



*The Committee on Energy and Commerce*

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**Memorandum**

September 11, 2012

To: Members and Staff, Subcommittee on Communications and Technology

From: Majority Committee Staff

Subject: Hearing on Federal Spectrum Use

The Subcommittee will hold a hearing Thursday, September 13, 2012, at 10:15 a.m. in 2123 Rayburn House Office Building entitled, "Creating Opportunities through Improved Government Spectrum Efficiency." One panel of witnesses will testify:

Mr. Mark Goldstein  
Director, Physical Infrastructure Issues  
Government Accountability Office (GAO)

Preston Marshall, Ph.D.  
Deputy Director, Information Sciences Institute  
University of Southern California  
*on behalf of* the President's Council of Advisors on Science and Technology

Mr. Karl Nebbia  
Associate Administrator, Office of Spectrum Management  
National Telecommunications and Information Administration (NTIA)

Mr. Mark Racek  
Director, Spectrum Policy  
Ericsson Inc.

Mr. Steve Sharkey  
Director, Federal Regulatory Affairs and Chief, Engineering and Technology Policy  
T-Mobile USA, Inc.

Mr. Doug Smith  
President and CEO  
Oceus Networks

Maj. Gen. Robert Wheeler  
Deputy Chief Information Officer for Command, Control, Communications and Computers (C4)  
and Information Infrastructure (DCIO for C4IIC)  
U.S. Department of Defense

## **I. Overview**

Meeting the spiraling demand for mobile broadband services will require auctioning additional spectrum to wireless carriers. That is why this subcommittee worked to authorize incentive auctions in which the Federal Communications Commission (FCC) shares proceeds with commercial licensees that return spectrum to be auctioned for wireless services. But the Federal government, the single largest user of spectrum, should play its part, too. Using spectrum more efficiently and with modernized equipment could help Federal agencies better fulfill their objectives while freeing spectrum for broadband services. That approach made 90 MHz of spectrum available for the 2006 Advanced Wireless Services (AWS-1) auction and produced more than \$13.7 billion in auction proceeds.

Yet rather than focusing on repeating that success, recent reports by the National Telecommunications and Information Administration (NTIA) and the President's Council of Advisors on Science and Technology (PCAST) pivot toward sharing spectrum between Federal and commercial users. To support its case, the NTIA claims that clearing additional spectrum currently used by Federal agencies would cost more than \$18 billion and take 10 years. The NTIA has conceded, however, that it conducted no independent analysis to reach those estimates, but merely aggregated estimates by the Federal agencies using the spectrum. Initial agency estimates proved overinflated in the AWS-1 experience. And conversations in the Commerce Spectrum Management Advisory Committee have already indicated that agencies may have based these initial estimates on inaccurate assumptions. While the subcommittee welcomes the PCAST report to the extent that it explores additional options, sharing spectrum in the way it envisions is less useful than clearing spectrum and too untested to be the focus of the subcommittee's spectrum strategy. Such sharing should be reserved for cases in which Federal clearing is impossible.

## **II. Background**

The two primary approaches for making spectrum used by Federal agencies available to the private sector are reallocation and sharing.

In the past, Federal users have relocated to other bands to make more spectrum available for auction to the private sector. To facilitate such clearing, the 2004 Commercial Spectrum Enhancement Act (CSEA) authorizes the FCC to hold contingent auctions of spectrum used by Federal agencies. If the proceeds of the auction exceed the cost of relocating the Federal agencies, the winning bidders receive licenses for the spectrum and the Federal agencies receive funding to relocate. This approach led to the AWS-1 auction of spectrum from 1710-1755 MHz used by Federal agencies, paired with spectrum from 2110-2155 MHz. Building on the experiences of the AWS-1 auction, Congress amended the CSEA in the Middle Class Tax Relief and Job Creation Act of 2012 to make clearing even smoother by allowing agencies to use some of the funding for advance planning and system upgrades.

An alternative to clearing Federal users is to allow commercial users to share the spectrum the Federal users occupy, so long as they can do so in a way that does not interfere with the Federal use. There are many types of sharing. In geographic sharing, multiple entities use the

same band of frequencies in different locations. For example, two different broadcasters can use channel 7 in New York and channel 7 in Los Angeles because their service areas do not overlap and they won't cause interference to one another. In temporal sharing, multiple entities use the same band of frequencies at different times. Again using a broadcast analogy, some AM radio stations sign off the air during part of the day so other stations can boost their transmitter power. In dynamic or cognitive sharing, an entity checks to see if anyone is using a band of frequencies, starts when everyone else has stopped, and stops again when others start. This type of sharing is much more complex and can encompass many different technologies, including "dynamic frequency selection" (which is a part of the Wi-Fi standard), accessing spectrum through a database of available frequencies (which is a part of the television white spaces model), and spectrum sensing, in which devices "listen" to see if certain frequencies are in use (which was rejected in the white spaces model because of technical challenges).

Based on the assumption that additional Federal clearing would be too difficult, cost too much, and take too long, the PCAST released a paper in July 2012 that emphasizes dynamic and cognitive sharing over clearing. Federal users would remain where they are and a database would keep track of governmental spectrum uses. Potential commercial or unlicensed users could then query the database and gain access to the spectrum when they can do so in a way that does not interfere with the Federal use. Any compatible device could seek to operate on the spectrum on an unlicensed basis or a user could pay for exclusive access to the spectrum for a period of time. The government would pre-empt any commercial use when it needs exclusive use of the spectrum.

To help determine the feasibility of various types of sharing in the context of specific spectrum and real-world services, T-Mobile sought special temporary authority in May 2012 from the FCC to test the use of commercial wireless technology in the 1755-1780 MHz band. The 1755-1780 MHz band has long been sought after by the commercial wireless industry for reallocation because it is immediately adjacent to existing wireless spectrum and because that spectrum is used around the world for commercial wireless operations, creating economies of scale. The FCC granted T-Mobile's request in August, which will allow it and other members of the wireless industry to test how best to accommodate commercial wireless users in the 1755-1780 MHz band.

This band of frequencies, however, is one small piece of the government's spectrum use. To get a better understanding of the scope of government spectrum holdings, Members on subcommittee's working group on Federal spectrum use sent a letter to the NTIA in July 2012 seeking a detailed listing of government spectrum holdings. The NTIA has begun providing responses to the questions asked, including the spectrum holdings in specific frequencies broken down by Federal agency. The first response from NTIA provides critical information on the scale and scope of Federal use and committee staff continues to work with NTIA to gather the remainder of the information requested by the working group.

### **III. Discussion**

Auction participants bidding on spectrum to be cleared have the certainty of knowing that if they submit a winning bid and the aggregate auction proceeds exceed the clearing costs, they

will have the exclusive use of the spectrum. Consequently, they have an incentive to pay more and to invest in network and equipment resources to use the spectrum. The PCAST report largely based its push for sharing of spectrum over clearing based on the assumption that it will be too costly to clear additional spectrum of Federal users. It rooted that claim, however, on a report by the NTIA alleging that the clearing and reallocation of spectrum in the 1755-1850 MHz band will take ten years and cost more than \$18 billion. The NTIA, however, engaged in no independent analysis to reach that conclusion. Rather, it merely aggregated the estimates of the Federal agencies currently using the spectrum. Neither the NTIA nor the PCAST report fully investigated the agencies' relocation estimates, whether the agencies need all the spectrum they have, or whether they could get by with less if they had more efficient equipment or relied more on commercial services. Market forces compel commercial providers to become more efficient. Federal agencies are not subject to such forces and have less incentive to contain costs. The CSEA provides a counterbalancing mechanism to account for that fact.

The database technology that the PCAST report bases its proposal on is also largely untested, and completely untested at the scale PCAST envisions. Moreover, the PCAST report fails to address the economic feasibility of its proposal. Carriers are unlikely to pay as much for spectrum without the certainty that they can use all of the spectrum they pay for, when and how they need it. The proposal is therefore unlikely to raise as much money as clearing would, and might not even raise enough money to offset the costs that Federal users would incur to enable the sharing. Carriers and manufacturers, already forced to make tough engineering and economic decisions in deciding which spectrum bands to support in their wireless devices, are also unlikely to add support for a band where access may or may not be available because of government use. The PCAST report also assumes commercial providers will pay for spectrum licenses and the networks needed to make use of the spectrum in bands where their right to access the spectrum is somewhere greater than those of unlicensed users in the same band but subordinate to Federal users. Carriers are less likely to pay for access to spectrum if that same spectrum is available free for unlicensed uses. Carriers are also less likely to pay for spectrum if their use is subject to Federal pre-emption. Indeed, the FCC assumed that carriers would bid on the D-block in the 2007 700 MHz auction even though their rights would be subordinate to local public safety users. That assumption proved false, and the D-block failed to sell.

None of this is to say that sharing should not be explored. For the time being, however, the PCAST approach is too speculative to be the focus of the Committee's spectrum strategy. It should be reserved for cases where attempts to clear fail, where clearing is impossible, or where there is greater certainty that the costs of clearing will exceed the value of the spectrum. More efforts should be directed toward working with Federal agencies to determine how to clear spectrum in ways that not only works for governmental users, but helps improve their capabilities.