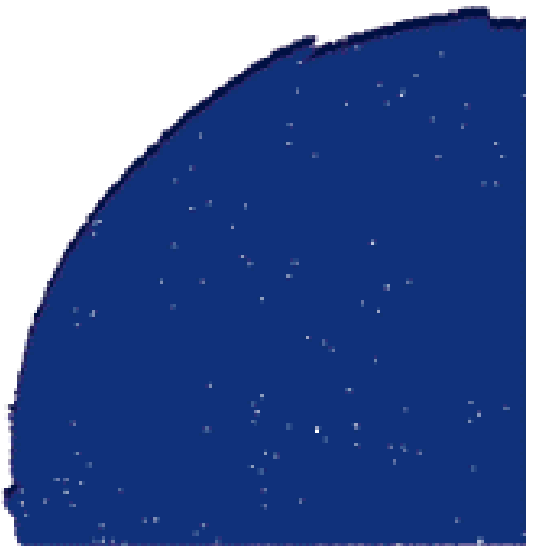
PUBLIC CONSULTATION

March 2009

Public consultation on the award of licences in the 800 MHz and 2.6 GHz frequency bands for ultra high-speed mobile services

5 March 2009 – 15 June 2009



ARCEP
www.arcep.fr
AUTORITÉ DE RÉGULATION
des Communications électroniques
et des Postes

Responding to this consultation

All responses to the public consultation must be received by ARCEP by 15 June 2009.

Responses must be sent by e-mail to treshautdebitmobile@arcep.fr, preferably in an MS Word file. They can also be sent by mail to the following address:

Mr. Jean-Claude Mallet
Chairman
Autorité de régulation des communications électroniques et des postes
7, square Max Hymans
75730 Paris Cedex 15

This document can be downloaded off the ARCEP website (http://www.arcep.fr/).

The Authority reserves the right to render public all or a portion of the answers it receives, unless specifically requested by their authors not to do so. These contributors are invited to submit both a public and a confidential version of their response to ARCEP.

For more information, please contact ARCEP by e-mail (treshautdebitmobile@arcep.fr).

Contents

Introduction: background to and purpose of the public consultation

This public consultation marks the first stage of ARCEP efforts to establish, in concert with all of the interested parties, the terms and conditions for awarding spectrum licences in the 800 MHz and 2.6 GHz frequency bands, in preparation for the development of ultra high-speed mobile networks.

The purpose of this public consultation is to obtain analyses and opinions from all interested parties on the relevant terms and conditions for the award of these licences.

This process is part of the overall strategy concerning mobile network frequencies announced by the Prime Minister on 12 January 2009.

Context

The deployment of third generation, or 3G, mobile networks based on the UMTS standard has made real progress. These networks make it possible to provide a better user experience, thanks in particular to higher speeds, and are enabling the rollout of new services.

The next stage, which is well underway in both Europe and around the globe, involves the introduction of ultra high-speed mobile networks that will replace UMTS-based ones over the next decade.

The goal now is to prepare for the deployment of these new networks, to be able to anticipate users' growing needs in terms of content and access speeds.

With this in mind, the Government decided to assign the 790 – 862 MHz frequency band (referred to as the "800 MHz" band) from the digital dividend to electronic communication services. This decision is one of the measures contained in the "*France numérique 2012*" (Digital France 2012) Plan, which the Minister of State to the Prime Minister responsible for Forward Planning, Assessment of Public Policies and Development of the Digital Economy, Mr. Eric Besson, made public on 20 October 2008.

The 800 MHz band comes to complete the 2500 – 2690 MHz frequency band (referred to as the "2.6 GHz" band), which has been harmonised at the international level as an extension band for mobile services.

On 12 January 2009, the Prime Minister set the objective of launching the joint awards procedure for licences to the 800 MHz and 2.6 GHz frequency bands before the end of 2009. To this end, the Government called on ARCEP to launch a consultation on the terms and conditions to apply to this call for submissions.

The present consultation is part of this process, the goal being to obtain the analyses and opinions of all interested parties on the relevant terms and conditions to apply to the

award of licences for the deployment of ultra high-speed mobile networks in the 800 MHz and 2.6 GHz frequency bands.

Content of the consultation

There are eight parts to this consultation.

The first part of the consultation is devoted to pinpointing the issues surrounding the nationwide deployment of ultra high-speed mobile services. Respondents are invited to express themselves in particular on what contributions can be expected from the development of ultra high-speed mobile access from an economic, cultural and societal perspective, and on the overall strategy concerning spectrum for ultra high-speed mobile.

The second part examines the 2500 – 2690 MHz (a.k.a. "2.6 GHz") and 790 – 862 MHz (a.k.a. "800 MHz") frequency bands, which have been identified for the supply of ultra high-speed mobile access in the short term, and is aimed at obtaining respondents' views on spectrum availability, the technical conditions attached to their use and on the industry ecosystem.

The purpose of the three following parts is to obtain contributors' views on three central issues that will guide the allocation of these frequencies.

The third part thus contains analysis of the specific issues tied to the organisation of the frequency bands, in view of their allocation. Respondents are invited to share their views on the number of licences to be awarded in each of these two frequency bands, and to describe the possible means of structuring these spectrum resources.

The purpose of the fourth part is to gather contributors' analyses of the way in which the issue of regional development should be factored into the equation – an issue which is central to the spectrum allocation procedure, especially for the 800 MHz (790-862 MHz) band from the digital dividend. In particular, this section explores questions concerning rollout obligations and sharing installations.

The fifth part addresses the topics of competition dynamic and open networks. Respondents are invited to express themselves on the issues surrounding the state of competition between mobile operators, and on opening networks up to mobile virtual network operators, or MVNOs.

The next two parts are devoted to the design and structure of the procedure, drawing on elements from the previous sections pertaining to the issues surrounding these frequency allocations.

In the sixth part, contributing parties are invited to express their views on the rights and obligations to be contained in the licences that will be issued in the two frequency bands.

The seventh part analyses the different possible allocation procedures for the frequency bands. Contributors are invited to share their views on several possible scenarios for allocating this spectrum.

And, finally, the purpose of the eighth part is to discern the players' interest in obtaining licences to these frequencies.

1 Development of the ultra high-speed mobile services market

The goal of this section is to obtain an updated view from respondents on the development of the ultra high-speed mobile services market, which will replace services being offered on UMTS-based third generation networks over the next decade.

The first part examines the evolution towards ultra high-speed mobile services. The contributions that ultra high-speed mobile is expected to make from an economic, cultural and societal perspective are the focus of the second part, while the third part is aimed at analysing the overall spectrum strategy in Metropolitan France for achieving the nationwide supply of ultra high-speed mobile services. And, finally, the fourth part analyses the issues surrounding ultra high-speed mobile in the overseas *départements* and territories.

1.1 Mobile services evolving to ultra high-speed

The aim of this part is to obtain an updated view from respondents on mobile services' ongoing shift to ultra high-speed access.

This question was already addressed in earlier consultations, which are available to the public[1] and whose main conclusions can be summarised as follows.

Mobile communication services are poised to follow the same trajectory as fixed services, in other words an accelerated transition from high-speed to ultra high-speed. Mobile access is expected to become an extension of fixed broadband and ultra-fast broadband access services and be able to provide consumers, both residential and business, continuous and ubiquitous access to Internet services, on a wide range of devices, outside the home and the workplace. These services are to be available anywhere, anytime, offering the same ease of use and the same range of applications as high performance wireline connections do.

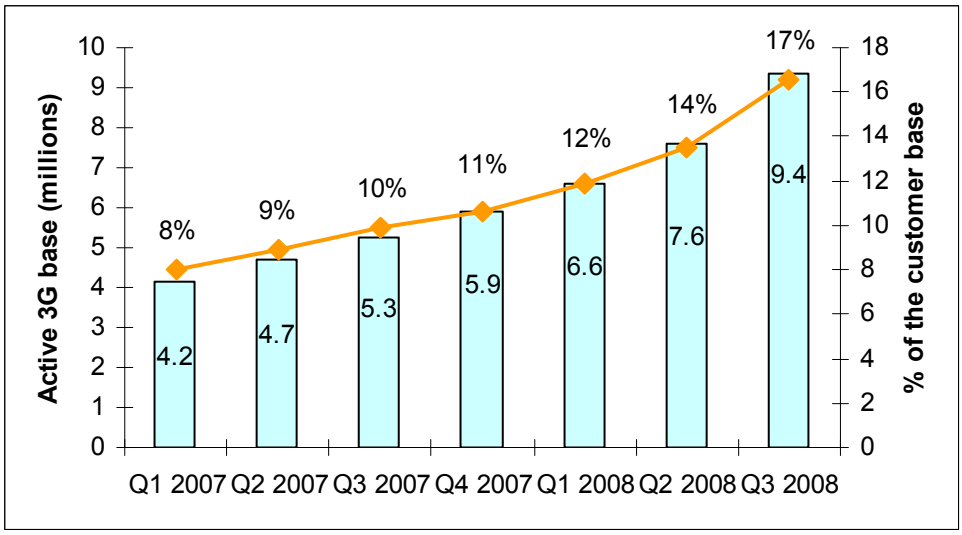
The market is already moving in this direction, with the rise in bitrates and traffic on UMTS networks and its HSPA successors, along with the introduction of the first unlimited mobile flat rate offers and handsets designed with the mobile Internet in mind. The rollout of 3G networks in France has enabled the launch of new high-speed data services that are helping to spur demand, as revealed by the growth in the number of active 3G customers, which is illustrated in the graph below[2]. This has contributed to altering mobile consumption habits, with services now expanding steadily beyond voice calls and voicemail to include enhanced services such as Internet access and multimedia content. The introduction of new

[1] Particularly relevant are the public consultation on the issues surrounding new frequencies for networks that provide access to electronic communication services, which was launched on 13 July 2007 and whose executive summary and all contributions were published on 7 November 2007, along with the report from the Radiocommunications Consultative Committee, CCR (*Commission consultative des radiocommunications*) published on 15 October 2007. These changes were also examined during the public consultation on the allocation of the 2.1 GHz band, launched on 13 June 2008, whose executive summary and contributions were made public on 22 September 2008.

[2] The 3G base is defined as the number of customers who have accessed a mobile service (voice calls, videophony, mobile TV, data transfer, etc.) that employs a 3G radio access technology, at least once in the past three months (uplink or downlink).

handsets with larger screens, and of netbook computers enabling access to a richer array of multimedia content, are altering users' behaviour patterns as they consume more and more data services.

Active 3G base (source: ARCEP – Market observatory)



The next stage is now underway in Europe and around the globe, and the process has begun for introducing the systems that will gradually take over from existing third generation networks over the next decade. Mobile technologies capable of delivering performances in line with market expectations have already been announced, one of them being LTE, or Long Term Evolution technology. These technologies offer high performance and increased quality of service, and are expected to achieve their full potential with the use of very wide bands of up to 20 MHz. Over the next few years, mobile technologies are expected to reach speeds of one to several dozen Mbit/s, and of more than 100 Mbit/s further down the road, in addition to offering short enough latency to enable the development of high-speed interactive applications. These technologies will prove crucial adjuncts to the consumption of ultra high-speed services.

Question n°1. Would you care to add any details, nuances or elements to this description of the development of mobile services that emerged from previous public consultations? Do you have any elements that could update this view of the mobile services market's evolution towards ultra high-speed?

1.2 Economic, cultural and societal contributions made by ultra high-speed mobile

In the following section, respondents are invited to share their updated analysis of what we can expect the development of ultra high-speed mobile to contribute from an economic, cultural and societal perspective.

Previous consultations had already underscored the very significant issues inherent in the development of ultra high-speed mobile access, which included not only the industrial

development of the radiocommunications networks and services sector itself but also, more broadly, of the economy and society as a whole.

The principle points to emerge were the following.

Increased access to ultra high-speed mobile services is expected to have a significant impact on the economy. It should help stimulate economic growth and contribute to sustainable regional development by contributing both directly and indirectly to creating jobs, and to improving businesses' competitiveness and productivity levels.

It should also open up new prospects in the area of entertainment and leisure, create new ways to consume digital content and to access culture. This means that ultra high-speed mobile should enable new means for accessing cultural content, particularly in relation to where the user is located or travelling at any given moment (museum, monument, etc.). It should contribute to the development of new modes of consuming content which should be available on-demand, self-produced and interactive.

By developing new ways to communicate, these solutions should help renew social ties as well as relationships between public services and citizens. A wide array of innovations are expected in the field of healthcare, notably in the area of telemedicine and remote patient monitoring, which will not only help improve the quality of care, but also the homecare services given to the elderly and those in need of assistance. Ultra high-speed mobile can also help increase everyone's security, thanks to the development of solutions that make it possible to implement mobile video and remote surveillance systems.

And, finally, in addition to providing coverage for roaming users, mobile networks could help reduce inequalities in fixed access levels between regions – both existing disparities and those that are likely to increase as ultra high-speed networks develop.

In the relatively near future, then, ultra high-speed mobile could prove just as indispensible as connection to the electrical grid or the water supply system. This is why making it available to the entire population makes it such an important objective.

Question n°2. In your opinion, what can we expect over the next decade from ultra high-speed mobile rollouts that are currently underway, notably from an economic, cultural and societal perspective? Would you care to add any details, nuances or elements to this summary description to emerge from previous public consultations?

1.3 Overall spectrum strategy for ultra high-speed mobile in Metropolitan France

To ensure that the ultra high-speed mobile networks planned for the next decade can be deployed, new spectrum resources need to be made available. The increase in traffic and bitrates will require the use of a greater quantity of spectrum than what mobile network operators currently have at their disposal.

As a result, public authorities have established an overall spectrum strategy for ultra high-speed mobile which is based on two complementary frequency bands:

- first, low frequencies ranging from 790 to 862 MHz (referred to as the "800 MHz" band), taken from the digital dividend, which are well suited to achieving broad nationwide coverage and to indoor coverage;
- and, second, high frequencies ranging from 2500 to 2690 MHz (a.k.a. "2.6 GHz" band), to provide the capacities needed to carry traffic in densely populated zones.

On 12 January 2009, the Prime Minister announced that the allocation procedure for the 800 MHz and 2.6 GHz frequency bands would be launched before the end of 2009, to enable the development of ultra high-speed mobile networks whose rollout is expected over the next decade. The launch of this procedure should thus make it possible to issue licences in 2010.

These new frequencies come to complete spectrum resources that have already been allocated in the low frequency bands at 900 MHz, and in the high frequency bands at 1800 MHz and 2100 MHz, which are currently being used by second and third generation mobile networks and which could eventually be reused by new, more advanced technologies, to satisfy users' evolving demands.

The purpose of this public consultation is to prepare the system and terms to apply to the allocation of the 800 MHz and 2.6 GHz frequency bands.

Question n°3. Do you have any comments to make on the overall spectrum strategy?

1.4 Ultra high-speed mobile in the overseas territories

The development of ultra high-speed mobile in the French overseas *départements* and territories is also an important issue for ARCEP[3].

The situation overseas is different from the one in Metropolitan France, however, because of the conditions surrounding the introduction of digital terrestrial television (DTT). The Prime Minister has not yet issued a decision regarding the terms for reusing the frequencies made available by the switch-off of analogue TV broadcasting, and notably the fact of making the 800 MHz band available for mobile services.

Moreover, third generation systems were introduced only recently in the overseas *départements* and territories. The first licences were awarded in early 2008, and the first commercial 3G services were not introduced until Q3 2008. It is therefore too early to make an initial assessment of broadband mobile service rollouts overseas, and to decide what measures need to be taken with regard to ultra high-speed mobile.

It should also be noted that because each 3G operator has been allocated only a 2 x 5 MHz carrier, there are still at least 2 x 45 MHz available in the 2.1 GHz band in each of the overseas *départements* and territories. This remaining spectrum should be sufficient to handle the increase in traffic and bitrates over the next several years.

[3] This part applies only to those overseas *départements* and territories over which ARCEP has jurisdiction, namely: Guadeloupe, Martinique, Guyana, Reunion, Saint-Martin, Saint-Barthelemy, Mayotte and Saint-Pierre and Miquelon.

Question n°4. What is your view of high-speed and ultra high-speed mobile service rollouts in the overseas *départements* and territories? To what extent will the bands that have currently been identified, and notably the remaining 2.1 GHz band frequencies, make it possible to sustain an increase in traffic and speeds? In your opinion, at what point will additional spectrum, notably in the 800 MHz band, become necessary?

Because the situation concerning spectrum in the overseas *départements* and territories is a special one, the rest of the consultation pertains only to the allocation of the 800 MHz and 2.6 GHz frequency bands in Metropolitan France. Contributors who wish to do so can nevertheless share their analysis on how their responses apply to the situation overseas.

2 The 2.6 GHz and 800 MHz frequency bands: spectrum resources, technical and industry-related aspects

The purpose of this section is to examine the 2.6 GHz (part 2.1) and 800 MHz (part 2.2) frequency bands that have been identified for the introduction of ultra high-speed mobile services. Respondents are invited to comment in particular on the international context, the availability of these frequency bands, the technical conditions attached to their organisation, and on industry-related matters.

2.1 The 2.6 GHz frequency band

This section addresses, in turn, the international context surrounding the allocation of the 2.6 GHz frequency band (part 2.1.1), the frequency band's availability in France (part 2.1.2), its technical organisation (part 2.1.3) and the industry ecosystem (part 2.1.4).

2.1.1 International context

The 2500 – 2690 MHz (a.k.a. "2.6 GHz") frequency band was harmonised at the global level at the World Radiocommunications Conference in 2000 for the implementation of the International Mobile Telecommunications 2000 (IMT-2000) standard.

Outside of Europe, it has already been assigned in several countries, including the United States and Japan. In the U.S., the first WiMAX rollouts have already taken place, and announcements have been made for deployments using the LTE standard starting in 2009.

In Europe, the Electronic Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT) drafted Decision ECC/DEC/(05)05[4], dated 18 March 2005, which harmonises the 2500 – 2690 MHz frequency band for IMT-2000/UMTS systems and defines a frequency allocation plan for this band.

More recently, the European Commission harmonised this band inside the European Union for terrestrial systems, enabling the supply of electronic communication services, through Decision 2008/477/EC[5] dated 13 June 2008, which specifies the technical conditions for using the 2.6 GHz frequency band. The CEPT was mandated to develop these technical conditions which were the subject of CEPT Report 19[6]. The decision from the Commission distinguishes itself from the ECC Decision ECC/DEC/(05)05 particularly by its technological neutrality (the frequency band is no longer identified for IMT-2000/UMTS systems), by the flexibility offered in duplexing modes and by the conditions applying to use of the spectrum (see part 2.1.3).

This Decision requires that, *"No later than six months after entry into force of this Decision [i.e. 13 December 2008], Member States shall designate and subsequently make available, on a non-exclusive basis, the 2 500-2 690 MHz band for terrestrial systems capable of providing electronic communications services, in compliance with the parameters set out in*

[4] http://www.erodocdb.dk/docs/doc98/Official/Pdf/ECCDec0505.pdf
[5] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:163:0037:0041:FR:PDF
[6] http://www.erodocdb.dk/docs/doc98/Official/Pdf/CEPTRep019.pdf

the Annex to this Decision".

As far as ARCEP is aware, only a single Member State aside from France (see next part) has requested a derogation, namely Bulgaria[7].

The 2.6 GHz frequency band was allocated in Norway in 2007 and in Sweden in 2008, and operator TeliaSonera has already announced the launch of the first commercial services in Stockholm and Oslo for 2010[8].

Other countries, including Austria, Belgium, Denmark, Finland, Germany, the Netherlands, Portugal, Spain and the United Kingdom[9], have scheduled the launch of their allocation procedure for the 2.6 GHz band for this year.

Question n°5. Would you care to add any nuance or details to this description of the international context concerning the 2.6 GHz frequency band?

2.1.2 Availability of the 2.6 GHz frequency band in France

In France, the 2500 – 2690 MHz frequency band is currently used by the Ministry of Defence.

Because the time it would take before the frequency band became available was incompatible with the 13 December 2008 deadline set out in the European Commission Decision 2008/447/EC, France submitted a request for derogation from this European Commission decision in December 2008.

The timeline for freeing up these frequencies across France is being finalised with the Ministry of Defence, and could be as follows:

Date	Operation
End of 2010	Liberation of 6 regions: Nord – Pas de Calais, Ile de France, Alsace, Picardie, Champagne-Ardenne, Provence-Alpes-Côte d'Azur
End of 2011	Liberation of 5 more regions: Haute-Normandie, Lorraine, Rhône Alpes, Midi-Pyrénées, Languedoc-Roussillon
End of 2012	Liberation of 5 more regions: Basse-Normandie, Pays-de-Loire, Aquitaine, Poitou-Charentes, Franche-Comté
End of 2013	Liberation of 5 more regions: Centre, Limousin, Auvergne, Bretagne, Bourgogne
Mid-2014	Liberation of Corsica

[7] Through the European Commission Decision 2009/1/EC dated 16 December 2008, Bulgaria was authorised to postpone application of Decision 2008/477/EC to 31 December 2009 for northern Bulgaria, and to 31 December 2010 in the southern part of the country.
[8] http://www.teliasonera.com/press/pressreleases/item.page?prs.itemId=403219
[9] Source: Informa telecoms & media

As was the case with earlier spectrum licence awards procedures, the cost of freeing up the frequency band could be shouldered by the operators, through a spectrum reallocation fund, for instance.

Question n°6. Do you have any comments to make on the availability of the 2.6 GHz frequency band? Is the timeline for making the frequencies available compatible with operators' requirements?

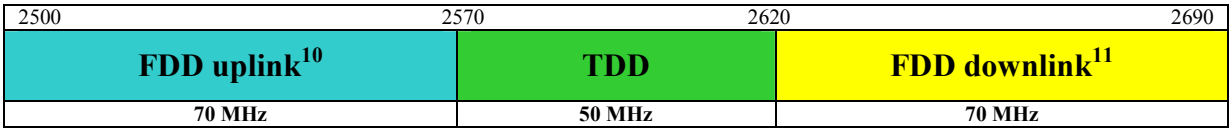
2.1.3 Description of spectrum resources

2.1.3.1 Frequency allocation plan

Frequency allocation plan established by the CEPT

The frequency allocation plan defined in CEPT Decision ECC/DEC/(05)05 recommends dividing the 2.6 GHz frequency band into blocks of 5 MHz, with 2 x 70 MHz in frequency division duplex mode (FDD) and 50 MHz in time division duplex mode (TDD).

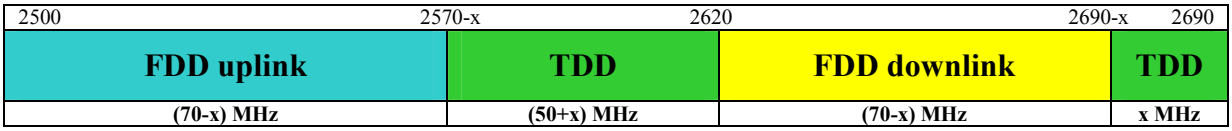
CEPT frequency allocation plan for the 2500-2690 MHz band



The possibility of allocating more spectrum for TDD, at the expense of FDD, has been allowed by the European Commission Decision.

As indicated in part 2.1.1, Decision 2008/477/EC introduced an added measure of flexibility that makes it possible to derogate from the frequency allocation plan defined in the CEPT decision. This added flexibility concerns the distribution of spectrum between the different duplexing systems, making it possible to reserve a larger quantity of TDD resources. Implementing this flexibility is left up to the Member States. The frequency allocation plan can thus be adapted as follows (the variable *x* is a multiple of 5 that can have a value ranging from 0 to 70):

Flexibility introduced by the European Commission for an extension of the portion reserved for TDD in the 2500-2690 MHz frequency band



[10] Frequencies used for transmissions from the mobile to the base station, paired with "FDD downlink" frequencies

[11] Frequencies used for transmissions from the base station to the mobile, paired with "FDD uplink" frequencies

Should we increase, or make it possible to increase, the quantity of spectrum reserved for TDD, at the expense of the portion reserved for FDD in the 2.6 GHz frequency band?

Further on in this section, we examine the opportunity for France to derogate from the ECC frequency allocation plan by allocating more TDD spectrum than the 50 MHz set initially, at the expense of spectrum in FDD mode.

Allocation procedures that have already taken place around the world provide useful information on this matter. It appears that TDD frequencies have been viewed as less valuable in past 2.6 GHz frequency allocation procedures. During the auctions in Sweden in April-May 2008, for instance, which were based on the CEPT frequency allocation plan, TDD frequencies were less coveted. At the outcome of the allocation procedure, the block of 50 MHz of TDD frequencies was awarded for around 4 eurocents per MHz, per capita, whereas FDD frequencies were valued at four times that, on average.

In Norway, the allocation procedure that took place in November 2007 was based on a frequency allocation plan for 6 TDD blocks of 10 MHz, along with the 2570 – 2620 MHz frequency band. These blocks, which correspond to the 2540 – 2570 MHz and 2660 – 2690 MHz frequency bands, can be re-paired under certain conditions. The paired and unpaired blocks were awarded at a comparable price. There were no bids, however, for one unpaired block in certain regions during the initial auction procedure. Moreover, Telenor, which was awarded four of the six additional TDD blocks of 10 MHz could request that these frequencies be re-paired to deploy FDD systems, as allowed under the terms of the licence.

Question n°7. In light of what has occurred internationally, and the reality of the respective outlook for FDD and TDD mode technologies, in your opinion is it preferable to plan on a breakdown between FDD and TDD as defined in the CEPT plan, or to increase the portion of the 2500-2690 MHz frequency band reserved for TDD, at the expense of FDD, as allowed for by the European Commission decision? In the event that you believe it preferable to increase the quantity of spectrum in the 2.6 GHz band allocated to TDD, at the expense of FDD, what breakdown would you recommend? Why?

One option could be to allow the market players a margin of flexibility in their use of the frequencies.

In Norway, for instance, the frequency allocation plan established during the procedure carried out in November 2007 derogated from the CEPT plan in the manner described earlier. This plan was established based on consultation with the players which revealed a desire in the Norwegian market to have more TDD resources available than the 50 MHz included in the ECC plan. As a result, an additional 60 MHz, taken from FDD frequencies, were made available in TDD mode. The players nevertheless had the option of re-pairing these frequencies if they wanted.

Sweden elected to apply the ECC frequency allocation plan, notably for the industry-related reasons cited earlier. To maintain some degree of flexibility, however, modifications to the duplexing systems were allowed provided they caused no interference with other users' systems. In particular, if all FDD licence holders wanted to convert their blocks to TDD, the licences could be altered to stipulate that. Use of these frequencies in TDD mode had to comply with specific stipulations concerning coordination between systems.

Introducing such a margin of flexibility can also have drawbacks, however. In some countries, the use of a frequency allocation plan other than the harmonised ECC plan could require dedicated equipment to be developed which could, in turn, impede market development.

Question n°8. How agile will equipment in the 2.6 GHz frequency band be? In particular, will it be able to adapt to any frequency allocation plan, provided of course it complies with the stipulations laid out in the European Commission's Decision 2008/477/EC?

It should also be pointed out that implementing a greater number of TDD blocks than what is included in the ECC frequency allocation plan means implementing new, restricted blocks, which will reduce the amount of fully usable spectrum available.

Question n°9. Do you think it is a good idea to maintain a degree of flexibility and to allow the players the possibility of transforming blocks of FDD frequencies into TDD blocks (while continuing to comply with the Commission's frequency allocation plan, which stipulates the terms for additional TDD blocks in the 2.6 GHz frequency band)? Are there any precautions that need to be taken if FDD frequencies are allowed to be reused in TDD mode?

Finally, another possible approach could involve allowing the procedure itself to determine the breakdown between the two duplexing systems. This approach nevertheless seems complicated and incompatible with the implementation of certain procedures, notably beauty contest-based awards.

Question n°10. In your opinion, should the breakdown of the duplexing modes in the 2.6 GHz frequency band be decided by the procedure?

2.1.3.2 Technical parameters for spectrum use

The use of frequencies also needs to comply with technical parameters called Block Edge Masks, or BEM, which are expressed in the form of average maximum equivalent isotropically radiated power (e.i.r.p.) limits for base stations and terminals. These limits are stipulated in the annex to Decision 2008/477/EC.

Two categories of block are defined for the base stations, which correspond to different parameters:

- unrestricted blocks, whose parameters are used by default;
- restricted blocks, with power limits to prevent interference with other systems.

The use of each category of block is described in Item 8 of the preamble to the European Commission Decision: "*To achieve compatibility a separation of 5 MHz is needed between the edges of spectrum blocks used for unrestricted TDD (time division duplex) and FDD operation (frequency division duplex) or in the case of two unsynchronised networks operating in TDD mode. Such separation should be achieved by either leaving these 5 MHz blocks unused as guard blocks; or through usage that complies with parameters of the*

restricted BEM when adjacent to an FDD (uplink) or between two TDD blocks; or through usage that complies with parameters of either restricted or unrestricted BEMs when adjacent to an FDD (downlink) block. Any usage of a 5 MHz guard block is subject to an increased risk of interference." In accordance with CEPT Report 19, restricted blocks would be taken from TDD blocks.

Question n°11. What measures do you recommend to ensure the coexistence between TDD blocks and FDD blocks on the downlink portion? In particular, do you believe it is necessary to require a guard block between the two?

For unrestricted blocks for the base stations, Table 2 of the annex to the European Commission Decision 2008/477/EC stipulates that the maximum in-block e.i.r.p. is 61 dBm/5 MHz. It is also stipulated that, "*Member States can relax this limit to 68 dBm/5 MHz for specific deployments e.g. in areas of low population density provided that this does not significantly increase the risk of terminal station receiver blocking"*.

This limit of 68 dBm/5 MHz can be used freely by operators, provided it has been agreed upon by all affected parties. It can also be applied to a certain number of applications that should be defined prior to the allocation procedure. Or it could not be allowed at all.

Question n°12. What approach do you recommend to the power limit for unrestricted blocks for base stations? For which applications, if any, should this limit of 68 dBm/5 MHz be allowed?

The European Commission also stipulates two sets of technical parameters for restricted blocks: standard parameters and alternative parameters which can only be used, "*in cases where antennas are placed indoors or where the antenna height is below a certain height"*.

Question n°13. What are the specific instances in which alternative parameters should be implemented for restricted blocks? What height limit, if any, should be set?

The European Commission Decision also stipulates that less stringent parameters can be applied, if agreed upon by the affected parties. A similar clause could be included in network operators' licences.

Finally, as an adjunct to CEPT Report 19, the ECC drafted a report whose purpose is to further explore the issue of interference between terminals. In its Report 131[12], which was the subject of a public consultation that ended on 6 January 2009, the ECC proposes the masks for out-of-block emissions for the terminals, aimed at completing the masks defined in the CEPT Report 19 and in the European Commission Decision 2008/477/EC.

From a regulatory standpoint, ARCEP cannot set more stringent technical conditions than those contained in the European Commission Decision. As this additional mask is more stringent than the stipulations contained in Decision 2008/477/EC, it cannot be included in the

[12] "Derivation of a Block Edge Mask (BEM) for terminal stations in the 2.6 GHz frequency band (2500-2690 MHz)", available at: http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP131.PDF

terms of operators' licences. It can nevertheless be taken into account by manufacturers when designing terminal equipment.

Question n°14. How can the measures recommended in the ECC Report 131 be taken into account?

Question n°15. Do you have any details to add or further comments to make on the technical conditions pertaining to use of the 2.6 GHz frequency band?

2.1.4 Industry ecosystem

The goal of this part is to obtain respondents' views on the performances and availability of equipment in the 2.6 GHz frequency band.

Several technologies are being developed in the 2.6 GHz band to deliver ultra high-speed mobile services, including LTE (Long Term Evolution, successor to UMTS and HSPA), standardised by 3GPP, and mobile WiMAX, standardised by the IEEE. Other technologies have also been the focus of work in this band, but do not appear to have the same appeal as LTE and mobile WiMAX technologies.

Question n°16. What are the technologies that are currently being developed for use in the 2.6 GHz frequency band? Respondents are invited to make a distinction between those developed for use in FDD mode and those being developed with TDD.

Question n°17. For each of the technologies mentioned above (LTE and mobile WiMAX), or which you listed in your response to the previous question, can you indicate a roadmap for the availability of this equipment, by distinguishing base station equipment and terminal equipment? As concerns terminal equipment, what products are being developed (handsets, USB keys, cards for laptops…)? When will the equipment be available on a large scale and compatible with a commercial rollout? Respondents are also asked to distinguish between the FDD and TDD components of the different technologies in cases where both systems are taken into account.

Question n°18. Can you provide more detailed information on the performance of equipment in the 2.6 GHz frequency band? What bitrates (peak, average…) do you expect to see? Can you confirm that an average bitrate of around 10 Mbit/s will be available? With what size channel?

The performance levels of equipment which is already available, or due to come on the market in the near future, could evolve rapidly.

Question n°19. What developments are expected (in terms of standardisation and equipment availability) in the 2.6 GHz frequency band in the medium and long term? Within what timeframe? What are the expected performances?

2.2 The 800 MHz frequency band

This section addresses, in turn, the international context surrounding the allocation of the 800 MHz frequency band (part 2.2.1), the frequency band's availability in France (part 2.2.2), its technical organisation (part 2.2.3) and the industry ecosystem (part 2.2.4).

2.2.1 International context

The World Radiocommunications Conference 2007 identified the 790 – 862 MHz (referred to as the "800 MHz" band) frequency band for International Mobile Telecommunications (IMT) services in Region 1 (including Europe). This band is also identified in other regions around the world where it is included in wider frequency bands. It is thus part of the 698 – 862 MHz band identified for the Americas zone, within which the United States already allocated the digital dividend in 2008[13].

In Europe, it is now the responsibility of each State to decide whether or not to allocate the 790 – 862 MHz band to electronic communications services. This decision is part of the process of allocating the digital dividend which corresponds to the frequencies that became available for other uses following the end of analogue terrestrial broadcasting and its switchover to digital.

The work performed on how to assign the digital dividend is largely complete, or at least well underway, in most European countries – and being conducted in tandem with harmonisation efforts initiated by the European Commission.

Several countries have already decided to allocate the digital dividend to national electronic communication services. Aside from France – whose Prime Minister issued his official decision on 22 December 2008, although the principle had already been announced during the unveiling of the "*France numérique 2012*" (Digital France 2012) plan on 20 October 2008 – these countries include Sweden, where the decision was issued on 19 December 2007, Finland, which decided in June 2008 to allocate this sub-band to electronic communication services, and Switzerland whose Federal Council decided that the 790 to 862 MHz frequency band would be made available for mobile services by 2015 at the latest.

In its *Digital Britain* interim report[14], published on 29 January 2009, the British government indicated that it supported the proposals from UK regulator, Ofcom, to align itself with the European allocation plan for frequencies ranging from 790 to 862 MHz. Ofcom launched a consultation on the subject[15] on 2 February 2009 and is due to make a decision in 2009, in view of allocating digital dividend frequencies in 2010.

In Germany, the 790-862 MHz sub-band is also expected to be used for deploying electronic communications networks, notably in rural areas, as announced by the Federal Ministry of Economics and Technology[16].

[13] The auctions for frequencies in the 700 MHz band that took place in the United States in 2008 brought in more than 19 billion dollars.
[14] http://www.culture.gov.uk/images/publications/digital_britain_interimreportjan09.pdf
[15] http://www.ofcom.org.uk/consult/condocs/800mhz/
[16] http://www.bmwi.de/BMWi/Navigation/Presse/pressemitteilungen,did=290326.html

Other countries are in the process of examining the issue, and could announce their decisions in the coming months.

What should also be underscored is the European Commission's involvement in achieving a harmonised approach to the digital dividend across Europe[17].

To this end, the Commission has instigated efforts aimed at achieving harmonised use of the 800 MHz frequency band in the European Union. These efforts are based on a mandate given to the European Conference of Postal and Telecommunications Administrations (CEPT) on 3 April 2008 to produce technical recommendations, which are expected by June 2009 at the latest.

The status of the work being performed by CEPT under this mandate is detailed in part 2.2.3 here below.

Question n°20. Do you have any comments or additional information on the international context pertaining to the 800 MHz frequency band?

2.2.2 Availability of the 800 MHz frequency band in France

In France, the 800 MHz frequency band is currently used by the broadcasting authority, *Conseil supérieur de l'audiovisuel*, CSA, for broadcasting (790 – 830 MHz, and some assignments in the 830 – 862 MHz band) and by the Ministry of Defence (830 – 862 MHz).

Allocating the 800 MHz frequency band (790-862 MHz) exclusively to mobile services takes effect on 1 December 2011, as stipulated in the Prime Minister's Order of 22 December 2008 bringing changes to the national frequency allocation chart. The Order adds a new footnote (F45a) to the chart, which specifies that, "*starting on 1 December 2011, in Metropolitan France, the 790 – 862 MHz band is assigned to ARCEP with the status EXCL [exclusive] and the allocation to RTV [broadcasting services], along with the footnote F47 [concerning agreements with the broadcasting authority, CSA and the Ministry of Defence] removed. Derogations which could prove necessary to coordination efforts with neighbouring countries are set by the national plan for the analogue switch-off and the switchover to digital. Starting on 1 December 2011, assignment of the 830 – 862 MHz band to DEF [Ministry of Defence] in Metropolitan France is terminated. Derogations which could prove necessary after that date for the use of MXA [mobile service except aeronautical] by DEF [Ministry of Defence] will be set in agreement with ARCEP.*"

In addition, the Prime Minister's Order of 22 December 2008 approving the national plan for reusing the frequencies made available by the switch-off of analogue broadcasting indicates that, "*to prepare for the liberation of the 790-862 MHz sub-band, [broadcasting authority] CSA is asked to exclude broadcasting services from these frequencies once*

[17] In November 2007, the European Commission sent a communiqué to the European Union Council entitled, "Reaping the full benefits of the digital dividend in Europe: A common approach to the use of the spectrum released by the digital switchover", to which the Council responded on 6 June 2008, acknowledging the benefits of a harmonised approach at the European level to allocating the digital dividend to electronic communications services. Moreover, the European Commission's Radio Spectrum Policy Group (RSPG) is currently in the process of drafting a document aimed at promoting a common understanding of the main challenges that need to be met to be able to take full advantage of the digital dividend in Europe.

analogue broadcasting has been terminated. The Government can allow only temporary exceptions to this principle to ensure the continuity of the reception of existing audiovisual services in the zone in question following the analogue switch-off or, when necessary, to enable the switchover to the target plan in a neighbouring region, or due to specific restrictions in a border zone".

Use of this band in border zones is covered by bilateral or multilateral agreements signed by France, which have been the subject of negotiations with neighbouring countries, conducted by the National Frequency Agency, ANFr (*Agence nationale des fréquences*). On this matter, the Prime Minister's Order of 22 December 2008 approving the national plan for reusing the frequencies made available by the switch-off of analogue broadcasting specifies that, "*the National Frequency Agency is mandated to negotiate with neighbouring countries […] the use of the 790-862 MHz frequencies by electronic communication services, this band having been identified for this purpose at the World Radiocommunications Conference in 2007".* It should be mentioned that negotiations in border zones may not be finalised by the end of 2009, which means that we will not have a complete picture of potential interference in the 800 MHz frequency band that could be caused by broadcasting transmitters in neighbouring countries.

Moreover, efforts are currently being devoted to examining the questions of coexistence in the adjacent band around 790 MHz between broadcasting transmitters and mobile terminals (receiving), on the one hand, and (transmitting) mobile network base stations and broadcasting receivers on the other. This work is being performed at the European and the national level, the goal being to identify the different cases of interference and to arrive at solutions to enable the coexistence of these applications.

And, finally, as with the 2.6 GHz frequency band, the costs of freeing up the 800 MHz frequency band could be shouldered by the operators, through a spectrum reallocation fund.

Question n°21. Do you have any comments on the availability of the 800 MHz frequency band? Is the timeline for the availability of the frequencies compatible with operators' requirements? To what extent would the derogations that could be given after 1 December 2011 in this band have a negative impact on network rollouts and on consumer offers? Do you have any suggestions regarding future problems of coexistence between mobile and broadcasting services around 790 MHz? Is it necessary to have a complete picture of the actual availability of the 800 MHz frequency band nationwide before launching a call for candidates?

2.2.3 Description of spectrum resources

CEPT is currently working under a mandate issued by the European Commission on 3 April 2008, to recommend technical conditions for harmonised use of the 790-862 MHz sub-band by two-way broadband mobile applications. Two reports are to be submitted to the Commission by June 2009 at the latest. The purpose of the first is to identify the technical conditions that could be applied in this band; the purpose of the second is to provide a frequency allocation plan.

The draft of a preliminary report from the PT1 working group was submitted during the meeting of the CEPT Electronic Communications Committee (ECC) in late October 2008. In it, the PT1 working group proposed two frequency allocation plans.

The first allowed for the use of 2 x 30 MHz in frequency division duplex mode (FDD):

Description of the FDD plan in the 790-862 MHz band: 2 x 30 MHz separated by a duplex gap of 12 MHz

790	820	832	862
FDD downlink	**Duplex gap**	**FDD uplink**	
30 MHz (6 blocks of 5 MHz)	**12 MHz**	**30 MHz (6 blocks of 5 MHz)**	

As to the size of the channels, work performed thus far appears to lean in favour of an approach based on multiples of 5 MHz, analogous to the systems used in other bands, although the possibility of blocks of 8 MHz which corresponds to those on broadcasting channels has also been examined.

The size of the central gap is still being examined. Initially set at 12 MHz, it could be reduced to 10 MHz. The reduction of the size of the separation and the corresponding shift of the "FDD downlink" part to the higher end of the spectrum (792 – 822 MHz instead of 790 – 820 MHz) would make it possible to install a guard block with broadcasting services around 790 MHz, but would create greater restrictions when designing equipment. The size of this central separation would not alter the quantity of spectrum that was available for use, i.e. 2 x 30 MHz (see below).

Description of the FDD plan for the 790-862 MHz band (alternative scheme): 2 x 30 MHz separated by a duplex gap of 10 MHz and including a guard block of 2 MHz

790	792	822	832	862
Guard block	**FDD downlink**	**Duplex gap**	**FDD uplink**	
2 MHz	**30 MHz (6 blocks of 5 MHz)**	**10 MHz**	**30 MHz (6 blocks of 5 MHz)**	

The duplex gap could be used by wireless microphones or low-power electronic communication applications. Technical studies appear indeed to indicate that, given the technical restrictions created by the narrowness of this central separation, it would be difficult to use it for TDD-based mobile network systems.

At this stage, the second allocation plan for FDD frequencies appears to be the one favoured by most parties.

However, a second frequency allocation plan, based on time division duplexing (TDD), and which is incompatible with the FDD plan detailed above, has also been defined.

As with the FDD plan, it favours an approach based on multiples of 5 MHz. The quantity of available spectrum would be 60 or 65 MHz, depending on whether the guard block, which has not yet been set, is 7 or 12 MHz.

Description of the TDD plan for the 790-862 MHz band

790	797/802	862
Guard block	**TDD**	
7 or 12 MHz	**60 or 65 MHz (12 or 13 blocks of 5 MHz)**	

Hybrid allocation plans which include both FDD and TDD frequencies are not being considered as they would require guard blocks between FDD and TDD systems, which would reduce the quantity of spectrum available for use.

For technical coordination reasons, and to facilitate the industrial design and development of equipment (see part 2.2.4), it could be preferable to establish a common frequency allocation plan for the whole of Europe. This would mean making a choice between the two allocation plans described above.

Question n°22. Would you like to comment on the technical organisation of the 800 MHz frequency band? What are the respective advantages and drawbacks of an FDD frequency allocation plan and the TDD plan described above? Do we need to choose one? Which one? Should the same scheme be chosen for the whole of Europe?

N.B.: In the following section, a hypothetical frequency allocation plan may be used to illustrate some of the questions concerning the organisation and allocation of the 800 MHz frequency band. In some cases, to avoid needlessly repeating the same disclaimer each time, these questions could be illustrated by only a single example of a frequency allocation plan, namely the FDD plan. When answering these questions, respondents should nevertheless keep in mind that frequency allocation plans have not yet been set at the European level, and should therefore feel free to refer to and/or distinguish between the different possible allocation plans in their responses.

In addition to the frequency allocation plan, work continues to be performed within the ECC SE42 group on the technical conditions for use of the band.

2.2.4 Industry ecosystem

Equipment available in the 800 MHz frequency band will likely derive from adapting technologies already developed in other bands, such as LTE systems in the 2.6 GHz frequency band.

The work performed by the Radiocommunications Consultative Committee, *Commission consultative des radiocommunications*, in 2007 concluded that once decisions had been made on frequency allocation, and standardisation efforts finalised, the development period would be around 6 to 12 months. Developments could take advantage of the expertise acquired elsewhere from the deployment of technologies in similar bands, such as the 700 MHz band in the United States.

Question n°23. What is the current status of standardisation efforts, and of industry efforts to adapt LTE technology in the 800 MHz frequency band? What other technologies will be developed in the 800 MHz frequency band?

Question n°24. Respondents are invited to answer the following questions as they pertain to each technology identified for the 800 MHz frequency band: what channel sizes will be available industrially in the 800 MHz frequency band (10, 15, 20 MHz, other)? Within what timeframe would equipment become available (please distinguish base station and terminal equipment)? What conditions could affect the time to market for equipment? When can we expect to see trials or technical demonstrations of ultra high-speed mobile systems in the 800 MHz frequency band? When will equipment be available on a large scale, and compatible with a commercial launch?

Equipment in the 800 MHz frequency band will need to enable the supply of ultra high-speed mobile services, based on wider channels than those used by existing systems (5 MHz for UMTS and its HSPA evolutions). LTE technology thus reaches its full potential when using channels of up to 20 MHz.

Question n°25. What are the performances (in terms of peak bitrates, average bitrates, latency, etc.) expected in the 800 MHz frequency band, notably compared to those achieved in the 2.6 GHz band? Using what size channel? What appears to be the minimum quantity of spectrum that needs to be allocated in this band to a player to allow it to roll out ultra high-speed mobile services?

As mentioned in part 2.2.3, the allocation plan for the 800 MHz frequency band has not yet been finalised. Two plans, which are incompatible, are being examined: one FDD and one TDD plan. Favouring one plan over another is justified in particular by the outlook for industry developments in this band.

Question n°26. For the 800 MHz band, do industry developments at this stage point in favour of either of the two suggested frequency plans, namely FDD or TDD?

The purpose of the next parts of the public consultation is, first, to identify and obtain responses from the players on the issues surrounding the allocation of the 800 MHz and 2.6 GHz frequency bands in Metropolitan France (parts 3, 4 and 5) to then define the terms contained in the licences that could be proposed (part 6) and the allocation procedures to be used for these frequencies (part 7). In light of this public consultation, the last part is aimed at measuring the parties' interest in obtaining a licence to these frequencies (part 8).

3 Issues surrounding the arrangement of the spectrum resource: number of operators and combination of the two bands

The purpose of this part is to obtain respondents' views on the organisation of the 800 MHz and 2.6 GHz frequency bands, and particularly on the number of operators that may be issued a licence and the way the spectrum resource is structured in each of these bands.

It should be mentioned that these questions do not apply equally to the two frequency bands, given their very different features. The 800 MHz band offers good wireless propagation properties, enabling broad coverage and good indoor coverage, but its narrowness means a strong restriction on the number of potential operators that can deploy ultra high-speed mobile networks. The 2.6 GHz frequency band, on the other hand, is compatible with a much higher number of licence holders than for the 800 MHz band, albeit with lesser propagation capabilities.

This is why the 800 MHz and 2.6 GHz frequency bands will be addressed separately in the following two sections that examine the question of the number of licences to award and the way the spectrum resource should be structured. And, finally, in the third part we will examine the possibility of combining spectrum in both the 800 MHz and 2.6 GHz bands in single licences.

3.1 Number of operators and arrangement of the 800 MHz frequency band resource

The goal of this section is to obtain respondents' views on the number of operators to award with a licence – and the corresponding choice of the quantity of spectrum to allocate to each operator – in the 800 MHz frequency band. It will present several possible scenarios of how the spectrum allocation could be organised.

3.1.1 Number of operators that should be awarded a licence in the 800 MHz frequency band and quantity of spectrum in that band to be allocated to each

There is very little spectrum available in the 800 MHz band, which naturally limits the number of licences that can be awarded for the deployment of ultra high-speed mobile networks.

This means that a choice needs to be made between the number of operators to be licensed to operate in this band, and the amount of spectrum to allocate to each one, which itself determines the capacity to deliver high speeds.

This scenario will be illustrated using a frequency allocation plan in FDD mode which includes 2 x 30 MHz that can be used by FDD systems in the 800 MHz frequency band.

A segmentation into 4 licences or more would translate into a small amount of spectrum being allocated to each operator, which may seem incompatible with the ability to provide ultra high-speed services. Because the technology operates in multiples of 5 MHz channels, dividing it into four would mean quantities of spectrum limited to 2 x 5 MHz for

some operators, as illustrated in the example of dividing the 2 x 30 MHz into two licences to 2 x 5 MHz and two licences to 2 x 10 MHz. This narrow amount of spectrum would limit the licence-holder's capacity to deliver high speed services, which would seem inappropriate given that the very purpose of the allocation is to enable the rollout of ultra high-speed mobile solutions, and that LTE achieves its full potential with channels of 20 MHz.

On the other hand, awarding the entire resource of 2 x 30 MHz to a single operator, and so giving it a monopoly over access to spectrum in the 800 MHz band, would create a problem on the competition front, at a time when access to low frequencies is crucial to achieving broad coverage. Here, the way mobile services have developed from the outset has revealed that competition between several players creates one of the prime incentives to invest in extending coverage and in developing innovative services.

This is why the most likely choice is to award spectrum in the 800 MHz frequency band to two or three operators, depending on the quantity of spectrum that is attached to each licence.

With this in mind, respondents are invited to provide any input that they feel is relevant on how best to decide how many licences to award and the quantity of spectrum to be allocated to each operator.

Question n°27. Generally speaking, what is your analysis of the choice that needs to be made with respect to the number of licences to award and the amount of 800 MHz-band spectrum to be allocated to each operator? What terms should apply to making these decisions?

Question n°28. In light of the past and current state of market competition and investments in expanding the coverage of second and third-generation mobile services, what is your view on the number of operators that should be awarded a licence to the 800 MHz frequency band?

Question n°29. What will be the capability to deliver ultra high-speed mobile services for operators that have been awarded 2 x 5, 2 x 10, 2 x 15 or 2 x 20 MHz blocks? Respondents are invited to provide details on the peak bitrates and average bitrates that can be achieved with these different quantities of spectrum.

3.1.2 Possible scenarios for organising the 800 MHz frequency band

The organisation of the 800 MHz frequency band, in other words, the number of licences and the quantity of spectrum allocated to each operator, will have an impact on both the competition dynamic and the rate of innovation.

The purpose of this part is to obtain respondents' analysis of the most suitable arrangement for the 800 MHz frequency band, based on the technical elements provide in part 2.2 and of the discussion in part 3.1.1. The hypothesis used in what follows is a segmentation of the spectrum into blocks of 5 MHz (and not 8 MHz, see part 2.2.3).

Two cases in particular are addressed in the following section: one involving two operators and one involving three operators. Each case scenario includes a detailed

description of a frequency allocation plan in FDD mode, which appears to be the solution of choice in technical harmonisation efforts being carried out in Europe.

3.1.2.1 Two-operator arrangement

With an allocation plan using FDD, as is currently the case in Europe, the most natural arrangement for delivering two licences is based on two operators which are allocated an equal quantity of spectrum, namely a 2 x 15 MHz block each. The two corresponding licences are marked FDD 1 and FDD 2 in the following table.

Scenario 1 (FDD) for structuring the 790-862 MHz band

790	805	820	832	847	862
FDD 1	FDD 2	Duplex gap	FDD 1	FDD 2	
15 MHz	15 MHz	12 MHz	15 MHz	15 MHz	

It should nevertheless be mentioned that an alternative arrangement exists, which would involve a disparate allocation whereby one operator would be allocated a 20 MHz duplex (2 x 20 MHz) and the other a 10 MHz duplex (2 x 10 MHz).

Scenario 1b (FDD) for structuring the 790-862 MHz band

790	810	820	832	852	862
FDD 1	FDD 2	Duplex gap	FDD 1	FDD 2	
20 MHz	10 MHz	12 MHz	20 MHz	10 MHz	

This second scenario would enable the first operator to make use of a 20 MHz channel for LTE, but has the drawback of involving two very unequal licences since one operator would have twice the amount of spectrum as the other – the second being limited to 2 x 10 MHz blocks. The licence for 2 x 20 MHz would be in the lower part of the frequency band so that it is the operator with the greatest amount of spectrum that would have to engage in technical coordination efforts with broadcasting services below 790 MHz (see part 2). Technical coordination with broadcasting services could restrict the use of a portion of these frequencies[18].

Under the hypothesis where the TDD plan is ultimately applied across Europe, the process of structuring the spectrum resource would involve scenarios where the quantity of spectrum allocated to each player is similar to the allocations in the FDD plan.

[18] See part 2.2

3.1.2.2 Three-operator arrangement

Should three operators be awarded a licence, the balanced arrangement would be an allocation of three 10 MHz duplexes (e.g. 2 x 10 MHz) in FDD mode. The three corresponding licences are labelled FDD 1, FDD 2 and FDD 3 in the table below.

Scenario 2 (FDD) for structuring the 790-862 MHz band

790 800	810	820	832	842	852	862
FDD 1	FDD 2	FDD 3	Duplex gap	FDD 1	FDD 2	FDD 3
10 MHz	10 MHz	10 MHz	12 MHz	10 MHz	10 MHz	10 MHz

An arrangement based on the TDD allocation plan is also possible, with the quantities of spectrum allocated to each player similar to the allocations in the FDD plan.

3.1.2.3 Other possible arrangements

Question n°30. Are there any other possible arrangements for allocating the 800 MHz-band spectrum that you feel are relevant?

3.1.2.4 Comparison of the different scenarios

Respondents are invited to provide all possible elements of comparison between the different configurations described here above.

Question n°31. In your opinion, what are the respective advantages and drawbacks of these different scenarios? In particular, what is your comparative analysis of the two-operator arrangement (whereby each is allocated 2 x 15 MHz blocks under an FDD plan, for instance) and the three-operator arrangement (with each being allocated 2 x 10 MHz blocks under an FDD plan, for instance)? What scenario, in terms of number of licences in the 800 MHz frequency band and quantity of spectrum allocated to each operator, do you feel is the most relevant, under the hypothesis where the spectrum resource for each licence is set by the government beforehand?

3.1.3 An alternative scenario: allowing the procedure to define the number of licences awarded

We should mention an alternative approach to setting the number of awards beforehand, and which has already been employed abroad when assigning other frequency bands.

Under this approach, through the interest expressed by the candidates, the procedure itself decides how many licences are awarded and the quantity of spectrum allocated, without these parameters being set *ex ante*. By not defining the arrangement of the spectrum beforehand, using a system based on blocks of 5 MHz, the players can be given greater flexibility in adjusting their spectrum resource requirements.

This approach was used in part during the auctions conducted in Norway[19] (November 2007) and in Sweden[20] (April-May 2008) for the 2.6 GHz frequency band. It is also expected to be employed in the UK during the auctions for the 2.6 GHz band.

It should nevertheless be pointed out that this approach is closely bound up with an auction-based awards procedure, as illustrated by the examples cited from abroad, since it is the only selection process that is flexible enough to enable candidates to adjust their spectrum demands as the auction progresses. The opportunity for an approach based on segmentation by blocks of 5 MHz for the allocation of the 800 MHz frequency band should thus be examined in tandem with the choice of selection process to be used (see part 7). Regardless of the approach taken in terms of spectrum segmentation, regional development is a crucial consideration and will be central to the awards procedure.

Moreover, unlike with the 2.6 GHz frequency band, the narrowness of the 800 MHz frequency band means only a few options are available for dividing up the spectrum. This is why this approach would offer the players relatively little flexibility in the arrangement of the band, particularly if certain ground rules are established beforehand to eliminate the possibility of certain undesirable outcomes. An added upper limit on the quantity of spectrum allocated to each operator could be imposed to prevent the creation of a situation that is incompatible with a state of effective market competition. A minimum limit on the amount of spectrum allocated to each operator could also be allowed if the goal is to ensure that each licence-holder has the capability to deliver ultra high-speed services.

Question n°32. Are you in favour of an approach that allows the procedure itself to determine the number of licences awarded in the 800 MHz frequency band?

3.2 Number of operators and arrangement of the 2.6 GHz frequency band resource

The goal of this section is to obtain respondents' views on the number of operators to award with a licence – and the corresponding choice of the quantity of spectrum to allocate to each operator – in the 2.6 GHz frequency band. It will present several possible scenarios of how the spectrum allocation could be organised.

3.2.1 Number of operators that should be awarded a licence in the 2.6 GHz frequency band and quantity of spectrum in that band to be allocated to each

There is a considerable quantity of available spectrum in the 2.6 GHz band, which means that there can be more licence-holders in this band than in the 800 MHz frequency band.

In Europe, two countries have already allocated the 2.6 GHz frequency band: Norway (November 2007) and Sweden (April-May 2008).

[19] In Norway, FDD spectrum was allocated based on a segmentation of 2 x 5 MHz, and TDD-system frequencies in blocks of 10 MHz.
[20] In Sweden, only FDD spectrum was allocated in blocks of 2 x 5 MHz, with only a single 50 MHz block of spectrum for TDD mode being awarded.

The Norwegian example

In Norway, the licences were awarded at auction at the regional level (Norway was broken down into six regions) on the basis of blocks of 2 x 5 MHz (FDD) or 10 MHz (TDD).

Netcom, which is currently a 2G and 3G operator and a subsidiary of TeliaSonera, was awarded FDD spectrum in the whole of Norway (2 x 20 MHz in all cases, except in Oslo: 2 x 15 MHz) and has announced that it would be deploying an LTE network whose commercial launch in Oslo is scheduled for 2010.

Telenor, which is also a 2G and 3G operator, was awarded both FDD spectrum (2 x 20 MHz in the whole of Norway) and TDD spectrum (40 MHz in all of Norway in the form of two blocks of 20 MHz). In accordance with the terms of the procedure, Telenor could request that its TDD blocks be re-paired to enable it to implement FDD systems.

A new entrant, Craig Wireless, was awarded TDD spectrum in the 2570 – 2620 MHz band.

The two 3G operators, along with the new entrant, obtained enough spectrum to allow them to roll out ultra high-speed mobile services.

Lastly, two players were awarded blocks of 5 MHz locally (chiefly in TDD mode): Hafslund Telekom and Arctic Wireless.

The Swedish example

In Sweden, licences were awarded at auction on a national basis. The frequency allocation plan chosen was the one established by CEPT. FDD-system frequencies (i.e. 2 x 70 MHz) were segmented into blocks of 5 MHz, and a 50 MHz block of TDD spectrum was on auction as a single lot. The four operators which are present in the country's 3G market all acquired FDD spectrum: Tele2, TeliaSonera and Telenor obtained a 2 x 20 MHz duplex each, and Hi3G was awarded a 2 x 10 MHz duplex.

The 50 MHz block of TDD spectrum was awarded to Intel.

Application to the situation in France

In light of these international examples, it may seem advisable that the number of licences awarded for FDD spectrum in the 2.6 GHz frequency band be at least equal to the number of licence-holders for third generation mobile networks in the 2.1 GHz band. There are currently three mobile network operators in France, and a call for candidates will be taking place in 2009 that will likely result in a licence being awarded to a fourth operator. This means that a procedure that allows a licence to be awarded for FDD spectrum in the 2.6 GHz band to at least four operators could prove compatible with the market players' requirements. It would also be compatible with the implementation of wide channels which are needed to supply ultra high-speed mobile services. Under a four-operator scenario, three could be allocated 2 x 20 MHz (which is the widest channel, ideal for ultra high-speed) and one could be allocated 2 x 10 MHz, for instance. A more balanced configuration would be

two licences to 2 x 20 MHz and two for 2 x 15 MHz. The exact arrangement of the band is addressed in part 3.2.2.

The way in which the FDD spectrum is structured could also be defined to allow a new entrant to join the market. In Norway and Sweden, however, whose awards procedure was based on auctions for small blocks of frequencies, no new entrant acquired FDD spectrum for a national ultra high-speed mobile service rollout. In addition, a new entrant with no network infrastructure of its own could have a difficult time competing with established operators, even if measures were taken in its favour. The issues created by the arrival of a fifth player are examined in more detail in part 5.1.4.

Furthermore, the FDD resource in this case would be structured around at least five licences, which would limit the amount of spectrum allocated to each player. Under a balanced arrangement, four players would each have 2 x 15 MHz and one would be awarded 2 x 10 MHz, which would make it more difficult to deliver a high-speed service.

Question n°33. In your opinion, how many players could be licensed to operate FDD spectrum in the 2.6 GHz frequency band? Do you think there should be as many licences as there are 3G operators? Should we go even further and structure the FDD resource to allow for a new entrant?

Under the CEPT allocation plan, the 2570 – 2620 MHz band is reserved for TDD-based systems. It should be pointed out that the maximum amount of fully usable spectrum is 40 MHz, in a situation where a single operator is licensed to employ this band (due to technical coordination constraints with the FDD blocks, referred to in part 2.1.3) and decreases with the number of licence-holders. If two operators are awarded a licence, a 5 MHz guard block needs to be placed between the two operators, which reduces the amount of fully usable spectrum to 35 MHz – to be divided up between the players, and which would make it difficult to deliver high-speed services.

Over and above technical considerations, procedures that have already taken place elsewhere help shed some additional light. In Norway, the five blocks of 10 MHz in the 2570 – 2620 MHz band were acquired by a single player, which did not acquire any other TDD spectrum[21]. In Sweden, the 50 MHz block of TDD spectrum was awarded to a single player[22].

Given the technical constraints weighing on the use of TDD spectrum, and the lessons learned from the allocation of these frequency bands in other countries, one option could consist of allocating the 50 MHz between 2570 and 2620 MHz reserved for TDD in a single block.

Question n°34. In your opinion, how many players could be licensed to operate TDD spectrum in the 2.6 GHz frequency band? Do you think more than one licence should be awarded?

[21] Norway had reserved other frequencies for TDD systems. Telenor acquired TDD spectrum outside the central 2570 – 2620 MHz block in all of the country's regions, but has not yet finalised its strategy in terms of technology and duplexing mode. It has not ruled out the possibility of re-pairing the blocks to deploy FDD technology, as allowed by the terms of the procedure.

[22] Sweden employed the CEPT frequency allocation plan. Aside from one 50 MHz block of TDD spectrum (corresponding to the 2570 – 2620 MHz frequencies), the other frequencies were offered in FDD mode.

3.2.2 Scenarios for organising the 2.6 GHz frequency band

The purpose of this part is to obtain respondents' input on how the 2.6 GHz frequency band should be organised, in other words how many licences should be awarded and how much spectrum should be allocated to each operator.

As explained earlier, one obvious solution would be an arrangement consisting of four licences to the 70 MHz duplex reserved for FDD systems in the 2.6 GHz frequency band, as suggested by the CEPT allocation plan. Two variations are possible here: either an arrangement of two licences to 2 x 20 MHz and two to 2 x 15 MHz, or a scheme based on three licences to 2 x 20 MHz and one for 2 x 10 MHz. The TDD spectrum would be awarded as a single licence to a block of 50 MHz.

The 2.6 GHz frequency band could thus be organised according to one of the two following scenarios, including four licences to the FDD portion of the spectrum, labelled below as FDD 1, FDD 2, FDD 3 and FDD 4 and one licence to the TDD portion, labelled TDD.

Scenario 1 for arrangement of the 2.6 GHz frequency band

2500	2520	2540	2555	2570	2620	2640	2660	2675	2690
FDD 1	FDD 2	FDD 3	FDD 4	TDD	FDD 1	FDD 2	FDD 3	FDD 4	
20 MHz	20 MHz	15 MHz	15 MHz	50 MHz	20 MHz	20 MHz	15 MHz	15 MHz	

Scenario 2 for arrangement of the 2.6 GHz frequency band

2500	2520	2540	2560	2570	2620	2640	2660	2680	2690
FDD 1	FDD 2	FDD 3	FDD 4	TDD	FDD 1	FDD 2	FDD 3	FDD 4	
20 MHz	20 MHz	20 MHz	10 MHz	50 MHz	20 MHz	20 MHz	20 MHz	10 MHz	

Question n°35. Are there any other arrangements that you feel are worth mentioning? In light of the details presented earlier, what is the best arrangement for 2.6 GHz frequency band resources, under a hypothesis that the spectrum resource attached to each licence would be set by the government beforehand? Please explain why.

If reuse of FDD spectrum for TDD systems were allowed (see part 2.1.3.1), the arrangement of the licences described above could be altered to satisfy requests from players to use FDD spectrum in TDD systems, while complying with Decision 2008/477/EC which governs the organisation of this band. These players would naturally need to ensure that they do not cause interference with other operators' systems by installing guard blocks (see part 2.1.3).

Finally, if several users were to request the conversion of their FDD resource into TDD spectrum, changes to the terms of the licences could be made in certain very specific cases, to allow a player to be awarded contiguous blocks of spectrum.

For instance, if two players were awarded licences to 2 x 15 MHz, which they wanted to use in TDD mode, instead of each being awarded two blocks of 15 MHz (2555 – 2570 MHz and 2675 – 2690 MHz for one, and 2540 – 2555 MHz and 2660 – 2675 MHz for the other), one could be awarded a licence to the 2540 – 2570 MHz band and the other to the 2660 – 2690 MHz band.

Question n°36. Should changes be made to the terms of the licences to the 2.6 GHz band which would allow TDD system operators to be awarded contiguous blocks of spectrum? Are there any precautions that need to be taken?

3.2.3 An alterative scenario: allowing the procedure to define the number of licences awarded

Under an alternative scenario, through the interest expressed by the candidates, the allocation procedure itself would decide how many licences are awarded and the quantity of spectrum allocated, without these parameters being set beforehand.

This approach, which has already been used in auction procedures abroad for the allocation of the 2.6 GHz frequency band, is described in Part 3.1.3. It would mean not defining the configuration of the lots beforehand and basing allocations on blocks of 5 MHz, with the players being offered greater flexibility to best adjust their needs to the available spectrum resources.

Implementing this type of approach could require that certain rules be in place, to prevent the creation of undesirable configurations.

A cap on the amount of spectrum allocated to any one player could be set, for instance, to prevent competition issues that would arise from having one operator with too great a share of spectrum in the 2.6 GHz band.

Question n°37. In the case where the definition of the licences is left up to the market, should a limit be set on the quantity of spectrum in the 2.6 GHz band that any single operator can be allocated? If so, what should that limit be?

A minimum amount of spectrum per player could also be imposed to ensure that each party is allocated enough spectrum to enable it to roll out ultra high-speed services.

Question n°38. In the case where the definition of the licences is left up to the market, should there be a minimum set for the quantity of spectrum in the 2.6 GHz band allocated to a player? If so, what should that minimum be?

Furthermore, given that it would be difficult to issue a licence to more than one TDD-system player (see part 3.2), all of the TDD blocks of 5 MHz could be bundled into a single block of 50 MHz, as was the case in Sweden:

<table>
<tr><td colspan="14">2500</td><td colspan="2">2570</td><td colspan="2">2620</td><td colspan="14">2690</td></tr>
<tr><td>FDD1</td><td>FDD2</td><td>FDD3</td><td>FDD4</td><td>FDD5</td><td>FDD6</td><td>FDD7</td><td>FDD8</td><td>FDD9</td><td>FDD10</td><td>FDD11</td><td>FDD12</td><td>FDD13</td><td>FDD14</td><td rowspan="2">TDD</td><td>FDD1</td><td>FDD2</td><td>FDD3</td><td>FDD4</td><td>FDD5</td><td>FDD6</td><td>FDD7</td><td>FDD8</td><td>FDD9</td><td>FDD10</td><td>FDD11</td><td>FDD12</td><td>FDD13</td><td>FDD14</td></tr>
<tr><td colspan="14">Blocks of 2 x 5 MHz</td><td colspan="2">Block of 50 MHz</td><td colspan="14">Blocks of 2 x 5 MHz</td></tr>
</table>

Lastly, it should be mentioned that such an approach could be applied either to all 2.6 GHz band spectrum or to only a portion. For instance, in the case where there are licences that include both 800 MHz and 2.6 GHz-band spectrum, as explored further down, this type of arrangement could be examined for the remaining spectrum available in the 2.6 GHz frequency band.

Question n°39. What would be the advantages and drawbacks of an approach whereby the number of licences issued in the 2.6 GHz frequency band, or a portion of it, is decided by the allocation procedure itself? Are you in favour of this approach? Does the approach described earlier in part 3.2.2, based on prior arrangement of the band (and a set number of licences) seem preferable? Why?

3.3 Combining the 800 MHz and 2.6 GHz frequency bands

The purpose of this part is to obtain respondents' analysis of the possibility of combining spectrum from the 800 MHz and 2.6 GHz frequency bands in a single licence. We will then examine the possible terms to apply to such an arrangement.

3.3.1 Advantages and drawbacks of creating several licences that combine spectrum in the two bands

The 800 MHz and 2.6 GHz frequency bands are complementary. Because of their particularly good propagation capacities, frequencies in the 800 MHz band are very important for the deployment of ultra high-speed mobile access networks with broad national coverage. But the spectrum available in the 800 MHz band alone is not enough to deliver the capacities needed to supply ultra high-speed mobile services in densely populated, heavy traffic zones. This means that 2.6 GHz-band capacity needs to be deployed in these zones as well to ensure the delivery of services with the quality and speed that customers expect. A more detailed discussion on this topic can be found in part 4.

Hence the possibility of having a licence that includes both 800 MHz and 2.6 GHz-band spectrum, which would give the licence-holder the assurance of having all the resources needed for the successful development of ultra high-speed mobile services nationwide.

Under such a scenario, there would be a procedure that distinguishes licences that include spectrum in both the 800 MHz and 2.6 GHz frequency bands and licences to spectrum in the 2.6 GHz band only, instead of a procedure for awarding separate licences to either the 800 MHz band or the 2.6 GHz band, as would be the case if the option of combining the two were dismissed.

The possibility of combining spectrum from both bands would not necessarily need to be decided beforehand for it to occur as a result of the procedure, given that a party could be a candidate for two separate procedures, one for the 800 MHz frequency band and one for the 2.6 GHz frequency band.

Planning for such a combination beforehand would nevertheless provide a guarantee to players that need to have access to both bands to realise their projects that they will be allocated both resources if they are selected. It would also help clarify the candidates' submissions as being part of overall strategy for accessing 800 MHz and/or 2.6 GHz-band spectrum, which would be especially useful if a beauty contest procedure were employed.

On the other hand, it could complicate the situation for candidates that take a different approach to their submissions for the two frequency bands, as some players could elect to form a consortium for the collective acquisition of a licence in the 800 MHz band through a single application, while also seeking to acquire an individual licence in the 2.6 GHz frequency band (a more detailed discussion on this topic can be found in part 4.5.1).

Question n°40. In your opinion, what would be the advantages and drawbacks of the creation of licences that combine spectrum in both the 800 MHz and 2.6 GHz frequency bands? Which approach do you recommend? Why?

3.3.2 Terms for a combined licence and possible scenarios of the overall arrangement of the 800 MHz and 2.6 GHz frequency bands

The scenarios described below would apply in the case where it was decided *ex ante* to combine spectrum in the 800 MHz and 2.6 GHz frequencies as part of the same licences awarded for both the 800 MHz and 2.6 GHz bands.

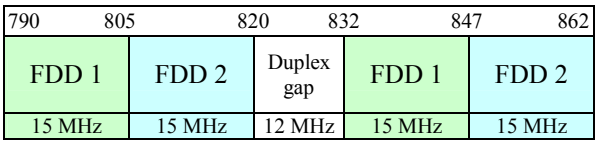
Respondents are invited to share their analysis of the means of combining licences to the 800 MHz and 2.6 GHz frequency bands. Several possible scenarios are presented below, based on arrangements sketched out earlier for each of the two frequency bands.

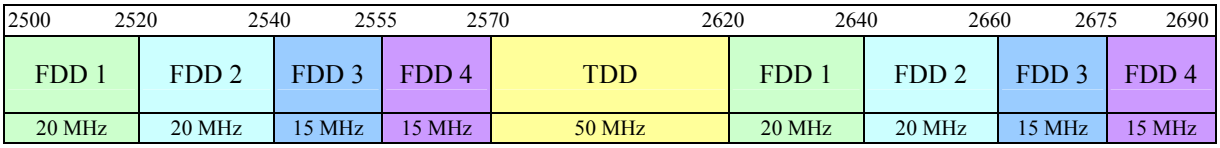
This combination thus leads to an overall arrangement of the 800 MHz and 2.6 GHz frequency bands, of which the two main scenarios would be as follows:

A first scenario, illustrated in the chart below involves the following arrangement:

- two licences, each combining a 15 MHz duplex in the 800 MHz frequency band and a 20 MHz duplex in the 2.6 GHz frequency band (labelled FDD 1 and FDD 2 in the chart below);
- two licences in 2.6 GHz frequency band for 2 x 15 MHz blocks of FDD spectrum (labelled FDD 3 and FDD 4 in the chart below);
- one licence in the 2.6 GHz frequency band for a 50 MHz block of TDD spectrum (labelled TDD in the chart below).

Arrangement based on two combined licences in the 800 MHz and 2.6 GHz frequency bands (each colour corresponds to one licence)

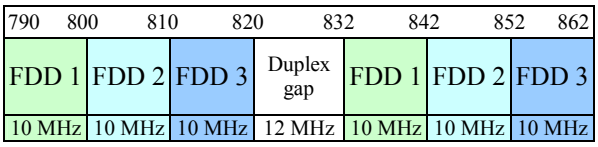


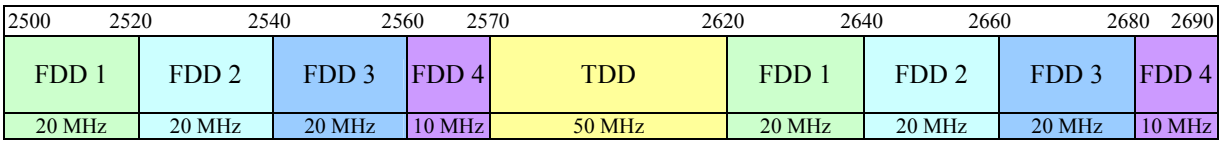


A second scenario would result in the following arrangement, summarised in the chart below:

- three licences that combine a 10 MHz duplex in the 800 MHz frequency band and a 20 MHz duplex in the 2.6 GHz frequency band (labelled FDD 1, FDD 2 and FDD 3 in the chart below)
- one licence in the 2.6 GHz frequency band for 2 x 10 MHz blocks of FDD spectrum (labelled FDD 4 in the chart below)
- one licence in the 2.6 GHz frequency band for a single 50 MHz block of TDD spectrum (labelled TDD in the chart below).

Arrangement based on three combined licences in the 800 MHz and 2.6 GHz frequency bands (each colour corresponds to one licence)





This second scenario makes it possible to create three licences that combine the two frequency bands, but has the drawback of isolating a fourth licence in the 2.6 GHz band with a quantity of spectrum that is much smaller compared to the others. It also reduces the amount of spectrum each operator is allocated in the 800 MHz band to 2 x 10 MHz (the issue of quantity of spectrum to allocate to each operator is addressed in part 3.1.1).

In both of the above scenarios the combination of frequencies is based on FDD systems. It could be adapted to TDD mode, however. Other arrangements are also possible, one being to combine a 50 MHz block of TDD spectrum with FDD spectrum in the 800 MHz frequency band.

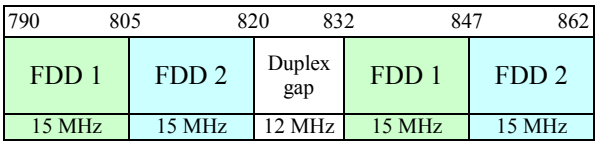
Question n°41. Under the hypothesis where licences are issued that combine spectrum in both the 800 MHz and 2.6 GHz frequency bands, what would be the most relevant combinations? What are the advantages and drawbacks of the different possible

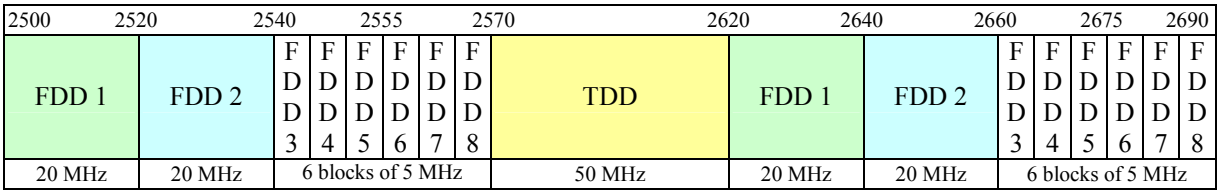
scenarios for the overall arrangement of the two bands? Do scenarios that involve a combination of the different duplexing modes make sense from an operator's standpoint?

An intermediate approach could involve the prior definition of licences that combine spectrum in the 800 MHz band with spectrum in the 2.6 GHz band, while leaving it up to the market, through a flexible auction-based procedure, to decide on how the remaining spectrum in the 2.6 GHz frequency band is allocated.

Here, possible variations on the earlier scenarios can be examined. For the first scenario, this would consist, for instance, of the following arrangement:

- two licences combining a 15 MHz duplex in the 800 MHz frequency band and a 20 MHz duplex in the 2.6 GHz frequency band (labelled FDD 1 and FDD 2);
- the remaining available 30 MHz duplex of FDD spectrum in the 2.6 GHz frequency band, which would be awarded based on blocks of 5 MHz (blocks marked FDD 3 to FDD 8) with no configuration set beforehand and where the number of licences issued for this 30 MHz duplex is determined by the procedure itself;
- a licence for the remaining 50 MHz block of TDD spectrum in the 2.6 GHz frequency band (labelled TDD).





Question n°42. Are you in favour of a scenario that involves issuing licences that combine spectrum in the 800 MHz and 2.6 GHz frequency bands, leaving it up to the market to decide on the number of licences and the quantity of spectrum included in each licence for the remaining frequencies? What are the advantages and drawbacks of such a scenario?

4 Regional development issues, rollout obligations and network sharing

The purpose of this part is to query respondents on the measures that could be taken to respond to the challenges of equipping the country with ultra high-speed mobile capabilities.

Providing nationwide access to mobile communication services is a major issue, and it is with the very goal of achieving vast ultra high-speed mobile coverage over the next decade that the decision was made to assign 800 MHz frequencies (790-862 MHz) from the digital dividend to mobile services, along with those from the 2.6 GHz band.

This is why the goal of achieving broad national coverage is one of the key points of the call for submissions procedure for the introduction of ultra high-speed mobile.

This question needs to be addressed by taking account of the differences between the situation for operators with licences to spectrum in the 800 MHz frequency band, which has very good propagation properties, and those awarded a licence only to spectrum in the 2.6 GHz band.

We will begin with a reminder of the current state of affairs and the outlook for second and third-generation mobile system coverage, to gain some perspective on the issue of the expected rate of deployment for ultra high-speed mobile over the next decade (part 4.1).

Respondents are then invited to share their analysis of the nature of the coverage expected for ultra high-speed mobile, in other words to characterise the availability of ultra high-speed mobile access and services in the covered areas (part 4.2).

We will then examine the economic aspects of achieving broad ultra high-speed mobile coverage. Respondents are invited in particular to share any remarks they deem pertinent on the economic feasibility of and the reasonable timeframe for achieving a level of coverage for ultra high-speed mobile that is comparable to what has been achieved for GSM (part 4.3).

Next, respondents will be asked to express their views on the rollout obligations that could be imposed in these frequency bands (part 4.4).

The question of network sharing is explored separately in the following section (part 4.5).

And, finally, the last part (4.6) is devoted to the issues of environmental protection and exposure to electromagnetic fields.

4.1 Reminder: current state of and future outlook for 2G and 3G coverage

The goal of this section is to provide a summary of the current state of affairs and future outlook for 2G and 3G mobile systems coverage.

State of national coverage by second generation (2G) GSM-standard mobile systems

Licensed GSM operators have made considerable investments that have enabled them to achieve broad network coverage across France over the past fifteen or so years. Each cellular operator has thus deployed its own 2G network over an area that provides roughly 98% of the population with access to GSM standard mobile telephony services, including voice, SMS and, more recently, data transmission.

In addition to these deployments, the operators have an obligation to complete the programme aimed at bringing access to areas where service is currently lacking, and to cover the main transportation arteries. Satisfying these two obligations will make it possible to complete mobile coverage over the next few years in all those locations in the country where none of the three operators is currently present, and on all of the main roadways in each *département* in Metropolitan France.

The progress made with these two deployment programmes has already brought 2G coverage to more than 99% of the population, with over 95% of the population being covered by all three operators. The eventual rate of coverage by at least one mobile operator will exceed 99.3% of the population.

As stipulated in Article 109-V of the Law on modernising the economy, an overall assessment of national coverage, including the outlook for eliminating areas not covered by all three 2G operators, referred to as “gray zones”, will be performed by ARCEP by August 2009.

State of national coverage by third generation (3G) UMTS-standard mobile systems

By the Order dated 18 July 2001, Orange France and SFR were authorised to establish and operate a third generation radio network open to the public. Bouygues Telecom was awarded its licence on 3 December 2002, or 16 months after the other two operators.

In accordance with their initial rollout obligation, Orange France and SFR were to have covered 58% and 75% of the population of Metropolitan France, respectively, with UMTS-standard services by the end of July 2003. Bouygues, meanwhile, was to have achieved at least 20% coverage by the end of December 2004.

Because of the significant gap that was noticed across Europe between the technical-economic reality and the forecasts made when UMTS licences were initially issued, ARCEP did not sanction 3G operators for their failure to comply with the initial coverage deadlines. ARCEP was thus forced to allow a delay of around 28 months in the three 3G operators’ rollouts: Orange France and SFR committed to launching their UMTS service by the end of 2004 and to have covered 58% of the population of Metropolitan France by 31 December 2005, while Bouygues was to have rolled out its UMTS services, with at least 20% coverage of the population by April 2007.

SFR and Orange France opened up their 3G mobile networks commercially in late 2004. By the start of 2006, SFR had achieved coverage of 60% of the population and Orange France of 58% of the population. Since then, the operators have continued their efforts to

expand their 3G coverage: by the end of 2007, SFR had covered 70% of the population and Orange France reached this level in late 2008. Meanwhile, Bouygues Telecom had reached a level of 20% coverage of the population by the end 2007, after having been put on notice by ARCEP.

To facilitate an increase in 3G coverage, ARCEP authorised 3G operators to reuse their low frequencies in the 900 MHz band for UMTS. These low frequencies, which are currently used for GSM, have much better physical propagation properties (range and indoor penetration) than the high frequencies, particularly those in the 2.1 GHz band. The use of 900 MHz-band frequencies played a crucial role in achieving nationwide coverage for 2G mobile services. Without these frequencies below 1 GHz, three to four times the number of sites would have been needed to achieve equivalent coverage using frequencies around 2 GHz. In early 2008, ARCEP thus altered the terms of the Orange France and SFR licences to allow them to deploy UMTS technology in the low frequencies of the 900 MHz band. ARCEP offered Bouygues Telecom the same option given to Orange France and SFR of reusing the 900 MHz band for 3G but, as of this consultation, the operator has not yet asked to implement it.

Now that UMTS has taken hold in the marketplace, with more than 9.4 million active customers, and the possibility of reusing 900 MHz frequencies for 3G has been opened up, operators must comply with the deployment obligations stipulated in their 3G licences. The third target for SFR and Orange France, whose deadline falls on 21 August 2009, stipulates a rate of coverage of 99.3% and 98% of the population, respectively, or a rate comparable to 2G. The next target applying to Bouygues Telecom's 3G licence is 75% coverage of the population, with a deadline of December 2010. ARCEP will make careful verification that these targets have been met.

4.2 Nature of the services expected in ultra high-speed mobile coverage zones

The aim of this section is to obtain respondents' views on how to characterise ultra high-speed mobile coverage. It is not enough to characterise it merely by the fact that access to a mobile network or to a mobile telephony service is available, as such is already the case with existing second and/or third generation mobile networks. What also needs to be specified are the features of this access or the services expected to be enabled by the deployment of ultra high-speed mobile networks in the coverage zone.

Characterisation of the mobile coverage expected to be supplied by ultra high-speed mobile networks is a critical point as it translates the public policy objectives assigned to the allocation of these new frequencies. It represents a key point in the obligations that will be imposed on the operators that are awarded a licence, whether in the form of minimal obligations attached to the frequency allocations, or commitments that the candidates make of their own accord as part of a comparative selection, or "beauty contest", procedure.

The parameters that characterise the nature of the mobile coverage must thus translate the developments enabled by the technologies and the progress expected by consumers over the course of the next decade, compared to the performances delivered by the third generation mobile systems that are currently being deployed.

Previous candidate submission calls for licences to frequencies to be used by mobile networks made specific mention of the technology (GSM) or family of technologies (UMTS is part of the set of technologies recognised internationally as being among the third generation of mobile systems) that operators had to employ. Rollout obligations applied to the services that these technologies supported, and were thus known before the procedure. Calls for submissions for the introduction of 3G mobile systems asked that candidates make coverage commitments for voice and data services running at several speeds that were, in theory, standard for the 3G interface (144 kbit/s, 384 kbit/s).

The application of the principle of technological neutrality in the 800 MHz and 2.6 GHz frequency bands will probably mean more uncertainty over the technologies that operators are likely to employ, and so requires a new approach. It nevertheless seems problematic to allow candidates absolute freedom in their proposals of the features of the connection or the nature of the services that will be delivered over these new networks. It would offer no guarantee of the actual supply of ultra high-speed mobile access, and could make it difficult to compare candidate submissions should the chosen procedure be a beauty contest that includes deployment as one of the selection criteria.

To compensate for this drawback, it does seem necessary to characterise the coverage that would be achieved by the availability of a mobile connection that meets certain minimal performance levels and/or which includes certain standardised services. The performance delivered by this connection could be characterised in terms of bitrate or latency, for instance, and defined by taking account of the performances expected of the technologies that are likely to be deployed, notably LTE and Mobile WiMAX.

Ultra high-speed mobile coverage rates could be characterised by the supply of a data transfer service or a very high-speed Internet access service alongside other mobile services such as voice calls and messaging (SMS or MMS).

Rollout obligations (see part 4.4) would be set on the basis of these services.

It should be emphasised that taking account of standardised services in the definition of coverage means requiring that they be provided throughout the zone covered by the network. Close attention thus needs to be paid to the relevance of the list of services chosen, which could be limited to the bare minimum needed to characterise an ultra high-speed mobile connection.

Question n°43. How to characterise the nature of the mobile coverage expected with ultra high-speed mobile networks? What standardised services do you think should be included when defining the coverage of an ultra high-speed mobile network? Do you think the availability of a data transfer or an Internet access services is an appropriate criterion? Do mobile communication services (voice, SMS, MMS) that are already offered on existing networks also need to be included? In particular, should it be mandatory to include the supply of mobile telephony in the definition of an ultra high-speed mobile network's coverage? How and to what extent could these ultra high-speed mobile services contribute to the supply of a high-speed and ultra high-speed fixed connection that could not be supplied by any other means, notably via wireline networks?

Question n°44. How to characterise the minimum performances expected in the zone covered by ultra high-speed mobile or of an Internet connection? In particular, what parameters (peak bitrates, average bitrates, average Web page upload time, file download time, latency, etc.) should be adopted and what values should these parameters have? For instance, to what extent does the availability of an Internet connection running at a minimum 10 Mbit/s seem a relevant way to characterise the features of the coverage expected from ultra high-speed mobile networks?

4.3 Economics of a broad ultra high-speed mobile network rollout

The goal of this part is to obtain respondents' analysis on what can be reasonably expected in terms of national coverage levels for ultra high-speed mobile networks, under conditions that are compatible with achieving economically balanced operations.

The economics of a broad ultra high-speed mobile network rollout will vary a great deal depending on whether or not the operator has access to low frequencies, in other words spectrum below 1 GHz. An operator with a licence that includes spectrum in the 800 MHz frequency band enjoys a considerable advantage for achieving broad national coverage, compared to an operator that only has access to resources in the 2.6 GHz frequency band.

This is why this question will be addressed separately:
- as it pertains to operators that have a licence that includes spectrum in the 800 MHz frequency band;
- and as it pertains to an operator that only has access to frequencies in the 2.6 GHz band.

Lastly, the question of the complementary use of the 800 MHz and 2.6 GHz frequency bands will be examined separately.

In the questions that follow, the notion of ultra high-speed mobile coverage, as discussed earlier, is presumed to be set.

4.3.1 The case of operators with licences that include spectrum in the 800 MHz frequency band

Achieving broad coverage for ultra high-speed mobile was central to the decision made by public authorities to assign the 790-862 MHz sub-band ("800 MHz frequency band") to mobile services.

Studies were undertaken beforehand to assess the economics of achieving broad national coverage, with and without low frequencies.

The report produced by the firms Analysys Consulting and Hogan & Hartson on behalf of ARCEP[23] revealed the following results, in the case where low frequencies are allocated. First, the net present value of a network development project that supplies ultra high-speed mobile services is maximised for a coverage level of 75% of the population – this

[23] Available on the ARCEP website: http://www.arcep.fr/index.php?id=8455&tx_gspublication_pi1[typo]=4&tx_gspublication_pi1[uidDocument]=609&cHash=261066d65d

being the natural extension of operators' current installations, discounting any regulatory restrictions. Moreover, coverage could exceed 99% of the population, i.e. current GSM network coverage levels, under conditions that are economically balanced for operators: this would involve an extension that can be achieved by imposing certain specific rollout obligations on operators, and without having to use additional sources of financing. By imposing such a rate of coverage, the net present value of the operators' profits, is still positive if the 800 MHz frequency band is used.

These economic results are consistent with the commitments made by Orange France and SFR when they were awarded licences for the deployment of third generation mobile networks, based on a target coverage analogous to the one achieved for GSM. Here, it should be pointed out that the reuse of 900 MHz frequencies for UMTS, which has been provided for in principle since the call for candidates issued in 2000, is crucial to achieving this broad coverage, in the same way that having access to the 800 MHz frequency band is for the rollout of ultra high-speed mobile. On the other hand, it should be reiterated that Bouygues Telecom has not made a coverage commitment for its 3G mobile network beyond 75% of the population, in other words a level well below what it has achieved for its 2G network.

Question n°45. Respondents are invited to share any analysis on the economics of deploying an ultra high-speed mobile network with broad national coverage, based on resources that include spectrum in the 800 MHz frequency band. In particular, they are asked to share any element pertaining to the economic feasibility of coverage that is equal to or greater than the GSM footprint. What is your estimate of the investment needed to achieve ultra high-speed mobile coverage comparable to current GSM coverage?

Question n°46. Based on current forecasts on the availability of equipment, and the timeline for the release of frequencies, what deployment roadmap seems achievable in the 800 MHz frequency band? In particular, what do you think is a reasonable timeline for achieving a coverage rate of 75% of the population for ultra high-speed mobile, and for matching the current level of GSM coverage (>99%)?

Mobile network deployments require the use of radio transmission sites where operators install their electronic equipment and their masts, which are crucial to ensuring network coverage. Nationwide GSM coverage was achieved thanks to use of the low frequency band at 900 MHz. Inheriting the sites employed for 2G mobile networks, and especially those engineered for use with the 900 MHz band, provides a key link to the national infrastructure that operators can rely upon to deploy third generation mobile systems, and will certainly be able to rely upon when deploying ultra high-speed mobile systems in the 800 MHz frequency band.

Question n°47. Can the deployment of networks in the 800 MHz frequency band be achieved by relying on sites that have already been deployed, notably for systems in the 900 MHz band? Respondents are invited to specify whether their economic assessments provided earlier take account of the savings generated by the use of existing sites, thanks to meshing with the 900 MHz band.

4.3.2 The case of operators with licences only to spectrum in the 2.6 GHz frequency band

The report on the digital dividend produced by the firms Analysys Consulting and Hogan & Hartson on behalf of ARCEP (see above) concluded that, without the availability of new low frequency bands, and so without access to the 800 MHz resources, the maximum extension for a non-subsidised operator, i.e. one that foregoes all its profits, is 76% of the population.

Based on quantitative data, this report confirms that using only the 2.6 GHz frequency band would not suffice to achieve a level of coverage comparable to what could be achieved with use of the 800 MHz frequency band.

Question n°48. Given the outlook for the availability of the 2.6 GHz frequency band, what deployment timeline can we expect in this band? Respondents are invited to share their analysis of the economics of deploying an ultra high-speed mobile network in the 2.6 GHz frequency band and the coverage level that can be achieved using these frequencies.

Coverage from the 2.6 GHz band could be improved by existing rollouts in other frequency bands. Existing and new entrant operators could reuse existing sites, notably those deployed for high frequencies (e.g. 2.1 GHz). Nevertheless, because the 2.6 GHz band has poorer propagation capabilities than the already allocated frequencies, it is possible that relying only on the reuse of existing sites could lead to gaps in coverage, which means new sites would need to be deployed.

Question n°49. To what extent can existing sites facilitate the deployment of networks in the 2.6 GHz band? Will these new networks require a higher density of base stations than existing networks?

4.3.3 Complementary nature of 800 MHz and 2.6 GHz-band spectrum

If the 800 MHz frequency band is well suited to achieving nationwide coverage, it nevertheless has the drawback of limited capacity, and may not be enough to supply ultra high-speed mobile in urban zones. Because the 2.6 GHz band has a quantity of frequencies (190 MHz) that well exceeds what is available in the 800 MHz band, it can serve to offset the latter's deficiency by supplying the capacities needed in heavy traffic zones to ensure the quality of service and the speeds that consumers expect.

Question n°50. What would be the optimal spectrum usage strategy for an operator that has access to both the 800 MHz and the 2.6 GHz frequency bands? To what extent would the 800 MHz band be used in the entire area covered, including densely populated zones, to ensure indoor coverage and contribute to routing traffic? What zones would be covered with the 2.6 GHz-band frequencies? What percentage of coverage, of the population and the country, would that represent?

Once it is established that both the 800 MHz and 2.6 GHz bands are needed for the deployment of networks that cover the entire population, licences that combine access to

spectrum in both the 800 MHz and 2.6 GHz bands could be proposed. The question of whether or not to issue licences that combine access to both frequency bands is addressed specifically in part 3.3.

4.4 Rollout obligations in the 800 MHz and 2.6 GHz frequency bands

The goal of this section is to obtain respondents' views on the rollout obligations to be attached to these two frequency bands.

To satisfy regional development objectives in particular, minimal rollout obligations need to be imposed on operators, regardless of the type of selection procedure used. Should the chosen procedure be a beauty contest that includes a selection criterion pertaining to coverage, these minimal obligations could be reinforced by rollout commitments made by the operators.

These questions concerning rollout obligations are discussed in the following section, with a distinction being made between the situations as it pertains to the 800 MHz frequency band and as it pertains to the 2.6 GHz frequency band.

4.4.1 Zone covered by the licences

In light of the goal of building nationwide mobile networks and business models to match, it does seem logical that the zone covered by these licences, which are few in number, be the whole of Metropolitan France, as is already the case for second and third generation mobile networks.

Question n°51. Should the licences issued be national in scope?

4.4.2 Coverage objectives and rollout deadlines in the 800 MHz frequency band

Licences in the 800 MHz frequency band could be attached to significant coverage obligations. The question posed is the level of coverage that should be imposed as a minimum obligation, with the candidates possibly being asked to make additional commitments as part of a beauty contest procedure that includes a selection criterion pertaining to coverage.

The question here is therefore whether it would be relevant to impose an obligation on operators with spectrum in the 800 MHz frequency band to meet high minimum coverage levels, i.e. that correspond to demanding a level of coverage for ultra high-speed mobile that is at least equivalent to what has been achieved for GSM.

Question n°52. What coverage obligations should be included as a minimal condition attached to the allocation of 800 MHz frequencies? Should coverage obligations analogous to those attached to GSM be imposed for the 800 MHz frequency band from the outset? Do you think these obligations should be for a lower rate of coverage? Or, on the contrary, be higher than the current rate of GSM coverage? Should these minimum obligations be completed by a selection criterion pertaining to coverage, encouraging candidates to make additional rollout commitments? What qualitative and quantitative

impact would very high minimum coverage obligations have on the value of the frequencies?

As with 3G licences, coverage obligations could be expressed as a percentage of the population or as the surface area covered by the different deadlines, by one or several services. They could correspond to the use of terminals of a given maximum power and a rate of outdoor availability of at least 95% in the zone of coverage. This definition, which is consistent with the one included in current operators' 3G licences, has the added benefit of being well suited to verification procedures.

Question n°53. How should the principles pertaining to coverage obligations be defined? What would be the maximum allowed power of the terminals?

Question n°54. What should the deadline be for achieving the ultimate target rate of coverage (99% or another figure)? What impact will the fact of not having access to spectrum until well after the licences are issued have on network rollouts?

Intermediate obligations could also be imposed. They would make it possible to measure the progress being made in covering the country. To compare, the obligations set for 3G for packet mode services with a symmetrical bitrate of 144 kbit/s included a target of 20% coverage of the population within two years, with the goal of covering 60% of the population within eight years. 3G coverage commitments for these same services were 75%, 58% and 20% within two years for SFR, Orange France and Bouygues Telecom, respectively, and 98.9%, 94% and 60% within five years, and 99.3%, 98% and 75% within eight years.

Question n°55. What intermediate thresholds could be set in the 800 MHz frequency band?

If a beauty contest were used as the selection procedure, operators could commit to higher rates of coverage or shorter timetables.

Moreover, it is possible to set regional targets over and above national coverage obligations to ensure that deployments are progressing evenly across the country.

Question n°56. Should coverage targets on a smaller geographical scale be set in addition to national obligations?

Lastly, existing operators could use the frequencies they already have at their disposal to provide the services imposed by the coverage obligations.

The question here then is whether coverage obligations should be designed as a rollout obligation carrying the mandatory proviso that only the frequencies allocated to the operator can be used to satisfy it, or rather as an obligation to provide a service which could be satisfied by using other frequency bands as well. In particular, under a hypothesis where a coverage obligation includes the supply of voice call service, should it be mandatory that this coverage obligation be satisfied using only the frequencies allocated in the 800 MHz/2.6 GHz band, regardless of the other frequencies for which the operator may hold a licence, or could it

also be satisfied by the combined use of other frequencies to which the operator has access, notably in the 900 MHz, 1800 MHz or 2100 MHz band?

A provision that allows the use of any frequency band to satisfy these obligations would not, however, make it possible to ensure the actual use of 800 MHz band frequencies.

Question n°57. What is your view on the use of frequency bands that have already been allocated to satisfy the service provision obligations mentioned earlier, which would be attached to the licences issued to spectrum in the 800 MHz frequency band?

4.4.3 Rollout obligations in the 2.6 GHz frequency band

4.4.3.1 Rollout obligations in the 2.6 GHz frequency band for an operator that also has access to spectrum in the 800 MHz band

In a situation where an operator has access to spectrum in both the 800 MHz and 2.6 GHz frequency bands, three main approaches can be proposed.

The first approach would consist of requiring operators to satisfy distinct rollout obligations in each of the frequency bands. In particular, this system would make it possible to ensure the actual use of the two frequency bands, but would not necessarily lead to better overall coverage of the country.

Under the second approach, generic rollout obligations would be set, based on the band with the greatest coverage capacity, namely the 800 MHz frequency band. These obligations could be satisfied by the use of either band, leaving it up to the operator to decide. No specific obligation would be attached to either frequency band.

The second approach would nevertheless not make it possible to ensure that the 2.6 GHz band was actually used. The third approach could thus consist of generic rollout obligations (to be satisfied using 800 MHz and 2.6 GHz bands as the operator sees fit), as with the second approach, but this time accompanied by as yet undefined measures that would make it possible to ensure actual use of the 2.6 GHz frequency band.

Question n°58. What are the advantages and drawbacks of the different approaches to rollout obligations in the 2.6 GHz frequency band for an operator that also has access to spectrum in the 800 MHz band? Which of the three do you feel is the best? In the case of the first approach, what would be the target rate of service coverage with the 2.6 GHz frequency band? What rollout timetable do you recommend? Under the third approach, what measures could be defined to ensure an efficient rollout in the 2.6 GHz frequency band?

4.4.3.2 Rollout obligations in the 2.6 GHz frequency band for an operator with access only to spectrum in the 2.6 GHz band

The 2.6 GHz frequency band offers rollout conditions (site meshing, etc.) similar to the 2.1 GHz band, in particular thanks to their comparable propagation properties. Deployments that have been performed by 3G operators thus far in the 2.1 GHz band can therefore serve as a relevant point of comparison. To wit, all three mobile operators have

achieved or plan on achieving coverage of around 75% of the population with the 2.1 GHz band.

An alternative approach could consist of not setting any rollout obligations. This is the approach that was taken in several European countries when allocating the 2.6 GHz frequency band at auction. With a comparative selection procedure, the commitments made in this area by the candidates could help in the assessment of their applications.

Question n°59. What is the best approach to rollout obligations for an operator that has access only to spectrum in the 2.6 GHz band? In the case where coverage obligations were imposed, what level should be set and what should the timeline be?

Several provisions discussed in part 4.4.2 which pertain to the 800 MHz frequency band could also be applied to the 2.6 GHz band, namely the possibility of introducing obligations on a smaller geographical scale than at the national level, and the question of reusing already allocated spectrum to satisfy new rollout obligations.

Question n°60. Do you have any comments to make on the geographical scope of the obligations and/or the reuse of already allocated spectrum to satisfy rollout obligations attached to the 2.6 GHz frequency band?

4.5 Network sharing and accessing networks in the 800 MHz band

The goal of network sharing is to enable market players to mutualise certain infrastructures or certain parts of their network. Two main forms of installation sharing are possible.

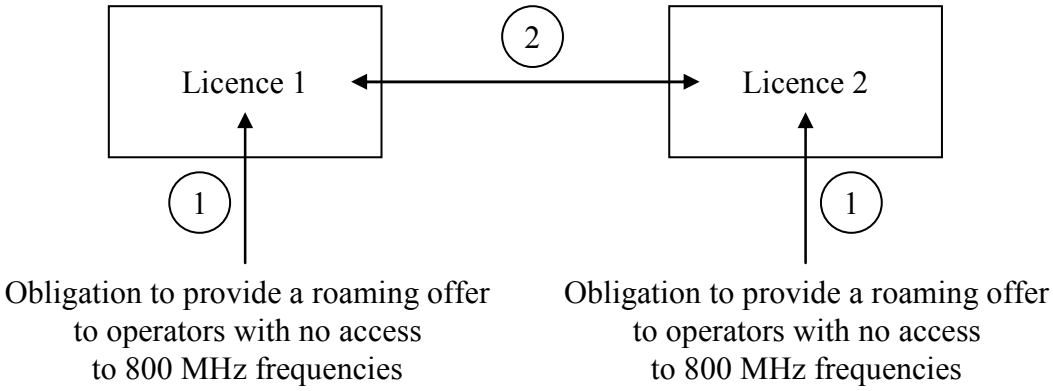
Sharing passive infrastructure and facilities (sites, masts, equipment rooms, air conditioning, etc.) is already widely used for 2G and 3G installations. General provisions are in place that encourage operators to share these passive installations as much as possible – in particular Article D 98-6-1 of the French postal and electronic communications code, CPCE. Passive installations can be shared regardless of the technologies deployed. These systems will continue to be implemented by operators, especially in zones where they are already sharing several sites. This will not be addressed any further in this section.

Active equipment can also be shared. This type of arrangement creates very different issues from simple passive installation sharing as it involves sharing electronic equipment. This means that it will have an impact on operators' capacity to differentiate themselves, since they are sharing equipment, and on the incentives they have to invest. This option is open to operators but has not been used thus far in France for either 2G or 3G deployments, aside from the very specific programme aimed at completing mobile coverage.

The question of sharing active installations involves two very different issues, which are depicted in the diagram below:

- operators with spectrum in the 2.6 GHz band but none in the 800 MHz band accessing mobile networks deployed in the 800 MHz band: this creates the roaming issue on 800 MHz-band networks depicted in the diagram below by the one-way arrows marked (1);

- network infrastructure shared by two operators with a licence to spectrum in the 800 MHz band: this is the only real sharing problem between operators, depicted in the diagram below by the two-way arrow marked (2).
-



These two issues are analysed, in turn, here below.

4.5.1 Providing access to networks in the 800 MHz band to operators licensed only to access the 2.6 GHz frequency band

Because there will, in theory, be fewer licences issued for the 800 MHz than for the 2.6 GHz frequency band (see part 3 for more on this topic), there could be players with access to spectrum in the 2.6 GHz band but not in the 800 MHz band.

This has a dual consequence, for both the operators and users.

Operators with access only to spectrum in the 2.6 GHz band will not be able to compete with other operators in sparsely populated areas, or only at the cost of an extremely expensive rollout. This imbalance could lead to a major competitive disadvantage if the services offered by 2.6 GHz operators are confined to densely populated zones only, and if one of consumers' key demands is that ultra high-speed access be available everywhere, and not only in densely populated zones.

To compensate for this problem, players could form consortia to acquire spectrum. This solution, which could be enabled by a strategy involving shared investments and sharing infrastructure, would allow more players than there are licences to have access to infrastructure in the 800 MHz band.

This type of solution has already been implemented in certain countries for the deployment of third-generation systems. In Spain, for instance, Orange and Vodafone joined forces to deploy their 3G networks. This strategy allows them to provide broad nationwide coverage, while minimising their infrastructure-related costs.

No such agreement between operators has been signed to date in France.

Question n°61. Is a strategy of acquiring a licence to spectrum in the 800 MHz band through a consortium of several players a good idea? Could it create any particular

technical, economic, competition or legal problems? Is there a quantity of spectrum below which such a solution would not be viable?

Another solution, which does not contradict the previous one, consists of allowing the players to benefit from roaming agreements on networks deployed in the 800 MHz frequency band.

Each licence-holder in the 800 MHz band could deploy a network and decide to allow other players access to its network via roaming. This does not, however, guarantee that all players with a licence to access the 2.6 GHz band would have access to 800 MHz frequencies.

To ensure that every player wanting to access the 800 MHz band can do so, licence-holders in this band could be subject to an obligation to sign roaming agreements with operators that have a licence only to the 2.6 GHz band, when the latter so requests.

Establishing a provision of this kind must nevertheless be part of an approach aimed at stimulating investments in achieving broad coverage, if necessary through shared investment schemes between operators, and must not create the opposite effect of creating disincentives to invest. What needs to be examined then is what should be demanded in exchange from the 2.6 GHz-band operators that would be the beneficiaries of these roaming agreements.

Question n°62. How could access to the 800 MHz frequency band translate in terms of minimum obligations imposed on its licence holders to offer roaming? Which operators could benefit from roaming access to this band (e.g. those with only resources in the 2.6 GHz band)? Under what conditions could such a system help create incentives to invest in achieving broad national coverage, for instance by encouraging shared investments schemes between operators? What precautions need to be taken to prevent the system from creating the opposite effect, i.e. a disincentive to invest? What could be demanded in exchange from those operators that are the beneficiaries of these roaming agreements?

This type of obligation could have an impact on the value attributed to the frequencies. A party with a licence to the 800 MHz band which is required to satisfy extensive rollout obligations and to provide roaming on its network will have to make a very considerable investment.

Question n°63. What impact would an obligation to provide roaming have on the value of the spectrum?

4.5.2 Infrastructure sharing between operators with licences to the 800 MHz frequency band

In addition to the competition-related aspects of allowing all operators to access the 800 MHz frequency band, sharing infrastructure can help speed up coverage of the less densely populated areas by allowing licence-holders to mutualise their infrastructure.

This issue echoes the efforts currently being devoted to third generation networks, pursuant to Article 119 of the Law on modernising the economy, which requires ARCEP to determine, following public consultation, the terms and measures that will be implemented in

Metropolitan France for sharing third generation mobile electronic communications network installations. In accordance with the Law, ARCEP has held a public consultation on the subject of sharing third generation network installations[24] that will enable it make the necessary decisions. This work could be used to help define measures specific to the 800 MHz frequency band.

Question n°64. Do you think that specific measures (e.g. imposing obligations) are needed at this stage on the matter of infrastructure sharing in the 800 MHz frequency band? Would it be enough to give operators the option of sharing their passive or active installations?

4.6 Aspects tied to environmental protection and exposure to electromagnetic fields

The deployment of new networks with a vast footprint across the entire country must naturally factor in the impact that these new installations will have on exposing the public to electromagnetic fields and on the environment. These two points are addressed below.

4.6.1 Public exposure to electromagnetic fields

Public authorities take a serious view of the issue of exposure to electromagnetic fields. Measures have been taken to define standards for radio installation deployments, which would naturally apply to mobile networks in the 800 MHz and 2.6 GHz frequency bands in the same way they apply to all other mobile networks.

First, it needs to be remembered that the electromagnetic emissions from infrastructures and terminals must comply with regulations and standards that are based on international recommendations.

Antennae and masts are thus not installed or put into service in a haphazard way. All installation projects are subject to a number of regulations, including those pertaining to public exposure to electromagnetic fields, based chiefly on Decree no. 2002-775 which sets the maximum exposure thresholds that must not be exceeded. The decree is based on recommendations that are applied internationally, and which have also been adopted by the European Commission (Recommendation 99/519). Also in application is the obligation for the relay antennae to comply with health protection regulation, the corresponding verification falling under the purview of the National Frequency Agency, ANFr.

In addition, Article D 98-6-1 of the French postal and electronic communications code, which pertains to health and environmental protection regulations, stipulates that operators must make an up-to-date list of the location of their radio transmission sites available to the public. Anyone can access this list, which contains information on the location of the antennae and on the results of on-site measurements of their electromagnetic field, via the Cartoradio database maintained by the ANFr and made available on its website.

[24] The consultation ended on 23 January 2009 and the responses are currently being analysed.

There is also regulation in place that defines the limits on electromagnetic emissions for terminals used in France. The Order of 8 October 2003 sets the technical specifications in this area that apply to wireless terminal equipment.

All of the provisions listed above are currently being applied by network operators and will continue to apply to new networks. Should these standards evolve, operators will naturally be required to comply with any new regulation.

Question n°65. In addition to complying with existing regulation governing the public's exposure to electromagnetic fields, do you have any comments to make on this subject? How can recent developments concerning public concerns about these matters be taken into account? To what extent could these concerns affect the rollout of ultra high-speed mobile networks?

4.6.2 Taking environmental aspects into account

Taking account of environmental aspects is also covered by Article D 98-6-1 of the French postal and electronic communications code. These provisions include obligations concerning site sharing, which were referred to earlier.

Network sharing and reusing sites that already house second and third generation mobile networks are both important elements in helping to minimise the environmental impact of ultra high-speed mobile network deployments.

Respondents are invited to share their analysis of the opportunity to impose measures for sharing infrastructure, specifically as they pertain to mobile networks in the 800 MHz band. A question on this point is posed in part 4.5 of this consultation, on the matter of infrastructure sharing.

Future operators could also be asked to make specific commitments to other means of minimising the environmental impact of ultra high-speed mobile network deployments in the 800 MHz and 2.6 GHz bands in their submissions to a comparative selection procedure.

A selection criterion on this matter could thus be included in a beauty contest procedure. Such a provision could invite candidates to make a commitment to limit the visual impact of their sites. Operators could also make commitments in the areas of energy consumption, site design and equipment recycling. Other elements could also be taken into account.

Question n°66. What elements in the area of environmental protection do you think should be included in the selection procedure? In what form?

5 Questions pertaining to market competition and network openness

The purpose of this part is to obtain respondents' analysis of the competition-related issues inherent in the award of licences for the deployment of ultra high-speed mobile networks in the 800 MHz and 2.6 GHz frequency bands.

The first part addresses issues relating directly to the competition dynamic between mobile network operators. It situates the award of spectrum in the 800 MHz and 2.6 GHz bands in mobile operators' overall licensing strategies, with the reminder that a call for candidates is being issued in 2009 in the 2.1 GHz band which will likely to result in a fourth 3G mobile operator joining the market.

Respondents will first be asked to share their views of the issues affecting the competition dynamic between existing third-generation mobile network operators. They are then invited to share their analysis of the impact that an additional player in the ultra high-speed mobile frequencies would have on market competition.

The second part examines the question of opening the networks up to mobile virtual network operators (MVNOs).

And, finally, the third part is devoted to obtaining feedback on the issues of network openness and neutrality with respect to devices, services and content, and on how to take these aspects into account during the procedure for awarding licences to deploy ultra high-speed mobile networks in the 800 MHz and 2.6 GHz frequency bands

5.1 Issues affecting the competition dynamic between mobile network operators

The goal of this section is to obtain respondents' comments on the stakes attached to the award of spectrum in the 800 MHz and 2.6 GHz frequency bands that affect the competition dynamic between mobile network operators.

Two matters in particular will be examined in the following section: third generation mobile operators' access to the 800 MHz and 2.6 GHz frequencies, and the possibility of a new entrant joining the market, i.e. which is not already present as a 3G mobile network operator.

We begin by providing some background on the second and third generation mobile market in France, with the reminder that a procedure is underway for the allocation of remaining spectrum in the 2.1 GHz band, which is likely to result in a licence being awarded rapidly to a fourth 3G mobile operator.

Next we will summarise the results of the first allocation procedures for 2.6 GHz and 800 MHz-band frequencies that have taken place around the world: respondents are invited to comment on the preliminary conclusions that can be drawn from them.

Next we address the issues attached to accessing spectrum for the deployment of ultra high-speed mobile networks that will affect the competition dynamic between existing third-generation mobile network operators.

And, finally, respondents are invited to share their analysis of the eventuality of a new player being present in the ultra high-speed mobile frequencies, i.e. which is not currently present in the market, following the award of a licence to deploy a third generation mobile network in the 2.1 GHz band.

5.1.1 Background: market structure for second and third generation mobile networks

The competition issues inherent in the procedure for awarding licences in the 800 MHz and 2.6 GHz frequency bands need to be assessed with respect to the changes occurring in the competition structure of the mobile market, and by taking account of the overall spectrum strategy for the development of mobile networks.

There are, at present, three network operators in the French mobile market, each one operating both a 2G and a 3G network. These network operators host mobile virtual network operators (MVNOs), whose share of the mobile market stands at around 5%.

As of this public consultation, a procedure has begun to award the spectrum that is still available in the 2.1 GHz band for the deployment of third generation mobile networks. This will be a two-stage procedure of which the first will be devoted to awarding a 5 MHz duplex and will be open only to new entrant candidates, while the second will be devoted to awarding the remaining frequencies and will be open to all candidates. Particular attention will be given during the procedure to proposed measures to stimulate the development of mobile virtual network operators.

This procedure could result in the creation of a fourth mobile operator in France in the coming months. This operator will have been awarded spectrum that would enable the rapid deployment of a third-generation mobile network in the 2.1 GHz band, completed by spectrum in the 900 MHz band which is crucial to achieving broad coverage.

The arrival of a fourth mobile network operator in the French market would constitute a major development.

5.1.2 Preliminary conclusions to draw from earlier international allocation procedures for 2.6 GHz and 800 MHz-band frequencies

Allocation procedures that have already taken place abroad provide very useful information on the possible outcome of a procedure for awarding licences for the deployment of ultra high-speed mobile networks.

Here, the recent auctions for the 2.6 GHz frequency band that were held in Norway and in Sweden are particularly instructive.

First, the mobile network operators already involved in the 3G market all submitted a bid and all were awarded frequencies in the FDD portion of the 2.6 GHz band.

Second, the substantial quantity of spectrum available in the 2.6 GHz band makes it possible for a new player not already present in 2G or 3G to enter the marketplace.

This statement should be put into perspective, however. The situation is not the same if we look separately at the portion of the 2.6 GHz band designed for the deployment of FDD-mode systems, such as LTE, and the portion of the 2.6 GHz band designed for TDD-mode systems, such as WiMAX.

With the exception of a few isolated frequencies, all of the FDD spectrum has been allocated to mobile network operators that are already present in the second and/or third generation mobile market.

It was TDD spectrum that was awarded to new players, and appears not to have attracted the same size of bids as FDD spectrum did: in Sweden, TDD spectrum brought in a price per MHz that was four times lower than the price paid for FDD spectrum.

Very few awards procedures have taken place around the world for the low frequency bands for ultra high-speed mobile, as it was only just recently decided to assign them to mobile services. But the relative narrowness of these frequencies means very few licences can be awarded, and limits the likelihood of a new player being able to position itself compared to existing mobile network operators that are also interested in these frequencies. Here, it is worth mentioning that, in the United States, 700 MHz band frequencies were awarded to existing operators during an auction procedure that took place in 2008.

These international examples help expose the reality of the economic area that exists for a new entrant operator that is not already present in the second or third generation mobile network market, aside from possible models that would be based on accessing TDD spectrum in the 2.6 GHz frequency band.

Question n°67. Would you care to add any nuance or details, or expand on this description of these early international examples, and the preliminary conclusions they offer about the state of competition between mobile network operators?

5.1.3 Issues affecting the competition dynamic between mobile network operators already present in the 3G market

Gaining access to additional spectrum appears to be part of the ongoing development of a network operator that is already present in the 3G mobile market. These additional frequencies represent both a means of continuing to evolve their services towards ultra high-speed mobile and 4G, and of acquiring added resources to ensure their capacity to route the increasing volume of traffic from existing services and maintain quality of service. Access to these additional frequencies constitutes a particularly important stake for mobile operators with access to an only limited quantity of spectrum for delivering third generation mobile services.

Question n°68. Respondents are invited to share their remarks on what gaining access to spectrum represents for a third generation mobile network operator, in terms of pursuing its operations.

Under these conditions, it could appear logical that the procedure for allocating spectrum in the 2.6 GHz band be compatible with awarding spectrum to at least as many third generation network operators as there are in the 2.1 GHz band.

It is nevertheless worth underscoring that there are differences in the circumstances and the strategies being operated by the market players when it comes to 3G, of which the situation in France provides a good example. This itself could be a good reason to examine more flexible awards procedures that do not, in theory, rule out the possibility of allocating the whole of the band to a different, perhaps smaller, number of operators.

To shed more light on this topic, respondents are invited to share their views on the incorporation of access to 800 MHz and 2.6 GHz-band frequencies in view of an ultra high-speed mobile network rollout into the overall spectrum strategy of an operator that is already present in the second or third generation mobile market.

Question n°69. For an operator that is already present in the second or third generation mobile market, how does access to 800 MHz and 2.6 GHz-band frequencies factor into an overall strategy for employing the spectrum to which it already has access (in the 900 MHz, 1800 MHz or 2.1 GHz bands)? To what degree will all of these bands eventually contribute to the supply of ultra high-speed mobile access services?

Question n°70. Will all third generation mobile operators have a need for additional spectrum in the 2.6 GHz frequency band to enable their evolution to ultra high-speed mobile? Will these needs arise at different points in time? If one of these operators were not allocated spectrum in the 2.6 GHz band, what impact would that have on the competition dynamic between existing operators?

Question n°71. Is it absolutely necessary that there be at least as many licences to FDD spectrum in the 2.6 GHz band as there are operators in the 2.1 GHz band? Should the procedure be made flexible enough to allow for the possibility of allocating the whole of the band to a different number of operators?

The narrowness of the 800 MHz band strongly limits the number of licences that can be awarded to support ultra high-speed mobile network rollouts. This then gives rise to the question of how the competition dynamic between operators with 2.6 GHz band spectrum would be affected if not all them had access to lower frequencies as well.

Question n°72. How will the competition dynamic between operators be affected if only some of them were able to access the 800 MHz frequency band?

The option of providing access rights via roaming to remedy this situation of a lack of spectrum in the 800 MHz band is examined earlier in this public consultation.

5.1.4 The question of the possible arrival of a new entrant

The competition issues created by the arrival of a new entrant to the mobile market, specifically via the allocation of 800 MHz and 2.6 GHz spectrum for the deployment of an ultra high-speed mobile network, need to be examined. What has occurred in other markets around the world reveal that the different frequency bands need to be distinguished and, within the 2.6 GHz frequency band, a distinction needs to be made between FDD and TDD spectrum.

Prior to that arises the question of the economic area that exists for a new entrant in the marketplace.

This question is particularly pertinent in France given that a procedure which is currently underway could well result in the creation of a fourth 3G mobile network operator. This would affect the economic positioning of an application from a new player as it would be entering the mobile market in the position of fifth operator.

This question is made even more relevant by the fact that this new operator would be making a relatively late entry into an even more mature market. On this topic, the public consultation on the 2.1 GHz band that took place in 2008 had emphasised the fact that use of the 800 MHz and 2.6 GHz-band frequencies was not compatible with a new player's swift entry into the marketplace, given the roadmap for the spectrum's availability and for the development of compatible equipment.

It is nevertheless worth examining the economic area that exists for the entry of an additional player, in terms of the possibility of a creating a business model that is different from those implemented by existing mobile network operators, with deployments in smaller areas or oriented towards niche markets – either in the target customer or the nature of the service offering. These projects, whose business model differs from one employed for a national ultra high-speed mobile services rollout, could be undertaken using only 2.6 GHz spectrum.

Question n°73. In your opinion, is there enough room economically for a new player that does not already operate a 3G mobile network, to enter the French market via ultra high-speed mobile frequencies? If so, using what business model? What would be the commercial target and coverage levels for these projects? If appropriate, please make a distinction between projects based on access to the 800 MHz frequency band, to FDD spectrum in the 2.6 GHz band and to TDD spectrum in the 2.6 GHz band.

The question can be posed in terms of the possibility of reproducing measures that apply to a possible new entrant for ultra high-speed mobile that are analogous to those included in the call for candidates procedures for the 2.1 GHz band. Terms attached to licences awarded via these procedures included roaming rights on 2G/3G operators' 2G network during a transitional period, access to 2G sites reused for 3G and access to low frequencies at 900 MHz which existing operators would be required to hand back if and when a new entrant to the 3G market was allocated spectrum in the 2.1 GHz band.

It should nevertheless be pointed out that not all of these measures would necessarily be appropriate in this particular case. For the sake of argument, however, what could be

examined is the issue of providing a new entrant with access to low frequencies. The new entrant would have the same rights as other players to apply for available spectrum in the 800 MHz band, for which only a small number of licences can be awarded. If the new entrant only had spectrum in the 2.6 GHz band, it could nonetheless enjoy access to 800 MHz frequencies through other operators' roaming offers, if such an obligation were imposed on operators that are awarded licences to the 800 MHz band – a possibility that is discussed elsewhere in this consultation (see part 4.5.1).

Question n°74. To what extent is it possible and justified to plan on including provisions that apply to a possible new entrant in the ultra high-speed mobile bands similar to those that were included for a possible fourth 3G mobile operator in the call for submissions for the allocation of the 2.1 GHz band? If relevant, respondents are invited to make a distinction between the situation where the current allocation procedure for 2.1 GHz frequencies results or does not result in a fourth 3G mobile network operator joining the market.

Question n°75. Are there, in your opinion, other issues that affect the competition dynamic between mobile network operators attached to the allocation of spectrum in the 800 MHz and 2.6 GHz bands, beyond those cited in part 5.1?

5.2 The question of opening networks to mobile virtual network operators

This part addresses the question of opening the ultra high-speed mobile networks to be deployed in the 800 MHz and 2.6 GHz frequency bands to mobile virtual network operators, or MVNOs.

Considerable efforts have been devoted in recent months to the question of the development of virtual operators. In an Opinion[25] dated 30 July 2008, the French Competition Authority (*Conseil de la concurrence*) analysed the impediments to the development of MVNOs, and issued recommendations for stimulating competition in the mobile market.

This question was also taken into account when preparing the terms for awarding the remaining spectrum in the 2.1 GHz band, in view of deploying third generation mobile networks.

This work was nevertheless carried out under circumstances that differ from the present consultation as it concerned the development conditions for MVNOs in the already mature second generation mobile services market, or third generation mobile services that were launched in late 2004 and whose commercial development is already well underway.

The question of MVNO development does need to be re-examined in the new context of allocating frequencies for the rollout of ultra high-speed mobile networks.

[25] Competition Authority (*Conseil de la concurrence*) Opinion of 30 July 2008 on the state of mobile virtual network operators (MVNO) in the French mobile telephony market, available on the Competition Authority's website (in French): http://www.conseil-concurrence.fr/user/avis.php?avis=08-A-16

Question n°76. How should the issue of hosting MVNOs be taken into account in the procedure for allocating spectrum in the 800 MHz and 2.6 GHz frequency bands? Should the question be posed in the same terms for both frequency bands? What are the economic stakes involved? Do you think a mandatory selection criterion pertaining to providing MVNO access to the newly created network should be included, as was the case in the candidate submission procedures for licences to the 2.1 GHz band for the purpose of deploying third generation networks, that have been launched since 2000? Is there a better way to factor in this consideration? What would that be?

5.3 Network openness and neutrality with respect to services and content

This question is an extension of the debates that took place in the United States over access and net neutrality in the 700 MHz band.

It gives rise to the issue of a possible obligation for networks to be open to all types of services, the aim being to allow users to access any services (including software) and applications (including Voice over IP and bandwidth-hungry services) they want, as is currently the case on wireline connections.

Question n°77. What is your analysis of the issues surrounding network openness and neutrality with respect to services and content, as it pertains to future ultra high-speed mobile networks in the 800 MHz and 2.6 GHz frequency bands? How should these issues be taken into account in the procedure for awarding licences for the use of frequencies for the deployment of mobile networks in the 800 MHz and 2.6 GHz frequency bands?

6 Content of the licences: rights and obligations

This part addresses the rights and obligations that could be attached to the licences to be issued for the 800 MHz and 2.6 GHz frequency bands.

Some of the main points of this question are addressed in earlier parts of this public consultation, most notably rollout and network access obligations.

Respondents are invited to share their analysis of the issue of relevant rights and obligations, with particular emphasis on those points that have not been examined elsewhere.

It is worth reiterating that the obligations contained in the licences will include minimum obligations attached to the award of the licence, as well as commitments made by the operators in their submissions to a comparative selection procedure.

6.1 Spectrum usage rights

The licence-holder will be authorised to use spectrum in the 800 MHz and or 2.6 GHz frequency band(s) with a view to deploying an ultra high-speed terrestrial mobile network open to the public.

The corresponding frequencies will be specified in the licence, as will the timeline for their availability. The dates when they will become available, as indicated in parts 2.1.2 and 2.2.2 will also be specified in the licences. Possible derogations granted to the French broadcasting authority, CSA (*Conseil supérieur de audiovisuel*) and to the Ministry of Defence will also be stipulated.

The technical terms applying to use of the frequencies will also be included in the licences, in accordance with the technical provisions that have been harmonised at the European level.

One particular stipulation will be compliance with European provisions concerning the frequency allocation plan. The duplexing mode will also be specified.

Here, it should be noted that European provisions are built on the principle of technological neutrality, and do not demand compliance with any particular technological standard or family of standards.

Question n°78. Do you have any comments to make on this technologically neutral approach to technologies and families of technologies for the 800 MHz and 2.6 GHz frequency bands?

Under the hypothesis where flexibility would be allowed in the duplexing mode used in the 2.6 GHz frequency band (see part 2.1.3.1), and due to the constraints inherent in changing the arrangement of the bands, these choices cannot be reversed at a later date and will thus be included in the licences. Giving the players the possibility of altering the

duplexing mode after the licence has been awarded could create an unfair situation. Indeed, because of the constraints involved in changing the duplexing arrangement of the band (see part 2.1.3), this option could be open only to certain players.

Question n°79. Do you think it is a good idea to give players the option of changing the duplexing mode used in the 2.6 GHz frequency band after the licence has been issued?

6.2 Ultra high-speed mobile coverage, mandatory services and access to 800 MHz frequencies

Coverage obligations will be included in the licences. They will need to define the notion of coverage as it pertains to the goal of making ultra high-speed mobile services available and to the services that must be offered within the covered area. They will then set a roadmap for the rollout.

It should be noted that the obligations contained in the licences will include both minimal obligations attached to the award of the licence, as well as commitments made by the operators in their submissions to a comparative selection procedure.

The questions of infrastructure sharing and roaming access to mobile networks in the 800 MHz frequency band must also be taken into account.

All of these issues are addressed in part 4.

Question n°80. Respondents are invited to reiterate their proposals on the subject of ultra high-speed mobile coverage, mandatory services and access to 800 MHz frequencies. What minimum obligations should be included with respect to coverage and mandatory services? In the case of allocation by beauty contest, should this point be made a selection criterion inviting candidates to go beyond minimum obligations? Would you like to share any additional comments or suggestions on this topic?

6.3 Permanence, quality and availability of services

To ensure the permanence, quality and availability of the services, quality of service obligations could be imposed, and possibly reinforced by additional commitments made by the operators in their submissions to a comparative selection procedure.

Question n°81. Do you think that quality of service obligations should be included? If so, what obligations do you think should be included?

In the case of a beauty contest, candidates could be selected based on their commitments. Standardised metrics should nonetheless be established to be able to compare the submissions. These metrics need to be easily verifiable by field surveys.

Question n°82. What metrics should be used as the basis of comparison for the quality of service commitments made by candidates in their comparative selection submissions?

The obligations set need to be consistent with the performances, the expected availability of the equipment and the devices, and with the quantity of spectrum allocated.

6.4 Network openness and ability to stimulate competition

Measures could be taken in favour of new entrant operators, notably obligations for them to be granted temporary roaming privileges on existing operators' networks. These measures would enable a new operator to roll out an offer more rapidly.

Hosting MVNOs is another important contributor to the competition dynamic, and could be taken into account by placing particular value on the commitments candidates make in this area, provided the procedure allows it.

And, finally, ensuring that networks are fully open to all devices and services could also be factored into the licence awards procedure.

All of these issues are examined in part 5.

Question n°83. Respondents are invited to reiterate their proposals on the subject of network openness and ability to stimulate competition. Must minimal obligations be in place, notably to encourage the entry of a new market player? In the case of a comparative selection procedure, should one of the selection criteria concern the ability to stimulate competition and network openness? Do you have any additional comments to make on this matter?

6.5 Reuse of frequency bands currently authorised for mobile services

Depending on technological developments and market needs, 900 MHz, 1800 MHz and 2.1 GHz-band frequencies could eventually be reused for the implementation of new, more high-performance technologies than the GSM and UMTS technologies that are currently in use.

A clause to this effect could be added to existing operators' licences when issuing licences in the 800 MHz and 2.6 GHz frequency bands.

Question n°84. Should a clause be added to existing licences that allows for the reuse of frequency bands that are currently authorised for other types of technology?

6.6 Licence duration

The French Postal and electronic communications code limits the possible duration for a spectrum usage licence to a maximum of 20 years.

A lifespan of 15 to 20 years is generally deemed relevant for licences relating to the deployment of mobile networks as it offers the operator sufficient visibility and a long enough period of time to earn a return on its investments.

GSM mobile operators' licences were initially awarded for a period of 15 years, and have been or will be renewed for the same length of time. The lifespan for UMTS licences was set at 20 years.

Question n°85. What lifespan do you recommend for the licences? Do you think the preferable licence duration should be 15 or 20 years, or another length of time?

6.7 Secondary trading

The French Postal and electronic communications code, CPCE, allows for the implementation of a system for trading spectrum usage licences in the frequency bands identified by ministerial order, in accordance with Article L 42-3 of the CPCE.

This type of system was authorised and used by the players for spectrum usage licences for the deployment of wireless local loop networks in the 3.4-3.6 GHz band.

Such a measure has not yet been authorised for the frequency bands used for second and third generation mobile communication services (900 MHz, 1800 MHz, 2.1 GHz), however.

Respondents are invited to share their views on the implementation of a system for trading spectrum in the 800 MHz and 2.6 GHz frequency bands that will be allocated to ultra high-speed mobile services and, more generally, to all of the frequency bands employed by mobile networks open to the public.

Allowing for secondary trading in these bands could enable more flexible use of the spectrum by the players, and could subsequently alter the quantity of spectrum they have at their disposal.

This secondary market must be subject to certain guidelines to ensure proper use of the spectrum and to prevent companies from hoarding frequencies.

Question n°86. Do you think it is a good idea to allow for secondary trading of the spectrum usage licences for the deployment of mobile networks open to the public? Respondents are invited to specify whether they recommend an identical approach for all of the frequency bands used by mobile networks open to the public (900 MHz, 1800 MHz, 2.1 GHz and 800 MHz and 2.6 GHz)?

6.8 Other measures

In addition to the topics addressed above, operators' current licences contain other terms and obligations which could be carried over to the licences issued for the use of the 800 MHz and 2.6 GHz frequency bands.

Question n°87. Do you have any additional comments or suggestions to make on the rights and obligations that should be attached to the spectrum usage licences in the 800 MHz and 2.6 GHz frequency bands?

7 Candidate selection procedures and methods

The purpose of this section is to obtain the respondents' views on the selection procedure to be used for the award of licences in the 800 MHz and 2.6 GHz frequency bands, in a situation of scarce spectrum resources.

It begins by providing background on the legal framework for spectrum allocation procedures. It then describes the different types of possible procedures in cases where scarcity exists (comparative selection or auction) and the lessons learned from experiences abroad. And, finally, the players are invited to express themselves on possible allocation procedures.

7.1 Background on the legal framework for spectrum allocation procedures

The European directives of 2002, and the framework[26] and authorisation[27] directives in particular, constitute the European regulatory framework for the award of radio spectrum usage licences. Their relevant provisions have been transposed to Articles L. 41 and following of the French postal and electronic communications code, CPCE (*Code des postes et des communications électroniques*), and particularly to Articles L. 42-1, L. 42-2 and L. 42-3. In accordance with the terms of Article L. 41-1 of the CPCE, licence-holders do not own the frequencies allocated to them but rather have the status of legal occupants of public property, which requires them to obtain prior administrative authorisation.

If there is no scarcity of available frequencies, the radio spectrum allocation procedure will take place over time, in accordance with Article L. 42-1 of the CPCE which allows ARCEP to satisfy operators' spectrum requests as they arise, provided the resources are available.

In situations where spectrum resource is scarce, however, it is the provisions contained in Article L. 42-2 of the French postal and electronic communications code that apply. In accordance with the terms of Article L. 42-2, *"when proper use of the frequencies demands, ARCEP can, following public consultation, limit the number of licences issued for their use, provided a situation of effective competition is ensured.*

After receiving recommendations from ARCEP, the Minister responsible for electronic communications will set the terms for awarding and modifying the corresponding authorisations for use of these frequencies, as well as the duration of the awards procedure, which cannot exceed a duration which has been set by decree.

The selection of the recipients of these authorisations will be made through a call for submissions based on criteria concerning the terms of use stipulated in Paragraph II of Article L. 42-1, or on the candidates' contribution to achieving the objectives listed in Article L. 32-1, or by an auction procedure that is in accordance with these objectives and after definition of these terms by the Minister, based on recommendations from ARCEP.

[26] Directive 2002/21/EC of the European Parliament and Council of 7 March 2002 on the relative on a common regulatory framework for electronic communications networks.

[27] Directive 2002/20/EC of the European Parliament and Council of 7 March 2002 on the authorisation of electronic communication networks and services.

The Minister may require that a bid guarantee be requested and that a penalty be imposed on candidates that withdraw their application before the authorisation is issued.

ARCEP conducts the selection procedure and assigns the corresponding frequencies.

The Minister may require that the selection criterion, or one of the selection criteria, be the licensing fee that the candidates agree to pay if they are assigned the frequency or the frequency band. The Minister will set the reserve price, below which the authorisation will not be issued.

The licensing fee and the terms for payment of the sums due for the assigned frequencies in accordance with the present article can depart from the provisions contained in Article L. 2125-4 of the French general public lands and property code."

The purpose of the next part of this section is to obtain respondents' views on the possible methods to be used in the allocation procedure, in the case where spectrum scarcity is established and so requires that an allocation procedure be launched in accordance with Article L. 42-2 of the French postal and electronic communications code.

7.2 Possible types of selection procedure and lessons learned from earlier experiences in France and abroad

Pursuant to Article L.42-2 of the French postal and electronic communications code, when the scarcity of the radio spectrum has been established, the Authority can employ one of several types of procedure for selecting the candidates to be awarded a licence: comparative selection ("beauty contest") or auctions.

Comparative selection

In a comparative selection (or beauty contest) procedure, candidates are chosen based on a comparative assessment of the commitments they make with respect to selection criteria which are defined in advance, and which do not include a financial criterion.

The selection criteria that are usually employed correspond to general interest objectives assigned to electronic communications regulation[28]. Through the selection criteria applied during this type of procedure, candidates are invited to make commitments that go beyond the minimum obligations contained in the call for submissions which are pre-requisites to obtaining a licence.

During the UMTS licence awards in 2001, for instance, operators Orange France and SFR made rollout commitments that corresponded to achieving coverage analogous to GSM coverage, and which went beyond the minimum obligations contained in the call for submissions. It was these commitments that were reiterated as obligations in the terms of the licences awarded to Orange France and SFR.

Similar procedures were implemented in France in the calls for submissions for the award of spectrum licences for the development of third generation mobile networks in the 2.1 GHz band, which were launched starting in 2000. They were based on several selection criteria, including scope and speed of deployment, the service offering and prices, quality of

[28] Article L. 32-1 of the French postal and electronic communications code

service, relationships with service providers, including MVNOs, environmental protection measures and the project's and business plan's coherence and credibility.

The criteria applied to the selection procedure may also include a criterion related to the price that candidates are willing to pay to obtain a licence.

A combined procedure of this kind was employed in France in 2006 for the award of spectrum licences for the deployment of wireless local loop (WiMAX) licences in the 3.5 GHz band. This procedure was based on three selection criteria pertaining, respectively, to the scope and speed of deployment, the ability to stimulate competition for the benefit of consumers and the proposed price for obtaining the frequencies.

Auctions

In an auction-based procedure, the winning candidates are chosen based on the price they bid to obtain the licences, to which prior rights and obligations are attached.

An auction procedure is thus entirely compatible with the existence of rollout obligations, for instance, provided they are incorporated in advance into procedure's specifications.

Moreover, an auction procedure can be either pure auctions, i.e. based solely on the bids submitted by the candidates, or also take account of selection criteria on which candidates would make commitments (coverage, providing access to MVNOs, etc.), in which case prior correspondence would make it possible to weigh the candidates' financial bids in accordance with the commitments they have made on qualitative criteria. This type of auction procedure, framed by several selection criteria, is somewhat similar to a combined procedure as described earlier.

International experiences

Spectrum licence awards procedures for the deployment of mobile networks which have taken place recently in other countries provide examples of both comparative selection and auction-based procedures.

For the award of spectrum usage licences for the deployment of third generation mobile networks in the early 2000s, European Union countries were divided almost equally into two camps, one opting to award licences via beauty contest and the other opting for auctions.

Allocation procedures for the 2.6 GHz frequency band have been launched in several countries (the United States, Norway, Sweden, Hong Kong…) or will be soon (the Netherlands, Germany, Austria, Belgium, Switzerland, and the UK are all planning on an allocation in 2009). To date, all of the countries have issued licences based on an auction procedure.

As to the frequencies derived from the digital dividend, there have already been several auction-based allocation procedures in the United States. These procedures nevertheless involved a range of frequencies slightly different from the 800 MHz band chosen in Europe, and were thus subject to different restrictions.

Question n°88. What conclusions concerning the choice of the type of procedure do you think can be drawn from the procedures for awarding spectrum usage licences for the deployment of mobile networks which took place recently in France and abroad? What light do these procedures shed on the advantages and drawbacks of the different possible selection procedures (i.e. comparative selection and auctions)?

7.3 Selection procedure scenarios for the award of licences in the 800 MHz and 2.6 GHz frequency bands

The purpose of this section is to obtain respondents' analysis of the different selection procedures to be used for the award of licences in the 800 MHz and 2.6 GHz frequency bands.

These scenarios are constructed based on the different possible options in terms of the number of licences to be awarded and the arrangement of the 800 MHz and 2.6 GHz frequency bands, as discussed in part 3.

It does seem that the relationship between the two frequency bands is crucial to how the procedure is designed.

This is why the different possible selection procedures described below are broken down into two main sets: scenarios which include licences that combine spectrum in both the 800 MHz and 2.6 GHz frequency bands (part 7.3.1) and those that involve no combination of the two frequency bands (part 7.3.2).

Respondents are invited first to share their analysis of each of the two sets of scenarios which will be addressed in succession, on the relevant terms to apply to the selection procedures, then on the advantages and drawbacks of the different scenarios.

7.3.1 Set of scenarios combining the 800 MHz and 2.6 GHz frequency bands

These scenarios pertain, on the one hand, to the award of licences to both the 800 MHz and 2.6 GHz frequency bands and, on the other hand, to licences to the remaining frequencies in the 2.6 GHz band.

The question of the number of licences to be awarded and the arrangement of the 800 MHz and 2.6 GHz frequency bands was discussed in detail in part 3.3.

Several arrangements are possible for these licences, notably the scenarios marked A and B in this part:

- Scenario A

A first scheme (Scenario A) could be based on two or three combined licences, each with a 2 x 15 MHz for FDD (if two licences are awarded) or 3 x10 MHz for FDD (if three licences are awarded) in the 800 MHz frequency band and 2 x 20 MHz of FDD spectrum in

the 2.6 GHz frequency band. The remaining spectrum in the 2.6 GHz band could be structured beforehand into two FDD licences and one TDD licence.

- Scenario B

An alternative to Scenario A could consist of offering the remaining FDD spectrum in the 2.6 GHz frequency band not through two licences as in Scenario A, but in elementary blocks of 5 MHz if there is a mechanism in place to allow the procedure itself to determine how many licences to this remaining spectrum are issued (Scenario B).

These scenarios are discussed and illustrated by diagrams in part 3.

The purpose of this section is to obtain respondents' analysis of the different possible selection procedures for the award of these licences. In their responses, contributors are invited to provide a separate analysis, when applicable, of the different possible arrangements of the 800 MHz and 2.6 GHz frequency bands described above.

The following will be addressed here, in turn:
- the selection procedure for the award of licences that include spectrum in both the 800 MHz and 2.6 GHz frequency bands;
- the selection procedure for the award of licences to the remaining spectrum in the 2.6 GHz frequency band.

7.3.1.1 Selection procedure for the award of licences that include spectrum in both the 800 MHz and 2.6 GHz frequency bands

In theory, all types of procedure are possible for the award of combined licences: beauty contest (or a combined procedure that includes a financial criterion) or auction (pure auction, auction framed by selection criteria).

Respondents are invited to provide a comparative analysis of the extent to which the different types of procedure are capable of satisfying the general interest objectives attached to the award of these resources, notably in terms of innovation, regional development, stimulating competition and valuation of the spectrum.

To this end, they are invited to provide their joint analysis of the relevant selection criteria for comparing the candidates and the minimum criteria required to allow them to compete.

It is worth remembering that there are two ways in which the selection procedure can ensure that general interest objectives are met:
- either by defining in advance minimal obligations which all candidates must satisfy to be allowed to compete;
- or by defining selection criteria which will make it possible to choose between the candidates that have been allowed to compete through a comparative assessment of the commitments they have made of their own accord.

This point can be illustrated with the example of the regional development objective. It can be satisfied by a minimum rollout obligation that is set in advance, including for a procedure that does not include a selection criterion pertaining to deployment: such a scheme

would ensure that a minimum obligation would be imposed on all candidates awarded a licence. What is required here is to ensure that the minimum obligation is properly calibrated to meet the desired objective, without introducing a minimum level that is so high that it adversely affects the number of applicants.

This regional development objective can also be taken into account through a selection criterion that invites applicants to make commitments concerning coverage: this type of measure provides candidates with an incentive to go beyond the minimum obligations. It does not, however, necessarily guarantee that the candidates will make commitments that are significantly greater than the minimum obligations, if it is a selection criterion meant to distinguish the submissions.

Question n°89. In your opinion, how should the relative weight of the objectives attached to the award of licences that combine spectrum in the 800 MHz and 2.6 GHz bands be divided between set minimum obligations that are a pre-requisite to taking part in the procedure and additional commitments made freely by the candidates? Respondents are invited to provide a detailed response with respect to objectives in the area of coverage and regional development. Separate responses can also be given depending on whether the chosen procedure is a beauty contest (which could mean a combined procedure that includes a financial criterion) or an auction (pure auction, auction framed by selection criteria).

If a comparative selection procedure were to be used, the list of selection criteria and their weight would need to be determined precisely in advance.

All of these criteria need to comply with Article L.42-2 of the French postal and electronic communications code, which states that a comparative selection procedure must be, "*based on terms of use stipulated in Paragraph II of Article L. 42-1 or on the contribution to achieving the objectives stipulated in Article L. 32-1"*.

To this end, ARCEP has employed several approaches during previous calls for submissions, notably in terms of the number of selection criteria and whether or not a financial criterion was included. In all cases, the following criteria were taken into account in a recurring fashion: the project's and business plan's coherence and credibility, the service offering and prices, national coverage levels and notably the scope and speed of deployment, quality of service, relationships with service providers, consumer relations, environmental protection and job creation.

Question n°90. In the case where a comparative selection procedure is used for awarding licences that combine spectrum in the 800 MHz and 2.6 GHz frequency bands, what minimum obligations could be attached to the award of these licences? What selection criteria do you think would be relevant for selecting the recipients of the combined licences? Do you think it is relevant to include a criterion pertaining to the price of the licence (combined procedure)? What weight could be applied to the different criteria?

Question n°91. In the case where an auction-based procedure is used for awarding licences that combine spectrum in the 800 MHz and 2.6 GHz frequency bands, what type of auction (pure auction, auction framed by selection criteria) and what method

(single round, multiple rounds, etc.) should be used? What obligations could be imposed on the candidates?

7.3.1.2 Selection procedures for the award of the remaining spectrum in the 2.6 GHz frequency band

The allocation of the remaining spectrum in the 2.6 GHz frequency band could be performed through either a beauty contest (possibly a combined procedure that includes a financial criterion) or an auction (pure auction, auction framed by selection criteria).

Regional development issues, which are crucial in the 800 MHz frequency band, are not as significant in the awards that are specific to the 2.6 GHz band as this frequency band does not enable broad national coverage.

On the other hand, if obligations comparable to those contained in combined licences are not applied, the value attributed to these frequencies could be increased. It could, for instance, be taken into account through a price-related criterion in the case of a combined procedure.

As to the number of licences available and how the spectrum is arranged, as discussed in part 3.2, two possible options exist: one where the arrangement of the remaining frequencies in the 2.6 GHz is defined beforehand, e.g. around two FDD licences and one TDD licence, and the other where there is no set arrangement for the FDD spectrum – leaving it up to the procedure to determine how many FDD licences are issued – and one TDD licence is awarded. Under a scenario where the number of licences is not set beforehand, an auction procedure could seem the most natural choice.

Question n°92. In your opinion, how should the objectives attached to the award of remaining spectrum in the 2.6 GHz band be divided between set minimum obligations that are a pre-requisite to taking part in the procedure and additional commitments made freely by the candidates? Separate responses can also be given depending on whether the chosen procedure is a beauty contest (which could mean a combined procedure that includes a financial criterion) or an auction (pure auction, auction framed by selection criteria).

Question n°93. In the case where a comparative selection procedure is used for awarding the remaining spectrum in the 2.6 GHz band, what minimum obligations could be attached to the award of these licences? What selection criteria do you think would be relevant for selecting the recipients of the licences? Do you think it is relevant to include a criterion pertaining to the price of the licence (combined procedure)? What weight could be applied to the different criteria?

Question n°94. In the case where an auction-based procedure is used for allocating the remaining spectrum in the 2.6 GHz band, what type of auction (pure auction, auction framed by selection criteria) and what method (single round, multiple rounds, etc.) should be used? What obligations could be imposed on the candidates?

7.3.1.3 Sequence used for issuing the two types of licence

The awards procedure could be broken down into two stages, for instance: first, the award of licences that include spectrum in both bands, followed by the award of licences to the remaining spectrum in the 2.6 GHz band. This method would make it possible to award the licences with the highest value first.

Alternatively, all of the licences could be awarded simultaneously, if both the combined spectrum licences and those specific to the 2.6 GHz band were awarded through a beauty contest (possibly a combined procedure that includes a financial criterion). In such a situation, however, the players may be required to submit as many applications as there are types of licence up for award.

Question n°95. In the case where licences that combine spectrum in the 800 MHz and 2.6 GHz bands are to be awarded, what sequence do you recommend for awarding the different licences?

7.3.2 Set of scenarios with no combination of 800 MHz and 2.6 GHz-band frequencies

In this set of scenarios, licences are specific to a single frequency band.

Several arrangements are possible in each of the bands, which correspond to the following scenarios:

- Scenario C: two or three licences at 800 MHz and five licences at 2.6 GHz;
- Scenario D: two or three licences at 800 MHz, FDD spectrum at 2.6 GHz proposed in blocks of 5 MHz, and a TDD licence in the 2.6 GHz band;
- Scenario E: 800 MHz frequencies and FDD spectrum at 2.6 GHz proposed in blocks of 5 MHz, and a TDD licence in the 2.6 GHz band.

No combination of the two bands is proposed, in theory, but a player can be a candidate for a licence in each of these frequency bands, which would allow it to roll out a project based on the complementary nature of the two bands. The sequence of the procedures used for the two frequency bands will be decisive in choosing which type of selection procedure is employed.

7.3.2.1 Simultaneous allocation of the two bands

Given the complementary nature of the two bands designated for the deployment of ultra high-speed mobile services, one option could be to allocate the two bands simultaneously.

In the case where they are not be combined in any way, it nevertheless appears wise to design a procedure that allows the candidates to combine the bands themselves in a manner they deem relevant. This would not seem to be compatible with a comparative selection procedure. A combined auction procedure (simultaneous ascending, for instance, or closed, combinatorial single round) based on small divisions of the spectrum (in blocks of 5 MHz, for

instance) could enable candidates to value the different combinations of spectrum that interest them, including combinations of the two frequency bands.

Question n°96. In the case where the two frequency bands are not combined beforehand, and where their allocation is nevertheless performed simultaneously, what selection procedure could be employed? To what extent could a beauty contest procedure be used? In your opinion, when allocating the frequency bands how much relative importance should be given to the set minimum obligations which are a pre-requisite for all candidates and to the additional commitments made by the candidates?

Question n°97. In the case where an auction procedure is used for the simultaneous allocation of the two bands, what type of auction (pure auction, auction framed by selection criteria) and which method (single round/multiple round, etc.) should be used? Should the number of licences be set beforehand, or should it be decided by the procedure itself? What obligations could be imposed on the candidates?

Question n°98. How could a comparative selection procedure be put into place in a situation where the two bands are allocated simultaneously? How should the terms be set? On what basis could the applications be compared? What minimum obligations could be imposed? What selection criteria do you think are relevant for choosing the recipients of the licences? Do you think it is relevant to include a criterion based on price (combined procedure)? What relative weight should be given to the different criteria?

7.3.2.2 Sequential approach

Another option would consists of allocating the two bands sequentially.

Under this hypothesis, all types of procedure could, in theory, be used: comparative selection (possibly a combined procedure with a financial criterion) or auction (pure auction, auction framed by selection criteria).

With a sequential approach, candidates for the 800 MHz frequency band could be selected based on a similar approach to the one developed for combined licences (see part 7.3.1.1), as the stakes are similar.

Question n°99. In the case of a sequential allocation of the two frequency bands, in your opinion how should the relative weight of the objectives attached to the award of licences in the 800 MHz band be divided between set minimum obligations that are a pre-requisite to taking part in the procedure and additional commitments made freely by the candidates? Respondents are invited to provide a detailed response with respect to objectives in the area of coverage and regional development. Separate responses can also be given depending on whether the chosen procedure is a beauty contest (which could mean a combined procedure that includes a financial criterion) or an auction (pure auction, auction framed by selection criteria).

Question n°100. In the case where a comparative selection procedure is used for awarding the spectrum in the 800 MHz band, what minimum obligations could be attached to the award of these licences? What selection criteria do you think would be relevant for selecting the recipients of the licences? Do you think it is relevant to include

a criterion pertaining to the price of the licence (combined procedure)? What weight could be applied to the different criteria?

Question n°101. In the case where an auction-based procedure is used for allocating the spectrum in the 800 MHz band, what type of auction (pure auction, auction framed by selection criteria) and what method (single round, multiple rounds, etc.) should be used? Should the number of licences be set beforehand, or should it be left to the procedure to decide? What obligations could be imposed on the candidates?

Licences in the 2.6 GHz frequency band could also be awarded based on a method similar to one described for the remaining spectrum in the 2.6 GHz frequency band in the section on scenarios with combined allocation (see part 7.3.1.2).

Question n°102. In the case of a sequential allocation of the two frequency bands, in your opinion how should the relative weight of the objectives attached to the award of licences in the 2.6 GHz band be divided between set minimum obligations that are a pre-requisite to taking part in the procedure and additional commitments made freely by the candidates? Separate responses can also be given depending on whether the chosen procedure is a beauty contest (which could mean a combined procedure that includes a financial criterion) or an auction (pure auction, auction framed by selection criteria).

Question n°103. In the case where a comparative selection procedure is used for awarding the remaining spectrum in the 2.6 GHz band, what minimum obligations could be attached to the award of these licences? What selection criteria do you think would be relevant for selecting the recipients of the licences? Do you think it is relevant to include a criterion pertaining to the price of the licence (combined procedure)? What weight could be applied to the different criteria?

Question n°104. In the case where an auction-based procedure is used for allocating the spectrum in the 2.6 GHz band, what type of auction (pure auction, auction framed by selection criteria) and what method (single round, multiple rounds, etc.) should be used? Should the number of licences be set beforehand, or should it be left to the procedure to decide? What obligations could be imposed on the candidates?

The sequential approach has the advantage of providing visibility for one band before allocating the other one, but without allowing candidates to combine the two bands in the presentation of their projects. Two schemes are possible: allocation of the 800 MHz frequency band then of the 2.6 GHz frequency band or, inversely, allocation of the 2.6 GHz frequency band and then of the 800 MHz frequency band.

Allocating the 800 MHz frequency band first could result in a situation where an operator has acquired spectrum in the 800 MHz band but not in the 2.6 GHz band, which means it will have lasting limited capacity in densely populated areas. Allocating the 800 MHz frequency band first would nevertheless have the advantage of awarding the highest value spectrum first, allowing candidates to then position themselves in the 2.6 GHz-band frequencies, which are of lower value.

Allocating the 2.6 GHz frequency band before the 800 MHz band could help facilitate the creation of consortia. Moreover, a player which is not subsequently allocated any

spectrum in the 800 MHz band could still develop a national-scale project by taking advantage of the roaming offers provided by 800 MHz-band operators. It should also be pointed out that an allocation procedure of this kind would make it possible to take overall projects into account, allowing players to include in their submissions for 2.6 GHz-band frequencies a description of their project based on whether or not they are subsequently awarded 800 MHz frequencies.

Question n°105. In the case where the two frequency bands are not combined beforehand, and where the allocation is performed sequentially, which sequence do you recommend? Should the 800 MHz or the 2.6 GHz frequency band be allocated first?

7.3.3 Comparison of the procedures

Respondents are invited to supply all elements of comparison between the different procedures described earlier, and reiterated below:

- Scenario A: two or three licences that combine spectrum in the 800 MHz and 2.6 GHz frequency bands, and three licences in the 2.6 GHz band;
- Scenario B: two or three licences that combine spectrum in the 800 MHz and 2.6 GHz frequency bands, the remaining FDD spectrum in the 2.6 GHz band offered in blocks of 5 MHz, and one TDD licence in the 2.6 GHz band;
- Scenario C: two or three licences at 800 MHz and five licences at 2.6 GHz;
- Scenario D: two or three licences at 800 MHz, FDD spectrum at 2.6 GHz proposed in blocks of 5 MHz, and a TDD licence in the 2.6 GHz band;
- Scenario E: 800 MHz frequencies and FDD spectrum at 2.6 GHz proposed in blocks of 5 MHz, and a TDD licence in the 2.6 GHz band.

If the spectrum is allocated based on a division into blocks of 5 MHz, an auction procedure could seem the most suitable for enabling candidates to combine frequency blocks.

Under scenarios A and B, all types of procedure are possible in theory. Combined licences could be awarded first, and the remaining frequencies afterwards.

Under scenarios C, D, E, the 800 MHz and 2.6 GHz frequency bands could be allocated simultaneously, in which case an auction-based procedure would appear to be the most suitable, enabling candidates to bid on combinations of 800 MHz and 2.6 GHz-band frequencies, or in a sequential fashion, in which case all types of selection procedure would be possible.

Question n°106. What type of allocation procedure do you think should be used? Does one of the scenarios described above strike you as particularly appropriate? Why? Are there any specific measures that need to be taken into account to implement it?

8 Candidate interest

The goal of this part is to invite respondents to express their interest in being awarded spectrum in the 800 MHz and 2.6 GHz frequency bands.

Responses to this will not be made public.

Question n°107. Are you interested in FDD and/or TDD spectrum in the 800 MHz and 2.6 GHz frequency bands? Do you plan on responding to the call for candidates for these frequency bands which is due to be issued in late 2009, in view of awarding licences in 2010? What quantity of spectrum do you want to be allocated? For what type of project? Within what timeframe?

Recapitulation of the questions