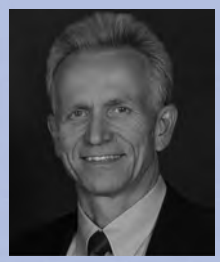
BNA
Insights

*Peter Rysavy is the president of Rysavy Research, LLC, a consulting firm that has specialized in wireless technology since 1993.*



## Uncertain Government Spectrum Policies Have Far-Reaching Consequences

By Peter Rysavy

Engineers abhor uncertainty. And, right now, wireless network engineers in the United States are facing a grave uncertainty: How much spectrum will the Federal Communications Commission and the Commerce Department's National Telecommunications and Information Administration make available for future mobile broadband uses?

With no clear answer, network engineers will be forced to make tough decisions in the near term, which could short-change the potential of next-generation technologies while negatively impacting service quality and increasing costs.

Simply put, engineers must design networks assuming that the network will be more—not less—capacity constrained. And reduced capacity results in fewer innovative applications and undermines the entire mobile ecosystem.

What is more, such uncertainty leads wireless carriers to make incremental network investments, a far from optimal result. Consider a highway construction project: Incrementally adding lanes to a freeway ***after*** it is built costs more than building the road wider in the first place.

**When massive infrastructure-planning decisions are affected by uncertain government spectrum management policies, the consequences for consumers and the entire wireless broadband ecosystem are significant and negative.**

But the fact is, carriers must actually delay deploying next-generation technology, since such deployments almost always require new spectrum. What operator wants to commit to a multi-billion-dollar investment in long-lead-time infrastructure when it's uncertain whether and when it may get access to the spectrum needed to power that infrastructure?

Thus, one of the most important things the FCC and the NITA can do to realize a stated goal of the Obama's administration's June 2013 memorandum—"to expedite the repurposing of spectrum and otherwise enable innovative and flexible commercial uses of spectrum, including broadband, to be deployed as rapidly as possible"—is to dispel the cloud of uncertainty that hangs over spectrum planners.

### The Tall Order for Engineers.

For now, however, the problem continues to exist. Engineers tasked with designing and upgrading the world's leading mobile broadband networks must confront a staggering degree of complexity when determining how to deploy different technologies in differ-

ent frequency bands—all with sporadic access to new tranches of spectrum.

To cope, they must keep six goals in mind: (1) optimize when and how to migrate from one technology to the next (for example, High Speed Packet Access, or HSPA, to Long Term Evolution, or LTE); (2) clear incumbent users from newly acquired spectrum; (3) participate in standards-setting work to define the use of new bands; (4) install new equipment at cell sites; (5) manage potential interference with neighboring bands; and (6) work closely with chip and device vendors to produce the next generation of mobile gear that is not only compatible with the cellular networks but desirable to consumers.

Speaking of the consumer, engineers also must support multiple categories of users—users who adopt the latest and fastest technology and users who do not, users who roam onto networks from other parts of the world, and users of machine-to-machine applications with extended life cycles (e.g., up to 10 years or even longer).

## Inconsistency from the FCC.

So what's the solution? At a minimum, the FCC should present a single and reliable set of data points that make clear what spectrum it considers usable for wireless broadband.

The agency seems to be well on its way to doing just that. For example, on Feb. 26, the FCC published a report, ''The Mobile Broadband Spectrum Challenge: International Comparisons,'' in which it clearly delineates the various bands. Table 3 lists 70 MHz of 700 MHz spectrum, 64 MHz of the original cellular band, 130 MHz of Personal Communications Service (PCS), 130 MHz of Advanced Wireless Service (AWS), 20 MHz of Wireless Communications Service (WCS), and 194 MHz comprising Broadband Radio Service (BRS) and Educational Broadcast Service (EBS), adding up to a total of 608 MHz of spectrum (130 DER A-10, 7/8/13).

However, the way the FCC has vacillated on how the agency accounts for BRS/EBS spectrum, as used by Clearwire Corp., bears closer scrutiny. Consider that 194 MHz is the maximum amount of spectrum available in the BRS/EBS band, according to the official table of allocations, but the amount the FCC says is available to Clearwire is slightly less than 194 MHz.

Clearwire itself tells investors that it has 160 MHz in its top 100 markets, saying in the process that it holds ''the largest spectrum portfolio in the U.S.'' Further, Clearwire's 10K filing adds that it has 140 MHz, on average, across its national footprint.

Meanwhile, in the FCC's annual competition report, issued in March, the agency lists Clearwire as having 131.5 MHz of spectrum on a population-weighted basis. Yet this very same report states that the current FCC spectrum ''screen'' attributes only 55.5 MHz of spectrum to the BRS. In fact, the FCC's July approval of SoftBank Corp.'s majority acquisition of Sprint Nextel Corp. included only this 55.5 MHz value when accounting for Sprint's spectrum—a difficult-to-understand discrepancy.

Ultimately, though, the exact amount of BRS/EBS spectrum the FCC treats as ''available'' for wireless broadband is not the issue; deciding what amount of spectrum it believes is usable for mobile broadband and sticking with that decision is. This would give companies a better sense of how much spectrum will be made available in the future under the agency's spectrum aggregation rules. Without clarity, network engineers are stuck planning for myriad contingencies rather than optimizing technology upgrades.

Hopefully, the eventual outcome of the FCC's notice of proposed rulemaking on ''Policies Regarding Mobile Spectrum Holdings'' will offer greater clarity, but the proceeding, which is still ongoing, has only further contributed to confusion, as have non-final rules on the extent of spectrum available to different bidders in the agency's forthcoming incentive auctions.

## Spectrum Sharing Another Question Mark.

Yet another example of uncertainty is the current multi-agency investigation into the possibility of spectrum sharing among commercial broadband networks and government systems in the 1755-1780 MHz band of spectrum, which will become the ''AWS-3'' band when combined with the 2155-2180 MHz band.

Confusion over how sharing might work, and if it will work at all, has put the wireless industry into a ''wait-and-see'' mode. To date, no company has made concrete plans for how it might use this extremely valuable spectrum. For both AWS-3 and future bands, neither industry nor government is clear on which of the

## Uncertain Government Spectrum Policies Have Far-Reaching Consequences

multitude of sharing approaches to use when and how, or if these approaches should be combined: database, geographic, temporal, and sensing.

When massive infrastructure planning decisions are affected by uncertain government spectrum management policies, the consequences for consumers and the entire wireless broadband ecosystem are significant and negative.

Resolution of BRS/EBS spectrum quantity, a consequent clearer and fairer policy on spectrum ''caps,'' and realistic and effective approaches to spectrum sharing are needed to help mitigate uncertainty.