

Testimony of  
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Before the  
House Energy and Commerce Committee  
Subcommittee on Communications and Technology

Hearing on  
*Creating Opportunities through Improved Government Spectrum Efficiency*  
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## Summary

Federal spectrum users require advanced commercial wireless technology to support bandwidth-intensive – and increasingly mobile – data communications to meet their mission. Commercial off-the-shelf technologies are an important part of the solution for how these needs are met.

DoD has a level of spectrum requirements that is unprecedented, driven by growing video and other data needs and increased reliance on advanced technology capabilities. Via state-of-the-art tactical use of LTE, Oceus Networks is committed to providing DoD and other Federal users the same technological capabilities for wireless broadband to which commercial consumers are now accustomed. With our portable 4G LTE broadband solution, *Xiphos*, we are demonstrating the capabilities of this technology to meet warfighter needs for many missions across the Services, including the first operational deployment of 4G LTE for DoD in the Navy. We are also using this solution to support the FCC’s consideration of the potential role of High Altitude Platforms in the national public safety network.

As the globally accepted mobile broadband standard of choice, 4G LTE “evens the technology playing field” for government users. 4G LTE provides a clear way forward for many of DoD’s advanced communications requirements by providing a technology roadmap with the same economies of scale, rapid technology life-cycles and low cost factors from which commercial users now benefit. Bringing the advantages of a commercial technology roadmap to Federal user requirements is impactful because:

1. Standardized commercial technologies such as LTE leverage the extensive ecosystem of commercial R&D investment and greatly reduce time from development to deployment.
2. Use of commercial wireless broadband technologies, when appropriate to meet mission needs, can allow military and other Federal government operations to use spectrum efficiently and cost-effectively.
3. Systems that rely on the same wireless broadband standard embraced in the commercial world (i.e., LTE) facilitate interoperability and sharing between government and private sector users.

Federal policymakers are increasingly looking to sharing as a potential option to both enhance the effective and efficient spectrum use of government operations and provide capacity for commercial broadband uses. Given the increasingly congested nature of the portions of spectrum most attractive for mobile broadband, the terms and conditions of how to apply a sharing framework to accommodate commercial operations in Federal spectrum are now being studied. For new policies based on sharing to remain viable as true “win-win” solutions, sharing should be viewed as a “two-way street.” Government and commercial use of standard technologies such as LTE facilitates the challenges associated with sharing over the long-term. Sharing is easier between “like” systems, recognizing that it is imperative that individual user requirements (i.e., national security needs) be protected.

## Testimony

Good morning Chairman Walden, ranking member Eshoo and distinguished members of the Subcommittee. Thank you for inviting me to talk with you about how commercial wireless broadband technologies can provide opportunities to make government spectrum use more efficient and effective.

### I. INTRODUCTION

Oceus Networks provides mobile broadband communications services and tactical military solutions for delivering high-speed voice, video and data communications. We are headquartered in Reston, Virginia, with a major R&D center in Plano, Texas.

The topic of today's hearing, "Creating Opportunities Through Improved Government Spectrum Efficiency," is very timely. A related, but critical, issue is the need that Federal spectrum users have for advanced commercial wireless technology to support bandwidth-intensive – and increasingly mobile – data communications to meet their mission. Commercial off-the-shelf technologies (COTS) are an important part of the solution set for how these needs will be met.

***Need for 'Future-Proofed' Solutions:*** Few technology and policy challenges are more important for national security and economic growth. Fortunately, sound decisions can lead to "future-proofed" solutions, for both commercial wireless ecosystem development and the advanced, high-speed tactical and enterprise wireless communications required by military users on bases.

Across the Federal government, spectrum is a critical enabler. The mobile broadband revolution that is transforming consumers' daily lives has profound implications for government users, presenting both opportunities and challenges. DoD has described a level of spectrum

requirements that is unprecedented, driven by increased data needs and increased reliance on advanced technology capabilities.<sup>1</sup> Shrinking budgetary resources and a growing reliance on unmanned operations that require mobile, portable high-bandwidth solutions are other key drivers. In addition, the U.S. Armed Forces must maintain a high tempo of training, focused on expeditionary warfare capabilities, but with 80 percent of forces at home.<sup>2</sup> Warfighters are trained to fight through U.S.-based operations but must be ready to deploy with little or no notice. This means that for training and testing purposes, our soldiers, sailors and airmen and women require spectrum access on bases.

Through state-of-the-art tactical use of Fourth Generation Long Term Evolution technology, commonly known as 4G LTE, Oceus Networks is deeply committed to providing Federal users the same advanced technological capabilities for wireless broadband to which consumers have access. With our portable 4G LTE broadband solution, called *Xiphos*, we are today demonstrating the capabilities of this technology to meet warfighter needs for many missions across the Services, including the first operational deployment of 4G LTE for DoD in the Navy.<sup>3</sup>

The rapid evolution in modern communications technology is well-documented, with CTIA's semi-annual survey indicating that wireless data traffic grew 123 percent from 2010 to

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<sup>1</sup> Statement by Teresa M. Takai, DoD Chief Information Office, Before the House Armed Services Committee, Subcommittee on Emerging Threats and Capabilities, on Fiscal Year 2013 Budget Request for Information Technology and Cyber Operations Programs, March 20, 2012, available at [http://armedservices.house.gov/index.cfm/files/serve?File\\_id=d6d557bc-a941-49e0-996a-d29cf376fb0d](http://armedservices.house.gov/index.cfm/files/serve?File_id=d6d557bc-a941-49e0-996a-d29cf376fb0d).

<sup>2</sup> *CHIPS Magazine*, December, 2009, Interview with Commanding General, Network Enterprise Technology Command/9th Signal Command Maj. Gen. Susan Lawrence, available at [www.doncio.navy.mil/chips/ArticleDetails.aspx?ID=2610](http://www.doncio.navy.mil/chips/ArticleDetails.aspx?ID=2610).

<sup>3</sup> Oceus Networks Press Release, "First U.S. DoD Operational Deployment of 4G LTE with Navy Pilot of Oceus Networks' Xiphos Solution," March 29, 2012, available at <http://oceusnetworks.com/news/oceus-news/first-us-dod-operational-deployment-4g-lte-navy-pilot-oceus-networks-xiphos™-solutio>.

2011.<sup>4</sup> However, this success story should not be limited to mass-market consumer devices.

These capabilities meet mission needs today for Federal users who also need high-speed, mobile voice, video and data communications.

***Parallel ‘Spectrum Crunches’:*** Oceus Networks appreciates the work that the Federal Spectrum Working Group has undertaken to examine more efficient ways for the Federal government to use spectrum. These challenges are neither new nor easy to resolve. Both commercial and government users face parallel trendlines of a “spectrum crunch” to meet growing bandwidth needs. Cisco estimates that video traffic will comprise 55 percent of all consumer Internet traffic in 2016, up from 51 percent in 2011, and that mobile data traffic will increase 18-fold between 2011 and 2016.<sup>5</sup> With regard to mobile data services, I can personally vouch for these growing commercial requirements. I was an early employee at Ericsson in the United States and now have spent more than 20 years in the private sector working on broadband communications, including in support of carrier needs for wireless high-speed data.

At the same time, for DoD, there are parallel needs for bandwidth and apps for mission and enterprise use. As is the case in the private sector, these increased bandwidth requirements are driven, in part, by video, which has been a contributor to increased spectrum requirements. One case in point is the stunning increase in the number of Unmanned Aerial Systems (UASs), which rely on Federal spectrum, to process critical intelligence, surveillance and reconnaissance data, including through video transmission capabilities. For DoD, the number of UASs rose from

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<sup>4</sup> CTIA Press Release, CTIA-The Wireless Association® Semi-Annual Survey Shows Significant Demand by Americans for Wireless Broadband, April 13, 2012, available at <http://www.ctia.org/media/press/body.cfm/prid/2171>.

<sup>5</sup> Cisco Visual Networking Index, The Zettabyte Era, May 30, 2012, available at [http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/VNI\\_Hyperconnectivity\\_WP.html](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/VNI_Hyperconnectivity_WP.html).

167 in 2002 to more than 7,500 in 2010.<sup>6</sup> In the face of such increased demands, we laud the efforts that DoD is undertaking to use spectrum effectively to meet growing mission requirements for broadband. As DoD CIO Teri Takai recently noted: “We must ... recognize the growing spectrum demands resulting from [DOD’s] increasing reliance on spectrum-dependent technologies.”<sup>7</sup>

## **II. OVERVIEW**

You may be asking why a player from a relatively new, but fast-growing, wireless technology firm is testifying today on this topic? I am here today to discuss the importance of commercial wireless broadband technology – specifically 4G LTE – as part of a toolset to meet the current and ever-emerging broadband communications requirements for military and other Federal users.

Oceus Networks recognizes that open, standards-based communications infrastructures, including those relying on 4G LTE, are not a one-size-fits all approach for all Federal spectrum user needs. Given the diversity of government spectrum requirements – for both communications and non-communications capabilities – no single technology could be. At the same time, it is a matter of long-standing DoD policy to rely on COTS technology, when technologically feasible to meet military requirements.<sup>8</sup> As the Defense Science Board pointed out in a 2009 report: “Defense-funded research and development once drove commercial technology, but commercial technology now leads DOD in many key areas.”<sup>9</sup> LTE is a prime

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<sup>6</sup> DOD News Article, “Defense CIO: Wireless Spectrum a Critical Enabler,” by Claudette Roulo, American Forces Press Service, July 20, 2012 available at <http://www.defense.gov/news/newsarticle.aspx?id=117210>.

<sup>7</sup> Id.

<sup>8</sup> 10 U.S. Code § 2501, "National security objectives concerning national technology and industrial base."

<sup>9</sup> Report of the Defense Science Board Task Force on Integrating Commercial Systems into the DOD,

example of this commercial-driven technology trend and the opportunity it presents for DoD and other Federal government users to leverage private industry R&D investments and have greater capabilities sooner and often at a lower cost than largely custom-built communications solutions.

**4G LTE as Complement:** DoD has a broad range of complex and often unique spectrum user requirements, for which the Department may need to rely on programs of record tailored to more specific mission requirements. Commercial technologies, including 4G LTE, are a strong complement to certain existing programs. LTE is the globally accepted mobile broadband standard of choice.<sup>10</sup> As such, 4G LTE “evens the technology playing field” for government users. 4G LTE provides a clear way forward for many of DoD’s communications requirements by offering a technology roadmap with the same economies of scale, rapid technology life-cycles and low cost factors from which commercial users now benefit.

At the same time, these broadband communications requirements, based on LTE, are not often otherwise supported by commercial carriers on the bases and training ranges where warfighters require access, including remote parts of the country. As the FCC’s National Broadband Plan pointed out, increased spectrum demands are “primarily an urban phenomenon.”<sup>11</sup> Rather than waiting indefinitely for wireless broadband services to be made available as part of commercially deployed networks, portable LTE solutions such as ours are bringing this capability directly to our armed forces, where and when they need it.

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“Effectively and Efficiently Buying Commercial: *Gaining the Cost/Schedule Benefits for Defense Systems*,” February 2009, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, available at <http://www.acq.osd.mil/dsb/reports/ADA494760.pdf>.

<sup>10</sup> “The Benefits of Using LTE Digital Dividend Spectrum,” 4G Americas, November 2011: “LTE is the global standard developed by the 3rd Generation Partnership Project (3GPP) for next- generation mobile broadband networks supported by all major players in the industry.” Available at [www.4gamericas.org/documents/Benefits%20of%20LTE%20in%20Digital%20Dividend\\_11.08.11.pdf](http://www.4gamericas.org/documents/Benefits%20of%20LTE%20in%20Digital%20Dividend_11.08.11.pdf).

<sup>11</sup> FCC National Broadband Plan, Chapter 5, Spectrum, available at <http://www.broadband.gov/plan/>.

While the topic of security is outside of the scope of this hearing, Oceus Networks appreciates that this is an important issue for national security users. We are working with the Federal government to secure the 4G LTE waveform and user devices.

***Federal Policy Drivers:*** Federal policy is increasingly recognizing the opportunities presented by powerful mobile broadband platforms, including LTE. Congress in its wisdom earlier this year recognized the prevalence of LTE as the worldwide commercial standard for wireless broadband when adopting it in the Middle Class Tax Relief and Job Creation Act as the standard for the nationwide public safety network for interoperability.<sup>12</sup> The White House issued a Digital Government Strategy earlier this year that included goals such as developing models for the delivery of commercial mobile applications into the federal environment.<sup>13</sup> DoD released a ground-breaking Mobility Device Strategy in June.<sup>14</sup>

These important policy initiatives also reflect a larger reality. The expanded apps, continually evolving devices and improved network performance of commercial mobile networks are already embraced by most of our nation's young men and women who are entering military service. They grew up with wireless broadband devices ranging from smartphones to tablets. As a result, they ask how the same advanced capabilities, coupled with stronger security features and military-appropriate apps, could be made available on mobile devices when training and in the battlefield?

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<sup>12</sup> PL 112-96, Section 6203.

<sup>13</sup> "Building a 21st Century Digital Government," May 23, 2012, available at <http://www.whitehouse.gov/sites/default/files/omb/egov/digital-government/digital-government-strategy.pdf>.

<sup>14</sup> DoD Mobility Device Strategy, June 8, 2012, available at [www.defense.gov/news/dodmobilitystrategy.pdf](http://www.defense.gov/news/dodmobilitystrategy.pdf).

### III. COMMERCIAL TECHNOLOGY PATH FORWARD

As the Federal Spectrum Working Group has recognized, finding more efficient ways for government users to utilize spectrum “without compromising critical objectives” will produce valuable dividends for agencies and help foster economic growth in the private sector.<sup>15</sup> To this end, DoD’s ability to harness commercial technological capabilities has several long-term benefits for our nation’s warfighters, both within the Continental United States (CONUS) and outside of it (OCONUS). Both scenarios are critical to members of the Armed Forces who need assured access to spectrum and modern technologies to “train as we fight.”

Bringing the advantages of a commercial technology roadmap to Federal user requirements is impactful because:

1. Standardized commercial technologies such as LTE leverage the extensive ecosystem of commercial R&D investment and reduce the time from development to deployment by years, and even decades. This is important for the ability to leverage today’s commercial innovations but even more important as it provides the ability for government users to more easily remain current going forward as emerging standards-based advanced capabilities are developed.
2. Use of commercial wireless broadband technologies, when appropriate to meet mission needs, can allow military and other Federal government operations to use spectrum even more efficiently and cost-effectively.
3. Deploying systems that rely on the same wireless broadband standard that is embraced in the commercial world (i.e., LTE) facilitates interoperability between government and private sector users.

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<sup>15</sup> House Energy and Commerce Committee press release, “Federal Spectrum Working Group Seeks Update on Government Spectrum Use,” July 10, 2012, available at <http://energycommerce.house.gov/press-release/federal-spectrum-working-group-seeks-update-government-spectrum-use>.

4. There is a technology gap between the technology development life-cycles of commercial cellular systems and specific DoD programs of record that can be measured in orders of magnitude. Relying on COTS, when it meets the mission, can help bridge this gap.

LTE offers technological capabilities that facilitate sharing between government, public safety and commercial users, including the ability to more easily coordinate operations in adjacent geographic areas. In addition, where security issues permit, it offers the ability for military users to roam onto a commercial network when leaving a base or installation. To help meet rising demands for mobile broadband data, Oceus Networks has been working with an array of Federal government and private sector users to ensure that 4G LTE technology solutions are part of comprehensive, forward-looking strategies for using commercial mobile broadband platforms.

Specifically, Oceus Networks delivers end-to-end cellular network solutions of varying sizes. These solutions range from full power macro solutions supporting multiple sectors to reduced size, backpack solutions. These deployable cellular solutions can be networked together to satisfy the needs of users over a large area. In contrast to traditional cellular networks, our highly survivable architecture establishes a core network in each radio node. Further, Oceus Networks offers a “network of networks” capability providing solutions for administration, maintenance, security, and provisioning. These features are accomplished via open interfaces facilitating expansion and integration with other systems. Nodes can be fixed, portable, mobile, airborne, marine, or ground. All nodes integrate into a network of networks, providing a seamless mobile experience for user and operator. All “networks of networks” interoperate with traditional mobile network architecture through open standard interfaces. The networks interoperate either as independent networks or as an integral part of a traditional carrier network.

Oceus Networks provides these capabilities securely and reliably, without changes to standard handsets or switching algorithms. This allows the full cost savings of commercial economies of scale to flow to Federal government users.

#### **IV. MEETING WARFIGHTER REQUIREMENTS**

Our 4G LTE solution *Xiphos* ensures that specific military user needs are addressed, through meeting specific encryption requirements and ruggedizing equipment as needed. We provide mission-critical apps for the warfighter, for situational awareness, video streaming and VoIP. Our mobile 4G LTE solution provides the functionality of a full cellular network in a single unit to address warfighter broadband requirements “on the move,” which would not be possible with fixed switching equipment. This means our mobile LTE networks can be placed aboard ships, installed in tactical warfighter vehicles, mounted on UASs and other aerial vehicles, and/or be soldier back-packed.

In addition, it is worth noting that it is no accident that for the first time in the history of the cellular wireless world, technology developers have converged on a single global standard technology of choice, which is LTE. What we are working on is strengthening our own product. However, we are also mindful that it would be a missed opportunity for Federal users to not incorporate LTE as part of their mobile data use profiles, to reflect the current commercial technology roadmap.

How are these technologies being used by the military today? One example is a Navy trial in which Oceus Networks is participating to provide communications systems using its 4G LTE-based *Xiphos* solution, which marks the first operational deployment of 4G LTE for the U.S. DoD. This technology allows the Navy to leverage the global mobile phone industry’s R&D investment. This 4G tactical network, using Android devices, will support communications,

including classified, for up to 3,500 marines and sailors deployed with the Kearsarge Amphibious Ready Group. The 4G solution that the Navy is currently testing here is an example of how Federal users are relying on commercial wireless broadband technology to use spectrum more efficiently and effectively. The data needs that the project supports free up limited bandwidth on intraship communications for other mission-critical needs. The project designates 4G as a “mission critical requirement” for the Counter-Piracy Task Force, which mostly operates off the Horn of Africa.<sup>16</sup>

## **V. REQUIREMENTS OF OTHER FEDERAL USERS**

Oceus Networks is also using its 4G LTE-based solution to support the Federal Communications Commission’s consideration of the potential role of High Altitude Platforms in the national public safety network.<sup>17</sup> In a Notice of Inquiry launched in May 2012, the FCC is considering how Deployable Aerial Communications Architecture (DACA) can restore the communications capabilities of first responders shortly after the occurrence of a major natural disaster or terrorist attack. DACA technologies are aerial technologies, ranging from UASs to weather balloons, which could provide emergency communications in the period immediately following a major disaster, when terrestrial communications infrastructures typically are damaged or disrupted. In a trial scheduled to begin this fall, we will demonstrate the role of 4G LTE in a rapidly deployable aerial communications architecture that can provide immediate broadband

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<sup>16</sup> Fast Company, “The 4G System That Powers The Navy’s Pirate Fights,” April 20, 2012, available at <http://www.fastcompany.com/1834739/4g-system-powers-navys-pirate-fights>.

<sup>17</sup> FCC Notice of Inquiry, Utilizing Rapidly Deployable Aerial Communications Architecture in Response to an Emergency, adopted May 24, 2012, PS Docket No. 11-15.

communications to such disaster areas.<sup>18</sup>

***Extending Reach with 4G LTE:*** Because the 4G LTE network based on *Xiphos* is an entire network of capability in each node, our robust, compact technology solution can be built to extend the reach of wireless broadband into remote or rural areas. These areas are not always a priority of coverage for large network operators, due to the cost-benefit trade-offs of deploying fixed networks to less densely populated areas. But for our *Xiphos* technology solution, this provides an excellent example of how advanced commercial wireless technology can enable more efficient and effective spectrum use in geographic areas that might not otherwise have access to the advanced communications capabilities provided with 4G LTE.

In the Middle Class Tax Relief Act, Congress envisioned the much-needed new public safety broadband network as providing nationwide reach to meet the broadband requirements of first responders, including deployment milestones for substantial rural coverage.<sup>19</sup> To this end, our proven mobile 4G LTE solution can provide a cost-effective means to extend the national public safety network's LTE broadband footprint, both rapidly and cost-effectively, to reach public safety users in remote and rural communities. Given limits of time and funding, it is not otherwise reasonable to expect that a fixed cellular infrastructure could be feasibly built to completely fill out the required terrestrial footprint of the FirstNet network. But the portable 4G LTE solution developed by Oceus Networks could be deployed cost-effectively and quickly, including as part of vehicle-mounted solutions, to provide broadband connectivity to first responders as part of the FirstNet network. Multiple solutions will be required to extend the LTE

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<sup>18</sup> Oceus Networks Press Release, "Oceus Networks to Demonstrate Rapidly Deployable Networks for Public Safety," May 24, 2012, available at <http://oceusnetworks.com/news/oceus-news/oceus-networks-demonstrate-rapidly-deployable-networks-public-safety>.

<sup>19</sup> PL 112-96, Section 6206.

footprint of the larger FirstNet network. The cost and time advantages of our solution are important given the need to stretch the finite FirstNet network funding as far as possible.

## **VI. SHARING AS A TWO-WAY STREET**

Federal policymakers are increasingly interested in sharing as a potential option to both enhance the effective and efficient spectrum use of government operations and provide capacity for commercial broadband uses. Spectrum sharing based on time and geography is not a case of first impression, and in fact dates back to the creation of the Radio Act of 1912. But given the increasingly congested nature of the portions of spectrum most attractive for mobile broadband deployment, the terms and conditions of how to apply a sharing framework to accommodate commercial operations in Federal spectrum are now being studied. For new policies based on sharing to remain viable over the long-term as a true “win-win” solution for commercial and government spectrum users, sharing must be viewed as a “two-way street.” To obtain improved economies of scale by adopting commercial technologies such as LTE, Federal users need potential access to commercial spectrum bands. As one aspect in a larger spectrum supportability tool set, this is an important option for government users, for whom modifying commercial technology to work effectively in government bands is expensive, time consuming and off the commercial roadmap.

***Need for Balance:*** The implications of finding solutions that get this balance right are far-reaching. Both Federal government and commercial wireless broadband users are integral to U.S. global leadership in mobile broadband technology. As the President’s Digital Government Strategy released earlier this year noted, the amazing mix of smarter mobile devices, cloud computing and collaboration tools is not only changing consumers’ experience but is “bleeding into government as both an opportunity and a challenge.”

Government and commercial use of standard technologies, such as LTE, facilitates the challenges associated with sharing over the long-term. Sharing is easier between “like” systems, although it is imperative that individual user requirements (i.e., national security needs) be protected. We are also studying the more dynamic-based sharing ideas raised in the recent recommendations to the President made by the President’s Council of Advisors on Science and Technology (PCAST). At the same time, we recognize that Dynamic Spectrum Access (DSA)-focused sharing may be more feasible in the longer-term, rather than currently available geography- and time-based alternatives.

## **VII. CONCLUSION**

In sum, assured access to the kinds of modern advanced communications capabilities provided by technology solutions such as 4G LTE is essential for warfighters to maintain information dominance on the battlefield and for efficient and effective use as part of enterprise solutions.

Helping Federal users to harness the full advantages of 4G LTE is important for improving access to wireless broadband communications. To this end, Federal users need access to this technology in the bands identified by worldwide standards bodies for LTE deployment. As Congress has already recognized, this is a critical aspect of the buildout plans for the nationwide network for first responder interoperability that will unfold under FirstNet, which will rely on LTE technology in the 700 MHz band. In other areas, balanced policy approaches are also needed that view sharing as mutually beneficial to commercial and government users. Just as commercial users require access to current Federal spectrum bands for future deployments of 4G LTE, government users will need the flexibility to access bands that are globally harmonized for this technology, as well.

The stakes are high for getting the policy part of this equation right, including the terms of access for Federal users involved in first response. Ensuring a wireless broadband future for Federal government users that is on par with that of U.S. consumers is a key contributor to economic growth, technological competitiveness and national security.

Thank you for the opportunity to testify at today's hearing and I look forward to answering any questions you may have.