

**TESTIMONY OF**

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**WIRELESS BROADBAND AND THE FUTURE OF SPECTRUM POLICY**

**U.S. SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION**

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Chairman Thune, Ranking Member Nelson and Members of the Committee. My name is Thomas Lenard, and I am president and senior fellow at the Technology Policy Institute, a non-profit, non-partisan think tank that focuses on the economics of innovation, technological change, and related regulation in the United States and around the world. I appreciate the opportunity to testify before you today on wireless broadband and the future of spectrum policy.

The growth of wireless broadband is a bright spot in the U.S. economy, but it depends on the availability of spectrum and in particular flexibly licensed spectrum rights. Freeing up spectrum from other uses would allow greater expansion of wireless broadband, bringing substantial gains for U.S. consumers, businesses, and the federal treasury. A recent study by the Brattle Group, using the Federal Communications Commission’s methodology, estimates that by 2019 the U.S. will need more than 350 additional MHz of licensed spectrum to support projected commercial mobile wireless demand—50 percent more than is currently available.<sup>1</sup>

Despite significant progress toward a more market-based approach to the allocation of spectrum, much of the most valuable spectrum remains unavailable to the private sector or locked into inefficient uses under FCC license terms. The latter group includes allocations to broadcast TV and mobile satellite services (MSS). Even more spectrum is unavailable to the market because it is occupied by the federal government.

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<sup>1</sup> Coleman Bazelon and Giulia McHenry, “Substantial Licensed Spectrum Deficit (2015-2019): Updating the FCC’s Data Demand Projections,” the Brattle Group, prepared for CTIA – the Wireless Association, June 23, 2015.

In the short run, the largest block of available spectrum—indeed, the only significant block of spectrum that is already licensed but not deployed—is the Mobile Satellite Service (MSS) spectrum. Beginning in 1986, the FCC allocated over 150 MHz of prime spectrum to MSS—mobile “satellite phone” service—for which demand has been extremely limited. Because it is already licensed and doesn’t need to be auctioned, the MSS spectrum could be deployed for mobile broadband more quickly than other spectrum blocks. The National Broadband Plan initially counted 90 MHz of MSS spectrum, mostly controlled by Dish and LightSquared, toward its 2015 goal of an additional 300 MHz for wireless broadband; but this estimate has been cut by more than half due to exclusion of the LightSquared spectrum. The failure to utilize the LightSquared spectrum represents a costly regulatory failure. Interference disputes between LightSquared and users of adjacent spectrum are a complex issue, but ultimately the inability to resolve them stems from the absence of a flexibly licensed regime—in essence, the lack of clearly defined quasi-property rights and the absence of a market mechanism for buying and selling those rights. This has made it difficult for the occupants of adjacent bands to strike a mutually beneficial deal that would have enhanced the value of the spectrum and benefited consumers. The FCC should do what is needed to rapidly return as much as possible of the LightSquared spectrum to the spectrum pipeline.<sup>2</sup>

The broadcast TV spectrum is the other major private-sector category that under current FCC license terms can’t be used for wireless broadband. At the conclusion of the DTV transition in 2009, 294 MHz of prime spectrum remained allocated to broadcast TV. The FCC projects the upcoming incentive auction will release 120 MHz of this broadcast spectrum for mobile broadband uses, but many consider this projection optimistic. Moreover, U.S. experience indicates that large-scale reallocations of spectrum such as the proposed incentive auction have taken 6-13 years to complete. Indeed, it has already been five years since the National Broadband Plan proposed the incentive auction and three years since Congress authorized the FCC to do it.

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<sup>2</sup> For a discussion of this issue, see Thomas M. Lenard and Lawrence J. White, “The Spectrum Crunch, MSS Spectrum and LightSquared,” Technology Policy Institute, April 2013; and Thomas Lenard and Lawrence White, “Broadcast Spectrum is not the only Spectrum Available, *The Hill*, July 23, 2013.

Potentially the largest source of additional spectrum is the federal government, which has “sole or primary use of between 60-70 percent of the spectrum suitable for wireless broadband.”<sup>3</sup> My testimony recommends both administrative/budgetary and market mechanisms for freeing spectrum from these bands based on a TPI study I co-authored with Professor Lawrence White of the NYU Stern School of Business.<sup>4</sup>

## **Government Spectrum Use and Opportunity Costs**

There is a widespread consensus that spectrum in government hands is likely not being used efficiently and that some—perhaps a significant amount—could be reallocated to more efficient private uses.<sup>5</sup> However, efforts to determine the extent of this “surplus” and then to devise a method of freeing it from government hands confront a dilemma: the absence of a market mechanism, or even a budgetary mechanism, that could encourage this reallocation.

First, government agencies do not operate in a market context, and their goal is not to maximize profits. Consequently, the “opportunity cost” paradigm that naturally applies in a market-oriented context is often neglected within government agencies.

Second, unlike most of the inputs that are used by a government agency—e.g., personnel, materials, vehicles and equipment, real estate—which are subject to annual budgetary allocations and must be

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<sup>3</sup> CTIA, “From Proposal to Deployment: The History of Spectrum Allocation Timelines,” p. 3, available at <http://www.ctia.org/docs/default-source/default-document-library/072015-spectrum-timelines-white-paper.pdf>.

<sup>4</sup> Much of this testimony is drawn from Thomas M. Lenard, Lawrence J. White, and James L. Riso, “Increasing Spectrum for Broadband: What Are the Options?” Technology Policy Institute, February 2010.

<sup>5</sup> This is implied by the broadly popular Radio Spectrum Inventory Act, which is premised on the ability to “promote the efficient use” of spectrum. In 1996 former Senator Larry Pressler recommended that the federal government reallocate 25% of its holdings below 5 GHz (see <https://www.policyarchive.org/bitstream/handle/10207/8335/bg-1085.pdf>, p. 8). For additional references on why government users might be expected to use spectrum inefficiently see Mark M. Bykowsky and Michael J. Marcus, “Facilitating Spectrum Management Reform via Callable/Interruptible Spectrum,” presented at TPRC 2002, available at <http://intel.si.umich.edu/tprc/papers/2002/147/SpectrumMgmtReform.pdf>; Kenneth R. Carter and J. Scott Marcus, “Improving the Effectiveness and Efficiency of Spectrum Use by the Public Sector: Lessons from Europe,” presented at TPRC 2009, available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1488852](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1488852); and Martin Cave and Adele Morris, “Getting the Best out of Public Sector Spectrum,” presented at TPRC 2005, available at <http://web.si.umich.edu/tprc/papers/2005/497/Morris%20Cave%20public%20sector%20spectrum%209%209%202005.pdf>

purchased in a market, spectrum under a government agency's control was awarded by the Department of Commerce and now is effectively "owned" by those agencies. From a government agency's perspective (i.e., the perspective of the agency's senior management), the spectrum is a free resource, for which it pays no rent or upkeep costs. The perceived opportunity costs of spectrum are small at best, since there is no market for this spectrum because the agencies are not allowed to sell it.

Further, even if there were an active market for government-held spectrum (and hence readily apparent opportunity costs), and even if a government agency were interested in exchanging spectrum for revenues that could be used to achieve agency objectives, the agency could nevertheless be largely indifferent to those opportunity costs for the following reason: If an agency were to sell its spectrum, the agency's net gain might be far smaller than the selling price—or even zero. That result could occur due to budget reallocations that would net out the agency's gain. From an agency's perspective, a better strategy might well be to make some use of the spectrum under its control (even if that use is of low value, as judged by opportunity costs), or even to let the resource lie idle and wait for some future use, since doing so is costless.

As an analogy, one might think of real estate that, at some time in the past, had come under a government agency's ownership and control. If that real estate has little or no upkeep costs, then from the agency's perspective it is a free resource. The opportunity costs of the real estate may be of little interest to the agency, for the budgetary recoupment reasons mentioned above. The agency may put the real estate to low-value uses, or even keep it idle. When challenged by higher governmental authority, an agency's narrow interests will be best served by claiming that the real estate is vital to the agency's current and future functions.

There are limits, of course, to the real estate analogy. As compared with spectrum, the opportunity costs of an agency's real estate holdings are likely to be much clearer. Physical inspection of the property to determine whether the agency is making reasonable use of it (in light of its opportunity costs) is surely easier as well.

Accordingly, the task of determining the extent of surplus spectrum in government hands and reallocating it to wireless broadband use is more difficult than if the resource were real estate. Further, implicit in this discussion is the inability to bring the power of markets as a force for assisting in the reallocation. As a consequence, the effectiveness of market or quasi-market

mechanisms in identifying and freeing up government spectrum might be limited—at least in the short run.

## **Spectrum Sharing**

Spectrum sharing has become the preferred means of freeing up government spectrum. The 2012 report by the President’s Council of Advisors on Science and Technology (PCAST) concluded that “the traditional practice of clearing government-held spectrum of federal users and auctioning it for commercial use is not sustainable” and recommended a policy of “share[ing] underutilized spectrum to the maximum extent consistent with the Federal mission.”<sup>6</sup> But this task is also hindered by the lack of market forces.

Establishing a system in which federal agencies face the opportunity costs of the spectrum they use would greatly facilitate efficient sharing of government spectrum. When faced with the opportunity costs, the government user may decide to make investments or otherwise alter the way it uses the spectrum so as to increase spectrum availability and/or permit less restrictive conditions for private-sector users. This increases the combined social value (to government and private users) of the spectrum. Thus, it is important that federal users internalize the costs of their spectrum use.

For government agencies that have only an occasional need for spectrum—e.g., for emergencies—consideration should be given to purchasing an "option" to over-ride/displace some private spectrum users at such times (rather than owning the spectrum and letting it sit idle or severely underused most of the time). This would be an innovative way of “sharing” spectrum. The government agency could hold a procurement auction. Potential sellers of this (call) option for "when needed" spectrum would presumably be those who could economize or dispense with their spectrum usage during such emergency periods (rather than, for example, wireless broadband providers whose networks likely would also be severely stressed during such emergencies).

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<sup>6</sup> “Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth,” President’s Council of Advisors on Science and Technology, July 2012.

## **Administrative/Budgetary Mechanisms**

Strengthening administrative and budgetary mechanisms holds the greatest promise for freeing up government-held spectrum for the short run and would complement the market mechanism discussed subsequently. I recommend the following:

1. The National Telecommunications and Information Administration (NTIA) should prepare an annual report that presents data on the government's spectrum inventory, the opportunity costs of the various bands, and the likely sources of surplus spectrum. The data on surplus positions should take into account changes in usage and technology.
2. The Office of Management and Budget (OMB), as part of its annual budget process, should require any U.S. government agency that has a spectrum allocation to provide an annual accounting of that agency's use of that spectrum.<sup>7</sup> OMB should have a heightened awareness of spectrum as a scarce resource (the NTIA estimations of opportunity costs would help in this awareness) and should routinely search for under-utilized spectrum that could be auctioned by the FCC.<sup>8</sup> In essence, OMB should become a skeptical auditor of government-held spectrum, its use, and its opportunity costs.
3. OMB should encourage (and provide the funding for) agencies to create employee incentive plans that would provide rewards (including cash awards) to agency employees for devising ways for their agency to economize on its use of spectrum. The spirit of these awards would be consistent with other government awards that encourage employees to take special efforts to utilize resources efficiently and to provide outstanding performance.

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<sup>7</sup> A partial step in this direction is included in OMB Circular A-11, which provides guidance on the preparation of the budget. Section 31.12 instructs agencies to consider the value of radio spectrum required for telecommunications, radars, and related systems, to the extent practical, in economic analyses of alternative systems/solutions. [https://www.whitehouse.gov/sites/default/files/omb/assets/a11\\_current\\_year/s31.pdf](https://www.whitehouse.gov/sites/default/files/omb/assets/a11_current_year/s31.pdf)

<sup>8</sup> OMB should also be encouraging agencies to share the use of under-utilized spectrum, again encouraging greater efficiency.

## **Market Mechanisms: A Government Spectrum Ownership Corporation (GSOC)**

Over the longer run, the Federal government should pursue incentive pricing mechanisms that force government agencies to internalize the costs of the spectrum they use.

One model to consider is based on the market-oriented rental rates that agencies are charged when they lease space in buildings that are owned (or leased) by the General Services Administration (GSA). The GSA's Federal Buildings Fund (FBF) provides recognition of the opportunity costs of those buildings.<sup>9</sup> The government agencies make rental payments to GSA, which can use the money to acquire additional property if necessary. These rental payments provide an incentive for government agencies to economize on space.

Suppose, then, that all U.S. government-used spectrum was “owned” by a central government agency and leased to government users. In this case, the idea that the spectrum-using agencies should pay rental fees to the central agency—and that those rental fees should represent something approximating the opportunity costs of the spectrum holdings—would not be much different from the practice that government agencies pay rent for their use of the GSA's buildings.

Accordingly, the federal government should create a “Government Spectrum Ownership Corporation,” or GSOC. The GSOC would take possession of all government-held spectrum, with the existing user agencies granted annual leases (that are perpetually renewable at the option of the agency) at annual rental rates that are determined by the GSOC, based on its estimates of the relevant opportunity costs. The GSOC would forward its net proceeds to the Treasury. In the first year OMB would add to each using agency's budget a sum that is just equal to the rental payment, so the first year's financial transactions would be a “wash” for all agencies (and for the Treasury).

In subsequent years the agencies' budgets would start from the base that included the initial assignments and rental charges; but the GSOC would change the rental rates in light of updated information about opportunity costs. The agencies and OMB would then negotiate (as they do now) over resource usage and budget allocations; but, although the agency's budget would take into account its spectrum rental costs, there need not (and should not) be a one-to-one adjustment in an agency's budget allocation in relation to any changes in its spectrum rental costs. Instead, the

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<sup>9</sup> As another analogy, government agencies pay postal rates to the U.S. Postal Service (USPS) when the agencies make hard-copy mailings through the USPS.

agency's budget allocation should reflect its overall resource needs in light of its overall mission and operations. Thus, this "normal" budgetary negotiation process would recognize the opportunity costs of spectrum in the same ways that the opportunity costs of an agency's use of other resources are recognized.

The goal would be that such a system would (like the GSA framework) provide sensible incentives for agencies to economize on spectrum use. The GSOC might then have a surplus of spectrum that it could sell or lease to the private sector (or turn over to the FCC for auctions). The GSOC could also accumulate a fund (again, similar to GSA) that could be used to purchase additional spectrum if needed for leasing to government agencies.

### **Conclusion**

There is a significant opportunity for large economic gains for the U.S. economy from expanding wireless broadband by freeing up under-used government spectrum and reallocating broadcast and MSS spectrum. Public policy should take advantage of that opportunity.

Thank you for the opportunity to present my views and I look forward to answering your questions.