CHAPTER 4

Scare resource regulation

A. Spectrum management

The freedom that wireless, or radio technologies offer depends on the availability of physically limited frequency resources. Therefore, as demand increases the regulator responsible for this resource has to take into account the potential for shortages when setting the conditions for accessing radio frequency spectrum. Scarcity requires resources to be shared and sharing is thus the 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.

1. General framework

1.1 Spectrum management at the national, European and global levels

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

Global rules are set by 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)[1] and the Radio Spectrum Committee (RSCom)[2].

At the national level, France's National Frequency Agency, ANFr, coordinates management of the different wireless spectrum allocators (ARCEP, CSA, civil aviation, CNES, different ministries, etc.).

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

1 - Group of Member State administrations, responsible for advising the European Commission on frequency policy matters.

2 - Committee made up of the Commission and the Member States, and responsible for making founding decisions on frequencies at the Community level.

1.1.1 European standardisation

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 2007, the ECC adopted decisions concerning the harmonised use of spectrum by broadband access systems operating in the 3400–3800 MHz frequency band, and concerning the terms for harmonised use of UWB (*Ultra-Wideband*)[3] equipment for certain specific imaging applications.

In addition to these decisions, the ECC also devoted its efforts to the mandates issued by the European Commission on the introduction of WAPECS (*Wireless Access Policy for Electronic Communications Services*)[4], broadband wireless access systems, intelligent transport systems, mobile systems onboard aircraft and the digital dividend[5].

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 2007, the Authority thus implemented Community decisions concerning the satellite mobile service operating in the 2 GHz frequency band and 5-GHz wireless access systems.

In tandem with ANFr, the Authority was also involved in the work performed by the ECC group responsible for wireless spectrum engineering. Electromagnetic compatibility studies on wireless communication services in the 3.4-3.8 GHz band were completed, which made it possible to define the terms for use of this band by broadband wireless access systems (BWA). Studies were also completed on frequency sharing between UMTS and systems operating in bands adjacent to 900 MHz and 1800 MHz. Lastly, studies concerning the co-existence of 1.6 GHz mobile satellite systems and the terms of use for mobile systems onboard aircraft and ships were also finalised.

In 2007, the Authority paid equally close attention to the work performed by the ECC on the technical feasibility of harmonising a sub-band for mobile services in the UHF frequency band[6].

Lastly, ARCEP was involved in ECC efforts to introduce ultra-wideband (UWB) technologies, and in those devoted to new approaches for achieving more flexible wireless spectrum management and to providing access to new frequency bands for short-range devices.

Worth noting is that the European Commission Decision concerning harmonisation of the 900 and 1800 MHz bands for terrestrial systems capable of providing electronic communication services across the European Union can only come into effect once the directive repealing the GSM Directive[7] has come into force.

3 - Ultra-Wideband: a radio modulation technique enabling the transmission of a very high-speed signal over a wide frequency, but low power to prevent interference with other signals.

4 - An initiative launched by European Union Member States, aimed at enabling swift spectrum access for new technologies, with the goal of encouraging competitiveness and innovation (by eliminating obstacles which adversely affect market momentum), and to ensure coherent licence award mechanisms, while upholding the principles of technological neutrality with respect to services.

5 - Cf. Part 1, Chapter 1, B.

6 - Cf. ECC "Report B", in response to a European Commission mandate on the digital dividend.

7 - Cf. European Council Directive 87/372/EEC, dated 25 June 1987, concerning the frequency bands to be set aside for the coordinated introduction of public, terrestrial digital cellular communications across the European Union.

1.1.2 A major event for ITU-R in 2007: the WRC

The 2007 World Radiocommunication Conference (WRC) was held in Geneva from 22 October to 16 November 2007. This major event, which has a fundamental influence on how spectrum is managed, was attended by some 2,800 participants from the 164 ITU member countries.

The 2007 edition of the WRC provided an opportunity for the Authority to take part in work devoted to the issues surrounding IMT systems (3G and 4G), fixed services, fixed satellite services and, more indirectly, aeronautical mobile services, in addition to helping prepare the agenda for the next WRC which will be held in 2011.

Of particular interest is the fact that WRC-07 marked a decisive step forward by opening a portion of the UHF band – which is currently devoted to audiovisual applications – to electronic communications services. The WRC identified and assigned the 790-862 MHz sub-band on a primary basis to mobile services in the Europe/Africa region. Although this assignment will take effect in November 2015, the provisions adopted by the conference allow several countries in the region, including France and most of its neighbours, to allocate this spectrum to mobile applications immediately, notably for the deployment of IMT systems.

The Authority is pleased with this WRC-07 decision, although the quantity of UHF-band spectrum allocated to mobile services in Europe (72 MHz) is well below the quantity allocated in this same band in other regions around the globe. The Americas zone and certain Asian countries (including China, Japan, South Korea and India), for instance, have already allocated a much wider band to mobile services: 698-806 MHz (or 108 MHz), completing the extension of the 806-862 MHz band already attributed to IMT.

The WRC also identified and assigned the 3400-3600 MHz high frequency band for mobile services, on a primary basis, to ensure that future high-speed mobile systems (referred to as IMT-Advanced) will have access to the large volume of resources they require.

Furthermore, the Radiocommunication Assembly of October 2007 took the decision to amend ITU-R Recommendation M.1457 to incorporate the new OFDMA TDD WMAN technology (mobile WiMAX) into the IMT-2000 (3G) family of standards.

1.2 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[8]. 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*[9] and that the list of frequency bands whose licences can be traded is to be determined by the Minister responsible for electronic communications[10].

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

8 *- CPCE Article L42-3.*

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

10 *- Decision 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.*

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), 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.

1.3 Spectrum and the Review of the European Regulatory Framework

On 13 November 2007, the European Commission published legislative proposals aimed at modifying the regulatory framework governing electronic communications, of which spectrum is one of the central components.

1.3.1 Striving for better spectrum management ("Framework" Directive)

The Authority believes in the need for more flexible frequency management. Technological neutrality, as it applies to wireless technologies in particular, should make it possible to keep up with the very swift changes taking place in the electronic communications sector. It should also encourage the players to favour technologies that make optimum use of the spectrum.

- ARCEP also supports efforts to achieve spectrum regulation that provides for greater neutrality with respect to electronic communication services. An electronic communication network should thus enable the distribution of the broadest possible array of electronic communication services (voice, Internet, video, etc.).
- However, applying the principle of technological neutrality to radiocommunications networks as a general, mandatory rule without distinction appears difficult, if not unrealistic, to implement. The goals of optimising spectrum and preventing harmful interference require, at the very least, that the types of radiocommunication networks that can share the same frequencies (wireless access, microwave links, satellite networks, broadcasting networks, etc.) be specified beforehand.

In its communiqué concerning the digital dividend[11], the European Commission recognizes that problems of interference prevent fundamentally different, classic digital broadcasting networks (towers, high transmit power) and electronic communications networks from being associated in the same frequency zones. It is the Commission's view that the best solution would be to segment the spectrum.

11 - Cf. COM(2007)700 final dated 13 November 2007.

- **The Authority** also **subscribes to the Commission's views on the implementation of secondary frequency markets** and shares its goal of facilitating access to spectrum.

It nevertheless feels that achieving more flexible use of spectrum resources and implementing a secondary frequency market will not be enough to constitute a European spectrum policy. Given that access to spectrum is the priority in radiocommunications policy, explicit objectives need to be associated with it such as: promoting innovation, competitiveness and jobs in the European electronic communications industry; promoting competition between electronic communications services providers for the benefit of consumers; and service interoperability at the European level.

It therefore seems indispensable that the European Commission work to achieve these objectives by taking account of the specific features of each use that is made of the spectrum. The wide range of applications and the issues surrounding frequency usage itself make it impossible to take a doctrinaire approach that seeks to apply the same rules to all situations.

1.3.2 Proposals concerning spectrum licences ("Authorisation" Directive)

Because it simplifies access to certain frequencies, the system of general authorisation[12] both enables and accelerates the introduction of innovative systems (Wi-Fi, RFID, anti-collision radar systems, etc.) and helps stimulate industry momentum.

12 - General authorisations set the technical terms for specific, generally low-power and short-range systems. Use of equipment governed by this system is open, provided it meets the stated technical conditions. To shorten the drafting time of these decisions and to guarantee their legal viability, the drafting of any new decision on the matter follows a standardised process that is integrated into the quality procedures of the Authority's "Frequency" Division.

Nevertheless, the European Commission's desire to impose the general authorisation system as a systematic rule gives rise to certain reservations. This approach appears to be less efficient than the current system which draws a distinction between cases where a general authorisation is possible and cases where an individual authorisation would, in most cases, offer a greater guarantee against harmful interference and ensure a good quality of service.

It is therefore the Authority's view that the current framework is satisfactory in this respect, and it will continue to work to maintain a healthy balance between flexibility and potential risks of interference.

As concerns individual frequency authorisations, although the power of technical regulation governing radio spectrum to impose harmonisation is important for the single market, basing national procedures for individual authorisations on Community-driven harmonisation efforts appears problematic.

Informal coordination and greater exchange of best practices within European working groups, such as COCOM, the RSPG, or within the ERG, provide a possible alternative to the Commission's proposals.

Finally, the Commission could be granted the additional power of managing and awarding authorisations in the very specific case of satellite. The work underway on the S band has indeed revealed the shortcomings of the current framework.

1.3.3 Striving for better implementation of spectrum management at the Community level

On the whole, the Authority supports the expansion of Community powers in the area of spectrum management. As the development of the electronic communications market is taking on an increasingly European dimension, purely national approaches can be found to be lacking and, depending on the case, may require increased coordination and better harmonisation of spectrum policies at the European level.

Managing spectrum for public use nevertheless falls under the power of Member States: expanding the European Commission's power in the area of spectrum must therefore be within strictly limited boundaries.

With this in mind, an ambitious approach to strengthening Community competencies in the area of spectrum management could thus take the following directions:

- The European Commission must rise to the challenge of achieving consensus amongst European Union Member States on international frequency issues.

Even if, for legal reasons, the Commission cannot act as the European Union representative to the ITU or CEPT, it needs to develop its capacity for initiative-taking and for coordinating Member States within international bodies when addressing key issues concerning spectrum.

As it stands, the Commission does not coordinate the international positions taken by European Union Member States. In many instances, it takes a back seat – its involvement is reserved and not timely enough, and reveals a sometimes limited and remote knowledge of the market. As a result, coordination on frequency matters between EU Member States occurs as part of broader, multilateral negotiations within the CEPT which is comprised of more than forty countries, from the Atlantic Ocean to the Ural Mountains.

Greater involvement by the European Commission in representing the European Union within the ITU and CEPT, or at least in coordinating EU Member States' positions, is thus a prerequisite to any credible expansion of the Community's spectrum management powers.

Excerpt from an interview with Paul Champsaur in the ARCEP newsletter n°60

You mentioned the wireless spectrum: do you feel that the new institutional framework proposed by the Commission is satisfactory?

As concerns frequencies, national governments are responsible for the decisions on how they are divided up between the major applications (security, broadcasting, telecommunications…), and for the financial terms of allocations. The rules that the Commission wants to see in place across the Union – service neutrality, spectrum allocation on a purely market-based system – are laudable but unsuitable because Europe does not have a federal structure. So the Commission cannot adopt principles and methods whose benefits suppose that they be implemented at the federal level whereas, in Europe, they would be implemented at the national level which could mean a fragmented European market.

Member States are well aware that the prospect of European harmonisation is a necessary step to enabling a large interior equipment market to develop, and for creating a strong European industry. So there is no alternative to European harmonisation in the current balance of power. Up until now, the Commission has not been forward-thinking enough. It was late in tabling harmonisation proposals that Member States could have taken a position on; it did not even help Member States make the right choices for their own market.

The Commission now needs to equip itself – internally, if possible – with the technical-economic expertise needed to be able to propose a proactive harmonisation policy to Member States, whose prime benefit would be to educate them on the delicate choices involved in assigning spectrum to different applications.

Are you thinking about the digital dividend ?

Yes, it is a necessary measure for furthering harmonisation of spectrum use across the European Union, which enables a European country to develop very high-speed mobile services (running at several Mbps) in its more sparsely populated regions, without those services encountering interference from high-power, terrestrial broadcasting transmitters in neighbouring countries.

This harmonisation effort is also a prerequisite for allowing the European industry to begin working immediately on developing equipment to be available at the start by the next decade, in other words as soon as the adequate frequencies are made available following the digital switchover. But Europe was a scattered group at the World Radiocommunication Conference in Geneva. One might even say that the battle was already over by the time the Commission arrived.

- The European Union needs to strengthen its internal capacities for education and strategic debate on frequency issues

In particular, this increased capacity for strategic debate would help shed more light on the communal benefits of the work performed by the Commission.

This capacity also needs to be achieved through strengthened and more cohesive Community bodies. Increasing the European Commission's influence would be a positive step, although it already possesses most of the legal powers needed to shape and define spectrum strategies with Member States, in tandem with the market players.

The most important aspect of the European Commission's role is its capacity to achieve consensus amongst Member States on policy directions. To be credible, the Commission needs to prove its desire and capacity to establish paths that are accepted by all. Here, the issue of the digital dividend constitutes both an opportunity and a test for the European Commission.

- Striving for more effective application of the current regulatory framework

It is the Authority's view that working to achieve more flexible spectrum management is a legitimate goal, as is greater harmonisation of management mechanisms across Europe, but also believes that the current framework provides the legal tools necessary to achieve this. It nonetheless needs to be fully exploited, which itself no doubt requires that the Commission increase its expert resources in this area, before undertaking a major overhaul of the existing framework.

1.3.4 Progress in the area of WAPECS (*Wireless Access Policy for Electronic Communications Services*)[13]

13 - Wireless access policy for electronic communication services: an initiative launched by European Union Member States, aimed at enabling swift spectrum access for new technologies, with the goal of encouraging competitiveness and innovation (by eliminating obstacles which adversely affect market momentum), and to ensure coherent licence award mechanisms, while upholding the principles of technological neutrality with respect to services.

Without awaiting the implementation of the new regulatory framework, the European Commission continued its work on the WAPECS project in 2007, and assigned CEPT the task of examining its application to certain bands dedicated to wireless access systems: 470-862 MHz bands, so-called GSM 900 and GSM 1800 bands, the 2 GHz UMTS "core " band, the 2500-2690 MHz band and the 3400-3800 MHz band.

The Authority is closely monitoring the work being done by CEPT, which is responsible for identifying a set of minimal technical restrictions applicable to these bands. The result of this work made it possible to designate two "pilot" frequency bands for implementing WAPECS: the 2500-2690 MHz and the 3400-3800 MHz bands. Two corresponding decisions at the European level could be adopted in the first half of 2008.

The Authority also worked to further clarify spectrum usage rights for WAPECS within a dedicated Commission working group. A specific recommendation on this score could also be adopted by COCOM in the first half of 2008.

1.4 The digital dividend

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, particularly in terms of regional development, enabling the rollout of ultra-broadband mobile.

At the international level, the World Radiocommunication Conference (WRC) in December 2007 opened up the possibility of having the UHF band used by telecommunications services, by identifying the 790-862 MHz sub-band – which accounts for only a small fraction of the digital dividend – for that purpose in Europe. But this is only one possibility.

In France, it will be the Prime Minister who decides on how the digital dividend is allocated, following consultation with the digital dividend Parliamentary Commission. Composed of four deputies and four senators, this commission was created and began working in late 2007. It consulted with ARCEP Chairman, Paul Champsaur, in January 2008[14].

As indicated by Senator Bruno Retailleau in a report[15] submitted to the Senate Commission on Economic Affairs, "*failing to identify a frequency sub-band would be prejudicial to the outcome of debates over how to employ the liberated spectrum, before the debate even begins*".

The Authority is very actively involved in this issue. It helped further the national debate by querying all players on the issues involved with the digital dividend during its public consultation in July 2007, and by publishing several informative documents on the topic, including the November/December 2007[16] issue of its public newsletter.

ARCEP Newsletter n°58 – November/December 2007

"The Digital Dividend: telecom and media industry players speak out."

Including the views of: Viviane Reding (European Commissioner, Information Society), Bruno Retailleau (Senator, Vendée), Jean-Michel Hubert (Chairman of the Digital Strategy Committee, *Comité stratégique pour le numérique*), André Marcon (Vice-Chairman of the Economic and Social Council, *Conseil économique et social*), Martial Gabillard (Chairman of Avicca), Ed Richards (CEO, OFCOM), Jean-Bernard Lévy (Chairman of the Management Board, Vivendi), Vincent Bolloré (President, Bolloré group), Michel Combes (Chairman and CEO, TDF), Michel Boyon (Chairman, CSA), Patrick de Carolis (President, France Télévision), Nicolas de Tavernost (Chairman of the Board, M6), Didier Lombard (Chairman and CEO, France Telecom), Jacques Veyrat (President, Neuf Cegetel), Emmanuel Forest (Deputy CEO, Bouygues Télécom), Pascal Faure (Vice-Chairman, CGTI), François Rancy (Director General, ANFR), Guy Roussel (President, Ericsson France).


La lettre de l'Autorité

Dividende numérique : les acteurs des télécoms et de l'audiovisuel s'expriment

- *For more details, please see Part 1, Chapter 1 of this report.*

All literature published by ARCEP on this topic[17] can be viewed online at: www.arcep.fr.

14 - *The Chairman's speech is available on the ARCEP website: www.arcep.fr.*

15 - *Bruno Retailleau, briefing on behalf of the Commission for Economic Affairs, on the current state and future outlook for ARCEP (Autorité de régulation des communications électroniques et des postes).*

16 - *ARCEP Newsletter n°58, November/December 2007.*

17 - *Cf. « La Lettre de l'Autorité n°58 », November/December 2007 and the «grand dossier" devoted to the digital dividend on www.arcep.fr.*

2. Mobile licences

2.1 The fourth 3G licence

On 8 March 2007, the Minister responsible for electronic communications launched a call for submissions for the fourth and only remaining 3G licence. Free Mobile, a wholly owned subsidiary of the Iliad group, submitted an application.

In early October 2007, the Authority rejected the Free Mobile application on the grounds that it did not meet the financial conditions defined by the Finance Act[18].

18 - Cf. Modified Article 36 of the Finance Act for 2001.

Repealed by the law on developing competition for the benefit of consumers[19], these conditions were lifted on 3 January 2008. If, following a parliamentary debate, new financial conditions are set by government decree, the Authority could propose the launch of a new call for applications.

19 - Cf. Act n° 2008-3 dated 3 January 2008, concerning the development of competition for the benefit of consumers, JO of 4 January 2008.

• *For more details, please see Part 1, Chapter 1 C of this report.*

2.2 Reuse of the 900 MHz band for 3G

In April 2006, mobile operators SFR and Orange France requested that ARCEP allow them to reuse a portion of their 900 MHz frequencies to develop third-generation (3G) mobile services. The new generation of mobile networks will spur the development and ubiquity of mobile Internet access and the innovative services it enables to a considerable degree, by offering consumers mobile access running at several hundred kbps.

The Authority feels that it is essential that the largest possible number of users have access to third-generation (3G) services. Providing the whole of France with access to 3G mobile services is in fact a fundamental, regional development objective.

The call for 3G licence applications and operators' GSM licences stipulate that, in the case of reuse of the 900 and 1800 MHz bands for 3G services, the Authority will launch a consultation that could result in the redefinition of frequency allocations in these bands, to ensure that the spectrum is allocated fairly between all of the operators concerned.

This is why it is necessary to query the players on their interest in obtaining the fourth remaining 3G licence, to determine the number of operators (three or four) to take into account when establishing the manner in which the 900 and 1800 MHz bands reused for 3G will be divided up. ARCEP thus held a public consultation from 5 October to 17 November 2006 to obtain feedback from the market on this issue[20].

20 - Cf. Part 1, Chapter 1, C, for more detailed information concerning the fourth 3G licence.

In light of the interest expressed in the fourth 3G licence during this public consultation, on 20 February 2007 the Authority suggested to the government that a call for applications be organised. It was launched by the Minister responsible for Industry on 8 March 2007.

In the intervening period, during which candidates were given the time to compile their application dossier, ARCEP held a second public consultation from 4 May 2007 to 4 June 2007, to establish the terms for reusing the 900 and 1800 MHz frequencies for 3G.

On 5 July 2007, the Authority published its selected guidelines based on the results of these two public consultations. At the same time, it announced the

possibility of allowing 2G-3G operators to reuse the 900 MHz frequencies for 3G mobile services starting in 2008. ARCEP also indicated that the operator awarded the fourth 3G licence would have the option of accessing a UMTS carrier wave (2 *5 MHz) in the 900 MHz band.

On 27 February 2008, the Authority put these guidelines into effect. To achieve this, and pursuant to the requests of Orange France and SFR, ARCEP made changes to the two operators' licences to allow them to deploy 3G services in Metropolitan France in the 900 MHz band. Bouygues Telecom, which ARCEP consulted on the subject, indicated that it would also be deploying UMTS in the 900 MHz band by the end of 2009, and that it would request changes to the current terms of its licence in due time.

This system leaves open the future possibility of providing an eventual 3G new entrant with access to 900 MHz frequencies. The new entrant would be able to access a UMTS carrier wave in the 900 MHz band once current 2G operators have relinquished a portion of this spectrum, as per the guidelines of 5 July 2007.

To ensure that reuse of 900 MHz frequencies for 3G is not prejudicial to future decisions concerning the fourth 3G licence, ARCEP has included a conditional and time-specific provision in operators' licences that describes the terms for frequency restitution, which will be implemented if and when the fourth 3G licence is awarded.

2.3 Renewal Bouygues Telecom's GSM licence

Bouygues Telecom's GSM licence was awarded on 8 December 1994, for a period of 15 years. Two years prior to its expiration, i.e. 8 December 2007, the operator must be notified of the terms of its licence's renewal, or the reasons for its non-renewal.

To define the terms for renewing this licence, the Authority held a public consultation from 5 October to 17 November 2006. The responses to the consultation confirmed that the terms for renewing Bouygues Telecom's should be the same as those applied to Orange France and SFR.

On 4 December 2007, the Authority thus adopted a decision[21] that sets the terms for Bouygues Telecom's use of frequencies in the 900 and 1800 MHz bands.

21 - ARCEP Decision 2007-1114, dated 4 December 2007.

New provisions included in Bouygues Telecom's renewed licence

The specific terms attached to the new Bouygues Telecom licence must be similar to those applied to Orange and SFR. The new licence will be valid for a period of 15 years and, in addition to the current provisions, will contain new conditions, including:

- increased coverage obligations, bringing its footprint to 99% of the population by 2010, taking coverage of dead zones into account;
- an obligation for transparency with respect to the coverage of the network for which frequencies were authorised, including the production of an annual coverage survey and its annual publication;

- a basic service offer enhanced with a person-to-person messaging service (SMS, etc.), a packet-mode data transfer service (GPRS, etc.) and a location-based service, in accordance with the solutions enabled by existing standards;
- the introduction of a quality of service obligation for the SMS, MMS service (delivery time) and the packet-mode data transfer service (service access time, service maintenance and speed);
- the possibility for the licence-holder to request reuse of frequencies in the 900 and 1800 MHz band for operating its third-generation cellular network.

2.4 The 2.6 GHz band

The use of frequencies in the 2.6 GHz (2500-2690 MHz) band is important to the development of mobile services, and procedures for its allocation are being prepared across Europe.

2.4.1 Sector interest in the 2.6 GHz frequency band

The Authority queried the sector on its interest in having access to this band during a public consultation[22] that ran from 13 July to 26 September 2007.

A great many operators expressed their interest in the 2.6 GHz frequency band during the consultation, particularly 3G operators but also fixed carriers and Internet access providers (ISPs).

Mobile operators also took the opportunity to express their preference of having frequencies in this band made available starting in 2010, at which point it would allow them to satisfy growing demand for spectrum in densely-populated areas, particularly if the fourth 3G licence[23] were to be awarded.

22 - ARCEP public consultation starting on 13 July 2007, devoted to the issue of nationwide availability of broadband wireless access, and the identification of the frequencies required to achieve this.

23 - Cf. Part 1, Chapter 1, C.

2.4.2 Liberation of the frequencies used by the Ministry of Defence

Preliminary work performed under the aegis of ANFr confirmed that it is possible to liberate frequencies in the 2500-2690 MHz band that are currently being used by the French Ministry of Defence, provided the spectrum reconfiguration fund is increased, similar to what was implemented for UMTS and DTT (digital terrestrial television). The sum earmarked by the State, which could total several dozen million euros and which operators would have to reimburse, already exceeds the fund's current capacity.

In terms of timing and financing, the process of freeing up the 2500-2690 MHz band thus depends chiefly on the government: making a portion of these frequencies available starting in 2010 would require a budgetary decision to be adopted in 2008.

2.4.3 Europe-wide trend

Several other European countries, including the United Kingdom, Sweden and Germany, have also begun discussions over the allocation of the 2.6 GHz frequency band. Outside the European Union, the United States and Norway have already auctioned off spectrum in this band.

As a reminder: in March 2005, CEPT published a decision[24] describing the technical organisation of the 2.6 GHz band. This decision had been drafted to include third-generation mobile systems.

24 - ECC/DEC/(05)05 Decision, dated 5 March 2005.

The Authority will continue its preparatory work in 2008, in tandem with market players, which will likely result in a public consultation.

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 by 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.

The award of new WLL licences in the 3.5 GHz band in 2006 was a sign of revived momentum and innovation in the telecommunications sector, and of the Authority's adaptation of its spectrum management methods to the new market realities.

As a result, ARCEP designed an innovative awards procedure: it was initially comprised of several stages aimed at launching a selection process only in those zones where spectrum had been determined scarce. The selection process itself was a combined procedure based on three criteria:

- contribution to the development of regional broadband services;
- the project's ability to stimulate broadband market competition;
- the fee that the candidate was willing to pay upon obtaining the licence, in addition to the annual fee for accessing and using WLL frequencies.

A flexible system has been planned that will enable frequency distribution to evolve: it makes it possible to transfer or lease frequency licences in a secondary market and is an integral part of the frequency allocation plan for the 3.4-3.6 GHz band. This flexibility thus allows providers that did not obtain a licence in the initial allocations to gain access to frequencies.

And, finally, for the first time ever in France, local authorities took part in these scarce resource allocation procedures, in accordance with the new powers bestowed on them by the act governing local authority involvement in telecommunications.

2007 was marked by the implementation of secondary market mechanisms that further the regional development objectives targeted in the initial allocation process.

3.1 Secondary market provisions

3.1.1 The texts

The Decree of 11 August 2006 *concerning application of Article L. 42-3 of the French postal and electronic communications code, CPCE, – which pertains to frequencies or frequency bands whose licences can be traded* – identifies licences for the 3.4 GHz-3.6 GHz band as open to full or partial transfer of one or several geographical or spectral components or time periods.

Spectrum transfers are governed by the provisions contained in the Decree of 11 August 2006 concerning the transfer of frequency licences[25].

25 - Decree 2006-1016, dated 11 August 2006, concerning spectrum licence transfers.

Spectrum leasing is subject to the general framework of the decisions made by administrative authorities.

3.1.2 Spectrum trading

Full transfer

This is the most straightforward secondary market transaction: the spectrum licence-holder transfers all of its rights and obligations to a third-party. The new licence-holder must thus comply with all the obligations therein, notably fee payments, for the entire remaining period of the licence.

Partial transfer

Here, the spectrum licence-holder transfers only a portion of the rights and obligations contained in its licence. Partial transfers can concern:

- a fraction of the **geographical zone** covered by the initial licence;
- a fraction the **frequencies** covered by the initial licence;
- or a portion of the **lifespan** of the initial licence.

By their very nature, geographical or frequency fractioning is possible only in certain frequency bands for which the Authority issues licences "by allotment". These licences give their holder the right to use a relatively wide range of frequencies in a given geographical zone, with no specification as to the location of transmission sites.

As a result, an operator licensed to operate in a given region can, for instance, transfer its frequency rights in the entire region or only a portion of it. This ability to fraction the licence opens up new prospects for the use of these frequencies. It encourages players to manage their resources more carefully and allows new players to develop by targeting smaller zones or employing a smaller range of frequencies, meeting the needs of niche markets that may have been poorly served by generalist operators up until now.

A portion of the lifespan for all licences can also be transferred, with both parties sharing the remaining lifespan of the licence.

If a licence was awarded as the result of a call for submissions, or if the frequencies being transferred are subject to public service continuity requirements, the transfer must be submitted to the Authority for prior approval.

3.1.3 Spectrum leasing

Spectrum leasing allows third parties to employ licensed spectrum. Contrary to a transfer, of which it is a corollary, the licence does not change hands under leasing arrangements and the original licence-holder remains solely responsible for complying with the obligations attached to use of the frequency. Leasing can concern a complete licence or only a portion of the geographical zone or frequencies covered by the licence. It can also be a short-term lease.

All frequency-leasing operations require the prior approval of the Authority.

3.1.4 Status of the secondary WLL frequency market as of 1 March 2008

Frequency licensing decisions delivered by the Authority in 2006 specify in their appendices the licence-holder's ability to engage in the transfer or lease of the wireless local loop frequencies it has been allocated. For certain licences, particularly those awarded to regional authorities (*Conseils régionaux*), obligations are to the local authorities concerned by the services.

These trading mechanisms were widely used in 2007. The following tables provide a summary view of the state of the secondary wireless local loop frequency market in early 2008.

Spectrum trades as of 1 March 2008

Geographical zones		3 465-3 480 MHz and its 3565 - 3580 MHz duplex		3 432,5-3 447,5 MHz and its duplex 3532.5-3547.5 MHz	
Regions	**Departements**	**Licence-holders as of 25 July 06**	**Licence-holders as of 1 Feb. 08**	**Licence-holders as of 25 July 06**	**Licence-holders as of 1 Feb. 08**
Alsace	Bas-Rhin	Alsace Regional Council	Conseil général du Bas-Rhin Decision n°07-0586 of 3 july 2007	Maxtel	Altistream Decision n°07-0504 dated 7 June 2007
	Haut-Rhin		Conseil général du Haut-Rhin Decision - n°07-0033 of 11 january 2007		
Aquitaine	Dordogne	Bolloré Télécom		Conseil régional d'Aquitaine	Conseil général de la Dordogne Decision n°07-0605 of 5 july 2007
	Gironde				Conseil général de la Gironde Decision n°07-0606 of 5 july 2007
	Landes				Conseil général des Landes Decision n°07-0607 of 5 july 2007
	Lot-et-Garonne				Conseil général du Lot-et-Garonne Decision n°07-0608 of 5 july 2007
	Pyrénées-Atlantiques				Conseil général des Pyrénées-Atlantiques Decision n°07-0609 of 5 july 2007
Auvergne		Maxtel	Altistream Decision n°07-0505 of 7 june 2007	Bolloré Télécom	
Basse-Normandie		Maxtel	Altistream Decision n°07-0506 of 7 june 2007	HDRR France	
Bourgogne		Maxtel	Altistream Decision n°07-0507 of 7 june 2007	Conseil régional de Bourgogne	Conseil régional de Bourgogne
Bretagne		Bolloré Télécom		Conseil régional de Bretagne	Conseil régional de Bretagne
Centre		Maxtel	Altistream Decision n°07-0508 of 7 june 2007	HDRR France	

Champagne-Ardennes		Maxtel	Altistream Décision n°07-0509 of 7 june 2007	HDRR France	
Corse		Bolloré Télécom		Overseas collectivity of Corsica	Overseas collectivity of Corsica
Franche-Comté		Maxtel	Altistream Decision n°07-0886 of 16 october 2007	Bolloré Telecom	
Haute-Normandie		Maxtel	Altistream Decision n°07-0510 of 7 june 2007	HDRR France	
Ile-de-France		Bolloré Télécom		SHD	
Languedoc-Roussillon		Bolloré Télécom		HDRR France	
Limousin		HDRR France		Bolloré Télécom	
Lorraine		Maxtel	Altistream Decision n°07-0511 of 7 june 2007	HDRR France	
Midi-Pyrénées		Bolloré Télécom		Maxtel	Altistream Decision n°07-0512 of 7 june 2007
Nord-Pas de Calais		Maxtel	Altistream Decision n°07-0513 of 7 june 2007	HDRR France	
Pays de la Loire		Maxtel	Altistream Decision- n°07-0514 of 7 june 2007	HDRR France	
Picardie		Bolloré Télécom		HDRR France	
Poitou-Charentes	Charente Charente-Maritime Vienne Deux-Sèvres	Conseil régional Poitou-Charentes	Conseil régional Poitou-Charentes Decision n°08-0129 of 29 january 2008	HDRR France	
			Conseil général des Deux-Sèvres Decision n°08-0128 of 29 january 2008 then Altitude Développement Decision n°08-0251 of 26 february 2008		
Provence-Alpes-Côte d'Azur		Bolloré Télécom	SHD		
Rhône-Alpes		Bolloré Télécom		Maxtel	Altistream Decision n°07-0887 of 16 october 2007

Table 2: Spectrum sub-leasing as of 1 March 2008

Licence-holders	Lessor	Geographical zones
France Telecom	SPM télécom	Saint-Pierre-and-Miquelon
HDRR France	SUSI	Site with a 20 km radius in the Picardie region
Bolloré Télécom	Alcatel	Site in Vélizy
Conseil Général du Haut-Rhin	HDRR 68	Haut-Rhin Département
Collectivité Territoriale de Corse	Corsica Haut Débit	Corsica
Conseil Régional de Bretagne	Quimper Communauté Télécom	Quimper community of municipalities
Conseil Régional de Bretagne	Rennes Métropole Télécom	Metropolitan Rennes
Conseil Régional de Bretagne	Nomotech SAS	Pays de la Roche aux Fées community of municipalities

3.2 Wireless local loop operator fees for 2007

Fixed wireless spectrum leasing and management fees for operators of the wireless local loop in the 3.5 GHz and 26 GHz frequency bands in 2007 totalled 2,528,754 euros. The corresponding portion of the 26 GHz band represents 3.3% of this figure.

3.3 What outlook for 2008-2009 ?

The market in 2007 was shaped by the implementation of the secondary market provisions included in the licences delivered in July 2006, primarily to and for local authorities as part of an ongoing bid to further regional development.

In late June of 2008 the Authority will publish the initial results of the deployments, i.e. two years after the first WiMAX licences were awarded. Examining these initial results will provide a launch pad and fuel for discussions over the possible allocation of additional resources, notably in the 3.6-3.8 GHz band.

4. Mobile satellite services

New 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. These 2GHz MSS (mobile satellite service) projects propose an original architecture that combines satellite with a complementary ground component (CGC) enabling both access to available services by alleviating the restrictions resulting from the shadow regions of satellite coverage (particularly in cities), and increased spectral efficiency.

26 - *Commission Decision of 14 February 2007 on the harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of systems providing mobile satellite services (2007/98/EC).*

On 14 February 2007, the European Commission adopted a decision[26] designating the 2 GHz band for use by systems delivering mobile satellite-based services, to ensure that this band would be available to these systems in a harmonious fashion in all Member States. This decision sends out a strong message on the availability of spectral resources for such systems[27].

27 - Article 3 of Decision 2007/98/EC states that, "Member States shall designate and make available as from 1 July 2007 the frequency bands 1 980 to 2 010 MHz and 2 170 to 2 200 MHz for systems providing mobile satellite services".

However, the systems that will potentially use the 2 GHz-band have 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. A draft decision from the European Parliament and Council was adopted by the College of Commissioners on 22 August 2007.

The selection and licensing process proposed by the Commission comprises two phases. After publication of a call for candidates, the first phase consists of assessing the technical and commercial maturity of the candidate systems. In cases where spectrum is scarce, as determined by the outcome of this first phase, the eligible candidates will undergo a second round of selection based on the following criteria: pan-European geographical coverage, competitive advantages for consumers, efficiency of spectrum use and general interest objectives. A draft version of the call for submissions is currently being drawn up by the Commission, in tandem with Member States (within the COCOM licensing sub-group).

The Commission has set early 2009 as the deadline for completing the Europe-wide selection process, but the ability to meet this deadline will depend on when the co-legislators of the decision adopt it.

Once this Community process is complete, it will be up to the Member States to award the frequency licences to the selected candidates.

5. Frequency assignments and allotments

In 2007, 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:

- 11,180 new frequency assignments (as many as in 2006);
- 440 changes to existing frequency assignments;
- 5,086 frequency assignment cancellations;
- 3,351 international coordination efforts.

As of 31 December 2007, the Authority's database was managing:

- 3,162 in-service frequency assignments for the fixed satellite service;
- 64,447 in-service frequency assignments for the fixed service.

On 25 March 2006, ARCEP announced the implementation of new management terms for frequencies above 20 GHz for fixed service point-to-point links. These frequencies will now be managed either by assignment or by allotment upon

request, with justification if need be. Use of the frequency bands below 20 GHz is authorised solely through frequency assignment.

In 2007, 258 decisions concerning professional terrestrial mobile and fixed networks in the 1.5 GHz band were adopted, including:

- 41 decisions on microwave systems;
- 102 decisions on mobile networks, excluding PMR networks: 45 on allotted frequencies and 57 on assigned frequencies;
- 115 decisions on PMR networks: terrestrial (88), maritime (19) and aeronautical (8), representing 1,750 created networks, 1,375 renewed and 500 modified.

6. Frequency register

Making a frequency register available is an important part of the frequency management process, allowing the players concerned to access relevant information on the licences that could be made available for trading.

This database provides a response to both industry and consumer needs, and implements regulatory provisions aimed at developing the information concerning spectrum that is made available to the public:

- 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 provisions contained in the European Commission Decision 2007/334/EC 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 2006-1016 of 11 August 2006 concerning spectrum licence sales and which requires the Authority to create a register for the sale of spectrum licences.

The database, which has been accessible on the ARCEP website since February 2008[28], provides a complete view of all electronic communications services and applications. 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.

28 - *Cf. http://www.arcep.fr/index.php?id=8977.*

It also provides 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.

To guarantee the relevance of this information, updating the database is part of the quality process initiated by the Frequency Unit in 2005, and given ISO 9001 certification in October 2006[29].

29 - *Cf. ARCEP annual report, 2006, p. 329.*

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

Geographic numbers: numbers starting with 01, 02, 03, 04, 05, reserved for fixed lines (allocated to operators by blocks of 10,000 numbers).

Non-geographic numbers: (new) 09AB numbers reserved for fixed lines (097B numbers are due to replace 087B numbers by 15 December 2008).

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

Value-added services[30]

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

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

Special 10XY numbers: numbers reserved by an operator for offering services to its subscribers (e.g. for reporting service interruptions).

3BPQ short numbers: 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 mission

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[31].

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[32] and MCC+MNC codes (for GSM network SIM cards and TETRA networks).

30 *- Cf. Part 4, Chapter 5, H.*

31 *- 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).*

32 *- These codes correspond to technical addresses that serve to identify the PSTN's signalling resources, based on the CCITT n° 7 protocol. They are similar to the X.25 addresses used in packet switching transmission 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[33] and decree[34]. For example: a block of 10,000 "classic" numbers – such as 01 40 47 MC DU – costs 200 euros a year; a four-digit prefix costs 40,000 euros a year. For a single-digit prefix, referred to as an E prefix, the beneficiary must pay an annual fee of 400,000 euros. Article L.44 of the CPCE also addresses operators' obligations to provide their customers with a number portability service.

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

34 - *Decree dated 6 August 2007, establishing the value of the coefficient that de termines the tax base for numbering resource allocation., JO of 28 August 2007.*

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[35]: this is referred to as number portability[36]. This system applies to fixed geographical numbers (starting with 01, 02, 03, 04 and 05, but does not apply to subscribers who move outside a certain perimeter), to non-geographical fixed numbers (starting with 08, 087 and 09) or to mobile numbers (starting with 06). For example: the turnaround time for mobile number portability (MNP) in Metropolitan France has been brought down to 10 days since 21 May 2007.

35 - *Article L. 44 of the CPCE.*

36 - *The procedure is described in greater detail in Part 4, Chapter 5, E.*

Surcharged numbers and the "Chatel" Act

Adopted on 3 January 2008, the "Chatel" Act strengthens the consumer code, one of the primary goals being to provide stronger guidelines for the contractual relationship between telecommunications operators and their customers.

ARCEP was given the task of defining the list of surcharged numbers – with all the other numbers being, by definition, non-surcharged.

Article 16, II.

"*Under the national numbering plan, the Authority identifies the list of numbers or blocks of numbers that can be surcharged. The numbers or blocks of numbers that do not appear on this list are not surcharged.*"

2. Resources allocated in 2007

In 2007, the Authority adopted 239 decisions on numbering. They are broken down as follows:

- 3 decisions that are general in scope;

- 236 decisions on the day-to-day management of numbering resources; these decisions are broken down into 186 allocation decisions, 11 operator-to-operator transfer decisions, 4 decisions amending previous decisions and 35 repeal decisions.

Numbering resource status at the end of 2007

Type of number	Quantity allocated
Person-to-person communications	
Fixed geographic numbers (01, 02, 03, 04, 05)	194,530,000
Non-geographic person-to-person numbers (09AB and 087B)	29,500,000
Mobile numbers (06)	82,640,000
Value-added services	
Special numbers 10XY	21
Short numbers (3BPQ)	206
Six-digit numbers (118XYZ)	26
Non-geographic VAS numbers (08AB except 087B)	14,241,000
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-digit carrier network selection	4
Short numbers (3BPQ) for other uses	186
Total	206

Other resources allocated in 2007

National semaphore signalling points[37]	5461
International semaphore signalling points	125

An information system is available to the public on the ARCEP website[38]: 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.

37 *- These resources correspond to technical addresses that serve to identify the PSTN's signalling resources, based on the CCITT n° 7 protocol. They are similar to the X.25 addresses used in packet switching transmission networks.*

38 *- Cf. ARCEP's website: http://www.arcep.fr/index.php?id=interactivenumeros.*

Number database for the industry

ARCEP offers members of the telecommunications sector online access to the G'NUM* database.

This database allows them to access a range of information on person-to-person services, which 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 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.

* www.gnum.arcep.fr