

# Spectrum

— regulation and bandwidth

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**The soaring demand for more bandwidth capacity poses increasing challenges for spectrum users that are dependent on it for their business. This, coupled in the satellite arena with the recent increase in interference and jamming for political purposes, provides areas of discussion in the regulatory forums and the associated preparatory meetings ahead of, and during, the World Radiocommunication Conference 2012 (WRC-12) to be held in Geneva early next year.**

**This article explores some of the issues facing administrations and poses some questions about what the broadcasters are doing to engage with the regulatory bodies.**

How many of the Boards of broadcasters take an active interest in the world of spectrum allocation and regulation? It's not the most riveting subject for those that are more interested in the content and editorial priorities of the organization's output. But in a technology team there will usually be experts familiar with the copious agendas, minutes or discussion papers that are being submitted to one committee or another of their national bodies, or to CEPT, CENELEC, the ITU and other groups ... or who are actually spending time in those meetings. These may be a standards or study group, a working party or conference preparatory group, a national meeting or European body – the list is long. These issues rarely get to the Board agenda of most broadcasters, but the outcome of some can have a significant impact on the distribution of content or its cost.

The increasing demand for spectrum, fuelled by new-generation technologies, has led many national regulators to impose pricing mechanisms to “maximize economic efficiency”. The ITU recommends particular measures for spectrum efficiency<sup>1</sup> that aid the decision-making progress. The net effect is that, as spectrum is freed up either as a result of declining use, pricing mechanisms or the use of more efficient digital technology, it is being reallocated within or between sectors.

There are many areas in the various frequency bands where changes in the allocation of bandwidth are having an impact on the broadcast sector. The rapid growth of Power Line Telecommunications (PLT) technology, the allocation of the 800 MHz band to mobile services in Region 1, the use of C-Band spectrum for terrestrial WiMax services and other changes are making their impact felt.

For the international broadcasting community – accustomed to the competing demands for HF spectrum from the defence, aviation and maritime sectors, and the pre-conference preparatory work – the planning for a World Radiocommunication Conference is a familiar routine. The regular HF co-ordina-

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1. The ITU recommends that the “composite bandwidth-space-time domain” should be used as a measure of spectrum utilisation for comparing spectrum efficiency between radio systems.

tion meetings and dialogue around MF interference already ensured that the issues were well known and understood. But as the boundaries between broadcasters and telcos blur, and linear content is augmented by online and on-demand, it can be difficult for the broadcaster or media company to stay across all the initiatives that may impact on their business. The potential for growth of mobile services, and the ability to remain connected on the move, has resulted in a quantum shift in demand for spectrum to meet probably the fastest growing sector under the ITU's purview.

In the last two years, another issue has been added to the regulatory agenda with the increased incidence of interference to satellite services. "Interference" has long been a feature of terrestrial broadcasting, and HF broadcasters are well used to dealing with the problems of jamming, though not always solving them, whether it is an accidental or deliberate act.

To illustrate some of the challenges that broadcasters face, the author has looked at the three areas of PLT, C-Band/WiMax and satellite jamming. The issues highlight many of the pressures that broadcasters face in understanding the diverse nature of the initiatives that can affect their ability to compete and how – what might appear to be unrelated – developments can have a major impact on getting content to audiences, unless the broadcasters engage early in the discussion process.

There are two aspects that are worth bearing in mind:

- Firstly, much of the work that goes into setting standards may not bring benefits for several years. New technologies take time to develop. Broadcasters need to be wary of thinking that they don't need to engage in the work for a new piece of technology, just because it may not become a reality until 2020. It is often in the early stages of development that the defining aspects of the technology are set.
- Secondly, during the development phase, aspects of the technology may change beyond the original scope. Not to engage until the technology is closer to commercial fruition means opportunities may be missed to influence its design or detail.

## Power Line Telecommunications (PLT)

This technology has been developed to allow local internet access over domestic power distribution systems. Originally it was conceived for use over main power-grid supplies for getting content to the home although, in recent years, the focus has been on domestic distribution within the home or other buildings. Work continues on the grid-based technology, which poses similar risks to the broadcast industry with the potential for significantly-increased power levels. PLT has not until recently been of much concern to the broadcast community, other than those still using the AM bands. National regulators, keen to see the take-up of easy-to-use broadband services, have encouraged its development, and the trade and regulatory bodies in the communications sector have been largely left to work on the standards.

Broadcast members in the ITU, CISPR and CENELEC working parties (ITU WP1A, WP6A for example) have been seeking to ensure there is sufficient protection from the noise floor of PLT to minimize the potential interference to receivers being used in the home (or wherever PLT might be used), where the loss of audibility is perceived to be a risk. The use of filters has been advanced by the industry as a solution but the question remains: *will it be universally adopted by the various suppliers?*

The more recent move by the communications sector to allow the further development of PLT brings the potential risk of interference to FM radio in Band II (87.5 - 108 MHz) and DAB in Band III (174 -

### The challenge facing broadcasters

The challenge the broadcast industry faces is that increasingly it needs to be more aware of what is happening in other sector groups if it is to ensure that new technologies are developed and standardised in a way that does not bring risks to established or developing broadcast technologies. As the network operators and broadcast industries overlap in the provision and distribution of content, more needs to be done to bring them together in the world of standardisation, regulation and spectrum management.

240 MHz). The broadcast industry is seeking to ensure that sufficient protection is provided to minimize the risk of interference and is actively engaged in the relevant industry groups.

The development of PLT is an area where the broadcast sector has had different views. Some broadcasters, keen to see growth in online audiences, have encouraged PLT while others have been rather cautious.

## Terrestrial C-Band for WiMax

For most broadcasters C-Band is associated with the distribution of content to head-ends and other local distribution systems. For the telecommunication and satellite industries, it provides a much broader base of services. Whilst consumers can use it to access content, the larger dish sizes make it less relevant as a Direct-to-Home (DTH) technology. It also has considerable use in the developing world and in the tropics, because of its greater resistance to rain-fade than, say, Ku-band. It is these same regions that are likely to find WiMax attractive to provide cost-effective access to consumers where DSL and cable is likely to prove prohibitively expensive.

WiMax provides local broadband services at 34 Mbit/s (and potentially up to 1 Gbit/s) for up to several kilometers, depending on local conditions, and is seen as a low-cost alternative to cable and DSL. The WiMax industry body originally sought to use the 2.3, 2.4 and 3.5 GHz parts of the frequency bands, and this was taken to WRC-07 for endorsement. Since then, national regulators have allowed more spectrum to be used, and it does vary by country.

It is the use of the 3.4 to 4.2 GHz band that is causing concern to many C-Band<sup>2</sup> users, not just satellite owners and operators, but some broadcasters as well. The key issue is in the reception of C-Band services where WiMax services can cause interference. Even though some have moved their content to a different frequency to minimize the risks, the main issue arises from the noise floor of the WiMax service impacting on the C-Band services outside the frequency of the WiMax service.

Working on the basis of wanting to maximize the economic efficiency of the spectrum, users of C-Band are sometimes being asked to pay for the frequencies they want to protect or use, on the basis that they cannot be licensed to WiMax providers.

Many users and sectors have reported interference problems from WiMax services and it highlights that the development of a technology for use by one sector does not necessarily take into account the potential impact in another sector. Whilst the ITU premise is one of non-interference, it relies on its Members' contributions to standards and regulations to address the potential problems. When problems do arise, the solution at a regulatory level can be to commission a working party of interested administrations to work on potential solutions, requiring a consensual approach to problem solving – as such groups often include both proponents of a technology as well as those who seek to drive a different solution. Even when a recommendation emerges, there can be no mechanism for enforcing its adoption.

## Satellite jamming

The jamming of broadcasts has been a reality for the international HF-broadcaster community for many years. Countries who have not wanted to expose their populations to the views of outside news organizations have sought to jam those transmissions. With a few exceptions, HF jamming is less important today, largely because of changes in consumer use of the technology. That is because international broadcasters and media organization are using multiple distribution channels to reach audiences. The increasing use of FM – either dedicated services or as part of an affiliate or re-broadcaster arrangement – is helping international broadcasters to reach audiences. In addition

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2. The references to C-Band are based on the “Extended C-Band” description.

to FM, the internet with online content and streaming, and content to mobile devices, has seen significant growth.

Satellite interference is not new and has occurred almost since satellites began broadcasting. Through an uplink facility going off frequency or a misunderstanding about a frequency allocation, interference can become an issue – though often accidental and quickly resolved.

This is not true of the recent and growing incidence of deliberate jamming of broadcasters' content. The BBC's Persian TV service and VOA's Persian News Network (PNN), as well as Radio Free Europe/Radio Liberty's (RFE/RL) *Radio Farda*, have been jammed. The jamming affected whole transponders causing considerable damage to other users of the transponder. The satellite operator, Eutelsat, is reported to have triangulated the interference to originating in Iran. The same jamming has also affected Deutsche Welle (DW) services.

In the last year, services in North Africa and the Gulf have also suffered interference – including to News contribution feeds. Some of the interference has originated from the same location, some not. But it has become a more frequent problem in recent times.

The possibilities for broadcasters to address the issue are limited. Their contract may not be with the satellite operator, but through one of the many aggregators who lease transponders and sell on the capacity. When interference does occur, the responsibility for reporting the occurrence to the ITU and the country from where the interference is believed to originate lies with the administration for the satellite operator. In the case of the jamming that affected the BBC, VOA, RFE/RL and DW, it was Eutelsat's French spectrum authority, the *Agence Nationale des Fréquences* (ANFR) that took up the case. The complaint was followed up by the ITU. But sadly, the problem has not gone away and has not been solved through bilateral discussions between the countries involved.

The next World Radiocommunication Conference (WRC-12) is due to take place early in 2012 and there may be opportunities to raise the issue there. Europe's CEPT submitted a European Common Proposal at the ITU Plenipotentiary Conference that took place towards the end of 2010, where the matter was deferred to WRC-12.

The issue of jamming does raise much wider issues. The increased incidence and the ease by which it appears to be carried out, do pose risks for the satellite industry that has depended on the ITU's premise of non-interference. Technology is not likely to provide a short-term solution to the problem. That same satellite industry has, for quite understandable reasons, sought to remain apolitical and not get drawn in to the issues beyond their reporting obligations.

The ITU – a UN agency that depends on the consensual agreement of its member nations to determine the way it operates, regulates, allocates and rules – has no ability to intervene, enforce or bring sanctions to those who seek to operate outside its agreed procedures. So those involved in spectrum and frequency regulation are finding that they need more bandwidth themselves with the range of issues they are dealing with, not all of which have easy solutions. Whether it is new standards, changes in the allocations or jamming, there is much still to be discussed and agreed, but not all of the answers are yet clear.

### Abbreviations

<b>AM</b>	Amplitude Modulation	<b>DSL</b>	Digital Subscriber Line
<b>ANFR</b>	<i>Agence Nationale des Fréquences</i> (France) <a href="http://www.anfr.fr/">http://www.anfr.fr/</a>	<b>DTH</b>	Direct-To-Home
<b>CENELEC</b>	European Committee for Electrotechnical Standardization <a href="http://www.cenelec.eu">http://www.cenelec.eu</a>	<b>FM</b>	Frequency Modulation
<b>CEPT</b>	<i>Conférence Européenne des Postes et Télécommunications</i> <a href="http://www.cept.org/">http://www.cept.org/</a>	<b>HF</b>	High-Frequency
<b>CISPR</b>	<i>Comité International Spécial des Perturbations Radioélectrique</i>	<b>ITU</b>	International Telecommunication Union <a href="http://www.itu.int">http://www.itu.int</a>
<b>DAB</b>	Digital Audio Broadcasting (Eureka-147)	<b>LLP</b>	Limited Liability Partnership
		<b>MF</b>	Medium-Frequency
		<b>PLT</b>	Power-Line Telecommunications
		<b>WRC</b>	(ITU) World Radiocommunication Conference

There is one further dimension that broadcasters are probably already aware of. Whilst the issue or challenge facing the broadcaster or media operator may appear to have a ready answer, it may not be the same answer or have the same priority as that of the national regulator or administration, whose remit and obligations are likely to have a broader responsibility. Beyond the national interest, in Europe – through organizations such as CEPT – another set of priorities is likely to exist ... and that is before the matter is taken to the ITU. All of these issues are likely to be subject to different priorities.

There are some problems, such as jamming, where there is debate about the remit of the ITU and whether it has or should have jurisdiction beyond its responsibility for determining standards and the processes for spectrum use. The way the ITU operates is the product of years of negotiations by its member states over its role; the rules and regulations by which it works, and the extent to which it can intervene when problems arise. The underlying assumption is that problems between member states should be resolved through bilateral discussions between those member states.

The above are just some of the issues that need a resolution. It is by no means an exclusive list as we have not touched, for example, on the use of Band V for LTE/4G which has a number of issues still to be resolved.

Time is short for resolving some of these issues. The broadcast community does need to think hard about its engagement in the world of spectrum regulation – not only nationally, and how they work with their own administrations – but more widely. In some areas of activity, there are good examples of broadcasters coming together through organizations such as the EBU and the Bruges Group to address common interests. It is important that this engagement is not left until standards and technologies are set in stone and difficult to change. Involvement needs to start when the discussions begin, not when they are ending.



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Marquis provide a range of support and advice to broadcasters and media organizations, across the breadth of technology-related projects and services including spectrum and frequency regulation.

Perhaps the one item that is not down to be discussed is what sort of ITU does the world need in the future. The problem of satellite jamming has highlighted that the ITU is not able to provide a remedy when some members choose to operate outside the agreed rules and regulations that they have signed up to. The very nature of the ITU's mandate,

one based on years of discussions between its members, suggests that any changes would take many years to implement. Others will understandably argue that it is not the body to enforce sanctions and penalties. But if not the ITU, then who is responsible?

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