From the Magazine: Spectrum Clearing and Sharing

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As the Federal Communications Commission (FCC), National Telecommunications and Information Administration (NTIA), Congress, the Department of Defense (DoD), and other agencies move to meet the mandate to free up more spectrum for commercial broadband services, and as the FCC works toward the incentive auctions, I have to wonder if some of their ideas have been properly thought through.

One positive is that the DoD has turned 180 degrees on spectrum and has volunteered to give up from 1755 MHz to 1780 MHz so it can be paired with 2155-2180 MHz, which will provide far more value at auction than not being able to offer more paired spectrum. The cost, DoD states, will run about $3.5 billion since some of this spectrum is used for drone control around the world. This action came only after members of Congress came down hard on the DoD for refusing to release spectrum. In another move, the DoD also stated that it is willing to share access to the 2025-2110 MHz portion of the spectrum. Is spectrum sharing a long-term solution or merely a patch?

Typically, commercial spectrum holders that vie for spectrum at auction want to be able to carry the value of the spectrum on their books as an asset. While I am not an accountant, I think this might be difficult when using shared spectrum. Further, if it cannot be used nationwide, what is the real value of the spectrum to commercial network operators? It appears as though the move toward shared spectrum totally ignores the fact that devices will have to be built with yet more spectrum capabilities, some of which may only be useful in certain parts of the country or during certain times. Qualcomm and others continue to amaze us with the number of different portions of spectrum they can build into a single device, but there is a limit.

Incentive Auctions

Here again, unless the FCC has buy-in from all of the stations located on a specific channel, it will only be able to clear each 6-MHz channel in certain areas of the United States, again diminishing the value of the spectrum and causing devices to be functional in certain areas but not others. For example, for Channel 48 (675-681 MHz) we find that there are 37 stations in the United States. If all of them don’t

agree to the incentive auction, the FCC won't be able to offer a clean 6 MHz of spectrum across the United States so it will have to force the balance of the stations to relocate. The FCC has the right to take this action but it will, undoubtedly, be met with lawsuits and delaying tactics.

We certainly need more spectrum for commercial broadband services. However, those who make spectrum decisions should be considering the location of the spectrum, its proximity to existing broadband spectrum, and the feasibility of building devices to cover all of this spectrum. LTE Advanced will permit spectrum aggregation. For instance, taking spectrum in the 700-MHz band, say a 10X10 MHz portion, and adding another 10X10 MHz at 1700 MHz to provide what looks like a full 20X20 MHz LTE system. But LTE Advanced is a standard and not yet a proven set of technologies. There are some reported issues with battery life and other technical requirements for devices that will take advantage of spectrum aggregation. Perhaps we should move carefully in this area to ensure that all of this new technology will be realized and that the devices will, indeed, be able to work across wide portions of the spectrum without becoming more susceptible to interference from other commercial networks and other spectrum users.

There seems to be a disconnect between Congress and all of the government agencies working on finding new spectrum (many of which are not conversant with the limitations of devices and the laws of physics) and the wireless community. This disconnect starts at the chip-level manufacturers and continues up through the network operators. Perhaps it would be a great idea to have representatives from these two groups work together to define the limitations of what can be done today, what is projected for additional capabilities in the next 3-5 years, and what the ideal situation would be if certain laws of physics could be broken or perhaps bent a little.

It makes no sense to me to order spectrum to be freed up for commercial broadband services that will end up costing the network operators, device vendors, and wireless consumers more in the long run. Elected officials cannot be expected to understand the nuances of spectrum allocation and usage, yet they are making laws based on the premise that spectrum is spectrum. Any spectrum anywhere is better than no spectrum at all. Somewhere between the lawmakers and those who make wireless work there is a middle ground. We need to identify this middle ground and use it for the guidelines for spectrum growth going forward.

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