Written Testimony of

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"Perspectives from the Fields: The State of Rural Broadband in America"

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Good morning, Chair Latta, and members of the Subcommittee. I am Troy Klinger, Director of Network Operations at unWired Broadband, a hybrid fixed wireless and fiber optic Internet Service Provider (ISP) whose primary mission is to serve the rural and underserved residents, businesses and anchor institutions in California's Central Valley and North Valley. I am responsible for the design, management and ongoing operation of the unWired Broadband network with a team of highly qualified and experienced engineers and technicians. I'm honored and pleased to offer my perspective on the current state of broadband in rural California, and how we can secure meaningful connectivity for every American, close the digital divide, and more specifically, meet the challenges and opportunities in providing high speed Internet services to rural Americans.

About unWired Broadband

unWired Broadband has been providing high speed Internet services to rural and underserved residents, businesses, and anchor institutions in the California Central Valley since

2003. unWired Broadband is a privately held company, founded by Central Valley natives, with the goal of providing fast, reliable internet connectivity to its customers. All our operations and expansion have been self-funded to date.

unWired Broadband's service area extends from the base of the Tehachapi south of Bakersfield to Red Bluff, north of Sacramento--a total of over 18,000 square miles of coverage.

Our network is managed as a business-quality, high speed Internet service featuring speed guarantees, unlimited data and a choice of flat-rated service plan options depending on a customer's bandwidth needs and budget. We have over 29,000 customer connections--80% residential, 20% business--served by 228 employees. We were named the Wireless Internet Service Provider of the Year in 2023 by the nationwide Wireless Internet Service Provider Association (WISPA). In 2022 and 2023, unWired Broadband was the Fresno Bee's People's Choice Award Winner for "The Best of Central California" in the ISP category. We have earned a Network Promoter Score (NPS) of 59 reflecting customer satisfaction that is more than double that of the national Telecom Industry Benchmark for satisfaction.

unWired Broadband's Fixed Wireless Network

unWired Broadband's fixed wireless network consists of wireless transmitters on 209 vertical assets including communication towers, grain silos, water towers and tall buildings with a diverse and redundant microwave and fiber optic backbone. Customer connections are established via small antenna that are attached to structures on their premises. The majority of our customers are within 10 miles of one or more of our transmission sites.

Over the first 20 years of our operation, typical download and upload speeds offered in our fixed wireless network ranged from 5 to 30Mbps with higher speed, more expensive connections available using dedicated transmission equipment, sometimes ordered by Enterprise customers. UnWired's enterprise services range from small 20Mbps/20Mbps symmetrical connections to 2Gbps/2Gbps with capabilities to exceed 10Gbps in some areas.

Unlike the majority of ISPs, unWired provides a minimum speed guarantee. To deliver on our promise to our customers, we have historically only provided smaller bandwidth connections that actually meet their broadband usage needs. It may come as a surprise to you based on the speeds specified in various programs identifying unserved and underserved customers, but across our entire network, at peak demand times, the actual average usage of our customers is 6 Mbps!

More recently, we have seen significant improvements in fixed wireless technology capable of serving rural areas. The most significant advancements are the availability of hardware using new chips from manufacturer Peraso Inc in the 64-71GHz frequencies that allow reliable connectivity of 1Gbps or faster speeds up to 1.5 miles from a transmission tower. The other, more impactful development is from the technology company Tarana Wireless. Unlike the previous hardware manufacturers, Tarana developed a chipset specifically for use in point-to-multipoint radio communications. This platform uses beam forming and noise cancellation technology that allows for reliable, high speed, connectivity in noisy RF environments. Where we have been able to deploy the new generation Tarana equipment, we can offer plans with download speeds ranging from 25 to 200 Mbps at significantly lower rates. The Tarana equipment is capable of much faster speeds than we typically offer. In many cases

our technicians will see over 500Mbps at installation. These technologies combined with the recent availability of LIDAR mapping have enabled fixed wireless providers to accurately plan new deployments ensuring comprehensive coverage in a way never before possible.

Our company is currently allocating millions of dollars in funds to two transformative projects: our NextGen fixed wireless services using the advanced technologies like available from Tarana Wireless, and our fiber optic network projects in small, denser rural cities and census designated areas.

Importance of Connectivity in Rural Areas

There are many residents and businesses in the rural California Central Valley who do not have access to reliable, trenched-in high-speed Internet services because the cost of deploying a fiber infrastructure is not economical. Nor is it expected to be economical with the demand for high-speed Internet services in unserved and underserved areas relative to public funding sources and budget constraints. For those customers, fixed wireless technology can meet the mission in most cases.

We have long been trusted by some of the most prominent names in Central Valley agriculture providing Internet services to business offices, shops, packing sheds and warehouses. Over the last five years, we have seen increased demand for services from the agriculture community. More IP-based technology is being used in the ag industry to manage water resources at pump facilities, optimize soil quality and crop health in the field, and to maintain the proper feeding and health of livestock on the farm.

While we have had inquiries from the ag industry to enable connectivity to their vehicles in the field, that is a need that fixed wireless technology is not able to address. There are several technologies that farms, and equipment manufacturers are using to solve these problems, but just as fiber or fixed wireless isn't the single solution for broadband there is not a single solution for connectivity across a farm. Technologies using LoRa are best suited for longer distances with lower data throughputs where battery power alone will maintain connectivity for long durations. For applications that require larger bandwidth such as autonomous tractors, WiFi solutions provide the best coverage and connectivity, but require power through cables, solar, or wind power generation. With all varieties of farm technology, the need for great connectivity to the farm is increasing.

As we have been seeing demand for more services and higher speeds from the ag industry, we have also been seeing more demand for services from workers in that industry at their rural residences.

Since March of 2020, we have seen our subscriber count from the rural and underserved areas of the Central Valley increase by over 100% with a surge in new subscribers coinciding with trends in on-line learning, remote working, and telemedicine. Some of that increased demand was triggered by Covid, and some simply the necessity for a reliable, affordable Internet service to meet the requirements of modern day life and business operations.

Many of the rural communities that currently lack access to high-speed broadband are communities with lower household incomes. Many ISP's will avoid investment in these communities due to customer take rates and financial risk. The Affordable Connectivity Program (ACP) enabled eligible, lower income customers in rural areas to subscribe to high-

speed Internet services that they could not otherwise afford. We have seen hundreds of new customers since November 2023 subscribe to our services through our participation in the ACP program. We encourage refunding that program to help bridge the digital divide in the rural areas of the US. Losing access to this much needed assistance will result in many households not having Internet access. Additionally, the loss of customers will likely result in reduced investment into low-income rural markets due to longer ROIs for service providers if they choose to invest at all. Even with ACP, the most sparsely populated areas of the country are unlikely to ever be attractive to ISPs due to the lack of revenue. It is in these areas where government investment with programs such as BEAD are the most important. These are the areas most likely to be serviced by a WISP today. It is the small WISP, based in the local community, that best knows these remote areas and understands what is required to provide access to these small communities where fiber infrastructure doesn't make financial sense.

Unlike unWired Broadband, who has recently made significant investments to manage regulatory compliance and grant applications, there are many smaller WISPs in rural areas that have a staff of 5-10 employees who do not have the ability to navigate the complexity of grant applications and compliance. I urge the members to find ways to simplify access to funds for these small, but vital, companies who are already working to serve the most underserved rural areas of our country.

Choosing the right tool for the job

unWired Broadband is now a hybrid technology ISP, meaning we can match the technology solution with a fixed wireless or fiber optic service depending on the service

mission. Being technology agnostic enables us to deploy fixed wireless or fiber optic solutions where it makes economic sense to do so and meet the bandwidth needs of the rural customer.

While fiber-based connectivity can take years to plan, permit and fund, unWired Broadband's fixed wireless service can be deployed much more quickly than wireline alternatives and at significantly lower costs. For denser rural communities with more than 30 households per mile, fiber is the right solution for the job. In areas with less dense populations, fiber becomes too expensive to deploy and difficult to maintain. In these areas, fixed wireless provides a fast, cost-effective solution.

There are still hurdles for the fixed wireless and fiber ISP's that should be addressed. Extended permitting processes, approval delays and costs slow the deployment of both fiber and wireless solutions. Access to power for the technologies from the local utilities can be complicated and, in some cases, take over a year, even where power infrastructure exists. In many cases unWired has purchased and deployed solar trailers so that we can start providing service in these rural areas while we wait for commercial power companies to energize our networks.

Recently, great strides have been made in access to additional spectrum but much more still needs to be done to provide access to unlicensed or licensed spectrum for the small companies who cannot compete with the Tier 1 providers at auction. Much of the spectrum purchased by the large carriers goes unused in the rural areas. Providing access to this unused spectrum will allow smaller carriers to provide better service while encouraging manufacturer development of new systems.

Over the course of the last year and continuing this year, unWired Broadband has been reaching out to cities, counties, community organizations, state, and federal officials to discuss needs and plans to improve access to high-speed Internet services in rural areas where we can or could potentially provide high speed Internet services to meet the needs of residents and businesses. We have heard that the majority of local jurisdictions are not planning to pursue broadband funding (for a variety of reasons) but are willing to partner with ISPs like unWired Broadband to expand high speed Internet services in their communities.

While unwired Broadband has been self-funded to date, we are exploring ways to accelerate the availability of our high-speed Internet services using both Next Generation wireless technologies and fiber optic network services through public funding programs, like BEAD, wherever possible.

Conclusion

In closing, let me take this opportunity to commend the Congress for the federal funding of programs to expand broadband services in rural and underserved areas. Less red tape and the fostering of partnerships with federal, state, and local governments will help ensure that ISP's deploy broadband to more people in the unserved and underserved rural areas, sooner, not later.