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A LOOK AT THE ITALIAN WAY TO SPECTRUM MANAGEMENT: CURRENT SITUATION AND FUTURE DEVELOPMENT

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First of all I would like to thank the ITU and the FUB for the kind invitation to attend this workshop, allowing me to make a speech on the spectrum management matter.
Before starting my considerations on the spectrum management policy and the new trends in this important issue, I would like to illustrate how spectrum management and planning work in Italy, pointing out the bodies entitled at different level.
The bodies involved in Italy in spectrum management and planning are three:

- Ministry of communication: entitled for spectrum allocation and for private and public services frequency assignment for civil utilisation as well as the elaboration of the assignment plans apart of broadcasting services; the Ministry is also in charge of representing Italy in relevant international bodies, such as ITU, CEPT, EC;
- Ministry of defence: entitled of the management of frequencies for military and public safety applications;
- Authority of telecommunications: entitled of frequency planning for broadcasting services.

The main tool for managing the frequencies allocation is the Piano Nazionale di Ripartizione delle Frequenze (PNRF - Plan), that includes the National Frequency Allocation Tables. The Plan is a Ministerial Decree that is fully updated every three years and at the end of every WRC, but there is the possibility to update it in any circumstance requiring the introduction of a new service or application or a new regulation regarding the frequencies utilisation.
The procedure for a partial or complete updating of the Plan is performed through a previous consultation with all the parties interested in the frequency utilisation, such as communications operators, both terrestrial and satellite, manufacturers, other Ministries (defence, research, university and so on), Authority, public associations involved in spectrum utilisation. The same parties are involved in the definition of the

Italian position before the participation to the activities of main international bodies such as Conferences, working groups, international committees and so on, with the aim to represent at the best national interests.

As you know the aim of spectrum management is to gain the most efficient frequencies utilisation. In particular it's also very important to grant that the equipment are fit to meet the scope of using the spectrum in an efficient way. There's also the need to grant that every operator, entitled of a frequency right of use, will use the resource under the conditions stated by its authorisation. Those tasks are accomplished through the market surveillance and spectrum monitoring, which are both in charge of the Ministry of communications.

In the field of market surveillance in Europe there has been a great innovation towards the liberalization with the need for the Administrations to change how to control the conformity of the radio equipment. The new regulation foresees no more ex ante but only ex post control, without the previous procedures for type approval radio device before being placed on the market. This new philosophy seems very attractive also for those manufacturers that wish to extend such flexibility to the spectrum management too; but this issue will be discussed later in my intervention.

The spectrum monitoring is the instrument for preventing the incorrect utilisation of the spectrum and consequently to protect all entitled users of the spectral resource. Spectrum monitoring also grants that such utilisation is consequents with the right of use and that won't damage other users. The Ministry of communications performs both market surveillance and spectrum monitoring through a network of local offices, equipped with mobile and fixed measurement laboratories. The monitoring stations are located in every Italian *regione* and are also settled at *provincial* level.

But let me come back to the theme of the workshop.

As you know the utilisation of the radio spectrum has became, in the very last decades, more and more important, due to the peculiar current development of electronic communications prevalently toward the wireless links in alternative to the

wired ones. The first reason that force the prevalent use of the wireless technologies is the growing request to be connected to telecommunications networks everywhere, independently from the location and without interruptions in motions. People, especially business men, need to be always connected to transmission networks, not only for phone calls, but also for document exchange and data base access. This means to have not only a pervasive wireless access but also an ever larger bandwidth. But the request for mobility isn't the only cause of the increased need of wireless access to telecommunications networks. The complexity and the cost of the deployment of wired local loop make wireless lines ever more attractive; this is true for the access to the last mile in most populated cities, in which it's difficult to dig the streets in order to allocate cables, but it is also true in the rural areas and less developed regions. This means that also in the developing countries can be more advantageous to deploy wireless networks than wired ones. In any case the need to perform an efficient use of the spectrum is a vital issue for the improvement of economy both in developed and developing countries. The result of the ever increasing request of spectrum is a growing pressure on spectrum managers to have new bands available for new services and to introduce new technologies capable of more efficient spectrum utilisation.

There is a general request for a new way to manage spectrum, and in particular there is pressure for more flexibility both in the assignment of new resource and in the market of frequencies. At European level, both in CEPT and in European Commission, is now in discussion a new approach to the frequency management, that, in a strange way, claims, contemporary, for both flexibility and wider harmonization.

From the side of flexibility in frequency allocation the main issue is the search of frequency bands that cannot be subject to any kind of *a priori* allocation, free to be used without any kind of harmonization; the other main issue is the technological neutrality, that means that no advantages must be given to a particular technology in

frequency allocation. The aim is that a new technology can compete freely with existing ones, and the only decisive factor for success should be exclusively the efficient use of the spectrum and the quality of the service offered; the most extreme evolution of this way of spectrum management is that an allocation to a specific service is not only unnecessary but a limit to the market evolution. In this framework is included the idea of a free secondary spectrum trading, which means the possibility to buy the right of use of frequency and the possibility to use resources acquired for applications or services different from the original use. My description is clearly extreme and there is a huge degree of different positions between those ideas and the opposite ones that don't allow any kind of flexibility in spectrum management.

Before expressing my own opinion on those issues I would like to give some indication on the needs and the benefit of a policy of spectrum management.

If I affirm that spectrum is a scarce and easily polluted resource I make an obvious statement, but this does not mean that it is not true; from this descends the difficulty to imagine a completely free use of the spectrum, at least on the light of current technology. This implies the need for a cautious use of frequencies, based on an international set of rules aiming to prevent an incorrect use of the resources. On the other hand the harmonisation is a practice useful both for the final users and the manufacturers. The real problems are the extent of these rules to be posed and the amount of the harmonization really necessary to grant both the users and the manufactures and, at the same time, to avoid the exclusion from the market of new and more efficient technologies. In a world in which information and knowledge are more global than ever, it is of primary importance for an user to be able, independently of his technical skill ness, to access in the simplest way to information networks, without the need to retune or change his terminal while passing from a national network to another. This means to grant a certain level of interoperability. But also for the manufacturers or communications operators is important to have a market as huge as possible, and this goal can be obtained only with an economy of

scale able to widen the market for a terminal or an application. Those considerations are at the basis of the harmonization of the frequency at the most wide level attainable. I invite you to think about the decisive impulse given to the success of GSM technology by the possibility to use everywhere the same terminal, whose cost is very cheap due to the large diffusion of an unique standard, tuned on harmonized frequencies. But there isn't always the need to impose restrictive rules on the frequency utilisation or to harmonize it at international level. We need to let the door open to the introduction, without excessive and not necessary restrictions, to new innovative technologies, preventing in an unduly manner their introduction. So I think that there are situations in which there is the need, for the general interest, to apply stringent rules on frequency allocation, but there are also applications not requiring such rules.

If we look at current frequency allocations in Europe, both at CEPT and EC level, we can find that there is a set of applications, the Short Range Devices, whose utilization is not subject to any kind of authorisation ex ante; nevertheless also in this case the devices must be compliant with a minimum set of rules granting the correct spectrum utilisation. The same kind of rules will be applied to a new set of applications, namely Ultra Wide Band devices, currently under study by CEPT and EC. But I think that a certain amount of flexibility could be reached also for different applications, but granting the degree of commonality necessary to maintain the minimum of interoperability between different applications recognised as members of a specific family of service, and to assure to manufacturers that they wouldn't never a number of different markets with different standards and frequencies, but a unique great market which benefits of economy of scale. But to reach this aim there is no need to allocate frequencies to the particular technology or application, but to allocate it to services, granting that all technologies are compliant with a minimum set of characteristic enough to allow, at larger extent possible, the interoperability and the use of same frequencies. This is, for example, the philosophy at the basis of the third

generation mobile services, based on the IMT2000 standard, which does not prevent anyone to introduce different technology, attended that it's compliant with a well defined set of characteristics; as an example is currently under acknowledgment WiBro (a Korean WiMax mobile technology) as a component of the family IMT2000. Another condition that could be requested to a new technology aspiring to share frequencies already allocated to a particular service or application, is the openness of the standards to grant to manufacturers certainty about prices and fairness of condition for accessing to the licences.

Another example is the introduction of the WiMax applications; in this case the licences will be given to the Broadband Wireless Access applications, whose WiMax is a component, and will be the market to decide if the better standard is this one, without preventing that another one, with better performances, could be in future more successful.

Finally I would like to spend some words about the challenge that spectrum managers are facing on the issue of *digital dividend*, the mythic amount of frequencies that could be made free as a consequence of the switch off of the analogue television to be accomplished, in Europe, before the year 2012. The efficiency in the utilization of spectrum typical of digital television is promising an amount of band to be available for other services than broadcast. Nevertheless no one knows the real amount and the allocation of those resources, and at present we must take into account that the Geneva 06 plan has not reserved a common band for all the European countries, using, at European level the whole VHF and UHF bands for the digital TV. An alternative for having a common sub band in VHF and UHF to be allocated for new services (mobile TV, fourth generation mobile services and so on) is to make a new planning conference aimed to make free the same sub band in all Europeans Countries: I think this is an unrealistic hypothesis considering the cost, the logistic and diplomatic difficulties already faced during Geneva 06, although there is someone which is proposing such a solution whose results are largely unpredictable.

Considering this situation I think that the only solution is the one called by Italian Ministry of communications during the last ministerial council in Bruxelles, a *flexible harmonization*. At first glance this seems to be a contradiction, a so called in Italia language *ossimoro,* id est the use together of two contradictory words, but it means that we need to recognize that complete harmonization is not possible, if we intend to reserve the same amount of band and the same sub band in all countries in Europe; but if we realistically want to reach the final result of introducing new services in the band freed by broadcast we must accept that broadcast and new services networks must be tuneable on the whole bands VHF and UHF, and each country will reserve the sub band that better fit the national condition arisen by Geneva 06. This would be a new flexible approach to the spectrum management that allows to introduce flexibility in spectrum utilization without jeopardizing interoperability and economy of scale.

In conclusion let me give a look to a hypothetic, more o less distant, future in which it would be realistic to imagine a complete liberalization of spectrum policy: when it will be possible to tune the terminal by software, in a large bandwidth, and harmonize only a common channel to download from the network information about the service offered, the frequencies used and the characteristic of the service, then it will be possible to stop with harmonization of the frequencies and of the standard preserving the possibility of interoperability and of mass production of terminals with the advantages of economy of scale. When this will happen my duty as a frequency manager will end, but for the time being I think there is yet the need to manage the spectrum allocation and assignment at national and international level balancing carefully the harmonization and the liberalisation.