

Written Testimony of Ravi Potharlanka, COO
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House Energy and Commerce Committee's subcommittee on
Communications, Technology and the Internet

Hearing: Competition in the Wireless Industry

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Executive Summary: Middle mile and last mile backhaul enables wireless competition to exist and to thrive. Our country has an interest in ensuring its growth and availability. The decisions that are made along the way (encouraging the use of multiple-use backhaul platforms known as MuniFrames® and ensuring equal and non-discriminatory access to those platforms, making a limited number of the numerous vacant TV white space channels available in rural areas, re-enforcing FCC rules that prevent burdensome and preempted zoning or permitting restrictions, and implementing FCC, NTIA, and RUS rules) can create (or destroy) the necessary environment. Making a limited number of TV White Space channels available before the initial broadband grant filing deadlines will greatly increase the ability to bring broadband services to many more unserved and underserved communities, while sparking short term and long term job growth and ensuring wise efficient use of taxpayer funds.

Good morning Chairman Boucher, Ranking Member Stearns, and members of the subcommittee. My name is Ravi Potharlanka and I am the Chief Operating Officer of FiberTower Corporation.

FiberTower operates a 100% facilities-based telecommunications network using fiber optic and wireless assets and leads the nation in providing backhaul services to mobile wireless carrier cell sites. Facilities-based providers like us own or lease a substantial portion of the property, plant and equipment necessary to provide backhaul services. Backhaul is the transport of voice, video and data traffic from a customer location (such as a cell site) back to a switching center or to the Internet.

FiberTower utilizes its partnerships and master lease agreements with tower operators to deploy carrier-class and government-class networks. We own a national spectrum portfolio of 24 GHz and 39 GHz wide-area spectrum licenses, including over 740 MHz in the top 20 U.S. metropolitan areas and, in the aggregate, approximately 1.55 billion channel pops calculated as the number of channels in a given area multiplied by the population, as measured in the 2000 census, covered by these channels. We believe our spectrum portfolio represents one of the largest and most comprehensive collections of millimeter wave spectrum in the U.S. Our licenses extend over substantially all of the continental U.S., with a population of approximately 300 million.

We offer our services to mobile wireless carriers, competitive and local exchange carriers, 1st responder networks, and to government and enterprise customers. Our network currently covers approximately 12,000 route miles with 7,000 miles covered using fixed wireless and another 5,000 miles using dark fiber. Through our partnership and master lease agreements we have the ability to access over 100,000 towers nationwide

When the customer is a mobile wireless carrier, the backhaul typically runs from a mobile base station, or cell site, to the carrier's mobile switching center, or MSC, or other exchange point where the traffic is then switched onto a wireline telecommunications network. We utilize our comprehensive spectrum assets and extensive fiber service provider relationships to provide backhaul services nationally through a hybrid fixed wireless/fiber network architecture. Our services allow mobile wireless carriers to optimize their networks, enable significant improvements in their availability, reliability, scalability and reduce costs, while providing a long-term solution for the increasing demand for backhaul capacity.

- As of December 31, 2008 we provide backhaul service to over 6,000 mobile base stations (or cell sites) in 13 markets;
- We have customer agreements with the eight largest U.S. wireless carriers;
- We hold a master service agreement with Verizon as their fixed wireless partner on the General Services Administration Network contract.

We offer our customers service that consists of time division multiplexing, or TDM, transport at speeds starting with T-1s (a standardized telecommunications service offering at 1.54 megabits per second of capacity) and scaling up to 300 megabits per second and beyond. We have designed our network architecture to accommodate other transport services that our customers may implement in the future, including Ethernet-based backhaul, which launched in 2007, and other packet-based protocols.

Our network is designed to be modular and is relatively inexpensive to deploy as compared to fixed wireline networks. The point to point fixed wireless networks we presently deploy use mature and proven technologies, allowing us to operate at carrier-class and government-class network reliability standards. We also offer the ability to deploy physically diverse network connectivity in accordance with the federal standard established through Public Law 108-447, section 414. We deploy networks to existing towers, rooftops, or other sites where wireless carriers have deployed cell sites. At each of these physical locations, or sites, there may be more than one wireless carrier's cell site - each of which we refer to as a customer location.

When possible, we provide service to multiple customers at a single site, using a shared infrastructure in order to increase capital efficiency. We generally generate revenue in proportion to the number of customers on a site, the amount of bandwidth used by each customer at that site, and the price charged for each increment of bandwidth. This revenue, after subtracting the cost of fiber service transport (which is a semi-variable expense), is available to cover a fixed cost base consisting of items such as rent, insurance, utilities, and field technicians.

FiberTower congratulates Congress, and in particular this subcommittee, on creating language in the 2009 Stimulus bill that truly identifies key elements necessary to bring broadband to the unserved and the underserved. FiberTower also congratulates this subcommittee on its ongoing work on a National Broadband Plan. Concerning next steps, FiberTower believes that government policies to overcome “middle mile” and “last mile” broadband backhaul and transport facility shortages - particularly in unserved and underserved areas - are best addressed by:

- 1) Encouraging the installation of multiple-use backhaul platforms. Such platforms provide unserved and underserved areas with all the benefits of a Municipal Network, or “MuniFrame®.”¹ For example, these platforms in broadband-

¹ See Attachment 1.

- enabled municipal areas will be able to provide backhaul for mobile wireless carriers, wireline carriers, schools, libraries, 1st responder networks, and local, state, and municipal government;
- 2) Ensuring equal and non-discriminatory access to those multiple-use backhaul platforms. Without access to backhaul many broadband services will remain undelivered;
 - 3) Re-enforcing the existing federal preemptions over burdensome zoning and permitting restrictions for fixed wireless antenna deployments. Unnecessary zoning and permitting requirements often add substantial delay and cost to deployments, and may create barriers to entry; and
 - 4) Providing point-to-point licensed access to a limited number of the numerous vacant channels in TV White Space. This spectrum provides the ability to swiftly bring middle mile and last mile backhaul transport to areas that cannot afford fiber optic or traditional fixed wireless connectivity.

Utilizing Multiple Use Backhaul Platforms

The private sector discovered that shared access backhaul platforms save funds and allow more broadband services to be deployed to more areas more swiftly. Still, historically, many areas exist where the initial capital remains scarce to start even a shared access backhaul platform. We believe that the 2009 stimulus bill, if enacted wisely, will enable middle mile and last mile service providers to economically address the backhaul needs of unserved and underserved areas.

Taxpayers' funds will be dispersed more efficiently if NTIA and the RUS encourage providers to deploy backhaul and transport platforms that are designed to support, among others, mobile wireless carriers, public safety, government, education and medical entities, incumbent and competitive local exchange carriers ("ILECs" and "CLECs"), and enterprise customers. In other words, if an end user network provider builds their own backhaul to an unserved or underserved area, then the middle mile and last mile backhaul to that area for all the other priority broadband services will remain unavailable. A backhaul platform that shares access for all the end users identified in the legislation truly brings broadband to the area while greatly reducing costs.

Middle mile and last mile backhaul and transport services are critically necessary for all broadband networks, whether they ultimately support carrier, enterprise, or government operations. Backhaul and transport infrastructure connects last mile end-user networks, including those that serve first responders, municipal buildings, medical facilities, schools, and libraries to the Internet or to network switching centers. In short, absent such infrastructure, broadband networks cannot operate. Moreover, backhaul and transport infrastructure must be built before end users can fully realize the benefits of new unlicensed and licensed broadband networks and devices. In fact, backhaul is often considered the "Achilles heel" to achieving broadband connectivity to end users, whether in mobile networks or direct transport to a building. This lack of development in

unserved and underserved areas has inhibited the growth, service quality and operational efficiencies of broadband services.²

Ensuring Equal and Non-Discriminatory Access to Multiple-use Backhaul Platforms

The stimulus bill seeks to see broadband service reach mobile wireless carriers, 1st responder networks, wireless internet service providers, wireline carriers, government agencies, educational and health services institutions, and others in unserved and underserved communities. Backhaul availability for all the interested parties is critical to achieving this goal. It is important to ensure that all parties have the ability to access multiple-use backhaul platforms in a non-discriminatory manner.

Additionally, the backhaul infrastructure (not just the wireless connections from a tower or building to a consumer) enables wireless competition to exist and to thrive. Without backhaul the mobile wireless networks cease to function. So our country has an interest in ensuring backhaul availability for *all* end user services the stimulus legislation deems “mission critical” to our communities.

Re-Enforcing the Existing Federal Preemptions Over Burdensome Zoning and Permitting Restrictions for Fixed Wireless Antenna Deployments

The Federal Communications Commission’s (FCC) rule, Section 1.4000 of Title 47 of the Code of Federal Regulations, preempts restrictions that impair the use of small antennas (one meter or less in diameter) that receive and/or transmit various types of broadcast, satellite, and fixed wireless signals. This rule expressly prohibits private restrictions, such as lease provisions and homeowners’ association rules. Furthermore, this law takes precedence over state and local regulations.

Restrictions that impair the use or installation of small antennas that receive or transmit data, telecommunications, or video are not permitted. For example, fixed wireless carriers and their customers have the right to install antennas one meter or less in diameter that receive or transmit fixed wireless signals. Antennas for all types of service, whether voice, data, or video, are covered. These antennas may be installed in any area under the exclusive control of the user (either the carrier or its customer), whether owned or leased and whether the premises are residential or commercial.

Governments and municipalities cannot impair installation and use of qualifying antennas by requiring zoning variances, building permits, or construction permits, whether prior to or after installation. Landlords or homeowners’ associations cannot use lease provisions, covenants, or other forms of private agreement to impair the installation

² See FiberTower Corporation, the Rural Telecommunications Group, Inc., COMPTTEL, and Sprint Nextel Corporation, Letter and Petition for Reconsideration, FCC GN Docket No. 09-29, at 2 (filed March 25, 2009) (“*FiberTower, et. al. Ex Parte*”).

and use of these antennas. While it may be permissible to require reasonable prior notice before installing an antenna, such a provision cannot be used, directly or indirectly, to suggest prior approval is needed.

A private or governmental party that desires to restrict the installation of these antennas can do so only if it can demonstrate to the FCC or a court that it has good reason to have such a restriction. The restriction is unenforceable until the FCC or a court has made a finding that the proposed private restriction or local regulation should be allowed.

Continued re-enforcement of these federal preemptions is paramount to rapid deployment of middle mile and last mile backhaul and transport services using fixed wireless infrastructure.

Allowing Access to TV White Spaces Spectrum

The lack of backhaul and transport services is particularly problematic in rural areas when great distances or barriers exist between a local network and an Internet connection. The further the transport distance, the more costly the service is to provide. The high cost and difficulty of constructing and deploying middle mile and last mile backhaul and transport facilities has become a barrier to the widespread availability of affordable broadband services.

Trenched fiber may cost \$10-to-\$35 per foot to install, and if rocky terrain, rivers, airports, roadways, graveyards, parks or other obstacles appear, the costs can climb rapidly. A single fixed wireless link using a 3-foot or smaller antenna in the 11 GHz band typically may cover distances from less than a mile up to 7 miles. In the 6 GHz band a carrier-grade link may be established at up to 20 miles with a single radio pair, though that requires 6-foot or taller dishes which in turn require very sturdy towers. It is important to note that microwave links at these bands also require line of sight.

Covering 50-to-100 miles, requires either millions of dollars in fiber expenses, or multiple microwave links and towers which is often too great an obstacle. However, a solution exists in lower spectrum bands.

Today, over 300 licensed systems exist in the U.S. that use the TV White Spaces to deliver point-to-point connections over great distances.³ This is done through the Broadcast Auxiliary Service (BAS) and it exists to allow TV stations to deliver programming to other stations over long distances. A 100-mile wireless broadband connection using the White Spaces would typically cost less than \$200,000 to construct, while the same connection using 6 GHz or 3.65 GHz spectrum would likely cost more than \$3 million, more than 15 times as much. A new trenched fiber build would normally be at least 20 or 30 times more expensive, not to mention the extended time period to build and implement. Fixed wireless links can often be installed in a matter of days.

³ See Attachment 2.

Most White Space spectrum lies fallow in unserved, and some underserved, areas, and ample spectrum exists in those areas to accommodate wireless backhaul. Typically, rural areas possess anywhere from 15-to-48 vacant TV White Space channels. The fixed wireless TV White Space equipment that the broadcasters use is sold off-the-shelf now and can be adapted for use in the White Spaces. Thus, if the FCC were to adopt a fixed, licensed regime for a portion of the White Spaces, it would immediately spur broadband deployment to long-unserved and -underserved areas. The FCC possesses enough information on the record to make a declaratory ruling now. Even more importantly, since the FCC last ruled on TV White Spaces in November 2008, the U.S. Congress and the President made it a priority to swiftly bring broadband to the unserved and underserved areas.

Authorizing fixed use on a 47 CFR Part 101 point-to-point licensed basis also fosters regulatory certainty and protects incumbent users operating in the White Spaces against harmful interference. In particular, the proposed technical rules for fixed, licensed use of the White Spaces set forth on the FCC record are designed to address and mitigate harmful interference from new fixed operations to other pre-existing operations in the band, including broadcasters, low-power television stations, wireless microphone users, medical devices, radio astronomy, TV studio transmitter and relay links, and pre-existing fixed operations, as well as potential cable headend and television receiver direct pickup interference. These proposed rules are the result of a consensus reached through extensive communications among the incumbent licensee organizations principally responsible for spectrum interference issues and will fully protect incumbents operating in the TV bands. Thus, unlike the unlicensed use authorized in the recent FCC White Spaces order, there are no interference concerns with respect to licensing a portion of the White Spaces for fixed operations such as critical wireless backhaul and transport. Finally, providing point-to-point licenses through the Part 101 process allows for the provisioning of backhaul and transport networks in a manner that meets carrier-grade and government-grade service level agreements (SLAs) for signal availability, interference protection and other key factors.

The FCC should designate six UHF TV Bands channels (where vacant second-adjacent channels exist) in rural areas for fixed, licensed operations, similar to the Canadian Remote Rural Broadband Systems model. That model is fully consistent with U.S. policy, and, by setting aside these UHF channels in rural areas (*e.g.*, counties with a population density of 100 people or less per square mile), the Commission can encourage the deployment of new fixed, licensed services with sufficient capacity and scalability and help expand wireless backhaul facilities to facilitate rural broadband deployment. The White Spaces in Channels 33-35 and 49-51 are particularly well-suited for point-to-point services, while the technical characteristics of VHF Channels 2-13 prevent the economic use of directional antennas that are essential for establishing backhaul links.

Making TV White Spaces available also assists in short term job creation. For example, for the price of one community 100-mile trenched fiber project, broadband TV White Space systems could be simultaneously built to 20 or 30 isolated communities. The long term job creation factors look even better, as all those communities set to work with broadband to their medical facilities, their local businesses, their mobile networks and more. In addition, obvious benefits flow to all the schools, libraries, first responder networks and other public safety functions that receive broadband in all those communities.

Establish NTIA and RUS Broadband Implementation With FCC Guidance

As recognized by Congress, the FCC, NTIA and RUS possess a significant role in helping to establish the definitions used to administer funds under BTOP. The FCC should use its discretion and expertise to recommend definitions that ensure that the Congressional directives to expand broadband deployment are met in a manner that ensures that a wide variety of providers and services. Specifically, it should recognize, as Congress has, the importance of middle mile and last mile and backhaul and transport capabilities, and accordingly, propose to NTIA definitions that would facilitate the receipt of grant funds by entities providing these services.

Participation rules should reflect industry standards and create an inclusive and technology-neutral environment.

The FCC should recommend the adoption of definitions that satisfy Congress's explicit intent that "as many entities as possible be eligible to apply for a competitive grant."⁴ Defining eligibility broadly would satisfy Congress's explicit intent that the Commission and NTIA ensure that a broad variety of entities are "eligible to receive grants . . . including wireless carriers, wireline carriers, backhaul providers, satellite carriers, public-private partnerships, and tower companies."⁵ Broad definitions would also satisfy Congressional intent by ensuring that applicants, such as middle mile and last mile backhaul and transport providers, are selected based on their ability to "best meet the broadband access needs of the areas to be served, whether by a wireless provider, a wireline provider, or any provider offering to construct last-mile, middle mile, or long haul facilities."⁶ Thus, the definitions should include providers that can implement projects that have the capability of facilitating many different types of broadband service and ensure that the broadband funding is, in effect, multiplied in impact and scope.

A. Unserved/Underserved Areas.

In recommending definitions to NTIA, the Commission should not focus solely on the provision of service to end users when determining whether areas are unserved or underserved. The FCC should recommend that NTIA consider various forms of

⁴ See, H. CONF. REP. NO. 111-16, at 775 (2009) ("Conference Report") American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009).

⁵ Conference Report at 775.

⁶ Id. at 774.

broadband -- all of which are critical to creating a nationwide broadband network -- and ensure that all of them are eligible for funding. The FCC should propose that NTIA consider not only the availability of end-user services but whether an area has middle mile and last mile backhaul and transport facilities available. An area without such capabilities is unable to support the multiple broadband networks -- for carriers, enterprise customers, public safety entities and health care providers -- that will drive economic recovery.

The FCC, NTIA and RUS should therefore consider an area without adequate backhaul or transport coverage as “underserved” even if such area has a broadband service provider.

Applying a broader definition of “unserved” and “underserved” to encompass middle mile and last mile backhaul and transport facilities also reflects Congress’s intent to ensure that a variety of providers and services receive BTOP funding.⁷ Moreover, ensuring that additional middle mile and last mile backhaul and transport providers deploy facilities will further the priorities of many in Congress to ensure that BTOP funds are used for broadband deployment that “spur[s] job creation in rural areas hardest hit by the recession . . . [and is] central to improving educational opportunities and delivering health care more efficiently, important benefits that also contribute to economic growth.”⁷

B. Broadband Service.

As a threshold matter, the FCC, NTIA and RUS should ensure that the definitions it implements embody Congress’s directive that broadband service be defined in a technologically-neutral manner. As noted above, Congress provided that grants should be awarded to any “recipient that will best achieve the broad objectives of the program” and those agencies distributing support funds are to do so to any recipient they “judge will best meet the broadband access needs of the area to be served, whether by a wireless provider, a wireline provider, or any provider offering to construct last-mile, middle-mile, or long haul facilities.”⁸

The Commission should ensure that any definition of “broadband” that includes upload/download broadband speeds accurately reflects the differences between broadband wireline and broadband wireless services and also promotes inclusiveness among the many existing and emerging broadband solutions. Any criteria for transmission speeds should consider whether the end user networks are expandable and scalable so that providers can evolve their networks in the future.

⁷ *Id.* at 774-775.

⁸ *Id.* at 774.

Conclusion

Middle mile and last mile backhaul enables wireless competition to exist and to thrive. So, our country has an interest in ensuring its availability. The decisions that are made along the way (encouraging the use of multiple-use backhaul platforms and ensuring equal and non-discriminatory access to those platforms, making a limited number of the numerous vacant the TV white space channels available in rural areas, re-enforcing FCC rules that prevent burdensome and preempted zoning or permitting restrictions, and implementing FCC, NTIA, and RUS rules) can create (or destroy) the necessary environment. Making a limited number of TV White Space channels available before the initial grant filing deadlines will greatly increase the ability to bring broadband services to many more unserved and underserved communities, while sparking short term and long term job growth and ensuring wise efficient use with taxpayer funds. Thank you for the opportunity to testify today.