)<sup>3</sup>.

At the national level, France's National Frequency Agency, ANFR, coordinates management of the different wireless spectrum allocators (ARCEP, CSA or the Ministry of Defence).

The Authority is involved at all three of these levels in working groups and conferences dealing with matters that concern the Authority, thereby enabling it to contribute to the rules governing frequencies.

In concert with ANFR, the Authority continues to contribute to the CEPT Electronic Communication Committee's (ECC) frequency harmonisation efforts – operating, in certain cases, under a mandate from the European Commission, notably in the areas of technical harmonisation of the terms governing spectrum availability and its efficient use.

In 2008, the ECC adopted two decisions:

- ◆ the first concerned the harmonised use of spectrum by intelligent transport systems operating in the 5 875-5 925 MHz frequency band for road safety applications;
- ◆ the second concerned the harmonised use of embedded GSM mobile systems onboard seafaring vessels in the 900 and 1 800 MHz band.

In addition to these decisions, the ECC also devoted its efforts to the mandates issued by the European Commission, notably on the configuration of the 790-862 MHz band with a view to using it for mobile systems, and on the definition of the minimum technical requirements for their implementation (second digital dividend<sup>4</sup> mandate). The work performed by the ECC also concerned spectrum harmonisation for broadcast auxiliary services, mobile communication systems onboard ships, anti-collision radar systems for vehicles and ultra wideband technology.

4 - Cf. Part 1, Chapter 1, A..

The Authority has monitored and contributed to these very important endeavours, which result in technical measures, notably those aimed at achieving harmonised spectrum allocation and use. These measures can serve as points of reference for the European Commission, through the work performed by RSCoM when drafting Community decisions that ARCEP will, for the most part, be responsible for implementing.

In 2008, the Authority implemented Community decisions concerning:

- ◆ terrestrial access systems in the 3 400-3 800 MHz band;
- ◆ intelligent transport systems in the 5 875-5 905 MHz band;
- ◆ GSM systems onboard aircraft in the 1.8 GHz band;
- ◆ short range devices.

In tandem with ANFR, the Authority was also involved in the work performed by the ECC group responsible for wireless spectrum engineering. Work is currently underway on several issues:

- ◆ additional spectrum needs for GSM-R<sup>5</sup> and RFID<sup>6</sup>;
- ◆ the definition of technical and regulatory terms for implementing the concept of WAPECS<sup>7</sup> and flexible frequency bands;
- ◆ review of the terms for spectrum sharing between mobile satellite systems at 1.6 GHz;
- ◆ the introduction of complementary terrestrial components into mobile satellite systems.

5 - GSM-R (Global System for Mobile communications – Railways) is an international mobile communication standard developed specifically for railways

6 - RFID (Radio Frequency Identification) is a radio-frequency based ID system that uses tags which transmit radio waves.

7 - WAPECS (Wireless Access Policy for Electronic Communications Services) was developed by the Radio Spectrum Policy Group, RSPG.

The Authority is also actively monitoring the work being done on:

- ◆ introducing new ultra wideband technologies;
- ◆ cognitive systems and software radio;
- ◆ new approaches to achieving more flexible management of the radio spectrum;
- ◆ terms for allowing short-range devices to access new bands.

## 2. Developing mobile broadband for all: 3G

### Background

Orange and SFR were both awarded a UMTS (3G) licence on 18 July 2001, and launched their services commercially in late 2004. Bouygues Telecom, which was awarded a 3G licence on 2 December 2002, was to have achieved at least 20% coverage of the population by April 2007. Noting that it had failed to do so, ARCEP issued Bouygues with an official order to comply with this objective by the end of 2007, which it did.

What are the operators' coverage obligations? They must cover:

- ◆ 98% of the population by 21 August 2009 for Orange;
- ◆ 99.3% of the population by 21 August 2009 for SFR;
- ◆ 75% of the population in December 2010 for Bouygues Telecom.

As of 31 December 2008, Orange and SFR covered more than 70% of the population with 3G services. In spring 2009, Bouygues Telecom announced that it had achieved 72% coverage of the population.

### 2.1 The fourth 3G licence and the 2.1 GHz frequency band

#### ◆ In 2007

8 - ARCEP  
Decision no. 07-0177  
of 20 February 2007.

In light of the interest that the sector's players expressed in the award of a fourth 3G licence in France, during a public consultation held in October 2006, ARCEP adopted a decision<sup>8</sup> on 20 February 2007 which it transmitted to the Minister responsible for industry, proposing the methods and terms of award for a UMTS standard 3G mobile licence in Metropolitan France, in the 2.1 GHz frequency band.

On 8 March 2007, the minister launched a call for candidate submissions for the fourth licence to which only Free Mobile, a wholly owned subsidiary of the Iliad group, responded.

To be selected, candidates were required to satisfy the selection criteria stipulated in the call for submissions, notably the ability to pay the fixed portion of the licensing fees, under the terms defined by law<sup>9</sup>, namely a fee "of € 619,209,795.27 to be paid on 30 September of the year the licence is issued, or upon delivery of said licence should it occur later than 30 September".

9 - Cf. amended Article 36  
of the Finance Act  
for 2001.

On 9 October 2007, the Authority rejected the Free Mobile application on the grounds that it did not meet the selection criteria<sup>10</sup>.

10 - ARCEP Decision  
no. 07-0862  
of 9 October 2007.

#### ◆ In 2008

To bring greater flexibility to the awards procedure for the fourth 3G licence, the Law of 3 January 2008 for the development of competition for the benefit of consumers (also known as the "Chatel Act")<sup>11</sup> provides for the ability to modify the financial terms set by the Finance Act.

11 - Cf. Article 22 of Law  
no. 2008-3 of 3 January  
2008 (Law for the  
development of  
competition for the benefit  
of consumers),  
JO of 4 January 2008.

On 13 June 2008, at the government's request, the Authority launched a broad public consultation whose purpose was to "determine the most appropriate terms and conditions" for allocating available frequencies and "assess the respective advantages of a scheme for allocating all frequencies to a new entrant and an

alternative scheme for allocating several blocks<sup>12</sup>. The responses to this consultation<sup>13</sup> confirmed the interest that exists in the sector for gaining access to 2.1 GHz frequencies through an awards procedure that would give priority for all or a portion of the available spectrum to a new entrant, under similar terms to those applied during previous calls for candidates.

#### ◆ In 2009

In presenting the government's strategy for high speed and ultra high-speed mobile on 12 January 2009, the Prime Minister approved the scenario whereby the spectrum would be divided into several blocks, with one of them being reserved for a new entrant, i.e. an entity other than Bouygues Telecom, Orange or SFR. All of the players, including the new entrant, could then compete for the two remaining blocks.

Following the parliamentary debate that took place in the National Assembly on 5 February 2009 and discussions in the Senate on 11 February 2009, the government announced the new financial terms for the block of spectrum set aside for a new entrant, in other words a set fee of around € 209 million for a 20-year duration, in addition to a variable annual fee equal to 1% of the revenue generated by the use of these frequencies.

Based on these elements, in early March 2009 the Authority proposed to the Minister responsible for electronic communications that a new call for candidates be launched for the allocation of the remaining 2.1 GHz frequencies in Metropolitan France.

This procedure will take place in two stages:

- ◆ the first phase will concern the allocation of a 5 MHz duplex to a new entrant, according to the financial terms set by the government in early 2009;
- ◆ the second phase will involve the allocation of the 2.1 GHz frequencies that are still available once the first phase has been completed. Depending on the results of the first phase (i.e. whether or not the 5 MHz duplex has been allocated), the second phase could involve the allocation of two or three blocks of spectrum.

The second phase will not begin until the first phase is complete, thus allowing the candidates to know exactly how many blocks are available. This phase will be open to all candidates, regardless of whether or not they already hold a spectrum licence for the 2.1 GHz frequency band in Metropolitan France.

The selection criteria for the entire procedure are similar to those applied during previous calls for UMTS candidates, with applicants able to go beyond the minimum criteria by making additional commitments, notably with respect to coverage. The criteria include the coherence and feasibility of the project, the candidates' financial capacity, openness to MVNOs, etc. The selection criteria pertaining to candidates' willingness to host MVNOs was stipulated to take account of the work performed by the Authority and the Competition Authority in 2008<sup>14</sup>.

12 - Available on the ARCEP website : [http://www.arcep.fr/fileadmin/uploads/tx\\_gspublication/consultation-pub-2GHzvf.pdf](http://www.arcep.fr/fileadmin/uploads/tx_gspublication/consultation-pub-2GHzvf.pdf)

13 - Available on the ARCEP website: [http://www.arcep.fr/uploads/tx\\_gspublication/synt-consult-3g-2ghz-220908.pdf](http://www.arcep.fr/uploads/tx_gspublication/synt-consult-3g-2ghz-220908.pdf)

14 - See Part 4, Chapter 4, D.3.

### Rights and obligations of a possible fourth mobile operator

The allocation of available 2.1 GHz frequencies confers certain rights on their recipient, including:

- ◆ access to a 5 MHz duplex in the 900 MHz band (associated with payment of an identical fee to that being paid by existing operators);
- ◆ roaming rights on one of the three GSM mobile networks for a duration of 6 months (provided the operator has already covered 25% of the population for voice services);
- ◆ rights of access to the three other GSM mobile operators' sites, when they are used for 3G, to collocate 3G equipment.

The operator is subject to coverage obligations: 25% of the population of Metropolitan France must be covered within two years, and 80% within eight years.

### 2.2 Reuse of 900 MHz band for 3G

The reuse of the 900 MHz frequency band, which was initially assigned to GSM (2G) systems, is a major asset for speeding up the deployment of 3G to the entire population. The propagation properties of the 900 MHz frequency band in fact make it possible to cover the whole country, and particularly rural zones, more efficiently than with the 2.1 GHz frequency band allocated to UMTS (3G standard) – thereby helping to reduce the number of towers that need to be installed.

The calls for candidates in 2000, 2001 and 2007 for the introduction of the 3G in France thus provided for the possibility of reusing the 900 and 1800 MHz frequencies for 3G to facilitate its deployment across the country. They specify that the use of these frequencies for 3G systems was correlated with the principle of equal access to spectrum for all 2G and 3G operators, including a new entrant. The principles governing the reuse of these frequencies were included in the three mobile operators' GSM licences in 2002, and the terms of their implementation were defined when the licences came up for renewal.

On 5 July 2007, ARCEP published guidelines for the reuse of the 900 and 1800 MHz frequency bands for 3G<sup>15</sup>. These guidelines state that 2G-3G operators wanting to reuse the 900 MHz frequency band for delivering 3G services could do so starting in 2008. They also state that a possible new 3G operator with a licence to the 2.1 GHz band would have access to a UMTS carrier (or 5 MHz) in the 900 MHz band.

In February 2008, ARCEP specified the terms for implementing these guidelines. It also made changes to the SFR<sup>16</sup> and Orange<sup>17</sup> licences, at the operators' request, to allow them to deploy UMTS technology in the 900 MHz frequency band in Metropolitan France. When queried by ARCEP on this matter, Bouygues Telecom indicated that it would also be deploying UMTS in the 900 MHz band before the end of 2009, and that it would request an amendment to its decision in due course.

15 - <http://www.arcep.fr/fileadmin/reprise/dossiers/umts/modal-orient-umts-900-fev08.pdf>

16 - ARCEP Decision no. 08-0228 dated 26 February 2008 amending Decision no. 06-0140 authorising SFR to use spectrum in the 900 MHz and 1800 MHz frequency bands to establish and operate a radio network open to the public.

17 - ARCEP Decision no. 08-0229 dated 26 February 2008 amending Decision no. 06-0239 authorising Orange France to use spectrum in the 900 MHz and 1800 MHz frequency bands to establish and operate a radio network open to the public.

### Implementing ARCEP guidelines

In accordance with the guidelines published by ARCEP on 5 July 2007, a possible 3G new entrant with a licence to the 2.1 GHz band would also be given access to a UMTS carrier in the 900 MHz band, after existing 2G operators relinquish a portion of this spectrum. The target configuration for the allocation of 900 MHz band spectrum would thus be as follows:

2x9.8 MHz	2x10 MHz	2x5 MHz	2x9.8 MHz
Bouygues Telecom	Orange France	4 <sup>th</sup> operator	SFR
880.1 MHz	889.1 MHz	899.9 MHz	904.9 MHz
925.1 MHz	934.9 MHz	944.9 MHz	949.9 MHz
			914.9 MHz
			959.9 MHz

In the situation where a licence in the 2.1 GHz band is awarded to a fourth 3G mobile operator in Metropolitan France before 30 June 2010, the following must occur:

- ◆ Bouygues Telecom must relinquish 2 x 4.8 MHz outside very densely populated areas, within 18 months of the licence being awarded to the fourth operator;
- ◆ Orange France and SFR will relinquish 2 x 2.4 MHz in very populated areas by 31 December 2012;
- ◆ Orange France allocations are moved by 200 kHz towards the bottom of the band to make a block of 2 x 5 MHz available to the fourth operator.

In addition, Orange France and SFR must not create interference that would be prejudicial to this fourth operator, when using allocated spectrum that is adjacent to the fourth operator's frequencies.

If no licence is awarded to a 3G new entrant in the 2.1 GHz band before 30 June 2010, the operators will not be required to relinquish this spectrum in the 900 MHz band.

### 2.3 A portion of the digital dividend allocated to electronic communications

The switch from analogue to digital television broadcasting will free up a sizeable quantity of spectrum: an increase in available resources referred to as the digital dividend. This opportunity holds major economic and societal implications for the coming years.

Fewer frequencies being used means more programmes can be offered, along with high-definition channels. But because of their excellent propagation properties – long range and good indoor penetration – the newly liberated frequencies also constitute a highly coveted resources for enabling the delivery of high-speed access for all to the mobile Internet, and so to helping eradicate the digital divide.

Work is being performed in France under the aegis of the Digital strategy committee (*Comité stratégique pour le numérique*)<sup>18</sup>, in accordance with its mandate from the President of the Republic.

The issue of reallocating digital dividend spectrum gave rise to a national debate whose significance was underscored by Senator Bruno Retailleau, Chairman of the parliamentary committee on the digital dividend, in a report submitted to the

**18 -** The Digital strategy committee was created in May 2006 at the request of the President of the Republic, to coordinate and steer the efforts being undertaken towards the digitisation of terrestrial TV broadcasting and the full switch-off of analogue programming, and the reuse of the spectrum that is freed up in the process. Its acting chairman is former ART Chairman, Jean-Michel Hubert.



Senate Commission for Economic Affairs<sup>19</sup> to which the Authority made a substantial contribution through the publication of several informative documents, including:

- ◆ an issue of its newsletter<sup>20</sup>;
- ◆ a report on assessing the value of the digital dividend, produced by the firms Analysys and Hogan & Hartson in May 2008<sup>21</sup>.

All of these works revealed that access to the UHF band – 470-862 MHz – is critical to achieving the nationwide deployment of ultra high-speed mobile.

On 16 November 2007, the World Radiocommunication Conference (WRC) opened up the possibility of using a portion of the UHF band for telecommunications services, and identified the 790-862 MHz sub-band to this end, for Europe.

On 20 October 2008, when presenting the “*France numérique 2012*” (Digital France 2012) plan, the Secretary of State to the Prime Minister responsible for forward planning and development of the digital economy announced the government’s intention to allocate these frequencies to mobile services.

After consultation with the parliamentary committee on the digital dividend, which issued its opinion on 10 December 2008, the Prime Minister approved, in the Order of 22 December 2008<sup>22</sup>, the national plan for reusing digital dividend frequencies which includes allocating 72 MHz of the 790-862 MHz sub-band to mobile electronic communication services.

**2.4 The transition to ultra high-speed mobile (800 MHz and 2.6 GHz)**

A central thrust of the development of mobile services is the accelerated shift to high-speed solutions. The deployment of 3G networks in France enabled the rollout of new data services which are spurring a change in users’ behaviour patterns: enhanced services such as access to the Internet and multimedia services which are gradually coming to complete voice and text messaging services.

To allow these new services to develop and to satisfy users’ growing capacity needs over the next decade (4G using LTE for ultra high-speed services), new frequency bands will be required.

The “*France numérique 2012*” (Digital France 2012) plan, which was made public on 20 October 2008 by the Secretary of State to the Prime Minister responsible for forward planning and development of the digital economy, specified that the 800 MHz band would enable “*nationwide coverage of new generation ultra high-speed fixed and mobile networks*” and that the allocation procedure for these bands would begin by the end of 2009. He also requested that ARCEP set the terms for allocating the 2.6 GHz frequency band in 2009.

On 12 January 2009, the Prime Minister unveiled France’s overall spectrum strategy, setting the goal of launching the procedure for allocating the 800 MHz and 2.6 GHz bands before the end of 2009.



19 - Bruno Retailleau, briefing on behalf of the Senate Commission for Economic Affairs, on the current state and future outlook for ARCEP, 2007.

20 - La Lettre de l'Autorité no. 58, November/December 2007, available at: [www.arcep.fr](http://www.arcep.fr)

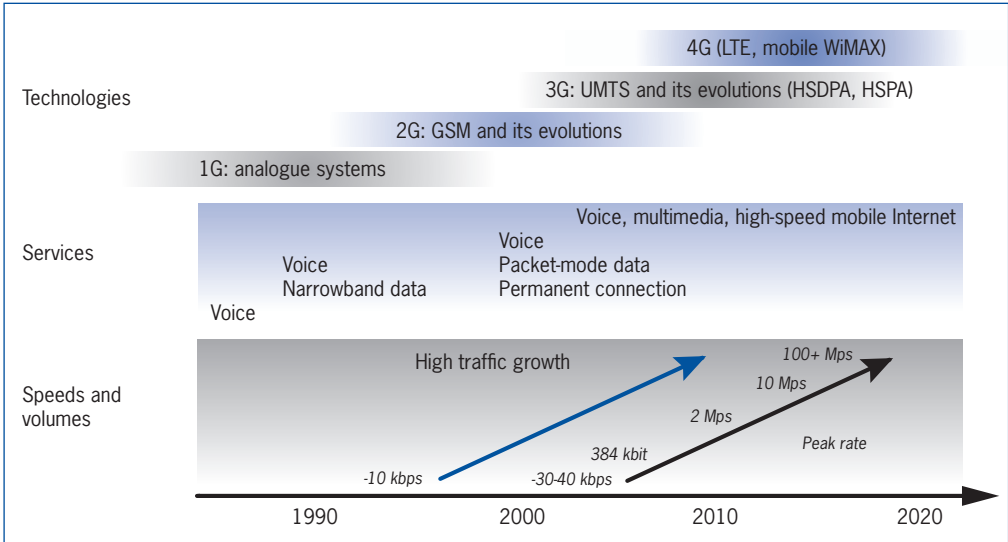
21 - Available in the appendix and online at: [www.arcep.fr](http://www.arcep.fr)

22 - Order of 22 December 2008 approving the national plan for terminating analogue broadcasting and switching over to digital, JO of 23 December 2008.



The challenge is to enable the introduction, as soon as possible, of ultra high-speed mobile services in the 2.6 GHz and 800 MHz (4G) bands, which will take the place of UMTS (3G) over the next decade. The goal is to provide players with maximum visibility on all of these frequencies and to stimulate investments in the deployment of new ultra high-speed mobile networks.

### From analogue to 4G: which technologies for which services?



With this in mind, on 5 March 2009 ARCEP launched a public consultation to obtain feedback from all of the stakeholders on the methods to be used for awarding spectrum licences:

- ◆ in the low frequency bands ranging from 790 to 862 MHz (referred to as the “800 MHz” band), which come from the digital dividend, and are well suited to achieving broad national coverage as well as indoor coverage;
- ◆ in the high frequency band, ranging from 2500 to 2690 MHz (referred to as the “2.6 GHz ” band), to deliver the capacity needed to route traffic in densely populated areas.

The goal is to provide players in the French market with enough clarity ahead of time to assist their positioning in the international market. A great many other countries are also in the process of identifying frequency bands that will enable the deployment of ultra high-speed mobile solutions.

The 2.6 GHz band has already been allocated in the United States, Japan, Hong Kong, Norway and Sweden, while the 800 MHz band has been identified for ultra high-speed mobile in Finland, Sweden and Switzerland, and more recently in the UK and Germany.

### 3. Wireless local loop/WiMAX

#### Definitions

The Wireless Local Loop (WLL) is a technology that uses a wireless communications link to connect fixed or roaming subscribers to an Internet access point using a device equipped with an antenna.

WiMAX (Worldwide Interoperability for Microwave Access) is the common name given to the IEEE's (Institute of Electrical and Electronics Engineers) 802.16 standard. It corresponds to using a wireless, long-range broadband transmission technology chiefly in point-to-multipoint architectures, and notably in the 3.4-3.6 GHz frequency band. This standard is being developed by the WiMAX Forum whose role includes certifying the interoperability of IEEE 802.16 standard equipment.

#### 3.1 Reminder of operator obligations

Over the course of summer 2008, ARCEP performed an audit of the rollout obligations for public wireless local loop networks in the 3.4-3.6 GHz frequency band (so-called WiMAX band).

The operators that were awarded a WiMAX licence by ARCEP back in 2006 had made sizeable rollout commitments. Listed as obligations in their licences, these commitments included the deployment of more than 3,500 sites in all by June 2008 – one major purpose being the coverage of those areas still not covered by DSL, i.e. broadband dead zones.

This audit concerned the parties that held a licence as of 30 June 2008. With the introduction of the secondary frequency market<sup>23</sup>, the number of licence-holders in Metropolitan France had virtually doubled (to 19, of which 14 local authorities and 5 operators)<sup>24</sup> since 2006 when the original 10 WiMAX licences were awarded (to 6 local authorities and 4 operators).

##### 3.1.1 Rollouts performed

The first point to emerge from the audit was the actual deployment of the wireless local loop in over 500 sites, along with the availability of commercial offers and several thousand residential and business customers.

Rollouts remain still relatively small-scale, however, and currently fall well short of the licence-holders' original commitments.

The Authority also held hearings that made it possible to assess the circumstances affecting the development of wireless local loop projects in the 3.4-3.6 GHz band and to obtain an updated view of the market.

##### 3.1.2 Industrial factor

Pioneer rollouts use WiMAX 802.16d and 802.16e technologies. The 802.16d standard is currently being developed by only a few local players, and by manufacturers offering hybrid 802.16d and 802.16e equipment. At the global level, market players, manufacturers and operators have opted for the 802.16e version of WiMAX.

23 - See Section A.1.2 of this chapter.

24 - Cf. The list of WiMAX licence-holders as of 1 January 2009 in the table below.

This technology, which enables roaming, also promises better performance and global economies of scale. This is why the majority of players, including those wanting to deliver a fixed offer, have adopted it. But delays in equipment production and the lack of maturity of 802.16e standard equipment have hampered the development of WiMAX to some degree.

For WiMAX to take off, 802.16e-compliant equipment needs to be available on a large scale, interoperable and deliver the promised performance. This availability itself depends heavily on the existence of a global market that France alone cannot provide.

### 3.1.3 Role of the wireless local loop in supplying high-speed access

The assessment performed with the players confirmed that two very different types of project existed:

- ◆ a national scale ISP model for providing high-speed roaming services, particularly in densely populated areas, which will likely forge itself a position between fixed and mobile high-speed technologies;
- ◆ a model geared specifically towards regional digital development, for covering ADSL dead zones and where the wireless local loop is positioned as a complementary solution in a combination of technologies. The economic feasibility of this model is contingent on it being part of a public-initiative network.

ARCEP has published a complete summary of this analysis on its website<sup>25</sup>.

### 3.2 Spectrum trading in 2008

Market players have taken advantage of the ability to trade, either fully or partially, spectrum licences in the 3.5 GHz band for the deployment of wireless local loop networks. The system was already widely used in 2007 and continued to be so in 2008.

<sup>25</sup> - Available on the ARCEP website: [http://www.arcep.fr/uploads/tx\\_gspublication/synth-enqt-blr-wimax-150908.pdf](http://www.arcep.fr/uploads/tx_gspublication/synth-enqt-blr-wimax-150908.pdf).

26 - CPCE Article L42-3.

27 - Decree no. 2006-1016 of 11 August 2006, concerning the sale of frequency licences, *Journal Officiel* of 12 August 2006.

28 - Ministerial order of 11 August 2006, concerning application of CPCE Article L. 42-3 relating to frequencies or frequency bands whose licences can be traded, *Journal Officiel* of 12 August 2006.

### The secondary frequency market

The possibility of trading spectrum licences was introduced by the law on electronic communications and audiovisual communication services of 9 July 2004<sup>26</sup>. This system is commonly referred to as the secondary frequency market. The law specifies that the general terms for trading licences in the secondary market are defined by decree from the *Conseil d'Etat*<sup>27</sup> and that the list of frequency bands whose licences can be traded is to be determined by the Minister responsible for electronic communications<sup>28</sup>.

Following publication of these two texts in the *Journal Officiel* of 12 August 2006, spectrum trading became a reality in France.

The introduction of a secondary market is a major step towards allowing operators wanting to deploy networks that use wireless frequencies to gain access to spectrum. In addition to rendering frequency management more flexible, it also enables optimised spectrum use and access to frequencies for market players excluded from initial allocations.

The adopted texts uphold the principle, suggested by the Authority, of widespread liberalisation of the bands for which licences are awarded on a site-by-site basis (frequency assignment), notably for PMR and microwave radio systems. For this type of authorisation, only those bands currently in the process of being reorganised will not be open for trading. All of the bands used for satellite services are also open to the secondary market. For both of these types of authorisation, the trading process essentially streamlines administrative procedures in cases of a change of licence-holder.

Among the bands for which authorisations are awarded for operating frequencies in a given geographical zone (frequency allotment where the exact geographical location of the equipment installation is not specified), the licences for the wireless local loop (WLL) and numerous professional mobile radio bands are open for trading. Trading in these bands can involve all or a portion of the licence, which can be broken down by frequency, by geographical zone or by time period. This encourages more careful resource management on the part of the players involved, and enables new players to develop by targeting operations in smaller zones or with fewer frequencies, and so provides a response to the demands of niche markets that may have been underserved by generalist operators up to now.

## Spectrum trades and list of licence-holders as of 1 January 2009

Geographical zones		3 465-3 480 MHz and its 3 565-3 580 MHz duplex		3 432.5-3 447.5 MHz and its duplex 3 532.5-3 547.5 MHz	
Regions	Départements	Licence-holders as of 25 July 06	Licence-holders as of 1 Jan. 09	Licence-holders as of 25 July 06	Licence-holders as of 1 January 09
Alsace	Bas-Rhin	Conseil régional d'Alsace	Conseil général du Bas-Rhin Decision no. 07-0586 of 3 July 2007	Maxtel	Altistream Decision no. 07-0504 dated 7 June 2007
	Haut-Rhin		Conseil général du Haut-Rhin Decision no. 07-0033 of 11 January 2007		
Aquitaine	Dordogne	Bolloré Telecom		Conseil régional d'Aquitaine	Conseil général de la Dordogne Decision no. 07-0605 of 5 July 2007
	Gironde				Conseil général de la Gironde Decision no. 07-0606 of 5 July 2007
	Landes				Conseil général des Landes Decision no. 07-0607 of 5 July 2007
	Lot-et-Garonne				Conseil général du Lot-et-Garonne Decision no. 07-0608 of 5 July 2007
	Pyrénées-Atlantiques				Conseil général des Pyrénées-Atlantiques Decision no. 07-0609 of 5 July 2007
Auvergne		Maxtel	Altistream Decision no. 07-0505 of 7 June 2007	Bolloré Telecom	
Basse-Normandie		Maxtel	Altistream Decision no. 07-0506 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0931 of 4 September 2008
Bourgogne	Yonne	Maxtel	Altistream Decision no. 07-0507 of 7 June 2007	Conseil régional de Bourgogne	Conseil régional de Bourgogne
	Côte-d'Or				Syndicat mixte Niverlan Decision no. 08-0584 of 27 May 2008
	Saône-et-Loire				
	Nièvre				
Bretagne (suite p. 276)	Côtes-d'Armor	Bolloré Telecom		Conseil régional de Bretagne	Conseil général des Côtes-d'Armor Decision no. 08-0580 of 27 May 2008
	Finistère				Conseil général du Finistère Decision no. 08-0730 of 24 June 2008
	Ille-et-Vilaine				Conseil général d'Ille-et-Vilaine Decision no. 08-0581 of 27 May 2008

Geographical zones		3 465-3 480 MHz and its 3 565-3 580 MHz duplex		3 432.5-3 447.5 MHz and its duplex 3 532.5-3 547.5 MHz	
Regions	Départements	Licence-holders as of 25 July 06	Licence-holders as of 1 Jan. 09	Licence-holders as of 25 July 06	Licence-holders as of 1 Jan. 09
Bretagne (suite of the p.275)	Morbihan	Bolloré Telecom		Conseil régional de Bretagne	Nomotech SAS Decision no. 08-0582 of 27 May 2008
Centre		Maxtel	Altistream Decision no. 07-0508 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0932 of 4 September 2008
Champagne-Ardenne		Maxtel	Altistream Decision no. 07-0509 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0933 of 4 September 2008
Corse		Bolloré Telecom		Collectivité territoriale de Corse	Collectivité territoriale de Corse
Franche-Comté		Maxtel	Altistream Decision no. 07-0886 of 16 October 2007	Bolloré Telecom	
Haute-Normandie		Maxtel	Altistream Decision no. 07-0510 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0934 of 4 September 2008
Ile-de-France		Bolloré Telecom		SHD	
Languedoc-Roussillon		Bolloré Telecom		HDRR France	
Limousin		HDRR France		Bolloré Telecom	
Lorraine		Maxtel	Altistream Decision no. 07-0511 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0935 of 4 September 2008
Midi-Pyrénées		Bolloré Telecom		Maxtel	Altistream Decision no. 07-0512 of 7 June 2007
Nord-Pas de Calais		Maxtel	Altistream Decision no. 07-0513 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0936 of 4 September 2008
Pays de la Loire		Maxtel	Altistream Decision no. 07-0514 of 7 June 2007	HDRR France	Bolloré Telecom Decision no. 08-0937 of 4 September 2008
Picardie		Bolloré Telecom		HDRR France	
Poitou-Charentes	Charente	Conseil régional Poitou-Charentes	Conseil régional Poitou-Charentes Decision no. 08-0129 of 29 January 2008	HDRR France	Bolloré Telecom Decision no. 08-0938 of 4 September 2008
	Charente-Maritime		Conseil général des Deux-Sèvres Decision no. 08-0128 of 29 January 2008 then Altitude Telecom Decision no. 08-0251 of 26 february 2008		
	Vienne				
	Deux-Sèvres				
Provence-Alpes- Côte d'Azur		Bolloré Telecom		SHD	
Rhône-Alpes		Bolloré Telecom		Maxtel	Altistream Decision no. 07-0887 of 16 October 2007

## Spectrum sub-leasing as of 1 January 2009

Licence-holders	Delegated to	Geographical zones	Decision
Conseil régional de Bretagne	Quimper Communauté Telecom	Quimper Communauté	2008-0088
Conseil régional de Bretagne	Rennes Métropole Telecom	Rennes Métropole	2008-0178
Conseil régional de Bretagne	Nomotech SAS	Communauté de communes du Pays de la Roche aux Fées	2008-0179
Bollore Telecom	Huawei Technologies France	Huawei Technologies France site Cergy Saint-Christophe business park of Cergy-Pontoise	2008-0296
HD RR France	Axione Limousin	Limousin	2008-0939
HD RR France	HD RR 52	Haute-Marne	2008-0608
Niverlan	Nivertel	Nièvre	2008-0700
Conseil général du Lot-et-Garonne	SDNum	Pays d'Albret	2008-0830
Conseil général du Lot-et-Garonne	SDNum	Pays du Dropt, Val de Garonne-Gascogne et de l'Agenais	2008-0831
Conseil général du Lot-et-Garonne	SDNum	Pays de la Vallée du Lot	2008-0832
Conseil général de l'Ille- et-Vilaine	Nomotech SAS	Ille-et-Vilaine	2008-0843
Bollore Telecom	17 Numérique (Axione)	Charente-Maritime	2008-0940
Bollore Telecom	HD RR52	Haute-Marne	2008-0941
Bollore Telecom	HD RR France	Seine-Maritime	2008-0942
Bollore Telecom	HD RR France	Vienne	2008-0943
Bollore Telecom	Mélisa Territoires Ruraux (Axione)	Maine-et-Loire	2008-0944
Bollore Telecom	Sartel (Axione)	Sarthe	2008-0945
Bollore Telecom	Tours Métropole	Tours	2008-0946
Altitude Wireless	APRR	Motorway concession, DPAC ( <i>Domaine public autoroutier concédé</i> )	2008-0947
Altitude Wireless	Ariège Telecom	Ariège	2008-1100

## 3.3 Monitoring WiMAX operators

ARCEP is monitoring WiMAX licence-holders, and tracking the progress being made in their rollouts

Based on the elements provided by WiMAX operators, the Authority elected to monitor the wireless local loop market. Operators are required to inform ARCEP of the status of their network rollouts every six months. This information, which is updated on a regular basis, is published on the ARCEP website in the form of a summary table and maps. WLL projects will be monitored while also keeping track of developments in WiMAX technologies from around the globe.

This monitoring process will continue until the next rollout deadlines included in the obligations, i.e. until December 2010.



## 4. Mobile satellite services

Several mobile satellite network projects are being developed in Europe in the 2 GHz S band (1980-2010/2170-2200 MHz duplex band), identified internationally for IMT2000/UMTS systems (4G/3G). Some of these 2GHz MSS (mobile satellite service) projects propose an original architecture that combines satellite with a complementary ground component (CGC) that enables both access to available services by alleviating the restrictions resulting from the shadow regions of satellite coverage (particularly in cities), and increased spectral efficiency.

The systems that are candidates for the use of 2 GHz-band spectrum have nevertheless expressed frequency requirements that largely exceed available resources. This means that candidates will need to undergo a selection process. Given the pan-European nature of mobile satellite services, and the lack of a suitable

institutional mechanism, efforts were undertaken at the European level to design a common selection and coordinated licensing process to be employed throughout the European Union.

29 - European Parliament and Council Decision concerning the selection and licensing of systems that provide mobile satellite services, 22 August 2007, COM(2007) 480 final.

A decision from the European Parliament and Council was adopted in 2007<sup>29</sup>.

It provides for a two-stage selection and licensing process:

- ◆ after issuing a call for candidates, the first stage consists of assessing the candidate systems' degree of technical and commercial development;
- ◆ in situations where the first stage reveals that spectrum resources are scarce, eligible candidates will be subject to a second round of assessment based on the following criteria: pan-European geographical coverage, competitive advantages for consumers, efficient use of the spectrum and general-interest objectives.

The Commission launched a call for submissions on 7 August 2008, and received four responses (ICO, Inmarsat, Solaris and Terrestar). The submissions were examined by the European Commission and the selection procedure was overseen at the COCOM level by a group of experts who were appointed by each of the Member States.

The European component of the process concluded in May 2009 with the selection of Inmarsat and Solaris. It is now up to the Member States to award the frequency usage rights to the winning candidates.

## 5. Frequency assignments and allotments

### 5.1 Fixed terrestrial and satellite systems

In 2008, the operational process of issuing spectrum licences for the fixed service (excluding the 1.5 GHz band) and for fixed satellite services, which resulted in a technical and administrative coordination report prepared by the Authority, translated into:

- ◆ 13,595 new frequency assignments (or 2,415 more than in 2007);
- ◆ 6,806 changes to existing frequency assignments;
- ◆ 7,410 frequency assignment cancellations.

As of 31 December 2008, the Authority's database was managing:

- ◆ 78,042 in-service frequency assignments for the fixed terrestrial service;
- ◆ 3,581 in-service frequency assignments for the fixed satellite service.

Overall, spectrum assignments for the fixed terrestrial and satellite services were up by 65% in 2008 compared to 2007.

The fees billed in 2008 totalled approximately:

- ◆ €20 million in fees for accessing the fixed service and €3 million in fixed service management fees;
- ◆ €1.2 million in fees for accessing the fixed and mobile satellite service and €500,000 in management fees.

## 5.2 Professional mobile radio networks (PMR)

In 2008, 178 decisions concerning professional mobile radio networks and microwave systems in the 1.5 GHz band were adopted, including:

- ◆ 38 decisions concerning assignments;
- ◆ 48 decisions concerning assignments that were individual in scope;
- ◆ 24 concerning microwave systems;
- ◆ 68 decisions that were general in scope.

The general decisions concerned 1,426 new licences, 866 changes to existing licences and 1,919 licence renewals.

Fees invoiced in 2008 were:

- ◆ for allocated networks: €103,000 in management fees and €8,859,000 in spectrum access fees;
- ◆ for networks open to the public and non-mobile services: €13,000 in management fees and €68,000 in access fees;
- ◆ for microwave systems in the 1.5 GHz band: €74,000 in management fees and €53,000 in access fees.

## 6. Frequency register

Making a frequency register available allows the players concerned to access relevant information on the use of frequency bands and on licences that could be made available for trading.

This database provides a response to both industry and consumer needs, and implements regulatory provisions:

- ◆ at the European level, the database contributes to providing information on frequency use by the radiocommunication systems managed by ARCEP and licence sales, in accordance with the stipulations defined by the European Commission<sup>30</sup> concerning the harmonised provision of spectrum-related information across the European Union;
- ◆ at the national level in France, it complies with the regulatory provisions set out in Decree of 11 August 2006<sup>31</sup> concerning spectrum licence sales and which requires the Authority to create a register for the sale of spectrum licences.

**30** - European Commission Decision 2007/344/EC of 16 May 2007.

**31** - Decree no. 2006-1016 of 11 August 2006 concerning spectrum trading, JO of 12 August 2006.

32 - Cf. <http://www.arcep.fr/index.php?id=8977>.

The database, which has been accessible on the ARCEP website since February 2008<sup>32</sup>, provides a complete view of all services. The frequency register provides details on the different categories of use, and the specific terms associated with them. It can be accessed via searches by frequency band, type of application or geographical zone.

It also supplies access to the terms for spectrum trading in the different frequency bands open in the secondary market, and allows users to perform searches on licences whose publication was made mandatory by a decree pertaining to this

market. The goal, then, is to increase the transparency of spectrum usage and to stimulate the secondary frequency market.

Lastly, all of the data in the base can be exported, notably to periodically enhance the European EFIS (*ERO Frequency Information System*) database, and so provide additional visibility for all of this information.



B. Numbering

Main categories of numbers allocated by the Authority

Person-to-person communications

Non-geographic numbers: numbers starting with 01, 02, 03, 04, 05, reserved for fixed lines.

Non-geographic numbers: 09AB numbers reserved for fixed lines originating on IP boxes (097B numbers are due to replace 087B numbers by the end of 2009).

Mobile numbers: numbers starting with 06 reserved for mobile operators' customers.

Value-added services

Non-geographic numbers: 08 numbers (excluding 087B) enabling access to value-added services (free or paid calls).

Six-digit numbers starting with 118: for providing directory assistance services.

Special numbers starting with 10: four-digit numbers reserved by an operator for offering services to its subscribers (e.g. for reporting service interruptions).

3BPQ short numbers: 4-digit numbers reserved for calling card services, two-digit carrier network selection, value-added services, etc.

Prefixes

E or 16XY format prefixes: one or four-digit prefix to be dialled instead of 0 ahead of the number being dialled. Enables callers to select their long-distance or local carrier.

## 1. ARCEP's missions

The Authority is responsible for establishing the national numbering plan (including the operational management of the plan, its management rules and ongoing development) and for allocating to operators the numbering resources needed for their business<sup>33</sup>.

This competency concerns the assignment of telephone numbers that can be used on the PSTN (geographic, non-geographic, short and special numbers and prefixes), as well as the attribution of addressing resources for data networks, post-paid card numbers, signalling point codes<sup>34</sup> and MCC + MNC codes (for GSM network SIM cards and TETRA networks).

ARCEP is also responsible for ensuring the proper use of these numbers and the operational implementation of the structures needed to ensure this function (files, databases).

The terms attached to ARCEP's assignment of numbers to operators are defined by Article L.44 of the CPCE, which provides notably for tax payments. The schedule for paying these taxes and their amount are set by law<sup>35</sup> and a ministerial order<sup>36</sup>. For example: a block of 10,000 "classic" numbers – such as 01 40 47 MC DU – costs €200 a year; a four-digit prefix costs €40,000 a year. For a single-digit prefix, referred to as an E prefix, the beneficiary must pay an annual fee of €400,000. Article L.44 of the CPCE also addresses operators' obligations to provide their customers with a number portability service.

ARCEP ensures the ongoing monitoring of European and international technical and regulatory developments in the area of numbering. It is worth remembering that the French national numbering is part of a global system that was implemented worldwide by the International Telecommunications Union (ITU) and regionally by the European Conference of Postal and Telecommunications Administrations (CEPT).

Furthermore, a provision contained in the CPCE allows any subscriber to change operators while keeping the same number<sup>37</sup>:

**33** - In accordance with CPCE Articles L.36-7 7 and L.44 which transposed into French law Article 10 of the European Parliament and Council Framework Directive (Directive 2002/21/EC, dated 7 March 2002) and Article 6 of the Authorisation Directive (Directive 2002/20/EC, dated 7 March 2002).

**34** - These codes correspond to technical addresses that serve to identify the PSTN's signalling resources, based on the CCITT no. 7 protocol. They are similar to the X.25 addresses used in packet switching transmission networks.

**35** - Amending Finance Act 2006-1771, dated 30 December 2006, JO of 31 December 2006.

**36** - Decree dated 6 August 2007 2005-605 of 27 May 2005, establishing the value of the coefficient that determines the tax base for numbering resource allocation, JO of 289 August 2007.

**37** - CPCE Article L. 44.

2. The situation in 2008

Status of numbering resources at the end of 2008

Type of number	Quantity allocated
Person-to-person communications	
Fixed geographic numbers (01, 02, 03, 04, 05)	213,880,000
Non-geographic person-to-person numbers (09AB)	29,750,000
Mobile numbers (06)	86,000,000
Value-added services	
Special numbers 10XY	35
Short numbers (3BPQ)	233
Six-digit numbers (118XYZ)	22
Non-geographic VAS numbers (08AB except 087B)	13,533,000
Codes	
"E" prefixes	4
16XY prefixes	29

Breakdown of allocated or reserved 3BPQ short numbers by service category

Short numbers (3BPQ) for offering calling card or assimilated services	16
Short numbers (3BPQ) for offering two-step dialling carrier network selection	4
Short numbers (3BPQ) for other uses	213
Total	233

Other resources allocated in 2008

National semaphore signalling points <sup>38</sup>	5,607
International semaphore signalling points	130

38 - These resources correspond to technical addresses that serve to identify the PSTN's signalling resources, based on the CCITT no. 7 protocol. They are similar to the X.25 addresses used in packet switching transmission networks.

39 - Cf. ARCEP's website: <http://www.arcep.fr/index.php?id=interactivenumeros>.

40 - Cf. [www.gnum.arcep.fr](http://www.gnum.arcep.fr).

An information system is available to the public on the ARCEP website<sup>39</sup>: by entering the first four, five or six digits of a number, visitors can obtain information on its validity and find out the name of the operator to which it is assigned. Internet users can also download the list of assigned numbering resources.

Number database for the industry

ARCEP offers members of the telecommunications sector online access to the G'NUM database<sup>40</sup>. This database allows them to access a range of information on person-to-person services that is housed on ARCEP's server. The data (management status, beneficiary's name, the trunk exchange area, the local sorting zone, the exchange for given geographic number blocks, availability, etc.) are very useful for their services and/or the implementation of their billing and taxation mechanisms.

22 companies currently subscribe to this service. The database is updated regularly with information supplied by local loop operators.

Access to the database is by subscription, which costs €1,500 a year.

### 3. Measures taken in 2008

In 2008, the Authority adopted 278 decisions on numbering:

- ◆ 1 decision that was general in scope, defining the use of the categories of numbers contained in the national numbering plan (with stipulations on the numbers that could be surcharged under the “Chatel Act”)<sup>41</sup>;
- ◆ 277 decisions on the day-to-day management of numbering resources; these decisions are broken down into: 221 allocation decisions, 15 operator-to-operator transfer decisions, 6 decisions amending previous decisions and 35 repeal decisions .

#### 3.1 Opening up the 09 block for VoIP and IP boxes

In a Decision<sup>42</sup> issued in late 2005, the Authority defined the categories of number in the national numbering plan, according to three main types of resource<sup>43</sup>:

- ◆ person-to-person communication numbers (starting with 01, 02, 03, 04 and 05 for fixed lines and 06 for mobiles);
- ◆ numbers for accessing value-added services (starting with 08);
- ◆ codes.

This Decision also introduced the block of numbers starting with 09 among the person-to-person communication numbers, and for replacing 087 numbers assigned to IP boxes – a migration process that was to be completed by 31 December 2008.

Numbers starting with 09 were intended chiefly to replace 087 numbers used by certain ISPs. As the 087 block was nearing saturation, new resources needed to be made available, added to which the 087 block had the drawback of causing confusion with numbers starting with 08, which consumers traditionally associate with value-added services (VAS) numbers.

The Authority had requested that operators replace the 087 numbers assigned to their customers with 09 numbers by December 2008 at the latest. This switchover is now expected to be fully complete by the end of 2009 as some operators failed to meet the initial deadline.

Since late 2005, ARCEP has thus been allocating numbers starting with 09 to operators that provide VoIP services (voice over IP or voice over broadband) via IP service boxes. As of January 2009, operators had assigned around 30 million numbers starting with 09.

#### 3.2 Opening up the 07 block for mobiles

The national numbering plan identifies numbers starting with 06 for mobile communications and, up until now, this block of numbers has been large enough to satisfy mobile numbering needs.

The market's development has nevertheless meant heavy consumption of

**41 - ARCEP Decision**  
no. 08-0512 of  
6 May 2008 amending  
Decision  
no. 05-1085 of  
15 December 2005,  
setting the use of the  
categories of numbers  
in the national numbering  
plan.

**42 - ARCEP Decision**  
no. 05-1085  
of 15 December 2005  
setting the use of the  
categories of numbers in  
the national numbering  
plan.

**43 - See above.**

06 resources, which made it necessary to assess the use being made of this block of numbers and to perform a forward-looking analysis of future numbering needs for mobile services. This was the purpose of the public consultation launched by the Authority in late 2008.

Following this assessment, the decision was made to gradually open up the 07 block of numbers to mobile services.

*44 - ARCEP Decision no. 05-1085 of 15 December 2005 setting the use of the categories of numbers in the national numbering plan.*

In its 2005 decision<sup>44</sup>, the Authority had predicted that mobile numbering resources (06 numbers) could reach saturation by 2010. This decision stipulated that the 07 block was reserved for future use, while specifying that it could either serve to remedy the saturation of the 06 block, or be assigned to a new type of use.

The inventory of mobile number consumption performed by ARCEP revealed that there are currently only 10 million numbers starting with 06 still available, of a total 100 million, which means the 07 block needs to be made available for mobile numbers.

*45 - The three mobile network operators (Bouygues Telecom, Orange and SFR), two other telephone operators (Iliad and Kertel) and three individuals took part in the ARCEP consultation concerning the introduction of the 07 block.*

This was confirmed by the feedback provided by mobile operators<sup>45</sup> in their responses to the public consultation, where it emerged that these numbering requirements were the result of three phenomena in particular:

- ◆ the rising number of mobile subscribers;
- ◆ the fact that some own more than one handset;
- ◆ the development of machine-to-machine communications for which the addressing solutions planned for these machines using numbers other than mobile numbers will not be available for several years yet.

To be able to satisfy all of these needs, the Authority decided to open up the block of 07 numbers for the supply of mobile services progressively, starting in the first half of 2010. This block of 07 numbers will be subject to the same terms of use as those that apply to 06 numbers: operators will be able to use 06 and 07 numbers indifferently, with no effect on consumers.

In the meantime, ARCEP intends to be economical in its management of the remaining 10 million numbers starting with 06. It will take account of all of mobile operators' future needs, including MVNOs, and notably those of a possible new mobile network operator for which 3 million numbers starting with 06 have been set aside.