

# 900 MHz and 1800 MHz band refarming case study

## France

*30 November 2011*

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## 1. Introduction

The GSM Association (“GSMA”) has retained NERA Economic Consulting (“NERA”) to write a report on the French process of refarming the 900 MHz and 1800 MHz bands for the purpose of documenting and sharing experience on what has happened in actual refarming cases around the world. Refarming is the term used for the process governing the repurposing of frequency bands that have historically been allocated for 2G mobile services (using GSM technology) for new generation of mobile technologies, including both third generation (using UMTS technology) and fourth generation (using LTE technology). This case study has been prepared by Dr Maria Maher, a NERA Senior Consultant.

This report is intended to provide a factual description of the refarming process carried out in France. It does not and is not intended to provide any judgement on the effectiveness of the process nor its impact on future market developments. Furthermore, this report is not intended to express any views or positions of the GSMA and/or the mobile industry.

The primary sources for this report are the documents released by the French communications regulator, L’Autorité de régulation des communications électroniques et des postes (“Arcep”), and its predecessor, L’Autorité de Régulation des Télécommunications (ART). These sources, which include both consultation documents and summaries of consultation responses, can be found on Arcep’s website at <http://www.arcep.fr/>. All Arcep documents are in French, although summaries of the documents are sometimes available in English. This case study is intended to provide the reader with a detailed summary of the French refarming process in the English language, such that readers can understand the process regardless of whether they can read the source material in French.

### *Structure of the report*

The remainder of this report is organised as follows:

- Section 2 provides an executive summary of the report;
- Section 3 discusses the award of 3G licenses in the 2.1 GHz band from 2000-2002, where the concept of refarming was first discussed;
- Section 4 reviews Arcep’s consultations between 2003 and 2009 on the renewal of GSM licenses and eventual reuse of GSM licenses for 3G;

- Section 5 discusses the linked processes from 2006 to 2010 for refarming the 900 MHz and 1800 MHz bands and the licensing of a fourth 3G operator; and
- Section 6 describes the current situation with respect to refarming as of October 2011.

## 2. Executive Summary

The 900 MHz and 1800 MHz bands in France have historically been used for providing 2<sup>nd</sup> generation mobile services using GSM technology. As 2G networks approach the end of their natural life, France – in common with all European countries – has been obliged to consider options for refarming these frequency bands for new mobile technologies. Such refarming is consistent with resolutions 223 and 2124 of the International Telecommunications Union’s WRC-2000, which identified these bands (together with the 2.6 GHz band) as suitable for IMT-2000 technologies.<sup>1</sup> More recently, in 2009, the European Directive (2009/114/EC)<sup>2</sup> and Decision (2009/776/ED)<sup>3</sup> on the 900 MHz and 1800 MHz bands, along with the 2011 Commission Decision (2011/251/EC)<sup>4</sup>, have cleared the way for refarming the 900 MHz and 1800 MHz bands on a technology neutral basis, subject to new systems – which may include UMTS, LTE or WiMAX technologies – being able to coexist with legacy GSM networks.

France began to think about the process of refarming 2G spectrum as far back as 2001, at the time of its first 3G award. Successful applications for 3G licences committed themselves to participating in any redistribution of spectrum across operators linked to refarming of their 2G licences. Until recently, there were three 3G licensees – Orange France (“Orange”), Société Française du Radiotéléphone (“SFR”) and Bouygues Telecom (“Bouygues”) – who are also the three incumbent 2G operators.

The refarming process that emerged over the following decade has a number of notable features:

- Refarming in France is operator driven – all existing 2G spectrum licences were renewed in their entirety. Operators decide when to apply to have their licences changed to allow for deployment of new technologies.
- Arcep has a policy of promoting equitable spectrum holdings across operators, and this is reflected in the refarming processes. Once an operator applies to

<sup>1</sup> <http://www.itu.int/ITU-R/index.asp?category=conferences&rlink=wrc-00-results&lang=en>

<sup>2</sup> Official Journal of the European Union, Directive 2009/114/EC of the European Parliament and of the Council, amending Council Directive 87/372/EEC (the so-called “GSM Directive”), 16 September 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF>.

<sup>3</sup> Official Journal of the European Union, Commission Decision 2009/766/EC on the harmonisation of 900 and 1800 bands, 16 October 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0032:0035:EN:PDF>.

<sup>4</sup> Official Journal of the European Union, Commission Decision 2011/251/EC amending Decision 2009/766/EC, 18 April 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:106:0009:0010:EN:PDF>

refarm spectrum in a 2G band, this triggers a formal review of spectrum holdings in that band, which may result in redistribution of spectrum between operators. Reflecting this policy, the process of refarming has been closely linked to the licensing of a fourth mobile operator, a process that was completed in January 2010 with the entry of Iliad Free Mobile (“Free”).

- The refarming process was not technology neutral. All decisions prior to 2009 focused on reuse of 2G spectrum for 3G (UMTS) services. Following the adoption of the 2009 EC Directive and Decision and its 2011 modification into French law, the existing framework allows for the introduction of LTE in the 900 MHz and 1800 MHz bands.<sup>5</sup>

France allowed refarming of the 900 MHz band in February 2008, before the 2009 EU Directive and Decision came into force. Accordingly, a process was initiated to collectively redistribute 2x5 MHz of 900 MHz spectrum from Orange, SFR and Bouygues to Free. With the adoption of the 2009 EC Directive and Decision into French law, the existing framework allows for the introduction of LTE, in addition to UMTS in the 1800 MHz band, in line with developments in the European equipment market. French operators may request to refarm, triggering a public consultation by Arcep, which might result in a redistribution of frequency holdings. Refarming in the 1800 MHz band has not yet been initiated, as none of the three incumbent operators have requested this.

Table 1 below provides an overview of the spectrum holdings of the three mobile network operators prior to the granting of the fourth 3G license; and Table 2 provides an overview of spectrum holdings after the licensing of a fourth 3G operator and once the redistribution from incumbent operators will be complete in 2013.

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<sup>5</sup> France has implemented the 2009 EC Directive and Decision, and its 2011 modification into French law, allowing LTE and/or WiMAX, along with UMTS, in the 900 MHz and 1800 MHz bands.

**Table 1: Overview of spectrum holdings in France prior to award of fourth License**

France	Orange France	SFR	Bouygues Telecom	Unassigned
900 MHz (high density areas)	2x12.4 MHz	2x12.4 MHz	2x9.8 MHz	
900 MHz (all other areas)	2x10 MHz	2x10 MHz	2x14.6 MHz	
1800 MHz (high density areas)	2x23.8 MHz	2x23.8 MHz	2x26.6 MHz	
1800 MHz (all other areas)	2x23.8 MHz	2x23.8 MHz	2x21.6 MHz	2x5 MHz
2100 MHz (FDD)	2x14.8 MHz	2x14.8 MHz	2x14.8 MHz	2x14.8 MHz
2100 MHz (TDD)	1x5 MHz	1x5 MHz	1x5 MHz	1x20 MHz

Source: Arcep

**Table 2: Overview of spectrum holdings in France after award of fourth License and redistribution**

France	Orange France	SFR	Bouygues Telecom	Free Mobile	Unassigned
900 MHz	2x10 MHz	2x10 MHz	2x9.8 MHz	2x5 MHz <sup>1</sup>	
1800 MHz (high density areas)	2x23.8 MHz	2x23.8 MHz	2x26.6 MHz		
1800 MHz (all other areas)	2x23.8 MHz	2x23.8 MHz	2x21.6 MHz		2x5 MHz
2100 MHz (FDD)	2x14.8 MHz	2x14.8 MHz	2x14.8 MHz	2x5 MHz	2x9.8 MHz <sup>2</sup>
2100 MHz (TDD)	1x5 MHz	1x5 MHz	1x5 MHz		1x20 MHz

<sup>1</sup> Free Mobile: 2x5 MHz available in all areas except high density areas from 13 July 2011; and in high density areas from 1st January 2013.

<sup>2</sup> The remaining unassigned 2x5 MHz and 2x4.8 MHz were awarded respectively to SFR and Orange in June 2010.

Source: Arcep

### **3. Award of 3G Licenses in the 2.1 GHz Band (2000-2002)**

The French regulator has a policy of awarding frequency holdings such that operators have an equitable distribution of frequency holdings. The possibility of redistributing the GSM bands in the event of new entry and reuse of the 900 MHz and 1800 MHz bands for 3G was first discussed in the context of awarding the 3G licenses and was closely linked with the licensing of a fourth 3G operator.

France launched two application processes for UMTS licenses in the 2.1 GHz band, the first in August 2000 and the second in December 2001. The awards formats were 'beauty contests', based on applications for licences at prices fixed by the government. Only three of the four 3G licenses on offer were eventually awarded, and went to all three of the incumbent GSM operators. At the first attempt, the government only sold two of the four 3G licences available. Orange and SFR were awarded 3G licenses in the first beauty contest. In October 2001, Arcep's predecessor, ART, amended the terms and fees of the 3G licenses, applying them retrospectively to Orange and SFR. In December 2001 it re-launched the beauty contest for the remaining two licenses. The sole bidder, Bouygues, was awarded a concession in September 2002. This left a fourth possible license still unassigned.

The application procedures for the 3G licenses foresaw the possible reuse of the GSM frequency bands for UMTS. Section I-6-3 of the application procedures states that in the event such reuse is considered, the Authority will conduct a review of the of the frequency holdings assigned to each 2G and/or 3G operator. In the event that an operator has fewer resources than its competitors, the Authority may adopt decisions to redistribute the frequencies to restore equity amongst the operators. It is thus possible that when the frequencies of the GSM bands are reused for 3G that these frequencies are redistributed. Any costs associated with such redistribution will be borne by the operators and is not subject to any financial compensation. By applying for, and obtaining, a 3G license under the terms and conditions of the application procedure conducted in 2000 and 2001, Orange, SFR and Bouygues agreed to these provisions.



#### **4. Consultations on Renewal of GSM Licenses and Eventual Reuse of Licenses for UMTS technology (2003-2009)**

The initial 15-year GSM licenses of Orange and SFR were due to expire in March 2006, with Bouygues' license expiring at a later date of December 2009. The conditions for the renewal of the licenses are defined in Article L.33-1 of the Post and Electronic Communications Code ("CPCE"). The Minister in charge of Telecommunications, based on proposals by the regulator, was obliged to notify license holders of the renewal conditions of their licenses or, in the event of non-renewal, why the licenses would not be renewed two years prior their expiration. While ART (later Arcep) determines the renewal conditions, the determination of license fees is the responsibility of the Government.

Given the date the licenses were initially granted and the two-year notification requirement, France was the first European Union country to notify operators of the renewal conditions of their GSM licenses. In the second half of 2003 and early 2004, operators and other interested parties were discussing the GSM license renewal conditions with ART. The Authority's consultation on GSM license renewal also raised the issue of reusing the GSM bands for UMTS.

The issue of reuse of 900 MHz and 1800 MHz spectrum for UMTS came up not only in the context of the renewal of the GSM licenses, but also in regard to the coverage obligations previously made by the GSM operators in their 3G licenses. In 2004, recognising the difficulty operators were facing in meeting their 3G rollout obligations, ART revised the rollout obligations. In its press communication of 9 March 2004, ART announced the revised obligations, while at the same time confirming that the mid-term objective of national UMTS coverage was maintained. In order to achieve this objective, ART stated in its press communication that innovative solutions, such as the use of the GSM 900 band for UMTS, would be considered.<sup>6</sup>

##### *July 2003 Consultation – Renewal of Orange and SFR's GSM Licenses*

In July 2003, ART issued a public consultation of the renewal of the GSM licenses of Orange and SFR, and asked all interested parties to respond by 6 October 2003.<sup>7</sup>

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<sup>6</sup> Press release, 9 March 2004: <http://www.arcep.fr/index.php?id=8076>.

<sup>7</sup> Consultation publique sur le renouvellement des autorisations GSM, July 2003: [http://www.arcep.fr/uploads/tx\\_gspublication/conspublication/conspublication-re-nouv-gsm.pdf](http://www.arcep.fr/uploads/tx_gspublication/conspublication/conspublication-re-nouv-gsm.pdf)

## Consultations on Renewal of GSM Licenses and Eventual Reuse of Licenses for UMTS technology (2003-2009)

In its July 2003 consultation, ART already noted the transition to UMTS and raised the issue of the possible reuse of the GSM frequencies. It proposed renewing the GSM licenses with the same frequency holdings as the existing licenses, but leaving open the possibility to review these holdings at a later date depending on the evolution of spectrum requirements for GSM, the possible reuse of these frequencies for 3G networks, and the possible entry of a new 3G operator. Arcep's later consultations on the refarming of the 900 MHz and 1800 MHz spectrum therefore was closely linked to its plans to license a fourth 3G operator in the 2.1 GHz band.

ART received 11 contributions to its consultation. In addition, ART interviewed the three GSM operators and the French Association of Mobile Operators (AFOM), and met with other stakeholders that wished to express their views on the GSM renewal authorisations.

In January 2004, ART published a summary of the responses to its consultation on the renewal of the GSM licenses.<sup>8</sup> With regard to the issue as to when the GSM frequencies could be reused for UMTS, all contributors favoured giving maximum flexibility to operators. Given the uncertainty concerning the pace of migration of 2G users to 3G networks, contributors felt it was difficult to predict a precise timetable for the refarming of GSM frequencies.

### *March 2004 Decision*

At the end of the consultation phase, ART detailed its proposal for the renewal of licenses, and initiated discussions with the two operators concerned (Orange and SFR) and with Bouygues, whose license was not yet up for renewal. The detailed conditions proposed to the Minister for the renewal of Orange and SFR's GSM licenses can be found in ART's Decision No. 04-0151, dated 24 March 2004.<sup>9</sup> The advisory Commission for radio-communications (CCR) was also consulted on 24 March, 2004.

According to Article L.36-7 (6°) of the CPCE, the awarding of frequencies must be objective, transparent and non-discriminatory, and ensure competitive conditions in the market. At the time of the consultation on the GSM license renewals of Orange and SFR there was no interest expressed by a new entrant to enter the market. In the absence of such interest, ART decided to renew Orange and SFR's GSM licenses with the same

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<sup>8</sup> Arcep received contributions from 11 different parties, including the GSM operators. A synthesis of these contributions to its consultation on the GSM license renewal was published in January 2004: [http://www.arcep.fr/fileadmin/reprise/publications/ref\\_autogsm/synt-renouvgsms.pdf](http://www.arcep.fr/fileadmin/reprise/publications/ref_autogsm/synt-renouvgsms.pdf)

<sup>9</sup> ART decision n° 04-150: [http://www.arcep.fr/uploads/tx\\_gsavis/04-150.pdf](http://www.arcep.fr/uploads/tx_gsavis/04-150.pdf)

## Consultations on Renewal of GSM Licenses and Eventual Reuse of Licenses for UMTS technology (2003-2009)

frequency holdings for another 15 years. However, the renewal included provisions for potential redistribution of some of the renewed frequencies to a fourth operator.

The main provisions relating to the conditions for the GSM license renewals for Orange and SFR were also published in the Official Bulletin of the Ministry of Economy, Finance and Industry.<sup>10</sup> In its Bulletin the Ministry stated that operators may request reusing all or part of their GSM frequencies for 3G. In this case, the Authority will consult on the possible redistribution of the 900 MHz and 1800 MHz band and may modify the holdings to ensure a fair distribution of frequencies between all GSM and 3G mobile network operators.

*“Utilisation des fréquences, modalités et échéance concernant la réutilisation des fréquences GSM pour l’UMTS*

L’opérateur peut demander la réutilisation de tout ou partie des bandes de fréquences qui lui sont attribuées au titre de son autorisation GSM pour l’exploitation de son réseau mobile de troisième génération.

Dans ce cas, l’Autorité engage une concertation sur la base de laquelle elle peut être amenée à redéfinir la répartition des attributions de fréquences dans les bandes GSM 900 et 1800 MHz afin de garantir le maintien de l’équité des attributions de fréquences entre l’ensemble des opérateurs de réseau mobile de deuxième et troisième générations.

L’Autorité modifiera en conséquence les décisions d’autorisation d’utilisation des fréquences de l’ensemble des opérateurs concernés.”<sup>11</sup>

The principle of fair distribution of frequency holdings across operators is not defined in detail, thus giving some latitude to the Authority in determining future redistribution of spectrum. The general principle is that operators should have access to (or at least have been given the option of having access to) a reasonably equitable distribution of frequencies across bands.

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<sup>10</sup> *BO Minéfi* – n° 12 – 4e trimestre 2004: <http://www.arcep.fr/fileadmin/reprise/dossiers/auto-gsm/boac2004-4t.pdf>

<sup>11</sup> *BO Minéfi* – n° 12 – 4e trimestre 2004, p. 15-16.

***January 2006 and February 2006: SFR and Orange's GSM licenses renewed with possibility to request reuse of GSM bands for UMTS***

On 31 January 2006, Arcep renewed SFR's GSM licenses (Decision No. 06-0140)<sup>12</sup>; and on 14 February 2006, it renewed Orange's GSM license (Decision No. 06-0239)<sup>13</sup>. The key terms of the renewal were as follows:

- The licenses were renewed for 15 years, with the operators frequency holdings unchanged.
- The GSM authorisations allow Arcep to conduct a re-examination of the frequency holdings in relation to the actual needs of the operators by the following deadlines: 5 years after the renewal (i.e. 24 March 2011) and 10 years after the renewal (i.e. 24 March 2016).
- The licenses allow for the introduction of UMTS in the 900 MHz and 1800 MHz bands – i.e. the license holder could request to use all or part of its GSM allocation for UMTS. In this case, Arcep can modify the licenses and may reallocate the frequencies to ensure a fair distribution of frequencies between all GSM and 3G mobile network operators.
- Coverage obligations of 99% of the population from end-2007.
- The GSM license fees were set by the Government and consisted of two parts: an annual fixed payment of Euros 25 million and a variable fee equal to 1% of turnover related to all revenues attributable to the use of relevant frequency bands.<sup>14</sup>

***October 2006 Consultation – Renewal of Bouygues GSM License***

In October 2006, Arcep issued a public consultation on the renewal of Bouygues' GSM license expiring in December 2009, proposing to renew Bouygues GSM license under the same conditions as those of Orange and SFR.<sup>15</sup> As with Orange and SFR's renewals, Bouygues' frequency holdings could be reviewed depending on the evolution of

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<sup>12</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/06-0140.pdf](http://www.arcep.fr/uploads/tx_gsavis/06-0140.pdf)

<sup>13</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/06-0239.pdf](http://www.arcep.fr/uploads/tx_gsavis/06-0239.pdf)

<sup>14</sup> <http://www.arcep.fr/fileadmin/reprise/dossiers/auto-gsm/avis-redevc-200604.pdf>

<sup>15</sup> Public consultation on Bouygues' GSM license renewal, October 2006:  
[http://www.arcep.fr/uploads/tx\\_gspublication/consult-autogsm-bouygues-051006.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-autogsm-bouygues-051006.pdf)

spectrum requirements for GSM, the reuse of these frequencies for UMTS, and the possible entry of a new 3G operator.

On 23 November 2006, Arcep published a synthesis of the responses to the consultation. Apart from the contribution from Bouygues, Arcep received one other contribution, which argued that reallocation of the GSM bands in the event of reuse of the GSM bands for 3G use should be directly included in the authorisation renewing Bouygues' license. Arcep noted that the existing GSM licenses of the three operators already contained the necessary provisions for the redistribution of frequency holdings in the bands in the event of reuse of the GSM bands for 3G.

### *December 2007 Decision*

On 4 December 2007, Arcep published its decision on the renewal conditions for Bouygues' GSM license (Decision No. 2007-1114), effectively proposing to renew Bouygues' license under the same conditions as for Orange and SFR.<sup>16</sup>

### *November 2009 Renewal of Bouygues' GSM License*

On 5 November 2009, Arcep renewed Bouygues GSM licence for 15 years (Decision No. 2009-0838).<sup>17</sup> By the time Bouygues license was renewed, Arcep had undertaken consultations on the refarming of the GSM bands and allowed refarming of the 900 MHz band for UMTS. Under the conditions taken in its decisions on refarming the 900 MHz and 1800 MHz band, Bouygues' GSM license specifies the frequency assignments that Bouygues may have to give back in the event that a fourth 3G operator entered the market before 30 June 2010.

### *Frequency assignments prior to the licensing of a new 3G entrant*<sup>18</sup>

A summary of the frequencies assigned to the three incumbent operators, following the renewal of Bouygues' licences, and prior to the entry of a fourth operator, is provided in the following figures.

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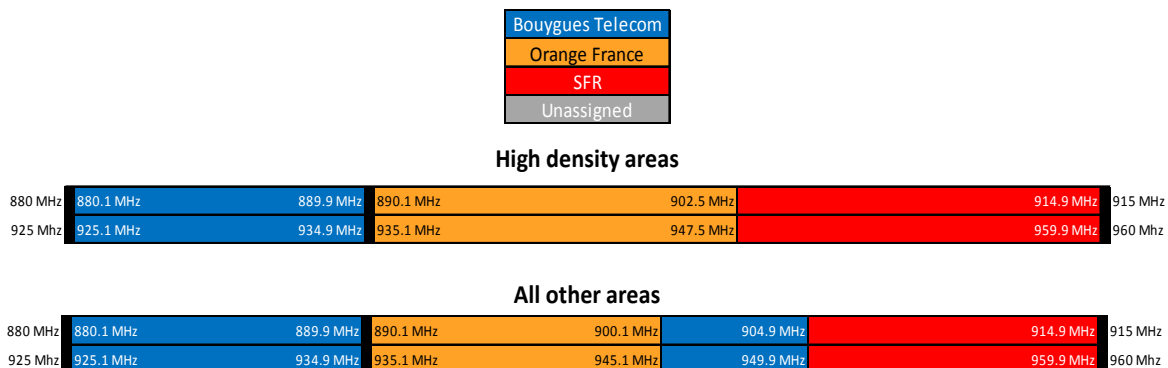
<sup>16</sup> [http://www.arcep.fr/fileadmin/uploads/tx\\_gsavis/07-1114.pdf](http://www.arcep.fr/fileadmin/uploads/tx_gsavis/07-1114.pdf)

<sup>17</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/09-0838.pdf](http://www.arcep.fr/uploads/tx_gsavis/09-0838.pdf)

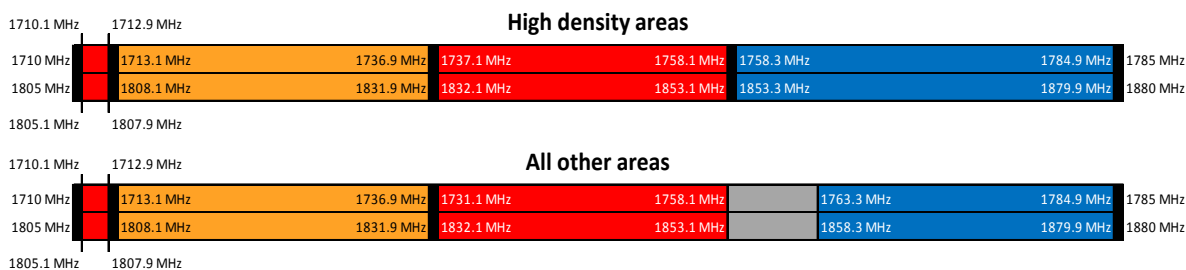
<sup>18</sup> Source: Arcep, Spectrum assignments in France, 26 April 2010. High density areas are defined as the areas surrounding and including Paris, Lille, Strasbourg, Lyon, Nice, Marseille, Toulouse and Bayonne. See Decision No. 2006-0140 for the precise boundaries.

# Consultations on Renewal of GSM Licenses and Eventual Reuse of Licenses for UMTS technology (2003-2009)

## The 900 MHz band – 2x35 MHz (880-915 / 925-960 MHz)

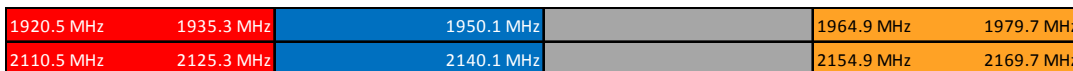


## The 1800 MHz band – 2x75 MHz (1710-1785 / 1805-1880 MHz)



## The 2.1 GHz band – 2x60 MHz (1920-1980 / 2110-2170 MHz) + 20 MHz unpaired

### FDD (paired spectrum)



### TDD (paired spectrum)



## **5. Consultations on Licensing a fourth 3G Operator and the Associated Process of Refarming the 900 MHz and 1800 MHz Bands (2006-2010)**

Arcep's proposals for refarming the 900 MHz and 1800 MHz spectrum have always been closely linked to its plans to license a fourth 3G operator. In making this link, Arcep has noted, in particular, the characteristics and value of the 900 MHz band relative to higher frequency bands, specifically that the 900 MHz spectrum is advantageous for rural coverage, as lower frequency spectrum can cover wider areas with fewer cell sites, and that it provides superior in-building penetration. Accordingly, it has expressed concern that a fourth 3G operator would be at a competitive disadvantage relative to the three incumbents if it did not have access to 900 MHz spectrum.

Arcep has considerable autonomy in making decisions on redistribution of frequency holdings in the event of refarming. Notably, the French Competition Authority was not involved in the refarming process, as Arcep's policy is to assign equitable amounts of spectrum across operators to ensure competitive conditions in the market under Article L.36-7 of the CPCE. In addition, unlike some other countries, the military was also not involved, as the whole of the E-GSM spectrum had been released to mobile operators in prior processes.

A key aspect of Arcep's approach to refarming has been to allow operators to drive the process. The renewed GSM authorisations of Orange and SFR allow the operators to request permission to reuse the 900 MHz and 1800 MHz bands for UMTS (Bouygues' later renewal does the same). Within the framework of their renewed GSM licenses, in March/April 2006, both SFR and Orange stated their desire to take advantage of refarming in the 900 MHz band.<sup>19</sup> In conformity with their authorisations, Arcep responded by launching a public consultation aimed at determining whether the distribution of the 900 MHz and 1800 MHz bands needed to be redefined in order to ensure that the frequencies are distributed equitably amongst all the 2G and 3G mobile operators.

### ***October 2006 Consultation on refarming the 900 MHz and 1800 MHz bands for 3G and on a fourth 3G license in the 2.1 GHz band***

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<sup>19</sup> On 31 March 2006 and 5 April 2006, SFR and Orange respectively wrote to Arcep requesting permission to refarm the 900 MHz band.

## Consultations on Licensing a fourth 3G Operator and the Associated Process of Refarming the 900 MHz and 1800 MHz Bands (2006-2010)

On 5 October 2006, Arcep issued a public consultation on refarming of the 900 MHz and 1800 MHz band and the licensing of a fourth 3G operator in the 2.1 GHz band, and asked all interested parties to respond by 17 November 2006.<sup>20</sup>

The first part of Arcep's October 2006 consultation deals with the request for GSM refarming by Orange and SFR. Arcep's consultation noted two important objectives to refarming the 900 MHz and 1800 MHz currently used for GSM:

- to help meet UMTS coverage obligations outside of high density areas in the short term (particularly using the 900 MHz band); and
- to help meet capacity needs in high density areas in the medium term.

The second part of Arcep's October 2006 consultation addresses whether or not there is interest in the fourth 3G license still available in order to determine whether the refarmed 900 MHz and 1800 MHz band needed to be shared between three or four operators. Arcep's consultation noted that this would be the last opportunity for a new player to have access to a 3G license under the condition defined in 2001 – that is, to have a 3G license in the 2.1 GHz band along with complementary access in the 900 MHz and 1800 MHz bands refarmed for 3G use.

If no player showed interest in entering the market, or if the award of a fourth 3G license was unsuccessful, the assignment of frequency would be based on the three existing operators. Given the investments necessary to refarm the GSM bands, Arcep stated that it would not be possible for a new entrant at a later date to have the same access to the 900 MHz and 1800 MHz bands for 3G that the three incumbent operators have. If in response to its October 2006 consultation interest was expressed in a fourth license, Arcep proposed to immediately launch the process to award a fourth 3G license during 2007 and under the same conditions as the 3G licenses awarded in 2001.

### *Results of October 2006 Consultation*

On 23 November 2006, Arcep issued a press release regarding the outcome of its consultation.<sup>21</sup> Arcep received 21 responses. Several players expressed interest in the

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<sup>20</sup> Arcep, Consultation publique sur la réutilisation des fréquences 900MHz et 1800MHz pour la 3G et sur la quatrième licence 3G dans la bande 2 GHz, [http://www.arcep.fr/uploads/tx\\_gspublication/consult-freqc-900-1800-051006.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-freqc-900-1800-051006.pdf).

<sup>21</sup> Press release 23 November 2006 on 3G: [http://www.arcep.fr/index.php?id=8571&tx\\_gsactualite\\_pi1\[uid\]=895&tx\\_gsactualite\\_pi1\[annee\]=&tx\\_gsactualite\\_pi1\[theme\]=&tx\\_gsactualite\\_pi1\[motscle\]=&tx\\_gsactualite\\_pi1\[backID\]=26&cHash=5e97bad520](http://www.arcep.fr/index.php?id=8571&tx_gsactualite_pi1[uid]=895&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=5e97bad520)



## Consultations on Licensing a fourth 3G Operator and the Associated Process of Refarming the 900 MHz and 1800 MHz Bands (2006-2010)

assignment of a fourth 3G license in 2007. This was a new development. Until now there had been no interest expressed in the fourth license which remained available following the two previous application procedures.

The responses to the consultation also confirmed the importance of reusing the GSM bands for 3G, with access to the 900 MHz band being particularly important, both for existing operators and for any new entrant, in order to extend 3G coverage. In their responses, industry representatives confirmed the future availability of UMTS networks and terminals in the 900 MHz band.

In its press release, Arcep confirmed:

- that it would propose an application process for the award of a fourth license; and
- that it had already initiated work with regard to establishing the means by which the frequencies currently used for 2G could be used for 3G and that this refarming would be based on distributing the frequencies between four operators if a fourth license is assigned, or otherwise would be based on distributing the frequencies between the three incumbent operators.

### *Launching of a third beauty contest for the fourth 3G license*

Following the October 2006 Consultation, on 20 February 2007, Arcep adopted and sent to the Ministry its Decision containing its proposals for awarding a fourth 3G license under the same conditions as the previous two awards procedures conducted in 2000 and 2001 for the first three licenses (Decision No. 2007-0177).<sup>22</sup>

The general conditions of the beauty contest are defined in the Annex of Arcep's Decision No. 2007-0177 and provide measures to facilitate the licensing of a new entrant operator. These measures cover, amongst others, the reuse of the frequencies currently used for 2G for 3G uses; national 2G roaming; and site sharing. As stated previously, the reuse of the 900 MHz and 1800 MHz bands for 3G services had already been planned since the first 3G application procedures in the 2.1 GHz band. Applications needed to be filed by 31 July 2007. In the meantime, as stated in its Decision, Arcep committed itself to providing more details on how the fourth operator would be

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<sup>22</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/07-0177.pdf](http://www.arcep.fr/uploads/tx_gsavis/07-0177.pdf)

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provided with 900 MHz and 1800 MHz frequencies reused for 3G,<sup>23</sup> so that applicants would be able to take this into consideration when preparing their applications.<sup>24</sup>

Following Arcep's publication of its Decision regarding the terms and conditions for the award of a fourth license, the Minister now had to officially launch the application process by simultaneously publishing the related financial conditions. On 8 March 2007, the Ministry of Industry officially launched the application process for the assignment of the fourth license, and published the financial conditions.<sup>25</sup>

### *May 2007 Consultation on the introduction of UMTS in the 900 MHz and 1800 MHz bands*

On 4 May 2007, Arcep issued another consultation on the introduction of UMTS services in the 900 MHz and 1800 MHz bands, taking into account the launch of the application procedure for the fourth 3G license, and laying out its plans for the redistribution of the 900 MHz band.<sup>26</sup> In its consultation, Arcep presented an analysis of market needs and resources available, and requested comments on the possible division of the 900 MHz band among the operators. Responses to the consultation were due on 4 June 2007.

Since December 2006, Arcep had been engaged in technical discussions with Orange, SFR and Bouygues in order to establish an inventory of the GSM frequencies used and to identify possible scenarios for their reuse for 3G. Arcep identified the 900 MHz band as needing a rapid authorization for reuse by the operators and any new entrant; and proposed allowing the introduction of UMTS in the 900 MHz band as soon as the uncertainties regarding the number of 3G operators to be considered in the distribution of frequencies is resolved. It found that the case for refarming the 1800 MHz band was less pressing than that for the 900 MHz band; and that the timing of commercial availability of equipment compatible with UMTS in the 1800 MHz band would be much later than that of UMTS for the 900 MHz band. Arcep's therefore proposed that refarming of the 1800 MHz band be dealt with separately and at a future date depending on the needs of the market.

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<sup>23</sup> The cost associated with any redistribution of frequencies is borne by the operators and is not be subject to any financial compensation.

<sup>24</sup> Arcep launched this consultation in May 2007 laying out its proposal for the redistribution of GSM frequencies in the event of entry of a fourth 3G operator.

<sup>25</sup> <http://www.arcep.fr/fileadmin/reprise/dossiers/umts/avis-mod-fin-umts-080307.pdf>

<sup>26</sup> Arcep, Consultation publique sur l'introduction de l'UMTS dans les bandes des fréquences mobiles à 900 et à 1800MHz en France métropolitaine, [http://www.arcep.fr/uploads/tx\\_gspublication/consult-umts-900mhz-mai2007.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-umts-900mhz-mai2007.pdf).

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Arcep's plans for the redistribution of the 900 MHz band specified two scenarios:

- Scenario 1: in the event that the award of a fourth license is unsuccessful and no entry occurs, the 900 MHz spectrum holdings would effectively remain unchanged with the exception that Arcep proposed eliminating the guard bands and that the incumbent three operators manage interference issues themselves. In this case, in high density areas Orange and SFR would each be assigned 2x12.5 MHz (instead of 2x12.4 MHz) and Bouygues would be assigned 2x10 MHz (instead of 2x9.8 MHz); and in all other areas Orange and SFR would each be assigned 2x10 MHz (instead of 2x9.8 MHz) and Bouygues would be assigned 2x15 MHz (instead of 2x14.8 MHz).

**High density areas**



**All other areas**



- Scenario 2: in the event that a fourth operator enters the market, Arcep proposed redistributing the 900 MHz spectrum so that the new 3G entrant would also be awarded 2x5 MHz of the 900 MHz spectrum. Under this scenario, Arcep would redistribute 2x2.5 MHz each from Orange and SFR in high density areas (including guard blocks) and 2x5 MHz from Bouygues in other areas, so that the new entrant would have 2x5 MHz in all areas. After the redistribution, Orange, SFR, and Bouygues would each have 2x10 MHz in all areas, which could be used for 2G or 3G/UMTS.



In the event that a fourth operator entered the market, Arcep's consultation requested that interested parties comment on the dates that should be set for the release of the frequencies from the incumbent operators.

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### *Results of the May 2007 consultation and Directions set by Arcep on the introduction of 3G in the 900 MHz and 1800 MHz bands*

On 5 July 2007, Arcep issued a press release reporting on the results of the May 2007 Consultation.<sup>27</sup> Arcep received nine responses to its consultation. According to Arcep, the contributions supported the major outlines of its consultation proposals regarding the different scenarios for redistribution of frequencies in the 900 MHz band. Taking into account the responses to the consultation, on 5 July 2007 Arcep also published its Directions for the refarming of the 900 MHz and 1800 MHz bands which depend on whether the market will be composed of three or four mobile network operators.<sup>28</sup> In particular:

- *Three operator configuration:* The current assignments of the 900 MHz and 1800 MHz band would not change except for some minor adjustments regarding the guard bands. The authorisations of the 2G/3G operators would be modified to allow refarming in the 900 MHz and 1800 MHz bands upon request by the operator to reuse its frequencies.
- *Four operator configuration:* The frequency usage authorisations in the 900 MHz band of the three existing 2G operators would be modified as quickly as possible to allow refarming and to plan for the return of frequencies in order to assign 2x5 MHz in the 900 MHz band to the new 3G entrant. The existing operators would keep about 2x10 MHz each. The reuse of the 1800 MHz band would be examined at a later date, with a timetable adapted to market demands.

Arcep further announced its intention to impose the obligation that 3G users conform to the maximum levels of interference currently authorised for 2G networks in the 900 MHz band.<sup>29</sup> This condition was proposed to ensure that the introduction of UMTS technology at 900 MHz does not create any interference prejudicial for applications in adjacent bands.

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<sup>27</sup> Arcep's press release is also available in English:  
[http://www.arcep.fr/index.php?id=8571&L=1&tx\\_gsactualite\\_pi1\[uid\]=957&tx\\_gsactualite\\_pi1\[backID\]=1&cash=fe91fb5a9d](http://www.arcep.fr/index.php?id=8571&L=1&tx_gsactualite_pi1[uid]=957&tx_gsactualite_pi1[backID]=1&cash=fe91fb5a9d)

<sup>28</sup> <http://www.arcep.fr/fileadmin/reprise/dossiers/umts/orientation-900-1800-mhz-050707.pdf>

<sup>29</sup> This is in accordance with the electromagnetic compatibility studies mentioned in Arcep's consultation which tend to show that emissions outside the UMTS bands are equivalent to those of GSM.

***Results of third application process (beauty contest) for the assignment of a fourth 3G license***

Arcep launched its third beauty contest for the assignment of the fourth 3G license in March 2007. The only candidate to submit an application was Free Mobile ("Free"). On 9 October 2007, Arcep rejected Free's application on the basis that it did not meet the qualification criteria as set out in the required financial conditions specified in the request for applications.<sup>30</sup>

***Arcep's February 2008 authorisation on refarming the 900 MHz and 1800 MHz bands***

On 27 February 2008, Arcep implemented its Directions adopted on 5 July 2007 which stated that 2G/3G operators wishing to reuse their 900 MHz band for 3G would be allowed to do so in 2008. In accordance with their requests, Arcep modified the authorisations of Orange (Decision No. 2008-0229)<sup>31</sup> and SFR (Decision No. 2008-0228)<sup>32</sup> to allow them to deploy UMTS technology in the 900 MHz band and laid out the new financial conditions as set out by the Ministry and published in the Official Journal on 16 January 2008. Arcep also proposed that Bouygues be allowed to reuse its 900 MHz band for 3G. Bouygues stated that it would deploy UMTS in the 900 MHz band by the end of 2009, and that it would request the modification of its authorisation at such time.

The modified authorisations also allow for reuse of the 1800 MHz band for 3G upon request by the operators. In the event of such a request, Arcep will undertake a consultation on the basis for which it may redistribute operators' frequency holdings in the 1800 MHz band to ensure the maintenance of an equitable distribution among all 2G/3G network operators.

Notwithstanding the failure of the 3G licence award in 2007, the refarming process implemented by Arcep included the possibility of a fourth 3G operator having access to the 900 MHz band. In order to ensure that the reuse of the 900 MHz band for 3G did not affect future decision concerning the fourth 3G license, Arcep added to the operator's licenses a conditional, time-limited measure describing the means by which they would return part of their 900 MHz frequencies if a fourth operator entered the market. In particular, in the event that a fourth 3G operator was licensed in the 2.1 GHz band before 30 June 2010, the licence terms required that incumbent operators may be

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<sup>30</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/07-0862.pdf](http://www.arcep.fr/uploads/tx_gsavis/07-0862.pdf)

<sup>31</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/08-0229.pdf](http://www.arcep.fr/uploads/tx_gsavis/08-0229.pdf)

<sup>32</sup> [http://www.arcep.fr/uploads/tx\\_gsavis/08-0228.pdf](http://www.arcep.fr/uploads/tx_gsavis/08-0228.pdf)

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required to relinquish the frequencies in the 900 MHz band as laid out in Arcep's Directions of 5 July 2007. If no new entrant was authorised by 30 June 2010, the operators would not be required to relinquish part of their 900 MHz allocations.

The specific proposals for reallocating 900 MHz spectrum to a fourth operators were as follows: Bouygues would free up 2x4.8 MHz outside high density areas within 18 months of the authorisation of a fourth operator; Orange and SFR would free up 2x2.4 MHz each in high density areas by 31 December 2012; and Orange's frequency allocation would be shifted down by 200 kHz so as to provide a contiguous block of 2x5 MHz for the new entrant.

The redistribution of frequencies proposed by Arcep would create the following frequency assignments in the 900 MHz band:<sup>33</sup>

2*9,8 MHz		2*10 MHz		2*5 MHz		2*10 MHz	
Bouygues Telecom		Orange France		4 <sup>e</sup> opérateur		SFR	
880,1 MHz	889,9 MHz	899,9 MHz	904,9 MHz	904,9 MHz	914,9 MHz	914,9 MHz	914,9 MHz
925,1 MHz	934,9 MHz	944,9 MHz	949,9 MHz	949,9 MHz	959,9 MHz	959,9 MHz	959,9 MHz

In addition, there was an obligation imposed on Orange and SFR not to create harmful interference by the use of the frequencies assigned to them and adjacent to the fourth operator. Given the rules of coexistence between GSM and UMTS as described in the Report 82 of the ECC, the implication of this was that these two operators could not use channels 49 and 75 for GSM deployment once a fourth operator was active.

### *Award of a fourth 3G license and redistribution of the 900 MHz frequency assignments*

After the modifications in February 2008 allowing Orange and SFR to reuse their 900 MHz band for 3G, Arcep launch a further public consultation in June 2008 on the award of 3G licenses in the 2.1 GHz band. The purpose of the consultation was to obtain the stakeholders' view on a process for awarding the remaining spectrum in the 2.1 GHz frequency band and associated issues.<sup>34</sup> Arcep received 23 responses and on 22 September it published a summary of the consultation results.<sup>35</sup> A significant number

<sup>33</sup> <http://www.arcep.fr/fileadmin/reprise/dossiers/umts/modal-orient-umts-900-fev08.pdf>

<sup>34</sup> Consultation publique sur l'attribution de licences 3G dans la bande 2,1 GHz en France métropolitaine: [http://www.arcep.fr/fileadmin/uploads/tx\\_gspublication/consultation-pub-2GHzvf.pdf](http://www.arcep.fr/fileadmin/uploads/tx_gspublication/consultation-pub-2GHzvf.pdf)

<sup>35</sup> The Executive Summary of the consultation is available in English: [http://www.arcep.fr/uploads/tx\\_gspublication/synt-consult-3g-2ghz-220908-eng.pdf](http://www.arcep.fr/uploads/tx_gspublication/synt-consult-3g-2ghz-220908-eng.pdf)

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of players, including both potential new entrants and the existing three mobile network operators, expressed interest in the remaining unassigned 2.1 GHz frequencies.

After further consultations and much deliberation, Arcep launched its fourth beauty contest in August 2009 for the award of a fourth 3G license. On 17 December 2009, Arcep awarded Free the fourth 3G license with 2x5 MHz (FDD) in the 2.1 GHz spectrum and 2x5 MHz in the 900 MHz band. In January 2010, Arcep published its decision authorising Free to immediately use its spectrum allocation in the 2.1 GHz band to begin establishing a 3G network. In this decision, Arcep also laid out the timetable for reclaiming the 900 MHz spectrum from the three incumbents in a phased process. Bouygues must free up 2x5 MHz to be reassigned to Free in non-urban areas within 18 months, and SFR and Orange must free up 2x2.5 MHz each to be reassigned to Free in urban areas within two years.<sup>36</sup>

Following the award of a 3G license to Free, 2x5 MHz and 2x4.8 MHz of the 2.1 GHz band remain unassigned. On 25 February 2010, Arcep launched the process to award the remaining 2.1 GHz spectrum through a beauty contest.<sup>37</sup> Applications were evaluated on the basis of a candidate's commitment to hosting MVNOs and its financial bid. Applications were received from Orange, SFR and Free, and on 18 May 2010 Arcep selected the best applications for each of the two unassigned blocks: the one submitted by SFR for the 2x5 MHz block, and the one submitted by Orange for the 2x4.8 MHz block.<sup>38</sup> On 8 June 2010, the remaining 2x5 MHz and 2x4.8 MHz blocks were awarded respectively to SFR and Orange<sup>39</sup>.

The revised frequency holdings of 3G spectrum in the 2.1 GHz band, following these awards is illustrated in Figure 1 below.

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<sup>36</sup> Arcep, Décision autorisant la société Free Mobile à utiliser des fréquences pour établir et exploiter un réseau radioélectrique de troisième génération ouvert au public, Décision no. 2010-0043, January 12, 2010.

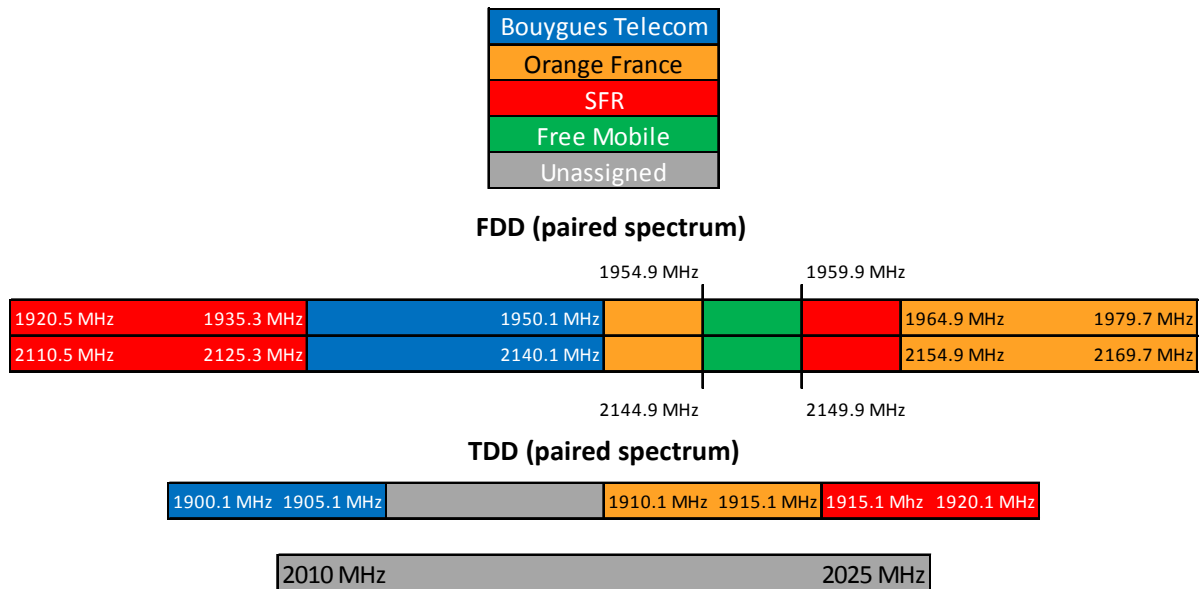
<sup>37</sup> See Arcep Decision No. 2010-0199, 11 February 2010: [http://www.arcep.fr/uploads/tx\\_gsavis/10-0199.pdf](http://www.arcep.fr/uploads/tx_gsavis/10-0199.pdf); and Arcep Press release of 25 February 2010: [http://www.arcep.fr/index.php?id=8571&tx\\_gsactualite\\_pi1\[uid\]=1254&tx\\_gsactualite\\_pi1\[annee\]=&tx\\_gsactualite\\_pi1\[theme\]=&tx\\_gsactualite\\_pi1\[motscle\]=&tx\\_gsactualite\\_pi1\[backID\]=26&cHash=06769b1919](http://www.arcep.fr/index.php?id=8571&tx_gsactualite_pi1[uid]=1254&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=06769b1919)

<sup>38</sup> Arcep Decision No. 2010-0581, Décision relative au compte rendu et au résultat de la procédure d'attribution d'autorisations d'utilisation de fréquences dans la bande 2,1 GHz en France métropolitaine pour établir et exploiter un réseau radioélectrique de troisième génération ouvert au public: [http://www.arcep.fr/uploads/tx\\_gsavis/10-0581.pdf](http://www.arcep.fr/uploads/tx_gsavis/10-0581.pdf)

<sup>39</sup> Arcep Press release: [http://www.arcep.fr/index.php?id=8571&L=1&tx\\_gsactualite\\_pi1\[uid\]=1283&tx\\_gsactualite\\_pi1\[annee\]=&tx\\_gsactualite\\_pi1\[theme\]=&tx\\_gsactualite\\_pi1\[motscle\]=&tx\\_gsactualite\\_pi1\[backID\]=26&cHash=6aa1702935](http://www.arcep.fr/index.php?id=8571&L=1&tx_gsactualite_pi1[uid]=1283&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=6aa1702935)

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Figure 1: Current assignments of French 2100 MHz spectrum following the 2009 and 2010 awards

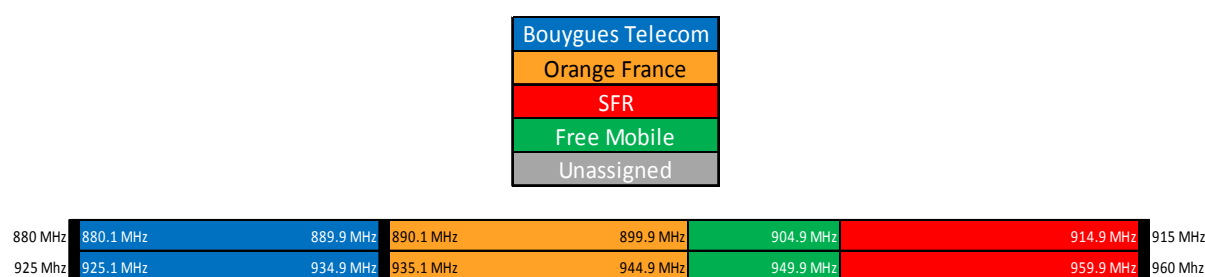




## 6. The Current Situation

The interlinked administrative process regarding refarming and redistribution of the 900 MHz band is now complete. Figure 2 illustrates the revised frequency holdings of spectrum in the 900 MHz band across operators. The responsibility of managing the transition in spectrum use from legacy GSM technology to 3G technology now rests with the operators themselves, albeit subject to their commitments to manage interference between themselves and with adjacent bands, and their 3G coverage commitments.

**Figure 2: Distribution of spectrum holdings in the French 900 MHz band after redistribution**

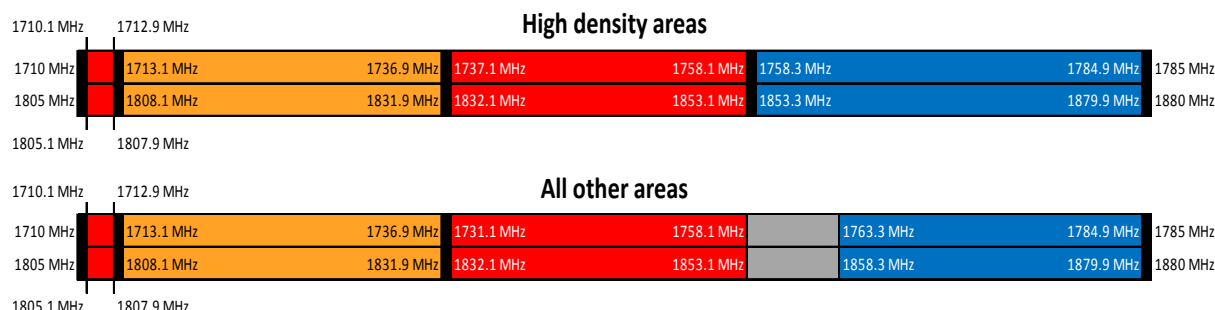


**Free Mobile: 2x5 MHz available in all areas except high density areas from 13 July 2011**

**Free Mobile: 2x5 MHz available in high density areas from 1 January 2013**

The process of refarming and redistribution of the 1800 MHz band is yet to begin. According to the terms of the GSM licence renewals, a review of the frequency holdings in the band will be triggered at the point that one or more of the three incumbent mobile operators requests the right to refarm this spectrum. As of October 2011, no such applications have been received by Arcep. Therefore, the current distribution and use of 1800 MHz spectrum, as illustrated in Figure 3, remains unchanged.

**Figure 3: The current distribution of French 1800 MHz spectrum (no reallocation process as yet)**



It may be noted that ART's and Arcep's initiatives regarding refarming were not technology neutral and came prior to the 2009 EC Directive and Decision. Specifically, Arcep's refarming Decision envisaged the 900 MHz and 1800 MHz being reused to provide 3G services using UMTS technology.

At the same time that France was considering refarming the 900 MHz and 1800 MHz bands, work was also underway at the European level. The new European directive (Directive 2009/114/EC) that amended the existing GSM Directive came into force in October 2009. The Amending Directive removed the exclusive reservation of the 900 MHz spectrum for GSM services.<sup>40</sup> The other important piece of legislation that came into force at the European level in October 2009 was the European Commission (EC) decision on the harmonization of the 900 MHz and 1800 MHz bands (2009/766/EC), which sets out the technical harmonization measures for the introduction of other terrestrial systems capable of providing electronic communication services that can coexist with the GSM systems in the 900 MHz and 1800 MHz bands (the EC Decision);<sup>41</sup> and Commission Decision (2011/251/EC)<sup>42</sup> amending Decision 2009/766/EC. The EC Directive and Decision have cleared the way for refarming the 900 MHz and 1800 MHz bands on a technology neutral basis, subject to new systems – which may include UMTS, LTE or WiMAX technologies – being able to coexist with legacy GSM networks

<sup>40</sup> Official Journal of the European Union, Directive 2009/114/EC of the European Parliament and of the Council, September 16, 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF>.

<sup>41</sup> Official Journal of the European Union, Commission Decision, October 16, 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0032:0035:EN:PDF>.

<sup>42</sup> Official Journal of the European Union, Commission Decision 2011/251/EC amending Decision 2009/766/EC, 18 April 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:106:0009:0010:EN:PDF>

These decisions require European Member States to make the 900 MHz and 1800 MHz bands available for GSM and UMTS systems, as well as other systems capable of providing electronic communications services that can coexist with GSM systems. With the adoption of the EC Directive and Decisions into French law, the existing framework allows for the introduction of LTE, in addition to UMTS in the 1800 MHz band. French operators may request to refarm the 1800 MHz band, triggering a public consultation by Arcep, which might result in a redistribution of frequency holdings. It is not clear whether refarming the 900 MHz band for LTE triggers a further redistribution of spectrum. Refarming the 900 MHz for LTE by an operator would require further modification to its licence.



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