



Crowd Control: The Need for a Spectrum Management Mitigation Fund

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A “spectrum management mitigation fund” would help legacy users defray the inadvertent costs of adapting to innovations in the marketplace.

Whether it’s 4G cell phones, light-as-a-feather laptops or the latest tablet, Americans are enjoying a wireless revolution. In 2010, Americans typed, tapped, texted, and called on an estimated 300 million mobile devices.¹

But all this increased connectivity is taking a toll on the nation’s increasingly crowded airwaves. The Federal Communications Commission (FCC) warns of a “spectrum crunch” that could hit as early as 2013, given how quickly wireless traffic is growing.

Innovative companies are devising new ways to maximize spectrum efficiency so more users can take up less space. But while these advances deserve strong support, they’re also not cost-free. In some cases, existing “legacy” users must retrofit older and less efficient technologies to adjust to these new uses.

This brief proposes a “spectrum management mitigation fund” to help legacy users defray the inadvertent costs of adapting to innovations in the marketplace. This fund would involve no new federal money and instead would be financed from a portion of revenues from “voluntary incentive auctions” -- a mechanism endorsed by the FCC to encourage more efficient spectrum allocation between current and prospective licensees.

Creating the fund would reconcile two goals: it would both encourage much-needed innovation while also acknowledging the legitimate concerns of users with older technologies. Moreover, it would obviate the politicization of spectrum management issues currently occurring in part due to the absence of a mitigation mechanism. For example, this fund could help resolve the current controversy between the legacy GPS community and the wireless broadband start-up LightSquared—it could partially compensate legacy GPS users for the cost of retrofitting existing devices, thereby clearing the path for LightSquared to deploy its network.

With the benefits of spectrum innovation too great pass up, this fund could be an important next step to ensure Americans enjoy the next generation and beyond of new wireless technologies.

The Wireless Revolution: More than “Angry Birds” on Your iPhone

In terms of transformational potential, wireless technology could be at least as significant as the Internet itself.

In its National Broadband Plan—a far-reaching blueprint released in 2010—the FCC singled out wireless broadband as “a key platform for innovation” in the next decade.² Mobile broadband, the FCC said, “represents the convergence of the last two great disruptive technologies—Internet computing and mobile communications—and may be more transformative than either of these previous breakthroughs.”³

The advent of wireless could revolutionize such varied sectors as education, health care and energy. Breakthroughs in distance learning, remote diagnostics, a “smart grid” and many other new tools have huge potential to both improve Americans’ lives and create new jobs. Certainly, data-hungry and well-wired Americans are already seeing the possibilities:

- More than 95 million Americans (or nearly 1 in 3) use smartphones,⁴ which are now outselling personal computers worldwide.⁵
- More than 276 million Americans (or nearly 9 in 10) subscribe to a wireless service. The number of wireless users jumped 40% just between 2005 and 2009.⁶
- In 2010, consumers worldwide downloaded more than 5 *billion* apps—a 16-fold increase from the mere 300 million apps downloaded in 2009.⁷

As a result, the explosive growth of wireless innovation has also been a lone bright spot of economic growth in an otherwise moribund economy. According to the FCC:

- Wireless is a growing contributor to U.S. gross domestic product (GDP). The FCC says wireless contributions to GDP grew more than 16% annually from 1992-2007 (versus less than 3% annual growth for the overall economy).⁸
- Investments in fourth-generation (“4G”) wireless technologies could generate as many as 205,000 U.S. jobs.⁹
- Tablets are now a \$35 billion dollar industry, while mobile online shopping generated \$4 billion in sales in 2010. By 2015, sales of mobile apps could total \$38 billion.¹⁰

The Need: New Technologies for Managing Spectrum

Government can take a two-pronged approach to tackling the spectrum crunch: (1) it can encourage the more efficient allocation of unused or underused spectrum; and (2) it could encourage technological innovations that would enable more data and more users to use existing capacity.

Because the nation’s airwaves are a “common” good, the government rightly plays a key role in managing who can use spectrum and how. Some frequencies, for example, are reserved exclusively for the use of first responders or for national security, while other bands have been licensed to private companies for cellular, mobile broadband, etc.

One major proposal under the first approach—allocating spectrum more efficiently—is the notion of a “voluntary incentive auction.” These auctions are a central recommendation of both the FCC’s National Broadband Plan and the Obama Administration’s Wireless Innovation and Infrastructure Initiative.

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Under this plan, holders of underutilized spectrum would be encouraged to “give back” their licenses to the FCC in exchange for some of the proceeds when their former slice of the spectrum is auctioned to new potential users. Not only is this market-based approach the fairest way to reallocate spectrum to better uses, it has the potential to raise as much as \$24 billion for the federal government when the old spectrum is auctioned to new bidders.¹⁵

But because these auctions are still dealing with a limited amount of physical capacity on the spectrum, promoting innovations in spectrum efficiency is at least as important, if not more so, for coping with the spectrum shortage. Since the spectrum itself can’t be expanded, we have no choice but to aim for better, faster and more when it comes to transmitting data.

One example of a promising innovation is the recent development of high-speed “4G-LTE” (or “fourth generation long-term evolution”) wireless. Verizon, for instance, says its 4G-LTE network is 10 times as fast as its 3G predecessor, capable of handling as many as 100 million bits per second of data.¹⁶

Another example of a promising innovation is the approach developed by the mobile broadband company LightSquared, which is developing a new 4G-LTE wireless network on a formerly unused slice of the spectrum on the “L Band”—traditionally used for satellite applications such as GPS. Not only would the LightSquared network significantly expand the nation’s overall broadband capacity, it would do so with previously unused spectrum and through an innovative new technology that integrates both land-based

and satellite-based systems (current networks are either land-based or satellite-based but not both).

The Problem: New Entrants Versus Legacy Users

Innovation can, however, be as disruptive as it is transformational. When new technologies and players come on the scene, there is no question that some existing “legacy” users will face unexpected costs in adapting to the changed environment.

In the case of LightSquared, for example, other users of the satellite “L Band” developed devices that can “bleed over” into adjoining spectrum and receive signals from outside their designated turf (including from spectrum now licensed to LightSquared). In the past, this bleed-over wasn’t an issue because the signals traditionally used by satellite-based systems are relatively weak.

LightSquared’s proposed network, however, integrates its satellite-based system with a much stronger land-based network as well. Thus, when receivers in neighboring frequencies “bleed over,” they now pick up LightSquared’s signals too, resulting in interference.

Fortunately, this problem is eminently solvable with yet another technological fix: the retrofitting of filters on older GPS devices to eliminate the “bleed-over” issue. In combination with other steps LightSquared is taking, the addition of these filters is expected to mitigate interference problems for up to 99% of current GPS devices.

On the other hand, however, these filters are not free. Some of LightSquared’s opponents argue that retrofitting all GPS devices with the right equipment could cost as much as \$400 million (a figure that LightSquared disputes).¹⁷

The Solution: A Spectrum Management Mitigation Fund

The creation of a federal spectrum management mitigation fund can soften the economic consequences to legacy users when a disruptive new technology is introduced. Such a fund would avoid two equally unattractive extremes—on the one hand protecting legacy users at the expense of innovation or on the other hand forcing either legacy users or innovators to shoulder the entire financial burden of adapting to new technologies.

By compensating legacy spectrum holders for the unexpected “costs” of innovation, the fund could help smooth the way for new entrants into the market and help defuse potential opposition from these legacy users.

The creation of a Spectrum Management Mitigation Fund would rightly recognize that the societal benefits of spectrum innovations should be borne more broadly while giving legacy users less incentive to block new technologies.

Such a fund also has precedent. In 2004, Congress passed the Commercial Spectrum Enhancement Act, which created a “Spectrum Relocation Fund” for the purpose of reimbursing federal agencies for the costs of moving to a new piece of the spectrum.¹⁸ While the fund proposed in this memo would have somewhat broader aims, it is conceptually similar to the Spectrum Relocation Fund in its desire to mitigate the specific individual impacts of innovations that will benefit the whole.

And while the creation of the fund could in the near-term help solve the specific dispute between LightSquared and the GPS community, it’s unlikely that the LightSquared/GPS controversy will be the last of its kind. If anything, it is the first. Thus, the fund could provide an ongoing solution for a longer-term problem that will exist for as long as spectrum is scarce.

In broad strokes, here’s what a Spectrum Management Mitigation Fund could look like:

- **Purpose and Administration.** The Spectrum Interference Mitigation Fund would partially compensate legacy spectrum users for any extraordinary expenses they incur (such as retrofitting filters) to mitigate the unintended impacts of new applications that improve overall spectrum efficiency. The fund would be run by the FCC.
- **Financing.** The fund would be financed through a portion of the proceeds received from voluntary “incentive auctions” of unused and underused spectrum. This could take several forms: (1) a slice of the federal government’s share of auction proceeds; or (2) a small additional surcharge to be paid by the buyer or seller (or both) of spectrum at an incentive auction. Minimum financing should be \$500 million a year.
- **Who Benefits.** Monies from the fund would be used to defray the costs and/or economic harm incurred by legacy users as a *direct* consequence of innovations in spectrum efficiency. To receive funds, applicants must: (1) demonstrate direct and substantial economic damage from the operations of a new user; (2) be able to quantify that damage; and (3) show that they did not actually know (nor should they have known) that this damage was likely. Disbursements from the fund could go toward “qualified” purposes such as the research, development and deployment of mitigation technologies. Benefits would be capped at either 50% of mitigation costs or \$20 million per user, whichever is lower.

Conclusion

Regulators should promote innovations in spectrum use that could lead to new and more efficient uses for spectrum, especially as the spectrum becomes more crowded. However, legacy users should not have to bear the entire “cost” of these innovations, particularly those who could not have

legitimately anticipated interference with existing technologies. The creation of a Spectrum Management Mitigation Fund would rightly recognize that the societal benefits of spectrum innovations should be borne more broadly while giving legacy users less incentive to block new technologies.

Moreover, the creation of this fund is a first step toward a longer-term solution aimed at coping with future issues due to other potential new entrants and technological advances.

Finally, financing the fund with revenues from voluntary “incentive” auctions would not only help free up spectrum that is inefficiently allocated, it would make the fund self-financing and cost-effective for the federal government.

The promise of wireless is too significant to ignore, which is why regulators should err on the side of innovation. The creation of the Spectrum Management Mitigation Fund would be one more tool for regulators to nudge the wireless revolution forward.

Endnotes

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