

# Broadcasters define their positions for WRC-12

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The next ITU World Radiocommunication Conference (WRC-12) will be held from 23 January to 17 February 2012 in Geneva. The aim of the Conference is to review and, if necessary, to revise the Radio Regulations (RR) – the international treaty governing the use of the radio-frequency spectrum and the satellite orbits. Organized by ITU-R roughly every four years, the next Conference will probably be held in 2015 or 2016.

The basis of the work undertaken during the Conference is the Conference Preparatory Meeting (CPM) report, resulting from the work of ITU-R study groups and the inputs from member countries and regional organizations. The CPM report includes a summary of the technical studies and also different methods for satisfying each agenda item.

During the Conference, regulators will express their preferred method for satisfying each agenda item and discussions (sometimes long) will be necessary to find compromises between the positions taken by different countries.

## European preparations

European regulators contribute to the work of a World Radiocommunication Conference (WRC) through their national preparations and also through the related CEPT working groups. The Conference Preparatory Group (CPG) is the highest regulatory body responsible for the development and agreement of European Common Proposals (ECPs) to be submitted to the WRC in 2012 on behalf of CEPT. The CPG has already submitted ECPs for several agenda items and during its last meeting at the beginning of November 2011, the CPG agreed on the remaining items <sup>1</sup>.

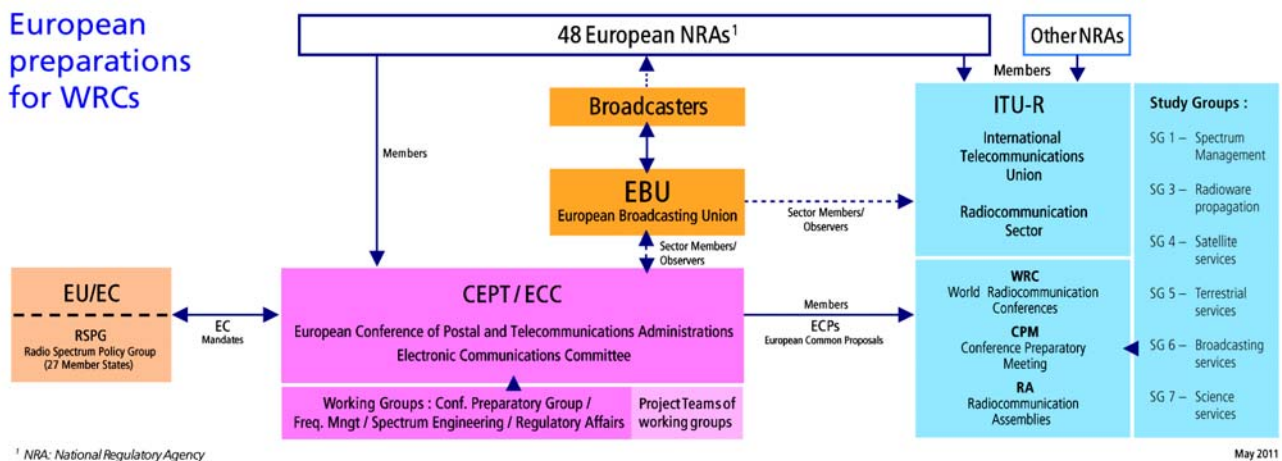
The European Commission, through the Radio Spectrum Policy Group (RSPG), has published a Communication which proposes the common policy objectives to be pursued by EU countries during their negotiations at WRC-12 <sup>2</sup>. This has been the basis for the European Parliament resolution on the European Union's policy approach to the ITU World Radiocommunication Conference in 2012 (WRC-12) <sup>3</sup>. At a WRC, the European Union is a "Sector Member", a status similar to industry and

1. CEPT agreed positions are available at <http://www.cept.org/ecc/groups/ecc/cpg/page/cept-briefs-and-ecps-for-wrc-12>
2. The EC Communication is available at [http://ec.europa.eu/information\\_society/policy/ecommlradio\\_spectrum/\\_document\\_storage/communications%20\\_et\\_al/com2011\\_0180\\_en.pdf](http://ec.europa.eu/information_society/policy/ecommlradio_spectrum/_document_storage/communications%20_et_al/com2011_0180_en.pdf)
3. European Parliament resolution available at <http://www.europarl.europa.eu/sides/getDoc.do?pub-Ref=-//EP//NONSGML+MOTION+B7-2011-0480+0+DOC+PDF+V0//EN>

regional organizations, and it relies on its Member States to gain support on Union policies and initiatives. It is to be recalled that Member States are bound by their obligations under the EU Treaties.

EBU Members prepare their national positions and contribute also through the EBU to the development of common positions for the broadcast community. The EBU contributes to CEPT and the ITU as a “Sector Member” where it tries to influence decisions with its technical expertise. The EBU has published Technical Report 012 – “*EBU Positions on WRC 12 Agenda items related to broadcasting*”<sup>4</sup> – and has opened a dedicated workspace in Confluence<sup>5</sup> where Members can find up-to-date information on the WRC-12 preparations. The EBU is also coordinating positions with other Broadcasting Unions to develop common proposals through the World Broadcasting Unions’ Technical Committee.

Fig. 1 shows the relations between the different bodies involved in the European preparations for the Conference



**Figure 1**  
European preparations for WRCs

## The WRC-12 Agenda

The list of agenda items to be considered at a WRC is defined at the previous conference; the WRC-12 agenda includes the items collected at the end of the WRC-07 conference. Proposals from countries and regional organizations are harmonized in order to have a coherent list; agenda items are also defined as follow-up work from the decisions taken at the conference.

The types of agenda items range from:

- issues relating to spectrum requirements (services asking for their spectrum requirements to be harmonized or to have potential additional spectrum allocations), to ...
- issues relating to sharing and compatibility studies between different services, and ...
- issues relating to regulatory aspects.

Although the WRC-12 agenda does not include any items dealing purely with the Broadcasting Service, several agenda items relate to broadcasting applications. The EBU has identified and classified them as (i) “High Priority” if the item represents a high threat for EBU Members, and active contributions are required, (ii) “Medium Priority” if the agenda item is considered important and the need for contributions might be required and (iii) “Low Priority” if only monitoring the progress of the agenda item is required and contributions are not expected to be needed. *Table 1* shows the high-priority agenda items identified by EBU Members.

4. Available at <http://tech.ebu.ch/webdav/site/tech/shared/techreports/tr012.pdf>

5. Open to EBU Members: <http://workspace.ebu.ch/display/ecsrap/WRC-12+preparations>

Table 1 – WRC-12 high-priority agenda items identified by EBU Members

Agenda Item	Spectrum / system requirements issues	EBU Priority
1.5	To consider worldwide/regional harmonization of spectrum for Electronic News Gathering (ENG), taking into account the results of ITU-R studies, in accordance with Resolution 954 (WRC-07)	High
	<b>Sharing or compatibility issues</b>	
1.17	To consider the results of sharing studies between the Mobile Service and other services in the band 790 - 862 MHz in Regions 1 and 3, in accordance with Resolution 749 (WRC-07), to ensure the adequate protection of services to which this frequency band is allocated, and take appropriate action	High
	<b>Regulatory issues</b>	
1.2	Taking into account the ITU-R studies carried out in accordance with Resolution 951 (Rev. WRC-07), to take appropriate action with a view to enhancing the international regulatory framework; Resolution 951 (Rev. WRC-07)	High
1.19	To consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution 956 (WRC-07)	High
	<b>Others</b>	
8.2	To recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 806 (WRC-07)	High

### **Agenda item 1.5: Harmonization of spectrum for ENG**

The radio equipment used by services ancillary to broadcasting and to programme making (SAB/SAP), commonly described as Electronic News Gathering (ENG), operates terrestrially in appropriate Broadcasting, Fixed and Mobile Service bands. The regulation of the use of the spectrum differs from country to country. While in some countries most operations require having a frequency licence, in some other countries operation on a non-protection and non-interference basis (licence-exempt) is possible. Similarly, the frequency bands available for such operations may differ depending on national uses of the spectrum. As a result of that, there is huge diversity of SAB/SAP equipment available from different manufacturers in a large range of frequency bands.

In addition, there is an increasing demand for the highest quality and an increasing complexity of technology for the coverage of radio and television programmes. As a consequence, the spectrum requirements for ENG operations are increasing fast and the spectrum made available is not able to cope with large events anymore. Consequently, broadcast organizations must possess a large diversity of equipment, working in different frequency bands, to ensure the coverage of their events.

Under those circumstances, harmonization of spectrum for ENG would be highly desirable to alleviate the difficulties. But to achieve it worldwide or even regionally is challenging. Another possibility being considered, and which in principle should be less difficult, is the harmonization of tuning ranges. The term “tuning range” has been used to designate a range of frequencies over which radio equipment is envisaged to be capable of operating, but limited to one or more specific frequency bands according to national conditions and requirements. CEPT has listed the different frequency bands that could be harmonized for tuning ranges in CEPT countries; the total count is more than 16 frequency bands and, in all of them, certain countries have a specific different use that would need to be considered. If we extend this to the context of a World Radiocommunication Con-

ference with more than 30 other agenda items to consider, we can understand that it could be really challenging.

But this is not to be misunderstood. The EBU supports the harmonization of “tuning ranges”. This would provide stability for equipment manufacturers. And it would help broadcasters and ENG operators, who cover international events, to be able to use their own equipment across borders.

A more simple way to achieve this it is through the development of ITU-R Recommendations and/or Reports which would list the preferred frequency bands and tuning ranges for ENG applications (Method C of the CPM report). This would provide the required worldwide/regional harmonization of tuning ranges and offer enough flexibility to enlarge the list as new tuning ranges are considered by equipment manufacturers. CEPT shares the same view and intends to propose the approval of an ITU-R Resolution relating to ENG at the Radiocommunication Assembly (RA), and to invite ITU-R to carry out studies and to develop relevant ITU-R Recommendations and/or Reports based on the studies, as appropriate.

In case the Resolution does not go through the RA approval, the EBU also supports the proposal from the Asian Broadcasting Union (ABU) of developing a Resolution at WRC-12 asking the development of ITU-R Recommendations and Reports on worldwide/regional harmonization of Tuning ranges for ENG systems.

Another proposal, from the USA and supported by certain non-European countries, and which might create lively discussions during the Conference, is the creation of a global database of frequency bands used in each country for ENG. That proposal is interesting but might give rise to more questions than answers. Who is going to create, update and maintain the database? Will it be the broadcast community, regional regulatory bodies or the ITU-R? And which legal framework will be given to the database, etc.?

**EBU Members are satisfied with the current level of information relating to spectrum use for ENG, as made available by national and regional regulatory bodies. They also believe that the development of databases would not contribute further to the harmonization of spectrum usage or to the harmonization of tuning ranges or to solving the issue of spectrum congestion for ENG.**

### ***Agenda item 1.17: Sharing with Mobile Services in the 790 - 862 MHz band***

This agenda item has been one of the most complex to deal with during the preparations for WRC-12! The previous conference, WRC-07, had allocated the 790 - 862 MHz band (the so-called “digital dividend”) in Region 1<sup>6</sup> to the Mobile Service and identified the band for IMT applications. However the band was already allocated and used by the Broadcasting Service and by the Aeronautical and Fixed Services in certain countries. It was then necessary to study the sharing conditions between the Mobile Service and the other services.

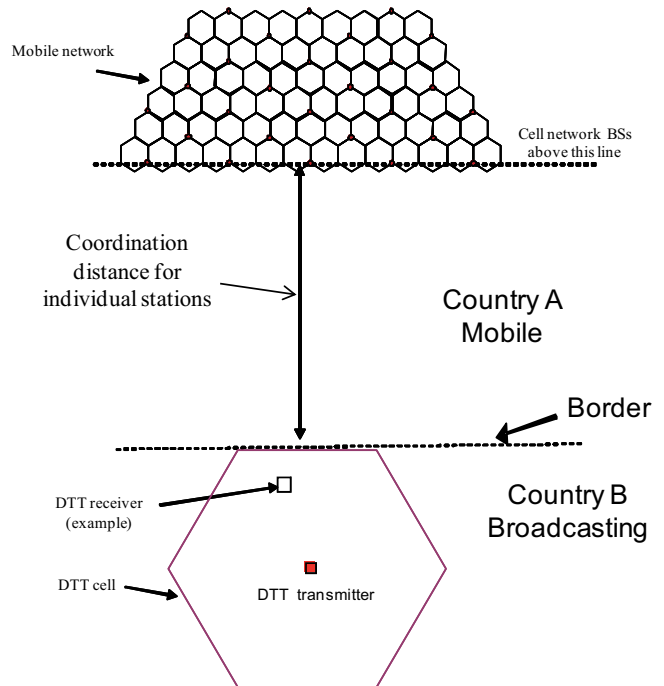
A Joint Task Group between Study Group 5 (dealing with Terrestrial Services which includes the Fixed, Mobile, Radiodetermination, Amateur and Amateur-Satellite Services) and Study Group 6 (dealing with Broadcasting Services) was then created. The JTG 5-6 had the task of performing studies in the band 790 - 862 MHz, between the Mobile Service and other services, in order to protect the services to which the frequency band was currently allocated. The case to be analyzed was that of cross-border coordination: when the same frequencies are used by the Mobile Service on one side and by the Broadcasting Service on the other side. However, the case of adjacent channel interference to services below 790 MHz was not under the scope of JTG 5-6.

The EBU Technical Department contributed with a large number of technical studies. The studies showed that when mobile cellular networks use the same frequency country-wide, the effect of

6. In ITU-R terminology, Region 1 comprises Europe, Africa, the Middle East (west of the Persian Gulf including Iraq), the former Soviet Union and Mongolia.

cumulative interference from all base stations into the Broadcasting Services could be significant and needs to be taken into account in the coordination procedures. The effect is expressed in two ways:

- The increase in the interfering field strength, more than 20 dB, due to the cumulative field strength with frequency reuse of 1 in the mobile network (single frequency network); and
- The reduction of the digital terrestrial television (DTT) coverage and quality. The CPM report summarizes the results of the studies for the case of the potential impact of multiple interference from up to 378 base stations of a mobile network on the quality of DTT services. The reduction of location coverage probability and the decrease in the Signal-to-Interference-and-Noise ratio (SINR) are expressed in terms of the percentage of interfered area throughout the entire DTT service area and also at the edge of the service area. The mobile cell network is located above the coordination distance and the DTT service area is placed with the edge tangential to the country border as shown in Fig. 2 [1][2].



**Figure 2**  
Graphic representation of a mobile cell network and a broadcasting network in neighbouring countries

The wanted DTT signal is calculated using the 50% time propagation curves and the interfering signals from the mobile cell network are calculated using the 1% time. The results are shown in Table 2, extracted from the CPM report §3/1.17/4.1.

**Table 2 – Impact of cumulative interference from mobile cell networks into DTT**

1% time for the interfering signals	Large DTT areas	Small DTT areas
<b>Decrease in location coverage probability</b>	5.2% (in the entire area) 18.2% (at the edge)	20.2% (in the entire area) 40.8% (at the edge)
<b>Decrease in SINR</b>	5.7 dB (in the entire area) 5.3 dB (at the edge)	12.7 dB (in the entire area) 11.4 dB (at the edge)

The effect on the coverage area of the DTT service and on its quality is not negligible, with small areas being more affected than large DTT areas. This is mainly due to the directivity of the roof-top antennas; in a small area there will be a greater part of the coverage area where the DTT receiving antennas are pointing towards the incoming interfering signals.

Some other views were also expressed during the CPM preparations: namely that, taking into account the real network configurations, the potential impact of cumulative interference might be less significant in practice.

Once the results of the technical studies were agreed, the regulatory mechanisms that will take them into account in the Radio Regulations were developed. In Region 1, the use of the 790 - 862 MHz sub-band is regulated by the GE06 Agreement that planned Band III (174 - 230 MHz) and Bands IV/V (470 - 862 MHz) for digital broadcasting. The agreement includes regulatory measures (i.e. coordination procedures) for the protection of the Broadcasting Service from the Mobile Service. Those coordination procedures, Article 4 of the GE06 Agreement, are based on the trigger mechanism. The coordination trigger procedure is used in Article 4 to identify potentially affected adminis-

trations with which coordination is required. The methodology that was used defines an area within which a trigger field strength value is exceeded [3].

EBU Members are of the view that the potential impact of the cumulative effect of interference from base stations, which individually do not trigger the need for coordination with broadcasting, could be significant. Therefore it should be taken into account as early as possible in the coordination process in order not to overlook these situations. To solve this, the EBU proposed to include more stations of the Mobile Service in the coordination by treating these mobile networks in the same way that DTT transmitters in an SFN configuration are dealt with in the GE06 Agreement (corresponding to option III, mandatory arrangements, of Method A of the CPM text). Therefore, EBU Members support Option III, mandatory arrangements.

CEPT Administrations are of the view that the GE06 Agreement already has the necessary regulatory measures and that no addition should be made to the Agreement or the Articles of the Radio Regulations. Interference issues are to be dealt with at bilateral and multilateral levels. In the preparation of bilateral meetings, the results of studies on the impact of cumulative interference carried out in JTG5-6 are available to assist Administrations.

Another possibility (corresponding to option II, optional arrangements, of Method A of the CPM text) is that WRC-12 agrees a Resolution asking ITU-R to develop calculation methods to assist Administrations in dealing with the cumulative effect of interference. This option would provide a compromise solution which would cover the concerns of all stakeholders. It provides flexibility to deal with the effect of cumulative interference without requiring additional regulatory measures.

However, the positions are different and with CEPT Administrations already taking a decision in one direction, this gives little margin for broadcasters to influence WRC-12 decisions in a different direction. It has been claimed that if WRC-12 takes no action to acknowledge the cumulative effect of interference from mobile cellular networks, it might not have major consequences for DTT services in EU countries because the 790 - 862 MHz band will be harmonized for non-broadcasting services. However this is not exactly true as Broadcasting Services below 790 MHz will suffer interference unless mitigation techniques are implemented. In addition, if additional broadcasting spectrum below 790 MHz is used for Mobile Services in some countries in the future, the situation of co-channel interference between Broadcasting Services and Mobile Services will definitely occur!

## ***Agenda item 1.2: Enhancing the international regulatory framework***

Discussions on how to enhance the current regulatory framework started several conferences ago. The use of the spectrum is regulated internationally by the ITU Radio Regulations. National regulators apply the decisions at national level, taking into account their particular needs to satisfy the country's requirements. The Radio Regulations are updated by a World Radiocommunication Conference which takes place every 3 to 4 years.

The current speed of technology developments is such that the Industry has claimed the need for a framework to regulate the radio waves more flexibly and to be better adapted to their evolution. In the past, the border-line between different types of radio communication services was clearly defined. Nowadays the convergence of services makes this line less necessary.

Some regulators may also think that a simplified international regulation would help to satisfy national regulatory requirements aimed at boosting their industry, in particular the mobile industry. Other more-conservative regulators prefer to keep the current framework as much as possible and take progressive steps towards flexibility – an evolutionary approach rather than a revolutionary one. And in this sense, WRC-12 is likely to address that agenda item.

Convergence of different services and technologies will be treated at the level of the Fixed and Mobile Services only, excluding Maritime and Aeronautical Mobile Services. There are proposals to modify existing definitions of the Fixed Service, Fixed Station, Mobile Station and Land Station. Any modification may have an impact to the regulation of the frequency bands allocated to the Fixed and Mobile Service and will need to be undertaken with care to protect allocated services (e.g. Space

Services) and ensure that coordination, notification and recording issues are properly addressed by the ITU-R.

The convergence of Space Services has also been studied but the results recommend not making any changes at WRC-12. Similarly, at WRC-12 the convergence of Terrestrial Services will not address convergence with Broadcasting Services. Broadcasters are satisfied as they are of the view that the current definition of the Broadcasting Service <sup>7</sup> in the RR is adequate and should not be modified.

But broadcasters already fear that this might be on the agenda of forthcoming conferences. The consumption of audiovisual content is no longer only possible with broadcasting devices but also with newer devices such as internet tablets, smartphones and PCs. Broadcasting Services are facing tremendous changes and are evolving towards new delivery mechanisms to reach those newer devices.

In the future, hybrid solutions might appear based on a single terrestrial network technology which is able to provide both Broadcast and Broadband Services.

WRC-12 might also open the door to additional flexibility by defining general principles for spectrum allocation which would complement the existing provisions of the RR. The proposal to be discussed aims to agree on a Resolution which would define those principles for future World Radiocommunication Conferences as follows: to allocate frequency bands to the most broadly-defined services, to allocate frequency bands on a worldwide basis and minimize the use of national footnotes.

The ITU-R would be invited to perform the necessary studies relating to the implementation of the principles. The proposed principles seem to be agreeable to the European Administrations. But other regions have different views; if they finally agree on the new principles, WRC-12 discussions may concentrate on whether to give a concrete action to the next conference to review the Radio Regulations as appropriate, taking into account the results of the ITU-R studies. Some countries might fear that this would bring again to the table a similar agenda item to enhance the regulatory framework as has been done at previous conferences, and would prefer to simply ask Administrations to apply the principles when allocating the spectrum.

Broadcasters have been supportive of the development of principles for the allocation of frequencies that makes use of the spectrum more flexible, and to facilitate access to frequency resources for new services and applications. However it is feared that current movements by regulators are mainly motivated by the pressure to allocate more spectrum to wireless broadband applications. Broadcasting Services in the UHF bands would easily be put on the spot again. It is therefore essential that protection and compatibility with existing services is considered before extending frequency allocations to Mobile Services. Spectrum requirements for the future evolution of Broadcasting Services also need to be taken into account. To retain a vibrant and competitive terrestrial platform, an adequate amount of spectrum should be made available to broadcasting.

### ***Agenda item 1.19: Regulating software-defined radio (SDR) and cognitive radio systems (CR)***

Regulation of the use of the spectrum by SDR and CR systems has also been studied. In the framework of a WRC, the discussions have focused on international regulation and not on national regulation.

A software-defined radio device is a radio transmitter and/or receiver with a technology that allows the RF operating parameters to be set or modified by software. An SDR device can then be programmed remotely to work on a frequency which is not used by another system in a given area at a given time. The major concern of such systems is to ensure that the device operates within its

7. In the ITU-R Radio Regulations, the Broadcasting Service is defined as a radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission.

## Abbreviations

<b>ABU</b>	Asia-Pacific Broadcasting Union <a href="http://www.abu.org.my/abu/index.cfm">http://www.abu.org.my/abu/index.cfm</a>	<b>ITU</b>	International Telecommunication Union <a href="http://www.itu.int">http://www.itu.int</a>
<b>CEPT</b>	<i>Conférence Européenne des Postes et Télécommunications</i> (European Conference of Postal and Telecommunications Administrations) <a href="http://www.cept.org/">http://www.cept.org/</a>	<b>ITU-R</b>	ITU - Radiocommunication Sector <a href="http://www.itu.int/publications/sector.aspx?lang=en&amp;sector=1">http://www.itu.int/publications/sector.aspx?lang=en&amp;sector=1</a>
<b>CPG</b>	(CEPT) Conference Preparatory Group	<b>JTG</b>	Joint Task Group
<b>CPM</b>	(ITU) Conference Preparatory Meeting	<b>PMSE</b>	Programme-Making and Special Events
<b>CR</b>	Cognitive Radio	<b>RA</b>	(ITU) Radiocommunication Assembly
<b>DTT</b>	Digital Terrestrial Television	<b>RR</b>	(ITU) Radio Regulations
<b>ECC</b>	(CEPT) Electronic Communications Committee	<b>RSPG</b>	(EU) Radio Spectrum Policy Group
<b>ECPs</b>	European Common Proposals	<b>SAB</b>	Services Ancillary to Broadcasting
<b>ENG</b>	Electronic News Gathering	<b>SAP</b>	Services Ancillary to Programme-making
<b>EU</b>	European Union	<b>SDR</b>	Software Defined Radio
<b>FM</b>	Frequency Modulation	<b>SINR</b>	Signal to Interference and Noise Ratio
<b>GE06</b>	Geneva Frequency Plan of 2006	<b>UHF</b>	Ultra High Frequency
<b>IMT</b>	International Mobile Telecommunications	<b>WRC-12</b>	(ITU) World Radiocommunication Conference 2012
		<b>WSD</b>	White Space Device

allowable parameters – in particular the exact frequency, the in-channel power and out-of-band emissions – in order to avoid harmful interference to other services.

A cognitive radio device is a radio system with a technology that allows the device to obtain knowledge of its operational and geographical environment in order to adapt its operating parameters – the exact frequency, the in-channel power and the out-of-band emissions – according to its obtained knowledge. Similar concerns over potential risk of interference to other services appear when operating in a shared environment. Cognitive radio systems are still part of research activities and different applications are currently under study and trial. Some applications have been deployed in certain countries and are being regulated at national level under a non-interference and non-protection basis (licence-exempt).

Both technologies, SDR and CR, offer the possibility of adding flexibility to – and maximizing the efficiency of – the spectrum used. The studies performed by ITU-R study groups concluded that if those devices meet the regulatory requirements in the Radio Regulations, no additional regulatory measures would need to be taken.

However, concerns remain relating to the management of the risk of interference to other services in case of dysfunction of the devices. The CPM text concludes that for the case of SDRs, the responsibility lies with software reliability and that solutions may be found in the modernization of the equipment certification and licensing regime which fall under national prerogatives and not within the scope of the ITU-R. So no further action is required.

For the case of CRs the capabilities of sharing spectrum with other services still requires further studies and WRC-12 should put in a request for this. An illustrative example is one of the CR applications under development during the last few years: the use by cognitive devices of the “white spaces”<sup>8</sup> in the broadcasting bands. Different categories of White Space Devices (WSDs) are possible, going from personal/portable and home/office devices that would be used at low height (typically at 1.5m) to public access points which are expected to be used at greater heights (e.g. 10 to 30 m).

Two cognitive techniques (sensing and geo-location database) have been analyzed by CEPT [4] regarding their appropriateness to provide protection to the incumbent radio services and in particular to digital terrestrial television. The resulting threshold levels of detection (of the presence of DTT signals) were so challenging that, in order to minimize the risks of interference, it is recommended

8. “White Space” defines those frequencies not used by a given service in a given area at a given time.



that both technologies – sensing and geo-location database – are implemented in WSDs. Protection of PMSE devices (which also make use of the white spaces) is still under study.

Broadcasters are supportive of CR applications and some EBU Members are promoting research studies on possible applications for Broadcasting Services. However, for broadcasters the protection of existing services from harmful interference is essential and will require additional studies. It is even more important if the use of the spectrum by those devices will be regulated at national level on a licence-exempt basis in most cases. Once a device has been agreed and thousands are on the market, it will not be easy to recall the devices in case of dysfunction!

### ***Agenda item 8.2: Spectrum for wireless broadband applications***

For European broadcasters, one of the most controversial subjects at the WRC-07 was the allocation of the 790 - 862 MHz to the Mobile Service in Region 1 and its identification for IMT services. This has opened the door to mobile network operators to get access to lower UHF frequencies which offer good propagation conditions to cover large areas and provide good indoor reception, reducing network costs when compared to operation in the higher bands.

Under the European political pressure, countries have started to move Broadcasting Services from those channels to lower frequencies and to auction the frequencies to mobile network operators. Across European countries it is expected that this band will no longer be available for Broadcasting Services in the near future. The European Commission's proposal for the first Radio Spectrum Policy Programme looks for a mandatory release as from 2013. The final text is to be approved by the European Parliament and the European Council in the coming months.

The use of the UHF band is not completely harmonized within the different regions of the world. In Region 2 (the Americas), WRC-07 extended the allocation to the Mobile Service from 806 MHz down to 698 MHz. In Region 3 (Asia and Australia), the allocation is as in Region 1 with the exception of certain countries which also went down to 698 MHz.

Since WRC-07, the mobile ecosystem has rapidly evolved. Portable devices such as smartphones and internet tablets (*pictured on the right is an Apple iPad*) are becoming the "standard". Those devices are able to display rich media applications with a high level of quality. For the users, downloading video and audio clips has become part of their daily life. Mobile network operators see in such applications a new and important source of revenues. However, those applications require much more data capacity than voice communication or messaging. To maximize their net income, mobile network operators need solutions to increase their capacity and minimize their network costs at the same time. The use of frequencies in the UHF band is then the simplest solution.

Furthermore, regulators also see an additional income. Auctioning the frequencies can become a fruitful business; the auctions of the 800 MHz band have returned 3.6 billion Euros to the German Government and more than 230 million Euros in Sweden.



So, as expected, the pressure for additional spectrum allocations to the Mobile Service has not decreased. All regional regulatory bodies are looking at an agenda item for the WRC in 2015 or 2016 to consider spectrum requirements for the development of terrestrial mobile broadband applications, including additional allocations to the Mobile Service and identification of bands for IMT.

In Europe the CPG has already agreed on that. The Resolution associated with the agenda item gives detail of the studies to be done and of the questions that the Conference should resolve and

what actions should be taken. The proposed resolution from CEPT asks for studies to be performed on the amount and type of capacity requirements, on the use of current spectrum allocations by Mobile Services and on the options to increase its efficient use. The possibilities for additional allocations should then take into account the spectrum requirements of existing services and their future evolution.

The CPG meeting in November finalized the European Common Proposal which has been submitted to WRC-12. This is expected to be one of the most controversial items at the Conference. Although most countries agree on the principle of giving additional spectrum allocations to the Mobile Services, there will be different positions to converge. One position might be to have a very restricted agenda item with a predefined list of candidate frequency bands. Others, including broadcasters, may prefer a more general agenda item such as the current CEPT position.

### ***Other WRC-12 agenda items of importance for broadcasters***

During this study period, broadcasters have also followed other agenda items of which two will be described here:

- 1) One relates to the introduction of new Aeronautical Mobile Systems in the 112 - 117.975 MHz band. Analogue systems have operated in that band for many years and compatibility measures with FM radio services in Band II (87 - 108 MHz) were already in place. The introduction of new aeronautical systems has required new compatibility analysis to be performed. The results indicate that new aeronautical systems can operate on a compatible basis with FM services below 108 MHz. Regarding compatibility with *digital* sound broadcasting systems in Band II, studies are still needed.
- 2) Another agenda item relates to the use of the 21.4 - 22 GHz band for the Broadcasting Satellite Service. At WRC-92, held in Torremolinos, provisions were made to make 600 MHz available for HDTV transmissions as from 2007, with provisions for experimental transmissions prior to this date.

At WRC-12, the definitive regulatory provisions for the use of the band will have to be agreed. But since 1992, some countries have already submitted files to the ITU for future deployment of satellites in that band. Since the rights to operate a satellite in this band are on a first-come first-served basis, countries that have not submitted such files fear that they might be left out of the business and will try to get agreement on procedures to balance the situation.

Furthermore, the band is also allocated on a primary basis to the Fixed and Mobile Service and countries that have already deployed terrestrial services would also look for procedures to protect their services from satellite emissions. Although the use of the 21.4 - 22 GHz band for enhanced Broadcasting Services does not seem to be questioned, the conditions of use might threaten the deployment of future Broadcasting Satellite Services.

## **Efficient use of spectrum is key!**

WRCs have the task of revising the Radio Regulations which define the use of the radio spectrum by all radiocommunication services. Looking at the agendas of recent conferences, there have not been many agenda items purely dedicated to Broadcasting Services. This does not mean that broadcasting has been stuck in a rut and has not evolved. Many different digital broadcasting standards have been developed during recent years to allow the migration of analogue Broadcasting Services to more-efficient digital systems. The use of the spectrum by those new digital technologies has been defined by specific procedures or by regional planning conferences. The introduction of new enhanced applications has only been possible through the development of new technologies which use the spectrum in a more efficient way to offer the possibility of adding new applications in the same amount of spectrum.



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Recent conferences have nevertheless dedicated much effort to finding additional allocations for Mobile Services. Mobile technologies are also evolving and providing a more efficient use of the spectrum. However, forecasts of growth in mobile broadband applications, requiring additional spectrum capacity, is pressurising WRCs to find additional spectrum allocations for Mobile Services. But, in the long term, will additional allocations be able to satisfy the forecasted capacity requirements?

Many WRC agenda items look for additional allocations and do not specifically request a study of the efficiency of spectrum use. But making more efficient use of the spectrum, i.e. delivering the same services using less frequencies, also facilitates the access to spectrum by new services and applications – thus facilitating innovation and technical evolution. Taking into account that spectrum is a scarce and limited resource, this discussion will be unavoidable in the long term. WRCs will not have to be limited to finding additional spectrum allocations to services forecasting tremendous growth of requirements but will also have to dig into the delicate question of improving the efficiency of the radio services.

And broadcasters will also have to define their spectrum requirements and their road maps towards the implementation of the most efficient technologies, as the amount of spectrum made available for their services is not expected to increase even when implementing their new enhanced and innovative features.

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*This version: 24 November 2011*

Published by the European Broadcasting Union, Geneva, Switzerland

ISSN: 1609-1469

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