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EQUIPPING CARRIERS AND AGENCIES IN THE WIRELESS ERA

HEARING

BEFORE THE

SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY

OF THE

COMMITTEE ON ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

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EQUIPPING CARRIERS AND AGENCIES IN THE WIRELESS ERA

THURSDAY, JUNE 27, 2013

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:35 a.m., in room 2322 of the Rayburn House Office Building, Hon. Greg Walden (chairman of the subcommittee) presiding.

Members present: Representatives Walden, Latta, Shimkus, Blackburn, Scalise, Lance, Guthrie, Gardner, Kinzinger, Long, Ellmers, Barton, Upton (ex officio), Eshoo, Doyle, Matsui, Braley, Lujan, Dingell, Rush, DeGette, Matheson, and Waxman (ex officio).

Staff present: Gary Andres, Staff Director; Ray Baum, Senior Policy Advisor/Director of Coalitions; Sean Bonyun, Communications Director; Andy Duberstein, Deputy Press Secretary; Neil Fried, Chief Counsel, Communications and Technology; Kelsey Guyselman, Counsel, Telecom; David Redl, Counsel, Telecom; Charlotte Savercool, Executive Assistant, Legislative Clerk; Shawn Chang, Democratic Senior Counsel; Patrick Donovan, Democratic FCC Detailee; Margaret McCarthy, Democratic Staff; Roger Sherman, Democratic Chief Counsel; and Kara Van Stralen, Democratic Policy Analyst.

OPENING STATEMENT OF HON. GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. I am going to call to order the Subcommittee on Communications and Technology, and our hearing on "Equipping Carriers and Agencies in the Wireless Era." I want to thank our witnesses for being here this morning as we examine ways to ensure our federal agencies and world leading wireless industry have the tools they need in the wireless era.

I am convinced we can upgrade the federal system while freeing spectrum, thereby promoting both our Nation's safety and our economic well-being. Last year, Congress passed the Middle Class Tax Relief and Jobs Creation Act, including the commercial incentive auction provisions that were the fruits of this subcommittee's bipartisan labor. Such auctions can help make spectrum available to meet the growing demand for mobile broadband services, provided the FCC gets the auction and band plans right. We cannot afford to rest on our laurels, however. That is why last Congress Ranking Member Eshoo and I created a working group led by Representatives Guthrie and Matsui that focused on federal spectrum use.

Building on the knowledge gained by the working group, today we look at the tools available to maintain and even improve federal agencies' capabilities while freeing spectrum for commercial use.

How much would various approaches cost, how much might they raise, and how long would it take them to implement? What progress is being made today? What steps might Congress, agencies, and the private sector take to facilitate the process? One way we can create additional spectrum is through use of the Commercial Spectrum Enhancement Act. Under CSEA, commercial providers bear the cost of moving incumbents to clear spectrum. This approach has been successful in the past, but is not without limitations.

Might the principles underlying commercial incentive auctions be applicable here? As we look at the budgetary pressures facing the country, is there a way to somehow share with federal agencies some of the value generated from spectrum that they relinquish? Our agencies are facing a shortage of funding. The U.S. wireless industry is facing a shortage of spectrum. If we work together to harness the strengths and assets of our agencies and the private sector, we can meet the needs of government, we can advance our leadership in the mobile wireless world, and we can create jobs in the process.

Our bipartisan staff, by the way, has spoken with the FCC to express our desire to see a proceeding opened on 1.6 gigahertz and 1755 to 1780 megahertz bands identified in the testimony today. We look forward to expeditious action on these bands. The time has come to take action to bring them to market.

I thank the witnesses and look forward to their counsel, and with that, I would recognize the vice chair of the subcommittee, Mr. Latta, for any comments he might have.

[The prepared statement of Mr. Walden follows:]

OPENING STATEMENT OF THE HONORABLE GREG WALDEN

I welcome our witnesses as we examine ways to ensure our federal agencies and world-leading wireless industry has the tools they need in the wireless era. I'm convinced we can upgrade federal systems while freeing spectrum, thereby promoting both our nation's safety and economic well-being.

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and assets of our agencies and the private sector we can meet the needs of government, advance our leadership in the mobile wireless world, and create jobs in the process. I thank the witnesses for their testimony and look forward to their counsel.

# # #

Mr. LATTA. Well thank you, Mr. Chairman, and I appreciate you holding this very important hearing today on federal spectrum.

As we continue to see the demand for mobile broadband skyrocket, the Nation's spectrum policy is one area that we must get right. The spectrum crunch is an undeniable fact, and in order for the United States to continue to lead the wireless world, we must get closer to the national broadband plan's goal of making 300 megahertz available by 2015.

Similar to approaching our Nation's energy challenge, we must take an all-of-the-above approach to spectrum. This includes looking at our vast federal holdings of spectrum and discussing solutions for ways to clear that spectrum for commercial use, particularly as the chairman said, the 1755 to 1780 megahertz band.

I appreciate the witnesses being here today and I look forward to hearing from them, and Mr. Chairman, I yield back my time to you.

Mr. WALDEN. Anyone else on the Republican side seeking the last minute and 24 seconds? The vice chair of the full committee, Ms. Blackburn.

Mrs. BLACKBURN. Thank you, Mr. Chairman. When it comes to transparency and efficiency, as you said, this also gets to what we are trying to do with spectrum, and I think that when we look at the spectrum issue and the FCC, it is time to stop studying the issue and start delivering for the American people. As one of my constituents said last weekend, they wanted to send all of us to the Larry the Cable Guy school of politics and "Git-R Done" and they are tired of waiting.

You mentioned the 1755 to 1780 megahertz band for commercial use, and also the 2155 to 2180 band. We are pleased to see these discussed today. We look forward to our witnesses to hearing from you, and we look forward to some action on these issues. I yield back.

Mr. WALDEN. Gentlelady yields back, and maybe at our next telehearing we could have Larry the Cable Guy come.

With that, I will yield back the remainder of my time and recognize the gentlelady from California, Ms. Eshoo, for 5 minutes.

OPENING STATEMENT OF HON. ANNA G. ESHOO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. ESHOO. Thank you, Mr. Chairman, and good morning to you.

With the President's call earlier this month for increased spectrum sharing, today is a timely continuation of the bipartisan examination we began in the last Congress on how to relocate or share spectrum held by federal agencies. Leading up to the enactment of the Public Safety and Spectrum Act last year, Democrats and Republicans on this subcommittee have worked hand in hand to ensure federal spectrum bands are used more efficiently. Today

is another manifestation of that cooperation, and with U.S. mobile data traffic expected to increase nine-fold between 2012 and 2017, making additional spectrum available for mobile broadband must remain a top priority for this subcommittee, because it is a top priority for the people of our country.

The President's Council of Advisors on Science and Technology, better known as PCAST, highlighted in their 2012 report that the Federal Government uses about 60 percent of the most valuable spectrum located between 225 megahertz and 3.7 gigahertz, 18 percent of which is used on an exclusive basis. That is a lot. The bottom line is that federal agencies have a responsibility to ensure efficient use and maximum benefit of this scarce resource, just as wireless companies do. Federal agencies and the wireless industry have been working together to identify ways of relocating or sharing the 1755 to 1850 megahertz band. We are entering a crucial period when we must begin the process of making some of this spectrum available for commercial wireless broadband. The economic value of auctioning this spectrum cannot be understated, since it will go a long way toward providing a down payment for the construction of First Net and address our Nation's spectrum crunch.

It is also important for us to examine the 5 gigahertz band. In February, to increase Wi-Fi speeds and alleviate congestion, former FCC Chairman Genachowski announced a proposal to unleash up to 195 megahertz of spectrum in the 5 gigahertz band. The consumer benefits of such an expansion in unlicensed spectrum include faster data speeds and greater capacity that will support high definition video, large file transfers, and a new generation of technologies that have yet to be invented. I hope that NTIA, DOT, and the FCC will work with industry stakeholders on a path forward for connected vehicle technology, while recognizing the immediate economic and consumer benefits of expanding Wi-Fi in the 5 gigahertz band.

Consumer appetite for wireless broadband will only continue to grow, and this is very good news. This is all about innovation and growth and jobs and opportunities and exciting markets. So I think the time to act is now. We really cannot drag our heels on this. So with the conclusion of today's hearing, Mr. Chairman, I know that we are going to work together and our staffs will work together to develop a plan to incent federal agency participation and provide the wireless industry with the certainty that they need to deliver fast, reliable wireless broadband service to all Americans.

And Mr. Chairman, I also want you to know that I support and will work with you to see that the FCC releases an NPRM on the 1755 to 1780 band as well.

So with that, I yield back.

Mr. WALDEN. Gentlelady yields back the balance of her time. Anyone else on the Republican side seeking the chairman's 5 minutes? Any comments? If not, I turn to former chairman of the committee, Mr. Waxman, for 5 minutes.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Chairman Walden, for holding this timely hearing on federal spectrum and how it might be utilized to serve the needs of both commercial wireless carriers and federal spectrum users.

Under the leadership of the Obama Administration, the National Telecommunications Information Administration, and other federal agencies, they have identified over 400 megahertz of federal spectrum that can be repurposed for commercial mobile broadband services on an exclusive or shared basis, encompassing both licensed and unlicensed services. This comprehensive all-of-the-above approach has already led the Federal Communications Commission to initiate two proceedings to reallocate nearly 300 megahertz of federal spectrum for commercial use.

I understand that companies like California-based Qualcomm are looking for innovative ways to share the spectrum with federal users, and I appreciate their willingness to testify today, and I welcome back Mr. Brenner. I also want to welcome Ms. Takai. I am pleased you are here, and Mr. Nebbia and Mr. Guttman-McCabe. You each represent critical parts of the cooperative public-private partnership that will be necessary to solve the challenges posed by repurposing the 1755 to 1850 megahertz band, and I look forward to hearing your perspectives today.

Now that the Commerce Spectrum Management Advisory Committee is winding down, we are at a crossroads. Federal and non-federal users must agree upon a roadmap to reallocate the lowest 25 megahertz of the 1755 to 1850 megahertz band by February, 2015. This is a valuable piece of spectrum real estate for many reasons, not the least of which is the opportunity to pair it with the 2155 to 2180 megahertz band. Doing do so would maximize the option value of this spectrum, and it would also provide a source of funding for incumbent federal users to modernize their equipment and capabilities, while generating a substantial down payment for the construction of First Net and other priorities in the law we passed last year.

The time to make this all happen is now, and I am hopeful that with the right tools and incentives we will be able to meet the deadline. The President recognizes the importance of this issue as demonstrated by the memorandum he issued earlier this month. The initiatives outlined in the memorandum should generate ideas and solutions to provide federal users with better tools to fulfill their missions, while ensuring our Nation's long-term spectrum needs are met. Congress, too, has a role to play. I hope to work concurrently on a bipartisan basis to explore additional ways to encourage agencies to relinquish under-utilized spectrum.

That completes my statement and I want to yield the balance of my time to my California colleague and friend, Ms. Matsui.

Ms. MATSUI. Thank you, Ranking Member Waxman, for yielding me time. I would like to thank our witnesses for being here today. I would like to applaud NTIA for their leadership during the CSMAC process, and I want to commend Teri Takai for her strong leadership in her capacity as CIO at the Department of Defense.

There is no doubt that the future of American innovation and growth depends on spectrum. Moving forward, we need a sound and smart spectrum policy. There is not a one-size-fits-all solution. There are opportunities for both clearing and sharing spectrum. I applaud the White House for putting forth a spectrum roadmap to guide government agencies to be more efficient in their spectrum holdings.

In the short term, there is a need to act swiftly to reallocate the 1755 to 1780 megahertz band. The clock continues to tick on the AWS–3 spectrum reallocation. Pairing the 1755 to 1780 band with AWS–3 makes sense, not just for revenue purposes, but also for spurring American innovation.

For the most part, a thorough review of the 1755 band has already occurred, and I applaud both industry and government stakeholders for working closely together. Now we are at a point where we need to make decisions. Given the time crunch we are facing on the AWS–3 band, it is not in anyone's interest to slow walk the process. The conversation needs to remain focused on the 1755 to 1780 band. We should not waste this opportunity for our Nation.

It is also my hope that once the Senate confirms Tom Weaver, he and the FCC will begin to move forward with service and option rules in consultation with NTIA and DOD on focusing on the 1755 band.

There are some tough decisions ahead. DOD does hold some valid concerns that must be addressed, and we should remain committed to finding a balance that meets both our national security and economic challenges. I look forward to continue working in a bipartisan manner moving forward, and I yield back the balance of my time.

Mr. WALDEN. Gentlelady yields back the balance of her time. All time has been consumed. We will now go to our witnesses, and we again thank you all for your testimony and for participating in this discussion which is so important to our country's future.

We will start with Mr. Karl Nebbia, Associate Administrator, Office of Spectrum Management for the NTIA. Mr. Nebbia, thank you for being here. We look forward to hearing your remarks.

STATEMENTS OF KARL NEBBIA, ASSOCIATE ADMINISTRATOR, OFFICE OF SPECTRUM MANAGEMENT, NTIA; TERI TAKAI, CHIEF INFORMATION OFFICER, DEPARTMENT OF DEFENSE; DEAN BRENNER, SENIOR VICE PRESIDENT, GOVERNMENT AFFAIRS, QUALCOMM INCORPORATED; AND CHRISTOPHER GUTTMAN-MCCABE, EXECUTIVE VICE PRESIDENT, CTIA—THE WIRELESS ASSOCIATION

STATEMENT OF KARL NEBBIA

Mr. NEBBIA. Chairman Walden, Ranking Member Eshoo, and members of the subcommittee, thank you for the opportunity to testify about the Administration's efforts to meet the Nation's spectrum demand. NTIA is the President's advisor on telecommunications policy and manager of federal spectrum use, and shares your sense of the importance of these issues. I will update you

today on the progress toward the President's spectrum goal and discuss his direction for the future.

Spectrum enables agencies to perform their missions, whether defense, law enforcement, and emergency services, transportation safety, science, or weather warning and prediction. While agencies make heavy use of cell phones and unlicensed devices, their need for government-only capabilities continues. Modern commercial wireless operations tend to be standardized and responsive to the market's desire for the latest capabilities and devices. Federal wireless, however, supports diverse missions and technologies, covering communications, many types of radars, science, ground, ship, aircraft, and satellite systems. These systems must work when they are needed and our men and women in uniform, including your local National Guard units, must be able to train at home before they feel the heat of battle. Furthermore, agencies develop systems with budgetary constraints and life cycles of 20 years or more. The physics of the spectrum beachfront supports mobility and small devices. While the beachfront makes possible pocket cell phones, it also allows systems to fit in the nose of a tactical aircraft, radars to detect at long distances, and rapid deployment of tactical systems.

In light of challenges in repurposing spectrum, NTIA with government and industry is pursuing a path to make spectrum available faster and at lower cost, relocating federal users where feasible and affordable, and sharing spectrum where possible. Thus far, NTIA has put into direct discussion up to 405 megahertz. NTIA brought industry and government together under the Commerce Spectrum Management Advisory Committee and greatly improved the opportunity for commercial access in the 1695 to 1710 megahertz band. The FCC then started a rulemaking on the 3550 to 3650 band, drawing proposals for small cell deployments sharing with government radars. This is another band NTIA had put in play. We also evaluated expanding unlicensed use, like Wi-Fi, in two portions of the 5 gigahertz range. This spectrum holds the potential to improve Wi-Fi performance, supporting network offloading and lower cost consumer options. Radar systems, some airborne, and foreign satellite-based sensors operate in the lower segment. In the upper portion, the automotive industry has been developing connected vehicle technologies. As auto and Wi-Fi technologies use the 802.11 standard, we have encouraged them to work together. In any case, the incumbent uses need to be protected.

To deal with the challenges of repurposing the 1755 to 1850 megahertz band, NTIA initiated industry and government collaboration through the CSMAC. Working groups made up of industry and government experts evaluated each type of federal system and potential solutions. The discussions have received tremendous support from industry and government. Two of the four groups have essentially completed their work; two others are working to finish by the July 24 CSMAC meeting, but will almost certainly lead to some further discussion.

Though cooperation and data exchange has been unprecedented, sharing sensitive information between agencies and industry is a challenge. DOD and industry are discussing a way forward right

now using the idea of trusted agents. In March, the FCC notified NTIA that it plans to auction the 1755 megahertz band as early as September, 2014. To make this a success, the FCC and NTIA must provide a plan for the 1780 to 1850 megahertz band and identify alternative spectrum to which the agencies could relocate. We are reviewing approaches, including the industry roadmap, to determine the best path. While we press ahead on specific bands, the President's June 14 memo reflects his commitment to improving future spectrum access, creating a policy team to support advances in spectrum sharing. The team will consider how to give agencies incentives to share or relinquish spectrum. NTIA and NIST will establish a center of advanced communications to promote stakeholder collaboration on sharing technologies. The memo seeks improved federal usage information by directing NTIA to develop a plan to quantify federal spectrum use and develop and evaluate a spectrum monitoring capability. NTIA and the agencies have made substantial progress towards the President's goal. We are excited by the momentum that CSMAC's progress and the Presidential memo bring.

Thank you for the opportunity to testify this morning.

[The prepared statement of Mr. Nebbia follows:]

Testimony of
Mr. Karl Nebbia
Associate Administrator, Office of Spectrum Management
National Telecommunications and Information Administration
U.S. Department of Commerce
Before the
Subcommittee on Communications and Technology
Committee on Energy and Commerce
United States House of Representatives

Hearing on
"Equipping Carriers and Agencies in the Wireless Era"
June 27, 2013

I. Introduction

Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee, thank you for the opportunity to testify on behalf of the National Telecommunications and Information Administration (NTIA) regarding federal agencies' use of spectrum and the Administration's ongoing efforts to make additional spectrum available for wireless broadband services. NTIA, an agency within the Department of Commerce, is the President's principal advisor on telecommunications and information policy matters and manages the federal agencies' use of radio spectrum.

As Associate Administrator for NTIA's Office of Spectrum Management, I oversee NTIA's federal spectrum management operations, including all frequency assignment, engineering, and spectrum planning and policy functions. This is my second appearance in less than a year before the Subcommittee to discuss federal spectrum matters, clearly underscoring the urgency with which the Subcommittee views these issues. I can assure you that NTIA shares this sense of urgency.

In my testimony today, I will discuss briefly the growing demand for spectrum by both consumers and government operations. I will also update you on NTIA's progress in repurposing federal spectrum for consumer uses in pursuit of the President's 500 megahertz goal, and summarize President Obama's recent executive memorandum to federal agencies, directing

further improvements in spectrum access opportunities and efficiency to promote economic growth and expand America's leadership in wireless innovation.

II. The Ever-Increasing Demand For Spectrum

It is hard to overstate the importance of radio frequency spectrum to our nation's economy and its impact on virtually every aspect of our society. Increasing commercial use of wireless spectrum for broadband is transforming multiple areas of the U.S. economy, including small businesses creation, productivity, employment, consumer welfare, health care, government services, and public safety. Spectrum is also vital to enabling federal agencies to perform their essential missions, as it supports national security, critical defense operations, law enforcement and emergency response, homeland security, transportation safety, scientific research, environmental monitoring, power marketing, and weather prediction. While federal agencies make heavy use of commercial services and unlicensed devices where appropriate, their spectrum needs for mission-critical capabilities continue to increase.

Modern, mass-market, commercial wireless operations generally tend to be homogenous, centrally controlled by licensed carriers, and subject to market-based principles. The American people's desire for wireless broadband services enables service and technology providers to refresh their networks and devices regularly to get us next-generation features and functionality.

Federal agencies' wireless operations, on the other hand, support a diverse set of missions and a variety of technologies, including fixed and mobile communications, many types of radars, sensors, radio astronomy, ground-based, ship-borne, airborne, and satellite systems. These systems must be reliably available when and where they are needed. Another key difference between commercial and government systems is that government systems are developed and deployed with taxpayer funding, within congressionally-imposed budgetary constraints that necessitate plans for many systems to stay in service for up to 20 years or longer, with limited refresh opportunities.

The physics driving the demand for certain spectrum bands centers around the need for signal coverage, bandwidth capacity, and mobility. Lower frequencies provide better coverage, higher frequencies can produce more bandwidth and greater data rates, but the prime spectrum bands (between 300 and 3000 MHz) support greater mobility required by small handheld devices. This "beachfront spectrum" also allows pocket-sized cell phones, small GPS receivers to receive weak satellite signals, radar systems to detect objects at longer distances, and tactical radios to penetrate heavy foliage.

In light of the significant challenges in repurposing a diminishing amount of available spectrum, NTIA is pursuing, with our industry and federal agency stakeholders, an innovative path forward that could allow us to make this band available faster and at a lower cost than would be possible under a traditional, relocation-only process, while still protecting critical federal missions. Such an approach relies on a combination of relocating federal users where feasible and affordable, and sharing spectrum between federal agencies and commercial users where possible and practical. By accounting for the unique requirements of each federal mission, along with recent innovation in commercial technology, a tailored approach that employs a combination of relocation and sharing may provide the best way to achieve: (1) faster entry by commercial services; (2) lower costs for the taxpayer; (3) more available spectrum due to efficiencies; (4) greater innovation in the wireless marketplace; and (5) assured capabilities for federal departments and agencies.

III. Challenges to Repurposing Spectrum

If it was easy to repurpose spectrum from long-term legacy uses to enable new consumer services and technologies, today's hearing would not be happening. In fact, our goal of making additional broadband spectrum available is extremely challenging – logistically, technically, and economically. NTIA is committed to overcoming these challenges in collaboration with federal

agencies and our colleagues in the Federal Communications Commission (FCC) and industry stakeholders.

Information sharing between federal agencies and industry representatives has been one of the most significant challenges. While the level of cooperation and information exchange between industry and government working within NTIA's Commerce Spectrum Management Advisory Committee (CSMAC) working groups reviewing the 1755-1850 MHz band reallocation over the past year has been unprecedented, and continues to improve. DOD and industry representatives have made significant progress in recent day regarding industry access to sensitive information on certain military systems. The DOD and industry are discussing improving information sharing by working with a subset of working group members or "Trusted Agents," through whom sensitive information could be shared under non-disclosure agreements.

Transition planning and preparation for the auction of the 1695-1710 MHz and 1755-1780 MHz bands, in the face of uncertain clearing and sharing outcomes, is another issue we are addressing. In a March 20, 2013 letter, the FCC notified NTIA of its plans to auction these two bands "as early as September 2014."[1] NTIA supports the FCC's efforts to ensure adequate time to conduct the auction and complete the subsequent licensing process pursuant to the Tax Relief Act's February 2015 deadline.[2] At the same time, there are other key statutory milestones and issues that, together with the other federal agencies and industry stakeholders, we must achieve and address to ensure a successful auction and smooth transition.

In order for agencies to timely and adequately prepare sufficient transition plans, especially those for the 1755-1780 MHz band, the FCC and NTIA must confront several

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[1] *See,* FCC March 20, 2013 letter to NTIA.

[2] This deadline is directly applicable to the 1695-1710 MHz band, and to the 2155-2180 MHz band that the FCC is proposing to pair with 1755-1780 MHz, but does not apply directly to the 1755-1780 MHz band.

important issues as soon as possible, many of which must be raised in the FCC's upcoming rulemaking proceeding. These issues include the nearer-term pairing of the 1755-1780 MHz band with the 2155-2180 MHz band, a long-term plan for the upper 70 MHz in the 1780-1850 MHz band, and the identification of alternative spectrum to which federal operations could be relocated, if necessary.[3]

First, NTIA recognizes that pairing and auctioning the 25 megahertz of spectrum in the 2155-2180 MHz band with the 1755-1780 MHz band is a priority for the FCC and the commercial mobile wireless industry. NTIA recognizes, however, the need to explore ways to accommodate a two-phased approach for the entire 95 MHz of spectrum in the 1755-1850 MHz band since most federal functions require and operate throughout the 1755-1850 MHz band to meet their missions. Specifically, the FCC will need to consider, whether as part of relocation or a sharing arrangement, the potential for a phased transition that facilitates commercial access to the 1755-1780 MHz band in a shorter timeframe, while preserving longer-term repurposing and transition opportunities for the entire 1755-1850 MHz band. NTIA and DOD are working with the FCC and industry representatives on a proposed roadmap to accommodate this two-phased approach.

Second, and equally important, agencies must have certainty that their mission-critical, spectrum-dependent operations will be maintained without interruption. Before agencies can plan to relocate any of their systems, the FCC and NTIA must identify and reallocate expeditiously spectrum to accommodate displaced federal operations, unless these agencies can maintain comparable capability of systems via sharing or utilizing alternative technology.

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[3] NTIA, Letter of Assistant Secretary Lawrence E. Strickling to FCC Chairman Julius Genachowski on the planned auction of licenses in the 1695-1710 MHz Band and the 1755-1780 MHz Band at 2 (April 19, 2013), *available at* http://www.ntia.doc.gov/other-publication/2013/letter-assistant-secretary-strickling-fcc-chairman-genachowski-planned-auctio.

Each agency with operations in the 1755-1780 MHz band provided NTIA, in rank order, a prioritization of comparable replacement spectrum for their operations. For example, the Department of Defense (DOD) identified the 2025-2110 MHz band as its preferred option to relocate most of its operations.[4] Current law requires that before DOD can "surrender" frequencies that result in a loss of "essential military capability," DOD and NTIA must jointly certify to Congress that alternative bands provide comparable technical characteristics to restore such capability or that capabilities are maintained through other means.[5]

Improvements to the Commercial Spectrum Enhancement Act (CSEA) enacted in the Middle Class Tax Relief and Job Creation Act of 2012 (Tax Relief Act) will play an essential role in facilitating federal agency relocation and sharing of spectrum the FCC plans to auction. For instance, agencies will be able to recover costs for planning for the reallocation and auctioning of spectrum, allowing agencies to more accurately plan how they will relocate from or share spectrum, and providing them with an important incentive to do so in a more timely and cost-effective manner. The CSEA also enables federal agencies to upgrade their systems with state of the art technology or commercial platforms, which is another important incentive to more quickly moving from or sharing spectrum. Other improvements in the law are aimed at facilitating better transparency, coordination, and predictability for bidders in FCC spectrum auctions and the ultimate winners of those auctions. For example, the requirement that NTIA publish agencies' spectrum transition plans on its website at least 120 days before the commencement of the corresponding FCC auction, with the exception of classified and sensitive information, will aid in post-auction coordination by facilitating more timely and easy access to information by auction winners.

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[4] *See* March 2012 Report at Table 3-2.

[5] National Defense Authorization Act, Pub. L. No. 106-65, Div A, Title X, Subtitle G, §1062(b)(1), 113 Stat. 768 (Oct. 5, 1999), *codified at* 47 U.S.C. §921 note (Surrender of Department of Defense spectrum).

NTIA has been working with the Office of Management and Budget (OMB), the FCC and other federal agencies to implement these provisions. Our objectives in this effort are to ensure the accuracy and sufficiency of agency transition plans, assure sufficient and timely funding to pay for and implement such plans, reduce risk and uncertainty in the auction and transition process, and avoid interruption or adverse impact to federal agencies' operations. However, the FCC's February 2015 licensing deadline is quickly approaching and, in light of the potential for a September 2014 auction, agency transition plans could be due as early as January 2014 even though the FCC has not yet commenced a rulemaking for the 1695-1710 MHz and 1755-1780 MHz bands. This leaves federal agencies without information critical to the development of transition plans, with three of the ten months normally available having already passed.

IV. 2013 Presidential Memorandum

The Executive Memorandum signed by President Obama on June 14th reflects the Administration's recognition of, and commitment to overcome, the significant and complex challenges that both industry and federal agencies face in improving access to and more efficient use of spectrum.[6] Specifically, it establishes measures federal agencies must take to more aggressively consider spectrum efficiency. It also directs NTIA to continue facilitating discussions and information sharing to expedite commercial entry into federal bands while maintaining and protecting the mission capabilities of federal systems. To this end, NTIA and the National Institute of Standards and Technology (NIST) have announced plans to establish a new Center for Advanced Communications in Boulder, Colorado, that will develop policies and best practices to promote and facilitate greater collaboration among agencies, the private sector,

[6] White House, Memorandum for the Heads of Executive Departments and Agencies, *Expanding America's Leadership in Wireless Innovation* (June 14, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-americas-leadership-wireless-innovatio.

and academia with respect to research, development, testing, and evaluation of spectrum-sharing technologies.[7]

The memorandum also creates a Spectrum Policy Team within the Administration tasked with monitoring and supporting advances in spectrum sharing policies and technologies. Among the Spectrum Policy Team's short-term deliverables are recommendations to the President regarding approaches that could give agencies greater incentive to share or relinquish spectrum, while protecting the mission capabilities of existing and future systems that rely on spectrum use. The team will consider whether proposals made by the President's Council of Advisors on Science and Technology (PCAST) – including the establishment of so-called "spectrum currency" and a "spectrum efficiency fund" – would be effective.

The memorandum also aims to improve the nature of information gathered on usage of spectrum by federal entities. NTIA will develop an approach for improved quantification of spectrum use by federal systems. This effort could potentially quantify the bandwidth and population occupied by federal systems, as well as consider the time of use along with other metrics and parameters. This will help determine the extent to which spectrum assigned to the agencies could potentially be made available for sharing with or reallocation to commercial users, particularly in major metropolitan areas. Each assessment will address the nature of the agencies' missions and projected increases in spectrum usage and needs, identifying situations where access to non-federal spectrum could aid in fulfilling agency missions. In addition to these quantitative assessments, the President's memorandum and the Administration's FY 2014 budget proposes the design, development, and deployment of a new spectrum monitoring capability. The memorandum includes other approaches to ensure efficient use of spectrum. For

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[7] *See* Press Release, *NIST and NTIA Announce Plans to Establish New Center for Advanced Communications* (June 14, 2013), *available at* http://1.usa.gov/12QE9QI.

example, an agency that requests a new spectrum assignment or that seeks to procure a spectrum-dependent system will have to document its consideration of alternative approaches and verify that it is pursuing the most spectrum-efficient method, in consideration of all relevant factors including cost and agency mission, particularly in the "beachfront spectrum."

V. Delivering on the President's Initiative to Double the Amount of Spectrum Available for Wireless Broadband

Since June 2010, when the President directed the Department of Commerce, working through NTIA, to collaborate with the FCC to make available an additional 500 megahertz of spectrum for wireless broadband use by 2020, NTIA and other federal agencies have pressed ahead to find the spectrum necessary to make these economic, technological, and societal benefits a reality.[8] Five hundred megahertz is a large amount of spectrum. NTIA has been working closely with federal and non-federal stakeholders to explore all options for making additional spectrum available to commercial providers: licensed and unlicensed uses, exclusive use and shared use. Everything is on the table. This involves potentially repurposing bands currently used by federal agencies by relocating them to other bands or by sharing spectrum where technology and other factors permit. Thus far, NTIA has formally recommended or otherwise identified for potential reallocation up to 405 megahertz:

- 15 megahertz from the 1695-1710 MHz band;
- 100 megahertz from the 3550-3650 MHz band;
- 95 megahertz from the 1755-1850 MHz band; and
- 195 megahertz in the 5350-5470 MHz and 5850-5925 MHz bands.

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[8] White House, Memorandum for the Heads of Executive Departments and Agencies, *Unleashing the Wireless Broadband Revolution* (June 2010), *available at* http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution.

None of these bands are easy to repurpose because they include major taxpayer-supported infrastructure investments by federal agencies, and similar infrastructure investments by the private sector. Federal operations are increasingly expensive and time-consuming to move, and few bands remain to which to move them. And before we can move federal systems, we must find ways to maintain capabilities, which could include identifying comparable spectrum bands, in order for agencies to maintain their operations and protect the federal missions they support. Private sector investments must also be protected by ensuring that appropriate and reliable sharing technologies are applied to give incumbent private sector users assurance they will have spectrum access when needed. In addition, the conditions and plans under which spectrum the identified spectrum is repurposed affects the potential benefits to the economy. But the increasingly important benefits of broadband to consumers, to commerce, and to ongoing innovation warrant our doing everything we can to get this job done.

a. 1695-1710 MHz and 3550-3650 MHz Bands

In 2010, NTIA led an interagency "fast track" evaluation of spectrum that could be reallocated without requiring relocation of federal systems and ultimately recommended reallocating 115 megahertz in the 1695-1710 MHz and 3550-3650 MHz bands for wireless broadband use on a shared basis.[9]

Further, as directed by Congress in Section 6401(a)(3) of the Tax Relief Act, NTIA submitted a report to the President identifying the 1695-1710 MHz band for reallocation from federal to non-federal use.[10]

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[9] NTIA, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz,4380-4400 MHz Bands* (Oct. 2010), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf.

[10] NTIA, Report to the President: *Identification of 15 MHz of Spectrum Between 1675 MHz and 1710 MHz for Reallocation* (Feb. 2013), *available at* http://www.ntia.doc.gov/files/ntia/publications/1675-1710_mhz_report_to_president_02192013.pdf.

The FCC has notified NTIA that it plans to auction licenses in the 1695-1710 MHz band as early as September 2014, although it has not yet launched a rulemaking.[11] The CSMAC recommended a framework for sharing the 1695-1710 MHz band with incumbent federal operations that maximizes the opportunity for new commercial use while protecting federal meteorological earth stations from harmful interference.[12]

The FCC has commenced a rulemaking on the 3550-3650 MHz band, proposing the use of new and innovative spectrum sharing technologies including low-power, small-cell deployments controlled by geo-location databases to protect critical federal radar and satellite operations in the band.[13] NTIA is working with FCC and DOD to ensure that implementation of small cell technology ensures the protection of DOD radar operations.

b. <u>5 GHz Expansion Bands</u>

Pursuant to Section 6406(b) of the Tax Relief Act, NTIA and the federal agencies have evaluated known and proposed spectrum-sharing technologies and the risks to federal users if the FCC allows Unlicensed-National Information Infrastructure (U-NII) devices to expand operations into the 5350-5470 MHz and 5850-5925 MHz bands.[14] This additional 195 megahertz of spectrum holds the potential to expand significantly the bandwidth available for unlicensed broadband devices, which often provide a link to the Internet while enabling service

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[11] FCC, Letter of FCC Chairman Julius Genachowski, to Lawrence E. Strickling, Assistant Secretary for Communications and Information (Mar. 20, 2013) (FCC March 20, 2013 letter to NTIA), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0321/DOC-319708A1.pdf.

[12] *See* CSMAC, *1695-1710 MHz Meteorological-Satellite, Final Report of Working Group 1* (Feb. 2013), *available at* http://www.ntia.doc.gov/files/ntia/publications/wg-1_report_v2.pdf.

[13] FCC, *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Notice of Proposed Rulemaking and Order*, GN Docket No. 12-354 (Dec. 12, 2012), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-148A1.pdf.

[14] NTIA, *Evaluation of the 5350-5470 MHz and 5850-5925 MHz Bands Pursuant To Section 6406(b) of the Middle Class Tax Relief and Job Creation Act of 2012* (Jan. 2013), *available at*: http://www.ntia.doc.gov/files/ntia/publications/ntia_5_ghz_report_01-25-2013.pdf.

providers to offload traffic from their licensed wireless networks, thus easing network congestion. In February, the FCC commenced a rulemaking proceeding that proposes to modify its Part 15 rules to provide U-NII devices access to additional contiguous spectrum at 5 GHz with consistent technical requirements, allowing unlicensed devices to use wider bandwidth channels, leading to faster speeds.[15]

We welcome this proceeding but note that a number of federal radar systems operate in the 5350-5470 MHz band and must be protected. Some of these are airborne, resulting in a more challenging sharing environment. Furthermore, other countries operate or depend on satellite-based sensing radars in the band. NTIA, the FCC, the agencies, and industry are working cooperatively to fully assess the conditions under which sharing may be possible in this band. In the 5850-5925 MHz band, the vehicle and infrastructure industries, with the support of the Department of Transportation (DOT), have been developing connected vehicle and infrastructure technologies that have safety and mobility applications using dedicated short-range communications (DSRC) services for more than a decade. The transportation industry may benefit from the economies of scale resulting from working with WiFi technology developers if DSRC commonality with unlicensed devices is possible. While both systems use the basic IEEE 802.11 standard, they implement the standard in different ways that may not allow spectrum sharing. NTIA's January 2013 Report to Congress identified some of the risks that need to be mitigated to support spectrum sharing in the 5850-5925 MHz band. We have encouraged the WiFi and transportation industries to work together to determine how best to address these risks. The transportation industry has engaged with the WiFi industry to determine if effective sharing techniques can be developed that protect the incumbent DSRC service. Furthermore, NTIA is

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[15] FCC, *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Infrastructure (U-NII) Devices in the 5 GHz Band, Notice of Proposed Rulemaking,* ET Docket No. 13-49 (Feb. 20, 2013), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-13-22A1.pdf.

engaged with DOT, FCC and other stakeholders in the public and private sectors to determine the potential effects of sharing in the 5850-5925 MHz band, with a view toward ensuring that critical public safety interests are protected.

c. **1755-1850 MHz Band**

In January 2011, NTIA asked federal agencies with operations in the 95 megahertz of spectrum in the 1755-1850 MHz band to assess the feasibility of relocating in ten years and to determine whether their systems could transition out of the 1755-1780 MHz portion of the band in five years, the conditions under which relocation could be accomplished, and the associated costs. In March 2012, NTIA determined that the full 1755-1850 MHz band could be repurposed for wireless broadband use once certain critical challenges are overcome.[16]

The challenges of repurposing the 1755-1850 MHz band include the high costs and long timeline of the undertaking, preliminarily estimated to be approximately $18 billion over ten years, and comparable spectrum requirements at 2025-2110 MHz and 5150-5250 MHz, assuming relocation of most existing federal users.[17] A May 2013 report of the Government Accountability Office (GAO) regarding the relocation costs associated with the 1710-1755 MHz band validated the agencies' approach to developing these cost estimates.[18] Although the government and industry gained valuable experience during the transition of federal operations from the 1710-1755 MHz band, relocating systems from the 1755-1850 MHz band presents significantly greater challenges and thus will require much more significant actions, costs and

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[16] *See* NTIA, *An Assessment of the Viability of Accommodating Wireless Broadband in the 1755-1850 MHz Band,* (Mar. 2012) (March 2012 Report), *available at* http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf.

[17] *See* March 2012 Report at 3.

[18] GAO, *Federal Relocation Costs and Auction Revenues* (May 22, 2013), *available at* http://www.gao.gov/products/GAO-13-472.

time. NTIA is therefore pursuing an approach that incorporates both relocation and sharing to make this band, and other bands, available more quickly and at less cost.

Accordingly, NTIA initiated, through the CSMAC, industry and government collaboration to identify potential solutions, including partial clearing scenarios. The CSMAC established several working groups, made up of experts from industry and government to evaluate each type of federal system and the prospective commercial technology solutions to determine the fastest, most cost-effective way forward to allow commercial broadband access in the 1755-1850 MHz band. The groups organized around particular federal operations that currently share the entire band throughout the country. In addition to relocation and geographic sharing options, some of the working groups considered the possibility that commercial users and federal agencies could access the same frequencies in the same geographic areas through greater spectrum availability and the use of new flexible and agile commercial technologies. While significant technical and policy challenges lie ahead, sharing would allow for more efficient use of this spectrum, could match intermittent government use with other valuable uses, and may reduce the uncertainties and disruptions to agency missions that result from the constant threat of relocating again in the future.

In some cases, sharing is not feasible and the CSMAC is recommending the relocation of federal systems. For example, for law enforcement surveillance systems, the CSMAC recommended prioritizing market areas for clearing, first considering the 1755-1780 MHz sub-band and second, 1780-1850 MHz.[19] This recommended priority list will serve as input to affected federal agencies with video surveillance operations in the band as they develop their transition plans.

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[19] CSMAC, *1755-1850 MHz Law Enforcement Surveillance, Explosive Ordnance Disposal, and other short distance links*, Final Report of Working Group 2 (Jan. 2013), *available at* http://www.ntia.doc.gov/files/ntia/publications/csmac_wg-2_final_report_jan-4-2012.pdf.

The working group addressing satellite links and electronic warfare systems completed its recommendations and presented them to the full CSMAC at last week's meeting. The group determined that commercial wireless networks are unlikely to impact the federal satellite operations in the 1755-1850 MHz band, but that the commercial wireless operators will likely have to bear some risk of interference within close proximity to the satellite earth stations sending signals into space. Electronic warfare preparedness operations will be coordinated under existing rules according to the working group's recommendations. We expect the full CSMAC to deliberate on these working group recommendations and approve final recommendations at its next meeting on July 24, 2013.

The CSMAC working group addressing federal fixed microwave and military tactical radio communications in the band is nearing completion of its work. Point-to-point microwave systems are relatively straightforward to move and comparable spectrum has been identified where these systems can be relocated. The working group will be identifying military sites where tactical radio relay systems are used for training exercises that will need to be protected, and technical analysis may help significantly reduce the size of the protection areas and coordination zones.

The CSMAC working group with the most difficult challenges is studying clearing and sharing options for military airborne operations. This group has initially identified the need for large protection areas based on traditional spectrum analysis techniques. To address this issue, NTIA and DOD will need to explore more advanced mitigation techniques to facilitate sharing or relocate the operations.

The CSMAC working groups have suggested that their results could be improved, offering greater potential for increased commercial access to the spectrum and successful sharing, if sensitive information, which cannot be shared publicly, could be more readily shared between industry engineers and the federal agencies, particularly DOD. As I will discuss

shortly, the President has taken action to improve this information sharing, including the handling of sensitive information. NTIA is committed to facilitating these communications to ensure that private and public stakeholders have the information they need to fully and adequately assess various options and hasten reallocation to the greatest extent possible.

VI. Conclusion

NTIA, in collaboration with the FCC and the federal agencies, has made substantial progress toward fulfilling the President's goal of doubling the amount of commercial wireless spectrum available this decade. We are excited by the strong and renewed momentum that the CSMAC's progress and the new Presidential Memorandum bring. Indeed, our success is critical to enable businesses to grow faster and create more jobs, improve education and job training, enhance public safety, and encourage innovation and economic growth while protecting critical federal missions.

We still have a lot of work to do. We will continue to work through the bands that NTIA has placed on the table. Under the President's new memorandum, we will continue to move forward to consider other bands used by the federal agencies while we explore a new set of tools to maximize use of our critical resource.

I appreciate the opportunity to testify before you today and welcome your questions.

Mr. WALDEN. Mr. Nebbia, thank you for your testimony.

We will now turn to the Chief Information Officer for the Department of Defense, Ms. Teri Takai. Ms. Takai, thank you for being here. We look forward to your comments.

STATEMENT OF TERI TAKAI

Ms. TAKAI. Thank you. Good morning, Chairman Walden——

Mr. WALDEN. You need to turn that microphone on, please. Thank you.

Ms. TAKAI. There we go. Good morning, Chairman Walden, distinguished subcommittee members, and thank you for the opportunity to be here this morning to testify before the subcommittee regarding the vital importance of scarce radio frequency spectrum to the U.S. national defense capabilities, the economy, and consumers.

Spectrum is critical to ensuring that our war fighters and mission partners have the critical capabilities they need to prepare for and execute their missions, an example of the Department's use of unmanned aerial systems (UAS) which require spectrum to control air vehicles as well as process volumes of critical intelligence surveillance and reconnaissance data, which is in support of our missions in military areas of operation.

Our inventory of UAS platforms has increased from 167 in 2002 to nearly 7,500 in 2010, and that is an example of, again, our concern that we need to become better at spectrum to meet our needs as well as to meet the needs of the Nation. This has resulted in a dramatic increase in our use and training requirements, and consequently an increase in demand.

But within DOD, we also understand that the strength of our Nation is rooted in the strength of our economy. In that regard, we remain fully committed in support of the national economic and security goals of the President's 500 megahertz initiative. We continue to work with NTIA, other Administration partners, and industry to ensure balanced spectrum repurposing decisions that are technically sound and operationally viable. We are working closely with the National Telecommunications and Information Administration, the FCC, and industry to develop viable methods to share information about the systems that depend on spectrum in the 1755 to 1850 band. Some of the key systems in that space include our satellite launch and on-orbit control operations, electronic warfare, air combat training, and many other systems that are the ones that we are focused on in the discussion.

We recently met with NTIA and industry representatives. We have agreed on an approach to share information. We have signed our nondisclosure agreements that are important not only to protect DOD, but also to ensure that our industry partners who are participating with us are protected in the future as it relates to their activities and future procurements with DOD.

So in summary, our ability to operate spectrum dependent national security capabilities without causing and receiving harmful interference is a part of our role in meeting the critical needs of our Nation's economy, as well as national security. We recognize the growing importance and the need for spectrum for economic development, technology innovation, and consumer demand. Any

repurposing decisions must include decisions on comparable spectrum where necessary, adequate implementation funding, and adequate time to execute the transition, as well as very important rulemaking as it relates to how we will share and what the ground rules will be around sharing.

We realize that no spectrum repurposing decision is without risk, but we believe those risks can be managed and must be managed for us to move together. We believe that we do need to move forward quickly. We do need to make decisions in terms of the 1755 to 1850, but also do that in the context of our overall plan for spectrum going into the future. We believe those long-term solutions will achieve a balance between national security spectrum requirements and meeting the expanding demand of commercial broadband services.

Thank you.

[The prepared statement of Ms. Takai follows:]

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SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY

STATEMENT OF
TERESA M. TAKAI
DEPARTMENT OF DEFENSE
CHIEF INFORMATION OFFICER

BEFORE

THE HOUSE ENERGY AND COMMERCE COMMITTEE
SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY

JUNE 27, 2013

NOT FOR PUBLICATION UNTIL RELEASED BY THE HOUSE ENERGY AND COMMERCE COMMITTEE,
SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY

Introduction

Good morning Mr. Chairman and distinguished Committee members. Thank you for the opportunity to testify before the Committee regarding the vital importance of scarce radio frequency spectrum to U.S. national defense capabilities, the economy, and consumers, especially during these challenging budget times. I am Teri Takai, and I am the Department's Chief Information Officer (CIO). I am responsible for ensuring that DoD information and information technologies can be depended upon in the face of threats by a capable adversary in all conditions from peace to war. Spectrum plays a critical role in that regard. My testimony today will focus on the importance of spectrum to the Department of Defense (DoD) in ensuring that our warfighters and mission partners have the critical capabilities they need to prepare for and execute the missions assigned to them by the Commander in Chief as safely and effectively as possible.

Importance of Spectrum to DoD

The DoD remains fully committed in support of the national economic and security goals of the President's 500 MHz initiative to make spectrum available for commercial broadband use, the implementation of more effective and efficient use of this finite radio-frequency spectrum and the development of solutions to meet these goals while ensuring national security and other federal capabilities are preserved. Spectrum has become increasingly important to the Department's missions, consumers, and the economy of the nation as a whole.

Military spectrum requirements are diverse and complex given the variety of different missions the Department must support around the world. DoD uses spectrum for command and control operations, communications, intelligence, surveillance and target acquisition, on land, at sea, in the air and in space. In the United States, our systems utilize spectrum in order to properly train as we must fight. In short, spectrum is the critical enabler that ensures information is dependably available to train our forces and ensure safe and successful mission accomplishment.

The Department, like the rest of the country and world, also has growing requirements resulting from our increasing reliance on spectrum-dependent technologies. An example is the Department's use of unmanned aerial systems (UAS) requires spectrum to process volumes of

critical intelligence, surveillance and reconnaissance data in support of our missions in military areas of operation. Our inventory of UAS platforms has increased from167 in 2002 to nearly 7,500 in 2010. This has resulted in a dramatic increase in UAS use and training requirements, and consequently an increase in demand for spectrum to adequately satisfy those missions.

While the Department critically depends on wireless and information technology that require spectrum, DoD is cognizant of the scarcity of this resource and its importance to the economic well-being of our nation. When referencing the United States Frequency Allocation chart, and using the strict interpretation of the allocations, one will find in spectrum between 225 and 3700 MHz 18% federal exclusive use, 33% non-federal exclusive use, and 49% federal/non-federal shared use. Within spectrum allocated for exclusive federal use, the majority of the spectrum is shared between DoD and all of the other federal agencies, across a wide array of systems, performing a multitude of varied missions, often with very different technologies.

As noted above, the Department also recognizes the importance of the growing needs for spectrum for economic development, technology innovation and consumer services. Within the DoD, we understand that the strength of our nation is rooted in the strength of our economy in harmony with the strength of our national security. We are dependent on industry for innovative products that can be used for national security.

The Department continues to work with the National Telecommunications and Information Administration (NTIA), other Administration partners, and industry to develop the information required to ensure balanced spectrum repurposing decisions that are technically sound, operationally viable from a mission perspective and economically prudent. The results so far have been promising. For instance, in support of the President's 500 MHz initiative, the initial frequency band assessment, commonly referred to as the "fast track study," resulted in arrangements to geographically share the 1695-1710 and 3550-3650 MHz bands. The reallocation feasibility assessment of the 1755-1850 MHz band also marks another important step. NTIA concluded in its assessment report that while there are significant challenges yet to overcome, including high cost and long timelines, it is possible to repurpose all 95 MHz of spectrum, based on the conditions outlined in the report. DoD is fully engaged in addressing these challenges, by closely working with industry to evaluate sharing possibilities and is open to

other options that would benefit the economy and fulfill DoD's mission needs.

In general, in order to avoid critical mission impacts and maintain comparable capability, there are three things the DoD requires if we are to relocate our systems out of spectrum to be repurposed for wireless broadband; cost reimbursement, sufficient time, and, if necessary, alternative spectrum with comparable technical characteristics to restore essential military capability that will be lost when the band of frequencies is surrendered (note Public Law 106-65. The costs to modify or replace existing systems to use the identified comparable spectrum (e.g., 2025-2110 MHz, 5150-5250 MHz) were included in the analysis. NTIA report shows total cost for all federal agencies is about $18 billion, approximately $13 billion is DoD's cost. The timeline to relocate systems from the 1755-1850 MHz band is dependent upon the schedule of developing and deploying comparable capabilities, and can vary from a few years for simple systems with readily available alternatives, up to 5-10 years for more complex systems, and upwards of 30 years for space systems, where modification is not an option. Recognizing the relocation challenges, the focus has shifted to spectrum sharing as a potential option for repurposing spectrum bands for commercial wireless broadband use.

The Department has and is continuing to work with NTIA and the Federal Communications Commission (FCC) to determine ways to share spectrum with commercial broadband users when possible. Recent successes include the FCC's new rules which allow Dish networks to roll out a Broadband network across the country in the 2180-2200MHz band adjacent to the 2200-2290MHz band that is critical to our satellite communications downlink and aeronautical mobile telemetry testing, yet collectively DoD and Dish were able to establish the rules to permit this new use to enter the band without risk of harmful interference. We are also working with the FCC and NTIA to explore ways to increase commercial access by sharing the 3550-3650MHz band and enable sharing in the 5GHz bands as well for commercial broadband use. To date we have identified 405MHz of spectrum for potential commercial broadband use.

While large-scale spectrum sharing between federal systems and commercial licensed cellular broadband services presents new challenges, DoD is committed to working with government and industry partners to develop equitable spectrum sharing solutions. DoD is actively supporting efforts through NTIA-established working groups (WGs) under its Commerce Spectrum

Management Advisory Committee (CSMAC) to further the 1755-1850 MHz band assessment, working with interagency partners, NTIA, FCC and industry. In spite of the information sharing challenges within the CSMAC WGs construct, DoD took on most of the analysis in order to progress the work to determine the best possible solution to repurpose the 1755-1850 MHz band. DoD has completed and provided the results to the WGs. DoD has also provided the details of the analysis to NTIA and the FCC for validation. As everyone recognizes, information sharing continues to be challenge, but DoD is working closely with NTIA, the FCC, and industry to develop viable methods to share controlled unclassified information with respect to the 1755-1850 MHz band. In fact, DoD recently met with NTIA and industry representatives and came to an agreement on an approach to share information with industry selected participants in the CSMAC working groups. Industry has provided us with answers to questions posed by DoD and we have developed and signed non-disclosure agreements to make this happen immediately. We are currently waiting on industry to sign the agreements.

The outcome so far from the CSMAC WGs evaluation have been very useful to finding long term solutions, although the final reports have not been completely finalized. The main focus of the evaluation is to determine the feasibility of sharing the entire 1755-1850 MHz band versus relocation, with the exception of the video surveillance systems, which are addressed under WG-2 and have been determined not to be compatible with the commercial mobile wireless broadband systems and, therefore, must relocate. WG-3 is showing promising results that sharing between federal satellite operations and commercial mobile wireless broadband is feasible. WG-4 is addressing Tactical Radio Relay, Software Defined Radios, and Fixed Point to Point Microwave systems and is showing the need for some sharing, some relocation and some systems may be able to operate above 1780 MHz with assured access to comparable spectrum. WG-5 which addressed federal airborne systems is the most challenging, not surprisingly, as sharing between federal airborne operations and commercial mobile broadband would require significant distance separations to preclude interference. Currently, DoD is unaware of commercial technologies that would allow airborne systems to share this spectrum band with commercial mobile devices without extensive exclusion zones. Therefore, it is likely that DoD will have to pursue options to relocate or modify the channelization of equipment, while maintaining essential capabilities. .

WG-1 addressed a different band, 1695-1710 MHz, and arrived at equitable sharing arrangements with refined results that greatly improved the 'fast track analysis' with respect to sharing between federal weather satellite receivers and commercial wireless broadband systems (LTE technology specifically). This is a positive outcome that enables DoD and other federal agencies to start developing transition plans in order to meet the congressional mandated auction timeline for this band.

DoD has also been cooperatively working with three major wireless providers to evaluate sharing the 1755-1850 MHz band, including allowing the wireless providers on selected DoD sites to monitor the spectrum, as well as modeling, simulation and analysis to develop an understanding of the sharing environment. The group has completed the monitoring phase, and DoD continues to work with industry to fully define the modeling simulation and analysis phase activities.

All of these efforts are examples of an unprecedented collaboration between the DoD and the commercial industry to assess highly complex technical issues with a goal of ensuring practical and balanced spectrum repurposing decisions that are economically viable, technically sound and operationally viable from a mission perspective.

Let me also address the issue of the lower 25 MHz or the 1755 – 1780 MHz band. We fully understand the desire to bring this 25 MHz to market rapidly, particularly with a potential pairing band called out for auction within three years in the Middle Class Tax Relief and Job Creation Act. However, the Department has some significant reservations, including with FCC notification to NTIA to auction the band as early as September 2014. As we worked within NTIA's established process to identify the 500 MHz directed by the President, the federal agencies, including DoD, were instructed to study reallocation of the entire 95 MHz band. Thus, a detailed study of vacating solely the lower 25 MHz has not been conducted, and the results of the full 95 MHz band study cannot be extrapolated to a solution for just the lower 25 MHz for many systems. Further, DoD would like to understand the long term status of the full band as part of any decision on the lower 25 MHz, in order to fully understand the impacts on DoD warfighting missions and cost implications of any relocation.

In order to make balanced decisions about relocating from or sharing the 1755-1850 MHz band

or any other spectrum, the Department requires adequate time to conduct operational, technical, cost and schedule-feasibility analysis to ensure national security and other federal capabilities are preserved, while supporting the economic benefits spectrum use affords the nation. These studies are critical to preserving the warfighting advantages our weapons systems provide so that our soldiers, sailors, airman and marines can perform their missions with the greatest possible advantage over our adversaries, and return home to their loved ones safely. For example, in evaluating alternative proposals for the 1755-1850MHz band, we must consider whether they overstate DoD's ability to compress, or understate the need for comparable spectrum and cost reimbursement, Further, without these assessments to inform clear plans and guidance, including where Federal systems will move to, it is difficult for Federal agencies to develop transition plans that would enable auction and reallocation of spectrum.

Based on all the analysis that has been done thus far, it is clear that complete relocation or total compression of federal operations into the 70 MHz between 1780-1850 MHz have major challenges associated with them. None of the analyses conducted thus far (by NTIA, the Federal Agencies, or CSMAC WGs) has assessed full compression into the upper 70 MHz, 1780-1850 MHz, both assessments provide great insight as to what challenges would be expected if compression of federal systems without proper accommodation is attempted. The NTIA assessment showed some ground systems can transition out of the 1755-1780 MHz band within 5 years as a transition step to relocating out of the entire band in 10 years. However, some major airborne systems (e.g., ACTS, AMT) could not transition out of the lower 25 MHz in many major commercial market areas due to significant separation distance requirements. In turn, eliminating use of 25 MHz without accommodation of alternative spectrum to move to would result in loss of capabilities for DoD and adverse operational impact.

In addition, the assessments undertaken so far highlight the fact that a realistic and balanced solution for the spectrum challenges we face will likely include a combination of sharing, relocation, and some compression. DoD believes that any solution, however, will require access to comparable spectrum and funding. From a DoD perspective, an approach that considers a combination of strategies to assess the 25 MHz and that takes into account national security and economics could reduce the total relocation costs for Federal agencies and lessen demands for comparable spectrum.

DoD recognizes the need to look forward. The Department is developing a spectrum strategy focused on investing in technologies and capabilities aimed at more efficient use and management of spectrum, and for increased interoperability with our Coalition partners and with Federal, State, and commercial entities.

Summary

The ability to have assured access to spectrum in order to operate spectrum-dependent national security capabilities without causing and receiving harmful interference while understanding the critical needs of our Nation's economy remains paramount to the Department. The federal government and our industry partners have built an impressive team that is working toward solving the technical and policy issues so we can move ahead. Together, we will develop long-term solutions to achieving a balance between national security spectrum requirements and meeting the expanding demand of commercial broadband services.

I want to thank you for your interest in hearing the importance of spectrum to DoD and I am happy to answer any questions you may have.

Mr. WALDEN. Thank you, Ms. Takai. We appreciate your testimony.

We will go now to Mr. Dean Brenner, the Senior Vice President, Government Affairs, for Qualcomm Incorporated. Thanks for your testimony. We look forward to hearing your comments here.

STATEMENT OF DEAN BRENNER

Mr. BRENNER. Good morning, Chairman Walden, Ranking Member Eshoo, and members of the subcommittee. I am proud to begin by saying that Qualcomm, an American company, is the world's largest licenser of technology and the world's largest manufacturer of chips for wireless devices. Our chips support licensed technologies, 2G, 3G, and 4G, unlicensed Wi-Fi, Bluetooth, and NFC, and GPS. Our chips support as many frequency bands as possible, because there are now approximately 40 bands worldwide for LTE alone.

We strive to develop new technologies, add them into our chips, and support every new band, as quickly as possible. We work with virtually every wireless carrier and manufacturer in the world.

We base our views on spectrum policy on technical feasibility and implementation. When we think about a new band, we always ask what technology is technically best suited for it, and what policies will enable the industry to start using it rapidly and broadly.

Every day, we deal with the enormous growth of wireless usage, and that is why we deeply appreciate the subcommittee's efforts to enact the Middle Class Tax Relief and Job Creation Act of 2012. In our view, the subcommittee got it right, and to help ease the spectrum crunch, it is crucial that the FCC successfully implement the voluntary incentive auction authorized in the Act.

Qualcomm's goal is to meet what we call the "1000x Challenge" to expand wireless capacity by 1,000 times. Wireless data usage is doubling each year, and if that trend continues, in 10 years, the usage will be 1,000 times today's. Qualcomm, the industry, and policymakers must work together on many fronts, in parallel, to meet the 1000x Challenge. The combination of massive research and development, extensive deployment of new small cells, and allocation of far more spectrum provides a good path to meet the 1000x Challenge.

Let me start with R&D. Last year, Qualcomm spent almost $4 billion, or over 20 percent of our revenues, on R&D, including many initiatives to help meet the 1000x Challenge, such as carrier aggregation and supplemental downlink to bond together separate bands for more capacity and faster data speeds for consumers; LTE broadcast for multi-casting of video and data in places where people want to see the same content; LTE direct to allow first responders and others to communicate device-to-device even if the cell network is down; 802.11ac and ad for faster Wi-Fi and unlicensed; DSRC, which enables cars to communicate with one another and with infrastructure to avoid collisions; and a next-generation system to provide broadband for airplane passengers.

In addition, creating 1000x more capacity will require locating cellular base stations much closer to devices. I am not talking about putting cell towers closer to people's homes; I am talking about integrating licensed small cells into networks, cells as small

as the one I am holding in my hand. This cell, with one of our chips inside, has the connectivity of a base station, but at much lower power. You can put it indoors, where so much wireless traffic originates. Software will integrate it into a wireless network to create what we call a hetnet, a heterogeneous network with cells of different sizes.

The third prong to meet the 1000x Challenge is, of course, your focus today: spectrum. We need more spectrum, far more spectrum. We need more clear, exclusive use licensed spectrum, such as the new 600 megahertz band from the voluntary incentive auction. Clearing new bands by a date certain in a reasonable time, and auctioning them for exclusive use, is, of course, the industry's top priority. For unlicensed, wide contiguous bands, adjacent to an existing unlicensed band, such as the 5.4 gigahertz band that the 2012 legislation directed NTIA and the FCC to consider for sharing, is ideal. Other government bands are equally important but do not fall easily into the two categories I just mentioned. We support the President's memorandum that seeks to enable the exchange of information and resolve the other practical issues that have hamstrung efforts to free up 1755 to 1780 megahertz. We look forward to working with the new Spectrum Policy Team created by the memorandum.

We are also focused on other government bands that are not used coast-to-coast on a 24/7 basis, but will not become clear in a reasonable time, such as 3.5 gigahertz. 3.5 gigahertz would be ideal for licensed small cells like this one, operating at low power and minimizing any impact on government operations. A small cell can operate at 3.5 because its signal need not travel far, but it requires licensed spectrum to avoid interference. We are working very constructively with NTIA and the FCC on this band.

Qualcomm, Nokia Siemens, and others have proposed what we call Authorized Shared Access, or ASA, to enable commercial use of a band such as 3.5 gigahertz when and where it is not used by the government. ASA is binary, either an operator or the government would use the spectrum at any given time and location. A database would ensure that government operations are fully protected from interference and when the operator uses the spectrum, it can provide a predictable quality of service. ASA can provide access to bands that would otherwise be unavailable for many years, without requiring any new technology for devices or networks.

Thank you, and I look forward to answering your questions.

[The prepared statement of Mr. Brenner follows:]

Before the

U.S. House of Representatives

Subcommittee on Communications & Technology

Hearing on "Equipping Carriers and Agencies in the Wireless Era"

Statement of

Dean R. Brenner

Senior Vice President, Government Affairs

Qualcomm Incorporated

June 27, 2013

Summary

Qualcomm, an American company, is the world's largest licensor of wireless technology and the world's largest manufacturer of chips for wireless devices. Our chips support licensed and unlicensed technologies and as many frequency bands as possible. We strive to develop new technologies, add them into our chips, and support every new band, as quickly as possible. Given the enormous growth of wireless usage, we deeply appreciate the Subcommittee's efforts to enact the Middle Class Tax Relief and Job Creation Act of 2012. The FCC must implement the voluntary incentive auction successfully to help ease the spectrum crunch.

Our goal is to meet the "1000x Challenge"—to expand wireless capacity by 1000 times. If usage doubles for ten years, it will be 1000 times today's. Qualcomm, the industry and policymakers must work together on many fronts, in parallel, to meet the 1000x Challenge. The combination of massive research and development, extensive deployment of new licensed small cells, and far more spectrum provides a good path to meet the 1000x Challenge.

First, we are developing new technologies to help meet the 1000x Challenge such as: Carrier Aggregation and Supplemental Downlink, for more capacity and faster data speeds; LTE-Broadcast to deliver content where many people want to see the same thing; LTE-Direct to enable communications when cell networks go down; 802.11ac and ad for faster unlicensed services; DSRC, to enable cars to communicate to avoid collisions; and, broadband for airplanes.

Second, to create 1000x more capacity, cell base stations need to be much closer to devices. Licensed small cells, integrated into wireless networks, will help meet the 1000x Challenge.

Third, meeting the 1000x Challenge will also require far more spectrum. The industry needs more clear, exclusive use licensed spectrum, such as the 600 MHz spectrum from the voluntary incentive auction. Clearing new bands by a date certain and auctioning them for exclusive use is the industry's top priority. For unlicensed, wide contiguous bands, adjacent to an existing unlicensed band, such as 5.4 GHz, which the 2012 directed NTIA and the FCC to consider for sharing, is ideal. Other government bands are equally important. We support the President's Memorandum to resolve the practical issues to free up 1755-1780 MHz, and we look forward to working with the new Spectrum Team created in the Memorandum.

We're also focused on other government bands that are not used coast-to-coast, 24/7, but will not become clear in a reasonable time, such as 3.5 GHz, which would be ideal for licensed small cells. Qualcomm and others have proposed Authorized Shared Access (ASA) to enable use of a band such as 3.5 GHz by an operator when and where it's not used by the government. A database would ensure that government operations are fully protected from interference, and the operator can provide a predictable quality of service when it can use the spectrum. ASA can provide access to bands that would otherwise be unavailable for many years, without requiring any new technology or devices. We're working very constructively with NTIA and the FCC on this initiative, which is another important aspect of meeting the 1000x Challenge.

Good morning, Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee. I'm proud to begin by saying that Qualcomm, an American company, is the world's largest licensor of wireless technology and the world's largest manufacturer of chips for wireless devices. Our chips support licensed technologies, 2G, 3G, and 4G; unlicensed Wi-Fi, Bluetooth, and NFC; and, GPS. Our chips support as many frequency bands as possible because there are now approximately 40 bands worldwide for LTE alone.

We strive to develop new technologies, add them into our chips, and support every new band, as quickly as possible. We work with virtually every wireless carrier and manufacturer in the world. Qualcomm constantly innovates and works with our many partners to deploy our innovations swiftly.

We base our views on spectrum policy on technical feasibility and implementation. When we think about a new band, we always ask what technology is best suited technically for it, and what policies will enable the industry to start using it rapidly and broadly.

Every day, we deal with the enormous growth of wireless usage, and that's why we deeply appreciate the Subcommittee's efforts to enact the Middle Class Tax Relief and Job Creation Act of 2012.[1] In our view, the Subcommittee got it right, and to help ease the spectrum crunch, it's crucial that the FCC successfully implement the voluntary incentive auction authorized in the Act.

Qualcomm's goal is to meet what we call the "1000x Challenge"-- to expand wireless capacity by 1000 times.[2] Wireless data usage is doubling each year, and if that trend continues, in ten years, the usage will be 1000 times today's. Qualcomm, the industry, and policymakers must work together on many fronts, in parallel, to meet the 1000x Challenge. The combination of massive research and development, extensive deployment of new small cells, and allocation of far more spectrum provides a good path to meet the 1000x Challenge.

Let me start with R &D. Last year, we spent almost $4 billion, or over 20 percent of revenues, on R & D, including many initiatives to help meet the 1000x Challenge, such as:

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[1] Public Law No. 112-96, 126 Stat. 156, enacted February 22, 2012.

[2] See http://www.qualcomm.com/solutions/wireless-networks/technologies/1000x-data.

- Carrier Aggregation and Supplemental Downlink to bond together separate bands for more capacity and faster data speeds for consumers;
- LTE-Broadcast for multi-casting of video and data in places where many people want to see the same content;
- LTE-Direct to allow first responders and others to communicate device-to-device even if the cell network is down;
- 802.11ac and ad for faster Wi-Fi and other unlicensed applications;
- DSRC, which enables cars to communicate with one another to avoid collisions; and,
- a next-generation system to provide broadband for airplane passengers.

In addition, creating 1000x more capacity will require locating cellular base stations much closer to devices. I'm not talking about putting cell towers closer to people's homes. I'm talking about integrating licensed small cells into cell networks—cells as small as the one I am holding in my hand. This cell, with one of our chips inside, has the connectivity of a base station, but at much lower power. You can put it indoors, where so much wireless traffic originates. Software will integrate it into a wireless network to create a hetnet—a heterogeneous network with cells of different sizes.

The third prong to meet the 1000x Challenge is your focus today: spectrum. We need more spectrum—far more spectrum. We need more clear, exclusive use licensed spectrum, such as the 600 MHz spectrum from the voluntary incentive auction. Clearing new bands by a date certain in a reasonable time, and auctioning them for exclusive use, is the industry's top priority. For unlicensed, wide contiguous bands, adjacent to an existing unlicensed band, such as the 5.4 GHz band that the 2012 legislation directed NTIA and the FCC to consider for sharing, is ideal.[3]

Other government bands are equally important and do not fall easily into the two categories I just mentioned. We support the President's Memorandum that seeks to enable the exchange of

[3] See Section 6406 of the Middle Class Tax Relief and Job Creation Act, supra.

information and resolve other practical issues that have hamstrung efforts to free up 1755-1780 MHz.[4] We look forward to working with the new Spectrum Team created by the Memorandum.

We are also focused on other government bands that are not used coast-to-coast, on a 24/7 basis, but will not become clear in a reasonable time, such as 3.5 GHz. 3.5 GHz would be ideal for licensed small cells, operating at low power and minimizing any impact on government operations. A small cell can operate at 3.5 GHz because its signal need not travel far, but it requires licensed spectrum to avoid interference. We're working very constructively with NTIA and the FCC on this band.

Qualcomm and others have proposed what we call Authorized Shared Access (or ASA) to enable commercial use of a band such as 3.5 GHz when and where it is not used by the government.[5] ASA is binary—either an operator or the government would use the spectrum at any given time and location. A database would ensure that government operations are fully protected from interference and when the operator uses the spectrum, it can provide a predictable quality of service. ASA can provide access to bands that would otherwise be unavailable for many years, without requiring any new technology for devices or networks.

Thank you. I look forward to answering your questions.

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[4] See Presidential Memorandum, "Expanding America's Leadership in Wireless Innovation," issued June 14, 2013.

[5] See Comments of Qualcomm Incorporated, In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Docket 12-254, filed February 20, 2013; Reply Comments of Qualcomm Incorporated, In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, supra, filed April 5, 2013.

Mr. WALDEN. Mr. Brenner, thank you for your testimony.

And now our final witness this morning, Mr. Christopher Guttman-McCabe, the Executive Vice President, CTIA—The Wireless Association. Sir, please go ahead with your testimony.

STATEMENT OF CHRISTOPHER GUTTMAN-MCCABE

Mr. GUTTMAN-MCCABE. Yes. Good morning. Thank you, Chairman Walden, Ranking Member Eshoo, and members of the subcommittee. I appreciate the opportunity to participate in today's hearing. CTIA hopes this hearing will lead to a recognition that a well-planned, properly executed reallocation of federal spectrum can produce results that benefit the government, the wireless industry, the United States' economy, and the American public.

As I have noted in previous hearings, America's wireless sector is facing unprecedented demand for wireless broadband capability. The demand curve we are facing requires that the wireless industry have access to additional licensed spectrum.

Fortunately, Congress recognized this when it passed the Spectrum Act and authorized incentive auctions that should result in the conversion of some television broadcast spectrum for wireless broadband use. The FCC is moving to implement that legislation and it is vitally important that the process move forward expeditiously. But even if the incentive auction yields the 120 megahertz called for in the National Broadband Plan, that and other bands identified for auction by last year's legislation will only provide a portion of what is needed for the industry to meet consumers' and businesses' need for wireless broadband.

Additionally, absent an aggressive effort to make additional spectrum available, the leadership role that the U.S. has long enjoyed could be put at risk. Many of our trading partners have recently brought or are in the process of bringing substantial amounts of spectrum to market for commercial use. The United States must keep pace, but under the most optimistic scenario, the auctions flowing from last year's legislation still will leave us short of these international efforts and fail to achieve the Broadband Plan's call for making 300 megahertz available for mobile flexible use by 2015.

To cover the shortfall Congress should, with leadership from this subcommittee, as has been the case countless times in the past, look to repurpose bands held by federal users. Clearing federal users from some of the bands they currently occupy will help the commercial sector gain access to the spectrum it needs while providing a critical infusion of funds to facilitate the federal users' movement to state-of-the-art equipment. This will reduce ongoing maintenance and procurement costs and free up limited financial resources that are increasingly strained by the budget caps imposed under the Budget Control Act.

The most logical frequency band to start with as we look to repurpose federal spectrum is the block between 1755 and 1780 megahertz. That band is immediately adjacent to existing commercial spectrum and it will fit seamlessly into the current mobile broadband spectrum portfolio. It will allow for rapid and efficient equipment development and facilitate a more cost-effective migration of mobile broadband technologies into that band. Additionally, because most developed countries, including 17 of the 20 members

of the G–20, either use or have allocated the 1755 to 1780 band for commercial use, there are significant economies of scale and scope that favor commercialization of this band. Recognizing that most of the developed world has already made the decision to use this band for commercial service, CTIA believes that the United States should follow the course charted by our trading partners. To CTIA, the right choice is clear. We have been studying this band for well over 3 years. It is time for decisive action on the part of our federal partners.

Near-term action by NTIA will allow the 1755 band to be paired with spectrum currently available for licensing at 2155 to 2180 megahertz. Current law requires that 2155 band to be licensed by February, 2015, and it is our hope that the 1755 band will be made available so that the two bands can be auctioned together. Pairing these bands will maximize their value not only to industry, but also to the government. A study by the Brattle Group found that auctioning the 2155 band by itself would yield just $3.6 billion, but when paired with the 1755 and auctioned together, they could generate as much as $15 billion. Given the budget realities facing the country, a difference of that magnitude should not be ignored. With support from this committee and the rest of Congress, as well as the White House, NTIA can move quickly to capture the benefits of pairing these two bands.

As an indication of our focus on this band, we have proposed a relocation roadmap that identifies alternative bands to which services currently operating in the 1755 to 1780 band could be relocated at a cost more than covered by auction revenue. This can happen in a way that improves their equipment and maintains and protects federal users' ability to execute their missions while alleviating risks to taxpayers and limiting dependence on an unpredictable and strained appropriation process.

We live in a wireless world. Every day we all see signs that our lives and our economy are tied directly to this amazing industry. We are willing to work in a collaborative and constructive manner, but we need your help to ensure that the process actually moves forward. We look forward to engaging with this subcommittee and with the teams at NTIA and DOD. Thank you again for the opportunity to participate in today's hearing. I look forward to your questions.

[The prepared statement of Mr. Guttman-McCabe follows:]

Testimony of

Chris Guttman-McCabe

Executive Vice President

CTIA – The Wireless Association®

on

"Equipping Carriers and Agencies in the Wireless Era"

before the

House Energy & Commerce

Subcommittee on Communications and Technology

June 27, 2013

Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee, thank you for the opportunity to participate in today's hearing on behalf of CTIA – The Wireless Association®. We welcome this hearing and hope it will lead to a recognition that well-planned, properly executed relocation of Federal spectrum users can produce results that benefit the government, the wireless industry, and, most importantly, the American public.

As I have noted in previous appearances before the Subcommittee, America's wireless sector is facing unprecedented demand for wireless broadband capacity. The demand curve we are facing, which Cisco projects will grow by a factor of nine over the next five years, requires that the wireless industry have access to additional licensed spectrum if it is to continue meeting consumer expectations and serving as a catalyst for economic growth and U.S. leadership.

Fortunately, Congress recognized this when it included provisions in last year's Middle Class Tax Relief and Job Creation Act authorizing the FCC to conduct incentive auctions that may result in the conversion of some television broadcast spectrum for wireless broadband use. The FCC is moving to implement that legislation and it is vitally important that the incentive auction process move forward expeditiously. It is equally important that the Commission get it right by maximizing the amount of spectrum that is brought to auction. But even if the incentive auction process yields the 120 megahertz called for in the National Broadband Plan, that and other bands identified for auction by last year's legislation will only provide a portion of what is needed for the industry to meet consumers' and businesses' need for wireless bandwidth.

Additionally, absent an aggressive effort to bring additional spectrum to market, the leadership role the U.S. has long enjoyed in wireless could be put at risk. Many of our trading partners, who are also America's competitors, have recently brought or are bringing substantial amounts of spectrum to market for commercial use. For instance, Germany recently auctioned 350 megahertz, while the U.K. recently auctioned 245 megahertz, and Spain just auctioned 260 megahertz. On the Pacific Rim, Japan has 255 megahertz in the pipeline, while Australia is bringing 230 megahertz to market. It is important that the U.S. keep pace, yet under the most optimistic scenario, the auctions flowing from last year's legislation still will leave the U.S. short

of all of these international efforts and fail to achieve the National Broadband Plan's goal of making 300 megahertz "available for mobile flexible use"[1] by 2015.

To close this gap, Congress should – as it has in the past, always with leadership from this Subcommittee – look to repurpose bands held by Federal users for commercial use. Clearing Federal users from some of the bands they currently occupy will help the commercial sector gain access to the spectrum necessary to stay ahead of consumer demand. And perhaps just as importantly, a relocation process that leads to an auction can provide a critical infusion of funds to facilitate Federal users' movement to state-of-the-art technology. This will reduce ongoing maintenance and procurement costs for Federal agencies and free up resources that are increasingly strained by the budget caps imposed under the Budget Control Act.

The most logical frequency band to start with as we look to repurpose Federal spectrum is the block between 1755 and 1780 megahertz. While that band is currently used by the Department of Defense and other Federal agencies, it is identified internationally for commercial mobile use and thus its reallocation for commercial use would produce substantial benefits for industry and government alike.

From our members' perspective, allocating the 1755-1780 megahertz band for commercial service makes tremendous sense. The band is immediately adjacent to existing domestic wireless commercial spectrum, and thus it would fit seamlessly into the current mobile broadband spectrum portfolio. This will allow for more efficient equipment development and facilitate a more cost-effective migration of existing and developing technologies into the band. Additionally, because most developed countries – including 6 of 8 members of the G-8 and 17 of 20 members of the G-20 – either use or have allocated the 1755-1780 megahertz band for commercial use, there are significant economies of scale and scope that favor commercialization of the band. Recognizing that most of the developed world has already made the decision to commercialize the 1755 to 1780 megahertz band, we need to follow or disconnect the U.S. from the course charted by most of our trading partners. To CTIA, the right choice is clear.

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[1] National Broadband Plan, at 84. Available at www.broadband.gov.

Assuming that the 1755-1780 megahertz band can be reallocated, it should be paired with spectrum currently available for licensing at 2155-2180 megahertz. Current law requires the 2155-2180 megahertz band to be licensed by February, 2015 and it is our hope that the 1755-1780 megahertz band can be made available so that the two bands can be auctioned together. Pairing these bands will maximize their value not only to industry, but also to the government. A study by the Brattle Group found that auctioning the 2155-2180 megahertz band by itself would yield just $3.6 billion, but when paired with the 1755-1780 megahertz band, the pairing could generate as much as $15 billion.[2] Given the budget realities facing the country, a difference of that magnitude should not be ignored. But given the fast-approaching deadline for licensing the 2155-2180 megahertz band, achieving this beneficial pairing requires a sense of urgency from all parties.

As an indication of our commitment to moving the process forward, we have developed a proposed relocation "roadmap" that identifies alternative Federal bands to which services currently operating in the 1755 to 1780 megahertz band could be relocated and benchmarks the cost of these relocations at approximately $4.7 billion. Based on information drawn from the NTIA 1755-1850 MHz Band Feasibility Report, the Commerce Spectrum Management Advisory Committee (CSMAC) Working Group effort, and an industry-sponsored monitoring study, we believe the "roadmap", if implemented, could enable operations subject to relocation to migrate to suitable alternative bands and state-of-the-art equipment in a way that maintains and protects Federal users' ability to execute on their missions while alleviating risk to taxpayers and dependence on an unpredictable and strained appropriations process.

Having offered the "roadmap" in a good-faith effort to advance discussions between industry and the government, we hope the Department of Defense and NTIA will respond constructively. If the government disagrees with the industry's analysis, it should identify points

[2] Coleman Bazelon, "The Economic Basis of Spectrum Value: Pairing AWS-3 with the 1755 MHz Band is More Valuable than Pairing it with Frequencies from the 1690 MHz Band," at 1. Available at http://www.brattle.com/_documents/UploadLibrary/Upload938.pdf.

of disagreement and offer its own proposed solutions, but do so expeditiously in recognition that the statutory clock is ticking on the 2155 to 2180 megahertz band.

We look forward to engaging with the Subcommittee and Federal users to move forward with the relocation process. With the protections provided by the Commercial Spectrum Enhancement Act's updated framework for Federal relocations, a properly executed relocation plan can result in a win-win-win for Federal users, the wireless industry, and the American public. Federal systems, many of which are decades-old and outdated, can be upgraded to the newest, most efficient technology. Wireless carriers can then use the relinquished spectrum to provide services and grow the economy. And the public will benefit from the savings associated with more efficient government systems and more robust, ubiquitous wireless broadband service.

Thank you again for the opportunity to participate in today's hearing. CTIA looks forward to working with the Subcommittee and the Federal user community to achieve an outcome that balances each of our interests and meets all of our needs. Taxpayers and consumers, who, of course, are one and the same, deserve no less.

Mr. WALDEN. Thank you, Mr. Guttman-McCabe. We share your concern about moving along and getting this done in a timely manner.

Ms. Takai, the Department continues to be critical of part of the spectrum—a critical part, I am sorry, of the spectrum debate. Let me be clear, we all believe that DOD's mission critical systems must be maintained and that operational readiness must be improved through this process. What special and specific challenges have hampered the Department's ability to improve its systems, and how can we help DOD clear or relocate existing systems without impacting their readiness? So what are the specific challenges that you face?

Ms. TAKAI. Well, I think if we talk to the specific challenges in terms of the systems that we have and then speak to the challenges of moving, I think the challenges that we have in terms of our specific systems is that today, what we focused on is because we have the availability of those systems to support our training needs, we have not necessarily been able to put the dollars into putting new innovative technologies into those systems in order to do some of these things. The second piece of it is that as some of the spectrum sharing capabilities are being developed, some of the new technologies, we have to look at how we introduce those into those capabilities and how long that would take.

So for instance, just to give you probably the most difficult example, is really our air combat training system, which is used in all of our planes and is really used in all of our UASs. The challenge for us is that all of our training is done in the U.S., and so our ability to actually, first of all, use that system and be able to compress into the higher band, moving to the 1780 to 1850, causes us interference problems because we would run multiple missions in a smaller amount of spectrum. So that is just one example probably of the most difficult system.

We have looked at some of the systems that are exclusive and we would have some opportunity to move, so I don't want to give the impression that all of our systems are challenged in that way, but the one I think that is the most problematic, the specific example is that it would, in fact, give us interference issues. It would limit the number of training missions that we could fly at the same time, and therefore reduce the number of training hours, which again are necessary for pilot certification prior to being able to deploy.

Mr. WALDEN. I am curious, to Mr. Guttman-McCabe, what does your roadmap say about the combat training system and pilot training?

Mr. GUTTMAN-MCCABE. Yes, thank you, Mr. Chairman. So just to take maybe a half-step back, the roadmap was put in place to address specifically the concerns about the lack of information that was flowing, so what we did is we actually went back to NTIA's assessment of several years ago, and we identified bands that NTIA had identified for possible reallocation and repurposing of these existing services. And what we found is that it looks—at least, it should be studied and if we are wrong, we should get some feedback, but it looks like each of these services have a band that they could go into, a band that already is a government-utilized band.

And so, there is no one in this room who wants to negatively impact our war fighters' ability to prosecute their jobs, but I think there needs to be a balance and what we are looking for is that balance. We have put a roadmap on the table. I think it is something, at least a starting point that DOD could work from and Ms. Takai and her team could look at, but it is bands that they have identified. I mean, we didn't pull this and create this from whole cloth.

Mr. WALDEN. So Ms. Takai, bands you have identified several years ago could be used? Is that—do you and Mr. Nebbia want to comment on that?

Ms. TAKAI. Yes. First of all, Mr. Chairman, I certainly don't want to imply that we aren't willing to work on moving and work on what the relocation would be. We have seen some of the results of the roadmap. We have not seen the full roadmap. My understanding is that is being released to us, and we are very willing to take a look at the recommendations that are in that roadmap and look to see where there are options and where there are areas that perhaps we have not studied adequately or where there may be opportunities for us to make the move that is suggested in that analysis.

Mr. WALDEN. OK.

Ms. TAKAI. We have been working on some of those areas in the CSMAC process, but I don't know that we have seen the complete one.

Mr. WALDEN. So Mr. Guttman-McCabe, can you get her the complete roadmap, or have you done that?

Mr. GUTTMAN-MCCABE. Absolutely. We submitted it formally to the CSMAC process and it has been filed at the FCC as well, and I think Dean has one in his right hand.

Mr. BRENNER. Here it is.

Mr. GUTTMAN-MCCABE. Yes.

Mr. WALDEN. All right. This is great. We are all getting along. This is wonderful. We have made progress right there.

My time—before I yield to my friend from California, just know that we are serious about trying to compress this timeline and get the answers, because it has been a number of years. And I also respect this is complicated stuff you have to get right, but I think I see a real bipartisan approach here to on a regular basis have some discussions and get some updates. We want to move this along. We want to move this along.

So I will turn now to the ranking member of the subcommittee, Ms. Eshoo, for 5.

Ms. ESHOO. Thank you, Mr. Chairman. Just in that exchange, maybe 6 months were saved, so maybe we should just keep having more——

Mr. BRENNER. Happy to be of service.

Ms. ESHOO [continuing]. Hearings. So thank you very much to each one of you for your testimony.

I can't help but think—this is just a general observation that federal agencies obviously need to have incentives in order to do this, and we can't just view this—or they can't—agencies can't just view this as a loss. You have to think of it as a win as well, and how we bring about the win is obviously what we want to zero in on.

But I have to say that the same old, same old that has prevailed for years simply is not going to be accepted around here. It just can't be. So this is as serious as it gets, and we really want to see some movement and some action in the right places with all the right things surrounding it.

So to Ms. Takai first. To date, DOD has not answered or directly answered what it would cost to reallocate the 25 megahertz of spectrum between 1755 and 1780, so I am going to ask about it again. Do you have a cost estimate and if not, when can you get one?

Ms. TAKAI. Yes, ma'am, we have not done a cost estimate for only the 1755 to 1780 band in terms of the next steps on it, and the reasons for not doing it is, number one, what we are looking for is some direction in terms of what is going to happen as it relates to is this going to be a two-stage auction where it would be the 1755 to 1780 and the second would be the——

Ms. ESHOO. Well, how can that be kind of short-circuited to get an answer from you?

Ms. TAKAI. Well, I think I would need to turn to my colleague at NTIA, because generally the direction in terms of the agencies to be able to put those estimates together would come out to all of the agencies.

Ms. ESHOO. But do you sit down and talk to each so that—if you have a commitment to reallocate and there needs to be a cost estimate, why wouldn't the two of you sit down and talk about it? Why are we—why am I even having to ask this question again? Maybe Ms. Takai first and then maybe NTIA? I don't want to use all my time on this, but this is frustrating.

Ms. TAKAI. Sure. Right, and first of all, I think I didn't mean to give the impression that we don't sit and talk about it a lot. We have put——

Ms. ESHOO. Well, that is a Washington meeting, with all due respect.

Ms. TAKAI. Well——

Ms. ESHOO. You have to have an outcome. We have meetings so that something comes out of it and we get something done.

Ms. TAKAI. Yes, ma'am. The challenge, I think, is that as we have met, in order for us to do an estimate of what it would take to move out of the 1755 to 1850, we need to understand where we would either relocate to or what the requirement would be in terms of where to move.

Ms. ESHOO. When do you think you will get this done?

Ms. TAKAI. Until we get an estimate or until we get direction in terms of are we going to be asked to compress into 1850—1780 to 1850— will we have the opportunity for either exclusive comparable spectrum or shared comparable spectrum——

Ms. ESHOO. OK.

Ms. TAKAI [continuing]. And until we have some idea of where, in fact, we can go and effectively either move to or share——

Ms. ESHOO. I think I have got the picture.

Ms. TAKAI. I can't really give you an estimate.

Ms. ESHOO. Yes. It hasn't changed.

Mr. Brenner, thank you for being willing to testify today. In your testimony, you talk about the benefits of connected vehicle technology as well as Qualcomm's work to deliver faster Wi-Fi and

other unlicensed applications in the 5 gigahertz band. Is this an either/or scenario, or through spectrum sharing can we successfully achieve both goals?

Mr. BRENNER. I think we can successfully achieve both goals.

Ms. ESHOO. Nice soft setup.

Mr. BRENNER. Thank you, I appreciate it. We can achieve both goals and it is crucial that we do, and let me explain why I say that. So at Qualcomm, we have been working on DSRC for years. Alistair Inquist, my colleague and I who is here with me, we attended the meeting at the FCC in 2003 in which they authorized the rules for DSRC. DSRC is ready, can be implemented.

Ms. ESHOO. So that is a decade ago.

Mr. BRENNER. Right. It is time to get DSRC going, and what we don't want is a spectrum proceeding at the FCC that, as you know, can go on for years to delay DSRC. So here is what we said at Qualcomm. We looked at the spectrum map, and if you—a faster variant of Wi-Fi that we are launching, 802.11AC, it operates in channels of 40 megahertz, 80 megahertz, or 160 megahertz. But when you do the math, the last 30 megahertz of the DSRC spectrum, that is 5895 to 5925, is of no use for Wi-Fi. It will never be used for Wi-Fi. It is not a multiple of 40, 80, or 160. So what we propose to the FCC is let's take that off the table for sharing. Let's put DSRC safety applications into that clear 30 megahertz exclusive use. And by the way, the chips that we are making for DSRC and which are used in the testing that has gone on, they only use 10 megahertz. So the 30 that is available would be ample for the DSRC safety applications that are ready to go. So what we said is put DSRC exclusively in that 30, and then we can talk about how do to sharing in the other 45.

Ms. ESHOO. Good, thank you.

Mr. BRENNER. And we have some ideas about how to do that.

Ms. ESHOO. Great. Mr. Chairman, I don't know if we are going to have another round, but if we do, I have some additional questions. So thank you, and thanks again to the witnesses.

Mr. WALDEN. Turn now to the vice chair of the subcommittee, Mr. Latta, for 5 minutes.

Mr. LATTA. Well thank you very much, Mr. Chairman, and again, thank you very much to our witnesses for being here.

Mr. Brenner, if I could just go to your testimony, because it is very interesting when you are talking about the 1,000 times challenge. We have had a lot of hearings and we have had individuals in here that have testified that by the year 2017, it is estimated that there will be 1.4 mobile devices per capita across the entire world. And we know that is not going to happen across the entire world, but it is really going to explode here in the United States. And you go on in your testimony talking about, again, the cellular base stations, and it really comes down to your last statement is that we have to have more spectrum to meet these needs. I would like you just to kind of walk me through this a little bit, because you are talking in your testimony about that 1,000 times, and that we are doubling the wireless data, doubling it each year, and that is where you are talking about being at least 1,000 times today. Just give me a picture of what things are going to look like in, let's say, 10 years, what we are going to be seeing that people are going

to be having in their hand, what they are going to be utilizing them for, because again, if you are talking about just doubling and getting up 1,000 times, where we are going to be?

Mr. BRENNER. Thank you, Congressman Latta. Let me answer that question with all dehumility, because I have to say that all the predictions about wireless broadband usage have always been wrong, and they have always been wrong because they have been too low. In fact, when Qualcomm developed the 1000x goal and actually if you say to any Qualcomm employee 1000x, we know as a company that is our goal. We originally had a goal that was much less than that, and we actually shared it with some of the operators, both in the United States and around the world, and they said you know what, Qualcomm, you are not thinking big enough. It is faster, it is bigger. So we went back to the drawing board and we came up with the goal of 1000x.

So you know, what is it going to be like? I think that there will be these small cells everywhere because again, think of the fact that in Washington, D.C., all the best places to put one of the big towers, there is already a big cellular tower there. So in the——

Mr. LATTA. For me, just to interrupt here. How many of those small cells do you think you are going to envision, let's just say, in 5 years?

Mr. BRENNER. So actually, the studies that we have done, we could envision in a neighborhood there being—and by the way, they are in this form factor for now, but we think they could go right into a cable box or your set top box could be a little down goal. It doesn't necessarily even have to be this big, but we could envision in neighborhoods 10, 20 percent of the neighborhood very quickly getting these small cells installed, and then what is exciting is although they will be placed indoors, they will provide also good coverage outdoors where again, there is tremendous extensity of use.

So in terms of what the vision is like, I think you would walk into this room and the lights would have some form of connectivity. I think that your phone would be on and it would tell you whether there is any constituent from your district that is in the building and who they are. I think that——

Mr. GUTTMAN-MCCABE. With proper privacy protection.

Mr. BRENNER. Right, right. Thank you, Chris.

Mr. GUTTMAN-MCCABE. Yes.

Mr. BRENNER. And I think that, the history is that once people get these devices they want to use them all the time wherever they go, and I think that is only going to multiply.

Mr. LATTA. Let me follow up with another question, and that would be what do different types of spectrum sharing due to potential spectrum evaluations at auction?

Mr. BRENNER. That is a great question. So let me say that the reason why the authorized shared access model that Qualcomm proposed that I mentioned in our testimony is important is because if you are going to get access to spectrum for a cellular type application—I am not talking about Wi-Fi, Wi-Fi doesn't work, I can use someone else's Wi-Fi or whatever. You need to depend on it. You need a predictable quality of service. So you have got to be able to know that once you are on the spectrum, you will have it unless

and until you can't, and then when you can't, you need to know that you can go onto another band that is available.

So if the spectrum is just a free-for-all, a wild, wild west, there will be almost no value to it. If the spectrum is auctioned in a way that there is a predictable quality of service, then I think the market can take into account the fact that it may not be available 24/7, but it will still have considerable value.

Mr. LATTA. Thank you. Mr. Guttman-McCabe, did you want to make a comment on that?

Mr. GUTTMAN-MCCABE. I did, and I think what we are seeing around the world is the delivery of a large box of cleared spectrum, and what we want to make sure is that the United States doesn't become the anomaly for bad reasons. Right now we are sort of the anomaly because we have LTE deployment and next generation technologies that no one else has. We are the test bed for the rest of the world. We don't want to be the last to receive equipment because we are the only ones that are delivering a range of overly shared spectrum products that don't allow carriers to really invest, to have a comfort level that they are going to get some return on their investment and actually be able to deliver.

So the product that Dean is talking about is one that people are getting a level of comfort with, but I think in other instances we are talking about cognitive technologies that I think people don't—they don't exist, at least don't exist commercially, and as we looked at this specific band that we are talking about, there are four uses in the band that the working groups have said can't be shared. And so we are talking about sharing in a band where the conclusion has already been reached that we can't share with those technologies. And so I am perplexed at times that we continue to prosecute this notion of sharing in this band when the subject matter experts, including those from the Department of Defense, have said you can't share with the unmanned area vehicles. You can't share with air combat training. You can't share—you can go down system, system, system, and we continue to investigate sharing. And now we are having a debate whether we can investigate a sub-band. My father used to say—I brought this up the other day. My father used to say you measure twice, you cut once. I was a little bit of a spastic child and I always wanted to cut and I always got myself in trouble. We have been measuring this band for 4 years. It is time to cut.

Mr. LATTA. Thank you very much, and Mr. Chairman, I see my time is expired and I yield back.

Mr. WALDEN. Gentleman yields back. Chair now recognizes the gentleman from California, Mr. Waxman.

Mr. WAXMAN. Thank you very much, Mr. Chairman. I want to yield to the chairman of the full committee, Mr. Upton, to have a colloquy.

Mr. UPTON. Thank you, my friend. We want to engage in a colloquy and say a couple things here.

First of all, spectrum is quickly becoming the lifeblood of our economy, as commerce, entertainment, and the government go wireless. At the same time, our supply of readily usable spectrum is certainly dwindling, and finding better ways to manage the spectrum and meet increasing demand is now certainly a matter of economic and national security for our country. That is why we are

having the hearing today and that is why we have been discussing federal spectrum use for the better parts of this Congress and the last.

I have talked with Ranking Member Waxman. We are both concerned that we are not making progress fast enough, and so therefore, the two of us, we have agreed on a bipartisan basis to ask Chairman Walden and Ranking Member Eshoo to convene monthly meetings with the NTIA, FCC, and DOD to make sure that we tackle the issues both responsibly and expeditiously.

And I yield back to Mr. Waxman.

Mr. WAXMAN. Thank you very much. I think that this bipartisan process can help us move forward. We have a limited time to act. It is imperative we push forward to make sure we are maximizing the use of the federal spectrum. We know that the agency professionals involved in this process are acting in good faith. They want what is best for the public interest. But if this hearing is any indication, Mr. Chairman, we are not making progress fast enough. The agencies seem to be pointing fingers at each other in justifying why they are not acting in accordance with the President's directives to free up the federal spectrum.

I believe that there is more than enough federal spectrum to take care of the spectrum needs of our armed forces, provide additional spectrum for commercial broadband, and raise additional revenues for priorities like First Net. We need to make sure that this effort is not slowed because agencies are talking past each other or because of bureaucratic inertia, which happens, and the stakes are too high.

So that is why Chairman Upton and I have agreed that the committee will hold these monthly meetings with the key officials at NTIA, FCC, and DOD to assess progress. I am especially pleased we have agreed to pursue this effort in a bipartisan manner. This is a good example of an area where we can work together towards a common goal, and I look forward to engaging with our colleagues on the other side of the aisle. And I know that this effort is in good hands under the leadership of Chairman Walden and Ranking Member Eshoo.

Thank you, Mr. Chairman. I will yield back my time.

Mr. WALDEN. Gentleman yields back. We appreciate your confidence in us, and we look forward to working with the agencies on a regular basis, as you heard, on a monthly basis, to stay on top of this and move forward.

We will now turn to the gentleman from Illinois, Mr. Shimkus, if he is—wants to go for 5 minutes, would be up next.

Mr. SHIMKUS. Thank you, Mr. Chairman. This is a good segue, because let me move with Mr. Guttman-McCabe. You know, when we were talking broadband, we really pushed for a broadband inventory, and although some stuff came out fast, we started deploying stuff before we knew who had what and where it was and at what speeds and the like. So there are folks who are talking about a spectrum inventory, and I would encourage you all as you start these meetings to talk about it.

Mr. Guttman-McCabe, what would—talk to me about doing a spectrum inventory and how that would be beneficial.

Mr. GUTTMAN-MCCABE. Sure. Thank you, Congressman, and I absolutely think it would be beneficial. I hope that it is used as a tool to move the process forward in an accelerated manner. You know, we often talk to the broadcasters and they say there should be an inventory before they are forced to move forward with the incentive auction process, and I say but we know where the broadcasters are, where they operate, and where their stations are. I hope it wouldn't be used as a tool to slow down the 1755 to 1780 because we have spent several years looking at what is in those bands. But I think as a whole, as sort of a holistic tool, it would be fantastic for us to get a sense of who is where. I, too, have seen the statistics that suggest that 60 percent of the beachfront spectrum is at least operationally used by the Federal Government, and so I think it would be good to get those exact numbers and get a sense of who is where and for what is it being used.

Mr. SHIMKUS. Mr. Brenner, I would hope that you would concur with that?

Mr. BRENNER. Oh, absolutely. Of course, Congressman Shimkus, as you can imagine, on a regular basis I am in contact with our folks who design chips to look at new bands and to try and predict what is going to happen.

Mr. SHIMKUS. So it might even be important for you to know what is available?

Mr. BRENNER. It is very important, right.

Mr. WALDEN. Would the gentleman yield?

Mr. SHIMKUS. I would yield.

Mr. WALDEN. I also think it would be interesting to know who has got it, is it is use, you know, how much is sitting out there. I realize there are licensed timelines where you have so many years to——

Mr. SHIMKUS. Reclaim my time. That is what we tried to do last year in the Spectrum Working Group, and even though we got some briefings, I don't think we walked away with a lot of comfort that we actually knew the actual spectrum holdings, and really, the more important question is actual use. And then if there is actual use, by what technology? Because actual use with old technology is really having more than you need currently. You know, the folks who know me, I do have a pretty solid military background in defense and security issues, and—but I will tell you that unless we know, we have a difficulty trusting that the Federal Government—that they may be holding on to assets that with new technology they might not need, and we could help grow this economy. So I think that is part of a bipartisan concern that we have out here.

And let me just segue with—because you mentioned the 1755 to 1780. I want to expand that out to the 1850. Ms. Takai and Mr. Nebbia, your testimony talked about the technical challenges in that area, right? My question is, this really segues into this a little bit. How old is that technology that is giving you technical difficulties? How old is that technology that is consuming that spectrum in that arena right now? Do you know?

Mr. NEBBIA. Certainly can't say for sure in every system. Certainly the Act system has some components that are very old. I might guess probably 20 years. Some of the law enforcement surveillance systems have been there for a long time also, once again,

working within the budget limitations that they have deployed those systems.

Mr. SHIMKUS. Let me ask Ms. Takai. Do you know?

Ms. TAKAI. Yes, sir, let me just first say those systems and the systems that are in both the 1755 to 1780 and 1780 to 1850 can be either moved or in some instances, we have identified opportunities for sharing. So I don't want to leave the impression that there is a problem with those systems or that those systems would not operate in other bands or under other conditions.

Mr. SHIMKUS. And that might be a technology debate that we are talking about that new technology might allow you to do the same thing in a different part of the spectrum, is that correct?

Ms. TAKAI. Yes, sir, but in addition to that, the technologies that we have today can operate—and it depends upon the particular system, either, again, in a shared mode or relocated to another band. We can do that with the technologies that we have today. The challenge is to know where, in fact, we would move to and what the conditions would be, and then we are prepared—and when we did the 1755 to 1850 plan, we had a plan there developed with the costs associated to make the move. So I wouldn't want to leave the impression that we are dependent upon new technology in order to do that.

Mr. SHIMKUS. And my time is expired, but I think we are pretty much on record, too, that the bona fide cost of transition will be borne by the selling of some spectrum, but not a gross premium.

Mr. WALDEN. First you have to have the spectrum to sell.

Mr. SHIMKUS. First you got to have it to sell.

Mr. WALDEN. And then I think it can be a real—we are about trying to help find a way to fund upgrades and enhance systems that are more efficient and can benefit protection of our country as we also do the jobs.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Mr. WALDEN. Thank you. Turn now to chairman emeritus of the committee, the gentleman from Michigan, Mr. Dingell, for 5 minutes.

Mr. DINGELL. Mr. Chairman, I commend you for this hearing, and thank you for doing it. It is very important. I think the statement made that we are going to be inquiring into this monthly is a good one, and I am very pleased to hear it.

I have my troubles with the way we are allocating spectrum. For years, we had it all being sat carefully on by the government, like a duck on an egg, and we couldn't get anybody off to see to it the spectrum was made available. When we finally did, it appeared that the matter was driven by money and that this was—that the spectrum was licensed out in ways that was going to generate the maximum amount of revenue. It turns out it was rather sloppily and slovenly done, so I don't think we gathered the maximum of revenue. I am hopeful we can avoid some of those things and stay within the good sense of wise use and proper allocation of the spectrum.

Now I note that the U.S. auto industry has made substantial investments in developing intelligent transportation systems that use the upper 5 gigahertz of band. At the same time, Section 6406 of the Spectrum Act directs NTIA to study risks associated with per-

mitting unlicensed use in the 5 gigahertz band. Wireless, as we have witnessed, is a significant driver of economic and technological growth. I want to ensure that Americans driver safer vehicles and that they enjoy the benefit of wireless growth at the same time. Consequently, we need to have a clear understanding of how these two matters affect one another.

Mr. Nebbia, these questions are going to be to you mostly, and will require a yes or no answer. Is NTIA helping facilitate direct interaction and cooperation between the wireless industry, automakers, the Department of Transportation to resolve any possible interference issues and potentially develop constructive proposals in the area? Yes or no?

Mr. NEBBIA. Yes.

Mr. DINGELL. Again, Mr. Nebbia, given the Federal Communications Commission the license ITS service almost 15 years ago, would it be premature for the Commission to authorize the use of unlicensed devices in the upper 5 gigahertz band before studies are completed that confirm these devices will not cause interference to ITS services or that strategies are available to sufficiently mitigate this risk? Yes or no?

Mr. NEBBIA. Without those studies, yes.

Mr. DINGELL. Again, Mr. Nebbia, will NTIA recommend to the FCC that it make this band available for unlicensed devices only when and if NTIA is satisfied that unlicensed services can spare the spectrum with ITS services without interference? Yes or no?

Mr. NEBBIA. Certainly.

Mr. DINGELL. Now, Mr. Nebbia, I would like to urge NTIA to do its utmost to complete the 5 gigahertz study required in the Spectrum Act in the time allocated by Congress. Any FCC action in this area must be grounded on sound quantitative analysis. I intend to write this matter—write a letter on this matter to the Commission in order to establish definitively that it will not move to open up the upper 5 gigahertz band until successful completion of NTIA study.

I ask unanimous consent, Mr. Chairman, that my letter and the Commission's response be included in this hearing's record.

Now I would like to turn my attention to the relocation of federal spectrum. The committee called for such relocation for commercial use in both 1993 and '97. Last year, we enhanced the protections available to federal users subject to reallocations. For example, we amended the Commercial Spectrum Enhancement Act to allow agencies to use funds for planning purposes, and we raised the threshold amount to 110 percent. Again, Mr. Nebbia, is it accurate to say that federal users now have more protections than they did in '93 and '97? Yes or no?

Mr. NEBBIA. Yes.

Mr. DINGELL. Mr. Nebbia, does NTIA believe these safeguards are sufficient? Yes or no?

Mr. NEBBIA. Not completely, Congressman.

Mr. DINGELL. Beg your pardon?

Mr. NEBBIA. Not completely, no.

Mr. DINGELL. Would you please submit for the record further comments on that?

Mr. NEBBIA. Certainly.

Mr. DINGELL. Now, these are to the remaining witnesses. Ladies and gentlemen, would you please comment briefly on Mr. Nebbia's response to my last question? Ma'am?

Ms. TAKAI. We certainly support the language that was in the CSEA. I think that is the heart of your question, sir. We believe that the——

Mr. DINGELL. So you believe the safeguards are sufficient or not?

Ms. TAKAI. I believe the safeguard on the 110 percent requirement is sufficient in terms of being able to——

Mr. DINGELL. I have my doubts on that.

Ms. TAKAI [continuing]. Support our——

Mr. DINGELL. Next witness, what are your feelings?

Mr. BRENNER. So Congressman Dingell, I want to see any issue involving the federal spectrum between DOD and NTIA or between DOD, NTIA, and the FCC resolved absolutely as quickly as possible.

Mr. DINGELL. And the last witness?

Mr. GUTTMAN-MCCABE. Congressman, yes, I do think the protections are much greater than they were during the last two reallocation efforts, and certainly, you know, I think we believe that they are sufficient, but if they are not, we would like to know where those gaps are.

Mr. DINGELL. Mr. Chairman, I want to commend you again for this hearing, but I want to urge that we have the FCC in here because without hearing from them, this whole exercise may be negatory because we will not have heard the people that are going to make the decisions.

I thank you for your courtesy to me.

Mr. WALDEN. Mr. Chairman, I can assure you that in our monthly meetings we will have all three agencies before us.

Mr. DINGELL. I would just observe that from time to time, the FCC has not been forthcoming and I would observe—and I am using time that I am not entitled to for which I apologize—but I would observe that they refuse to answer questions sometimes because the result might be embarrassing. I would hope that we would have a more forthright interchange with that agency if it——

Mr. WALDEN. We think in a bipartisan manner that may not apply to just one single agency. We are not pointing any fingers at any today, but we just occasionally think that. Thank you, Chairman.

Mr. DINGELL. A wise comment, Mr. Chairman. They are the ones that aren't here to hear us.

Mr. WALDEN. Oh, they may be listening. And they may not be listening.

We are going to turn now to the gentleman from Louisiana, Mr. Scalise, for 5 minutes.

Mr. SCALISE. Thank you, Mr. Chairman. I appreciate you convening this hearing, and thank our panelists for being here. I know this is something that our committee has been struggling with for a long time, but really if you look at the marketplace, consumers have been demanding this freeing up of spectrum because of the speed of which the devices, the great products that you all create and the things it allows people to do and make their lives so much

easier, that has increased the demand for spectrum, and yet the speed of government is just not moving fast enough. Unfortunately we see this in so many examples, but I think it was very significant that you had both Chairman Upton and Ranking Member Waxman, who do not come to agreements on big issues like this a lot, to both be in complete unison that the timeframe is not moving fast enough. I think Chairman Walden and I think Ranking Member Eshoo both recognize that as well. And so I do think, you know, hopefully that will spark some urgency within the federal agencies. I think having the FCC and NTIA and DOD having monthly meetings with our subcommittee I think will not only emphasize the urgency, but also create some deadlines and some timelines that we can compress, because this does have to get answered. We have been waiting for years to have a spectrum sale that the low-hanging fruit is gone already. I mean, at this point if you are really going to make some progress in freeing this up, and not only to generate revenue in the Federal Treasury, but to allow more innovation. I mean, we are holding back innovation by not getting these answers, and so hopefully we can spark that urgency but start getting the answers to these questions so that more of the spectrum can get freed up.

I want to ask first, Mr. Nebbia, we have got some reports that have come out, PCAST, even some Presidential memos that talk a lot about sharing, and it has usually been in the context of sharing between federal agencies and commercial users, but where the federal agencies would actually have the primary jurisdiction. If there was a conflict, the federal agencies could trump. And what we have seen is that dramatically reduces the value of that spectrum. One of the things I would like to ask you, have you all looked, as you all are looking at this concept of sharing, have you all looked at the concept of sharing between federal agencies where you could free up spectrum for commercial sale where it would be more valuable and not shared, and the sharing would occur between the federal agencies on some of that space that is not being utilized most efficiently?

Mr. NEBBIA. Yes, I think the thing that is important to understand, the Federal Government lives in an environment of sharing. The federal agencies have almost no exclusive spectrum to any particular agency. In fact, in the 1755 to 1850 band, we have got over 20 agencies sharing that spectrum on a day-to-day basis. So sharing is the norm among federal agencies. Almost no bands that we use have exclusive access to one federal agency. So that is our challenge. We already live in that environment, and as we begin to work to free up spectrum, one of the possibilities that that results in is packing those federal agencies closer and closer together in terms of frequency, and when there are emergencies, for instance, and everybody lights up their systems potentially you have problems with them interfering with one another, so——

Mr. SCALISE. Do you recognize that the—and I think it is a very valid concern that is coming from the commercial users. One of the goals that we are trying to achieve is, there will be an expense to relocate federal agencies, and part of it, if you have a successful sale of an auction of this space that would be freed up that not only generates money for the Federal Treasury, but it also provides the

money to go and relocate, and as the chairman said, to upgrade, to allow you to actually upgrade and make your technology much more efficient. Do you acknowledge that if you are just sharing between public and private, that it actually does diminish that value of that spectrum if it is just for shared use?

Mr. NEBBIA. I think it depends on the specific nature of the sharing that you set up. For instance, right now we still have federal agencies in the 1710 to 1755 band. That auction was an overwhelming success. So there are ways and situations where you can continue sharing. Obviously the more undefined it is, the more difficult it is for somebody to understand what value——

Mr. SCALISE. And I know my time is running short. I want to bring in Mr. Brenner and Mr. Guttman-McCabe on this. I know you, Mr. Guttman-McCabe had talked about the joining together of the two lines of spectrum of the 2155 as well as 1755, that you value—the value of it to the taxpayer would increase dramatically if those were joined together. Of course, that relies on having NTIA and other agencies providing us the reports.

Mr. GUTTMAN-MCCABE. Correct.

Mr. SCALISE. If you can expand on that and maybe touch on what we are talking about regarding the sharing?

Mr. GUTTMAN-MCCABE. Certainly. In our roadmap that we submitted, we suggest that the cost of clearing—an estimate for the cost of clearing the band 1755 to 1780 is about $4.7 billion. If this spectrum is unpaired, what some economists have suggested is that the unpaired auction of it would be $3.6 billion. It is south of the 110 percent that is required under the CSEA, so it doesn't happen. If you put it together and pair it together, I think it is reasonable to suggest, and I often hesitate to do this because that means my members have to pay that much, but I think it is reasonable to suggest $15 billion could come in if you look at comparable, including the AWS auction.

And you had mentioned something else, Congressman. I know General Wheeler and his team and Ms. Takai and her team and Mr. Nebbia, they are working hard, but I think what we need is that speed to market, that market speed that you talked about to move this forward, and we know this because you, we think intelligently, set an auction deadline, a licensing deadline for the upper half of the spectrum, the 2155 to 2180. So all we are asking for is a little bit greater alacrity. We have had some great movement recently and we are happy with that and we have had some movement on nondisclosures and memorandums of understanding, but we—speed is something that I think is integral to this process.

Mr. SCALISE. I see my time is expired, so I appreciate your answers and yield back the balance of my time, Mr. Chairman.

Mr. WALDEN. Gentleman yields back. Chair now recognizes the gentleman from Pennsylvania, Mr. Doyle, for 5 minutes.

Mr. DOYLE. Thank you, Mr. Chairman.

Ms. Takai and Mr. Nebbia, I understand that we know in the past there has been difficulties communicating between your two agencies and the issues related to the 1755 to 1780 band, but recently, however, a trusted agent program has been implemented. What is the status of this program, and has it been successful in resolving difficulties in communications between your two agen-

cies? And additionally, Ms. Takai, can you commit to moving forward expeditiously and resolving any outstanding issues in a timely fashion now that this trusted agent program is in place?

Mr. NEBBIA. Let me just mention up front, Congressman, the concept of the trusted agent is dealing with communications between the federal agency that has sensitive information that cannot be made public, and the private sector.

Mr. DOYLE. Right.

Mr. NEBBIA. The distinction there is not in discussions between NTIA and the DOD. There is no difficulty in us communicating——

Mr. DOYLE. No, I understand that. What is the status of the program and how do you think this is going to help you move expeditiously?

Ms. TAKAI. Well as I said, sir, it is in two steps. First of all, we have established MOUs, for instance, with DISH Network on some specific information sharing that is necessary around a particular band. So we are doing that to make sure that we have communication. The second thing is we have signed 12 NDAs with members of the CSMAC, so that is completed. The third step, which we really believe is a major step to speeding the process up, because the challenge, I think, has been for us to get this done quickly, is one where we have a proposal on the table. We are currently in discussion with NTIA and so we would anticipate moving that fairly quickly, and we are happy to come back and report on the status of that in one of the future meetings.

Mr. DOYLE. Great, thank you.

Mr. Nebbia, you said in your testimony that NTIA is working with DOD, FCC, and the industry on a two-phased roadmap to clear the entire 1755 to 1850 band. Can you give us a timeline for producing that roadmap, and can you produce that roadmap in time for the 1755, 1780 band to be paired for the September 2014 auction?

Mr. NEBBIA. Well certainly the work that has been done thus far in CSMAC is absolutely—has been absolutely crucial to being able to put that roadmap together. Industry drafted theirs based on the outcomes that they were seeing in that work. We are looking at similar types of input from DOD and the Commission, so I believe in the next few months we are going to have resolved that and we are going to be giving direction to the agencies concerning the preparation of their transition plans. But ultimately the critical issues that need to be solved is where do these systems go? A couple of the bands that we have talked about thus far, one of them is in the hands of the broadcasters so there will be some impact there. That is a door we would have to open. Another one of the bands is actually of interest to the Wi-Fi industry of 5 gigahertz that we are also discussing today. So there are not simple processes. We have got to move other pieces in order to make these things work. So that becomes the challenge in getting agreement with the FCC and the industries involved there for that type of arrangement.

Mr. DOYLE. Thank you. Mr. Chairman, I know my colleague, Ms. Eshoo, has some additional questions and I would like to yield the balance of my time to her.

Ms. ESHOO. I thank my friend from Pennsylvania.

The question that I would like to ask now is related to wireless. It is a little off the whole issue of spectrum, but nonetheless, I think it is an important one. I would like to go to Mr. Guttman-McCabe, because he heads up CTIA.

Last month, one of the larger member companies of your organization announced a 61 cent administrative fee for all of its contract wireless customers. Now, in looking at the bill, the contract is for $89.99. When you go online to sign up for it—this is for new service. You go to your Web site. There are three different pages and you move from one, you have to click to another. You go to page two, the due monthly still says $89.99. You go to step two, other charges applicable to wireless service—I have 20/20 vision, but I am telling you, God has got to give you another set of eyes to read this. I don't know who can, and I think it may be purposeful so that you can't figure it out. Then you go to step three, and yet it still doesn't total out what all of these fees equal.

Now this large company is not the only one that is doing this. I am just using this as an example, but the press reports say that this will gross this particular company at least a half a billion dollars in additional revenues. So you know, the consumer, I think, should have certainty. If there is a contract for $89.99 or whatever the contract is for, what are all these extra fees that are being—these new charges—what are they called? I don't know. Name it. You can call it whatever you want, but it is not part of the contract. So you sign up for one thing and then you get another deal, which I don't think is so terrific for consumers. So can you just briefly explain what the industry's rationale is for separating these mandatory—I guess they are mandatory. I don't know if they are mandatory or not. Below the line fees from advertised monthly price of the service?

Mr. GUTTMAN-MCCABE. Yes——

Ms. ESHOO. This is now across the board. Companies are all doing this. Sign up for one thing, you get all these other fees and charges but they are not advertised.

Mr. GUTTMAN-MCCABE. Certainly. I am going to be brief, because I just got a new job within CTIA and I would like to actually take it, and so talking about fees and prices gets me in trouble——

Ms. ESHOO. Timing is everything.

Mr. GUTTMAN-MCCABE [continuing]. With my general counsel who has probably the ability to remove that new title.

Ms. ESHOO. I think it is important to——

Mr. GUTTMAN-MCCABE. No, but I think——

Mr. WALDEN. I do also.

Ms. ESHOO [continuing]. Have a conversation about this, but it is important to raise.

Mr. GUTTMAN-MCCABE. Sure, it is a good point.

The reality is, we benefit, consumers benefit from national advertising from the ability to present the customer with a single price, but taxes and fees do vary in jurisdictions. I mean, I know you recognize that. And so I think our carriers are very clear up front, it is X plus taxes and fees, and the taxes and fees, the taxes are what the taxes are based on the municipality. We have some—we have on average 17 percent tax rate, which is troubling, I think, to most Americans. The fee portion of it is——

Ms. ESHOO. These are not taxes though.

Mr. GUTTMAN-MCCABE. No, it is——

Ms. ESHOO. What——

Mr. WALDEN. That may be.

Mr. GUTTMAN-MCCABE. So you are saying there is an advertised price and then there are taxes and fees. The fee portion of it is a recovery of some of the costs of doing business in different locations, and what they do is they generally make an average. And the reality is in our marketplace, consumers will dictate what the carriers can charge by moving from company to company. And so those, we see different companies with different prices or different fees, and that is driven by what consumers will bear.

But I think it is also fair to say that money is returned exponentially back into the marketplace. I mean, we have $30 billion in capital expenditure, and all of that is part of the revenue that the companies take in the cost of——

Mr. WALDEN. I am going to proceed here.

Mr. GUTTMAN-MCCABE [continuing]. Regulation and others, there is a fee, there is a cost to them and I think that is what you see in the fees.

Mr. WALDEN. I think your point is you want better disclosure to the public and truth in advertising.

Ms. ESHOO. Yes, I think if you sign up for something, that is the cost. If that is not what the cost is going to be, then say so.

Mr. WALDEN. Yes.

Ms. ESHOO. But these additional fees—and I am not talking about taxes, so I think we will have——

Mr. WALDEN. Yes, I will let you——

Ms. ESHOO [continuing]. More discussion. Thank you.

Mr. WALDEN. You will like my bill, too, then on Obamacare. It discloses all the taxes on your premium so you will know. That has been introduced.

We will go to Mr. Long now for 5 minutes.

Mr. LONG. Thank you, Mr. Chairman, and thank you all for being here today.

For the entire panel, the Commerce Spectrum Management Advisory Committee, CSMAC, we call it, advises the Assistant Secretary of Communications and Information at NTIA on a broad range of spectrum policy issues. The members are spectrum policy experts appointed as special government employees from outside of the Federal Government. Committee members offer expertise and perspective on reforms to enable new technologies and services, including reforms that expediate the American public's access to the broadband services, public safety, and long range spectrum planning. Members are selected based on their technical background and expertise, as well as NTIA's commitment to ensure diversity and balance and points of view. Members serve in a personal capacity and do not represent any organization or interest.

Now the CSMAC, it reads like a who is who on steroids. The co-chairs, Dr. Brian Fontes, Chief Executive Officer, National Emergency Number Association, and the other co-chair, Dr. Gregory Rosston, Deputy Director, Stanford Institute of Economic Policy Research of Stanford University. Members—I won't list them all—but they include a product manager at Google, vice president and direc-

tor, Wireless Future Program, the New American Foundation, a professor from the University of Michigan Law School, president and chief executive officer, Enterprise Wireless Alliance, president, Association of Maximum Service Television, Inc., vice president of business development, Verizon, director of business development, Comsearch, executive director, Center for Law and Technology Entrepreneurship, University of Chicago, technology policy consultant, Intel Corporation, IT manager of communication, infrastructure, strategy, Exelon Corporation, the president of Shared Spectrum Company, the founder and president of Freedom Technologies, vice president, global advanced technology policy, Cisco Systems, assistant vice president of public policy at AT&T, the head spectrum management department at Raytheon Space and Airborne Systems, a vice provost of the New Initiatives and research professor of computer science, Illinois Institute of Technology, a consultant at Qualcomm, an aerospace corporation, head department of electrical and computer engineering, North Carolina State University, a senior vice president of government affairs at T-Mobile, and a vice president of technology policy and regulation, Lockheed Martin Corporation. That is not even the complete list, so like I said, it is kind of a who is who on steroids.

So my question is for the entire panel. The CSMAC, Consumer Spectrum Management Advisory Committee, is working on clearing federal spectrum for commercial broadband use. It has been slow so far, more like dial-up, I would say, than broadband. What could you suggest to move this process along, and how can the pace of CSMAC's work be improved? And as a sidebar, with that many people from that many different areas, is the committee too large? But what would you suggest to get them out of the dial-up age and into the broadband age as far as moving this along?

Mr. NEBBIA. Thank you, Congressman. The work that this group is doing is very complex. In fact, the group that you specifically named are the members of the main committee. We have actually had many, many more people involved in the working groups, the actual engineers and representatives, the companies and technologies that are involved here. So we have broken this work out, actually, into working groups that have then reported back to the main body. So we have engaged a lot of people in this process. One of the challenges has been this issue of sharing specific sensitive information which DOD and the industry is working out, but some of it has just been the pure challenge of being able to model and understand how the networks work. For instance, it took us about 4 months to get an accurate picture from the industry as to how we should represent their networks in any analysis that we did. These are very complex issues. The systems are very capable of changing how they are operating and so on, so it has been a difficult discussion. But I think the steps that DOD is taking in opening this——

Mr. LONG. I will move on to DOD. I am running out of time here, but suggestions on moving their work along more rapidly?

Ms. TAKAI. Yes, sir. Well first of all, to comment, DOD has put over 50 full-time employees as a part of the CSMAC process to make sure that we move the engineering along. In terms of the answer to your question, we are now at the point where the CSMAC

results will be available in the July timeframe, and I think from that to the point of this committee, we are prepared to be able to make some decisions and make some tradeoffs and be able to move forward.

Mr. LONG. OK, thank you.

Mr. Brenner, even though I am over my time?

Mr. BRENNER. Yes, respectfully, Congressman, the problem is not CSMAC. CSMAC is completely fine. The problem is monthly meetings up here, deadlines, accountability, clear delineation of responsibility, clear communication on the Federal Government side. These are the issues. CSMAC is just fine.

Mr. LONG. Mr. Guttman-McCabe?

Mr. GUTTMAN-MCCABE. Yes, I would agree with Mr. Brenner, and I just think a lack of information hindered the process and I know we are moving there and Ms. Takai and General Wheeler and Mr. Nebbia are, I think, going to try to move the process forward and we have made some headway. Sharing of information is key. Whether it is sharing that results in actual sharing of spectrum or sharing of information that results in clearing and finding new bands, it is information exchange that is key.

Mr. LONG. Thank you, and I yield back.

Mr. WALDEN. Gentleman yields back his time. The chair now recognizes gentlelady from California, Ms. Matsui.

Ms. MATSUI. Thank you, Mr. Chairman, and I think all of you recognize the sense of urgency expressed here and the sense that we really need to move along.

Mr. Guttman-McCabe, one of the most pressing issues that DOD would like answered and which is important is where DOD can relocate once they have vacated the 1755 to 1780 band. Do you have any ideas specifically for us to consider?

Mr. GUTTMAN-MCCABE. Certainly, Congresswoman, and I submit—and if we haven't formally put the roadmap on the record, I would ask the ability to do that. But in our roadmap, we identify the ability for some systems to potentially truncate, for others to move out of bands maybe higher up in the spectrum, and then for others, we identify bands, I think as I stated earlier, that are already have some government use in them. So we have identified a range of bands——

Ms. MATSUI. Do you—can you be more specific in these bands that you are talking about?

Mr. GUTTMAN-MCCABE. Sure. I will pull this out, but for instance, particularly the four that are most difficult are in the working group five. They all involve some form—or almost all involve some form of aeronautical usage. So we talk about the air combat training systems able, hopefully, to be truncated, moved up within the 1755 to 1780, move from 1780 to 1850. As part of that, we talk about moving the AMT systems, the aeronautical mobile telemetry, moving them up higher in the band. The same thing is true with the small unmanned aerial vehicles is truncating some of their uses into the 1780 to 1850 band, and then to the extent that we can, we have identified some other bands that government can go into, the 1435 band, the 1780 band, the 2200 band. These are some of the bands that are already in play, have already been discussed in the original report from NTIA——

Ms. MATSUI. When was this roadmap developed?

Mr. GUTTMAN-MCCABE. It was I think finalized about a month ago.

Ms. MATSUI. OK, and this is—you all have not had the opportunity to actually look into it and study it, is that correct?

Mr. NEBBIA. Actually, we have begun to study it, Congresswoman, so we see points of interest here. They did suggest, for instance, the 5.1 gigahertz band for some of the systems. That also was a band that Comcast would like to use for increased Wi-Fi capability. So once again, each of the bands that get identified ultimately have some of their own issues to them, and that is why we are trying to work out as many of the systems as possible that can stay. In fact, industry is suggesting even with some of these aeronautical systems that there may be other approaches that they can take to living with them.

Ms. MATSUI. OK, so is this a starting point then, for all? Ms. Takai?

Ms. TAKAI. Yes. Just as a comment there, we do believe that it is a starting point. We do also feel that there—as the NDAs (nondisclosure agreements) are being signed so that we can increase the information sharing between the two groups, there will be additional information that will impact that industry roadmap, and so what we need to do now is to really take that additional information, use the industry roadmap, and then look at what the suggestions would be for the way ahead.

Ms. MATSUI. OK. Question for Mr. Guttman-McCabe and Mr. Nebbia. In your view, if the FCC auctions AWS–3 band without the pairing of 1755 to 1780, then could the entire 1755 to 1850 band be potentially lost forever for commercial and innovation purposes? Mr. Nebbia?

Mr. NEBBIA. I think certainly industry has expressed the fact that they need more downlink spectrum, so that certainly makes the upper portion worth more. I don't think necessarily that auctioning them separately necessarily makes that a permanent situation, but in fact, forcing all the federal agency operations into the upper portion will almost certainly lock that piece out from being able to be used in the future. So I think there is a significant impact here if we take that short step without knowing where we are heading. So I don't think it rules it out, but it certainly would make it more of a challenge.

Ms. MATSUI. OK. How about Mr. Guttman-McCabe?

Mr. GUTTMAN-MCCABE. Yes, there is a significant concern of ours that auctioning them separately wouldn't bring sufficient revenue to satisfy the Commercial Spectrum Enhancement Act, so as a threshold issue, you couldn't hold the auction. And so that is obviously a significant concern. For us, the fear that you orphan the band when the rest of—we say 17 of the G–20, it is everyone. You don't stop there. We have a map here—it is hard for me to see from this distance, but everything of color is where this band is being used for commercial operation, so it is Asia, south Asia, it is all of Europe, it is Africa. It is everywhere where we would want to compare ourselves to. But I think almost more importantly, Ms. Takai suggested that the Department of Defense—and this is logical—that they use spectrum to properly train as we must fight. Well,

I would argue every place where you are going to potentially fight is using this band for commercial purposes, so is this the proper band to train in the United States?

Ms. MATSUI. OK.

Mr. GUTTMAN-MCCABE. Most of the Middle East, most of the countries in Europe and Asia and south Asia use this for commercial purposes.

Ms. MATSUI. Certainly we all know that this band is really very important for America's innovation economy, and it is really critical that we not let this ship sail. I think there is agreement there, and we shouldn't pass on this unique opportunity.

And I just want to say something here. Ms. Takai, you have demonstrated really strong leadership and shown an openness to work with us in good faith on this complicated issue. Moving forward, given the process as has been discussed between Chairman Upton and Ranking Member Waxman moving forward, can you commit to our subcommittee that you will continue to work with us in good faith and a constructive manner to find the solution here?

Ms. TAKAI. Absolutely. DOD is committed to finding the solution to this issue. I really want to make sure that we have that on the record. We really have, number one as I mentioned, we have a plan to move and we certainly have worked, as I say—we put 50 full-time folks in, even in this budget time, to work the CSMAC process to see if we can't do the relocation, whether or not we can solve this problem through spectrum sharing.

So we are committed, again, to finding a solution to this issue, to making sure that we can make the best decisions in 1755 to 1780 as well as the rest of the band. So——

Ms. MATSUI. We appreciate that.

Ms. TAKAI [continuing]. We welcome the opportunity to, quite frankly, be here with the FCC and have the three of us actually see what we can do to work through the issues, because I do think it will take the three organizations in order to make the necessary decisions to move forward.

Ms. MATSUI. Thank you very much, and I think you realize that there is this unique opportunity, and we really feel that we really need to move forward as quickly as possible.

Thank you.

Mr. WALDEN. I would like to insert in the record a copy of the "Industry Roadmap to Assessing the 1755 to 1850 Megahertz Band."

Without objection.

[The information appears at the conclusion of the hearing.]

Mr. WALDEN. And now we will turn gentleman from Kentucky, Mr. Guthrie, for 5 minutes.

Mr. GUTHRIE. Thank you, Mr. Chairman. I appreciate you being here. Sorry I was at another hearing of a subcommittee of this full committee.

You know, the Federal Government is changing, the world is changing. Communications are so important, and it is difficult in these budget constrained times to get the right equipment at the right place at the right time. Ms. Takai, I just heard what you said to Ms. Matsui and I agree with that, but would the opportunity to purchase new state-of-the-art equipment due to money generated

from sales from spectrum—the opportunity to buy new state-of-the-art equipment be an incentive for your agency to relocate? Some of your aging communications systems are moving away from the propriety federal to the sharing or the commercial systems. Would that be an incentive that would be helpful to DOD?

Ms. TAKAI. Yes, sir. There are two things that you mentioned there that are important. One is the ability to look at new technologies that allow us to better take advantage of using less spectrum for the operations that we have. The second is the money for us actually to do the transition, either to a shared environment or to another exclusive environment. So those are the opportunities.

Now some of that funding is included in the funding that would come to us as a part of the auction process, so it wouldn't necessarily be incremental funding, but that is where we would really need to make those decisions around what those steps would be, do the auction, and then be able to have the funding to make those moves.

Mr. GUTHRIE. We will take it. May be an opportunity to modernize some areas.

Mr. Nebbia, does the NTIA, have they developed any metrics for assessing how effective federal agencies are in using efficient—spectrum efficiently?

Mr. NEBBIA. There are certainly existing measures related to the nature of a particular transmission. For instance, we try to eliminate as much of the unwanted emissions in any radio signal. Trying to evaluate the efficiency in terms of how much the systems are actually turned on we do not have a measure that we implement along that line. Each agency operates its systems according to its schedules and immediate needs. For instance, Department of Justice in the particular band that we are looking at operates law enforcement surveillance systems across the country. They operate at any particular time and location, so if you are asking for that kind of data, we simply don't have that kind of monitoring. To know more generally, yes, we have a sense of, in many cases, some of the systems are on all the time, others operate more sporadically.

Mr. GUTHRIE. Do you have any idea what kinds of carrots we could offer to agencies to be more efficient with their spectrum?

Mr. NEBBIA. Well, the one carrot that is in the CSEA right now is this concept that they can move to improved equipment. That certainly is a benefit to everybody, but you still have to be able to perform the mission in some band, so not only do you get the better equipment, but there has to be a band to move it to. And then ultimately when you are looking to move in that direction, you have to have a sense that you have got some stability, some—it is not we are going to give you an incentive to move there tomorrow and then next week we are going upset the apple cart again and ask you to move again. So we have got to come up with approaches like that. It is like if I ask you or I direct you to move from your home and I say I am going to compensate you for that move, it is not an incentive to want to move. To provide an incentive, you actually have to give somebody something that improves their situation, and it is both the place to go, the equipment to use, and that long-term sense that they are going to keep meeting the mission that we have all given them to meet.

Mr. GUTHRIE. That is a fair point. Thank you.

Mr. Chairman, I yield back.

Mr. WALDEN. Mr. Nebbia, that is exactly what we are talking about trying to figure out how to do.

So we will go now to the gentleman from Utah, Mr. Matheson, for 5 minutes.

Mr. MATHESON. Thank you, Mr. Chairman, and thanks to the witnesses. As many folks have mentioned, we have multiple subcommittee hearings going on at the same time, so I have a couple of questions and I will apologize in advance if there is some redundancy or if there are questions you are already answered today.

I wanted to ask Mr. Brenner a question. There has been—it is well accepted the huge increase in demand for spectrum with new devices and new technology is right there in front of us, and one suggestion has been a way to accomplish or to accommodate this is to establish some sharing regimes on parts of the spectrum. Can you explain what some of the different types of possible spectrum sharing regimes might have, and what impact those types of arrangements have on potential spectrum valuations at an auction?

Mr. BRENNER. Sure, Congressman, thank you for that question. So in my testimony I described the sharing regime that Qualcomm, Nokia Siemens and other companies are working on. We call it authorized shared access. Now Wi-Fi itself is a sharing regime, right? I mean, it is unregulated, there is no management to it, maybe it works, maybe it doesn't. Obviously if you are going to auction spectrum on the basis of that, you are going to get almost nothing for it. There is no predictability to its use at all. In contrast, obviously the best regime, the highest value regime is the spectrum is totally clear and pristine before the auction. You know you can get exclusive use to it the day the auction ends. That is obviously highest value. And by the way, we have done auctions three different ways in that regime. We have had the spectrum clear before the auction, we have had the spectrum clear after the auction, and now in the incentive auctions we are going to try to clear the spectrum through the auction.

So authorized shared access, what we are trying to do is get the situation of bands that are in between where we don't want to have them just be completely devalued and where they would be unusable for cellular, like just the pure unlicensed regime, and on the other extreme, you know, it is spectrum that just as far as the eye can see. There isn't a date certain, there is no reasonable path to clear it. So then this intermediate regime we call authorized shared access and here is how it works. There are no changes to devices. There are no changes to networks. The device has to have support for the frequency band, and the cell has to have support for the frequency band, but that is not a big deal. There is no new technology. Instead, what there is is a database, and one authorized operator, and that is key to this system. It is binary. Either the government has the spectrum in use or an authorized operator has it, and that operator has a network. This device talks over some other frequency band or through a wired connection to the network and it says I want to go on. The network talks to the database. Only the network talks to the database. There is a clear accountability, and the database then has the information from the government as

to how much interference, how much power can be tolerated at the location of the small cell is located at.

And we think that way, when the spectrum is not in use by the government, where the spectrum is not in use by the government, an operator could use the spectrum and we think you would get significant value for the spectrum. Again, only in this intermediate situation. Thank you.

Mr. MATHESON. I would ask Mr. Guttman-McCabe, do you believe there would be a strong incentive to bid on spectrum licenses if there was some type of this sharing agreement?

Mr. GUTTMAN-MCCABE. Yes, I think the key, Congressman, would be agreement. I think Mr. Brenner had said the more you know up front, the more you know in advance, the greater the likelihood that you would feel comfortable bidding. And so we look at it sort of like Mr. Brenner does. It is almost bifurcated. On one side is geographic or temporal use, so something where you really know who is there geographically and you can use everything but that area, or we know time-based or temporal. You can have access to the spectrum for every day of the week except for X or Y.

Then on the other side is cognitive, and what Dean's company is doing is beginning to sort of, I think, blur that bright line in that there is a cognitive element to this, but there seems to be the ability to get some level of comfort. And so I think there has to be an understanding that you actually will get access and that the government will provide some real time or some in advance understanding of what access you are getting. But it is all about information. If you don't feel comfortable that you actually will be able to use the spectrum a fair amount of time, then the value obviously is going to decrease precipitously.

Mr. MATHESON. OK, appreciate those answers. Mr. Chairman, I yield back.

Mr. WALDEN. Thank you. Chair now recognizes Mr. Lujan for 5 minutes.

Mr. LUJAN. Mr. Chairman, thank you very much. I really appreciate you holding this hearing and Ranking Member Eshoo as well.

I must say, coming into this hearing I am sensitive to both sides with the concerns that they have. I come from a rural State where it is challenging in some of the mountainous regions to get more penetration for additional bandwidth for many of my constituents. I represent two national—one national lab with two national labs residing in the district, Sandy and Los Alamos. The Air Force Research Lab is in the State of New Mexico. Cannon Air Force Base is in my district, currently an Air Force base, Holloman, White Sands. Parts of Fort Bliss from a training perspective, we have important training grounds in the State of New Mexico. But I must say, based on some of the responses today that I have some questions.

Ms. Takai, you indicated that until we are told, so I guess until the Department of Defense is told or until the Department of Defense is given direction, that this is something that is being looked at but not necessarily a priority. If you could clarify that for me, I am trying to understand until Department of Defense is given direction to do what?

Ms. TAKAI. Well first of all, Congressman, let me just clarify. As I mentioned to you and as I mentioned to the committee, we are not hanging back and waiting for direction. I mean, we have put over, as I mentioned, 50 people into the CSMAC process to look at what the options are for spectrum sharing. The point is, there needs to be a decision in order to actually make the auction happen and make the decision happen around what bands we are going to auction and the dollars that are coming in. So what we are saying is that as a result of all of the participation we have had, both in the study we did on the relocation completely and the sharing, now we are to the point where we have significant information. We need to make the decision around what areas are we going to share, where is there going to be comparable spectrum in order for us to be able to move.

Mr. LUJAN. So a decision needs to be made by whom?

Ms. TAKAI. It is a combination. It is recommendations coming from NTIA and then ultimately FCC would be involved as well in making the decision, particularly around the comparable spectrum, and then—because right now, what we have is we have a menu of options of things that we could do. I don't want to leave you with the impression that we don't. In fact, we have any number of combinations of things that we could do. But from an engineering perspective, we need to pick those, make them fit together, and then go and implement those. And that is the challenge I think we have right now.

Mr. LUJAN. And Ms. Takai, spectrum is important to the Department of Defense, correct?

Ms. TAKAI. Absolutely.

Mr. LUJAN. So I think that Ranking Member Eshoo asked a question about timeline. I think my colleague, Ms. Matsui, submitted into the record the President's Executive Order or memorandum to the heads of the executive departments and agencies that lays out inherent timelines therein, 3 month timelines, 6 month timelines, 12 month timelines, and I hope that that is enough to give direction, to say this has to be done and we need to move forward to be able to talk about this.

The reason that I asked the question about the importance of spectrum to the Department of Defense is does the Department of Defense monitor filings at the FCC associated with spectrum?

Ms. TAKAI. Yes, sir, we do.

Mr. LUJAN. So how don't you have what they gave you earlier when—there was a question about a report not being given to Department of Defense or not seeing it. How does Department of Defense not have it?

Ms. TAKAI. Well sir, we have been working with the industry folks on the report. There are some areas where we have to increase the information sharing as it results on the report. But I think what we have been doing is we have been seeing some of the preliminary recommendations, but in terms of the final report, bringing it all together and also looking at where, in fact, they were able to take our input and where they weren't. That was really where my comment was.

Mr. LUJAN. So before today, has Department of Defense seen the document that was handed to you?

Ms. TAKAI. We have seen preliminary copies of the report, yes, sir.

Mr. LUJAN. So you did have it?

Ms. TAKAI. We had preliminary copies of the report, yes.

Mr. LUJAN. Do you have the copy that was given to you today?

Ms. TAKAI. I do.

Mr. LUJAN. Did you have it before?

Ms. TAKAI. No, we did not have that report before.

Mr. LUJAN. So Mr. Brenner, was that filed with the FCC before today?

Mr. BRENNER. It was. It was filed by T-Mobile. T-Mobile went and met with the FCC, gave it to the FCC, and under the FCC's rules, T-Mobile was required to file it and I got it off the FCC's Web site.

Mr. LUJAN. So Mr. Chairman, before I was elected to Congress I was on the utility commission, and interested parties paid attention to cases that were important to them. When filings were made, you better know what was in that filing to be able to defend the position of the party and the client that you represent. And I would hope that after today, I think the chairman has made it abundantly clear, as has Ms. Eshoo, we need to be talking. We need to be monitoring these filings and doing all we can to be in a position to carry out the President's memorandum that says we must do this as effectively and efficiently as possible.

And again, Mr. Chairman, I am sensitive to both sides here, but some of the responses today I guess place some questions on my mind associated with information sharing. So I look forward to working with you, sir, and Ranking Member Eshoo. Thank you very much to the witnesses today.

Mr. WALDEN. Thank you. Turn now to our gentleman from Illinois, Mr. Rush, for 5 minutes.

Mr. RUSH. I want to thank you, Mr. Chairman, and I want to thank the Ranking Member Eshoo for convening this hearing.

My question is directed, first of all, to Ms. Takai. I recall sitting in a number of subcommittee hearings over the last Congress when we marked up the Middle Class Tax Relief and Job Creation Act of 2012, and in doing that, we reallocated D–Block spectrum for public safety and first responders. The Congress also provided an incentive auctions framework for relocating TV broadcasters at government expense and paying for the national Public Safety Network, mainly to free up more wireless broadband spectrum.

Ms. Takai, it is one thing to say that carriers may not invest in shared spectrum, and I am sure that that is true, but it sounds like you disagree with Mr. Guttman-McCabe that effective commercially available spectrum sharing technologies simply do not exist. Do you agree or disagree with that?

Ms. TAKAI. Congressman, I hope I have not given the impression at all that we don't believe the spectrum sharing is viable and workable. We absolutely do believe it is viable and workable. We share with other government agencies and we share with industry in many different situations where, in fact, we can. So if that was the impression I left, that was certainly not the impression I meant to leave.

There are, however, some systems where, in fact, we utilize really all of the band and therefore—and I think that was also expressed by industry—there are situations with particular systems where, in fact, sharing may not be viable going forward.

Mr. RUSH. These technologies are highly complex, but can you quickly tell us about the major barriers in realizing and implementing these technologies?

Ms. TAKAI. The major barriers in terms of implementing spectrum sharing, I think we have spoken of a couple of them. First of all, one of them is if we were to do geographic sharing, that, in fact, means that we have to ensure that where we are not using the spectrum that it is an advantage to industry to be able to use the spectrum in that geographic area. The second is we share it from a time standpoint, so on times that I am not using it, industry does use it. And there are cases where, in fact, we can do that. And then finally, there are areas where we are utilizing the band both from the standpoint of geography and from the standpoint of the amount of time we use it, which then makes it very difficult for us to be able to share.

Mr. RUSH. Mr. Guttman-McCabe, do you have anything you want to add to that?

Mr. GUTTMAN-MCCABE. No—well, I guess yes, Mr. Congressman. I agree with Ms. Takai completely. I mean, I think that there are areas where geographically I think we will be able to potentially share. We are looking at the satellite systems that are in the band as one example. We haven't yet come across, but that doesn't mean we won't come across time-based or temporal sharing opportunities, at least in this scenario. Mr. Brenner's company is investigating something that is even a little bit different than that, which is, you know, an intelligence-based type of sharing where you are dipping into a database that is already populated. So that, to me, is the next step but it is something that seems logical because I think people would know that the database is populated and be comfortable with a certain level. It is the step after that, it is sort of the real time intelligence or cognitive-based that, you know, we have heard and heard that it is not commercially available yet. We haven't seen it. I am not sure that Department of Defense would be comfortable with that on either side of the equation. I am not sure commercial or Department of Defense would be comfortable with that.

But the key thing to recognize here is that the four important systems that we are stuck having a debate back and forth about, I think everyone has already concluded we can't share with those. And so we continue to have our wheels spinning investigating sharing when the reality is it doesn't seem like sharing is going to deliver any usable spectrum or give the Department of Defense a comfort level. So——

Mr. RUSH. My time is running out and Mr. Guttman-McCabe, I represent a district where there is inter-generational unemployment, and jobs are the number one issue in my district and other similar districts across the Nation. If this Congress works with you to clear up spectrum for industry's use, then what commitment do your member companies have to create jobs not overseas, but here at home?

Mr. GUTTMAN-MCCABE. Congressman, I am excited to say that our industry will commit to that, because that is what we do. I mean, we are one of the bright shining elements of the economy right now. You know, we have foreign companies moving their R&D facilities into the United States because we are at the cutting edge, so the Ericssons and the Nokia Siemens, all of these companies are moving their facilities into the United States and bringing jobs with them. So we are almost the opposite of some of the job flight that you see, and we have this concept, we call it the virtuous cycle. You bring spectrum to market, then companies like Dean's and others come up with new technologies on the infrastructure side, then handset manufacturers come up with new capabilities in their handsets. Then we have this whole new applications world that didn't exist comes about, and then consumers buy more products and we are back up asking for more spectrum. It is a cycle that benefits the economy, it benefits your constituents. Seventy-eight percent of the apps developers are small businesses, so those are jobs that zero of them existed 3 years ago. So we are going to—we are driving jobs. We have more capital expenditures than the entire EU combined when it comes to mobile capital expenditures. So I will heartedly and excitedly make that opportunity—or make that commitment if you give us the opportunity in terms of new spectrum.

Mr. RUSH. Thank you, Mr. Chairman. I yield back.

Mr. WALDEN. I thank the gentleman for his questions. I thank our panelists for their testimony. It has been most enlightening, and I think you can see, we had 14 of our members here and asking questions throughout the course of the hearing, even though we had multiple hearings going on this morning. So we will look forward to seeing you on a regular basis to continue in joint progress.

I believe Mr. Latta had something he wanted to put in the record on behalf of Chairman Upton.

Mr. LATTA. Well thank you very much, Mr. Chairman. I do have a letter from the Wi-Fi Alliance and I would ask unanimous consent to have it submitted for the record, and ask for all the parties to work together, especially in the 5 gigahertz band, to get this thing moving.

Mr. WALDEN. Without objection, it will be entered into the record.

[The information appears at the conclusion of the hearing.]

Mr. WALDEN. Again, we want to thank you all for your counsel and your hard work, and we look forward to continuing to free up spectrum and create jobs and take care of our men and women in uniform and their needs.

So with that, the hearing stands adjourned.

[Whereupon, at 12:45 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

Industry Roadmap to Assessing the 1755-1850 MHz Band

Objective:

Using input from the NTIA 1755-1850 MHz Band Feasibility Report, CSMAC Working Group (WG) effort, and the Industry-sponsored monitoring study, develop a plan that assesses the entire 1755-1850 MHz band in a manner that considers making the lower band available first, but also addresses the rest of the band up to 1850 MHz in order to meet federal agencies' concerns.[1] The plan takes into account the NTIA instructions given to the CSMAC WGs, which were to consider a plan that lowers the repurposing costs and/or improves or facilitates industry access while protecting federal operations from adverse impact.

Approach:

Through a combination of sharing, relocation and channel prioritization for the majority of operations in the 1755-1850 MHz band it appears feasible to provide industry early access to the 1755-1780 MHz portion of the band. In some cases, additional analysis may need to continue to further refine long-term arrangements for the entire 1755-1850 MHz band, including potential long-term sharing in the 1755-1850 MHz band and/or other frequency bands as appropriate. The additional analysis could not only further refine the static exclusion zone sizes as needed but also develop innovative spectrum sharing techniques that exploit the more dynamic nature of the use of the spectrum and the advanced features in the LTE standards that we have started to discuss in CSMAC WG-5 in particular.

The proposal presented below relocates a number of systems for which viable relocation spectrum has been identified. This includes Aeronautical Telemetry operations, which as noted in the DoD analysis included in the NTIA March 2012 report, alleviates spectrum crowding pressure on lower bands and provides channelization and prioritization of remaining systems in a way that facilitates the availability of the 1755-1780 MHz band. In some cases, such as SGLS, sharing is feasible with no modification to federal operations. In other cases some change in channel prioritization would be necessary to facilitate sharing, with federal assignments prioritizing selection of channels above 1780 MHz, but with continued access to spectrum at 1755-1780 MHz in a limited number of areas to support large scale training operations.

In addition, work on sharing or relocation options for systems in the 1780-1850 MHz band should continue, including exploration of advanced technology options or relocation bands. The approach should recognize the legitimate requirements of Government operations, including the need for systems to have long term access to the 1780-1850 MHz band if other spectrum is not available for relocating those systems.

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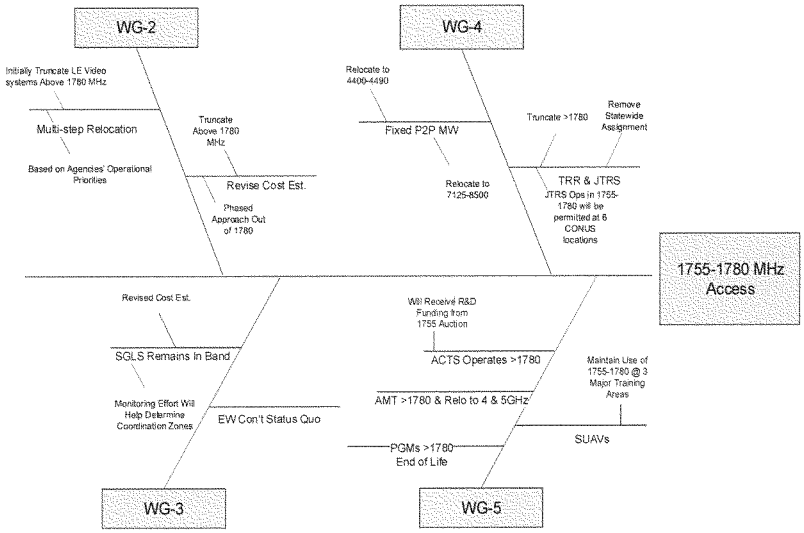
[1] See *NTIA Instructions to CSMAC Working Groups, July 28th 2012, and Framework for work within CSMAC* http://www.ntia.doc.gov/files/ntia/meetings/framework_for_work_within_csmac_20120525.pdf

Industry Roadmap to
Assessing the 1755-1850 MHz Band

Proposal:

1755-1780 MHz Band – Industry Access



Working Group 2:

Law Enforcement Video Surveillance – Phased relocation based on WG report[2]

- Sharing not feasible.
- All agencies can vacate the 1755-1780 MHz band within five years.
- WG developed a prioritized list of Economic Areas (EAs) according to industry market priorities for the potential relocation of video surveillance systems, prioritize clearing the 1755-1780 MHz band and second, the 1780-1850 MHz band.
- Relocation priorities will be based on the federal agencies' operational requirements and may vary from the industry priority.
- Agencies working to revise cost estimates to relocate from the 1755-1780 MHz band within 5 years - expected to be revised downward.

[2] NTIA, CSMAC (2013, January). *Working Group 2: 1755-1850 MHz, Law enforcement surveillance, explosive ordnance disposal, and other short distance links*. Retrieved from http://www.ntia.doc.gov/files/ntia/publications/csmac_wg-2_final_report_jan-4-2012.pdf

Industry Roadmap to
Assessing the 1755-1850 MHz Band

Working Group 3:

Space Ground Link Sub-system (SGLS) – remain in place and operate throughout the 1755-1850 MHz band – WG-3 Report[3]

- Interference from commercial mobile devices into satellite receivers shows that interference is acceptable.
- Based on current analysis there will be zones around the satellite earth terminals where interference into commercial base stations is above the acceptable levels.
- Mitigation methods can significantly reduce the zone of interference, both geographically and in time.

Electronic Warfare (EW) – Operate on a secondary, Non-Interfering Basis

- Continue status quo EW operations in the 1755-1850 MHz band.
- DoD requests a *more formalized coordination and EW operating procedure* that would permit EW testing and training in and around DOD ranges, and other approved operating areas when required.

Working Group 4:

Fixed Point-to-Point Microwave, Tactical Radio Relay (TRR), and Joint Tactical Radio System (JTRS)

Fixed Point-to-Point Microwave – relocate out of entire band

- All affected agencies selected either the 4400-4490 MHz band or the 7125-8500 MHz band for relocation of their fixed point-to-point microwave operations.[4]
- Most agencies, if not all, can relocate or truncate their systems within 5 years.
- Prioritization of markets will use the Top 100 MSAs, which was identified in WG-2, as a guide to relocate or truncate agency operations.

Tactical Radio Relay – relocate/truncate operations above 1780 MHz

- The DoD determined it can accommodate commercial broadband systems in the 1755-1780 MHz band within five years except for the Navy and Marine Corps, which will require exclusion zones at critical test and training locations.[5]

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[3] NTIA, CSMAC. (2013, February 11th). *CSMAC WG-3 – Status Report.* Retrieved from http://www.ntia.doc.gov/files/ntia/publications/csmac_wg3_status_report_14feb13_final.pdf

[4, 5] NTIA. (2012, March 27th). *An assessment of the viability of accommodating wireless broadband in the 1755-1850 MHz band.* Retrieved from http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf

- Critical test and training locations, particularly around major metropolitan areas, may need to be relocated if determined coordination zones to be impractical.
- Rationalize all statewide assignments to their appropriate military training location.
- If comparable spectrum is required, relocate to 2200-2290 MHz.[6]

Joint Tactical Radio System (JTRS) – truncate operations above 1780 MHz

- Compression of operations into the 1780-1850 MHz band is technically feasible in low-density environments.
- Need to rationalize assignment data – currently operating on experimental assignments.
- All efforts will be made to prioritize operations in the 1780-1850 MHz portion of the band, in and around the 6 locations yet to be identified.

Working Group 5:

Aeronautical Telemetry Systems: Air Combat Training System (ACTS), Air Mobile Telemetry (AMT), Small Unmanned Aerial Vehicles (SUAVs), Precision Guided Munitions (PGMs)[7]

Air Combat Training System (ACTS) – truncate operations above 1780 MHz

- Truncation of operations is predicated on the prioritized relocation of the AMT system.
- Re-channelize operations above 1780 MHz while maintaining operational pairing requirements.[8]
- Transitional sharing will need to be coordinated (e.g., coordination zones, frequency assignments, etc.).
- Seek Spectrum Relocation Funding (SRF) for system R&D from proceeds from the 1755-1780 MHz auction to study multi-band or new technology redesign.

Air Mobile Telemetry (AMT) – relocate to 4400-4940 MHz or 5150-5250 MHz band[9] (5150-5250 is UNII-1 which is low power (50mW), indoor use only), or any other 5 GHz band that supports DFS capabilities

- DOD determined that it can relocate its aeronautical mobile telemetry systems within ten years and can accommodate commercial broadband systems in the 1755-1780 MHz band within five years, by continuing to use 1435-1525 MHz, 1780-1850 MHz, and 2200-2290 MHz bands.
- Transitional sharing - requires DOD continued access to and protection for test ranges served by the Western Area Frequency Coordinator (WAFC), the Atlantic Test Range at Naval Air Station (NAS) Patuxent River, and WSMR to allow continued use of the entire 1755-1850 MHz band until AMT systems can relocate to the 5150-5250 MHz band, or

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[6, 7, 9] NTIA. (2012, March 27th). *An assessment of the viability of accommodating wireless broadband in the 1755-1850 MHz band.* Retrieved from http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf

[8] *See* findings from Comsearch & ITS Industry monitoring analyses at Eglin & Edwards AFBs.

other bands noted above. This will require further analysis of exclusion zone size and other techniques based off WG-5 deliberations.

- Determined that it can relocate the Standard Missile Kinetic Warhead Data Link capability from the 1755-1850 MHz band to the 1435-1525 MHz band in less than five years.[10]

Small Unmanned Aerial Vehicles (SUAVs) – truncate operations above 1780 MHz

- DOD determined that, as a transition to vacating SUAS and associated integrated capabilities out of the 1755-1850 MHz band within ten years, it can accommodate commercial broadband systems in the 1755-1780 MHz band within five years with exclusion zones for the entire 1755-1850 MHz band at three high-density training areas (Fort Irwin/NTC, Fort Polk/Joint Readiness Training Center (JRTC), and WSMR)[11]. This will require further analysis of exclusion zone size and other techniques based off WG-5 deliberations.
- Cost associated with the redesign and retuning of systems in the 1780-1850 MHz will come from any subsequent auction of that band.
- If comparable spectrum is required, move to 1435-1525 MHz or 2200-2290 MHz bands (with freed-up capacity in these bands from AMT relocation to 4 or 5 GHz).[12]

Precision Guided Munitions (PGMs) – truncate operations above 1780 MHz

- Navy can compress its operations into the 1780-1850 MHz band within five years.
- The Air Force does not need to take any action since the Air Force plans to cease operations of PGM systems that use the 1755-1850 MHz band within five years.

[10, 11] NTIA. (2012, March 27th). *An assessment of the viability of accommodating wireless broadband in the 1755-1850 MHz band*. Retrieved from http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf

[12] NASA Response to NTIA re 1755-1850 MHz Comparable Bands, *Version 3c April 2011, Pg.13. See: http://www.ntia.doc.gov/files/ntia/publications/nasa_1.pdf*

Industry Roadmap to Assessing the 1755-1850 MHz Band

Cost to free-up the 1755-1780 MHz band:

Operation	Estimated Cost ($M)
Fixed Point-to-Point Microwave	186 (relocate – 4 & 7 GHz)[13]
Military Tactical Radio Relay	160 (relocate/truncate – remain in band at 6 CONUS locations) [14]
Air Combat Training System	*200 for R&D (Retunes above 1780)
Precision Guided Munitions	Retunes above 1780
Tracking, Telemetry, and Commanding	Remains in Band
Aeronautical Mobile Telemetry	3,140 (Relocate to 5 GHz)[15]
Video Surveillance	**1000 (est. needs revised)
Unmanned Aerial Systems	***Retunes above 1780 (Remain in band at select sites in CONUS – may require Comp Spectrum at 2200 MHz or 1435 MHz)
Other DOD Systems	Retunes above 1780 MHz
Total ($M)	**$4,686**

* Assumes moving AMT to 4 or 5 GHz will free-up capacity in the 1780-1850 MHz band thereby accommodating ACTS operations
**Expect DoJ and DHS cost estimates to be revised downward (approximately $1B?)
*** May require comparable spectrum for redesign – current cost estimate for the entire 1755-1850 MHz band is $1,511. NTIA report states that the relocation of SUAS can permit accommodation of commercial broadband systems in the 1755-1780 MHz band within ten years with continued access and protection for DOD in the entire band at three high-density training areas until it completes transition. DoD request comparable spectrum at 2025-2110 MHz; however, if AMT moves to 5 GHz the AMT system will gain an additional 75 megahertz of capacity, which would free –up assignments for SUAS and ACTS in the 1435-1525 MHz, 1780-1850 MHz and the 2200-2290 MHz bands, which is consistent with other aeronautical systems.

[13,14,15] NTIA. (2012, March 27th). *An assessment of the viability of accommodating wireless broadband in the 1755-1850 MHz band.* Retrieved from http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf[13]

10900-B Stonelake Boulevard, Suite 126 • Austin, TX 78759 USA
Phone: +1-512-498-WIFI (+1-512-498-9434) | Fax: +1-512-498-9435
www.wi-fi.org

May 27, 2013

Mignon Clyburn
Acting Chairwoman
Federal Communications Commission
445 12th St SW
Washington DC 20554

Larry Strickling
Assistant Secretary
National Telecommunications and Information
Administration
US Commerce Department
1401 Constitution Ave. NW
Washington DC 20230

Re: Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, FCC ET Docket No 13-49

Dear Chairwoman Clyburn and Assistant Secretary Strickling:

Wi-Fi Alliance will soon be filing its comments in the above-captioned proceeding. Demand for Wi-Fi is exploding, and the 5 GHz band simply will not be able to support near-term growth without access to additional spectrum and updated technical rules. Furthermore, the 5 GHz band is the only band in the United States that has the potential to support 802.11ac, the next-generation of Wi-Fi technology. Unless the FCC designates the U-NII-2B and U-NII-4 bands for license-exempt use while also amending its existing rules to encourage greater utilization of all 5 GHz allocations, innovators and adopters will not be able to implement this new technology effectively. We, therefore, look forward to working with you as both the FCC and NTIA examine rule changes in the 5 GHz band to protect incumbents and to support Wi-Fi.

An important part of this process will be the effort to find ways for Wi-Fi equipment to share the U-NII-4 band with Intelligent Transportation Systems ("ITS") licensees. Our members are excited about the advent of connected vehicles, and we are proud that our membership now includes significant representation from the transportation industry. We have every incentive to ensure that Wi-Fi and ITS share the band in a way that benefits both communities.

With that goal in mind, Wi-Fi Alliance would like to emphasize several points.

- We agree that the transportation uses of the spectrum at 5.9 GHz may advance automotive safety, and that the 5.9 GHz band must continue to be a home for ITS as the technology progresses toward commercialization.
- We fully agree with NTIA, the FCC, and many transportation stakeholders, that in a shared U-NII-4 scenario, unlicensed devices must not cause harmful interference to ITS licensees.
- We advocate a collaborative effort by the FCC, the NTIA, and the Wi-Fi industry to determine the optimal rules for shared access that support both ITS and Wi-Fi use of the 5.9 GHz band. As NTIA recognized in its report on the 5350-5470 MHz and 5860-5925 MHz bands, a variety of sharing mechanisms could be adopted to permit ITS and Wi-Fi to coexist in U-NII-4.
- We believe Wi-Fi technology is complementary to certain ITS technologies under consideration. As such, we believe that the introduction of Wi-Fi to the U-NII-4 band has the potential to advance the cause of vehicle safety and to hasten the widespread implementation of ITS solutions by creating economies of scale among components used for communications and networking.
- We encourage the FCC, the NTIA, and all interested parties to participate in both the FCC and NTIA studies to in order to equip both agencies with the facts and findings they require to make the best decisions on the merits of the proposals.

Our commitment, through our members, is to participate and to provide the technology expertise to assist you in the decision process. As you continue to work through the issues raised in the proceeding, please reach out to the Wi-Fi Alliance for any assistance you might require.

Respectfully submitted

THE WI-FI ALLIANCE

Edgar Figueroa
President and CEO
10900-B Stonelake Blvd., Suite 126
Austin, Texas 78759
+1-512-498-9434
efigueroa@wi-fi.org

CC: Karl Nebbia, NTIA
Julius Knapp, FCC

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
RANKING MEMBER

ONE HUNDRED THIRTEENTH CONGRESS

Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6115
Majority (202) 225-2927
Minority (202) 225-3641

October 3, 2013

Mr. Karl Nebbia
Associate Administrator, Office of Spectrum Management
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, N.W.
Washington, D.C. 20230

Dear Mr. Nebbia:

Thank you for appearing before the Subcommittee on Communications and Technology on Thursday, June 27, 2013, to testify at the hearing entitled "Equipping Carriers and Agencies in the Wireless Era."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

To facilitate the printing of the hearing record, please respond to these questions by the close of business on Friday, October 18, 2013. Your responses should be e-mailed to the Legislative Clerk in Word format at Charlotte.Savercool@mail.house.gov and mailed to Charlotte Savercool, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, D.C. 20515.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Greg Walden

Greg Walden
Chairman
Subcommittee on Communications and Technology

cc: Anna Eshoo, Ranking Member, Subcommittee on Communications and Technology

Attachment

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

NOV 21 2013

The Honorable Greg Walden
Chairman
Subcommittee on Communications and Technology
Committee on Energy and Commerce
House of Representatives
Washington, DC 20515

Dear Chairman Walden:

Thank you for the opportunity to testify on behalf of the National Telecommunications and Information Administration (NTIA) at the Subcommittee's June 27, 2013 hearing entitled "Equipping Carriers and Agencies in the Wireless Era." I am enclosing my responses to the additional questions for the record you forwarded to me on October 3, 2013. If you or your staff has any additional questions, please do not hesitate to contact me at (202) 482-1850 or Sara Morris in NTIA's Office of Congressional Affairs at (202) 482-1840.

Sincerely,

Karl B. Nebbia
Associate Administrator
Office of Spectrum Management

cc: The Honorable Anna G. Eshoo, Ranking Member
Subcommittee on Communications and Technology

Enclosure

Responses to Question from The Honorable Marsha Blackburn

1. **What are the implications for the auto industry of any action to change the rules governing the use of DSRC signals in the 5.9 GHz band, particularly if these changes make US rules inconsistent with those applied in other countries?**

Response: The Federal Communications Commission (FCC) sought public comment regarding the potential for expanded use of Unlicensed National Information Infrastructure (U-NII) devices in the 5850-5925 MHz band as part of its pending rulemaking proceeding to make additional spectrum in the 5 GHz band available to unlicensed wireless devices and accelerate the expansion of Wi-Fi technology. The FCC is not proposing to change its existing rules governing the use of authorized Dedicated Short-Range Communications (DSRC) systems in this band. The underlying premise of regulations governing unlicensed devices in the United States has been, and continues to be, that unlicensed devices operating in any band may not cause harmful interference to any authorized service. Nor can users of unlicensed devices claim interference protection from other authorized services and devices. Therefore, if the FCC concludes that new U-NII devices can be accommodated without causing harmful interference to authorized DSRC operations, any new rules for U-NII devices would not change the existing DSRC rules and the auto industry's use of DSRC should not be impacted.

In addition to working with the FCC and the international spectrum community, NTIA continues to monitor discussions between auto industry and U-NII stakeholders in a working group of the Institute for Electrical and Electronics Engineers (IEEE) 802 standards committee. The IEEE 802.11 working group provides an international multistakeholder forum that has already developed standards for both wireless local area networks and vehicular wireless communications. The meetings of the 802.11 DSRC Coexistence Tiger Team have been productive and hold significant potential for successful collaboration and broad international implementation in this area.

Responses to Questions from The Honorable Henry Waxman

1. **I know several working groups were formed through the Commerce Spectrum Management Advisory Committee (CSMAC) to look at ways to either clear or share the 1755 to 1850 MHz band. I understand that a lot of progress has been made between industry and government participants of the process. In your view, what are some of the most valuable lessons learned? What were some of the most difficult challenges? How could this process help inform future efforts at clearing or sharing federal spectrum for commercial use?**

Response: NTIA views the effort as an overall success. The CSMAC approach broke new ground in industry/government collaboration and information sharing, which are critical components of decision-making regarding spectrum repurposing. This experience demonstrated how spectrum sharing requires a new way of doing business that involves earlier collaboration between industry stakeholders and affected federal agencies. The effort has allowed all parties to gain a better understanding of the different federal systems and the proposed commercial deployments in the bands tagged for repurposing and will facilitate commercial entry into the 1695-1710 MHz and 1755-1780 MHz bands after the auction.

Developing a framework for industry and government participants to share sensitive information on a timely basis was a significant challenge. Progress of the working groups was delayed as the parties negotiated and sought approval of formal non-disclosure agreements. Another challenge involved the groups' efforts to achieve consensus on the technical parameters, assumptions, and methodologies for conducting the analysis of potential interference. Recognition of these and other key challenges and their lessons learned will be helpful for future collaborative efforts. NTIA is grateful for the support and effort of all of the government and industry participants.

NTIA is holding a public forum to discuss lessons learned with industry and government participants of the CSMAC Working Groups on December 13, 2013. We expect to gain significant additional insight and feedback on the process at the forum.

2. **As you know, the Commercial Spectrum Enhancement Act ensures that federal agencies are able to recover costs associated with their relocation to other spectrum from commercial auction proceeds. The Public Safety and Spectrum Act enacted by Congress last year further updated the CSEA to ensure that the eligibility for reimbursements is expanded to include costs associated with upfront planning, spectrum sharing, and the replacement of existing federal systems with state-of-the-art equipment that provides comparable capabilities. Do you believe these provisions help address some of the concerns raised by federal users of spectrum, especially in regards to cost? Do you see the federal spectrum clearing or sharing process as an opportunity for agencies to upgrade and modernize their systems and equipment?**

Response: The 2012 amendments to the Commercial Spectrum Enhancement Act (CSEA) provide helpful incentives and financial assistance to federal agencies through the Spectrum Relocation Fund to facilitate relocation or sharing by eligible federal entities. CSEA now includes useful provisions addressing the content and format of federal entity transition plans, establishing a dispute resolution process, ensuring the protection of classified and other sensitive information, and funding the replacement of existing government-owned equipment with state-of-the-art systems.

That being said, NTIA recognizes that the planning, sharing and relocation processes are still, and in some cases more, time and resource intensive. For example, the improvements to the CSEA now require agencies to develop detailed transition plans prior to receiving funding from past or future auction proceeds.

NTIA is also cognizant of the agencies' efforts to make spectrum available for unlicensed uses, which helps alleviate data congestion and may promote innovation. This work occurs outside the framework of the CSEA, given that funding for agency planning, sharing and relocation expenses is derived from auction proceeds.

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
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October 3, 2013

Mr. Christopher Guttman-McCabe
Executive Vice President
CTIA – The Wireless Association
1400 16th Street, N.W., Suite 600
Washington, D.C. 20036

Dear Mr. Guttman-McCabe:

Thank you for appearing before the Subcommittee on Communications and Technology on Thursday, June 27, 2013, to testify at the hearing entitled "Equipping Carriers and Agencies in the Wireless Era."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

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Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Greg Walden

Greg Walden
Chairman
Subcommittee on Communications and Technology

cc: Anna Eshoo, Ranking Member, Subcommittee on Communications and Technology

Attachment

Response of Chris Guttman-McCabe, CTIA – The Wireless Association©

The Honorable Henry Waxman

1. **I know several working groups were formed through the Commerce Spectrum Management Advisory Committee (CSMAC) to look at ways to either clear or share the 1755 to 1850 MHz band. I understand that a lot of progress has been made between industry and government participants of the process. In your view, what are some of the most valuable lessons learned? What were some of the most difficult challenges? How could this process help inform future efforts at clearing or sharing federal spectrum for commercial use?**

The CSMAC Working Group process offered a highly useful opportunity for industry-government collaboration. In general, CTIA's members believe that the CSMAC process was successful in facilitating technical discussions that have led to a much more robust understanding of how this sort of analysis should be conducted.

Challenges that arose during the process generally fell into two groups: procedural or technical.

On the procedural front, the Federal Advisory Committee Act (FACA) structure imposed on the working group process posed a challenge. While the FACA requirements are intended to ensure transparency in the decision-making process, they proved to be a barrier to the efficient sharing of technical and operational data because of concerns on the part of the Defense Department and other federal agencies that sensitive information could be made public. While there is undoubtedly some legitimacy to federal users' concerns in this area, this lack of sharing and the tendency to categorize information "For Official Use Only" impedes the ability of private sector working group participants to gain full and timely access to critical information.

Additionally, when industry proposed the creation of "trusted agents" (a select group of industry representatives with appropriate clearances and subject to non-disclosure agreements), it took many months to work through the process. It would be helpful in the future to identify and approve "trusted agents" on the front-end of the process.

On the technical side, having both industry and government agree to and understand specifically what the goals are of the work effort are, i.e., relocation, sharing, reviewing sub-bands in addition to an entire band. The approach being taken should also be agreed to and understood prior to initiating technical analysis would provide more accurate evaluation and increased efficiency.

Additionally, when technical analysis is ongoing, efforts should be made to proceed with work on other issues. In this instance, when interference analysis was ongoing, there were sometimes weeks or months that went by during which no work was done. This was a lost opportunity and the cause of unnecessary delay.

Response of Chris Guttman-McCabe, CTIA – The Wireless Association©

Finally, more needs to be done to ensure that industry and government agree on important matters like interference protections. As almost every industry member of the CSMAC noted in their August 29 separate statement, "the analysis performed in each of these working groups was both conservative and limited. We believe that additional effort should be initiated that would greatly mitigate the protection zones for Federal operations including, but not limited to, considering other effects such as clutter, more reasonable interference protection limits and considering a more representative LTE system model. We believe that many of the current analysis results do not represent the real-world interference environment between Federal and commercial users." This situation should be remedied in future efforts.