

Mr. David Sampson, Deputy Secretary, US Department of Commerce.

Our Chairman Dale Hatfield, Adjunct Professor, University of Colorado

Distinguished guests and experts,

Ladies and Gentlemen,

It is indeed an honour to address you at this very important meeting about a subject that has been a major part of my life work.

A glance at the history books will show that 277 years before Christopher Columbus set sail, that the Magna Carta brought down by the Chancery of King John of England identified rights and obligations of property holders. Indeed your very own father of modern economics Smith in the “Wealth of Nations” treated this matter over two hundred years ago.

So why when the property right concept for land and other commodities has been very well understood and applied for over eight hundred years, has there been difficulties and issues with the theories and their applications for spectrum?

Well a barrel of oil is a barrel of oil. You know the size the weight and the volume along with what its wealth making properties are. Land owners through out the world understand the concepts of boundary pegs or fences. With spectrum however you can't see it and it does not behave or respect man made boundaries. Its governing laws are the laws of physics not economics or political “lines in the sand”. So is the application of property rights appropriate for the Radio Frequency Spectrum?

Well I believe that in some segments of the radio frequency spectrum the management is better of being the responsibility of the party to which the access to the spectrum gives the greatest value. Take the cellular radio bands. Management of the interference of these bands by the service provider allows for a dynamic approach to engineering. There are cell sites in Auckland, New Zealand where the antenna pattern is changed twice a day to meet the traffic needs. Obviously the manager of those bands needs to master of his own destiny.

Further, one of the roads to excellence in spectrum management, like virtually any other activity of mankind, is through competition. Imagine

that you want to put a fixed link between point A and B. You go along to one spectrum manager and he gives you a proposal but if you can then get another proposal, the quality of the engineering is driven up and the costs down! So what is needed to bring this about?.

Let me use the example of my own country New Zealand.

In the early 1980s the New Zealand economy was racing to the back door. In just thirty years we had managed to move from one of the wealthiest nations, per head of population, to about 20th on the OECD scale.

The country was amassing huge debt and the economy was sliding backwards. In 1984, the Lange Labour Government upon being re-elected to power opened the books and finding the cupboard rather bare decided that change was needed. About 48 % of the work force were either directly employed by the government or were in government agencies.

The government of the day looked at what it owned and decided to undertake a zealous programme of selling government assets. The theory was that the revenue from the sale of assets, that the government was operating with questionable efficiency, would be used to help pay off the national debt. It would also bring market forces to the provision of services.

As a first step the government formed State Owned Enterprises with the government as the owner. Each SOE had a commercial mandate and the body of business law applied to it. The SOE was required to pay a dividend to its owner, the government which also helped to turn around the economy.

When the opportunity was right, the State sold some of the SOEs and used the money to alleviate the national debt. Not all SOEs were privatised and in a couple of cases the government has had to step in and become involved again.

But it was in this environment that the government officials in the late 1980s looked for opportunities to enhance the value of the Radio Frequency Spectrum to the nation by overcoming the problem of a monopoly supplier. In 1988 the Government contracted the NERA organization of the United Kingdom to report on what the possibilities were.

This was a major turning point and even though history has shown that the issues were rather over simplified, the basic concepts have great merit today.

NERA recognized that in order to get a scenario where there was competition in the provision of spectrum, there would need to be competing Band Managers. A property right was needed that described the rights and obligations of an individual associated with managing a frequency band.

The spectrum products sold within that band also required to be a form of property right where the owner could make changes and even subdivide or join together with another licence to meet their needs.

These two forms of property rights of Management Right for an allocation, (frequency band) and Licence Rights for an individual assignment within that band became the cornerstone of the New Zealand spectrum sales programme.

Just to be clear here I call a licence or administrative licence, a grant of renewable access to the spectrum controlled by the government that enables an individual to carry out specific radio communications activities.

A spectrum property right is a registered instrument that confers a measure of ownership to the holder. A property right product is a commercial asset and can be bought and sold, mortgaged etc.

NERA was really a wave of enthusiasm in a brave new world. In reality it was a lot harder than first thought. Unfortunately the laws of physics did not yield and bend to economics or politics! NERA allowed three years for the process of devolving control of the spectrum to private ownership, to be completed. History has shown this to be well short of the mark.

New Zealand did not end up with a market of competing purveyors of spectrum products. It ended up with a robust sale of bands and licences to meet specific corporate needs. Almost universally, purchases of spectrum rights were to enable the holder itself to provide a commercial service, or to meet present and future needs.

The purchase of spectrum to enable trading as a commodity just did not happen.

Let me give you a little more history. New Zealand held its first spectrum sale in 1989 for the individual licences within the UHF Television bands. The Government itself was becoming a Band Manager. I remember it well as I hand carried a tender schedule to Auckland on Christmas Eve, for Sky Television. Preceding that sale was nearly a year of engineering work in the creation of the licence rights for the tender.

This was followed by a number of tenders for the other broadcasting licences and the 800/900 MHz cellular bands. In July 1990 in a wave of enthusiasm, a suite of licences for MDS were sold. The lack of any preconditioning meant that the fledgling MDS service operators were squeezed out by the big telecom and TV interests and after 15 years the rights lapsed with the spectrum lying virtually unused for all that time.

In a similar manner, the lack of preconditioning on the 1990 Cellular Telephone tenders led to some three years of litigation before the new entrant could use the bands.

The government tried very hard not to turn the tender process into just a money raising venture. The aim was to place spectrum products in the hands of those who most valued them.

Initially the tenders were second price sealed tenders where the winner paid the amount quoted by the second highest bidder. This caused huge distortions in the market and was eventually replaced by the normal tender procedure where the highest bidder is the winner at the bid price.

In 1996 Auctions were introduced using the format developed I believe by the FCC, of open ended ascending auctions. This process removed a lot of the distortions that typified the tender approach.

After 16 years of work creating and selling property rights, the spectrum that has been able to be defined as property rights and devolved to the market, is mainly the Cellular Telephone bands and Broadcasting (AM, FM, VHF TV and UHF TV) with associated services like the fixed services at 2 GHz that were caught up in the IMT2000 sales. The majority of the spectrum still remains administered by the government.

The evolution of spectrum management in New Zealand reinforces my view that the creation and sale of spectrum products, even though the process is difficult, is a vital part of stimulating usage and commitment to the provision of services to a nation.

The certainty of access brought about by ownership underpins the large expenditure often needed to develop the necessary infrastructure. But it is not easy and requires lawyers, market experts and engineers working closely together to create spectrum products that are attractive and of high market value.

But not all of the spectrum can be handled this way. The huge diversity of applications that use the Radio Frequency Spectrum, mean that there is no universal optimum solution for every band and service. Just like in real estate, many forms of rights are needed. There are many applications of the radio frequency spectrum that require shared access and a dominant party would be inappropriate. Rights of access vary from exclusive to unlimited access for all like the public park.

What I believe is needed is an overall spectrum strategy where the various levels access are managed in the best way for users of any particular band. In this context the definition of spectrum products in the form of property rights is one of the most powerful tools in the arsenal.

Even though the requirement for exclusive access would suggest a spectrum sale this is not always case. Take the air traffic control channels for example or military applications.

Shared bands would suggest management by administrative processes and also “public parks”. Bands where there are large international obligations for example the unplanned FSS bands are possibly still best treated under an administrative regime where the state has some flexibility to move to reach accord.

We should not lose sight of the need to provide bands the many non commercial or low revenue applications like radio communications for public utilities and for experimentation like the Amateur Service where aspiring engineers can learn and apply the theories without affecting other parties.

If one looks closely at the rapid growth of wireless LAN technology, it was dependant on there being available “public park” spectrum for its success. The need to provide workable systems in this unfettered environment has led to innovative technologies that allow many users to share the resource. The flow on into the economy is huge and more than justifies the creation of the “spectrum park”.

As you see Ladies and Gentlemen there is no silver bullet. There is no one unique solution applicable across all applications, which indicates to me that a whole range of types of spectrum access rights are needed to serve the community and of course underpin the creation of wealth.

We must recognise that what suits one country may be unacceptable in others. I have had a number of interesting reactions in discussing the sale of broadcasting frequencies for example..

In the Asia Pacific Region, Australia has a vigorous programme of spectrum auctions but they have avoided the challenges associated with the sale of the broadcasting bands. They have along with many other countries decided the fate of the IMT 2000 bands using spectrum sales and interestingly have sold the BSS allocations in the band 11.7 -12.2 GHz.

The rest of Asia has used different approaches that best suit their national policies and culture. To our way of thinking the market driven determination has huge merits. However not all countries and peoples think the same. Most of the major allocations in Asia have been determined by other factors rather than the ability to pay the highest price.

This of course is not restricted to Asia. Many European countries have granted exclusive spectrum access without resorting to auctions. This clearly demonstrates the two parts of the process. The first part is the generation of spectrum products to serve the needs of industry and the second is the allocation process.

One of the more interesting public policy initiatives was taken by one country in providing access for cellular radio spectrum. The criteria for deciding on who got what, was the guarantee for a fixed level of charges to the end users. The organization that guaranteed that it would hold the lowest rate for, if I remember rightly the first five years, was the winner. What was important to that country was the need for rapidly expanding low cost communications services to support growth.

In a number of countries in Asia the provision of telecommunications services is still carried out by government agencies and outside influences have been often excluded.

So far I have addressed the big services that naturally fit private spectrum ownership, but what sort of a regime do the rest require?

A spectrum management regime that is open is, in my experience the best arrangement. In the past the trend was for the spectrum managers to be surrounded by a veil of secrecy and associated wizardry. This has not served countries well. Unused or hoarded spectrum is a waste of national resources and not in the interest of any party. After all the radio frequency spectrum is the original renewable resource and it does not deteriorate with use!

In New Zealand now the data bases are a matter of public record and any suitably qualified and approved individual can carry out spectrum engineering. I carry the New Zealand band plans and assignments in my Laptop PC. The Internet has made all this possible and is being harnessed in New Zealand and many other countries as a powerful tool.

Just as land rights records have been open to public scrutiny for many years now the opening of the spectrum management licensing files is healthy trend to encourage innovation and new forms of service.

Most countries in Asia though, have a long way to go before they reach the point where independent engineers have available to them all the data so that they can carry out spectrum engineering in the quest for new and innovative services. Australia and New Zealand and I believe the USA are well down the track of “opening the books”.

I can envisage a regime in the future where if a licence for a fixed link is required the spectrum engineering is done on a competitive basis and as the records are public any interference issue is resolved between the interested parties. There would still need to be some form of licence for public record keeping and this would probably be needed to be funded by licence fees.

I am attracted to the “public park” concept, and when I see the explosion of RLANS it would suggest to me that larger amounts of spectrum will be required in the future for un licenced applications.

Ladies and Gentlemen I would now like to go over some of the difficulties I have experienced in the creation of property rights.

One of the pitfalls is the tendency to strive for technical neutrality to give the owner the greatest flexibility of application. Technical neutrality is an absolute myth. In my view the most successful sales and best

implemented regimes are where the product that will use the spectrum product is already well known.

This allows the technical characteristics associated with the use to be accurately described as part of the property right. It must be noted that even though the rate of change of technology is incredible, the rate of change of the spectrum it uses is small.

Most of the frequency allocations in the International Radio Regulations have been there for decades. I would suggest therefore that the needs of today should be addressed and leave the crystal balls somewhere else.

In bands where the usage is not well established, high transaction costs can often occur as the owner of the spectrum right attempts to change the characteristics to meet their particular need. This was a feature of the original Australian regime where the intention was that frequencies would be sold in designated geographical areas and these could then be merged to meet the needs of the owner. I understand the transaction costs made this approach somewhat unattractive. In fact one commentator indicated at the time that spectrum sales in Australia were like buying real-estate by the square metre.

One of the big difficulties I experienced was with the sale of licences rather than bands. The economists indicated that all existing and future licences in a particular band should be on offer. To create such a schedule of licence rights, the existing and future usage needed to be modelled and then each element legally described and wrapped up for sale.

No matter how hard I tried I always got the new FM Broadcasting licences located on the wrong hill or building for the new owners. Thus after a sale there would be a flurry of activity where the parties who having won licence right would want to move it to another site and if it was a broadcasting service, would want to increase power. New Zealand developed a whole policy framework for allowing for post sale changes.

Of course the simpler approach would have been to just sell the bands. The existing users would get an incumbency right and new licences would be generated and sold by the new band owner.

While the Broadcasting Industry agreed to the competitive purchase of licences provided they got incumbency rights for their existing stations, there was no way they would agree to the sale to a private concern of the

bands themselves. Thus all sales of broadcasting spectrum were by licences.

With the other services like cellular radio, the sale of bands still required some assumptions. For example the original 800/900 MHz bands were modelled as analogue services. The unwanted emission rights at the band edges gave considerable difficulty as the amount of latitude required for the analogue service was completely different from its digital replacement.

All of the above are challenges that need to be faced, however the end product is worth the effort.

Let me finish with one extra thought. The devolution of the spectrum from government monopoly to private ownership is in fact a two stage process. The first part is the description of the spectrum product and the second part is the allocation of the product to the end user. The allocation of the product does not need to be by sale. The grant of spectrum rights to an essential user may lead to a high level of innovation with the responsibility of getting it right being put in the hands of those most effected.

Once again ladies and gentlemen thank you for inviting me and I hope my comments will assist you finding the best way forward for this mighty nation.