

**Testimony of
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National Telecommunications and Information Administration
United States Department of Commerce
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Committee on Energy and Commerce
Subcommittee on Communications and Technology
United States House of Representatives
Federal Government Spectrum Use
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I. Introduction

Chairman Walden, Ranking Member Eshoo, Vice Chairman Terry, and Members of the Subcommittee, thank you for the opportunity to testify on behalf of the National Telecommunications and Information Administration (NTIA) regarding the Federal Government's use of the radio spectrum. I am very pleased to describe NTIA's efforts to maximize the efficient and effective Federal use of spectrum and our work to identify and reallocate spectrum to meet the Nation's rapidly-growing demand for wireless broadband.

II. President's Wireless Innovation and Infrastructure Initiative

Beginning with his June 2010 Executive Order, and more recently in the Wireless Innovation and Infrastructure Initiative (also known as the National Wireless Initiative) announced in February of this year, President Obama has set forth a bold vision for spurring innovation, expanding economic growth and job creation, and preserving America's global technology leadership, by doubling over the next ten years the amount of spectrum available for commercial wireless broadband.

With increased access to broadband, businesses will grow faster and create more jobs, students of all ages will have greater access to education and job training, and public safety officials nationwide will finally have access to state-of-the-art, secure, interoperable mobile communications. The end products of the President's National Wireless Initiative promise to help grow the economy in several ways. First, valuable spectrum that is currently underutilized will be freed up through voluntary incentive auctions. Second, and perhaps most importantly, a decade after the attacks of September 11th, our nation's first responders and other public safety service providers finally will have access to the modern communications system they need to help keep us all safe and secure. Finally, the President's initiative also will yield important benefits for American taxpayers by reducing the deficit.

The National Wireless Initiative leverages the rollout of next generation, "4G" wireless technology that is now being deployed in the United States by several carriers, and that promises considerable benefits to virtually every corner of our economy and society. As much as 10 times faster than current high speed wireless services, 4G wireless technology will spur innovation in new and improved information devices such as smartphones, tablets and laptops, which in turn will spur increased economic growth and job creation in areas such wireless services, equipment and application. It will put cutting-edge broadband-driven capabilities – such as instantly downloading the floorplan of a burning building – into the hands of police, firefighters and other first responders, allowing them to more quickly and accurately assess and respond to emergency situations. By catalyzing private investment and innovation and reducing the deficit, this initiative will help the United States – its businesses, its students, its entrepreneurs and all its citizens -- win the future and better compete in the 21st century economy.

III. NTIA Efforts to Identify 500 MHz of Additional Spectrum for Broadband Use

A critical component of the National Wireless Initiative is the President's directive to NTIA to collaborate with the Federal Communications Commission (FCC) to identify and make available an additional 500 megahertz (MHz) of spectrum, currently used by commercial and/or Federal users, for fixed and mobile broadband use over the next 10 years. Pursuant to that directive, NTIA delivered to the White House, within three months, a plan and timetable for performing this work.

The Ten-Year Plan and Timetable, developed with input from other Federal agencies and the Federal Communications Commission, identifies over 2,200 MHz of spectrum for evaluation, establishes a process for evaluating these candidate bands, and lays out the steps necessary to potentially make the selected spectrum available for wireless broadband services.

At the same time, NTIA also undertook a "fast-track" review to identify reallocation opportunities that exist in the next five years in order to make an early down payment toward that overall goal. NTIA recommended in the Fast Track Evaluation report that 115 MHz of spectrum be reallocated for commercial broadband use within five years. In reaching this conclusion, NTIA examined four spectrum bands: (1) 1675-1710 MHz, (2) 1755-1780 MHz, (3) 3500-3650 MHz, and (4) 4200-4220 MHz and 4380-4400 MHz. The report recommends that various portions of these bands totaling 115 MHz be made available for wireless broadband use within five years, contingent upon the allocation to Federal agencies of resources for necessary relocation activities. Specifically, NTIA recommended sharing 1695-1710 MHz, currently used for satellite-based weather observations, and dissemination of severe weather information and alerts via satellites operated by the Department of Commerce's National Oceanic and Atmospheric Administration, and reallocating 3550-3650 MHz, which commercial carriers would share with Department of Defense radar systems that operate primarily on ships. NTIA recommended geographic limitations on the commercial availability of these bands to prevent harmful interference to Federal Government facilities in the 1695-1710 MHz band and to the proposed commercial services in the 3550-3650 MHz band. In January of this year, NTIA formally proposed that the FCC reallocate these bands.

NTIA is currently conducting a detailed evaluation of the 1755-1850 MHz band to determine if any of that band can be reallocated for commercial service. NTIA chose this spectrum based on several key considerations, including: (1) the technical characteristics of this spectrum band that make it especially well-suited for mobile broadband communications; (2) the nature of current Federal agency use of the spectrum; (3) the likelihood of successfully repurposing operations located in the band within 10 years; (4) the international harmonization with mobile operations; and (5) the existence of mature wireless technologies to support Federal operations in other bands. NTIA and the other Federal agencies have been hard at work conducting technical analyses on 1755-1850 MHz and comparable spectrum bands and plan to complete the detailed evaluation of this band by September 30, 2011. Upon completion of this review, NTIA will continue to identify and evaluate additional candidate bands for repurposing consistent with the Plan and Timetable, and in so doing fulfill the spectrum goals outlined by President Obama.

IV. Maximizing the Efficient Use of Federal Spectrum

In addition to identifying additional spectrum for repurposing for wireless broadband use, NTIA is intently focused on ensuring, to the greatest extent possible, that Federal agencies use and share spectrum efficiently and effectively, while protecting critical Federal government operations. To do so, NTIA concurrently:

- manages frequency assignment and coordination;
- leads and manages the Interdepartment Radio Advisory Committee (IRAC), which is comprised of representatives from 19 Federal agencies that provide advice to NTIA on spectrum policy matters;
- reviews and certifies spectrum support for new systems;
- coordinates satellite operations;
- conducts border coordination and international negotiation;
- coordinates strategic planning; and
- performs spectrum engineering and analysis.

Let me now describe in more detail how these efforts allow us to maximize efficiency of use among Federal users, and some of the challenges we face in the pursuit of that efficiency.

a. The Variety and Complexity of Agency Spectrum Needs

Federal agencies utilize spectrum for myriad purposes, including national defense, law enforcement, emergency relief, scientific research, weather data analysis, space, and maritime and air traffic control. More than 60 Federal agencies receive spectrum assignments from NTIA. Given the diversity of purposes, NTIA must rely on the Federal agency spectrum managers within the IRAC to evaluate their spectrum needs and request appropriate frequency assignments. NTIA does not possess the expertise in the multitude of agency

missions to direct how agencies should utilize spectrum to meet their needs, whether it is pursuing terrorists, exploring outer space, or managing air traffic.

Moreover, given the many different uses of spectrum by Federal agencies, it is much more difficult to achieve efficiencies as compared to commercial systems. Generally, any particular commercial band is devoted to a uniform set of commercial users providing like services using comparable systems and technology. This general uniformity among commercial spectrum users makes it easier to design and implement efficiency enhancements. Furthermore, each of these users usually has exclusive control over the frequencies and geography under its licenses.

The Federal Government, on the other hand, often operates a variety of systems within a specific band that may have little in common from a technological perspective. A single Federal band, for example, could include operations as diverse and technologically unrelated as high-power radars, unmanned aerial vehicles (also known as "drones"), and terrestrial surveillance used by law enforcement. Operation of any type of commercial facility within such a complex and technologically variegated environment is simply not a viable option. Nonetheless, NTIA and the agencies make these shared Federal operations work. Notwithstanding the challenges of coordination among agencies, NTIA typically processes frequency assignments via the IRAC in nine days in order to ensure that agency mission-critical operations continue without disruption or interference.

b. The Widespread Practice of Sharing Spectrum Among Multiple Agencies and Operations

Within exclusive Federal bands, agencies work to improve efficiency by sharing spectrum with each other based on geographic and time restrictions. NTIA seeks to limit agencies to using spectrum only at the times and/or in the locations they need it, freeing up that same spectrum for use by other agencies at different times and places. Commercial spectrum is rarely used in a similar manner. Instead, commercial spectrum is often allocated in large geographic blocks to a single entity for a single purpose at all times. While this approach may make sense in a commercial context, Federal users achieve greater efficiencies by sharing spectrum bands with each other, meaning any individual band may be put to different uses by different agencies at different times of the day and/or in different geographic regions.

For example, the 1755-1850 MHz band alone supports the following uses, each with its own unique systems:

- satellite and unmanned drone command and control;
- air combat training;
- undercover surveillance;
- explosive disposal robotics;
- telemetry; and
- military tactical communications.

Squeezing an array of diverse agencies and systems into a single band makes for more efficient use of the spectrum, but it complicates the possible re-allocation of that spectrum. Federal operations often use custom technology that does not operate in other bands, which can impede easy relocation of that operation. Further, the unique needs of Federal users — whether with respect to radars or military tactical communications or scientific research — often means that needs cannot be simply met by using commercial services. As a result, accommodating all these users in order to re-allocate a single band can present an extremely complex and time-consuming challenge. For example, if it is determined that this band can be made available, relocating Federal users from all or part of the 1755-1780 MHz band may take anywhere from a few years to more than 10 years, depending on the complexity and cost of Federal equipment currently in use. In addition, particularly in the case of satellite systems, it is possible that the federal government may need to maintain some geographic exclusion zones for longer than ten years. Furthermore, for some operations, government users have different requirements than the majority of commercial or state/local users, which causes some government operations to have significantly higher equipment replacement costs than commercial users which benefit from broader economies of scale. For example, the per device cost for thousands of specialized federal law enforcement users will be higher than the per device costs for the many millions of wireless subscribers on commercial networks.

NTIA is committed to developing and improving new and innovative spectrum sharing capabilities to further our mission of increasing the efficiency of Federal spectrum use. To carry through on this commitment,

NTIA, in coordination with the FCC and other Federal agencies, established a Spectrum Sharing Innovation Test-Bed pilot program to enhance the sharing of spectrum between Federal and non-Federal users. Managed by our engineers and staff in both Washington, D.C. and Boulder, Colorado, this initiative engages private sector companies to identify and test technologies that we expect will pave the way for environment-sensing technologies that enable both Federal and non-Federal users to share spectrum in an even more efficient and effective manner.

c. The Costs Associated With Federal Relocation, Especially Upfront Planning Expenses.

The Spectrum Relocation Fund of the Commercial Spectrum Enhancement Act (CSEA) provides a solid foundation for promoting more efficient use through reallocation of spectrum from Federal to commercial use. This Committee, and Chairman Upton in particular, deserve credit for forward-thinking leadership in that legislation. Based on our experience to date, however, the CSEA can be improved to support timely and cost effective relocation. Specifically, the Fund should reimburse the costs associated with agencies' up-front planning for relocation – costs that currently are not covered under the CSEA. To address this concern, NTIA has recommended that Congress update the CSEA to support agencies up-front planning costs. NTIA believes that it would be penny-wise but pound foolish to withhold from agencies the funding they need to maximize their efficient use of spectrum. We are encouraged that legislation recently reported by the Senate Committee on Commerce, Science, and Transportation makes important strides in better accommodating the costs of relocating Federal users.

d. The Need to Avoid Stranded Public Investments

In evaluating the costs and benefits of possible reallocation of Federally assigned spectrum, NTIA also must consider the risk of stranding an agency's investment in systems and hardware – such as satellite systems (many of which have been designed and built to last for as long as 20 to 25 years), transmitters, and receivers – that could be abandoned and replaced years or even decades before the end of their useful lives if the agency re-locates all systems to another band. These are systems that the taxpayers have funded and which achieve the important missions that the Administration and Congress are requiring agencies to perform. Abandoning the taxpayers' investment in one band simply to replicate that operation – and that investment – in another band, may not be an effective and efficient use of public funds. We must take such costs into account when considering the relocation of Federal users.

e. The Need to Maximize International Harmonization of Spectrum Use

In assigning spectrum frequencies, NTIA seeks to maximize the international harmonization of spectrum. While this limits flexibility in assignments, it also increases efficiency by, among other things, increasing economies of scale for the production of hardware. However, because most other countries do not allocate as much spectrum exclusively to defense as the U.S., international harmonization has the effect of limiting current defense allocations.

f. Best Practices

Spectrum managers historically have preferred an environment where diverse systems maintain a good amount of separation in terms of both frequency and location. More and more, however, the introduction of new wireless technologies and services – and the consequent increased demand for spectrum for those technologies – requires placing technologies in closer proximity to one another. For example, NTIA and the FCC currently allow systems to operate up against the band edge next to their spectral neighbors instead of applying buffer zones, which are known as "guard bands." While new innovations in cognitive radio technologies promise to enable and mitigate interference among multiple communications services that are more tightly packed on a spectrum band, these situations present significant and novel challenges to spectrum managers.

To address this issue, NTIA is developing a Best Practices Handbook for Federal spectrum managers to help them evaluate the potential interference from emerging technologies and thereby improve the efficiency of Federal spectrum use. The Handbook will include a compilation of accepted technical standards, interference protection criteria, unwanted emission limits, and other tools. NTIA is considering releasing modules of the

Handbook as they become available, with the completed product likely to become available within the next few years.

V. Government Accountability Office Report

On May 12, 2011, the Government Accountability Office (GAO) issued a report entitled Spectrum Management: NTIA Planning and Processes Need Strengthening to Promote the Efficient Use of Spectrum by Federal Agencies. In the report, the GAO examined the extent to which NTIA's spectrum management oversight and policy activities address government-wide spectrum needs, how Federal agencies are using assigned spectrum, and what steps NTIA and the Federal agencies have taken to repurpose spectrum for broadband.

The GAO report provides a useful perspective on NTIA's critical role as the spectrum manager for Federal users and offered three specific recommendations to NTIA to facilitate the government-wide management of Federal spectrum use. I am pleased to report to the Committee on how NTIA is implementing these recommendations.

First, to ensure that NTIA's previous efforts to develop a Federal strategic plan are not diminished, the GAO recommended that NTIA develop an updated plan. As the Committee may be aware, NTIA, through the IRAC, assesses future Federal spectrum needs on a continuing basis. The Presidential Memorandum of June 28, 2010, and the Wireless Innovation Initiative provide significant strategic direction for NTIA and the other Federal agencies which are fully occupying our resources for conducting such planning efforts. As the Committee may be aware, NTIA, through the IRAC, assesses future Federal spectrum needs on a continuing basis.

Second, to help ensure Federal agencies are managing current and future spectrum assignments efficiently, GAO recommended that NTIA, in consultation with the IRAC, examine the five-year assignment review processes and consider best practices to determine if the current approach for collecting and validating data from Federal agencies can be streamlined or improved. NTIA concurs with this recommendation and, in conjunction with the IRAC, is currently reviewing the recommendations concerning the five-year review process and internal controls for management oversight of the accuracy and completeness of agency data. NTIA has proposed approaches to the IRAC to implement new measures such as identification of an agency point-of-contact who, for each five-year review, will submit an attestation regarding the currency and accuracy of the information and the need for the ongoing use of the associated systems. Based on feedback from the Federal agencies, NTIA expects to start implementing some of these proposals by the end of the fiscal year.

Third and finally, to provide the assurance that accurate and reliable data on Federal spectrum use are collected, GAO recommended that NTIA take interim steps to establish internal controls for management oversight of the accuracy and completeness of currently reported agency data. Specifically, GAO suggests NTIA, in developing the new Federal Spectrum Management System (FSMS), incorporate adequate internal controls for validating the accuracy of agency-reported information submitted during the assignment, certification, and frequency assignment review processes. NTIA concurs with this recommendation and is taking steps to implement these internal controls in a cost efficient manner. As we informed the GAO, the migration of the FSMS to enhance NTIA's operational and planning capabilities is a multi-year effort that will not provide full operational capability before October 2015. NTIA is working with the Federal agencies to determine what other new processes could be implemented in advance of the FSMS completion that would lead to more accurate and reliable data, including, as noted above, the establishment of procedures for agency attestation of submitted data. Furthermore, as part of this effort, NTIA is evaluating computer checks that will assist in validating data submitted to the IRAC. We have also sought input from the Commerce Spectrum Management Advisory Committee, so that we can better understand how these data issues are managed in the private sector.

VI. Spectrum Legislation

The Administration believes that Congress can take steps to promote economic growth by supporting the efforts of NTIA, the FCC, and other Federal agencies to identify spectrum for wireless broadband, and by providing modern, efficient and interoperable communications capabilities for the nation's first responders. Specifically, consistent with the President's National Wireless Initiative, the Administration urges Congress to

adopt proposals to improve the process for reassigning spectrum encumbered by Federal users to private use, grant authority for the FCC to hold incentive auctions, create governance structures and channel auction proceeds to manage the deployment and operation of a nationwide interoperable public safety broadband network, and spur innovation in wireless services by both providing for unlicensed access to wireless spectrum and funding critical research and development. Importantly, it is critical that any spectrum reallocation legislation be feasible to implement and consistent with ongoing interagency work to find the most efficient and effective uses of our national spectrum resources. In particular, statutory requirements to reallocate specific bands must incorporate sufficient flexibility to permit the Administration to conduct appropriate feasibility assessments and develop repurposing options that best meet the goals of promoting economic growth and allowing Federal agencies to continue critical missions.

Legislation that accomplishes the goals of improving spectrum management, providing a modern communications for the nation's first responders, while at the same time providing for considerable deficit reduction, is a compelling policy opportunity we must pursue to win the future and live within our means. NTIA looks forward to working with the Committee as it crafts legislation.

Thank you for the opportunity to testify, and I am happy to answer your questions.

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