Telecom Italia's response to the RSPG public consultation on the 'Draft RSPG Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband'

Executive Summary

- Telecom Italia agrees with RSPG on the opportunity to trace a roadmap for future broadband spectrum, and the development of a strategic plan by the Commission to make the necessary spectrum available for wireless broadband services in the time frame 2013 - 2020, including the intermediate target in the RSPP of at least 1200 MHz of spectrum by 2015.
- In Telecom Italia opinion, coordination of frequency allocation at European level is the primary objective of the regulatory process, to achieve economies of scale and a harmonized introduction of broad band services in all EU countries, maximizing the participation of wireless services to achieve the objectives of the Digital Agenda that are common to all the Member States.
- It is questionable that in urban areas the demand for broadband services and consequent spectrum needs are higher than in the rural ones and that in rural areas the overall need for spectrum will still be much lower than in urban areas. On the contrary, it is possible that the role of wireless communications in the rural areas would be economically and technically higher that in the urban areas.
- In general, even if the femtocell technology may be an effective tool to complete the coverage and to fill gaps of signal, it's questionable that its utilization can increase the overall connection capacity.
- It is premature to investigate if any other spectrum bands should be allocated to Wi-Fi applications as the bands already dedicated to this service are not only sufficient but still marginally used (i.e. 5 GHz band).
- Telecom Italia thinks that if any legal and regulatory tool to share frequency access will be introduced, it should only concern bands that are currently granted to subjects other than telecommunication operators (armed forces, government, etc.).
- Telecom Italia deems that the a higher priority should be given to the evolution of the harmonized 700 MHz allocation vs., for example, 1.5GHz, 2.3GHz and 3.8-4.2 GHz, due to the different potential for wireless services.
- Telecom Italia considers urgent the specific exploration of the economic and social implications at macro level of the various options of allocation of the 700MHz band, in view of also the development of services, technologies and devices in the same range of frequencies in Asia Pacific and Latin America areas.
- It's urgent to adequately define the electromagnetic environment of the 700MHz band.
- Telecom Italia considers that the LSA could be an alternative solution to access the 2300-2400MHz band in countries where clearing and/or refarming of the spectrum from legacy non-mobile services and users are not achievable in the short term, and therefore where subsequent spectrum allocation to mobile services/systems is not feasible in a timely way.

Introduction

Telecom Italia welcomes the Radio Spectrum Policy Group invitation to express comments and views on the draft RSPG Opinion on strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband.

Planning the future spectrum demand is of utmost importance, due to the increasing demand for mobile data services, the convergence among content distribution, fast access to information and mobile communications and the necessity of optimizing the use of frequencies in the next years.

The way to create sustainable consumer benefits and increased competition should start by creating legal certainty in the market to consolidate solid investment incentives, foster innovative services and increase competition in order to achieve benefits for consumers, market operators and society.

Telecom Italia has always supported the Commission initiative of developing a multiannual Radio Spectrum Policy Programme (RSPP), and underlined the importance of a close coordination between the radio spectrum policy and the implementation of the Digital Agenda for Europe, with a strengthened role of the RSPG.

Telecom Italia agrees on the importance of analysing the demand and the technological trends to determine the current and future spectrum need and on the requirement of defining suitable policies to provide sufficient resources in order to match the demand and to deliver the greatest collective and economical benefits.

In order to make more spectrum available for mobile broadband, any effort to employ new technologies and finally to explore new ways to increase spectrum efficiency should first and foremost be promoted.

The analysis should take into account the current and future spectrum demand for the next 10-15 years, since the possible reallocation processes generally require a long time period.

As a consequence, Telecom Italia agrees with RSPG on the opportunity to trace a roadmap for future broadband spectrum, and the development of a strategic plan by the Commission to make the necessary spectrum available for wireless broadband services in the time frame 2013- 2020, including the intermediate target provided by the RSPP of at least 1200 MHz of spectrum by 2015.

Telecom Italia generally agrees with the list of recommendations proposed by RSPG, and also suggests limiting the number of working areas, focusing in spectrum allocation matters which have greater relevance for the market dynamics and the rapid development of new technologies that should be considered more attractive from an economic and commercial point of view.

A long-term strategy should take into account that the frequency bands have to be reserved to applications which can efficiently use the spectrum resource and can be beneficial to society. In particular, those applications which can really bring economic and social benefits should be preferred.

It is important to consider that policy measures could have a different impact on different industries: industries with high spectrum efficiency such as the mobile industry should be protected from measures orientated to address industries with poor spectrum efficiency.

In this respect, Telecom Italia deems that the priority should be given to identifying the spectrum demand necessary to deploy the mobile broadband services that are a key enabler of economic growth and innovation, and whose exploitation will be improved by a harmonized regulation boosting the convergence between industry and member state interests.

Spectrum Policy and Regulatory Issues Regarding Wireless Broadband

In Telecom Italia opinion, coordination of frequency allocation at European level is the primary objective of the regulatory process, to achieve economies of scale and a harmonized introduction of broadband services in all EU countries, maximizing the participation of wireless services to achieve the objectives of the Digital Agenda that are common to all the Member States.

Policy makers and industry should together settle on how spectrum could contribute to exploit the full benefits from wireless technology, for EU consumers and citizens, including more ubiquitous broadband Internet access.

Telecom Italia deems that any initiative regarding spectrum should be launched only after an impact analysis that demonstrate the actual possibility to harmonise the frequency bands for wireless broadband at EU level, also considering that the required use of bands for wireless broadband in Member States may vary, depending on the national requirements for broadband access and for other services.

Member states harmonized approach in managing spectrum catalyzes the opportunities for the industry in exploiting the full potential of wireless technology.

In our view it is very important that not only Member States and the European Commission, but also the whole industry acquires a common reference on the objectives and the main themes to be treated at different levels, taking into account EU positions and priorities.

To this aim, Telecom Italia considers as essential the active participation by the EU institutions to the works of ITU and the consolidation of a common opinion on the topics to be discussed during the WRC-15.

Telecom Italia thinks that the WRC-15 outcomes will be crucial to meet the long-term spectrum demand, which accomplishment is fundamental to ensuring that all EU member states can continue to reap the significant potential for economic growth, job creation, innovation and resource efficiency generated by mobile broadband.

Telecom Italia deems that an effort should be done by the EU institutions to comply with the directions of the ITU regarding the allocation of the spectrum bands to wireless broadband services, starting the regulatory activities in a timely manner but without anticipating the decisions taken by ITU.

These activities has to include the progressive clearance of the specific frequency band from possible uses for services that fulfil national needs, taking into account the specificity of customer demands in the single countries, avoiding temporary spectrum underutilisation while ensuring the stakeholder that in a definite timeframe the spectrum will be allocated to mobile services throughout the European Union, avoiding "patchy" development of services and technologies. In other words, any frequency band should be fully harmonized across all the EU Member States, as it should be very inefficient that a given frequency band were allocated for mobile services in some countries and for military/civilians utilizations in others.

Telecom Italia doesn't agree the assertion that the lower frequencies are more suitable for rural areas and higher frequencies are more efficient in urban ones: as terminals will be able to work at both typology of frequencies, the operators will be encouraged to use both in any area to achieve a better economy of scale and commercial efficiency, considering also that the lower frequencies are necessary to ensure the coverage in any area (e.g. deep indoor penetration in urban areas) while the higher ones ensure an adequate access capacity.

On the other side, it is questionable that in urban areas the demand for broadband services and consequent spectrum needs are higher than in the rural ones and that in rural areas the overall need for spectrum will still be much lower than in urban areas.

On the contrary, it is possible that the role of wireless communications in the rural areas would be economically and technically higher that in the urban areas.

The narrow bandwidth of the 2 GHz unpaired bands suitable for TDD applications is in itself not enough to justify the limited TDD systems deployment in Europe. A wider justification should consider the absence of a global ecosystem for UMTS TDD and therefore the lack of the critical mass necessary to develop this technology in Europe.

In addition, the TDD 1900-1920MHz band is adjacent to the uplink band of the UMTS FDD and this can create coexistence problems.

On the other hand, FDD systems have shown an enormous growth because of their technical characteristics and maturity and because they do not present the synchronisation problems associated with the TDD systems in a multi-operator environment.

The allocation of blocks of width exceeding 20MHz, especially in bands below 3GHz may, on the other side, raise concerns of hoarding and competition hampering.

Trends in wireless technology

Femtocell technology offers the possibility of using a device like a broadband router to boost cellular reception indoors, as indoor signals may be a weak point of cellular coverage

Femtocells, in other words, address the problem of poor cell-phone reception indoors by taking advantage of the proliferation of home and small office broadband connections. Like the wireless router that distributes a Digital Subscriber Line or cable broadband, a femtocell device boosts carrier's cellular signal for indoor use, routing the calls through the broadband connection rather than directly through the larger cellular network.

In general, even if the femtocell technology may be an effective tool to complete the coverage and fill gaps of signal, it’s questionable that its utilization can increase the overall connection capacity.

Furthermore, notwithstanding the hypothetical advantages of this technical solution, its development is not responding to the expectations.

From a demand point of view, the main reasons of the limited application of Femtocells can be identified in the success of Wi-Fi microcells inside a single home or small office that let the same traffic offload applications to a wider variety of connected devices.

From the offer point of view, as Femtocells need a fixed broadband connection, its application as a residential wireless broadband solution is very limited: as the customer is already reached by the fixed broadband service, it is questionable the capacity of the Femtocells to add any value to the commercial chain.

The only potentiality of the cells of limited coverage can be envisaged in cases where a backhauling fibre based link, integrated with the transport network of the mobile operator, is available.

Even in this last case, on the operational side, to ensure the efficient use of small cells, operators should have added to the complexity of their networks a self-organising ability to effectively manage small cells, addressing the challenges of steering traffic in their networks, establishing the architectural and interface requirements for effective interaction between macro and small cells. As a consequence, the use of small cells always implies higher investments and costs due to its higher technological complexity.

Regarding possible solutions based on Wi-Fi, mobile operators are still assessing their viability, due to its management complexity also considering the seamless authentication issues to grant an acceptable customer experience when offloading to a Wi-Fi access points, and to manage the updating of terminal software.

On the other side, it should be very difficult to determine the optimum coverage and density of Wi-Fi access points in order to capture optimal offload traffic to replace a single capacity UMTS or LTE

cell, and it is questionable that any saving should be achieved by the operators when using Wi-Fi offloading.

Consequently, it is premature to investigate if any other spectrum bands should be allocated to Wi-Fi applications as the bands already dedicated to this service are not only sufficient but still marginally used (i.e. 5 GHz band).

Furthermore, the extension of Wi-Fi networks other than for offloading data traffic could introduce the risk of lowering wireless access quality, challenging the evolution of high quality networks and services, as the ones provided by IMT, needed to exploit the potentiality of a seamless wireless broadband access. A radio access, such as Wi-Fi, not managed by the mobile operator, cannot ensure a good quality of experience to the customers, since the interference level in areas with many access points could severely affect the available throughput.

The role of shared spectrum access

The concept called ASA (Authorised Shared Access) has been proposed by an industry consortium (Qualcomm and Nokia), with the aim to provide shared access to IMT spectrum under a licensing regime in order to offer services with a certain quality.

According to the consortium, the development of such a complementary authorisation model for spectrum rights of use should allow a shared use of spectrum using proper radio technologies (e.g. geo-location databases, sensing, etc.), and could act as an enabler to make available, in a timely manner, harmonised spectrum for mobile broadband while overcoming time, resource and political constraints.

The RSPG has considered the regulatory aspects of such an approach, and has used it as a basis to foster the potential to share spectrum, not only limited to the IMT bands, in a harmonised manner within a licence regime. The RSPG refers to this as “Licensed Shared Access” (LSA)[1].

In its Communication[2] on "Promoting the shared use of radio spectrum resources in the internal market" of September 2012, the Commission encourages Member States to move to a common approach for the shared use of the radio spectrum in the EU, identifying beneficial sharing opportunities (BSO) in both licensed and licence-exempt spectrum bands and by enabling regulators to define shared spectrum access rights (SSAR), to create the necessary economic incentives and encouraging contracts between users, who would all have shared spectrum access rights.

CEPT, on its side, is developing several activities regarding technical harmonising implementation measures, which refers to a regulatory framework using the “LSA concept”:

- Identifying mobile bands in which LSA can be a tool to enable their appropriate availability and to release them for mobile broadband in Europe
- Conducting compatibility studies between LSA and incumbent users to ensure operation on a shared and non-interference basis
- Defining and certificating harmonised geo-location databases

The spectrum so far indicated by CEPT for Mobile Service based applications authorised under the LSA concept is the 2300-2400MHz band (Mobile service sharing with military applications/wireless cameras).

[1] Reference: RSPG report 11-392 on Collective Use of Spectrum (CUS) and other spectrum sharing approaches - November 2011

[2] Reference: COM(2012) 478 - Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Promoting the shared use of radio spectrum resources in the internal market

As the matter of possible shared spectrum access regulatory provisions is of the utmost importance, we consider that's appropriate to clarify an apparent mismatch between the approaches proposed at EC and CEPT levels.

Telecom Italia understands that CEPT and ETSI are focussing their activities on the cases where the complementary regulatory approach that LSA provides is an alternative solution to access new frequency bands for commercial purposes. These cases include the situation in which clearing and refarming spectrum from legacy services and users is not achievable in a given frequency band and the subsequent exclusive allocation of the band to another use e.g. mobile services/networks should be not feasible in a timely way.

The LSA concept discussed in CEPT does not, consequently, apply nor impact MNOs' individual licenses in IMT spectrum. It aims at making available, to the telecommunications services, spectrum bands and resources that are currently designated for IMT services, but that, in a given country, are assigned to "incumbents" who are not telecommunications operators (Armed Forces, public administrations, civil aviation, wireless cameras, etc.).

In other words, in Telecom Italia's understanding, the application of the LSA concept discussed in the CEPT environment may increase the amount of overall spectrum resources available to telecom operators through solutions of frequency sharing of bands that are not exploited, so far, for commercial purposes.

On the other side, The European Commission approach, with the application of the BSO/SSAR concept, seems to be applicable also to bands in which mobile operators acquired exclusive spectrum usage rights and implemented high quality services carried by market forces and driven by technical and economic efficiency.

In our view this should be considered carefully, in fact exclusive access rights of use have well known associated benefits such as good interference management; high degree of market certainty necessary to create adequate investments and innovation incentives; greater standardization and economies of scale critical for business development, etc.

Exclusive rights of use have already demonstrated the ability to develop innovative services such as mobile Internet, among others, while creating positive effects on investments, job creation and social welfare.

Shared spectrum access should only be seen as another possible management tool to achieve additional spectrum in circumstances where its convenience is objectively demonstrated, but exclusive access has to be preferred, especially in industries where spectrum management policy is working correctly.

Sharing spectrum, potentially capable to be better exploited in an exclusive allocation scheme, should turn more difficult to clear, in the future, the specific band for exclusive access, including for mobile services, hampering the possibility to utilize it in the more efficient way.

Additionally, Telecom Italia underlines that the expected return on investment for the assignment of the individual rights to use radio frequencies for mobile operators, not only in terms of costs and revenues, but also of the business opportunities associated with investments, has produced a so intense and effective utilization of the resources to make impossible any kind of sharing.

The current level of demand for the services provided on the spectrum assigned to Telco operators is considerably growing, and the operators have all the incentives to exploit the spectrum resources deploying the "state of art" technology in terms of efficiency.

Telecom Italia strongly believes that frequencies for which the Telco operators have obtained individual rights of use are already very well efficiently used, as operators have to obtain the maximum return on investment from them.

In essence, it was demonstrated that the mobile industry is a clear example of high technical and economic efficient use of spectrum. Preliminary results of the Commission's "Inventory and review of spectrum use" confirm this statement.

Therefore, bands in which mobile operators acquired exclusive spectrum usage rights are not suitable for sharing opportunities, and, consequently, Telecom Italia thinks that if any legal and regulatory tool to share frequency access will be introduced, it should only concern bands that are currently granted to subjects other than telecommunication operators (armed forces, governmental entities, etc.).

Should not be, in any case, overlooked the fact that shared spectrum access potentially increases the cost of the equipment, both for the existing and the new systems, compared to the ones deployed in an exclusive spectrum allocation scenario, because it introduces new co-existence requirements and constraints. This could require tighter emission masks or better strong signal handling for receivers. The cost of implementing these requirements has to be included in any cost/benefit analysis, as at the end it affects the cost of devices and services provided to the users.

Moreover, there's a conspicuous gap between the potential impact that the individuation of new exclusive bands for IMT and the implementation of shared spectrum solutions may have on broadband diffusion European plans. The mobile industry and the wireless broadband service penetration may be severely affected in the near future if excessive expectations will be set on shared spectrum access potentiality while not investigating on new bands to be allocated on an exclusive right of use basis.

In conclusion, it must be ensured that:

- Exclusive access remains the primary means for public cellular mobile services to access spectrum, with shared access seen as a possible complementary tool within the spectrum toolkit;
- Voluntary shared spectrum access agreements must be supported and safeguarded by a light regulatory framework which gives confidence to the incumbent user and avoids negative impacts on investment resulting from sharing the spectrum;
- As shared spectrum access increases the need to manage interferences, clear policy indications to protect primary user rights should be defined.
- Any negative impact to the preparation process for WRC-15, coming from the shared spectrum access regulatory debate, must be avoided.
- The Commission should ensure that the need for exclusive harmonised spectrum is not disregarded, due the shared spectrum access debate, in the preparatory activities regarding new bands for IMT within the CEP/ECC and ITU workflow.

Meeting Future Spectrum Demand for Wireless Broadband Services

Regarding the detailed analysis of the usage of all bands identified in Annex 2 of the Draft RSPG Opinion, Telecom Italia deems that a higher priority should be given to the evolution of the harmonized 700MHz allocation due to its higher potential for wireless services compared with the other bands (as for example 1.5GHz, 2.3GHz and 3.8-4.2 GHz).

700MHz

Telecom Italia considers urgent the specific exploration of the economic and social implications at macro level of the various options of allocation of the 700MHz band, in view of also the development of services, technologies and devices applicable the same range of frequencies in the rest of the world.

The use of the 700 MHz frequency band for broadcasting varies considerably across Region 1 countries. Many European countries make extensive use of the 700 MHz band for terrestrial broadcasting. Making the 700 MHz band available for other services would require extensive re-planning activities.

Consequently, Telecom Italia agrees with the RSPG recommendation regarding the importance of individuating a possible channelling arrangement for mobile services in the 700MHz, in time for WRC-15, taking into account the necessity to exploit the potential economy of scale of a solution that is compatible with the channelling in the Asia Pacific and Latin America areas.

When dealing with the EU-wide strategy on the future use of the 700MHz band, Telecom Italia suggests to refer to the outcome and results of the harmonization initiatives and coordinated actions that the Member States put in place to reframe and reallocate the 800MHz spectrum band, that can be considered a positive benchmark to build up the homologous process for the 700MHz band.

The policy to facilitate a possible migration to make available the 700 MHz band to wireless broadband should in any case respect the timeframe already advised by the ITU.

UHF Band

The future use of the UHF band should be widely discussed among all the stakeholders, taking into account the spectrum needs DTT platforms and PMSE may gather due to convergence among collection, origination, distribution and customer enjoying of the media contents and also due to differentiation in terms of distribution platforms (i.e. delivering HDTV and 3DTV with alternative platforms like satellite or cable/fibre networks).

Consequently, Telecom Italia would welcome and participate to any initiative aiming at the development of a long-term strategic policy on the future convergence between broadcasting and mobile platforms and the delivering of media/audiovisual services and high-audience video and data to mobile devices.

In any case, an appropriate planning activity in order to facilitate the migration to more efficient technologies (e.g., DVB-T2, HEVC) or alternative platforms (e.g. satellite, cable/fibre) in all the Member States and the progressive substitution and introduction of the new generation TV receivers should be put in place.

Regarding the review of CENELEC standards applicable to DVB-C and DVB-T reception, Telecom Italia welcomes the initiative of recommending additional EMC measures relating to TV receivers to mandate more efficient technologies, and a review of ETSI and CENELEC standards applicable, under the EMC Directive 2004/108/EC, to DVB-C and DVB-T reception in the 700 MHz band and below, in order to avoid harmful interference and improving spectrum efficiency.

To this regard, it is important to highlight that the technical requirements of the TV receivers do not form part of products using the radio frequency spectrum and equipment attached to public telecommunications networks regulated by the radio communications and telecommunications terminal equipment standards (RTTE). As a consequence, it's urgent to adequately define the electromagnetic environment of the 700MHz band.

1452-1492 MHz

For the band 1452-1492 MHz, even if CEPT has established a project team to develop harmonised implementation measures for SDL applications, Telecom Italia deems that any measure to promote the use of this band, as for example for technical solution like SDL, has to follow the normal ITU frequency band identification procedure through a Radio Regulations modification at WRC.

Regarding the downlink to uplink ratios, figures indicating values round 10:1 in high-traffic areas were not shared so far by the whole industry, and further studies are required regarding the evolution of uplink/downlink ratio in the coming scenario of carrier aggregation techniques, cloud computing and e-Government applications, that will contribute to equilibrate the need of uploading user generated contents. In a digital society it could be expected that citizens will heavily interact with other people or Administrations by using the broadband access. Uploads of files and documents, customer generated contents, video presence residential applications, telemedicine and so on, are expected to require a much higher usage of uplink resources in the future.

2 GHz Mobile Satellite Service bands

In the case of the 2GHz band identified for use by Mobile Satellite Services with Complementary Ground Component (1980-2010 /2170-2200 MHz), Telecom Italia is available to participate to any activity of analysis and study of the possible re-allocation of the bands to terrestrial mobile services, if future actions taken by Member States in relation to Decision 2011/667/EU result in the withdrawal of licences or their modification that could allow terrestrial usage only.

2300-2400 MHz

Telecom Italia is participating and contributing to the studies and activities on the implementation of the LSA concept in the band 2300-2400 MHz. As the band under consideration is identified to implement IMT systems, Telecom Italia is interested in investigating if the LSA approach can be considered an actual solution to make the band effectively available to the mobile services.

In particular, Telecom Italia is following the activities of the Project Team (PT FM 52) established in September 2012 by the CEPT ECC Working Group FM, with the aim to develop harmonisation measures in the band 2300-2400MHz for MFCN (including broadband wireless access systems), and participated in the development of a System Reference Document focused on the 2300-2400 MHz band, by ETSI TC RRS (Technical Committee Reconfigurable Radio Systems).

Telecom Italia considers that the LSA might offer a mere complementary approach to increase the amount of overall spectrum resources available to mobile services. Provided that compatibility among services/systems are proven feasible, LSA may be applied to share frequency bands that otherwise cannot be exploited for commercial purposes in the short term.

Consequently, Telecom Italia considers that the LSA could be an alternative solution to access the 2300-2400MHz band just and only in countries where clearing and/or refarming of the spectrum from legacy non-mobile services and users are not achievable in the short term, and therefore where subsequent exclusive spectrum allocation to mobile services/systems is not feasible in a timely way.

3800-4200 MHz

Regarding potential use of the band 3400 – 4200 MHz, it should be noted that this band was thoroughly considered in preparation of WRC-07, which agreed some national footnotes to the Radio Regulations to allow the deployment of IMT systems in some countries. Nevertheless, the band 3400 – 4200 MHz continues to be in use by the FSS in Europe and the rest of the world.

Furthermore, in Europe, the band 3400 – 3800 MHz has already been identified for potential use for mobile/fixed communication networks (MFCN) and to BWA systems, giving potential access to 400 MHz of spectrum for broadband mobile systems including IMT, without prejudice to the protection and continued operation of other existing users in these bands, including the FSS.

Telecom Italia considers that the frequency band 3800-4200 MHz is a potential candidate band to enhance future capacity requirements, but we think that the sharing possibilities between FSS and terrestrial wireless broadband services in this band are very low, and that the situation within and outside Europe may differ, thus not enabling an economy of scale on a worldwide dimension for shared use of the band by wireless broadband services.