Warning: how WiMAX may affect you!

Television broadcasts can be—and have been—disrupted because of the frequencies allocated to some broadband services. Paul Brown-Kenyon, COO, MEASAT Satellite Systems, explains

IMAGINE the TV broadcast of a major global sporting event, watched by millions of people, suddenly failing. Imagine a regional entertainment channel unexpectedly going off the air. This has already happened and could potentially become a regular and frustrating occurrence. The problem originates with government decisions on spectrum allocation – a subject for technical experts but one that has profound implications and that we all need to be aware of . . .

While there are a number of different frequency bands allocated to the Fixed Satellite Service ('FSS'), the C-Band frequency band is the one most commonly used for core communication services. This band is used for providing communication networks via VSAT networks; for linking remote communities; and, for the distribution of television channels across a region.

The reason C-Band is used for these services is that it is the most suitable frequency band for satellite communications for critical services. This is especially the case in regions such as South East Asia where the alternative FSS frequency bands (such as the Ku-Band and the Ka-Band) are susceptible to interruption during heavy rain fall. So while C-Band can provide you with essentially 100% availability, Ku-Band can only provide availability levels of 99.8% or so (effectively meaning your service will be down for one day every year). This may be tolerable if you are providing consumer services but is unacceptable if you are providing backbone infrastructure for corporate services such as delivering television channels to PayTV operators.

Over the last 6 months, concern has swept the industry with the leading satellite operators – such as ABS, Asiasat, Intelsat and MEASAT -- and industry associations – such as CASBAA, APSCC and the Global VSAT forum – scrambling to the barricades. The concern is that the satellite C-band downlink band – the 3.4 to 4.2 GHz band – has been targeted by mobile broadband operators as a key band for the introduction of new broadband services. These include Fixed Wireless Access, Broadband Wireless Access and IMT-2000 services (generally called "WiMAX").

This would be fine – sharing of frequency bands is a common way of efficiently utilizing the limited spectrum available – except that the power level of these services can exceed the satellite signals by some 40dB. For the man in the street, this means that the signal of the WiMAX signal can be a few thousand times higher than the signal of the satellite signal. For signals looking to use the same frequency band, the WiMAX signal simply obliterates the satellite signal.

But even if WiMAX and FSS services use different frequencies within the same band there's still a problem. Firstly, WiMAX transmitters create out of band side lobes – transmissions that 'bleed' over into the adjacent frequencies – which, given the power differential still have the potential to 'knock-out' the adjacent satellite signal. Secondly, given the sensitive nature of the satellite receivers designed to receive signals broadcast from satellites 36,000km above the earth, a single WiMAX transmission a few kilometres away, even in a different part of the frequency band, can simply overload the satellite receiver, limiting its ability to receive any signal.

The only way to address these issues effectively is to ensure sufficient separation distances between the WiMax site and the satellite receive dish. International studies have indicated that a separation distance of more than 50km are required to protect the satellite receive stations from same frequency interference, shorter distances for adjacent band interference.

The problem becomes apparent when you look at the deployment of C-Band satellite services across the Asia-Pacific region (for example Malaysia) where the widespread deployment of C-Band satellite dishes makes the sharing of the band impossible. The WiMAX Forum already accepts this and has noted that that sharing of C-band FSS and WiMAX will not be possible where satellites heavily use these bands.

The battle for the 3.4 – 4.2 GHz spectrum is being discussed by the regulators across many countries at the moment with proponents of WiMAX looking to secure the use of the C-Band frequency band for their services. The issue will also be discussed at the WRC in Geneva at the end of the year where the same interest groups are looking to seek allocations for WiMAX services in the Radio Regulations that define the use of frequency bands around the world.

The reason why "Everyone NEEDS to know about WiMAX and Satellite Services" is that a decision to allocate any part of the 3.4 – 4.2 GHz frequency band to WiMAX type services will make these bands un-usable by satellites. With 3000 C-Band transponders worth $US3-5 billion in annual revenues potentially at threat, the impact on the satellite industry is enormous. At the minimum, it will lead to a large constraint on available satellite capacity leading to potential issues with existing services and increased transponder costs. At worst, it will have a fundamental effect on the economics of the FSS industry with implications to all.

The satellite industry is putting forward a strong case to both local regulators and the international bodies responsible for laying the guidelines for utilizing these frequency bands to protect the FSS C-band allocations. To fight this battle effectively we need the support of our customers who will ultimately be impacted by these decisions. As such, I would urge you to speak to your satellite provider; understand the local as well as global issues; and, add your weight to the arguments that are currently being debated. TVasia