

Testimony of Harold Feld, Legal Director of Public Knowledge
On behalf of the
Public Interest Spectrum Coalition

Before the
U.S. House of Representatives
Committee on Energy and Commerce
Subcommittee on Communications and Technology

Hearing On: “Promoting Broadband, Jobs and Economic Growth through Commercial Spectrum
Auctions”

June 1, 2011

Testimony of Harold Feld, Legal Director of Public Knowledge
On behalf of the
Public Interest Spectrum Coalition

Before the
U.S. House of Representatives
Committee on Energy and Commerce
Subcommittee on Communications and Technology

Hearing On: “Promoting Broadband, Jobs and Economic Growth through Commercial Spectrum Auctions”

June 1, 2011

Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee, thank you for the opportunity to testify before you on the critical issue of improving our spectrum policy to promote broadband, create jobs, and facilitate economic growth. My name is Harold Feld and I am the Legal Director for Public Knowledge, a nonprofit public interest organization that addresses the public's stake in a competitive and affordable telecommunications market. Today, I am pleased to represent the Public Interest Spectrum Coalition (PISC), a broad coalition of citizens groups consisting of civil rights organizations, consumer organizations, and organizations representing higher education.¹

Introduction

In order for the Federal Communications Commission's (FCC) spectrum policies to successfully promote broadband access, economic growth, and job creation, while simultaneously addressing exponential growth in mobile data consumption, Congress must empower the FCC to facilitate a

¹ PISC is an ad hoc coalition whose membership has varied from time to time and issue to issue. During PISC's advocacy for use of the white spaces and for its involvement in the 700 MHz auction proceeding, two proceedings most relevant to today's testimony, PISC's membership included, in alphabetical order: The CUWiN Foundation (CUWIN), Consumer Federation of America (CFA), Consumers Union (CU), EDUCAUSE, Free Press (FP), Media Access Project (MAP), the National Hispanic Media Coalition (NHMC), the New America Foundation (NAF), Public Knowledge (PK), and U.S. PIRG. For purposes of this testimony, PISC's membership includes: Public Knowledge, New America Foundation, and Media Access Project

mobile ecosystem that consists of a mixed use of licensed and unlicensed spectrum. Using unlicensed spectrum to increase access to spectrum for new entrants to provide more competition among commercial license holders will allow more ubiquitous access through a deregulatory, free market approach and exponentially grow capacity to match exponential growth in mobile data demand. Experts from industry, the public interest community, and the federal government alike have all celebrated the expanded use of unlicensed spectrum access as a compliment to expanding licensed access for purposes as diverse as rural broadband, offloading data from overburdened licensed networks, and stimulating the next generation in advanced “smart” wireless technologies.

At the same time, increased use of unlicensed spectrum, particularly in the unused television broadcast channels known as the “TV white spaces” (TVWS), will spur the development of new technologies that will benefit providers using licensed spectrum as well. Rarely does one find such unified and bipartisan support for a policy initiative. The recognition that unlicensed spectrum provides a deregulatory mechanism for spurring innovation, investment, and competition in new services has won support for the TVWS initiative from Republicans and Democrats alike. Republican Chairmen Michael Powell and Kevin Martin began and developed the TVWS rules with the support of their Democratic colleagues, while Democratic chairman Julius Genachowski concluded the rulemaking with the support of his Republican colleagues.

In order to free up additional spectrum, the White House, the FCC, and Members of Congress have advocated utilizing incentive auctions to increase the supply of spectrum for wireless broadband. Currently, PISC has no official position on incentive auctions because a large number of factors inherent in the concept are still generally unknown at this time. However, if compensating licensees for spectrum assets they obtained for free was done for the purpose of furthering the objectives Congress set out in Section 309(j) of the Communications Act, which is to promote competition and

opportunities for traditionally disenfranchised communities such as rural America, then incentive auctions can be a net good.

In order to meet these objectives though, Congress must avoid viewing spectrum policy strictly through the lens of a Congressional Budget Office (CBO) score. That is not to say that anything that is not calculated in a CBO score is lost revenue for the federal government, but rather that there is substantial economic evidence that spectrum policies not captured in a CBO score can actually provide revenue that far exceeds one-time spectrum auctions through economic growth. In fact, I will go further and state that if Congress passes legislation that forces the FCC to only focus on raising revenue for the federal government, the spectrum “crisis” the wireless industry is encountering today will become a spectrum *armageddon* resulting in higher costs, stifled innovation, and reduced global competitiveness.

The Health of the Mobile Ecosystem Depends on a Mix of New Licensed and Unlicensed Options

Despite commercial license holders investing more than \$20.4 billion in 2010 to improve wireless infrastructure and having received a substantial increase in spectrum with the recent 700 MHz auction, many experts agree that mobile data demand will continue to outstrip capacity.² This occurs for many reasons. First, we must recognize that government controlled spectrum auctions for commercial licenses can take several years and fundamentally represent a *linear* growth solution for an *exponential* growth problem. While there is no question that the existing commercial wireless business model – based on exclusive licensing, tower-based hub/spoke channelization, centralized infrastructure and metered billing – will require more exclusive-use spectrum in the short-run to meet

2 CTIA (2010, December 14) *2010 in Review: Wireless Industry Still #1 for Innovation, Competition and Investment* [Press release]. Retrieved from <http://blog.ctia.org/2010/12/14/2010-in-review-wireless-industry-still-1-for-innovation-competition-and-investment/>

peak mobile data demand, it should be equally clear that exclusive reliance on this model is not sustainable longer term.

Second, the number of uses for wireless data access far exceed the ability of any company, or group of existing companies, to keep up. Today, the consumer mobile market dwarfs all other market segments in its expanding and all consuming demand, and the largest wireless providers naturally focus on this and closely related enterprise and backhaul markets. But every day new uses for wireless access with very different needs emerge, addressed by companies and entrepreneurs focused on these new opportunities. The rise of “machine to machine” communication and the “internet of things” would quickly overwhelm networks better suited to critical uses and increased consumer demand without this dynamic sector of tech companies and new entrants with unlicensed spectrum access ready to take up the load. And while some of these uses, such as medical monitoring, do better on licensed networks, many other uses such as municipal meter readers, industrial inventory tracking, smart grid coordination, or any of an endless list of new applications innovators have only begun to recognize do better in the unlicensed environment with its flexibility and tolerance for interference.

Perhaps most importantly, licensed providers themselves recognize the value unlicensed spectrum plays in the ecosystem. The rise of the use of Wi-Fi hotspots and other ways in which providers such as AT&T and Verizon actively use unlicensed spectrum to offload data demonstrates how spectrum for unlicensed use also provides valuable benefits to traditional licensed providers.

In order for sufficient capacity to be built to meet exponential growth, the number of players involved in investing and building that capacity must expand to a point where virtually everyone from large businesses to the individual consumer can be involved. This requires low barriers to entry, economies of scale for the manufacture of equipment, and the flexibility that comes when inventors in garages can

apply their ingenuity. We have only to look at the amazing success of unlicensed and “Wi-Fi” to imagine what the next generation of “super Wi-Fi” will bring.

Unlicensed Spectrum is the Most Deregulatory and Free Market Success Story in Wireless

The enormous innovation facilitated by unlicensed spectrum has generated substantial consumer welfare. There are no government rules to unlicensed spectrum access and it is the only type of spectrum access where every single innovative entrepreneur can bring an idea to market without permission or barrier to entry. Unlicensed spectrum use through Wi-Fi alone has seen dramatic growth since its launch in 2001 with nearly 1 billion Wi-Fi chipsets sold between the years 2005 to 2008³ and an estimated growth expected to reach 1.5 billion devices sold per year by 2014.⁴ A study by USC economist Ergin Bayrak of the benefits of wireless home networking through Wi-Fi, estimated that unlicensed spectrum created considerable consumer welfare on the order of \$18 billion (nearly the same amount as the entire 700 MHz auction).⁵

Commercially licensed carriers have capitalized on the high bandwidth capabilities of unlicensed spectrum devices as a means to off-load mobile data traffic from their mobile networks in high density areas. This trend recognizes that consumers actually prefer utilizing these localized networks and consumer adoption of Wi-Fi offloading has proceeded at an unprecedented rate. For example, in 2008 AT&T purchased Wayport for \$275 million to add the company's 8,000 Wi-Fi hot spots to its currently held 12,000 Wi-Fi hot spots.⁶ For the first three months of 2009, AT&T reported 10.5 million Wi-Fi

3 Wi-Fi Alliance (2005, November 28) *Wi-Fi chipset sales grew 26 percent to 387 million in 2008* [Press release]. Retrieved from http://www.wi-fi.org/news_articles.php?f=media_news&news_id=770

4 Thanki, Richard (2009, September 8) *The Economic Value Generated by Current and Future Allocations of Unlicensed Spectrum* (p. 18). Retrieved from <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020039036>

5 Bayrak, Ergin *Welfare Effects of Spectrum Management Regimes*, SoCal NEGT Symposium, October 1, 2009, http://medianetlab.ee.ucla.edu/SocalNEGT/slides/SoCal%20NEGT%20presentation_ergin_bayrak.pdf.

6 Marshall, Matt (2008, November 6) *AT&T acquires Wayport for \$275M — Now Has 80,000 Hot Spots*. [Online] In

connections on its hotspot network, which was more than triple the number during the first quarter of 2008 – and more than half the 20 million total Wi-Fi connections during all of 2008.⁷ In the following three months in 2009, AT&T handled nearly 15 million Wi-Fi connections ending the year with a total of 85.5 million connections.⁸ Finally, the most recent data shows that in the third quarter of 2010, consumers made a total of 106.9 million connections on AT&T’s U.S. Wi-Fi network.⁹

Given the considerable breadth of unlicensed devices and multiplicity of uses, a completely comprehensive estimate of all of the economic value created by unlicensed spectrum is difficult, but some studies have sought to quantify the economic value of specific uses of unlicensed spectrum. One such study in 2009 by economist Richard Thanki analyzed the economic value generated by Wi-Fi broadband access within homes, wireless local area networks in hospitals, and radio-frequency identification (RFID) tags for in-store item-level tagging in the clothing retail sector. Thanki’s analysis showed that over the next 15 years these applications together could generate ***\$16 to \$37 billion per year*** in economic value for the U.S. economy. It should be noted that Thanki’s economic analysis does not account for other applications utilizing unlicensed spectrum such as white space devices or additional unlicensed utilization of spectrum below 1 GHz.

Virtually every sector of the economy relies on unlicensed spectrum and the number of certified devices that utilize unlicensed spectrum more than quadruples the number of certified devices in most

Venture Beat. Retrieved May 28, 2011 from <http://venturebeat.com/2008/11/06/att-acquires-wayport-for-275m-now-has-80000-hot-spots>

7 Berg, Andrew (2009) *Wi-Fi & the Need for Cheap Ubiquity* [Online] In Wireless Week Magazine. Retrieved May 28, 2011 from <http://www.wirelessweek.com/Articles/2009/08/Wi-Fi-Need-Cheap-Ubiquity/>

8 Malik, Om (2009) *With iPhone, Wi-Fi Use Grows on AT&T Networks* [Online] In GigaOm. Retrieved May 28, 2011 from <http://gigaom.com/2009/08/20/with-iphone-wi-fi-use-grows-on-att-networks/>

9 PR Newswire (2010, October 22) *Third-Quarter Wi-Fi Connections on AT&T Network Exceed Total Connections for 2009* [Press release]. Retrieved from <http://www.prnewswire.com/news-releases/third-quarter-wi-fi-connections-on-att-network-exceed-total-connections-for-2009-105520733.html>

of the commercially licensed bands.¹⁰ RFID tags alone are incorporated into any number of objects for the purposes of identification and tracking and operate over a number of unlicensed bands. Such uses include supply chain management, asset tracking, medical applications (linking a patient with key drugs, etc.), tracking for entrance management or security, manufacturing tracking of parts during manufacture, retail tracking, transport payments (such as Washington DC's SmarTrip system), warehouses real-time inventory, and livestock tracking. This wide ranging application is linked to the fact that unlicensed use of spectrum is dynamic and can respond to free market demands quicker than traditional government controlled commercial auctions.

The short history of unlicensed spectrum has demonstrated that even spectrum bands that were formerly considered "junk bands" could yield tens of billions of dollars in economic gains and activity. Allowing for an additional allocation of national unlicensed spectrum under the 1 GHz band, with its superior propagation characteristics of penetration and long distance, would allow for the creation of gigabit-capacity wireless LANs in schools, offices, high-density residential areas and mesh networks capable of several miles of coverage at a fraction of the cost of current Wi-Fi technology. While such gains will not show up in a CBO score, they will result in increased revenues for the federal government through investment, job creation, and economic productivity on an annual basis.

Critically, in 1989, when the FCC created the rules that provide the basis for current unlicensed technology, no one could have predicted this stunning success. For most of its history, the FCC approved individual technologies, such as specific garage door openers or "Mr. Microphone"-type novelty devices. In 1989, when the FCC went from this first generation unlicensed to the second generation of all purpose devices operating alongside licensed systems at low power, called

¹⁰ *Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies* by Key Bridge Global LLC. ET Docket No. 10-237 (p. 3) <http://fjallfoss.fcc.gov/ecfs/document/view?id=7021027412>

“underlays,” it assumed that the primary purposes of unlicensed devices would remain the same. No one anticipated the move from 2G unlicensed to 3G unlicensed with the adoption of protocols by the IEEE that enabled unlicensed wireless devices to provide wireless broadband.

The TVWS represents another breakthrough, from 3G unlicensed to 4G unlicensed. The promise of this change, enabled by the superior physical characteristics of the TV white spaces, has drawn investment from venture capitalists backing new start ups to established companies such as Microsoft and Motorola. It has made us once again a world leader in wireless technologies, with countries such as the UK, China and Brazil scrambling to follow where the U.S. leads.

The TV Bands Database and Cognitive Radio are the Future in Spectrum Policy

Over the years the FCC, on a unanimous and bipartisan basis under both Republican and Democratic Chairmen, has repeatedly taken steps to open up the white spaces within the TV bands to set the stage for next generation cognitive radios (white space devices). Promoting the development of white space devices and the database they rely on will increase efficiency in spectrum usage and can also open up access to spectrum held by federal agencies that may never be cleared for auction while providing additional long term revenue opportunities for the federal government. Access to the white spaces will also further a critical federal policy goal of bringing broadband to rural areas and is supported by the Wireless Internet Service Provider Association, which represents more than 300 wireless internet service providers, many of which serve exclusively rural communities with fixed wireless broadband services. The unique physical properties of the television band make it possible for these small businesses, as well as numerous non-profits and even private home owners, to send broadband signals for great distances, around difficult terrain, and through dense wooded areas that block existing Wi-Fi signals. The low barriers to entry for unlicensed allow these rural providers to serve their communities

without winning licenses at auction, which they cannot afford to do. Indeed, areas that cannot be profitably served with licensed spectrum because of the cost of winning licenses can be served sustainably, and without USF subsidies, with TVWS spectrum. For these reasons, the National Broadband Plan identified the TVWS proceeding as one of the important first steps in bringing broadband to rural America.¹¹

Commissioner McDowell summed up the potential of white space technology well by stating that the “uses for this spectrum are limitless. Moreover, the protocol developed in this proceeding for smart use of this spectrum has great potential for enabling access to and improving efficiency in other frequency bands.” In addition, Commissioner McDowell stated that the “ubiquitous availability of white spaces provides consumers a competitive alternative to existing broadband providers, an additional check against potential anti-competitive mischief, and a means to relieve spectrum congestion in licensed bands. Furthermore, as with Wi-Fi, the unlicensed nature of white spaces use will accelerate its deployment and adoption much faster than if this spectrum was auctioned (if that were even practical to begin with). Our action thus helps to bring more broadband to consumers as quickly as innovation, rather than the government, will allow.”¹²

Following the FCC's September 23, 2010 decision to officially open up the TV white spaces, the pace of involvement by the private industry has been staggering with ten companies (Comsearch, Frequency Finder Inc., Google Inc., KB Enterprises LLC and LS Telcom, Key Bridge Global LLC, Neustar Inc., Spectrum Bridge Inc., Telcordia Technologies, WSdb LLC, and Microsoft) investing and competing in the creation of spectrum databases which the white space devices will utilize. Currently, the United

11 Federal Communications Commission, *Connecting America: The National Broadband Plan* (p. 88)

12 Statement by Commissioner Robert M. McDowell (2010, September 23) *FCC Frees up Vacant TV Airwaves for “Super Wi-Fi” Technologies* [Press Release]. Retrieved from http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db0923/DOC-301650A4.pdf

States is the world leader in utilizing first generation white space technology with the following experimental uses ongoing today:

- 1) **Plumas California** – The Plumas-Sierra Rural Electric Cooperative launched the nation’s first “Smart Grid” wireless network trial while simultaneously providing broadband access to the local communities. The “Smart Grid” wireless network trial delivers real-time broadband connectivity allowing system operators to manage the electrical system remotely, request critical data from the substations, manage directed power flow and protect the systems and employees while maintaining the local grid.¹³
- 2) **Wilmington, North Carolina** - The city is currently relying on white space technology for its "Smart City" initiative, which focused on providing Wi-Fi access to both public safety officials and citizens in public areas, remote monitoring and management of wetland areas, and real-time traffic monitoring to reduce congestion, fuel consumption, travel time, and support local law enforcement during emergency situations.¹⁴
- 3) **Claudville, Virginia (population 916)** – A white space backhaul solution has effectively brought broadband access for the first time ever to this small town where only dial up Internet access existed well up until late 2009.¹⁵
- 4) **Logan, Ohio (population 6,704)** - The world's first white space broadband network trial for healthcare providers was launched here, enabling broadband access throughout the hospital,

13 Spectrum Bridge (2010, June 23) *Nation's First "Smart Grid" White Spaces Network Trial* [Press release]. Retrieved from http://www.spectrumbridge.com/news/pressreleases/10-06-23/Nation_s_First_%E2%80%9CSmart_Grid%E2%80%9D_White_Spaces_Network_Trial.aspx

14 Anderson, Nate (2010, February 24) *Wilmington, NC Takes White Spaces to Swamp, Ballparks*. [Online] In Ars Technica. Retrieved May 28, 2011 from <http://arstechnica.com/tech-policy/news/2010/02/wilmington-nc-takes-white-spaces-to-swamp-ballparks.ars>

15 Anderson, Nate (2009, October 21) *First White Space Broadband Deployment in Small Virginia Town*. [Online] In Ars Technica. Retrieved May 28, 2011 from <http://arstechnica.com/tech-policy/news/2009/10/first-white-space-broadband-deployment-in-small-virginia-town.ars>

including patient rooms, waiting areas, cafeteria, and meeting rooms.¹⁶

- 5) **Houston, Texas** – Rice University researchers, utilizing a grant from the National Science Foundation, were able to modify an off the shelf Wi-Fi computer card and successfully achieve a point to point transmission distance of one mile over its original 400 to 500 feet.¹⁷

As the geo-location, spectrum sensing, and database technologies move past their first generation phase, expansive applications of this technology could yield a substantial increase in spectrum access for the private market and additional revenue opportunities for the federal government. It is estimated that the federal government exclusively controls over 13 percent of all allocated spectrum with much of it unused in most areas at most times. However, most of these bands cannot be cleared or reallocated as they serve critical national security and other essential functions, leaving shared access to this spectrum as the only viable alternative. By leveraging the advances in white space devices and the white space database, the federal government could lease access to federal spectrum that would otherwise lay fallow through the database by way of micro-payments, either by user fees collected up front or on a real-time basis, during periods of peak demand.

Kevin Werbach, a professor at the Wharton School and a former FCC technologist, suggests that “properly designed, this system [the TV Bands Database] could be the basis for a distributed dynamic routing database, analogous to the DNS (Domain Name System) on the wired Internet.”

16 Business Wire (2010, September 14) *TV White Spaces Delivering Enhanced Broadband Access and Telemedicine Applications to Healthcare Providers* [Press release]. Retrieved from <http://www.businesswire.com/news/home/20100914005980/en>

17 Anderson, Nate (2011, April 26) *Extending Wi-Fi to one mile, thanks to empty TV channels*. [Online] In Ars Technica. Retrieved May 28, 2011 from <http://arstechnica.com/tech-policy/news/2011/04/extending-wifi-to-one-mile-thanks-to-empty-tv-channels.ars>

TV White Spaces Technology and Incentive Auctions

I must point out though that all of the progress made so far on developing this technology relies heavily on the existence of sufficient white space spectrum on a national basis. Incentive auctions could potentially bring all of these advancements to a halt if sufficient flexibility is not granted to the FCC to preserve its work on promoting private industry investments in researching and developing cognitive radio technology.

Supporters of TVWS have long recognized that we can both reclaim broadcast spectrum for licensed wireless with incentive auctions *and* maintain sufficient availability of white space spectrum to ensure a robust and well developed market. For this reason, investment has flowed readily into this new technology and companies such as Microsoft that invest TVWS have also embraced incentive auctions.¹⁸ Unfortunately, it is also possible to structure incentive auctions poorly. For example, if Congress precludes the FCC from ensuring sufficient national access to TVWS in the mistaken belief that this would increase revenue, it will significantly discourage investment and may prevent the promise of 4G unlicensed from becoming reality. Ironically, respected auction experts unaffiliated with any government agency have warned that attempts to micromanage the FCC's auction design are more likely to *reduce* revenue rather than raise revenue.¹⁹ For these reasons, supporters of both TVWS and incentive auctions such as Commissioner McDowell have urged Chairman Genachowski to reassure TVWS developers that we can, and will, have both a successful incentive auction and a robust TVWS.

¹⁸ Humphries, Fred (2011, April 29) *Incentive Auctions, Smart Radio Technology and Unlicensed Spectrum – Tools to Meet the Exploding Wireless Broadband Demand*. [Online] In Microsoft on the Issues. Retrieved May 29, 2011 from http://blogs.technet.com/b/microsoft_on_the_issues/archive/2011/04/29/incentive-auctions-smart-radio-technology-and-unlicensed-spectrum-tools-to-meet-the-exploding-wireless-broadband-demand.aspx

¹⁹ Jerome, Sara (2011, April 6) *White House Rallies Support for Airwave Auctions*. [Online] In The Hill. Retrieved May 30, 2011 from <http://thehill.com/blogs/hillicon-valley/technology/154235-auction-proponents-to-congress-stay-out-of-the-spectrum-weeds>

At the moment, the United States has a substantial lead in the development of TVWS technology. But other nations are looking to close this gap. OFCOM, the spectrum regulator for the United Kingdom, has proposed making TVWS available for unlicensed use as well.²⁰ China and Brazil are likewise looking into authorizing unlicensed use of TVWS. It is well to remember that ten years ago, the United States became the dominant provider of Wi-Fi technology because we had been the first country in the world to recognize the value of unlicensed spectrum use. It did not take long for other countries to recognize the advantages, and today companies like China's Huawei and Israel's Alvarion vigorously compete with American providers in the global market. Today, the focus of investment in 4G unlicensed TVWS technology remains in the United States. But if the United States actively discourages investment by forcing a false choice between unlicensed TVWS and reclaiming spectrum for incentive auctions, other countries will quickly pass us by. If we wish to capture these billions of dollars in new economic opportunity, Congress should send a clear signal that it embraces both unlicensed TVWS and expanded licensed use as valuable parts of our wireless future.

Exclusive Focus on Raising Short Term Revenues Will Short Change America's Economic Potential

Recognizing that another significant and expensive policy goal of creating an interoperable public safety broadband network will be connected with spectrum legislation that passes Congress, I urge this Committee to balance the multiple policy goals set before you and not focus exclusively on short term revenue opportunities. I am confident that it will be possible to have incentive auctions that would increase commercially licensed spectrum and unlicensed spectrum while retaining a suitable

²⁰ Geere, Duncan (2010, November 9) *Ofcom to Turn 'White Space' into Mobile Broadband*. [Online] In Wired UK. Retrieved May 29, 2011 from <http://www.wired.co.uk/news/archive/2010-11/09/ofcom-white-space-broadband>

innovation platform for private investments in cognitive radio all while yielding significant short term and long term revenue gains. Congress in fact must use an all of the above approach in order to meet the challenges of exponential mobile data demand. However, if too great a focus is placed on *maximizing* short term revenues, we will essentially run the risk of sacrificing tens of billions in annual economic activity in exchange for a single infusion of billions in immediate revenue.

It is worth noting that the original CBO estimate on the 700 MHz auction was almost half of what revenues were actually raised by the federal government. By contrast, revenues for other auctions, such as the LMDS auction in 1999 or the initial 700 MHz auction in 2003, have fallen well short of initial estimates. Even current estimates of incentive auctions range by several billion dollars and frankly, all of the estimates could be accurate depending on a number of factors. If that sounds strange, consider how valuations can change for a house. A county assessor comes away with a guess based on factors like the general value in the neighborhood of similar houses. If you refinance, an appraiser will come by and make another assessment, considering what they can see from a quick evaluation and based on what other houses she considers similar. Put the house on the market 6 months later and you may get an entirely different amount (assuming it can be sold at all), either higher or lower, depending on such factors as what interest rates are doing and how many people are looking to buy a home this month.

Appraising houses is routine, but we still have wild variances. Spectrum auctions present the same variability with years intervening between auctions and factors playing a role such as the state of financial markets, the nature of the spectrum, and whether potential bidders expect other spectrum to come on the market anytime soon or not. Adding into this uncertainty is the question of how many broadcasters will voluntarily partake in incentive auctions and when they would participate. No one can predict with any degree of certainty what spectrum auctions will actually deliver in revenues, let

alone incentive based auctions. However, should Congress provide the FCC with incentive auction authority, it must heed the advice of the 112 economists who recently endorsed such an action but also called for agency flexibility in conducting the process.²¹

It should be noted though that spectrum itself is not fundamentally scarce, but rather it is government issued licenses of spectrum that is scarce and is the bottleneck in meeting mobile data demand. In order to either eliminate or reduce the impact of this government imposed chokepoint, PISC has advocated a number of new spectrum access models that leverage current and future opportunities created by the TVWS bands database for opportunistic access to spectrum bands that cannot be cleared quickly (or may never be cleared). The Committee should consider this when drafting language that would compel the federal government to clear specific bands for auction. Many of these bands, such as bands between 3500-3650, may be better used for sharing than for clearing and auction.

Other Considerations in Auction Design

In addition to giving the FCC sufficient flexibility to preserve the TVWS, Congress should carefully consider the dangers in trying to micromanage spectrum auctions. A recent panel of auction experts acknowledged, no one can predict what combination of auction rules will maximize auction revenue – let alone properly balance other social welfare goals such as promoting competition or ensuring that all Americans – especially traditionally disenfranchised communities such as rural businesses, minority-owned businesses, and women-owned businesses – have the opportunity to acquire licenses and benefit from the economic opportunities of spectrum policy.

21 Letter to President Barack Obama from the Stanford Institute for Economy Policy Research. Retrieved from http://siepr.stanford.edu/system/files/shared/Letter_to_obama.pdf

When Congress authorized spectrum auctions in 1993, it provided a general list of goals for the FCC to further through spectrum auctions. This recognized that allocation of new spectrum is an opportunity that only happens once for a particular band. Efforts to make policy adjustments after the fact, either by rulemaking or reallocation, carry a high political cost. Particularly when it comes to the important goal of furthering competition, the FCC should have flexibility in designing auctions so that it can avoid more intrusive regulatory means for mitigating market concentration.

But even if Congress were to decide that, in this time of fiscal need, the FCC should focus solely on enhancing revenue. Congress would still be better served to leave discretion to the auction experts at the FCC than to try to micromanage auction design through the legislative process. Enhancing auction revenue requires just the right mix of established, deep pocket players and hopeful new entrants able to secure lines of credit. If potential bidders conclude that they cannot hope to win an auction against the largest, best-financed incumbents, then auction revenue falls as auction participants either seek to avoid bidding wars with incumbents they cannot win or simply stop participating in auctions altogether.²² By contrast, several new entrants in the 700 MHz Auction remarked that their presence as robust competitors was a direct result of their perception that the FCC had made a serious effort to address the needs of new bidders.

Finally, if the Committee feels it necessary to put in place legislative mandates as opposed to relying on auction experts to determine what combination of rules will maximize revenue in whatever market conditions exist years from now when the auctions occur, Members should carefully weigh whether the increase in revenue will offset the cost and social benefits of such restrictions. Economists of a variety of different schools and political orientations have consistently agreed that benefit of auctions lies not

²² Rose, Gregory & Lloyd, Mark (2006) The Failure of FCC Spectrum Auctions. Retrieved from http://www.americanprogress.org/kf/spectrum_auctions_may06.pdf

so much in the revenue, which is negligible compared to the overall structural deficit and debt crisis, but in the enhanced economic activity and social welfare that comes from making new spectrum available for use. Ensuring that the spectrum becomes available in a way that maximizes overall economic and social utility is far more important, therefore than any possible marginal increase in revenue from any specific auction.

Conclusion

As mobile data demand continues its exponential growth, it is essential that Congress broaden its spectrum policy approach beyond commercial spectrum auctions. The billions of dollars in economic activity driven by unlicensed use and the heavy reliance on unlicensed spectrum networks by commercial license holders demonstrates that the free market is very capable of maximizing the benefit of completely unregulated spectrum. As this Committee begins crafting legislation, I urge you to avoid undoing the years of hard work the FCC underwent on a bipartisan and unanimous basis to open up the TVWS to private investment in cognitive radio technology. The United States is the world leader in this technology and given the interest in keeping investment and jobs here in this country, special care must be taken to preserve sufficient white space spectrum when authorizing incentive auctions. If allowed to flourish, the technology could be leveraged to deliver revolutionary new ways to utilize spectrum.

Providing the FCC with flexible authority to conduct incentive auctions and allowing the agency to pursue a broad approach to spectrum policy that is not exclusively tied to raising revenues will be the most effective means of promoting broadband, job creation, and economic growth. Thank you again for inviting me to testify before the Subcommittee. I look forward to your questions.