Unraveling the Tangled 700 MHz

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Trying to figure out how the industry ended up with an incompatible 700 MHz band is a little like trying to untangle the cords in your junk drawer. The more you pull it apart, the more snarls you see, and you're left wondering, "How did we end up with this mess?"

That's exactly what I've been wondering over the past few days as I've delved into the interoperability issue.

The 700 MHz band plan is a mess. Instead of a comprehensive, holistic band design, it came about in bits and pieces as Congress tinkered with legislation and television broadcasters gradually relinquished control of their spectrum. The lower portion of the band was then bifurcated by the 3GPP standards process, further complicating matters.

As a result, we have a highly fragmented band with built-in inefficiencies and interference problems. Forget fragmentation in the global LTE ecosystem. It's hard enough addressing LTE fragmentation on the home front.

If you'll bear with me for a moment, let's go back to the start of the digital television transition laid out in the 1996 Telecommunications Act.

How'd We Get Into This Mess?

The legislation marked a major coup for broadcasters, giving them free spectrum for the switch to digital television. The licenses left over from the DTV transition were slated to be auctioned off for wireless service.

However, legislation passed the next year overturned FCC regulations that would have forced broadcasters to give back their analog licenses by the end of 2006.

The Balanced Budget Act of 1997 reallocated channels 52-69 for wireless service, but set out several exceptions that allowed television stations to maintain both analog and digital signals almost indefinitely. Those provisions made it unlikely that the spectrum that was supposed to have been cleared by the DTV transition would ever be free. Specifically, the bill included a provision that broadcasters didn't have to hand over their analog broadcast licenses until 85 percent of the households in their market could receive digital television signals. Given the slow pace of DTV adoption, that threshold was unlikely to be achieved by the 2006 deadline, allowing

broadcasters to hold on to their analog spectrum.

The legislation indicated that Channels 52-69 would likely be reallocated from broadcast television to commercial wireless service, and set out deadlines for the FCC to reallocate channels 60-69. However, the bill didn't make it clear when, if ever, the remaining channels would be used for cellular service, so the FCC retained 6 MHz channels across the entire 700 MHz band to accommodate incumbent broadcasters.

But then Congress changed its mind, cancelling the auction of channels 60-69 in favor of selling off channels 52-59. Portions of the lower C and D block were auctioned in 2002 and 2003.

Then Capitol Hill threw another monkey wrench in the works with the passage of the Digital Transition and Public Safety Act of 2005. The bill threw out the 85 percent standard that allowed broadcasters to delay relinquishing their analog licenses, setting a February deadline for the end of analog broadcasts.

As a result, channels 52-69, previously inhabited by television broadcasters, were suddenly about to become available for auction, and the FCC was under deadline to begin its auction by January 2008.

Because there were already some wireless licensees on the 700 MHz band – think back to the auctions in the early 2000s – the FCC decided against changing the band plan to 5 MHz channels, a more favorable configuration for LTE service.

It was also not in a position to do a time-consuming revision of the rules to come up with a guard band for the A block, given the urgency of the 700 MHz auction and existing Channel 51 licensees that would have been affected by the change.

The subsequent 2008 auction paved the way for possible interference problems to the A block from the lower E block after Dish Network bought a license that authorizes high-powered transmissions that could drown out neighboring signals in the A block. Dish Network has yet to put its 700 MHz license to use.

Repacking Channel 51 broadcasters came on the table after the 2008 auction, but has yet to make much progress beyond a recent freeze on new applications for Channel 51 broadcast stations.

Back to the Present

As a result, that "beachfront" A block spectrum is polluted - no wonder it sold for so much less than other bands during the 700 MHz auction. It's essentially unusable in markets where there's broadcast television on the air in Channel 51, markets like

New York City, Chicago, Los Angeles, where networks are congested and more spectrum is needed.

To make matters worse, the already interference-fraught lower 700 MHz was then divided into two incompatible classes by the 3GPP.

AT&T and its vendors lobbied for the new band class, arguing the change was needed to protect AT&T's lower B and C block spectrum from interference in the A block. Some of AT&T's smaller competitors now allege AT&T purposely carved out band 17 to exclude them from the LTE market, claims that have become the subject of an antitrust suit.

As has been well-documented, regional operators that snapped up band 12 spectrum expected to be able to access the same LTE ecosystem as AT&T. But the creation of band 17 made devices and equipment for AT&T's LTE network incompatible with band 12, dashing smaller providers' hopes for a robust LTE ecosystem. Many are now struggling to procure smartphones for their niche band class and have delayed their LTE deployments.

The FCC is considering a proposal that would collapse AT&T’s band into band 12, creating a single class for the lower 700 MHz. But the change is being heavily lobbied against by AT&T, which argues it will open its customers to interference issues and do little to ultimately help regional providers roll out LTE.

The spectrum slated to support the future of the U.S. wireless industry - a product of powerful special interest groups and repeated changes in legislative strategy - is now fraught with complexity, controversy and incompatibility.

The process of fixing it could be just as difficult and convoluted as the process by which it came to market in the first place.

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