BROADBAND: OPPORTUNITIES AND CHALLENGES IN RURAL AMERICA

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED FIFTEENTH CONGRESS

SECOND SESSION

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C O N T E N T S

BROADBAND: OPPORTUNITIES AND CHALLENGES IN RURAL AMERICA

THURSDAY, OCTOBER 4, 2018

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 11:08 a.m. in room SR–253, Russell Senate Office Building, Hon. John Thune, Chairman of the Committee, presiding.

Present: Senators Thune [presiding], Klobuchar, Tester, Udall, Cantwell, Hassan, Cortez Masto, Baldwin, Moran, and Wicker.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM SOUTH DAKOTA

The CHAIRMAN. Good morning and welcome to today's hearing on a topic that continues to be critically important to this committee and that's access for all the broadband services.

As Chairman, I want to share some principles that I believe should guide the Committee with regard to building out rural broadband.

First, rural Americans and the smaller businesses serving them must never be an afterthought when making public policy decisions.

Second, universal service cannot be achieved without pragmatic and bipartisan cooperation in Congress and without proper oversight of the Federal Communications Commission and other agencies tasked with advancing this goal, like the Rural Utilities Service at the U.S. Department of Agriculture.

Third, the certainty and sufficiency of funding for broadband in rural America for carriers and end users must be ensured.

Providing quality communications services at just, reasonable, and affordable rates as a congressionally mandated telecommunications mission has been in place for over 80 years.

In fulfilling this mission, one of the most crucial, critical programs overseen by the FCC is the Universal Service Fund's High-Cost Program. It has been more than a year since Chairman Pai, Commissioner Carr, and Commissioner Rosenworcel sat before this Committee and committed to conducting thorough economic analysis of the impact of USF funding cuts on broadband deployment in rural areas before allowing any further reduction in the percentage of cost recovery for high-cost areas.

Since that time, however, the cuts resulting from the FCC's budget control mechanism have increased by almost 25 percent. There has been no economic analysis of what these cuts are doing

to rural America, what they're doing to rural jobs, rural economic development, and the ability to live and learn, work and play in communities like Pierre, South Dakota; or Ocean Point, Hawaii; Yankton, South Dakota; or Yakima, Washington.

The FCC has not conducted an analysis of what insufficient and unpredictable funding is doing to the companies trying to deploy broadband under some of the most difficult circumstances in America. This is simply unacceptable.

The FCC's failure to ensure sufficient and predictable funding jeopardizes the vitality of America's rural communities and makes it much, much harder for our witnesses and others like them to deploy broadband. The impact of the FCC's failure is even greater in America's tribal lands.

The challenge of deploying broadband in these areas is often greater than in rural America more generally and so the impact of uncertain and insufficient funding is even more severe for tribal communities in desperate need of the communications infrastructure that brings more jobs and improved education resources.

Just yesterday, I, along with the rest of the South Dakota delegation, sent a letter to Chairman Pai in which we laid out a strong case for immediate FCC action to restore sufficiency and predictability to the High-Cost Program.

In my home state of South Dakota, support for rural carriers will be cut by more than $11 million over a 12-month period if the FCC does not act by the end of the year. That is just the impact on South Dakota.

If the FCC does not act, these cuts can cause providers to halt or cancel broadband build-out, reducing the availability of broadband throughout rural America. Additionally, this could also cause an increase to the cost of service to those who already receive service, putting at risk investments already made. Such an action by the FCC would be contrary to its mission.

Another issue the Committee has frequently examined is broadband mapping and how our current maps are insufficient. Without accurate maps, we cannot build out broadband in truly unserved areas.

On a more positive note, I am heartened to see FCC Chairman Pai planning for an option for the Remote Areas Fund to provide service to extremely high-cost areas, including both rate of return and price gap areas.

I'm interested in seeing a tech-neutral approach for future support from programs, such as the Remote Areas Fund, which ensures that wire line service, fixed mobile wireless service, and satellite service all have a part to play in connecting Americans to next generation broadband service.

As I said at the beginning of my statement, rural Americans should never be left behind their urban counterparts. That is why I'm happy to have a panel of individuals who are uniquely qualified to speak to the real-life challenges of running broadband in rural America.

I want to thank our panel to Washington and look forward to hearing from all of you momentarily.

I'll now recognize our Ranking Member, my neighbor from Minnesota, Senator Klobuchar, for an opening statement.

STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA

Senator KLOBUCHAR. Thank you very much, Mr. Chairman, and like our neighbors in South Dakota, we have many tribal lands and I have noted many times visiting them the issues with broadband.

This is the infrastructure challenge of our generation. I remember back 10 years ago people were just concerned about whether or not they had broadband. They wanted to send an e-mail to their grandkid in college. Well, times have changed. They need high-speed broadband and they need that to do their schoolwork and they need that to do their work and they certainly need that today in modern agriculture, with precision agriculture, and what we're seeing all over our country.

The 2018 Broadband Deployment Report shows that more than 24 million Americans lack access to high-speed broadband and for tribal areas, the report notes that only 31.6 percent of rural tribal lands in the lower 48 states have adequate broadband access.

In my home state, more than one in four rural Minnesota households lack access and I hear it in every single rural county that I visit and in every single tribal area.

Recently, I heard from a tribal member in Leech Lake who told me what happened when one of their members got Wi-Fi at their house and they were really excited and all of a sudden they look out the window and there are 15 kids out there in the yard doing their homework and it's a sweet story but it's also a sad story to think that that was where the kids had to go to the one house that was able to afford Wi-Fi.

We see that, of course, as the Chairman knows, with our farmers that are going to town just to be able to do business with their customers or the story I heard in Northern Minnesota of a doctor who, while he could get Wi-Fi at the hospital, he couldn't get it at his house and so when he had emergency calls, he would go to the McDonald's parking lot to do business.

This shouldn't be happening in the United States of America in the year 2018, and as the Chairman noted, one of the most effective tools we have to close the digital divide is the Universal Service Fund.

This funding is crucial to help deploy and maintain modern communications infrastructure in less populated areas. That's the whole reason it was designed for low-income and also for rural areas.

Current USF funding shortfalls are preventing new broadband deployments and driving up prices for our rural customers. That's why Senators Fischer and Moran and I have led some efforts to try to push this funding as have so many others on this committee.

In Minnesota, the insufficient USF budget is estimated to cut support by more than 7.6 million over a 12-month period. The Chairman, as was noted, has committed before this Committee to address the funding shortfall before the end of the year and I will be working to ensure that that deadline is met.

America's rural consumers can't afford to wait. If you lose customers or you're not able to do your schoolwork, you can't make up for that time. You can't make up for it if you can't get into college because you weren't able to get the right AP classes if you're on

a tribal land. You can't make up for it if you lose customers that your small business is working for. That's why this is so important.

Beyond USF, we need to be prioritizing broadband funding as a basic infrastructure investment. There are a number of us that are co-chairs of the Broadband Caucus and we have called for dedicated stand-alone broadband funding as part of any infrastructure initiative.

I hope we get that infrastructure initiative going. There's a lot of appetite for it around here and if we do it, it better have a significant amount of funding for broadband, including on tribal lands.

Mapping, I know that's something you're going to discuss. Recent reports from the GAO show that the FCC's Broadband Access Data on Tribal Lands frequently overstates coverage and fails to take into account the quality or affordability of service.

We know tribal communities are disproportionately underserved, we've all seen it in our states, and that's why this mapping is so important to improve.

Last issue, I'll bring up streamlining. We have worked to streamline the deployment process by requiring coordination between state departments of transportation and broadband providers during construction so they only have to dig once when they're doing other construction.

A provision based on this bill was included in the Mobile Now Act and was recently signed into law and we have also worked to include a provision to simplify the permitting process on Federal lands.

For many rural and tribal communities, the cumbersome process to get this going has been a major barrier to connectivity.

These issues can mean the difference, as I note, between a student doing her homework where she lives or in the school's parking lot, between a farmer sending crop data from the field or from the closest McDonald's.

In the 1930s, we worked to bring electricity and telephone service to every home in America. Today, we need to put the same effort into expanding broadband.

Thank you very much.

The CHAIRMAN. Thank you, Senator Klobuchar.

STATEMENT OF HON. JON TESTER,
U.S. SENATOR FROM MONTANA

Senator TESTER. Mr. Chairman, just very quick. At a time when both parties tend to run to their corners, I want to thank you for your opening statement. It was spot on with rural America and Indian Country and I want to associate myself with your remarks.

Thank you.

The CHAIRMAN. Thank you, Senator Tester.

We have a distinguished panel, as I mentioned. One of our panelists today is from New Mexico and so the Senator from New Mexico, Senator Udall, wishes to make an introduction.

INTRODUCTION OF GODFREY ENJADY BY HON. TOM UDALL, U.S. SENATOR FROM NEW MEXICO

Senator UDALL. Thank you, and I would also like to associate myself with your opening comments. I think they were right on, also, and with Senator Klobuchar's comments, which I thought were very good.

Thank you for the latitude to allow me to introduce my friend, Godfrey Enjady, representing the National Tribal Telecommunications Association as its current President.

His résumé is stellar and includes General Manager of Mescalero Apache Telecom in Mescalero, New Mexico; Chairman of the National Telecommunications Cooperative Association's Tribal Affairs Committee; and Designated Participant on the Federal Communications Commission Intergovernmental Advisory Committee.

Mr. Enjady, thank you again for your testimony yesterday in the Indian Affairs Committee and here this morning. Your comments are essential to help create a path forward to close the digital divide in rural and tribal areas.

Thank you, Mr. Chairman, for the courtesies.

Senator CANTWELL. Mr. Chairman,——

The CHAIRMAN. Yes, Senator Cantwell.

Senator CANTWELL.—Thank you for mentioning Yakima, Washington, in your remarks, and I just want to—since you've highlighted and my colleague here that we're having dual testimony from a witness from the Indian Affairs Committee yesterday, I hope our colleagues will get the testimony from that hearing of GAO's report on how the FCC is not doing all that it can be doing to help us here.

So I think a lot of information came to light yesterday in the Indian Affairs Committee and obviously could be applied to larger rural broadband, as well.

So thank you.

The CHAIRMAN. Thank you, Senator Cantwell.

We'll get started. We have a great panel. Mr. Denny Law is the General Manager and CEO of Golden West Telecommunications. He's joined by Ms. Mona Thompson, who's the General Manager of the Cheyenne River Sioux Tribe Telephone Authority; Mr. Grant Spellmeyer, who is Vice President of Federal Affairs and Public Policy for U.S. Cellular; and then, as Senator Udall already noted, Mr. Godfrey Enjady, who is the General Manager of Mescalero Apache Telecom, Incorporated.

It's great to have all of you here. We look forward to hearing from you. If you confine your oral remarks to no more than about five minutes, we'll make sure that your entire statements are included as part of the permanent record, and we'll look forward to interacting with you.

So, Mr. Law, please proceed.

STATEMENT OF DENNY LAW, CHIEF EXECUTIVE OFFICR, GOLDEN WEST TELECOMMUNICATIONS COOPERATIVE, INC.

Mr. LAW. Chairman Thune, Senator Klobuchar, Members of the Committee, good morning and thank you for this opportunity to testify on Broadband Opportunities and Challenges in Rural America.

I am Denny Law. I'm the Chief Executive Officer of Golden West Telecommunications Cooperative, based in Wall, South Dakota.

Golden West was incorporated in 1916 for the purpose of providing telephone service between the towns of Interior and Quinn. Today, we provide service to over 30,000 customers spread across 24,500 square miles. That's a geographic area larger than the states of Maryland, New Jersey, Connecticut, and Delaware combined. The largest community we serve is about 3,500 people.

With more than 14,000 route miles of network in service, that's enough to stretch from Wall, South Dakota, to Hong Kong and back, it underscores the strides Golden West has made to ensure that our customers have access to world-class communications that make rural South Dakota a more vibrant place to live and to do business.

Building broadband networks in rural areas is capital-intensive and very time-consuming. The population is sparse, the terrain quite diverse. Especially when crossing Federal lands or railroad rights-of-way, small rural providers must address permitting concerns or other hurdles that can delay projects or increase their already high costs.

All of these factors make the delivery of broadband in rural America a sustained commitment. We miss the mark as a nation when we treat the broadband challenge as a one-time declaration of success based on the preliminary act of connecting locations.

The construction of rural broadband networks is important but also challenging. It's also just the beginning.

Despite these many challenges, rural broadband has far-reaching benefits for both urban and rural America. In my written testimony, I share the stories of students in rural South Dakota learning Spanish from a teacher working from her farm, a broadband-enabled small business with overseas customers operated by a rancher in Western South Dakota, and a Golden West customer able to publish a book from home using online tools. These stories are not exceptions.

Golden West recently surveyed customers on whether they telecommute for their work using broadband internet access. Twenty-three percent of those surveyed answered yes and of those, Forty percent indicated they telecommuted from their home using broadband Internet access five days a week. Nor are these stories unique to Golden West or to South Dakota.

These networks exist and these benefits are possible because Congress wisely called for reasonable comparable services and rates between rural and urban America in the 1996 Telecom Act.

Anything less would not allow rural consumers to experience the same educational, economic, health care, public safety, or other benefits of broadband that Americans may take for advantage.

While the Universal Service Funding and concept to support robust networks, the high-cost budget has not kept pace. Instead, it has been effectively capped since 2011, forcing hometown companies, such as Golden West, to do more with less and calling into question the great progress we've made to date in advancing and sustaining rural broadband.

This high-cost budget cap is cutting USF support for investments that have already been made, deterring future rural broadband investments and driving consumer rates higher.

Cutting USF support cuts the legs out of the business case for rural broadband in many places and Golden West had to delay or cancel projects due to these cuts.

If we want to make progress as a nation toward universal broadband, we need to return to a predictable and sufficient mechanism as contemplated by Congress in 1996 and required by law.

Fortunately, policymakers across Washington, D.C., have expressed concern about the USF budget shortfalls. Earlier this year, more than 190 Members of Congress signed letters to the FCC urging prompt action on this issue and a window of opportunity now exists.

FCC Chairman Pai and several other FCC Commissioners have indicated their intent to resolve concerns about the budget shortfalls by the end of this year. We are grateful that they apparently plan to take action and we are also thankful to those of you in Congress who have supported our efforts.

Of course, once the business case can be made to build the network, one still needs the upfront capital to do so. This is where the Rural Utility Service or RUS has been so important.

RUS telecommunications lending has helped enable and unleash billions of dollars in private capital investment for rural communications infrastructure.

As Congress works to update our U.S. programs, rural providers believe we must update these programs and aim for more robust services and higher speeds.

It is also important, however, to ensure the efficient use of limited Federal resources by targeting those resources carefully. It is particularly important to ensure that new networks built leveraging new Federal programs will not undermine the sustainability of networks already in place leveraging other Federal resources. Coordination is essential to sustain rural broadband.

Golden West thanks this committee for its leadership on and interest in rural broadband and we look forward to working with you to realize a vision of true universal service form in the robust and sustainable networks that will deliver reliable, high-quality, and affordable communications services throughout rural America now and in the future.

[The prepared statement of Mr. Law follows:]

PREPARED STATEMENT OF DENNY LAW, CHIEF EXECUTIVE OFFICER, GOLDEN WEST TELECOMMUNICATIONS COOPERATIVE, INC.

Introduction

Chairman Thune, Ranking Member Nelson and members of the Committee, thank you for the opportunity to testify on the importance of rural broadband.

I am Denny Law, Chief Executive Officer of Golden West Telecommunications Cooperative, Inc in Wall, South Dakota. While every rural area presents unique challenges to serve—and while I believe Golden West's serving area is likely one of the more rural and sparsely populated in the nation—I also believe the history of advancing telecommunications in South Dakota is relatively indicative of the challenges and rewards of serving consumers and businesses throughout rural America.

Golden West Telephone Company was incorporated in 1916 to provide telephone service between the towns of Interior and Quinn, accomplished by stringing telephone line along fence posts to farms and ranches. Golden West Telecommuni-

cations and its subsidiaries now provide service to over 30,000 accounts, 25,000 broadband Internet subscribers, and 10,000 cable television customers across 24,500 square miles—an area larger than the states of Maryland, New Jersey, Connecticut and Delaware combined—equating to 1.42 customers per square mile. The largest community we serve has just over 3,500 residents. Yet, with more than 14,000 route miles of fiber and copper in service, one could stretch that 14,000 mile network from Wall, South Dakota, to Hong Kong and back again—underscoring the significant strides we have made to ensure that our customers have access to the world-class communications they need to make rural South Dakota a more vibrant place to live and do business.

In addition to robust service for consumers and businesses, we serve numerous anchor institutions, including 72 K–12 schools, 62 health clinics/hospitals, 22 libraries, and five Veterans Administration facilities within our service territory. Golden West also provides telecommunications service on portions of five Native American tribal reservations in South Dakota. In addition, Golden West operates across large swaths of Federal land, including land owned by National Grasslands, Bureau of Indian Affairs, Bureau of Land Management, National Forest, National Parks, and Army Corps of Engineers.

While once again every story in rural areas is unique, I think Golden West's efforts and its community commitment are fairly representative of the hundreds of small, community-based companies and cooperatives like those in the membership of NTCA–The Rural Broadband Association. I have had the privilege of serving as chair of the NTCA committee that sets policy direction for the association, and in that role, I have had significant opportunity to meet and talk with peers around the country who, like Golden West, are doing whatever they can to deploy and sustain advanced communications services in the most rural parts of America. Small telecommunication providers like Golden West serve less than five percent of the U.S. population spread across over 35 percent of the U.S. landmass. In the vast majority of these wide-ranging rural areas, companies like Golden West are the only full-service fixed networks available. Small broadband providers therefore are essential to connect rural America with the world—making every effort to deploy advanced networks that respond to demands for cutting-edge, innovative services that help rural communities overcome the challenges of distance and density.

Rural Broadband Deployment Benefits and Challenges

Benefits of Rural Broadband

Investing in rural broadband has far-reaching effects for both urban and rural America, creating efficiencies in health care, education, agriculture, energy, and commerce, and enhancing the quality of life for citizens across the country. A report released in 2016 by the Hudson Institute in conjunction with the Foundation for Rural Service underscores the nationwide benefits that arise from rural broadband; this study found that investment by rural broadband companies contributed $24.2 billion to the economies of the states in which they operated in 2015.[1] Of this amount, $8.3 billion accrued to the benefit of rural areas, while nearly $16 billion accrued to the benefit of urban areas. In addition, better broadband access in rural America is helping to drive growth in online transactions—a recent survey found, for example, that rural consumers account for more than 10.8 billion internet-driven transactions annually, representing approximately 15 percent of the national total.[2]

The benefits of rural broadband, however, go beyond sheer numbers—it's helpful as well to understand the productive uses of broadband and what they mean to those communities that get and stay connected. A major benefit of rural broadband, for example, comes in the form of distance learning. With a shortage of teachers in many areas of rural America, many schools must rely on high-speed connectivity to deliver interactive-video instruction for foreign language, science, and music classes. For example, rural Bridgewater, South Dakota resident Tara Currier-Hofer is teaching Level 1 and 2 Spanish to over 100 students in 14 high schools this year. She does it all from home, in a small office located on her farm. Because of her broadband connection, she is able instruct hundreds of students who otherwise would not have the opportunity to learn Spanish.

Robust broadband networks also enable rural residents to start their own business and gain access to new markets. JT Rickenbach from Oelrichs, South Dakota started WESTROM in nearby Hot Springs in 2002, while living and maintaining a ranch with his family. WESTROM builds electronics, cases and housings for elec-

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[1] "The Economic Impact of Rural Broadband" (2016), The Hudson Institute, Washington, D.C.
[2] A Cyber Economy: The Transactional Value of the Internet in Rural America, White Paper, iGR (2018), at 1.

tronics, and the machines to build electronics. WESTROM boasts two locations—one in Hot Springs and another in Hong Kong. Most of JT's business is outside of South Dakota, but despite the distance from most of his customers (many of whom are international), broadband enables JT and his family to live and work in South Dakota.

Another example of how broadband promotes and sustains entrepreneurs comes from Joyce Wheeler from Phillip, South Dakota. Joyce has lived on a South Dakota ranch her whole life, where she began to pursue her lifelong dream of writing novels. After the first two publishing houses she used closed their doors, Joyce decided to self-publish. She now works one-on-one via the Internet with a company in Florida. While she receives publishing help from Florida, Joyce also relies on her broadband service for local help in marketing her books and website.

One of the best statements I have ever heard about the importance of broadband in rural areas came from a Golden West customer who lives in a very rural area near Hayes, South Dakota. She is a Software Development Manager for an international software firm. After living and working in an urban area, she and her husband decided they "were done with city life" and wanted to move back to South Dakota. She was able to negotiate a work from home/telecommuting arrangement with her employer. Fast forward the clock a few years and she is now managing software teams located throughout the world, all from her rural location in Hayes. Her statement to me was that her broadband connection meant "being able to work where you want to live instead of having to live where you want to work."

These stories are not just exceptions to the rule or on the margins. Golden West recently completed a survey of our customers that posed the question "Does anyone in your household telecommute, or in other words, use an Internet connection to work from home?" Twenty-three percent of the respondents answered "Yes," and of those, 40 percent indicated they telecommuted for their employment five days a week. Nor are these stories, I believe, unique to Golden West or South Dakota—instead, my sense is that they are repeated in rural areas across the country, especially in places where smaller rural operators have, like Golden West, led the charge in deploying robust, high-capacity, low-latency networks and in taking pride in the delivery of high-quality customer service for the communities in which we live. Indeed, Golden West was recently given a "Smart Rural Community" Showcase award for its efforts in connecting rural South Dakota with the rest of the Nation and the world, and its partnership with local business and community leaders to make effective use of the broadband networks we have built. We were one of 13 award recipients this year nationwide, and several dozen other smaller operators have received similar awards in prior years. Taken together, these awards demonstrate the importance of not only getting broadband to rural areas in the first instance, but the value of keeping it there and empowering consumers, businesses, and anchor institutions to make the most of it.

As described in a recent CoBank report on rural economic challenges, "Rural America faces a unique set of economic challenges, but it has demonstrated resilience during the past eight years of recovery. The rural population, jobs and incomes are all trending in the right direction. And current efforts to improve rural broadband access offer the greatest opportunity to make a significant dent in the rural/urban economic divide. As broadband becomes more widely available in rural communities, enhanced access to education, healthcare and business opportunities can markedly improve the quality of life and the economic vitality in these communities. Rolling out broadband to rural communities will take several more years in some areas. But as access increases, so will rural America's economic potential." [3]

Rural Broadband Challenges

Building broadband networks is capital-intensive and time-consuming. The primary challenge of rural network deployment is in constructing networks across hundreds or thousands of miles where the population is sparse and the terrain is diverse. Especially when crossing Federal lands or railroad rights-of-way in rural America, small rural providers must address environmental and historical permitting concerns or contractual obligations that can delay projects and increase their already high costs. Then, where networks are built, they must be maintained over those hundreds or thousands of miles—this requires technicians who regularly travel long distances to make service calls and customer service representatives trained to deal with questions about router and device configurations in ways that were unimaginable for "telephone companies."

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[3] "THE YEAR AHEAD: Forces that will shape the U.S. rural economy in 2018" (2018), CoBank Knowledge Exchange Report, *https://www.cobank.com/-/media/files/ked/general/2018-year-ahead-report-jan-2018.pdf*

Moreover, even the best local or "last mile" networks in rural markets are dependent upon "middle mile" or long-haul connections to Internet gateways dozens or hundreds of miles away in large cities. As an example, Golden West's operations are more than 300 air miles—not route miles—from the closest Tier 1 Internet peering point. Reaching such distant locations is expensive, and as customer bandwidth demands increase—moving from Megabytes to Gigabytes to Terabytes of demand per month per customer—so too does the cost of ensuring sufficient capacity to handle customer demand on those "long-haul" fiber routes that connect rural America to the rest of the world. In fact, Golden West's analysis found that our average broadband customer monthly data usage was 92GB as of August 2016. By August 2018, the average broadband customer monthly data usage was 224GB. In just two years, we estimate the average usage will exceed 500GB a month. In four years, average monthly usage will likely exceed 1TB of data per month. By contrast, some networks come with plans that either cap data usage at much lower levels per month or slow data when they exceed these levels; for example, even in the context of their "unlimited" plans, certain wireless operators will use thresholds of 50 GB or less. These figures indicate the wisdom, the necessity, and the efficiency of investing in robust future-proof "last mile" access networks that can handle demands for years to come *and* the need for robust "long-haul" capacity to connect rural areas to the rest of the world.

Also, barriers to broadband deployment such as disparate applications, fees, and reviews across Federal and state landowning agencies must also be addressed as part of any holistic plan to promote and sustain infrastructure investment. Small providers often face infrastructure rules and burdensome permitting processes in seeking to build broadband networks across rural America. Efforts to standardize Federal permitting processes and implement "shot clocks" for securing prompt approvals would free resources for broadband investment. Our industry appreciates this Committee's bipartisan effort to reduce barriers to deployment of communications networks.

All of these factors make the delivery of broadband in rural America an ongoing effort that requires sustained commitment. We will miss the mark as a nation if we treat the broadband challenge as a one-time declaration of "success" just for the very preliminary act of connecting a certain number of locations. The construction of broadband networks is important and undoubtedly challenging in rural areas, but it is only the beginning. Particularly when one considers that even where networks are available many rural Americans pay far more for broadband than urban consumers, it should be apparent that the job of connecting rural America—and, just as importantly, sustaining those connections—is far from complete. I am proud of Golden West's investment in rural South Dakota, and the rural broadband industry as a whole can tell a great story of success. But there is also much more work to do—and this is where public policy plays an important role in helping both to build *and* sustain broadband in rural markets.

Rural Utilities Service Network Financing

Throughout Golden West's history, we have obtained financing from the Rural Utilities Service (RUS) or its predecessor agency under the U.S. Department of Agriculture. RUS telecommunications lending has helped enable and unleash billions of dollars in private capital investment in rural communications infrastructure. In Fiscal Year 2017, RUS loans to the small, rural broadband members of the South Dakota Telecom Association totaled $116.7 million. Due in part to the availability of this financing, many communities served by small broadband providers throughout the United States have significantly higher broadband deployment than neighboring communities served by larger carriers. But, as I will explain, RUS financing is just one important piece of a broader public policy puzzle when it comes to making the business case for rural broadband deployment.

In the first instance, deploying a communications network in a rural area requires a large capital outlay due to the challenges of distance and terrain. The RUS has long played a crucial role in addressing rural broadband challenges through its telecommunications programs that finance network upgrades and deployment in rural areas. Since at least the early 1990s, the RUS telecom programs have financed advanced network plant at a net profit for taxpayers and helped deploy state-of-the-art networks to rural Americans left behind by providers unable or unwilling to serve low-population-density markets. With rare exceptions, RUS, CoBank and the Rural Telecommunications Finance Cooperative are the primary lenders that small rural providers can turn to for outside financing. Not only does RUS help rural America remain connected, its Broadband Loan & Loan Guarantee program and traditional Telecommunications Infrastructure Loan & Guarantee program make loans

that must be paid back with interest—creating a win/win situation for rural broadband consumers and American taxpayers.

In addition to the creation of a new RUS broadband loan/grant pilot program in the FY18 Omnibus appropriations bill, the pending expiration of the current Farm Bill has afforded Congress an opportunity to reform and expand RUS broadband programs, including the Farm Bill Broadband Loan & Loan Guarantee program that was first authorized in the 2002 Farm Bill. Rural telcos wholeheartedly endorse the notion that we as a nation must closely examine these programs and aim for more robust services and higher speeds. As discussed above, networks must be built to accommodate future demands wherever and whenever possible. It is essential as well, however, to ensure the efficient and effective use of limited Federal resources to promote both the availability and sustainability of broadband networks by targeting those resources carefully. It is particularly important to ensure that new networks built leveraging new Federal programs do not compete with and undermine the sustainability of networks that are already in place leveraging Federal resources, such as those made available through the rural development programs of the RUS and/or Universal Service/Connect America Fund support from the Federal Communications Commission (FCC).

For decades, the RUS and FCC's High-Cost Universal Service Fund (USF) have worked in concert to deploy and sustain communications networks in rural America. In fact, I would submit there has been no more successful formula for advancing and sustaining rural broadband than the combination of RUS loans financing upfront network construction (with payback) and USF helping to support ongoing operations and the affordability of rates on the networks once built. More specifically, while RUS lending programs finance the substantial upfront costs of network deployment, the USF High Cost Fund helps to make the business case for such construction and then sustains ongoing operations at affordable rates.

In particular, USF by law aims to ensure "reasonably comparable" services are available at "reasonably comparable" rates. Not to be confused or conflated, RUS capital and ongoing USF support therefore serve distinctly important, but complementary rather than redundant, purposes in furthering rural broadband deployment. It is essential that these complementary roles continue, and that we avoid the prospect of two, dueling federally-supported networks built in a rural area that could not sustain either one without such Federal support. We can make smarter, better use of Federal resources by reaffirming and codifying yet again the complementary nature of coordinated RUS and FCC programs, rather than allowing these programs and the resulting networks to be pitted against one another in a manner that undermines the sustainability of the networks and the integrity of the programs themselves.

The FCC's High Cost Universal Service Fund

As mentioned above, support from the Federal High-Cost USF program is essential to make the business case for rural broadband. In fact, it is the primary, if not the only, tool to ensure—as mandated by the Communications Act—that consumers in deeply rural areas like those served by Golden West can purchase telecom services that are reasonably comparable to what urban Americans receive at rates reasonably comparable to what urban consumers pay.

Put another way, USF does not itself "pay for" upfront network construction; instead, the USF program supports ongoing operations (and the repayment of loans and private capital) by ensuring that rural consumers can pay reasonable rates for their use of services atop networks, thereby allowing consumers to buy such services and operators to justify the business case for investments in those networks in the first instance. USF is thus perhaps the best, most successful example of a public-private partnership that exists in the broadband space, having helped to justify the business case for private network investments that can total tens of billions of dollars per year when measured as gross plant in service. Without USF support, it would have been impossible for Golden West to do all that it has done in seeking to continuously improve broadband access across wide swaths of rural South Dakota—and if USF support remains capped as it has been for many years, this threatens to undermine our progress, if not stop it in its tracks.

Enabling the business case for delivery of advanced telecom services across rural America is a big job, and yet the High-Cost USF has been confined under the same budget since 2011—even as small rural carriers have sought to deliver more robust networks that will scale to meet the anticipated enormous consumer demands for bandwidth in the future and last over the lives of the loans taken out to build them.

No justification is available for why the current High-Cost USF cap is the appropriate level of funding to meet the program's goals, beyond a judgment back in 2011 that 2010 support levels seemed like the "right" amount to carry out a National

Broadband Plan. In fact, precisely because they have tried to keep investing where possible in broadband to serve their rural communities, small rural carriers now face escalating cuts to USF support for investments already made—revealing how much the High-Cost program is woefully underfunded to do the job that the law requires and that Congress wants in terms of making robust, affordable broadband available in rural America. To make matters worse, the High-Cost USF budget is the only program budget under the FCC's universal service umbrella without even an annual inflationary factor—and each of the other programs has also seen upward adjustments to their respective budgets in recent years. This is absolutely not to begrudge or question any increases needed in the other programs by any means, but only to point out that the High-Cost USF program's capped budget is woefully out of date and out of step.

Golden West and its customers have been directly affected by the High-Cost USF budget shortfalls. The loss of USF support for network projects already completed has forced us to reduce our future investment plans. Due to USF budget cuts, we have postponed nearly $4 million of network upgrade plans scheduled for 2019 in rural South Dakota. The end result will be fewer customers receiving broadband or upgraded broadband services. And, Golden West is not alone in feeling this pain. Because of these support cuts, I have heard that many other rural network operators are cutting back on future broadband infrastructure investments and cannot deliver affordable standalone broadband to rural consumers. A survey by NTCA earlier this year found that the average member reported over $660,000 in cuts in USF support over the next 12 months, which translated on average to more than an estimated $1.6 million in deferred or declined investment in rural broadband infrastructure. This in turn translates into fewer customers receiving higher-speed services; the NTCA survey found, for example, that the USF budget cuts were expected to result in 52 percent fewer customers on average receiving new 10 to 25 Mbps broadband than companies had anticipated prior to the cuts due to project postponements, cancellations, or modifications.

Fortunately, policymakers throughout Washington, D.C. have expressed concern about the USF budget shortfalls. Over the past several years, hundreds of members of Congress—including many members of this committee—have written repeatedly to the FCC, expressing serious concern about how the persistent and increasing USF budget shortfalls affect private infrastructure investment and consumer broadband rates. Yet again earlier this year, more than 190 members of Congress signed letters to the FCC expressing concern about the USF budget shortfalls. The letters demonstrated the sizeable, shared, and sustained bipartisan interest in prompt action on this issue, and a window of opportunity exists. Indeed, FCC Chairman Pai and several other FCC commissioners have expressed their shared concerns about the existing budget shortfalls, and have indicated their intent to act to resolve such concerns by the end of this year—we are grateful to them for planning to take action on the long-standing budget cap, and to those of you who have urged them to take such action.

But as heartening as it is to see an apparent consensus with respect to the problem and the need for a solution, it is essential to move forward now with all due speed. Remedying this USF budget concern and providing sufficient support by the end of this year is imperative to the sustained delivery of affordable, high-quality broadband service to consumers and small businesses that this Subcommittee and so many other members of Congress hope to see in rural America. We urge Congress to continue its efforts to press for a fix to this problem, and we are hopeful the FCC will take action as promptly as possible to provide sufficient support for all recipients of High-Cost USF support.

Conclusion

Robust broadband must be available, affordable, and sustainable for rural America to realize the economic, healthcare, education, and public safety benefits that advanced connectivity offers. As noted in this testimony, it takes an effective mix of entrepreneurial spirit, access to capital (whether from RUS or otherwise), commitment to community, and Federal USF support to enable and sustain deployment of communications infrastructure in many parts of rural America. The RUS and the High-Cost USF programs play important, but complementary rather than redundant, roles in promoting the deployment and sustainability of broadband infrastructure in rural America. Promoting greater access to capital through strong, well-tested RUS lending programs, ensuring sufficient funding of USF to make the business case for use of private and/or borrowed capital in rural areas, and demanding continued coordination between essential Federal programs that aim to promote broadband access in rural America are all critical pieces of a comprehensive, thoughtful national rural broadband strategy.

Golden West thanks the committee for its leadership on and interest in all these issues, and we look forward to working with you to realize a vision of true universal service in the form of robust and sustainable networks that will deliver reliable, high-quality, and affordable communications services throughout rural America now and for years to come.

The CHAIRMAN. Thank you, Mr. Law.
Ms. Thompson.

STATEMENT OF MONA THOMPSON, GENERAL MANAGER, CHEYENNE RIVER SIOUX TRIBE TELEPHONE AUTHORITY

Ms. THOMPSON. Chairman Thune, Senator Klobuchar, and members of the Committee, good morning and thank you for the opportunity to testify on Broadband Opportunities and Challenges in Rural America.

I am Mona Thompson, General Manager of the Cheyenne River Sioux Tribe Telephone Authority in Eagle Butte, South Dakota.

Today, I will describe the unique challenges of operating in rural America generally and tribal areas specifically as well as the struggles going into deploying a rural network. My relatives, I shake your hand with a good heart.

The Cheyenne River Sioux Tribe is a federally recognized tribe. It is also known as the Cheyenne River Lakota Nation. At 4,226 square miles, the Cheyenne River Indian Reservation is the fourth largest Indian reservation in the United States. The population density for our 8,000 residents is fewer than two people per square mile.

The Cheyenne River Sioux Tribe Telephone Authority, CRST, was founded in 1958 when the Tribal Council purchased an existing telephone company. CRST was the first tribally owned telephone company to partner with the Rural Electrification Administration, now known as Rural Utility Service.

50 years after its founding, CRST relied upon a $37.8 million loan with RUS, a telecommunications loan to upgrade its network to fiber. With the degrading copper network, upgrading to fiber network wasn't a luxury, it was a necessity for the Cheyenne River Community.

Before upgrading to fiber, our copper network couldn't handle a DSL connection further than three miles away from our central offices, leaving many without access to even minimal broadband connection. We actually had dial-up service, which is horrible.

In fact, the copper plant was in such poor shape that our customers living out of town would oftentimes receive static over the phone lines when it would rain.

We knew we had to do something, which is why we started construction on our fiber to the home project in 2010. However, a couple of years into the project, we became very concerned about continuing that construction over the winter months. We had a meeting to discuss whether to continue that project or not.

Due to the new budget control cuts that the Universal Service High-Cost Program, we were very concerned that the cuts would be drastic enough where we couldn't pay back our RUS loans and we didn't want to put our company in jeopardy nor the customers in jeopardy.

While we remained concerned, we decided to continue that project and in December 2016, we completed the fiber to the home project at a total cost of $27.5 million and that deployed over 1,500 miles of fiber throughout the reservation in Dewey and Ziebach Counties in South Dakota.

I'm very happy we continued with the fiber build-out because it was the right thing to do but cuts to the USF support mechanism that keeps our operations ongoing are still happening today.

The impact from this year's cuts will result in 500,000 less support than we anticipated to receive from the USF. As a general manager of a small company, cuts of this size are what keep me up at night and make me concerned about maintaining our operations in the future.

Despite these challenges, CRST delivers voice, broadband, and other advanced services across a cutting-edge network that is essential for economic productivity, health care, and education.

Federal high-cost support in our U.S. programs are essential to making this happen. These gains in rural broadband can be achieved only if sound policies support both the deployment and ongoing operation of broadband infrastructure in rural America. Sufficient and predictable universal service support is necessary to ensure that rural providers have reliable resources to deploy and maintain better broadband.

RUS loan and grant programs are also a vital piece of this puzzle, providing financing to move forward with critical infrastructure projects in deeply rural areas and tribal lands.

Together, USF and RUS financing programs allow local community-based providers, like CRST, to deliver better broadband and the benefits that it empowers.

Thank you very much for this opportunity to address this committee.

[The prepared statement of Ms. Thompson follows:]

PREPARED STATEMENT OF MONA THOMPSON, GENERAL MANAGER, CHEYENNE RIVER SIOUX TRIBE TELEPHONE AUTHORITY

Chairman Thune, Ranking Member Nelson and members of the committee, good morning and thank you for the opportunity to testify on broadband opportunities and challenges in rural America.

I am Mona Thompson, General Manager of the Cheyenne River Sioux Tribe Telephone Authority in Eagle Butte, South Dakota. I have also served on the Tribal Affairs Committee of NTCA–The Rural Broadband Association. Today I will describe the unique challenges of operating in rural America generally and Tribal areas specifically, as well as the opportunities promised by the deployment of robust and resilient broadband. My testimony will describe how, with the proper tools and resources, our rural areas and Tribal Nations can overcome these conditions for a brighter, more prosperous future. Our story also indicates that these gains are best realized through the deployment and sustainability of broadband networks that sit upon a foundation of entrepreneurial spirit, community buy-in, and programs that help make the business case for investment and ongoing operations.

An Introduction to the Cheyenne River Sioux Tribe Telephone Authority

The Cheyenne River Sioux Tribe is a Federally-recognized tribe; it is also known as the Cheyenne River Lakota Nation. Our members include representatives from four of the seven bands of the Lakota. The Cheyenne River Sioux Tribe has a proud lineage. Our heritage is bound up in the heroism of great leaders such as Sitting Bull; our reservation was initiated by the historic Treaty of Fort Laramie (1868). At 4,226 square miles, the Cheyenne River Indian Reservation is the fourth largest Indian reservation in the United States. The 2010 Census reported a population of 8,090 residents; our population density is less than two people per square mile.

The Cheyenne River Sioux Tribe Telephone Authority (CRST) was founded in 1958 when the CRST Tribal Council purchased an existing telephone company. CRST was the first Tribally-owned telephone company in the United States. CRST was also the first Tribally-owned telephone company to partner with the Rural Electrification Administration, now the Rural Utilities Service (RUS). Fifty years after its founding, CRST relied upon a $37.8 million RUS Telecommunications Loan to upgrade its network to fiber. In December 2016, we completed our Fiber to the Premise (FTTP) Loan Project at a total cost of $27.5 million that deployed approximately 1,500 miles of fiber throughout the Reservation, which covers approximately 2.8 million acres in the Dewey and Ziebach counties of South Dakota.

Rural Challenges—and Much More

Deploying and sustaining broadband in rural America present significant challenges. Distance and density make the costs of building networks and delivering services far greater than the revenues one can expect in return from rural consumers. Indeed, smaller community-based companies like ours exist in the first place because, back in the "telephone days," larger providers could not make the business case to serve certain areas. We filled the gaps in unserved areas back then, and today, we deliver voice, broadband, and other advanced services across a cutting-edge network that, as I will discuss, is essential for economic productivity and community well-being in areas that are otherwise challenged. But, even with technological advancements beyond what anyone ever could have imagined back when telephone service was first deployed, it is still difficult to make the business case to deploy and then continue to operate a network in deeply rural areas. For these reasons, as described below, even the most community-committed operator like ours cannot deliver on the promise of broadband for rural areas and Tribal residents without a reliable partnership with key Federal government initiatives.

Moreover, we face unique financial, geological, social and cultural factors serving Indian Country. For example, according to the 2014 American Community Survey of the U.S. Census Bureau, nearly twice as many Native Americans live in households with incomes that are beneath the Federal poverty level. Such economic conditions unfortunately pave the way for other adverse conditions: lack of adequate income can prevent the acquisition of proper health insurance or health care; persistent poverty can feed mental health challenges or substance abuse; and, educational performance among the youth can suffer, making it more difficult to secure gainful employment in already-depressed economic regions.

While we do not view broadband as a miracle cure, it is essential to attracting, cultivating, and attracting businesses that will help rural communities generally and Tribal communities more specifically rise and thrive. Broadband enables users to connect to the world, increasing their access to economic opportunity, improved health care, and educational resources. Without broadband, as I explain more fully below, we cannot hope to make the connections that will lift and sustain rural communities that can otherwise be isolated and Tribal areas that too often lack in hope and opportunity.

Leveraging Broadband to Overcome Adversity and Create Opportunity

Broadband is rapidly and increasingly being viewed as an "equalizer" for its ability to conquer distance. Whereas telephone enabled only verbal communication, broadband enables applications that encompass voice, video and data, allowing a great range of human experience to be shared across great spaces. There are several key applications worth noting as they help to overcome adversity and generate opportunity in rural areas and on Tribal lands.

Telemedicine

Chronic disease causes about 75 percent of health care costs and contributes to about 70 percent of all deaths in the United States. These conditions are exacerbated in rural areas. Individuals living in rural areas often have increased numbers of medical conditions such as: diabetes and hypertension. Rural residents also tend to travel further for medical care than urban counterparts. These rural health challenges are compounded by physician shortages and lack of access to nearby health care facilities. Although 25 percent of the U.S. population resides in rural areas, only 10 percent of physicians are in rural America. And, rural areas have 70 percent fewer specialists. Additionally, poverty increases the risk of complications from chronic conditions by decreasing the likelihood that individuals will have health insurance or otherwise be able to absorb the costs of treatment and preventative care. Unfortunately, Tribal lands not only share these challenges, but often experience more acute manifestations of them.

On the Cheyenne River Reservation, unemployment is a challenge, and more than two-thirds of the population subsists on less than one-third of the average U.S. in-

come. And, yet, while such factors affect communal health, broadband offers a promising tool to combat such problems. Broadband-enabled telemedicine can help patients monitor chronic illnesses and maintain more consistent contact with their physician, leading to better patient compliance rates. Broadband-enabled applications can also be helpful, if not critical, in enabling distant physicians to consult on and assist with acute medical emergencies. Broadband-supported teletherapy can be deployed for physical, occupational, and speech therapy. And, for regions afflicted by high rates of substance abuse, teletherapy can be a tool in the prevention, treatment and rehabilitation from alcohol and drug abuse. Broadband-enabled telehealth/ telemedicine thus holds the potential to improve the quality, cost and availability of health care throughout rural America. From avoiding transportation costs and lost wages to saving hospital costs and increasing revenues local labs and pharmacies, broadband-enabled telehealth can and does make a significant difference in rural areas, and on Tribal lands in particular.

A 2017 survey of NTCA rural broadband service provider members indicated that 75.9 percent of hospitals and medical clinics in NTCA service areas are connected by FTTP, with an average maximum available speed in the service area of 734 Mbps. In relation to other NTCA members, CRST currently offers speeds up to 250Mbps and we are capable of providing higher speeds. The existence of such connectivity is essential to realize the benefits described above, but the job is not done—many more healthcare facilities remain to be served at such levels, and even once built, the job of operating and maintaining such networks and delivering high-quality broadband at affordable rates in sparsely populated high-cost areas is itself an ongoing challenge.

Education

The future of rural communities depends upon educating young people who can graduate with the skills necessary to fill the next generation of jobs. Data projections through 2024, however, indicate a decline in the number of Native Americans who will be enrolled in public K-12 schools, graduate from high-school and attend post-secondary institutions. Similarly, as compared to libraries elsewhere throughout the United States, fewer Tribal libraries offer students the resources necessary to obtain coursework, resources for homework, or other materials. This is troubling given that quality educational systems help both to keep people in a community and to attract new residents who see the opportunities presented. Robust broadband— both in the schools and at home—can play in essential role in making quality education a reality in many rural communities, and perhaps in keeping within the educational system many students who might otherwise drop out.

Across the United States, K–12 schools and libraries are connecting increasingly to the Internet. Connectivity is exceedingly important in rural areas where that connection may be the student's sole access to cultural, historic or artistic resources. This is especially important where, for example, an insufficient number of students might not justify the offering of advanced or specialized coursework. In those instances, the aggregation of distantly placed students and their connection through broadband to an instructor can open theretofore unavailable educational opportunities. Here, too, rural achievements are high: a 2017 NTCA survey found that 63.9 percent of public libraries and 82.4 percent of K–12 schools in NTCA rural broadband provider service areas are connected by FTTP, with average maximum available speeds of more than 450 Mbps for libraries and more than a gigabit for K–12 schools. Like with telemedicine, our current speeds are up to 250 Mbps but we are capable of offering higher speeds.

But here, too, the job is not done. Once again, delivering broadband involves more than the one-time act of deploying connectivity; it takes significant ongoing effort to operate and maintain these networks, and to deliver affordable, high-quality services that respond to consumer demands. Moreover, even with a much-needed focus on connecting schools and libraries, reliable and robust broadband access at home is equally important to academic achievement. By definition, the "homework gap" indicates that learning does not begin and end at the schoolhouse door. Students should not be required to travel to libraries or community centers—or worse still, to try to "grab" WiFi in business parking lots—to complete homework. A national broadband plan that aims primarily to connect anchor institutions in rural America and does not include reliable connections at home as well risks failing rural America and leaving communities behind. This is one of the primary reasons why CRST has made such extensive efforts to deploy robust networks *throughout* its serving area, rather than delivering the highest-speed connections *only* to businesses and anchor institutions.

Economic Opportunities

Broadband is growth-enabling. A USDA report concluded that "wage and salary jobs, as well as the number of proprietors, grew faster in counties with early broadband Internet access." Other studies have found that broadband adoption can be linked to increases in several factors of economic prosperity, including higher growth in median household income levels, number of firms and total employment. These quantifiable benefits are joined by qualitative societal benefits, including more capable public safety communications resources for security and emergency response capabilities; civic engagement; and enhanced communications capabilities that can benefit regional coordination and development, exist beyond the quantifiable benefits. A recent survey found, for example, that rural America is responsible for 15.5 percent of all consumer internet-driven transactions—a value of $10.8 billion each year. Another recent study found that rural communications providers contributed $24.1 billion in economic activity to the U.S. economy in 2015, through their own operations and the follow-on impact of their operations. C.R.S.T. contributes approximately $2.5 million to the local reservation economy. Such figures help highlight the importance of broadband as a driver of economic opportunity.

How Do We Best Promote and Sustain Rural Broadband?

The benefits of rural broadband described above can be achieved only if there are providers willing to take on the work of reaching these rural areas, as well as sound and rational policies that help support the deployment of broadband infrastructure in rural America. For example, sufficient and predictable high-cost universal service fund (USF) support has been critical in enabling rural providers to deploy (and maintain) better broadband further into rural areas. Recent caps, cuts and constraints that have been implemented in the high-cost program, however, have had a damaging impact on rural providers' ability to meet important goals; CRST has seen decreases close to $1 million in high-cost support, and CRST has cautiously rolled out stand-alone broadband just recently due to pricing this service to be cost effective for CRST and reasonable to the customers. Time will tell. The decrease also impacts our ability to maintain the FTTP network and our certainty to pay back the debt for the FTTP deployment over the term of the loan. As a complement to Federal universal service support that helps to make the business case for investment and allows recovery of costs while still charging rural customers reasonable rates, RUS loan and grant programs are important too in providing access to upfront capital and allowing companies to move forward with critical rural infrastructure projects. The RUS programs were vital to CRST's network expansion, and the continuing availability and viability of these programs will be important to finance broadband deployment in many of the most rural parts of our country.

Conclusion

There seems to be no doubt that the challenges of deploying broadband in rural America are known and acknowledged by policy makers. But, sustaining broadband in such areas is equally important—and often overlooked. Indeed, particularly in Tribal areas where unique challenges can exist in terms of healthcare, education, and economic opportunity, the ongoing availability of robust and affordable broadband will be essential in overcoming such hurdles. We need to build broadband networks and then also enable the most effective use of them. For these reasons, those that share our view of the importance of rural broadband to American prosperity should look to leverage and improve the workings of programs like the FCC's USF and RUS financing—these coordinated programs have worked better than any others to make the business case for rural broadband investment, to sustain those broadband networks once built, and to enable effective use of those networks by Tribal residents and millions more rural Americans. It is by using and enhancing these proven USF and RUS programs that we can build upon and sustain the progress made to date, overcoming challenges and creating opportunities through better broadband in rural America.

Thank you very much for this opportunity to address the Committee.

The CHAIRMAN. Thank you, Ms. Thompson.
Mr. Spellmeyer.

STATEMENT OF GRANT B. SPELLMEYER, VICE PRESIDENT, FEDERAL AFFAIRS AND PUBLIC POLICY, UNITED STATES CELLULAR CORPORATION

Mr. SPELLMEYER. Chairman Thune, members of the Committee, thank you for the opportunity to testify here today regarding the challenges faced by wireless carriers serving rural America.

Although there are many items I could discuss this morning, I'm going to focus on the issue of broadband mapping.

This Committee has discussed the mapping topic on a number of occasions over recent months and I have had the opportunity to visit personally with many of you on the Committee to discuss the coverage problems you experience as you travel around your states.

A number of you have asked us to gather empirical data that accurately documents coverage. U.S. Cellular has driven many parts of your states as part of the Mobility Fund II Challenge Process and has gathered important data to help inform decisionmaking about the quality of the maps.

What I can tell you today is that your concerns are valid. U.S. Cellular has gathered way more data than I can touch upon here today in 5 minutes but I will share with you some of our essential findings.

First, let me briefly talk about that Mobility Fund Challenge Process. The original concept was that an accurate FCC propagation model, supplemented by an efficient challenge process to fine-tune the results, would yield accurate maps upon which to make Universal Service Funding decisions.

However, the maps have proven to be so inaccurate that the Challenge Process is ill-equipped to fix all but a tiny portion of the country.

The Challenge Process testing procedures are complex and will likely undercut the ability of local governments to conduct the tests for themselves. I can assure you that the process in place will prove problematic even for the most vigilant communities.

To begin with, you need to understand that the FCC created a one square kilometer grid, not miles but kilometers, and overlaid it over the United States. Imagine the country broken up into 200-acre farms.

In order to file a valid challenge, we are required to take multiple data readings at specified intervals inside each of those farms and we have to prove that 75 percent of each has coverage below the minimum requirements.

Almost half of those areas have insufficient roads to meet the 75-percent requirement and therefore are effectively immune to challenge, no matter how lacking the coverage may be.

Let me briefly talk about our findings to date. U.S. Cellular has spent nearly $2 million and taken over 16 million data readings in the field. That's 10 terabytes of information that we have gathered and we need to process and upload to the FCC. That's more data than the Hubble Space Telescope sends back to Earth in a year.

Unfortunately, that has allowed us to only manage to drive 3 percent of our ETC footprint. We will never recover that money, which could have otherwise been used to invest in rural networks.

Let's look at a couple of sample maps and talk about the results. If you look at Pages 14 and 15 of my testimony, you'll see a series

of maps that demonstrate what we found in Kansas, Maine, and West Virginia.

Our work has generated in excess of 400 additional maps that we intend to submit to the FCC. The purple areas you see on the map represent areas where we have found that the FCC's map is in fact invalid. Green represents areas where the coverage on the ground was accurately reflected by the FCC maps.

The colors you see follow the roads. We can't effectively reach the areas off the roads and this FCC Challenge Process won't fix those areas. Anything you see in yellow wasn't tested by us and is by default considered ineligible because the FCC says they're covered.

So a few key statistics. The FCC's maps are so flawed that we expect to successfully challenge 34 percent of the squares that we have driven across the country that have a sufficient amount of roads to meet the 75-percent requirement.

Even more startling, 55 percent of the time when we take a reading on the network of a carrier claiming coverage, we found no signal at all. These are huge error rates. We must face these facts. These maps simply can't be allowed to drive the allocation of $4.5 billion of government funding for rural America.

I applaud each of you here today for your continued leadership and engagement on this matter. The time is now to fix the maps. We believe a number of options exist to improve the mapping coverage, the mapping effort, including urging the FCC to further refine its model and then to move expeditiously forward to release better maps.

Thank you.

[The prepared statement of Mr. Spellmeyer follows:]

PREPARED STATEMENT OF GRANT B. SPELLMEYER, VICE PRESIDENT, FEDERAL AFFAIRS AND PUBLIC POLICY, UNITED STATES CELLULAR CORPORATION

Chairman Thune, Ranking Member Nelson, and members of the Committee, my name is Grant B. Spellmeyer, and I am the Vice President, Federal Affairs and Public Policy at United States Cellular Corporation. Thank you for the opportunity to discuss opportunities and challenges facing mobile broadband providers in rural America.

I. Introduction.

U.S. Cellular provides mobile wireless telephone and broadband services in nearly 200 markets across 23 states located in regional clusters across the country. We serve overwhelmingly rural areas in many states represented on this committee, including Missouri, Nebraska, Kansas, Washington, West Virginia, New Hampshire, Oklahoma, Wisconsin, and Illinois.

Much of our business involves finding ways to build cell towers in small towns and along rural roads, as well as in areas where population density, income levels, and commercial development are often below those in our Nation's urban areas. Consequently, we are constantly thinking about ways to address the economics of providing vital services to areas that present financial challenges to build, maintain, and upgrade.

Our nation's business success in the 20th Century was built upon our backbone infrastructure—our rail network, our interstate highway system, our electrical grid, and our fixed line telephone system—all of which blossomed with the active engagement of the public and private sectors. If the United States is to lead in the 21st Century, we must make a similar commitment to public and private sector investments to deploy essential broadband infrastructure, providing coverage throughout the country that delivers high-quality 4G LTE and 5G fixed and mobile broadband. Ubiquitous, high-quality mobile broadband is essential to your communities and the reasons are numerous and expanding daily. I will highlight just four of the many benefits that come from mobile broadband connectivity:

- Public Safety. The ability to use 911/E–911/Text-to-911 and eventually NG911, depends 100 percent on high quality coverage, to fully enable location-based services.[1] When disaster strikes, first responders depend on mobile wireless and broadband networks, which are the first to return to service.

- Health Care. Mobile devices and applications capable of diagnosing, monitoring and treating various conditions are burgeoning and revolutionizing health care.[2] These advances improve patient outcomes, and increase efficient delivery of services, saving millions of dollars. It is now possible for a diabetic patient to continuously monitor, store, and transmit glucose levels to health care providers through a mobile device.[3] Mobile video conferencing is increasingly important to emergency medical services and in delivering health care to remote areas where facilities are not easily accessible.[4] These applications are but a small fraction of the incredible health care tools enabled by mobile broadband.

- The Internet of Things. Soon, almost any object will be capable of connecting to the Internet. Statista projects 30.73 billion IoT devices will be deployed worldwide by 2020, and 75.44 billion will be deployed by 2025.[5] According to General Electric, the Internet of Things will add as much as $15 trillion (not a typo) to worldwide GDP growth by 2030.[6]

- Precision Agriculture. As agriculture technology has developed and expanded, it has made "mobile broadband . . . an essential service for agricultural operations that form the economic heart of many American rural communities." Deere has explained that, "[a]s these [precision agriculture] machine populations continue to grow and our solutions continue to rely on high speed machine connections, our reliance on rural broadband coverage will only increase. . . ."[7]

None of the benefits described above will be available to rural Americans unless high-quality mobile broadband coverage is available everywhere people live, work, and travel. It is critical that rural America not be left with 20th Century infrastructure in an age where access to technology and innovation are essential to economic success. Below, I discuss opportunities and challenges to improving broadband in rural America.

II. The Economics of Broadband Deployment are Challenging for Many Rural Communities and for the Carriers That Seek to Serve Them, Without Some Level of *Government Support.*

Building broadband infrastructure in rural areas where it is uneconomic to do so is a brute force problem—it can only be solved with sufficient funding to stand up and maintain networks. In many rural areas we serve, if there were a marketplace solution, it would have already appeared sometime in the nearly thirty years since the FCC awarded the first cellular licenses. The public and private sectors must

[1] The FCC estimates that 70 percent of 911 calls are placed from wireless phones, and that percentage is growing. *See, https://transition.fcc.gov/cgb/consumerfacts/wireless911srvc.pdf.*

[2] A list of hundreds of approved mobile medical applications (last updated on July 25, 2018) can be found at: *https://www.fda.gov/MedicalDevices/DigitalHealth/MobileMedicalApplications/ucm368784.htm.*

[3] *http://www.dexcom.com/g5-mobile-cgm* (describing a mobile continuous glucose monitoring system that provides real-time glucose readings for patients with type 1 or type 2 diabetes every five minutes). Someday soon, patients may wear a contact lens that constantly measures glucose level through tears, transmitting the data to attending physicians. *See, https://verily.com/projects/sensors/smart-lens-program/* (describing work on smart ocular devices, including a glucose-sensing lens for continuous monitoring of glucose levels).

[4] The FCC's Connect2HealthFCC initiative is a powerful example of how broadband data can be used to improve health care. *See, https://www.fcc.gov/about-fcc/fcc-initiatives/connect2healthfcc; https://www.fcc.gov/reports-research/maps/connect2health/#ll=39.909736,-95.039063&z=4&t=insights&inb=in_bb_access&inh=in_diabetes_rate&dmf=none&inc=none&slb=90,100&slh=10,22 (Mapping Broadband Health in America 2017);* and *https://www.fcc.gov/document/commissioner-clyburn-continuation-connect2health-task-force* (FCC Commissioner Clyburn statement that the Connect2Health Task Force "will continue to ensure that the Commission is equipped with the data and information it needs to understand the rapidly evolving landscape for broadband-enabled healthcare"). In addition, the FCC recently initiated an inquiry into how it can help advance and support the movement in telehealth towards connected care everywhere and improve access to the life-saving broadband-enabled telehealth services it makes possible. *Promoting Telehealth for Low-Income Consumers,* WC Docket No. 18–213, Notice of Inquiry, FCC 18–112 (Aug. 3, 2018).

[5] *See, https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/*

[6] *See, https://www.visioncritical.com/internet-of-things-stats/.*

[7] *See,* Deere & Company Comments, FCC GN Docket No. 17–199 (filed Sept. 21, 2017), at 2–3.

work together to provide incentives and rewards for entrepreneurs to deliver services, while ensuring that any support program is efficient and effective.

The primary driver of public funding for mobile broadband is the FCC's Mobility Fund. In the upcoming Mobility Fund Phase II, the Commission has allocated $4.53 billion over ten years ($453 million per year) to support the deployment of 4G LTE service at a median download speed of 10 Mbps and upload speed of 1 Mbps ("10/ 1"). Mobility Fund II support will be awarded by reverse auction, with the lowest bidders receiving the exclusive right to a ten year stream of payments. At this stage, there is no plan to develop Mobility Fund Phase III that we are aware of.

U.S. Cellular views the current level of support for mobile broadband, as well as what's proposed for Mobility Fund Phase II, as clearly insufficient to address the needs that many of the Senators at this hearing know afflict their communities. Our sense is that the size of Mobility Fund II, $453 million annually, has been somewhat constrained by program budgets, rather than calibrating the program's size to address need. In its orders adopting the Mobility Fund (going back a number of years), the Commission has never adopted a methodology that would, (1) set a specific goal to deliver high-quality terrestrial mobile 4G LTE broadband service everywhere that people live, work and travel, (2) estimate the cost of meeting that goal, and (3) determine how many years it should take to achieve the goal.

In 2017, CostQuest Associates estimated that providing 4G LTE service to the areas that the FCC believed to be unserved at that time (using Form 477 data) would require approximately 37,500 new towers, at a cost of $12.5 billion.[8] In addition, annual operating expenses for these towers would cost approximately $21 billion over ten years, for a total of approximately $33.5 billion. From this estimate, the FCC could determine how much public and private capital should be devoted to the task. What we know sitting here today is that the size of the hole dwarfs the amount of dirt we apparently intend to use to fill it. Hoping that $453 million per year will solve the problem should not be our strategy. What we should do is accurately assess the size of the challenge and set target goals and then determine what is the appropriate approach to meeting those goals. The basis of that effort must come from solid, reliable, verifiable, and empiric data.

Only by going through such an analysis can the Commission hope to accomplish the task that Congress set before it in the 1996 Telecom Act, to ensure that universal service support is "sufficient to achieve the purposes"[9] set forth in Section 254, including providing consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas with access to telecommunications and information services that are reasonably comparable to those services provided in urban areas, at reasonably comparable rates.[10]

A budget of $453 million per year is simply not going to accomplish the goal set by Congress to deliver reasonably comparable services at reasonably comparable prices any time soon, if ever. If by 2029, Mobility Fund Phase II delivers mobile broadband to rural America at 10/1 speed, which is currently being surpassed in urban areas, U.S. Cellular believes rural America will be farther behind urban areas than it is today.

We must have a sense of urgency because as 5G services begin to roll out in 2019, the Commission will need to begin working to ensure that rural Americans have access to 5G broadband, as envisioned by Section 254(b)(3). CostQuest has estimated several 5G deployment scenarios for the US, with total capital investment ranging from $61 billion to achieve ubiquitous coverage to $250 billion to deploy a network capable of autonomous vehicle support and future demand.[11]

At last week's 5G summit at the White House, lawmakers and stakeholders came together to discuss how the United States can extend the Nation's lead in 4G LTE technology into the rapidly approaching 5G world. Among other things, releasing suitable 5G spectrum, deployment standards, public safety, and protecting the supply chain were all on the table. It is just the kind of event that is needed to focus industry and policymakers.

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[8] *See,* CostQuest Associates, *Cost Study for 4G Unserved Areas,* accessed at: *https://ecf sapi.fcc.gov/file/10217086509033/2017%200216%20CQ%20Cost%20Study%20for%20Unserved% 20Areas%20FINAL.pdf.*

[9] 47 U.S.C. Section 254(e).

[10] 47 U.S.C. Section 254(b)(3). *See also,* S.2418, co-sponsored by Senators Klobuchar, Capito, King, and Cortez Masto, which proposes to establish a national standard to determine whether commercial mobile services, commercial mobile data services, and broadband Internet access services available in rural areas are reasonably comparable to those services provided in urban areas, as required by Section 254(b)(3).

[11] *See,* Cost Quest Associates, *The 5G Mobile Ubiquity Price Tag Costs for Full U.S. Deployment Of 5G—With and Without Support for Autonomous Driving* (2017), at: *https://www.cost quest.com/uploads/pdf/5g-mobile-ubiquity-costs-summary.pdf.*

In addition to the vital topics covered at this meeting, my sense is that additional focus is required to advance universal service in a 5G world. For decades, our Federal universal service mechanism has been the biggest driver of telecommunications infrastructure deployment in rural areas. As wireless speeds and capacity continue to increase, reforming the contribution mechanism and ensuring competitive neutrality must be addressed in the coming years to ensure that rural citizens can access advanced telecommunications and information services that are reasonably comparable to those available in urban areas.

Moving America into a 5G world requires bold action. Most important, in order to accelerate mobile and fixed wireless broadband, which is the most cost-effective means of serving sparsely populated areas, the Commission must have the will to increase the size of the Federal universal service fund dedicated to these tasks.

III. The FCC's Current Coverage Maps Significantly Overstate 4G LTE Coverage.

To efficiently invest Federal universal service support in rural areas, the Commission must accurately target funds to unserved areas. Everyone understands that mapping where people have access to mobile broadband, and at what speeds, is a difficult challenge, because radio waves must be mapped to a specific location, either with radiofrequency propagation maps or actual field testing. However hard it is to do, we must have accurate maps so that policymakers have confidence that our limited funds are targeting communities that most need reliable service.

A. How the FCC Developed the Challenge Map

In early 2017, the Commission acknowledged that its FCC Form 477 data did not identify mobile broadband coverage with sufficient accuracy to launch the Mobility Fund II auction. The Form 477 submissions allowed each carrier to determine where it has coverage using its own standards. Under Chairman Pai's leadership, the Commission moved away from using Form 477 data, instead requiring carriers providing 4G LTE service to submit improved data in a "one-time" filing.[12] This one-time submission, which consisted of data files developed from radiofrequency propagation models, was used to create a new challenge map. The Commission intended to limit variations in model inputs so that each carrier submitted data that produced consistent coverage maps.

For example, the Commission required model inputs specifying a coverage area showing where service is available at a download speed of 5 Mbps at the cell edge, with 80 percent probability and a cell loading factor of 30 percent. In rough terms, the model should show an area to be covered where a person can initiate a data session at the edge of a cell site's coverage at 5 Mbps of speed, with 80 percent certainty, if the cell site is running at 30 percent capacity.

I was personally involved in developing a wireless industry consensus on this one-time data collection. Although the FCC accepted many of industry's recommendations, some final decisions on the model parameters and the subsequent challenge process procedures undermined the challenge map's accuracy and made it extraordinarily difficult for carriers and third parties to mount challenges. Industry, including CTIA and CCA, recommended 90 percent certainty that a 5 Mbps session could be initiated at the cell edge, and that the network should be loaded at the 50 percent level, *consistent with how mobile broadband networks are designed.* Other technical suggestions from some parties, such as those relating to thermal noise density and standardizing power assumptions for handsets, were not adopted.

Importantly, parties submitting data using a radiofrequency model, with inputs set at the Commission's chosen parameters, were not required to do any field testing to validate their model, nor did the Commission do any independent validation, not even a statistically significant sampling, before releasing the challenge map. It was left to challengers to field test after the fact, to determine the accuracy of maps produced by the parameters. And here is the key issue: If the map output is generally accurate, then the areas needing to be tested and challenged are relatively small. If the map output significantly overstates coverage, then challengers must test a much larger area.

B. The Process Obstacles for Challengers

On February 27, 2018, the Commission released a 53-page public notice explaining how the challenge map would be generated, the procedures for filing a challenge, and how the FCC would process challenges.[13] The process has proven to be ex-

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[12] *See, Connect America Fund,* Order on Reconsideration and Second Report and Order, FCC 17–102 (Aug 4, 2017).
[13] *See, Procedures for the Mobility Fund Phase II Challenge Process,* Public Notice, DA 18–186 (Feb. 27, 2018).

tremely complicated for challengers, so much so that even U.S. Cellular will be unable to drive test the vast majority of areas within its rural service footprint.

Let me explain the process and consider how difficult it is to comply with such standards. Under the current procedures, mapping data from the Commission must be downloaded via a government portal to analyze which areas warrant a challenge. A challenger must demonstrate the absence of coverage in each one square kilometer block specified by the FCC. Inside each block, tests must be conducted no further than 800 meters apart from one another, and done between 6:00 AM and 12:00 AM local time. Vehicle based drive testing must be done on accessible roads, which in rural areas can be far apart or otherwise inaccessible due to private or public restrictions, seasonal closures, or other factors. The tests must include all unsubsidized wireless companies claiming coverage inside that block. Handsets enumerated by each operator must be purchased from each operator claiming coverage in the area, and rate plans must be subscribed to and constantly monitored to ensure service is not throttled or subject to data caps. A challenger must either purchase, mount and calibrate test equipment, or hire a testing company to perform the tests.

Drive testing the area requires understanding where the vehicle is in relation to the one square kilometer blocks eligible to be challenged, and conducting testing at the required locations inside the blocks, that is, at the minimum distance separation of 800 meters. This requires the purchase of separate GPS tracking equipment. To accomplish this project also requires access to drivable roads sufficient to demonstrate the lack of coverage in 75 percent of the grid being challenged.

In U.S. Cellular's experience, nearly half of the blocks in our footprint have proven to be untestable because there are insufficient roads to be driven to cover the 75 percent benchmark, as one might expect when testing in rural communities. Those blocks are off the table and essentially bullet proof from a challenge, notwithstanding that in many remote areas, it is easy to make a common sense observation from the lack of coverage on the roads that do exist that there can be no service in the balance of the surrounding area either. Yet, the Commission's testing procedures do not allow such observations to be submitted and off-road testing would require the challenger to mount equipment on horses, drones or all-terrain vehicles. I am not kidding about those options, as U.S. Cellular has actually used horse-drawn sleds to access remote sites for building some of our cell towers and infrastructure. Clearly, requiring such methods to reach areas in question is practically impossible given the time and money required to do so.

We've attached as Exhibit A several photographs taken by U.S. Cellular's drive testers while in the field depicting inaccessible roads that prevent challenges from being completed consistent with the FCC's rules. In addition, we've attached as Exhibit B a summary of the Commission's drive testing regime, along with materials from the Universal Service Administrative Company website, to give the Committee a sense of how difficult it is to conduct tests consistent with the Commission's rules.

To date, U.S. Cellular has conducted drive testing in 19 states including Colorado, Kansas, Minnesota, Missouri, Nebraska, New Hampshire, Oklahoma, South Dakota, Washington, Wisconsin, West Virginia, and Illinois.[14] In doing so, we have spent nearly $2 million conducting testing in compliance with the FCC's challenge process rules and have only covered 3 percent of the challengeable areas in our ETC coverage footprint. Accordingly, despite the Commission having granted an additional 90 days within which to submit challenges, U.S. Cellular has no hope of addressing even ten percent of the areas that should be tested.

If one extrapolates U.S. Cellular's experience across the nation, a huge portion of rural areas that could be challenged are not going to be verified. Regrettably, these areas will be doomed to whatever level of service they have today; it will be the apex of their experience for the next 10 years. We will lock them in to the status quo during a period of rapid technological growth.

C. The Map Outputs Significantly Overstate Coverage

As a policy matter, if the current maps understate coverage, then it is likely that scarce universal service funds would be used to construct facilities in areas that already have service at the threshold level. This error, which should be avoided, is trivial when compared to the damage potentially done when an unserved area is deemed to be served by an overstated map. I feel as if I must repeat the reason overstating coverage maps is so troublesome for your states and your communities: Let's be perfectly clear, any area deemed to be served today by these maps will be blocked from even bidding for support for at least ten years—the life of the funding from Mobility Fund II. In areas where our rural citizens need service, getting this

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[14] A short video demonstrating the difficulties U.S. Cellular has encountered in drive testing in and around Lewisburg, West Virginia can be found here: *https://youtube/L2rM7i3ivas.*

challenge map right is a huge issue and as crafted today will preclude the communities hoping for help from having the right to bid for support.

Let me also explain the extensive work we have undertaken in the past few months. So far, we have taken over 16 million data readings (10 terabytes of data) during drive testing of areas the FCC maps deem covered. U.S. Cellular observes that on average fully 34 percent of the locations tested showed no coverage or coverage at speeds below the FCC's 5 Mb standard. If even a quarter of the challenge area is overstated nationwide, there is a huge disparity between what the maps show to be served to the standard and what areas are actually served. To give the Committee a sense of the disparities we've encountered in testing, here are three examples of drive test results we've undertaken:
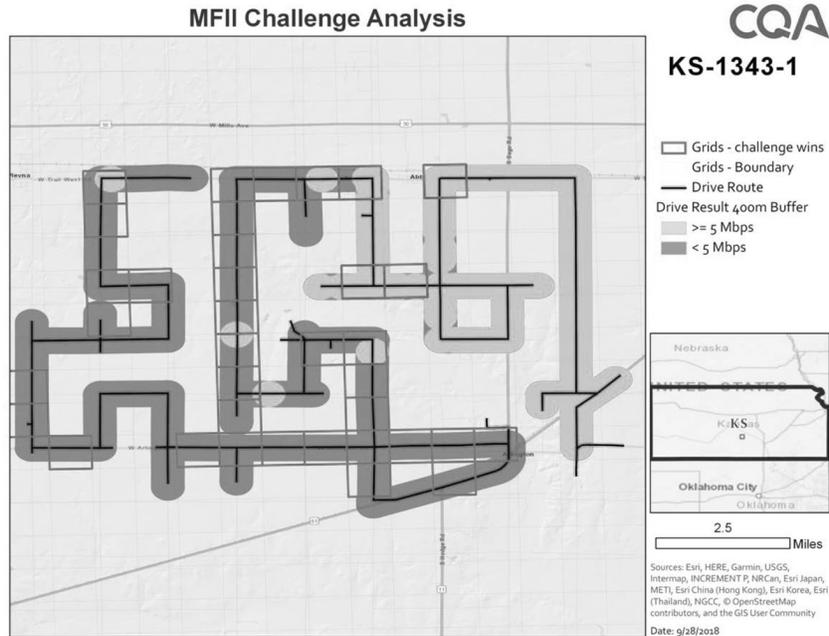
MFII Challenge Analysis
ME-400-1
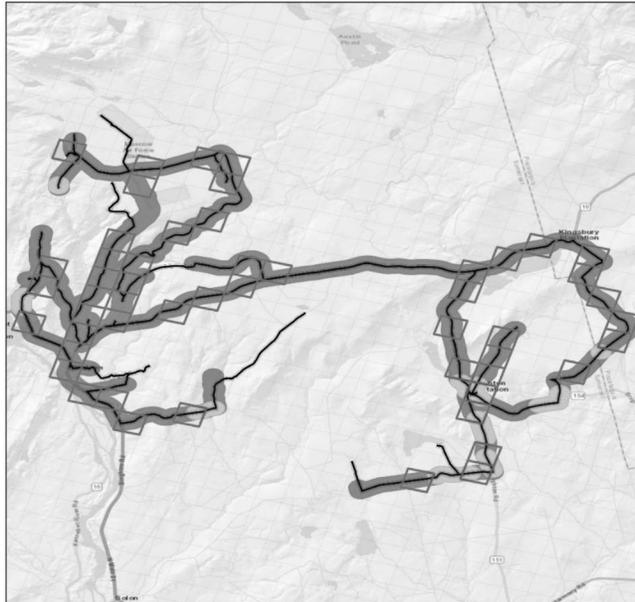
MFII Challenge Analysis
WV-994-1
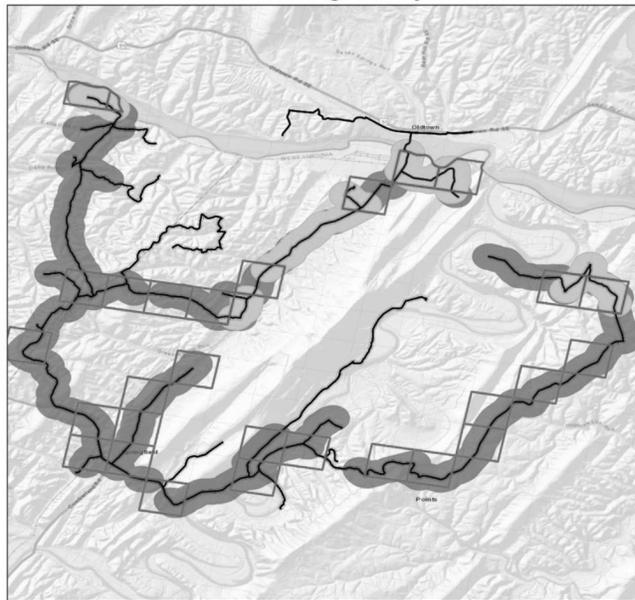
Just last month, in response to a request from members of the Senate's Committee on Indian Affairs, the U.S. Government Accountability Office (GAO) released a report concluding, among other things, that "limitations in the FCC's existing process for collecting and reporting broadband data have led the FCC to overstate

broadband access on tribal lands." [15] GAO recommended that the Commission develop methods for collecting and reporting accurate and complete data on broadband access specific to tribal lands. The specific findings, conclusions, and recommendations set forth in the GAO Report could be similarly applied to the challenge process maps.

Anecdotally, I know from conversations with many of the Senators on this Committee who drive throughout their states, that you know there are many more unserved areas than the maps show. At the recent oversight hearing, a bipartisan group of senators affirmed that the maps are not accurate and urged the FCC to update the maps and reset the program so that funds are accurately targeted to our Nation's rural areas. [16]

D. The Challenge Process Has Not Worked As Intended

Chairman Pai inherited FCC Form 477 data that was woefully inadequate and he called for better data. For example, under Form 477 an entire census block is considered to be covered if a carrier provides service to even one customer within the block, or if it can provision service to the block without extraordinary effort, even if such service has never been built. [17] Recognizing these and other shortcomings, Chairman Pai, the rest of the Commission, as well as industry stakeholders, have diligently worked to increase accuracy of mobile broadband mapping for Mobility Fund Phase II. Unfortunately, the process provided no way to test the challenge map output before commencing the challenge process. As a result, a significantly overstated coverage map has left challengers an extraordinary task: they must use a very difficult, cumbersome, and expensive process to test an enormous geographic area. When the time period for filing challenges expires on November 26, 2018, there will not be a complete and clear picture of the scope of wireless broadband coverage in rural America.

In sum, either the challenge process must be revised to allow more common sense testing methodologies or the challenge map must be revised to more accurately depict current 4G LTE coverage, so that the areas that need to be challenged can be significantly reduced. Once the FCC does fix the maps, there remain a number of additional issues that must be addressed for Mobility Fund II including how support will be allocated between flat states and mountainous states where funds are distributed in a reverse auction that clearly favors bidders aiming to serve open and flat terrain. Other issues include a number of auction procedure related items such as reserve prices for the auction.

Some people I've talked to have expressed concern that if we fix these maps the Mobility Fund Phase II auction will be delayed. While I agree that we need to move quickly to invest in infrastructure that is the foundation of a 5G future, any delay needed to get the map right will substantially accelerate the time within which support gets to the right places. If we get this wrong now, in some or even many areas where support is deployed incorrectly, it will delay coverage and upgraded technology in areas that need it, by as much as a decade. I think NTIA director David Redl got it right at last week's White House summit, in committing to develop improved mapping data from many available sources, a resource that the FCC could use to more accurately target Mobility Fund II support.

IV. U.S. Cellular Supports Additional Steps to Accelerate Broadband Deployment

A. The AIRWAVES Act

U.S. Cellular fully supports the efforts of Senators Gardner and Hassan regarding S.1682, the "Advancing Innovation and Reinvigorating Widespread Access to Viable Electromagnetic Spectrum Act." U.S. Cellular has long been a proponent of an "all of the above" strategy for broadband deployment, with fiber, mobile wireless, fixed wireless, licensed spectrum, unlicensed spectrum, and satellite all having an important role in knitting together broadband networks that meet the needs of every American.

Among other things, the AIRWAVES Act requires the FCC to release a steady stream of mid-band and high-band spectrum. By giving the FCC specific deadlines for completing auctions, it allows the FCC to put spectrum to use promptly, remov-

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[15] See *Broadband Internet, FCC's Data Overstate Access on Tribal Lands,* GAO–18–630 (Sept. 2018) at: *https://www.gao.gov/products/GAO–18–630.*

[16] See, *Oversight of the Federal Communications Commission* (Aug. 16, 2018) at: *https://www.commerce.senate.gov/public/index.cfm/hearings?ID=BD64E539-0863-41B5-AA8A-2B40D 3FEF89C.*

[17] *See,* FCC Form 477, Local Telephone Competition and Broadband Reporting, Instructions, OMB Control No. 3060-0816 (Dec. 5, 2016) at: *https://transition.fcc.gov/form477/477inst.pdf.*

ing external pressure on the Commission to schedule auctions to maximize revenue while providing potential bidders with increased certainty to plan for future auctions. This is the right policy choice because the economic and long term societal benefits of putting spectrum to use far exceed whatever short-term auction revenues might yield.

U.S. Cellular is also pleased to see that ten percent of AIRWAVES Act auction proceeds will be set aside for deployment of rural infrastructure. This reflects a Congressional policy priority—to develop a steady stream of auction proceeds that can target places most in need of infrastructure development. Congress has set aside proceeds in the past for spectrum clearing and other salutary purposes; this is a smart policy choice that will have lasting benefits. U.S. Cellular notes that Auction 101 for spectrum in the 28 GHz band commences in November 2018, with Auction 102 for spectrum in the 24 GHz band to follow immediately thereafter. Accordingly, immediate passage of the AIRWAVES Act is needed to capture ten percent of those auction revenues.

B. The STREAMLINE Small Cell Deployment Act

Senators Thune and Schatz have introduced S.3157, the Streamlining The Rapid Evolution And Modernization of Leading-edge Infrastructure Necessary to Enhance Small Cell Deployment Act, which would modernize Federal law governing small cell deployment and adopt shot clocks to move application proceedings along, while maintaining local authority over placement, construction, and modification of telecom facilities. U.S. Cellular supports this effort to ensure that the Nation leads in critical small cell 5G deployment.

C. Allowing E-Rate Support to be Used for Wi-Fi Access on School Buses

Senators Udall and Gardner have introduced S.2958, a bill to make the provision of Wi-Fi access on school buses eligible for E-rate support. In many rural and Tribal areas, children travel via bus to and from school, sometimes for several hours. U.S. Cellular supports allowing E-rate funding to be used to furnish Wi-Fi connectivity on school buses, to permit that time to be used for homework projects and related school activities.

D. Streamlining Broadband Infrastructure Permitting

Senators Wicker and Cortez Masto have introduced S.1988, the Streamlining Permitting to Enable Efficient Deployment of Broadband Infrastructure Act of 2017 (the "SPEED Act"), a bill to streamline permitting on established public rights-of-way. Among other things, the bill would exempt certain colocations, small cell deployments, and deployments in existing rights-of-way from review under the National Environmental Policy Act of 1969 ("NEPA"). The bill would also require a GAO report on delays in siting telecommunications equipment on Federal lands.

Also addressing deployment concerns on Federal lands, we thank Senators Heller and Manchin for introducing S. 1363, the Rural Broadband Deployment Streamlining Act. Importantly, this bill would create a timeline for considering applications to locate facilities on land administered by the Department of the Interior and the Forest Service and requires additional review of the accuracy of coverage data for the National Broadband Map.

U.S. Cellular supports prompt passage of both of these bills, because NEPA reviews should not delay projects, for example, in situations where equipment is being collocated on structures that have already passed NEPA review. In addition, U.S. Cellular has, and is aware of others, who have encountered significant delays in acquiring permits needed to construct wireless telecommunications facilities on Federal lands, especially those operated by the Bureau of Land Management and the U.S. Forest Service. While appropriate environmental reviews are necessary to preserve and protect our vital lands and our people, there must be a sense of urgency to complete reviews in a timely fashion, and not require redundant efforts on facilities that have already been reviewed, sometimes on multiple occasions.

E. Accelerating 5G in Rural America

There has been a great deal of discussion in this Committee regarding the promise of 5G in rural America. We agree that the promise is great. In particular, I want to flag the importance of clearing sufficient mid-band spectrum, especially 3.7–4.2 GHz, to ensure that at least four providers in every market have an opportunity to each to deploy robust 5G services. Mid-band is particularly important to bringing service to rural areas given its superior propagation characteristics compared to the high band spectrum that FCC will also auction, coupled with more bandwidth than is available at lower frequencies.

In addition, U.S. Cellular urges Congress and the FCC to conduct the mid-band auctions via a traditional FCC-sponsored public auction. Some have called for the

use of a private sale mechanism. We believe the use of a private sale mechanism will severely disadvantage non-national bidders and adversely impact rural service.

Closing Remarks

Thank you for your attention to the needs of rural America. It is critical that these communities are not left behind in the 21st Century economy. We all benefit when everyone is connected and we must find ways to use our precious public funding in the most efficient ways possible. That is our goal, and I know it's yours.

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EXHIBIT A
DRIVE TEST PHOTOGRAPHS

EXHIBIT B

Overview of Requirements for Challenging Areas
Deemed Presumptively Ineligible for Mobility Fund Phase II Support

Challengers in the Federal Communications Commission's ("FCC") Mobility Fund Phase II proceeding have a challenge window ending November 26, 2018 to submit a challenge via on online portal maintained by the Universal Service Administrative Company ("USAC").[1] Any mobile service provider, government entity, or other interested party seeking to submit a challenge is subject to the procedures and requirements adopted by the FCC. To provide a detailed overview of the challenge process, this exhibit includes copies of USAC's challenge portal user guide, its data specifications document, and its template for managing numerical specifications.

In support of its challenge, a mobile service provider or other party must submit detailed proof of a lack of unsubsidized, qualified 4G LTE coverage in the geographic area involved. This proof must consist of actual outdoor speed test data showing measured download throughput, along with other service measurements (set forth below). The FCC has imposed detailed requirements and procedures relating to these required speed tests set forth in its 53 page public notice.[2] To be clear, a standard drive test pursuant to industry standard procedures, is not acceptable.

The USAC portal system uses a uniform grid system to validate and process data submitted during the challenge process. A challenger must submit speed test data in a standard format on a state-by-state basis. The data must be produced from hardware- or software-based drive tests or application-based tests that overlap the challenged area. Each separate test must substantially cover a 1 km by 1 km grid cell, or that portion of the cell that is designated as served by unsubsidized 4G LTE.[3]

The speed tests, which are required to be conducted between the hours of 6:00 a.m. and 12:00 a.m. (midnight) local time, must use at least one of the three handsets identified by each incumbent provider whose coverage is the subject of the specific challenge. The challenger must purchase one or more service plans for the handset(s) it uses to test an incumbent provider's coverage in the challenged area. Challengers must monitor data usage to

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[1] *See USAC Challenge Process Web Page,* at: https://www.usac.org/hc/MFII-challenge-process.aspx.

[2] *See Procedures for the Mobility Fund Phase II Challenge Process*, WT Docket No. 10-208, *et al.*, Public Notice, 33 FCC Rcd 1985 (2018).

[3] The USAC portal system treats the challengeable portion of a 1 km by 1 km grid cell as constituting the challenged area.

EXHIBIT B – Page 1

ensure that they do not go over the incumbent provider's data plan limits, purchase plans that have unlimited and unthrottled data (if such plans are offered).[4]

Speed test measurements submitted by challenging parties must produce sufficient coverage density to reflect actual consumers' experience throughout the entire challenged area. Therefore, the FCC requires that a challenger must take measurements that (1) are no farther than 800 meters apart[5] from one another in each challenged area; and (2) cover at least 75 percent of the challenged area. The FCC explains that, if a challenger submits speed test measurements that are farther apart than this maximum distance parameter in a challenged area, the challenger's evidence may be insufficient to cover at least 75 percent of the challengeable area within a grid cell, and its challenge would presumptively fail. The FCC also specifically rejected proposals to allow parties to challenge an area without conducting speed tests throughout the area if portions of the area are non-drivable or otherwise difficult to access.

Conducting speed tests in areas that are non-drivable is problematic. U.S. Cellular has indicated that "[w]hile the challenge process may not technically be limited to drive tests, it is completely impractical to conduct any other means of challenge (e.g., off-road excursions) on any sort of scale."[6] U.S. Cellular explains that, "[i]f a tester needed to stop a test vehicle and hike to an appropriate location (assuming a property owner has granted permission, or the terrain is otherwise accessible), that one test will potentially add many additional hours to the overall testing process, depending upon the individual circumstances."[7]

Although the FCC's Wireless Telecommunications and Wireline Competition Bureaus have sought to address this problem by increasing the maximum distance between speed test measurements from 500 meters to 800 meters (approximately one-half of one mile) and the associated buffer radius to 400 meters (approximately one-quarter of one mile),[8] Smith Bagley has explained that "no one could reasonably conclude that it would be feasible for small rural carriers to use means other than road testing to measure vast rural areas in the high desert[,]"

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[4] Rural Wireless Association ("RWA") Comments, WT Docket No. 10-208, *et al.* (Nov. 8, 2017), at 7.

[5] The FCC initially adopted a distance of 500 meters, but the distance subsequently was increased to 800 meters.

[6] U.S. Cellular Reply, WT Docket No. 10-90, *et al.* (May 7, 2018), at 3.

[7] *Id.* RWA has explained that, in these non-drivable areas, "small rural carriers will be forced to mount challenges by testing on foot, or via drones, horseback, four-wheeler, or crop duster. The difficulty of doing so poses a significant deterrent to conducting such [speed test] measurements." Ex Parte Letter from Caressa D. Bennet, General Counsel, RWA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-208, *et al.* (Mar. 21, 2018), at 2. RWA indicates that, "[g]iven that many of the areas of concern are on private property, permission from the landowner(s) would also be required to conduct speed tests, permission which may be difficult, at best, to obtain."

[8] *Universal Service Reform – Mobility Fund, et al.*, WT Docket No. 10-208, *et al.*, Order on Reconsideration, DA 18-427 (WTB, WCB Apr. 30, 2018), *app. for review pending*. The FCC determines whether a challenger's speed test points cover at least 75 percent of a challenged area by buffering each speed test point that reports a downstream speed less than 5 Mbps, calculating the buffered area, and then comparing the area of the buffered points to the challengeable area within a 1 km by 1 km grid cell. *Id.* at para. 4, n.13.

such as Tribal and near-reservation lands in Arizona, New Mexico, and Utah.[9] In U.S. Cellular's experience, many roads appearing to be public are in fact designated as private, significantly impacting the time needed to test, as well as the number of blocks that can be successfully accessed to complete testing.

Challengers must submit all speed test measurements collected during the relevant time frame, including the following data:

- signal strength and latency;
- the service provider's identity;
- the make and model of the device used for testing (which must be from that provider's list of pre-approved handsets);
- the international mobile equipment identity of the device;
- the method of the test (*i.e.*, hardware- or software-based drive test or non-drive test app-based test);
- if an app is used to conduct the measurement, the identity and version of the app;
- the identity and location of the server it uses for speed and latency testing.

Speed tests submitted by mobile service providers must be substantiated by the certification of a qualified engineer (who may be an employee of the challenger or a third-party vendor). The engineer must possess a sufficient degree of technical knowledge and experience to validate the accuracy of submitted speed test data, and must have actual knowledge of the accuracy of the submitted data.

A challenger must electronically certify its counted speed test measurements on a grid cell by grid cell basis (since the USAC system considers each challenged grid cell as a separate challenge), although a challenger may certify some or all of its challenged grid cells on an aggregated basis. To certify a challenged grid cell, an authorized representative of the challenger must, (1) provide the name and title of the certifying engineer who substantiated the speed test data; and (2) certify under penalty of perjury that (a) the qualified engineer has examined the information submitted; and (b) the qualified engineer has certified that all data and statements contained in the submission were generated in accordance with the parameters specified by the FCC and are true, accurate, and complete to the best of the engineer's knowledge, information, and belief.

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[9] Smith Bagley, Inc. ("Smith Bagley"), Opposition, WT Docket No. 10-208, *et al.* (July 13, 2018), at 5.

Mobility Fund Phase II (MF-II) Challenge Process:
USAC Challenge Portal User Guide

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FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

We have estimated that each response to this collection of information will take 204 hours for challengers and 71 hours for challenged parties. Our estimate includes the time to request access to the online challenge portal, read the instructions, gather and compile the required data, and certify and submit the data. If you have any comments on this estimate, or on how we can improve the collection and reduce the burden it causes you, please write the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-1251), Washington, DC 20554. We will also accept your comments via the Internet if you send them to pra@fcc.gov. Please DO NOT SEND ANY ACCESS REQUESTS OR SUBMIT ANY DATA REQUIRED BY THIS COLLECTION TO THIS ADDRESS. You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-1251.

THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, P.L. 104-13, OCTOBER 1, 1995, 44 U.S.C. 3507

General Information and System Requirements

Requirement	Description
Internet Browsers and Versions Supported	- Internet Explorer version 11 - Safari version 10 - Edge version 14 and 15 - Chrome version 51 through 59 - Firefox version 46 through 55
User Access	Authorized existing users will receive instructions for accessing the portal via e-mail. New user accounts require prior FCC approval. For more information, see Challenge Portal Access Request PN
Comma Separated Values File Editor	In order to upload CSV files to the system, a text editor software that can create and edit CSV files will be required. We recommend using Notepad++ and/or spreadsheet programs that support text formatting.
Concurrent Accounts	Each organization will be permitted to have up to three user accounts.
Session Timeout	Sessions will timeout after 30 minutes of inactivity. You will receive a warning modal 5 minutes prior to the expiration of your session.

Please note: Throughout this user guide, the term "challenger" refers to an entity granted access to the USAC Challenge Portal system and participating in the MF-II Challenge Process. A challenger may be a mobile service provider; state, local, or Tribal government; or another entity, such as a business, organization, or individual consumer, who has been allowed to participate via the grant of a waiver for good cause shown by the FCC. The terms "user" and "you" refer interchangeably to an individual identified on a challenger's request for access to the USAC Challenge Portal system that is authorized to submit challenges and certify speed test data on behalf of the challenger.

Portal Home Page

The initial landing point for the system is the **Download Data** page. The Portal Home Page initially has navigation links to two sections of the USAC Challenge Portal system: **Download Data** and **Challenge**. You may switch between the two sections by clicking on either of the links in the navigation header. A third section, **Respond**, will become available after the challenge window closes.

Downloading Data

The **Download Data** page allows you to download a zip archive containing confidential, provider-specific coverage maps, as well as baseline GIS and tabular data for each state (or state equivalent). Only those states (or state equivalents) that have challengeable areas and that are included in the Mobility Fund Phase II Challenge Process will appear in the dropdown menu.). **In order to view polygon shapefiles you will need software that can view shape files (.cpg, .dbf, .prj, .shp, .shx), such as ArcGIS or QGIS.**

Steps to Download Data

1. Click on the checkbox to acknowledge the confidential nature of the data.

2. Select the state (or state equivalent) for which you wish to download data from the dropdown menu.

3. Click on the **Download** button.

You can download files one state (or state equivalent) at a time. Once a file download is complete, you may select another state to download its data.

Mobility Fund II Challenge

Download Data   Challenge

Download Data

Download Coverage Maps, Clutter Data, and the Handset List below.

☑ I acknowledge that provider coverage, clutter, and approved handset data is confidential information provided by the FCC and agree to only use this confidential data for purposes of submitting a challenge within the Mobility Fund II Challenge Process Portal.

KS   [Download]

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Baseline Data Details

The files contained in each baseline data download archive are summarized in the table below:

File Description	File Types
Coverage Maps for each provider in the state These are based upon the Propagation Maps for each provider, merged to a single layer, excluding water-only areas and subsidized areas.	.cpg, .dbf, .prj, .shp, .shx
Eligible Areas This is the map of areas presumptively eligible for Mobility Fund Phase II support in the state.	.cpg, .dbf, .prj, .shp, .shx
Propagation Maps for each provider in the state These are the unprocessed maps of 4G LTE propagation submitted by the provider as part of the MF-II 4G LTE Collection.	.cpg, .dbf, .prj, .shp, .shx
State Boundary This is the map of the state, based upon 2010 US Census TIGER data, intersected by the uniform grid.	.cpg, .dbf, .prj, .shp, .shx
Water-only Areas This is the map of water-only census blocks, based upon 2010 US Census TIGER Data, intersected by the uniform grid. Water-only areas are excluded from the Mobility Fund Phase II Challenge Process.	.cpg, .dbf, .prj, .shp, .shx
Provider Clutter	.csv
Provider Handsets	.csv

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Creating Challenges

The default page in the **Challenge** section is the **Create Challenge** page. On this page, you can view, manage, and create challenges for a state (or state equivalent). As adopted by the FCC, an entity may challenge the determination that an area is presumptively ineligible for Mobility Fund Phase II support by collecting and submitting speed test measurement data on a per-state basis.

At the top of the page, you can view summary information about the challenges submitted for your entity. In particular, the system will display:

a) the number of days remaining until the close of the challenge window; and
b) the number of grid cells for which challenge data has been submitted but to which a user has not yet certified.
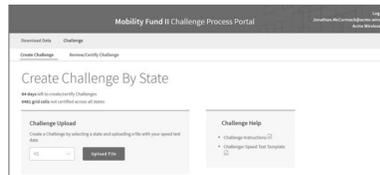
Below the summary information, you can create a new challenge for a state (or state equivalent) using the **Challenge Upload** form. You may also download this **User Guide** PDF document, as well as the **Challenger Speed Test Template** used to collect speed test measurement data from the **Challenge Help** section, located on the right side of the page.

Collecting and Formatting Speed Test Data

A challenger may challenge the determination that an area is presumptively ineligible by collecting and submitting evidence that there is no unsubsidized 4G LTE service meeting the FCC's adopted specifications in an area. In order to do so, the challenger must gather speed test measurement data for each unsubsidized provider in an area using standard parameters. For details on the requirements for collecting speed test data, please see section III.B.3, "Evidentiary Requirements for Challenge Data," of the Challenge Process Procedures PN.

Once sufficient speed test data have been collected, you may then submit these data by uploading a **Challenger Speed Test** file via the **Challenge Upload** form. The **Challenger Speed Test** file must be in Comma Separated Value (CSV) format and must match the USAC file template structure. All data values must be submitted per the **Data Specifications** guide below.

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For best results, please use robust text editing software, such as Notepad++ or a spreadsheet program (i.e., Microsoft Excel), and use the USAC file template, which can be downloaded from the **Challenge Help** section of the **Create Challenge** screen.

Additionally, please note:

1. Challenger Speed Test files must be structured according to the USAC file template, which shows all the fields that you must include.

2. You must upload your Challenger Speed Test file to the Mobility Fund II Challenge System as a plain-text CSV file. To convert a Microsoft Excel (.xlsx) spreadsheet into a CSV file, within Excel, select File > Save As, choose CSV (Comma delimited), and select Save.
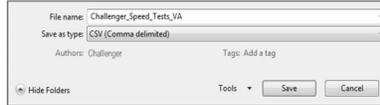
- Microsoft Excel may prompt you to confirm the file type. If you see the following pop-up box, select '**Yes**'.
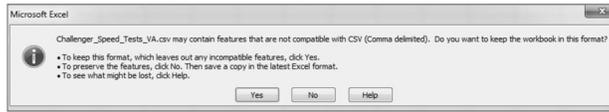
3. Challenger Speed Test files must include the header row as provided in the USAC file template. You must include the column headers used in the CSV template in the first row of each file you upload. If your file's header row does not match the USAC file template exactly, the file will not upload successfully. If this happens, correct the header and then try uploading it again.

4. Fields that include commas must be wrapped in double quotes (i.e., "Wireless Company, Inc.") if editing in a text editor. If using Microsoft Excel or other sophisticated editors, this should be done automatically when saving the file.

Managing Numerical Values in the CSV Template when using Microsoft Excel

Several of the columns in the Challenger Speed Test CSV file template must contain numerical values that strictly match the file specification and special care must be taken to preserve the data format when using Microsoft Excel.

Please note: Saving files in CSV format using Microsoft Excel will remove any special formatting. It is recommended that you keep a copy of data in Excel Workbook (i.e., XLSX) file format while working on and making edits to data. Once you are ready to upload your Challenger Speed Test file, you should then save a copy in CSV format.

Ensuring Latitude & Longitude Decimal Precision: The Challenge Speed Test file specification requires that the **latitude** and **longitude** fields include at least 5 values to the right of the decimal. Please follow these steps to ensure that Microsoft Excel does not remove any trailing zeros:

1. Select all values in the **latitude** and/or **longitude** column(s) and then click to access the **Format Cells** dialog box.

2. From the **Category** box, select **Number** and set the **Decimal places** value to a number of **at least 5**.

3. Leave the **Use 1000 Separator** checkbox **unchecked**, and make sure that the top value (i.e., **-1234.43210**) is selected under the **Negative Numbers** box.
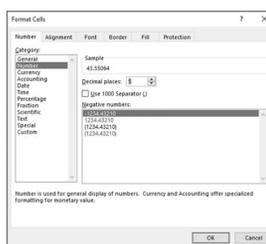
Ensuring the Device IMEI is not in Scientific Notation Format: The Challenger Speed Test file specification requires that the **device_imei** field match a valid IMEI code of between 15 and 16 digits. Please follow these steps to ensure that Microsoft Excel does not reformat long digit strings using scientific notation:

1. Select all values in the **device_imei** column and then click to access the **Format Cells** dialog box.

2. From the **Category** box, select **Number** and set the **Decimal places** value to **0**.

3. Leave the **Use 1000 Separator** checkbox **unchecked**.

Preserving Special Formatting when Opening a CSV File: when opening a CSV file in order to make any corrections using Microsoft Excel, special care must be taken to preserve the data formatting. Please follow these steps to ensure that Microsoft Excel preserves text formatting of certain values:

1. In Microsoft Excel, open a new blank workbook and from the **Data** ribbon select **From Text** or **From Text/CSV** (depending on platform).

2. Select **All Files** from the **File Types** dropdown menu, if necessary, then select the CSV file and click **Import**.

3. Depending on platform or version of Microsoft Excel, either the **Text Import Wizard** window appears or the **Import Data** window may appear.

    <u>If using the **Text Import Wizard**</u>:

    a. Select **Delimited** and click **Next**.

    b. From the **Delimiters** selection, check **Comma** and uncheck all other checkboxes and click **Next**.

    c. For each of the **latitude**, **longitude**, and **device_imei** columns in the **Data Preview** box, select the column and select **Text** from the **Column data format**. Once finished, click **Finish**.

    d. From the **Import Data** dialog box, select **Existing worksheet** and click **OK**.
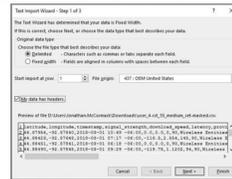
    <u>If using **Import Data**</u>:

    a. Select **Comma** from the **Delimiter** dropdown.

    b. Select **Do not detect data types** from the **Data Type Detection** dropdown.

    c. Click the **Edit** button to enter the **Query Editor**.

    d. Click **Use First Row as Headers** from the **Transform** section of the **Home** ribbon, then click **Close & Load**.

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Creating a Challenge for a State

At the top of the **Create Challenge** page, there is a counter that indicates how many days your entity has left to certify challenges that have been uploaded and how many grid cells have challenges but have not been certified. The window to file challenges opens on March 29, 2018 and will remain open through November 26, 2018, during which time speed test results may be uploaded and certified.

Please note: Only speed test results that have been certified by the close of the challenge window will be considered as having a challenged area. Once the challenge window closes, you will no longer be able to upload speed test data.

Steps to Create a Challenge

1. Select the state for which you would like to upload speed test data from the dropdown menu on the **Challenge Upload** form.

2. Click on the **Upload File** button.

3. Select a properly formatted **Challenger Speed Test** CSV file from your computer and click **OK** to upload the file.

In order to create a challenge, you must upload a CSV file that matches the Challenger Speed Test file template and that contains at least one valid speed test record for the state (or state equivalent) selected in the dropdown menu.

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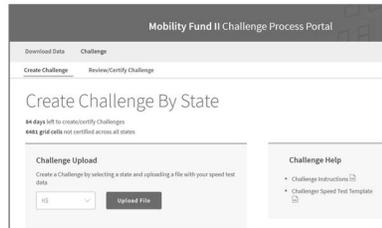
Viewing the Results of Automated Data Validation

Once the file uploads successfully, the system will begin automated validation of your submitted challenge data. Depending on the number of speed tests included in the Challenger Speed Test file, automated validation may take some time to complete. For larger files with hundreds of thousands of records, this process may take up to two hours. Please note that while the system supports files with greater than one million records, processing of excessively large files may take more than two hours to complete.

If any data errors are encountered during the automated validation process, the system will provide a warning that errors were found and you will be able to download the records that failed validation.

Please note: If your file has not completed validations after two hours, please email USAC support at mf2challengeoperationssupport@usac.org.

							Download Data Errors	Download Speed Test File	Review & Certify	Delete Challenge

Please download and review the data errors file before certifying your challenge. Speed test records with errors will be excluded from challenges. Please note that you must submit all speed test records collected for cells that you challenge, including those that show download speeds greater than or equal to 5 Mbps.

Challenge State	Cells Challenged	# of Speed Tests	Validation Progress	Created On	Created By	Download Data Errors	Download Speed Test File	Review & Certify	Delete Challenge
AZ	0	4,394	Completed	Jun 4, 2018 11:34:08 AM	Jonathan.McCormack@acme.wireless	📄	📄	View	Delete
CA	0	38,143	Completed	May 31, 2018 5:35:30 PM	Jonathan.McCormack@acme.wireless	-	📄	View	Delete
AL	0	32,815	Completed	May 31, 2018 5:10:44 PM	Jonathan.McCormack@acme.wireless	-	📄	View	Delete

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Speed Tests and Data Validation Summary

At the bottom of the page, you can view a table that includes summary statistics about the speed tests that have been uploaded for the challenger and the results of data validation, grouped by state (or state equivalent).

Field	Description
Challenge State	The state (or state equivalent) for which a **Challenger Speed Test** file has been uploaded.
Cells Challenged	The number of grid cells in the state for which at least one valid speed test record has been uploaded.
# of Speed Tests	The number of valid speed tests uploaded for a particular state. A valid speed test record is one that passes validation for each field in the **Challenger Speed Test** file.
Validation Progress	An indicator that provides the status of automated validations.
Created On	A timestamp of when the data file was uploaded.
Created By	The user account (email address) of the user that uploaded the data file.
Download Data Errors	A link to the **Data Errors** CSV file that includes data errors, if any. For the glossary of errors, please see the **Data Errors and Warning Codes** section below.
Download Speed Test File	A link to the **Challenger Speed Test** CSV file that has been uploaded for the state.
Review and Certify	A link to the **Review and Certify Challenge** page, where you may certify valid speed test records and complete the process to create challenges.
Delete Challenge	A link to allow you to delete the speed tests that were uploaded for a particular state. A challenger may only have one uploaded **Challenger Speed Test** file per state. **Please note**: If there are errors in your Challenger Speed Test file, or if you would like to submit additional speed tests for a state, you must delete the existing speed tests before uploading a new Challenger Speed Test file.

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Reviewing and Certifying Challenges

The **Review and Certify Challenge** page is available in the **Challenge** section after validation has successfully completed for at least one state (or state equivalent). On this page, you can view summary information about your challenge for a particular state (or state equivalent). You may also review and certify challenges on a grid cell-by-grid cell basis for the state.

This page may be accessed via the **Review/Certify Challenge** link in the navigation bar or via the **View** link in the Review/Certify Challenge column for a particular state in the summary table on the **Create Challenge** page.

At the top of the **Review and Certify Challenge** page, the system displays the number of days remaining until the challenge window closes and how many grid cells have challenges but have not yet been certified. You may also select a different state (or state equivalent) for which a valid Challenger Speed Test file has been uploaded and for which you would like to review and certify challenges by selecting a state from the dropdown menu.

Please note: All speed test data that have been successfully validated by the system must still be certified before a challenge is considered complete. In order to be able to certify challenges for a grid cell, a challenger must submit valid speed test data that challenges at least one square kilometer of ineligible area in a state (or state equivalent).

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Viewing Summary Information about Challenges in a State

Next, you may view summary statistical information about the state (or state equivalent) selected for review in the **Challenge Summary** table. This table includes aggregate information about speed tests that have been submitted and validated on behalf of the challenger, including the number of grid cells with at least one valid speed test point, the number of grid cells that meet the density requirement, the number of grid cells certified, and the total area challenged across the state.

Challenge Summary

Grid Cells Tested: **2108**	Total Challengeable Area: **1648.23 sq km**
Grid Cells Tested ≥ 75%: **1008**	Grid Cells Certified: **50**
Grid Cells Tested < 75%: **1100**	Grid Cells Not Certified: **2058**
	Grid Cells Invalid: **1308**

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Challenge Summary

Information contained in the Challenge Summary table is described below:

Field	Description
Grid Cells Tested	The number of grid cells where there is at least one valid speed test point
Grid Cells Tested ≥ 75%	The number of grid cells where the tested area exceeds the 75% density requirement
Grid Cells Tested ≤ 75%	Then number of grid cells where the area tested does not meet the 75% density requirement **Please note**: these cells may still be certified notwithstanding that the cells do not meet the density requirement
Total Challengeable Area	The total challengeable (ineligible) area in the state where provider coverage may be challenged
Grid Cells Certified	The number of grid cells in the state containing valid speed test records that have been certified
Grid Cells Not Certified	The amount of grid cells in the state containing valid speed test records that have not yet been certified
Grid Cells Invalid	The number of grid cells in the state for which there is not a sufficient number and/or type of speed test records required to create a challenge

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Viewing Detailed Information about Challenges in a State

The **Challenge Detail** table is displayed at the bottom of the page and includes detailed information on a grid cell-by-grid cell basis for all the validated speed test records that have been uploaded for a particular state (or state equivalent) on behalf of the challenger. At the top of the table, you may select one or more filters to filter the records in the table by:

- **Grid Row** or **Grid Column**;

- **Ineligible Area Tested** (you may specify values for Minimum Percent and/or Maximum Percent tested); and/or

- **Status** (values can be **Not Certified**, **Certified**, or **Invalid**)

Please note: you must click the **Apply** button after entering any filters for the filter to take effect.

You may also export data in CSV format by clicking on the **Export Table Data** link at the top of the table. Exported data includes the speed tests associated with each grid cell, along with the associated grid row, grid column, and ineligible area tested percent, and reflects any filters currently applied.

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Challenge Details

Information contained in the Challenge Detail table is described below:

Field	Description
State	State (or state equivalent) that is selected in the dropdown list for the **Challenge Review and Certification** page
Challenge Grid Row	The grid cell row of the challenged area
Challenge Grid Column	The grid cell column of the challenged area
Ineligible Area Tested	The proportion of the challengeable (ineligible) area for which the submitted speed test data tested **Please note**: the value in the table is highlighted when the area tested does not meet the 75% density requirement
Status	The status of the grid cell (i.e., **Certified**, **Not Certified**, or **Invalid**)
Associated Speed Test	Link to display the speed test records associated with a particular grid cell
Map View	Link to view the grid cell and associated speed tests on a map

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Viewing Speed Test Records Associated with a Challenge

The details of the speed test data records associated with the challenged area in a grid cell can be viewed by clicking on the **View** link in the **Associated Speed Tests** column of the **Challenge Detail** table for a particular grid cell. These records include all of the valid speed tests submitted in the **Challenger Speed Test** file that, when processed, count toward the **Ineligible Area Tested** percentage for that grid cell.

Associated Speed Test(s)   ×

Row #	Latitude	Longitude	Timestamp	Signal Strength	Download Speed	Latency	Provider ID	Provider Name	Device ID	Device IMEI	Measurement Method Code
9270	40.78425	-122.89259	2018-03-01 08:59 -08:00	-120.45	1.8423	136	90	Wireless Entities	99	358936468023947	2
9271	40.78659	-122.89826	2018-03-01 08:51 -08:00	-120.37	1.8132	67	90	Wireless Entities	99	358936468023947	2
9272	40.78673	-122.89736	2018-03-01 11:58 -08:00	-122.95	0.8591	49	90	Wireless Entities	105	634452211491185	2
9273	40.78691	-122.89243	2018-03-01 11:17 -08:00	-119.21	1.5532	68	90	Wireless Entities	99	358936468023947	2
9274	40.78735	-122.89271	2018-03-01 10:07 -08:00	0.00	0.0000	0	90	Wireless Entities	99	358936468023947	2
9275	40.78804	-122.89299	2018-03-01 07:47 -08:00	-120.54	1.5417	98	90	Wireless Entities	99	358936468023947	2
9276	40.78903	-122.89631	2018-03-01 07:34 -08:00	0.00	0.0000	0	90	Wireless Entities	105	634452211491185	2
9277	40.78922	-122.89319	2018-03-01 09:26 -08:00	-115.89	3.0625	28	90	Wireless Entities	105	634452211491185	2
9278	40.78974	-122.89327	2018-03-01 08:45 -08:00	-122.29	0.4114	57	90	Wireless Entities	105	634452211491185	2

Viewing Challenges on a Map

The **Map View** page displays on a map the geography of the speed test data associated with the challenged area in a grid cell and can be viewed by clicking on the **View** link in the **Map View** column of the **Challenge Detail** table for a particular cell.

Summary information about the challenge is displayed at the top of the **Map View** page screen in the **Challenge Details** table, which includes the State, Grid Row, Grid Column, and Ineligible Area Tested for the challenged area in the selected grid cell.

There are two tabs to the right side of the map, which allow you to switch between the aggregated **Baseline & Tests** map and a provider-specific **Providers** map.

Baseline & Tests Map View

By default, the **Map View** page displays the **Baseline & Tests** map, which includes layers showing the **Eligible Area** (orange), **Ineligible Area** (dark gray), **Water Area** (blue), and **Tested Area** (green). You may check the checkbox next to each layer to show or hide the layer.

The **Ineligible Area** layer shows the geographic area for which one or more providers reported to have unsubsidized 4G LTE service meeting the FCC's MF-II coverage specification. The **Tested Area** layer shows the geographic area for which the challenger has submitted speed test measurements for each unsubsidized provider, after the system has applied a 400 meter buffer (i.e., drawn a circle with radius of 400 meters) around each speed test measurement point. As a result, the **Ineligible Area Tested** percentage is the portion of the **Ineligible Area** layer that is overlapped by the **Tested Area** layer.

Providers Map View

Selecting the **Providers** tab on the **Map View** page displays the **Providers** map, which shows the speed test data points, tested, and untested areas in the grid cell on a per-provider basis. For each provider that has unsubsidized coverage in the grid cell, you may select the radio button next to its name to display the map data for that provider.

After selecting map data for a provider, the system displays all speed test data points for each measurement associated with the selected provider, as well as the 400 meter buffered area around each measurement point. Because speed test data from measurements conducted in adjacent cells may, when buffered, overlap with a provider's unsubsidized coverage in the selected grid cell, and therefore count toward establishing whether an area has been tested, some displayed points may fall outside of the grid cell.

You may view additional details about the individual speed test records for each speed test measurement point by clicking on the point(s) inside the buffered area.

The map shows the **Tested Area** (dark green) for all buffered speed points, which reflects the portion of the selected provider's unsubsidized coverage for which the challenger has submitted a valid speed test measurement covering that area. Conversely, the **Untested Area** (light green) is the portion of the selected provider's unsubsidized coverage not covered by a valid speed test.

In order to return to the **Challenge Review and Certification** page, you may click on the **Review/Certify Challenge** link in the navigation bar at the top of the page or click the back button in your browser.

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Certifying Challenges

A challenger must certify to the accuracy and completeness of the submitted data in order to complete the challenge for one or more grid cell(s). From the **Challenge Detail** table on the **Review and Certify Challenge** page, you may select the grid cell(s) for which you want to certify by clicking on the checkbox on the left-hand side of the table for a particular grid cell. Once you have selected the grid cell(s) to certify, you may click on the **Certify** button at the bottom of the page to certify those cells.

Please note: you may also click the checkbox at the top of the table to select all grid cells displayed in the table, or you may click the link next to that checkbox to select all grid cells across all pages. Only grid cells that have a status of **Not Certified** can be selected for certification.
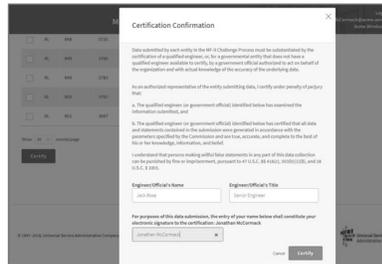
Certification Confirmation

After clicking the **Certify** button below the **Challenge Detail** table, the **Certification Confirmation** modal is displayed. In order to complete certification, you must then enter the **Name** and **Title** of the qualified engineer (or government official) who has completed the **Challenge Data Certification Form** PDF document. Finally, you must enter your name to constitute your **electronic signature** to the data certification and click the **Certify** button.

Please note: for details about who may certify, please see the Challenge Process Procedures PN, section III.B.5 (Certifying a Challenge). Additionally, the **Challenge Data Certification Form** that must be completed by a qualified engineer (or government official) is available as Appendix F of the Challenge Process Procedures PN.

Once cells are certified, the tables on the Review and Certify Challenge page are updated. Upon certification of all of the grid cells with challenges that you would like to submit, your challenge for a particular state (or state equivalent) is complete.

Only those grid cells that have a certified challenge by the close of the challenge window will be processed and presented to challenged parties for response during the response window.

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Data Specifications

The table below provides the specification for the **Challenger Speed Test** CSV file.

Field (* = required)	Description	Data Type	Max Length	Example
latitude*	Latitude of the speed test location. Values must have at least five digits to the right of the decimal.	Float	N/A	39.509220
	Coordinates must be in the WGS84 geographic coordinate system.			
longitude*	Longitude of the speed test location. Values must have at least five digits to the right of the decimal.	Float	N/A	-98.433700
	Coordinates must be in the WGS84 geographic coordinate system.			
timestamp*	Date and time of the speed test measurement in ISO 8601 style format (YYYY-MM-DD HH:MM ±HH:MM)	Date	30	2017-09-07 13:42 -04:00
	Speed tests must be recorded between 06:00 and 24:00 in the local time zone of the measurement location and must be between 2018-02-27 and the date of file upload.			
signal_strength*	Measured signal strength of the speed test in dBm.	Decimal	N/A	-99.10
	(Value may be 0 if coverage is insufficient to conduct test)			
download_speed*	Measured download speed in Mbps	Decimal	10	5.89
	(Value may be 0 if coverage is insufficient to conduct test)			

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Field (* = required)	Description	Data Type	Max Length	Example
latency*	Measured latency in milliseconds (Value may be 0 if coverage is insufficient to conduct test)	Integer	10	176
provider_id*	FCC identifier for the provider	Integer	3	90
provider_name*	Common name of speed measurement network provider	String	255	Acme Wireless
device_id*	FCC identifier for the unique device from the Provider_Handsets.csv file	Integer	3	5
device_imei*	Device IMEI number	String	16	867686022335391
measurement_method_code*	FCC code for the measurement method (1: non-drive app test, 2: software drive test, 3: hardware drive test)	Integer	1	1
measurement_app_name	The name of the measurement app used (Value may be null if measurement_method_code not 1)	String	255	FCC Speed Test App
measurement_server_location*	IP address or location of measurement server	String	150	Virginia

Universal Service
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Data Error Codes

If submitted data fail validations, you may download the **Data Errors** CSV file from the **Create Challenge** screen. The table below provides a list of all data error codes generated by the system.

Category	Code	Description
Latitude	LAT_REQUIRED	The latitude field is required and must not be null.
Latitude	INVALID_LAT_DEGREE_RANGE	The latitude range to the left of the decimal must be between -90 and 90, inclusive.
Latitude	INVALID_LAT_FORMAT	The latitude must be in numeric decimal format.
Latitude	INVALID_LAT_DECIMAL_ACCURACY	The latitude must have a minimum of 5 digits to the right of the decimal.
Longitude	LON_REQUIRED	The longitude field is required and must not be null.
Longitude	INVALID_LON_DEGREE_RANGE	The longitude range to the left of the decimal must be between -180 and 180, inclusive.
Longitude	INVALID_LON_FORMAT	The longitude field must be in numeric decimal format.
Longitude	INVALID_LON_DECIMAL_ACCURACY	The longitude field must have a minimum of 5 digits to the right of the decimal.
Latitude / Longitude	INVALID_SPEED_TEST_LOCATION	The latitude and longitude coordinate of each speed test must match a valid challenge area cell for the state.
Timestamp	TIMESTAMP_REQUIRED	The timestamp field is required and must not be null.

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Category	Code	Description
Timestamp	INVALID_TIMESTAMP_FORMAT	The timestamp field must be a string in valid ISO 8601 format: (YYYY-MM-DD HH:MM ±HH:MM)
Timestamp	INVALID_TIMESTAMP_TIME	The timestamp of each speed test measurement must be recorded between 06:00 and 24:00 within the local time zone of the measurement location.
Timestamp	INVALID_TIMESTAMP_DATE_RANGE	The timestamp of each speed test measurement must be recorded between 2018-02-27 and the date of file upload
Signal Strength	SIGNAL_STRENGTH_REQUIRED	The signal_strength field is required and must not be null.
Signal Strength	SIGNAL_STRENGTH_FORMAT	The signal_strength field must be in numeric decimal format.
Download Speed	DL_SPEED_REQUIRED	The download_speed field is required and must not be null.
Download Speed	INVALID_DL_SPEED_FORMAT	The download_speed field must be an integer or in numeric decimal format.
Latency	LATENCY_REQUIRED	The latency field is required and must not be null.
Latency	INVALID_LATENCY_FORMAT	The latency field must be in integer format.
Provider ID	PROVIDER_ID_REQUIRED	The provider_id field is required and must not be null.
Provider ID	INVALID_PROVIDER_ID_FORMAT	The provider_id field must be in integer format.
Provider ID	INVALID_PROVIDER_ID_CHALLENGE	The provider_id cannot match your own organization's ID.

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Category	Code	Description
Provider Name	PROVIDER_NAME_REQUIRED	The provider_name field required and must not be null.
Provider Name	INVALID_PROVIDER_NAME_LENGTH	The provider_name field must be a string that is less than or equal to 255 characters long.
Device ID	DEVICE_ID_REQUIRED	The device_id field is required and must not be null.
Device ID	INVALID_DEVICE_ID_FORMAT	The device_id field must be in integer format.
Device ID / Provider ID	INVALID_DEVICE_PROVIDER_ASSOCIATION	The device_id and provider_id must match a device and provider pairing from the Provider Handsets file.
Device IMEI	DEVICE_IMEI_REQUIRED	The device_imei field is required and must not be null.
Device IMEI	INVALID_DEVICE_IMEI_LENGTH	The device_imei field must be between 15 and 16 characters long.
Device IMEI	INVALID_DEVICE_IMEI_FORMAT	The device_imei field must be a string of digits.
Measurement Method Code	MEASUREMENT_METHOD_CODE_REQUIRED	The measurement_method_code field is required and must not be null.
Measurement Method Code	INVALID_MEASUREMENT_METHOD_CODE_FORMAT	The measurement_method_code field must be in integer format.
Measurement Method Code	INVALID_MEASUREMENT_METHOD_CODE	The measurement_method_code must match one of the acceptable measurement codes: 1, 2, 3.
Measurement App Name	MEASUREMENT_APP_NAME_REQUIRED	The measurement_app_name field is required and must not be null when the measurement_method_code value is 1.

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Category	Code	Description
Measurement App Name	INVALID_MEASUREMENT_APP_NAME_LENGTH	The measurement_app_name field must be a string that is less than or equal to 255 characters long.
Measurement Server Location	MSMT_SERVER_LOCATION_REQUIRED	The measurement_server_location field is required and must not be null.
Measurement Server Location	INVALID_MSMT_SERVER_LOCATION_LENGTH	The measurement_server_location must be a string that is less than or equal to 150 characters long.
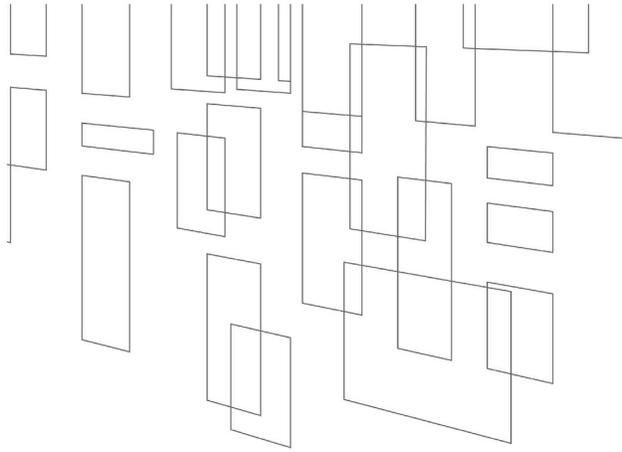
Mobility Fund Phase II
Data Specifications and Error Codes

MOBILITY FUND PHASE II CHALLENGE PROCESS

Data Specifications

The table below provides the specification for the **Challenger Speed Test** CSV file.

Field *= required	Description	Data Type	Max Length	Example
latitude*	Latitude of the speed test location. Values must have at least five digits to the right of the decimal. Coordinates must be in the WGS84 geographic coordinate system.	Float	N/A	39.509220
longitude*	Longitude of the speed test location. Values must have at least five digits to the right of the decimal. Coordinates must be in the WGS84 geographic coordinate system.	Float	N/A	-98.433700
timestamp*	Date and time of the speed test measurement in ISO 8601 style format (YYYY-MM-DD HH:MM ±HH:MM) Speed tests must be recorded between 06:00 and 24:00 in the local time zone of the measurement location. Speed tests must also be recorded between 2018-02-27 and the date of upload.	Date	30	2017-09-07 13:42 -04:00

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FC

Field *= required	Description	Data Type	Max Length	Example
signal_strength*	Measured signal strength of the speed test in dBm. (Value may be 0 if coverage is insufficient to conduct test)	Decimal	N/A	-99.10
download_speed*	Measured download speed in Mbps (Value may be 0 if coverage is insufficient to conduct test)	Decimal	10	5.89
latency*	Measured latency in milliseconds (Value may be 0 if coverage is insufficient to conduct test)	Integer	10	176
provider_id*	FCC identifier for the provider	Integer	3	90
provider_name*	Common name of speed measurement network provider	String	255	Acme Wireless
device_id*	FCC identifier for the unique device from the Provider_Handsets.csv file	Integer	3	5
device_imei*	Device IMEI number	String	16	867686022335391
measurement_method_code*	FCC code for the measurement method (1: non-drive app test, 2: software drive test, 3: hardware drive test)	Integer	3	1
measurement_app_name	The name of the measurement app used (Value may be null if measurement_method_code is 2 / 3)	String	255	Ookla
measurement_server_location	IP address or location of measurement server	String	Between 2 and 150 Characters	Washington

3   USAC | MF-II Data Specifications and Error Codes

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FCC

Data Error Codes

If submitted data fails validations, you may download the **Data Errors** CSV file from the **Create Challenge** screen. The table below provides a list of all data error and warning codes generated by the system.

| Category	Code	Description
Latitude	LAT_REQUIRED	The latitude field is required and must not be null.
Latitude	INVALID_LAT_DEGREE_RANGE	The latitude range to the left of the decimal must be between -90 and 90, inclusive.
Latitude	INVALID_LAT_FORMAT	The latitude must be in numeric decimal format.
Latitude	INVALID_LAT_DECIMAL_ACCURACY	The latitude should have a minimum of 5 digits to the right of the decimal.
Longitude	LON_REQUIRED	The longitude is required and must not be null.
Longitude	INVALID_LON_DEGREE_RANGE	The longitude range to the left of the decimal must be between -180 and 180, inclusive.
Longitude	INVALID_LON_FORMAT	The longitude field must be in numeric decimal format.
Longitude	INVALID_LON_DECIMAL_ACCURACY	The longitude field must have a minimum of 5 digits to the right of the decimal.
Latitude / Longitude	INVALID_SPEED_TEST_LOCATION	The latitude and longitude coordinate of each speed test must match a valid challenge area cell for the state.
Timestamp	TIMESTAMP_REQUIRED	The timestamp field is required and must not be null.

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FCC

Category	Code	Description
Timestamp	TIMESTAMP_FORMAT	The timestamp field must be a string formatted in valid ISO 8601 format: (YYYY-MM-DD HH:MM ±HH:MM)
Timestamp	INVALID_TIMESTAMP_TIME	The timestamp of each speed test measurement must be recorded between 06:00 and 24:00 within the local time zone of the measurement location.
Timestamp	INVALID_TIMESTAMP_DATE_RANGE	The timestamp of each speed test measurement must be recorded between 2018-02-27 and the date of file upload
Signal Strength	SIGNAL_STRENGTH_REQUIRED	The signal_strength field is required and must not be null.
Signal Strength	SIGNAL_STRENGTH_FORMAT	The signal_strength field must be in numeric decimal format.
Download Speed	DL_SPEED_REQUIRED	The download_speed field is required and must not be null.
Download Speed	INVALID_DL_SPEED_FORMAT	The download_speed field must be in numeric decimal format.
Download Speed	INVALID_CHG_DL_SPEED	The download_speed measurement must be below 5.0 Mbps.
Latency	LATENCY_REQUIRED	The latency field is required and must not be null.
Latency	INVALID_LATENCY_FORMAT	The latency field must be in integer format.
Provider ID	PROVIDER_ID_REQUIRED	The provider_id field is required and must not be null.
Provider ID	INVALID_PROVIDER_ID_FORMAT	The provider_id field must be in integer format.

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FC

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Category	Code	Description
Provider ID	INVALID_PROVIDER_ID_CHALLENGE	The provider_id cannot match your own organization's ID.
Provider Name	PROVIDER_NAME_REQUIRED	The provider_name field is required and must not be null.
Provider Name	INVALID_PROVIDER_NAME_LENGTH	The provider_name field must be a string that is less than or equal to 255 characters long.
Device ID	DEVICE_ID_REQUIRED	The device_id field is required and must not be null.
Device ID	INVALID_DEVICE_ID_FORMAT	The device_id field is a number and must be in integer format.
Device ID / Provider ID	INVALID_DEVICE_PROVIDER_ASSOCIATION	The device_id and provider_id together must match a device and provider pairing from the Provider Handsets file.
Device IMEI	DEVICE_IMEI_REQUIRED	The device_imei field is required and must not be null.
Device IMEI	INVALID_DEVICE_IMEI_LENGTH	The device_imei field must be a string of digits between 15 and 16 characters long.
Device IMEI	INVALID_DEVICE_IMEI_FORMAT	The device_imei field must be an integer string
Measurement Method Code	MEASUREMENT_METHOD_CODE_REQUIRED	The measurement_method_code field is required field and must not be null.
Measurement Method Code	INVALID_MEASUREMENT_METHOD_CODE_FORMAT	The measurement_method_code field is a number and must be in integer format.

Universal Service
Administrative Co.

FCC

Category	Code	Description
Measurement Method Code	INVALID_MEASUREMENT_METHOD_CODE	The measurement_method_code must match one of the acceptable measurement codes: (1: non-drive app test, 2: software drive test, 3: hardware drive test)
Measurement App Name	INVALID_MEASUREMENT_APP_NAME_LENGTH	The measurement_app_name field must be a string that is less than or equal to 255 characters long.
Measurement App Name	MEASUREMENT_APP_NAME_REQUIRED	If measurement_method_code =1 then measurement_app_name is a required field and must not be null.
Measurement Server Location	MEASUREMENT_SERVER_LOCATION_REQUIRED	The measurement_server_location field is required and must not be null.
Measurement Server Location	INVALID_MEASUREMENT_SERVER_LOCATION_LENGTH	The measurement_server_location field must be a string that is less than or equal to 150 characters long.

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FCC
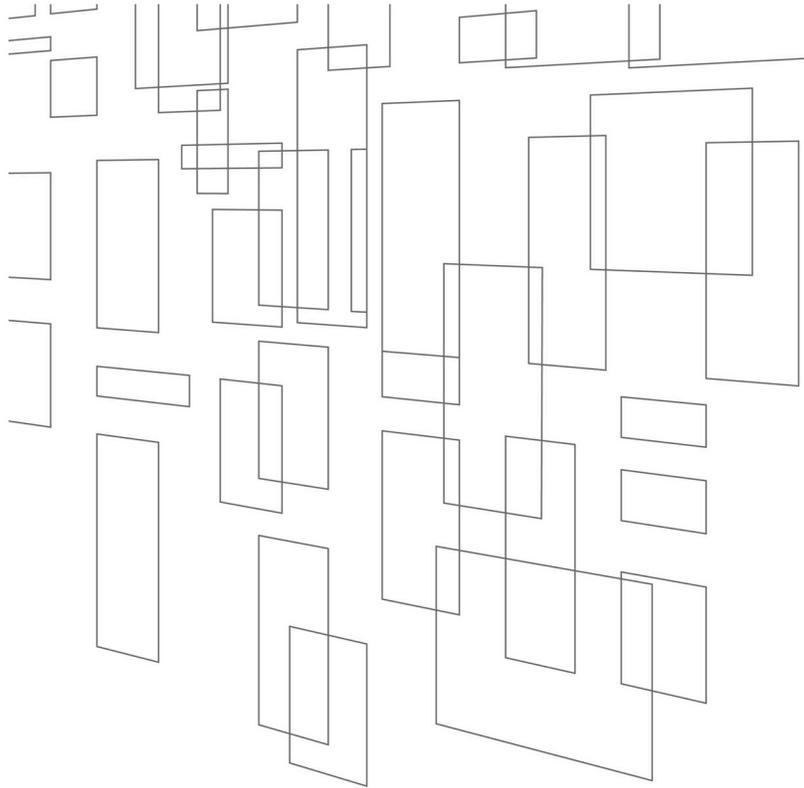
Mobility Fund Phase II
Managing Numerical Values in
Challenger Speed Test CSV Template

MOBILITY FUND PHASE II CHALLENGE PROCESS

Managing Numerical Values in the Microsoft Excel CSV Template

Several of the columns in the Challenger Speed Test CSV file template must contain numerical values that strictly match the file specification and you must take special care to preserve the data format when using Microsoft Excel.

This guide will help you ensure that the numerical values in your file are formatted correctly when you use the Challenger Speed Test CSV file template. Below is what you will find in this guide:

Note: Saving files in CSV format using Microsoft Excel will remove any special formatting. It is recommended that you keep a copy of data in Excel Workbook (i.e., XLSX) file format while working on and making edits to data. Once you are ready to upload your Challenger Speed Test file, you should then save a copy in CSV format.

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Ensuring Latitude and Longitude Decimal Precision

The Challenge Speed Test file specification requires that the **latitude** and **longitude** fields include at least five values to the right of the decimal. Please follow these steps to ensure that Microsoft Excel does not remove any trailing zeros:

1. Select all values in the **latitude** and/or **longitude** column(s). Then right click on them and choose **Format Cells** for the dialog box to appear.

2. In the **Category** box, select **Number** and set the **Decimal places** value to **at least five**.

3. Leave the **Use 1000 Separator** checkbox **unchecked**.

4. Make sure that in the **Negative Numbers** box, the top value (i.e., **-1234.43210**) is selected.
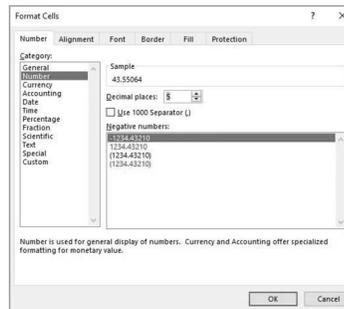
Ensuring the Device IMEI Is Not in Scientific Notation Format

The Challenger Speed Test file specification requires that the **device_imei** field match a valid IMEI code of between 15 and 16 digits. Please follow these steps to ensure that Microsoft Excel does not reformat long digit strings using scientific notation:

1. Select all values in the **device_imei** column. Then right click on them and choose **Format Cells** for the dialog box to appear.

2. In the **Category** box, select **Number** and set the **Decimal places** value to **0**.

3. Leave the **Use 1000 Separator** checkbox **unchecked**.

Preserving Special Formatting When Opening a CSV File

When opening a CSV file using Microsoft Excel to make corrections, you must take special care to preserve the data formatting. Please follow these steps to ensure that Microsoft Excel preserves text formatting of certain values:

1. In Microsoft Excel, open a new blank workbook. From the **Data** ribbon, select **From Text** or **From Text/CSV** (depending on platform).

2. Select **All Files** from the **File Types** dropdown menu, if necessary, then select the CSV file and click **Import**.

3. Depending on platform or version of Microsoft Excel, either the **Text Import Wizard** window or the **Import Data** window appears.

If using Text Import Wizard:

a. Select **Delimited** and click **Next**.

b. From the **Delimiters** selection, check **Comma** and uncheck all other checkboxes. Then click **Next**.

c. For each of the **latitude**, **longitude**, and **device_imei** columns in the **Data Preview** box, select the column and select **Text** from the **Column data format**. Once finished, click **Finish**.

d. From the **Import Data** dialog box, select **Existing worksheet** and click **OK**.
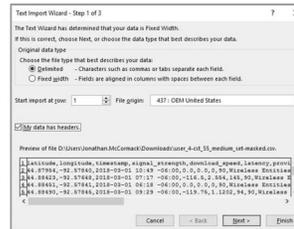
If using Import Data:

a. Select **Comma** from the **Delimiter** dropdown.

b. From the **Data Type Detection** dropdown, select **Do not detect data types**.

c. Click the **Edit** button to enter the **Query Editor**.

d. From the **Transform** section of the **Home** ribbon, click **Use First Row as Headers**. Then click **Close & Load**.

The CHAIRMAN. Thank you, Mr. Spellmeyer.

Mr. Enjady.

STATEMENT OF GODFREY ENJADY, GENERAL MANAGER, MESCALERO APACHE TELECOMMUNICATIONS, INC.

Mr. ENJADY. Thank you, Chairman Thune and members of the Committee. Thank you for this opportunity to provide testimony.

I am Godfrey Enjady, General Manager of the Mescalero Apache Telecom, located in Mescalero, New Mexico.

Today, I testify as President of the National Tribal Telephone Association, NTTA, which is comprised of nine tribally-owned telephone companies throughout the country. We provide voice, broadband, and other communications services to our communities.

While NTTA members share many of the same concerns that rural independent-owned and cooperative communications providers experience, my testimony focuses on issues vital to tribal communities.

The recent 2018 Broadband Deployment Report acknowledges that only 31.6 percent of rural tribal areas in the lower 48 states have access to 25.3 fixed broadband services.

The difficulties in serving more remote dispersed communities situated in hard-to-serve rough terrain has been thoroughly highlighted in congressional testimony and on the record at the FCC and RUS.

A September 2018 GAO study magnifies the digital divide experienced in Indian Country and I encourage you to take a look at that document. Access to capital is a major roadblock to network growth and viability because most tribally owned carriers cannot collateralize their assets. RUS is the only lender that we have.

In 2015, my company received the first RUS loan underneath the 2018 Farm Bill. Substantially under-served trust area, SSUTA provisions, RUS loans and FCC Universal Service Funds support go hand in hand.

NTTA supports language in the Senate version of the 2018 Farm Bill that allows for the refinancing of RUS loans with the understanding that the SSUTA provision would be used when appropriate.

We greatly appreciate Senator Udall's leadership in championing the provision. We also appreciate Chairman Thune's support. Thank you, sir.

The arbitrary budget cap that has been established for the FCC's USF High-Cost Program does not allow for adequate funds to build and maintain the broadband networks that are demanded by regulators, policymakers, and consumers.

There continues to be a debate about the appropriate levels, broadband capacities, and speeds no matter what the platform or delivery is.

To put it bluntly, the Universal Service Fund High-Cost Program is vastly underfunded, vastly underfunded. Capital operational expense caps must be eliminated. FCC Chairman Pai has even questioned the wisdom of these caps.

My company is experiencing major negative impacts from the implementation of the operational expense caps and we are in the process of working with the Commission on a positive solution and

examination and reform of the U.S. contribution regime is long overdue and may eliminate any need for arbitrary budget cap.

A just-released GAO study states that from 2010 to 2017, less than 1 percent of the FCC's funding and about 14 percent of RUS funding went directly to tribes and tribally owned providers or about .7 percent of the overall funding. This illustrates the need for dedicated funding for tribal entities.

In June 2015, NTTA went on record at the FCC with a proposal to adopt a tribal broadband factor as part of the reform of the long-term USF for rate of return carriers. The proposal was straight-forward and easily understood and was narrowly tailored to address the specific need to promote broadband while using very little impact on the overall USF mechanism. The FCC did not adopt this proposal.

NTTA continues to push for tribal area-specific high-cost mechanism. We encourage Congress and the FCC to address this much-needed reform to eliminate the digital divide experienced in Native communities today.

We also believe that an increase in the enhanced lifeline credit for tribal areas is vital to adoption and affordability of those who are eligible and qualified for this program.

As I previously mentioned, our communities have very high rates of low-income consumers. The previously mentioned GAO study addresses the need for better mapping mechanisms to measure the levels of access to broadband service in Native communities.

The use of Census walks as a measurement simply does not work and a majority of Indian Country, the enforcement of engagement and consultation between tribal entities and Federal, state, and local governments and private businesses must be improved.

NTTA looks forward to working with this committee and other policymakers to provide tribal communities with accessible, robust, and affordable broadband services and to add to that, I appreciate the Committee's work on this issue and that rural areas of this country need more funding. We seem to have been forgotten.

In closing, I want to thank you all for listening to my testimony. Thank you.

[The prepared statement of Mr. Enjady follows:]

PREPARED STATEMENT OF GODFREY ENJADY, GENERAL MANAGER, MESCALERO APACHE TELECOMMUNICATIONS, INC.

Chairman Thune, Ranking Member Nelson and members of the committee, thank you for this opportunity to submit testimony. I am Godfrey Enjady, General Manager of Mescalero Apache Telecom, Inc. (MATI) located in Mescalero, New Mexico. Today I testify as President of the National Tribal Telecommunications Association (NTTA) which is comprised of the nine Tribally-owned and operated telecommunications companies that provide voice, broadband and other communications services to their communities. Those companies are Cheyenne River Sioux Telephone Authority, Fort Mojave Telecommunications, Inc., Gila River Telecommunications, Inc., Hopi Telecommunications, Inc., Mescalero Apache Telecom, Inc., Saddleback Communications, San Carlos Apache Telecommunications Utility, Inc., Tohono O'odham Utility Authority, and Warm Springs Telecom. The Nez Perce Tribe and Sacred Wind Communications are associate members.

While NTTA members share many of the same concerns that rural, independently-owned and cooperative communications providers experience, my testimony focuses on issues vital to Tribal communities.

Mescalero Apache Telecom serves the entirety of the Mescalero Apache Reservation located in the remote South Central Mountains of New Mexico. Prior to MATI

purchasing its service area and building its network in 2001, 52 percent of the Mescalero Apache Tribe received no service, and 48 percent received only basic voice service. Nearly 100 percent of the Tribe now has access to some level of broadband service. MATI provides services in what is considered a rural, high-cost area and serves an average population density of two customers per square mile. This situation causes the average cost per loop to substantially exceed the national average. MATI, like all NTTA members, has a large percentage of consumers that qualify for the Lifeline program.

The recent 2018 Broadband Deployment Report acknowledges that only 31.6 percent of rural Tribal areas in the lower 48 states have access to 25/3 fixed broadband service. MATI attests that, in its specific case, extremely high costs are incurred to build out its Reservation and maintain network operations to provide modernized telecommunications and broadband services to its community and close the digital divide. The record is also clear that other NTTA members face similar high-cost circumstances and, like MATI, incur additional costs specific to serving Tribal lands.

The difficulties in serving remote, dispersed communities situated in hard to serve, rough terrain has been thoroughly illuminated in Congressional testimony and on the record at the Federal Communications Commission (FCC), and with USDA's Rural Utilities Service (RUS). A September 2018 GAO study (GAO–18–630) magnifies the digital divide experienced in Indian Country and I encourage you to take a look at that document.

Access to capital is a major roadblock to network growth and viability. Because most Tribally-owned carriers cannot collateralize their assets, RUS is our only lender and I appreciate the work that they do. In 2015, my company received the first RUS loan under the 2008 Farm Bill's Substantially Underserved Trust Area (SUTA) provision. RUS loans and FCC Universal Service Fund (USF) support go hand-in-hand. Reliable and predictable cash flow is required to get any sort of loan, including RUS loans.

NTTA supports language in the Senate version of the 2018 Farm Bill (Sec. 6209) that allows for the refinancing of RUS loans with the understanding that the SUTA provision would be used when appropriate. We greatly appreciate Senator Udall's leadership in championing this provision. We also appreciate Chairman Thune's support.

The National Broadband Plan, in numerous instances, outlined the need for greater efforts to make broadband available on Tribal lands. In referencing the GAO study outlined earlier in my testimony, there is a lack of FCC development of broadband performance goals and measurements on Tribal lands. We recommend the development of training, mapping, data collection, and performance goals and measurements for broadband development in Native communities.

The arbitrary budget cap that has been established for the FCC's USF high-cost program does not allow for adequate funds to build and maintain the broadband networks that are demanded by regulators, policy makers and consumers. There continues to be a debate about the appropriate levels broadband capacities and speeds, no matter what the platform of delivery. Fiber optic networks, with the complement of wireless and satellite technologies, delivers the highest quality, most rewarding Internet experience, and long term benefit to consumers. And that network requires a viable and predictable funding source, especially in areas that are remote, sparsely populated and hard to serve.

To put it bluntly, the Universal Service Fund high-cost program is vastly underfunded. Capital and operational expense caps must be eliminated. FCC Chairman Pai has even questioned the wisdom of these caps. My company is experiencing major negative impact from the implementation of the operational expense cap and we are in the process of working with the Commission on a positive solution. An examination and reform of the USF contribution regime is long over-due, and may eliminate any need for the arbitrary budget cap.

A just released GAO study (GAO–18–682) states—"Specifically, from 2010 to 2017, we found that less than 1 percent of FCC funding and about 14 percent of RUS funding went directly to tribes and tribally owned providers. Combined, FCC and RUS funding totaled $34.6 billion during that time period and tribes and tribally owned providers received $235 million, or about 0.7 percent." This illustrates the need for dedicated funding for Tribal entities.

In June of 2015, NTTA went on record at the FCC with a proposal to adopt a Tribal Broadband Factor (TBF) as part of the reform of the long term USF for rate-of-return carriers. The TBF included a multiplier for targeted support on Tribal lands, and had specific obligations for any carrier, Tribally-owned or not, that uses the program. The proposal was straightforward and easily understood, and was narrowly-tailored to address the specific need to promote broadband while causing very little impact on the overall USF mechanism. The FCC did not adopt this proposal.

NTTA continues to push for a Tribal area-specific high-cost mechanism (or revisions to the current mechanisms). We encourage Congress and the FCC to address this much needed reform to eliminate the digital divide experienced in Native communities.

We also believe that an increase in the enhanced lifeline credit for Tribal areas is vital to adoption and affordability of those who are eligible and qualify for this program. As I previously mentioned, our communities have very high rates of low income consumers.

NTTA recommends that a pilot program be established to locate existing infrastructure in Indian country. In many Tribal areas, current infrastructure facilities (water, sewer, gas, electricity) are not properly identified or mapped. The preference of burying new broadband infrastructure leads to unintended cuts and/or damage to existing utility facilities that can prove to be inconvenient and possibly dangerous to the local community as well as adding significant cost to a broadband build out. There are numerous instances of Tribally-owned and operated telecommunications companies using a major portion of their broadband project funding to repair damaged infrastructure. For example, MATI recently incurred over $350,000 of additional construction costs resulting from hitting unmarked water and sewer lines during its current fiber-to-the-home build. In the case of Tribally-owned companies, this funding would be provided primarily through RUS loans or grants. With aging infrastructure on Native lands, the scope of this problem is significant and unknown. A pilot program, with adequate funding, would allow all parties involved to develop best practices and methods to identify unmarked infrastructure to avoid damage and unneeded additional cost.

We also recommend additional funding for the development of more robust middle mile infrastructure and capacity. Most Tribally-owned telecommunications companies serve rugged and remote areas. Issues related to distance and capacity make connecting to the "outside world" very costly. As Tribal companies build out broadband to their communities, they add more customers and therefore more traffic on their network. Customer usage and consumer demands have also driven the need for more capacity (distance learning, telemedicine, video streaming, etc.). An injection of funds to build more middle mile capacity for Tribal use would greatly benefit those communities.

Also, there needs to be a reallocation of spectrum for Tribal use. The current process of spectrum allocation makes it very difficult for smaller entities to access spectrum. This includes Tribal communities which need both wired and wireless services to prosper. One way to address the scale of size issue is to establish a Tribal Spectrum Network to increase the capacity "buying power" of Tribal entities.

The previously mentioned GAO study addressed the need for better mapping mechanisms to measure the levels of access to broadband service in Native communities. The use of census blocks as a measurement simply does not work in a majority of Indian Country.

There are many other issues that can be addressed to enhance broadband deployment in Tribal areas: expansion and increased funding for USDA's Community Connect Grant program, the reduction of regulatory compliance reporting for small companies, and a better Tribal engagement and consultation processes. On this last point, the enforcement of engagement and consultation between Tribal entities, federal, state, and local governments, and private businesses must be improved. This includes a wide range of issues such as rights-of-way, easements, and pole and tower siting.

Mr. Chairman, much more work needs to be done on infrastructure growth in Tribal areas, most importantly in the area of broadband deployment. NTTA looks forward to working with this committee and other policy makers to provide Tribal communities with accessible, robust, and affordable broadband services.

Once again, thank you for the opportunity to testify today.

The CHAIRMAN. Thank you, Mr. Enjady, and again thank all of you for being here and for sharing your thoughts as we look at these issues and try and come to the best conclusions about how we can better serve rural areas of the country and ensure that everybody has access to the same quality of services that people in populated areas do.

Mr. Law, in your testimony, you emphasized the importance of predictable high-cost support.

Could you describe the process you go through in planning and deploying broadband and why predictability is so important to a small carrier like Golden West?

Mr. LAW. Thank you, Mr. Chairman. For all rural providers, when you are planning network upgrades over significant areas or even within specific communities, it is a multiyear process that involves identifying the needs, where do the updates need to happen or the upgrades need to happen, engineering it or at least coming up with an initial estimate to determine what's it going to cost.

Then you have to determine do I have the funding to do it, the customer base to do it. Then you have to deal with acquiring supplies, arranging for contractors, and in the Upper Midwest, you also have to account for the fact that you've got about a 5-month window from May through November, May through October, rather, that you can do construction.

Ultimately, design projects like that are a multiyear process. So we are working as Golden West right now, we're focusing primarily on our 2020 activities, of what are we looking to construct or upgrade or build in 2020 and 2021.

We've identified the items for 2019 already. The question will be, do we have adequate funding for it? So it is a multiyear process, Mr. Chairman.

The CHAIRMAN. Thanks. Ms. Thompson, I understand, it's Cheyenne River Sioux Tribe Telephone Authority's 60th Anniversary, so congratulations. We want to recognize you on that achievement.

Could you just kind of explain maybe some of the unique challenges that you've faced over the last 60 years as you've been able to come to them and what, if anything, Congress can help in overcoming those?

Ms. THOMPSON. Thank you, Chairman Thune. Some of the challenges that we face as the tribally owned telecom business on the reservation is where are we going to find the funding to bring a good quality service, which is in our mind is the fiber optics, and so without RUS funding, as Mr. Enjady noted in his opening statement, without that RUS funding, we would not have been able to build out the fiber that we did. So we were very glad about that.

The other challenge again is the Universal Service support and the cuts and the budget control mechanism and the pro rata factor, the impact that's had on us, and how are we going to continue to repay our loan, and also to make the service affordable for the low-income consumers that we serve in our area.

Like I said in my opening statement, I'm very happy that we did complete the build-out of fiber optics and the residents on the Cheyenne River Sioux Tribe Reservation have access to broadband service.

The CHAIRMAN. Great. Thank you.

Mr. Spellmeyer, we have been focused on making sure that the United States leads the world in 5G Mobile Broadband Services. However, we still have places that are without 3G or 4G services.

How will the lack of today's services impact the ability to deploy next generation services?

Mr. SPELLMEYER. Well, there is no doubt that the impact of bad data and bad maps is going to be very significant in its impact on 5G in rural America.

As we've seen in all the states that we've gone to, the FCC's maps have a high error factor. That's particularly important because what the FCC proposes to do in Mobility Fund II is to dedicate a full 10 years worth of support, based on those maps.

So if the maps are bad today in South Dakota and elsewhere, as we believe they are, it's going to be 2029–2030 before we can get access to additional government funding to come back and fix all those places and, you know, that's particularly alarming to us and it should be to all policymakers.

The CHAIRMAN. What would you use to determine whether the Mobility Fund II, which, as you mentioned earlier, is prepared to deliver $4.5 billion over 10 years to support and expand mobile broadband coverage in rural communities, what measure do you use to determine whether it's a success or not?

Mr. SPELLMEYER. Well, in the long run, I think 10 years from now you'll look back and see whether coverage has advanced significantly. We've got a lot of concerns about that.

The FCC set the speed target for Mobility Fund II at 10 megabits. So hopefully you'll get 10 megabit speeds out to rural America by 2029. You're going to have to take a look at that and, as I said again, if it only gets to half the places that really need it, it's going to be a terrible stumbling block to then move to 5G and 5G is likely to be—I characterized it the other day and other experts have as the next industrial revolution. It's going to change the country and if those changes don't come to half the geography in the country, it's going to be a terrible failure in the global race that we have with China and other countries to deploy 5G.

The CHAIRMAN. My time's expired.

Senator Udall.

STATEMENT OF HON. TOM UDALL,
U.S. SENATOR FROM NEW MEXICO

Senator UDALL. Thank you, Chairman Thune. I really appreciate the discussion you've engendered here.

Yesterday, the Senate Indian Affairs Committee, where Chairman Hoven and myself as the Vice Chair worked on a hearing and we convened a hearing around the issue of two recent Government Accountability reports. Both those focused on the significant need for additional dedicated attention and resources to provide broadband in tribal areas and, as Senator Cantwell said earlier here, I would suggest the staff to take a look at the testimony that came in because I think there are some very, very good things there that enlighten us a lot.

Yesterday, we heard some great practical ideas about ways to bring more broadband to tribal areas and most of them start with funding, both from the Universal Service Fund and from other grants or loans.

The question for the panel is does everyone here agree that we should have an infrastructure package and that it should include a broadband funding mechanism? If you want to elaborate a little bit that's fine.

Mr. LAW. Senator, I would answer two quick items. Overall, absolutely, yes, I agree, but I would also emphasize that RUS funding and, more importantly, Universal Service Funding are foundational

to that infrastructure package in making additional broadband investment.

Senator UDALL. Ms. Thompson.

Ms. THOMPSON. Yes, and I would agree to Mr. Law's statements. I do agree, absolutely, that there should be.

Senator UDALL. Thank you. Mr. Spellmeyer.

Mr. SPELLMEYER. Yes, Senator, U.S. Cellular certainly supports the concept of a large infrastructure package to address rural broadband, including in tribal areas.

The biggest challenge, other than finding the money, will be, as I've stated, getting the coverage determinations sorted out so the money can actually get there.

Senator UDALL. Mr. Enjady.

Mr. ENJADY. Yes, Senator Udall, it is greatly needed, especially in Indian Country. We always lag behind, as you can see from the numbers that I talked about earlier. We're still trying to catch up to the rest of the world.

Fortunately for us out in New Mexico, Mescalero, I was fortunate enough to work for a company called Comtel, which turned into GTE and eventually became Verizon but on the wire line side. From that, I was able to build a phone company, come back to the reservation and help build a phone company. So back in 2001, we opened the doors for Mescalero Apache Telecom.

I've been running the operation since then and working and advocating for more funding always to provide services on a reservation.

Our reservation's about 575 square miles. It's pretty huge and a lot of services that are needed by our tribal members. We've become very good at what we do but it's a hard thing to provide services to Indian land because there's not a lot of Mona Thompsons or Godfrey Enjadys on every reservation to be able to try to do that.

So the tribal engagement portion is very important for the FCC to make sure that they have the key people in place to be able to teach and educate, as we talked about yesterday, but, yes, more funding is needed. We need to be able to provide these services and the government is coming to where it's kind of more paperless, where we needing to use more iPads.

As you can see around the room, people are using their phones. We need that ability to have that come to our reservations and people to get to the services they need, that is so greatly needed, so yes. Thank you.

Senator UDALL. Thank you all for that answer.

Chairman Thune, I would ask unanimous consent to put this chart into the record.

The CHAIRMAN. Without objection.

[The chart referred to follows:]
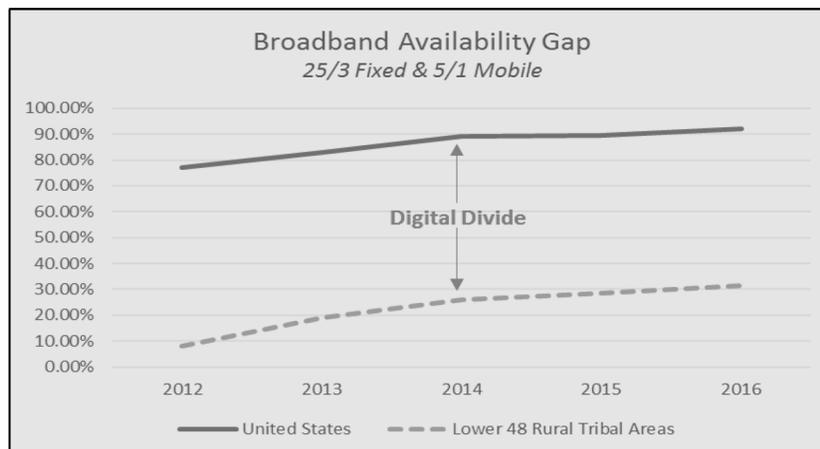
Senator UDALL. This is a chart we took from the FCC data and the very high graph on the end shows in the United States of America 92.20 percent is availability of broadband and that's in the United States and the much smaller down to a third, about 31.60 percent, is lower 48 tribal areas. So you can see the difference between tribal and non-tribal connectivity.

What does this severe lack of connectivity mean for tribal citizens to access to economic development, access to public safety, and their children's access to educational benefits that high-speed broadband offers?

I would focus on Mr. Enjady and Ms. Thompson on that. Please, Ms. Thompson.

Ms. THOMPSON. Without broadband on tribal lands, it would hinder the children's ability to get a good quality education and economic development definitely would impact that, as well. Public safety, broadband is important to all aspects of having quality of life on tribal lands, just as you would in other lands across the Nation.

Senator UDALL. Mr. Enjady.

Mr. ENJADY. Thank you, Senator Udall. Yes, it is very important, especially the education side, as Ms. Thompson's talking about. That is one thing that I'm getting older, hopefully these children that we're raising, I want to give them enough tools to be able to take care of me as I grow older and living on the reservation, it's kind of tough, and like I said, like any child, if they ask for something and want to learn something, obviously we teach it. So these are some of the aspects of what we as NTTA members try to do with our tribal members and hopefully we can outreach more.

I know, Senator Udall, you had talked about trying to get a school bus with Wi-Fi to be able to get the children to be able to at least have homework done before they get home or because, like you said earlier, that a lot of kids are trying to find Wi-Fi just anywhere to grab on and try to be able to do what they need to do.

But, yes, I appreciate your question.

Senator UDALL. Thank you, and thank you for the courtesies. I'm running over my time.

The CHAIRMAN. Thank you, Senator Udall.

Senator Hassan.

STATEMENT OF HON. MAGGIE HASSAN,
U.S. SENATOR FROM NEW HAMPSHIRE

Senator HASSAN. Thank you, Mr. Chairman, and I, too, want to thank you for your opening remarks and associate myself with them.

I want to thank you and the Ranking Member for this hearing and to all of the witnesses: thank you so much for being here.

Mr. Spellmeyer, I want to not only commend your testimony just now on the difficulty with the FCC maps and mapping process, but also I commend to the rest of the Committee the video that U.S. Cellular did of you and folks in the field trying to find their ways to these places where they're supposed to collect data, and where there aren't any roads.

It just showed a lot of the effort and a lot of the practical difficulty and I think the Committee could benefit from getting the link. So that's a homework assignment for you.

Mr. SPELLMEYER. Thank you, Senator. There is a link. If you go to the exhibit, there's a link at the bottom. We'll obviously circulate it around again. Most of the staff have it. It was a very challenging operation and I think that video captures it well.

Senator HASSAN. Yes. It really did. Toward that point, working with Senators Wicker and Moran, we challenged the FCC's process and we, along with members of this Committee, got the FCC to do a 90-day extension on the Challenge Process.

Is that 90-day extension enough, and what additional steps do we need to take to make these maps reliable?

Mr. SPELLMEYER. Senator, the 90-day extension was helpful. It is allowing us to drive right now to additional places, but as I indicated, you know, we've spent over $2 million. We've only gotten to 3 percent of the places that we really should go to, given the infirmities that we see in the maps, and, you know, I think we would benefit from an additional extension, if someone would be willing to grant us that.

But, frankly, I think we need to send the FCC back to the table to refine the model that led to these maps in the first place. We shouldn't be charged with going around and fixing a bad model. We should fix the model and then have a very minimal challenge process.

Senator HASSAN. OK. Thank you for that. I want to turn to another subject, Mr. Spellmeyer. I wanted to get your feedback on the importance of the AIRWAVES Act, which I introduced earlier this year with Senator Gardner.

This legislation now has 12 bipartisan co-sponsors in the Senate, including many people on this Committee. The legislation would ensure a Spectrum pipeline to meet the needs of a 5G America, would provide additional unlicensed Spectrum to benefit our Nation's entrepreneurs and innovators, and the AIRWAVES Act would make meaningful investments in rural broadband.

Mr. Spellmeyer, can you expand on the benefits the AIRWAVES Act and how this bill will help ensure 5G technology gets fully deployed not just in our heavily connected areas but throughout the country?

Mr. SPELLMEYER. Yes, Senator. I had to laugh. I spoke on a panel a few weeks ago and the press quoted me as saying I love the AIRWAVES Act and that remains the case. It's an important piece of legislation.

Senator HASSAN. We might have noticed that. Just saying.

[Laughter.]

Mr. SPELLMEYER. It is an important piece of legislation not only because it will help identify and free up additional Spectrum for 5G deployment, which will be important, but it contains the provisions related to the digital dividend which would set aside a portion of future Spectrum proceeds and to use those for rural deployment.

We don't think the Mobility Fund II is big enough to get the job done in the long run and that digital dividend, especially if we can get it passed before we do all these 5G options, will be very beneficial to rural America and deployment.

Senator HASSAN. Well, thank you for that. I wanted to ask about one other piece of legislation. It's a bill I introduced with Senator Capito that would establish a national standard for determining whether mobile and broadband services in rural areas are truly reasonably comparable to the service in urban areas. I think, Mr. Law, you had mentioned that concept, too.

I'll start with Mr. Spellmeyer and then maybe, Mr. Law, you can jump in.

The Rural Reasonable and Comparable Wireless Access Act would help ensure that there is equitable wireless and broadband coverage in rural and urban areas, something which has long been undefined.

So first, Mr. Spellmeyer, do you think this legislation is important, why or why not?

Mr. SPELLMEYER. I absolutely do. That, you know, reasonably comparable standard was in the 1996 Act. It's what the FCC is supposed to be working from. Unfortunately, that's kind of, you know, slipped to the back burner and your bill, along with Senator Capito, is important because it really does direct the FCC to do certain things, to take an inventory of that standard, and it will advance the equitability of service across the country.

Senator HASSAN. Thank you. Mr. Chair, if I may hear from Mr. Law? Please go ahead, sir.

Mr. LAW. We would be also supportive, Senator, of identifying reasonable and comparable as well as the addition of. That standard will change overtime and——

Senator HASSAN. Right.

Mr. LAW.—so appreciative of the legislative effort. Thank you.

Senator HASSAN. Well, thank you very much, and thank you, Mr. Chair.

The CHAIRMAN. Thank you, Senator Hassan.

Senator Cortez Masto.

**STATEMENT OF HON. CATHERINE CORTEZ MASTO,
U.S. SENATOR FROM NEVADA**

Senator CORTEZ MASTO. Thank you, Mr. Chair, and I, too, want to echo the comments of my colleagues.

I want to thank both you and Senator Klobuchar for your opening comments. I couldn't agree more.

Thank you all for being here as well as the hearing yesterday in Senate Indian Affairs.

Let me just start by this. Mr. Spellmeyer, I agree with you. As we move forward with 5G, and I think we should, we've got to address this issue of our rural communities that are not connected and underserved communities because they will be left behind, and I think that's a tragedy on so many levels from what we were just talking about, from the need for economic development that this connectivity brings to public safety to education, e-learning, to health care, behavioral health. I mean, there are so many things that we should be focused on.

So one of the topics that I want to talk about is grant funding and I was reading through the GAO report on the tribal broadband and I noticed many of the same concerns that tribal communities have are shared by those in our rural communities.

I'm from Nevada. We have both, and specifically under the section titled Grant Application Requirements, the report said, and I quote, "Representatives from eight of the tribes were contacted, told us that in general the language included in the Federal grant applications is difficult to understand or the administrative requirements of Federal grants are burdensome."

And again this is similar to what I hear across Nevada and I don't know if my other colleagues have, but I have applied for Federal grants and you literally need a degree to get through all of the requirements there.

So based on this input, I joined with Senator Gardner of Colorado and introduced the bipartisan Access Broadband Act and what this bill does is establishes a coordinating office for Federal broadband resources at the NTIA and requires that office to come up with a streamlined application process that is as uniform as possible for all of the Federal broadband programs.

So I wanted to open it to the panelists. Can you talk a little bit about what you're seeing with the application process and the comments that were in the GAO and would streamlining these grant programs help to bring needed dollars into the tribal communities to address what we are talking about today? Does anybody have any comments on that? Please.

Mr. ENJADY. My comments on that would be the fact that grants are great. The streamlining process, you usually go out—most tribes will get whoever they need to do that, but the biggest thing is that after you get the grant, put whatever you need to put in a grant or whatever, say telecommunications, you need sustainability of funding behind that to be able to take care of that because most tribes are very poor. They're not able to take care of the infrastructure itself after you've put it in.

So that's a big problem that needs to be addressed in some way of additional funding as the project goes along. So those are some of my comments that would be needed, but like I said, they're

great, but like I said, you've got to be able to pay for it afterwards and most tribes just don't have that funding right now.

Senator CORTEZ MASTO. Right, right. Thank you. Anyone else? Please.

Mr. SPELLMEYER. Senator, I can't comment on that process in particular, but if you look at my testimony, you'll see an attachment with 50 pages of instructions from the FCC about how we're supposed to upload the data that we collect in this Challenge Process and if it's anything similar to that, you get a feel for just how complicated it is for small enterprises to deal with this.

Senator CORTEZ MASTO. And I agree because I know part of the grant process for tribes particularly and the requirements are access to the data that's going to be necessary to apply for the grants and if you don't have accurate data or can't sustain it or get that information, it makes it difficult to even do that initial application, to even put your foot in and open the door to getting access to that funding. So I appreciate that.

Mr. Law, in your testimony, you mentioned that Golden West was recently given a SMART Rural Community Showcase Award.

Mr. LAW. Correct, Senator.

Senator CORTEZ MASTO. Do you mind, can you talk about some of the exciting things that you're doing, that you're seeing in rural America on this, and how important it is for the communities to have Federal and private partners?

Mr. LAW. Thank you, Senator. I'd say the exciting opportunity from the broadband are some of the items that were touched on today in terms of enabling small, rural, remote at times, depending on how you want to define remote, providing them with the digital opportunities to enhance the quality of life within those communities and so one of the communities that we worked on the eastern side of the state where we did a complete upgrade of the system in that community for Dell Rapid, South Dakota, we went through and met with various businesses, both how they use broadband today, at that time, as well as what did they need their broadband to be able to do for them in the future, focused on them in terms of capacity, system requirements, and really how that transforms their business opportunities specifically from contractors to main street, two-people to 30-people operations.

Those were some of the areas that we focused on in our SMART Rural Community application. Certainly we have other examples throughout, but it was an exciting process, honored to receive the award, and I hope there are more areas in rural America that we can talk about having a SMART rural community.

Senator CORTEZ MASTO. And I do, too, and that's why I introduced the Moving First Act. I think it's important that we authorize more grant funding programs for rural America, for certain communities to access the funding to do just what you talked about. So thank you.

Thank you, Mr. Chair.

The CHAIRMAN. Thank you, Senator Cortez Masto.

Senator Baldwin.

STATEMENT OF HON. TAMMY BALDWIN,
U.S. SENATOR FROM WISCONSIN

Senator BALDWIN. Thank you, Mr. Chairman. Many of Wisconsin's rural telecom companies trace their roots back to the early 20th Century. In order to serve their own rural communities, Wisconsites often formed their own telecom companies that would issue them shares in return for a small investment.

Today, many of those same companies still exist and remain the sole provider of phone, TV, and high-speed broadband in their communities. However, these original companies' shares have been split among children who have then split them among their children.

This has gone on for so many generations now that some Wisconsin companies will soon hit the SEC's 500-shareholder threshold, which requires the issuer to submit independent financial audits that can cost hundreds of thousands of dollars.

Now I've heard from a number of Wisconsin rural telecom companies that these reporting requirements are unnecessary in their circumstances and very burdensome.

So, Mr. Law, I understand your company is a co-op and does not have this problem, but I know you interact with many others, and I wonder if you could describe how the current reporting requirements impede rural telecom companies and discuss what we can do to ease this burden.

Mr. LAW. Thank you, Senator Baldwin. Certainly any of the rural telecommunications providers on this panel or throughout the country can tell you about the regulatory burdens in terms of provision of quality of service across wide areas, reporting to state authorities, public utilities commissions, the Federal Communications Commission, reports for Universal Service Funding. There's a whole litany of those things, but they are all dedicated to the provision or the providing of broadband services.

The action that you're referring to specific for the Wisconsin companies, and there are other companies throughout the country that are impacted by that, is involving Securities and Exchange Commission filings because the initial founders or shareholders of that company way back when, and many companies formed that exact same way, now has grown over the years and, all of a sudden, they trip a level for a non-publicly-traded entity that has, I'll say, evolved over the years to add the layer of SEC reporting requirements on top of what in many cases may be a 10–12–20-person operation that may not have that expertise is a tremendous six-figure financial burden, not just for Wisconsin companies but to others, as well.

But if they a similarly caught company, so to speak, that tripped that threshold on the number of shareholders, I would hope that some mechanism could be found to provide them an opportunity to either be waived or the requirements lessened because there is already a substantial, I'll say, regulatory burden in being in the telecommunications business.

Senator BALDWIN. Thank you. During the Committee's August FCC Oversight hearing, Commissioner Rosenworcel and I discussed the shortcomings of the current picture of what level of broadband service exists in which parts of the country.

In particular, I expressed my concern that we rely too much on the industry alone to tell us where the service exists, whether that is data submitted by providers or, as we've heard today from Mr. Spellmeyer's testimony, the costly efforts undertaken to identify service gaps as part of the Challenge Process.

Commissioner Rosenworcel and I discussed how the Federal Government could and should do more to bear the burden of having the accurate maps, and I suggested that there are a lot of Federal agencies that operate in rural parts of my state every day, the Postal Service and many others, that should be able to contribute to our knowledge of what's truly available to customers there.

Mr. Spellmeyer, given your company's experience on the ground testing as part of the Mobility Fund Challenge Process, do you agree that it makes sense to leverage these kind of Federal resources to collect more accurate data on broadband service and are there other ways beyond that that you think we should bring more stakeholders into the process?

Mr. SPELLMEYER. I do, Senator. The biggest single cost of this undertaking is the labor to drive the roads and we're going to have to deal with the stuff that's off the roads, as well, and ideas, like the Postal Service, the sheriff's department, the state patrol, have all been talked about and are worthy of consideration.

Beyond that, the concept of trying to use a model was a good one and, as I said earlier, I think the FCC just—another way to do this is to go back and take a short delay and fix the data and then let's move forward. We shouldn't need to drive every road to verify a model.

Beyond that, NTIA Administrator Redl just announced an RFP coming this fall where NTIA got $7.5 million, I believe, in the Appropriations Bill to work on mapping and they're going to push forward on that. They probably need more funding than that, given that I had to spend $2 million to cover 3 percent of my 15 percent of the country, but certainly all of those are viable options.

The CHAIRMAN. Thank you, Senator Baldwin.

Mr. Law, could you speak a little bit about what resources that you have or need as RUS moves forward with its pilot program to prevent overbuilding in your service area?

Mr. LAW. Thank you, Mr. Chairman. The concern is that as the RUS moves forward with its pilot program deals with there is a significant amount of money available, $600 million, but the question is what areas are eligible for that funding and, as a rule telecommunications provider, I strongly believe, and I think the industry supports that, those funds should be deployed to further broadband in areas that does not exist today.

There is language involved that RUS is seeking comment on about what standards should be used. There was language from the Senate that dealt with a 90-percent threshold, that if the area had a 90-percent coverage threshold—I'm sorry. If up to 90 percent of the customers didn't have coverage there, that the pilot funding was available.

House version sets a much lower level, and I think it would be disappointing to have RUS funding potentially working against funding of other programs, specifically USF or RUS loans to other providers, for the purposes of providing network.

Certainly the testimony here today and the comments from other members on the panel have all talked about the need to deploy broadband in areas that don't have it. It gets to be a lot more challenging to talk about not just deploying it in areas that don't have it but do we deploy for the second or the third or the fourth provider in areas that already do have it?

I personally don't believe that that's a satisfactory use of Federal funds used to deploy broadband.

The CHAIRMAN. Thanks. Ms. Thompson, can you explain what the impact that the current USF High-Cost budget shortfall's having on your company and the communities that you serve?

Ms. THOMPSON. Sure. For 2018, the impact to CRST was a loss of approximately 935,000 and that's due to the pro rata factor, the budget control mechanism, and the CAFVLS, and then for 2019, the new figures just came out yesterday, our impact is going to be $1.2 million of loss in support.

The CHAIRMAN. Mr. Law?

Mr. LAW. For the current funding year for Golden West, the budget control mechanism alone will impact us by $4.2 million, Mr. Chairman, and specifically that impact is based off of investments that Golden West made in broadband services two or more years ago and so the investments we made last year and the investments that we made this year really were done without the knowledge of what that budget control mechanism will be and so while $4.2 million is a significant amount of money to any company and certainly Golden West, the fact that the budget control looms even larger potentially in coming years makes it concerning in regard to our commitment to invest significantly in additional broadband services.

We will continue to invest at some level. However, I think it will be challenging in the current environment with the lack of budget and the budget control mechanism from the FCC when, all of a sudden, you take a $4.2 million haircut in 1 year and that number has increased each of the last three and a half budget cycles from the FCC.

So it's dramatic for us and we've had to either pause or cancel particular capital projects that would have furthered broadband expansion.

The CHAIRMAN. Mr. Enjady, any comment on that?

Mr. ENJADY. Repeat the question again.

The CHAIRMAN. The shortfall in the High-Cost budget——

Mr. ENJADY. Yes, it has caused a significant impact. Yes, I've lost pretty much along the same line as Mona's talking about, about $900,000. It has been tough. I've had to cut our budget by that much just to try to stay alive.

Again, once you use the High-Cost Fund, it's a double-edged sword because you have to spend money to be able to get money from the fund itself. So once I cut, I lose even more money. So it's even a tougher situation for us out in Indian Country, especially when we went out and borrowed money in the first place from the government, RUS, and be able to pay that back through USF. It is a double-edged sword.

We're trying to make it work, but like I said, once you go one way and the other way, it's a fine-tuning of trying to do this. Hopefully, the FCC can provide more funding, take the caps off, and

that will get us back in to be a whole company where we're just trying to provide services.

Right now, all my energy is trying to just balance our budget because predictability is not there. So once the FCC can be able to provide the funding that we need to be able to put us back on track, we can be able to go out and borrow money.

As you know, tribes cannot collateralize their tribal lands. So conventional banks, we cannot borrow from them. So RUS is our only provider of funding. So that's the only way we can do this.

The CHAIRMAN. Mr. Spellmeyer, as this committee heard in our recent hearing on the Race to 5G, the three and a half gigahertz band is the closest to market mid-band Spectrum for wireless use.

As the FCC considers the final rules for this Spectrum band, what's the most important for your company's ability to deploy in rural areas?

Mr. SPELLMEYER. Well, so I have had an opportunity to look at the Draft Order that is going to be voted on in a few weeks and, you know, to us, there are two major things.

One is license area sizes. That's counties in the three and a half gig item and we're supportive of that. We think that's a good compromise. The other thing that we look at is access to Spectrum by non-national carriers. Anybody smaller than a national carrier needs to have a pathway to get adequate Spectrum and so that's something we focus very closely on.

The CHAIRMAN. Thank you.

Senator Moran.

STATEMENT OF HON. JERRY MORAN,
U.S. SENATOR FROM KANSAS

Senator MORAN. I think Senator Klobuchar is next.

Senator KLOBUCHAR. No.

Senator MORAN. Mr. Chairman, thank you very much.

Mr. Spellmeyer, I'm going to start with you. We've had conversations about this topic and I know this has been talked about in this hearing, but I would put in the record, I continue to find the Mobility Fund Phase II Eligibility Map to be inadequate.

I've had that conversation with the FCC Commissioners. We've had that conversation in person. We've had this conversation in hearings in this room. I've heard the continued complaints from my carriers in Kansas and organizations like the Kansas Farm Bureau who are out trying to do tests to provide the information in the appeal process, and I've indicated this before and I would say it again.

It is troublesome to me that the FCC has a map that they know is faulty, they know is failing to meet its purposes, and the only solution that they have provided is for an appeals process, which means government is shifting the burden to people without the finances, the resources, the time and ability to correct a map that we know fails us.

I would compliment the FCC. They've taken several steps at our request, at others' request, to make this process different, and to give more people the opportunity to participate in the appeal.

But really what we need, you talk about a model in your testimony, how do we refine the model so that this is not about people

out testing, it's not about people trying to figure out how they get to a point in Kansas in which they can take this reading to demonstrate the map is failing? What's the model that can be used?

Mr. SPELLMEYER. So originally, Senator Moran, industry got together and agreed on a set of parameters that would be used for this one-time data collection. That agreement was based upon the way we engineer our own networks, things like cellage probability and cell-loading factors.

When that went to the FCC, unfortunately, the FCC watered those standards down, introduced a much higher error factor, an allowable error factor into the map, and once you've created four maps with a 20-percent error factor and overlaid them on each other, you end up with a real mess.

So, fundamentally, I think we need to go back to what was originally proposed by industry, quickly seek comment on it, and tighten down on those error factors so that we can get a better model and then we don't all have to drive around in a circle.

Senator MORAN. So this map and the appeal process will not end in a satisfactory result. We need to move ourselves away from this and begin again.

Mr. SPELLMEYER. I don't see any way that it will end in a satisfactory process. We've spent, as I said earlier, $2 million. We've covered 3 percent of our footprint. Everywhere we go, we're finding a 30–40–45-percent error rate in the areas that we're looking at.

The maps just are nowhere near accurate and many of you know it, if you look at your states, and you see in some instances an entire state has been deemed covered when you know it's not and in other places, the states are partially covered but everybody I talk to, you know, both Houses of Congress, all the Members of Congress that drive around all the time, they all know they're just terrible, and we can't lock it in for 10 more years that way and say Kansas is done, come back to us in 2030 and we'll revisit it then, or the tribal areas in Washington are done, so come see us in 2031.

Senator MORAN. Thank you very much.

Mr. Law, I do support the short-term funding. Let me tell you that every Kansan has been to Wall, South Dakota.

Mr. LAW. Thank you.

Senator MORAN. It's part of our growing-up experience. While I support the short-term funding the FCC agreed to provide in the USF High-Cost Program for rate of return carriers earlier this year to mitigate the consequences of budget control mechanism, I continue to urge the FCC that a sufficient and predictable funding for this program is critical for connecting our rural communities to high-speed broadband.

I assume you agree and I assume that this lack of certainty creates consequences in your decisionmaking process for deployment.

Mr. LAW. Thank you, Senator. Thank you for your support of the control and working with the budget aspects.

In response to an earlier question in terms of the planning cycle for networks as a telecommunications provider, it is a multiyear cycle just to plan it and deploy it, and I'll say to get it in the ground or hung on the poles and delivered to the house is a several-year process.

So in my organization, we're talking about what we would like to be doing in 2020 and 2021 right now. That is years out, but with the overhang of really an uncertain and wildly varying budget amount or potential funding available, the willingness to take a risk on funding that not only may not be there but may be significantly less than the funding that we have today causes us to look at less broadband upgrades instead of more at the time that a national priority is more rural broadband.

Senator MORAN. Thank you very much.

Mr. Chairman, have I bragged sufficiently on South Dakota that I can ask a third question? Thank you.

[Laughter.]

The CHAIRMAN. Of course you are.

Senator MORAN. It was the Thunes that brought us and our daughters to Wall, South Dakota, and it was my parents who took us to Wall, South Dakota, as kids. Every middle-class Kansan has to see Pike's Peak followed by Mount Rushmore and the Badlands. Thank you for your hospitality. We good? OK.

[Laughter.]

The CHAIRMAN. Proceed, proceed.

Senator MORAN. This again for you, Mr. Law, is I want to talk about the Farm Bill. In June, the Senate passed its version of the Farm Bill that included protections that we encouraged and insisted be included to prevent Federal subsidies administered by the Rural Utility Services from overbuilding, to overbuild on top of existing telecommunications infrastructure.

These protections were left out of the House Farm Bill and I just would like you to confirm that you and others would be supportive of the Senate version on this issue.

Mr. LAW. Thank you, Senator. Strongly supportive would be an accurate reflection of the Senate provision as it relates to the necessary items in place to prevent over-building areas where perhaps it is a struggle to support one network and take the focus off trying to figure out how do you get more networks in an area that can't support one network without Federal assistance. Thank you.

Senator MORAN. Thank you for both your answers.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Moran. Well done. You can brag on South Dakota, too, if you want to.

Senator KLOBUCHAR. We won't get into the football team.

[Laughter.]

The CHAIRMAN. Senator Klobuchar.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Mr. Chairman. I think she's going to pass to me, but I'll brag on South Dakota.

The CHAIRMAN. Senator Cantwell.

Senator CANTWELL. Definitely, definitely, definitely want to continue to work with the Chairman on making sure we have continued access to great sites for our national parks and we just moved legislation yesterday and are helping you with a lot of things in your state, which has many great assets, but getting there and the

infrastructure is very important, so we'll keep working with you on that.

I thank the witnesses and, Mr. Enjady, thank you for yesterday, as well.

To me, we could have more accurate data and information or I guess I should say crystallization of the issue in ways that would make it simpler to then decide what and where do we want to play our role in helping rural broadband and broadband in Indian Country.

But I wanted to ask the witnesses about this issue as it relates to the networks writ large. Having experienced around Washington several incidents where we have been able to get broadband delivered in very rural parts of the state or to Indian Country, we've had some great innovations, whether that's the PUDs, the public utility districts, being involved in the last mile or this issue of open access, which I know probably scares big providers because they don't want their network to be open access.

But at the same time, do we need some creativity at the local level to help on this last mile issue, yes or no?

Mr. LAW. Senator Cantwell, thank you for your question. I think in areas where there are committed providers to serving small rural or insular communities, honestly, I'm not sure that is necessary, and I think I could point to the three providers behind the table to say each of us and our organizations are committed to these small rural communities, not that there is not a role for some level of local government involvement. However, when you're talking about network deployment and other things, I think that gets a lot stickier.

As you get into other areas that may not have a committed local community provider, perhaps that's a different discussion, but I can only speak for the areas in much of South Dakota. For example, 75 percent of our land mass is served by locally-owned-based telecommunications providers and I think if you talk to the majority, if not all, of the communities inside that channel, I think they'd tell you that there is not a role for them.

Senator CANTWELL. OK. Yes, Mr. Enjady.

Mr. ENJADY. Thank you, Senator Cantwell. Yes, there needs to be involvement by tribes. There needs to be an understanding because most tribes do not understand what's going on. That's one of the things that we talked about yesterday, was education, educating tribes, getting the FCC to play a role in that, and it's the engagement process.

This is something that's much needed. Local governments have no knowledge or idea of how telecoms work. Like I said, when it comes to myself, we are general managers of small telephone companies but there are only nine of them throughout the United States and if we look, there are a lot more tribes than that.

So more participation by local government in tribal areas is needed to be able to provide comments to you to say that this is what we need. We're always the last ones left behind. So this is something that we've fought hard for.

NTTA as an organization has done that, too, to make people aware. As I speak, I'm just only one of nine tribally owned telephone company general managers that provide information about

tribal areas. We took it upon ourselves to be able to provide these services and be able to get our reservations hooked up, as you could say, with devices to be able to provide these broadband services.

Not every tribe has that opportunity. This is something that again, like I said, education is needed and if we can get the FCC to really push hard on that, the office, ONAP, being able to provide those services to Indian Country would be greatly needed. Thank you.

Senator CANTWELL. Well, I think the question here is just we're talking about trying to deliver broadband services to smaller populations where carriers just aren't running to because the market is not there and yet we have these programs that are supposed to help and yet we can't quite crystallize in some of these instances exactly how that's going to work or how much resource.

So I would just say from my own experience, Neah Bay being one of the most remote parts of our state at the end of the Strait of Juan de Fuca, yet that's where the Coast Guard is, that's where the Makah Tribe is, that's where health care delivery is. If you want health care other than right there in that community, you're going to be driving hours.

So it's essential that we have broadband and I think CenturyLink stepped up to that, working with the community, but it took a lot, a lot more hand-holding and coordination than people could even possibly imagine, and I'm not even sure that we're completely done because I think they're still looking at what service they are going to deliver there and how is it going to pencil out for the community, but I would just say that our rural communities, just like they deserve, Mr. Chairman, hospitals and critical access hospitals and just like they deserve infrastructure investment, like airports, they also deserve broadband investment.

So thank you for making this a priority.

The CHAIRMAN. Thank you, Senator Cantwell.

Senator Klobuchar.

Senator KLOBUCHAR. Very good. Thank you, Mr. Chairman. I'm glad to be back. We have a lot going on. You can always do two things at once, especially something this important.

As we work to close the digital divide, it's critical we understand where broadband is available and it's not. I mentioned in my opening statement the mapping issues and while the FCC can't verify coverage at the local level, consumers can provide valuable feedback about service quality at the places they live and work.

Mr. Spellmeyer, do you believe allowing consumers to report data could help create more accurate FCC maps, including when it comes to distributing funding? This is the crowd-sourcing idea.

Mr. SPELLMEYER. Yes. I absolutely do. We urged the FCC to incorporate that into the Challenge Process. Unfortunately, they decided to limit it to state and local governments absent a waiver.

Senator KLOBUCHAR. But this is one thing we could look at in the future?

Mr. SPELLMEYER. It absolutely is. A number of folks talked about it, including Commissioner Rosenworcel. My company can't drive to each of those one square kilometer grid cells that I described in my testimony, but there are a lot of people that live close to those who

could begin to tackle that issue. It's an important resource and it should be leveraged.

Senator KLOBUCHAR. OK. Mr. Law, Ms. Thompson, actually Chairman Thune and Senator Tester worked with me on this rural call complete issue.

As you know, unbelievably so, a number of rural calls are just dropped by basically middle men providers and others that don't think they're work the while and then what happens is people lose customers, including emergency providers have had this problem.

We did pass something to push the FCC to improve this and there have been some improvements, but could you tell me if your customers have experienced difficulty with any of these long distance calls?

Mr. LAW. First, Senator Klobuchar, Chairman Thune, Senator Tester and many members on this panel, thank you all for your support and advocacy for the legislation for rural call completion. The legislation was and is beneficial. It is now working its way through the process at the FCC——

Senator KLOBUCHAR. Right.

Mr. LAW.—in terms of setting up those guidelines. I will tell you as recently as two weeks ago in my office, we still experienced and had a customer, a large business customer of ours contact us to indicate that they were not receiving calls. So the problem does exist.

I'm hopeful and optimistic that a solution continues to be found. The legislation absolutely is helpful.

Senator KLOBUCHAR. Very good. You want to add anything, Ms. Thompson?

Ms. THOMPSON. Yes, thank you. I have not had any customer complaints about dropped calls of recent. I had taken several calls maybe a year or so ago but within the recent year, I have not heard any.

Senator KLOBUCHAR. Yes, I think there has been some improvements but, as we know, it's still going on, and I think shedding light on this has been helpful. Thank you.

Mr. Spellmeyer, I mentioned in my opening that we want to try to install the physical infrastructure at the same time before expanding broadband as we do other things.

Could you talk about how that might be helpful to get fiber conduit laid?

Mr. SPELLMEYER. It absolutely would be. It's something we've been supportive of in the past. The cost of opening and placing fiber optic especially on public roads is significant and the more we can get fiber out to the cell sites that we use to provide service and the more economically that can be done the better off everybody will be.

Senator KLOBUCHAR. OK. Have you all experienced challenges obtaining permits or can you give some examples on Federal land? What were some of the principle delays that you encountered?

Mr. LAW. Senator, thank you. Golden West serves a significant portion of Federal land, including national parks, Forest Service, Bureau of Land Management, Corps of Engineers, and I'm probably forgetting a couple of other agencies that we cross territories, as well.

Senator KLOBUCHAR. Can you name all their acronyms?

Mr. LAW. No, ma'am.

Senator KLOBUCHAR. You're not under oath.

Mr. LAW. At times, we have had significant delays, measured in years, merely to go along road right-of-way. I say merely because we had proposed in a particular area in Forest Service land in this case for a fiber construction project that would follow along road right-of-way, a nice two-lane highway in very rural South Dakota, very similar to what you would see in Minnesota and other rural states, and due to delays in receiving the permit to go along that road right-of-way, we had purchased several million dollars of material that sat in a storage area for over a year and a project—we missed the cycle and so we were granted the permit the following November, which meant we couldn't start construction until the next spring and we lost that whole year from that. That's just one example. I have several I could provide. Thank you.

Senator KLOBUCHAR. OK. Anyone else?

Mr. SPELLMEYER. We have certainly run into it on a number of occasions in particular in our operations in Washington and Oregon where we're adjacent to a number of Federal lands.

Senator KLOBUCHAR. OK.

Mr. ENJADY. Thank you, Senator Klobuchar. Yes, we do have two projects that are ready to go. Fortunately, working with the Forest Service, they streamlined our process and we went through quite quickly. The problem I have now is just trying to get funding. I just don't have——

Senator KLOBUCHAR. Right.

Mr. ENJADY.—a business plan to be able to provide the funding to be able to borrow the money to build it out.

Senator KLOBUCHAR. Right. And there are two big sources. One is the Universal Service Fund that I mentioned earlier and getting more money allocated from that and Chairman Pai, we're pushing to get that done. The second would be a major infrastructure investment, which, you know, we had every point of the Tax Bill was, I think a hundred billion or something like that, and you think about we may have done one or two points less, that would have been a huge investment we could have made, but we are where we are and so we need to ramp that up again.

We know we have other issues, as well, with locks and dams and with our highways and bridges and rail and we don't want to fall behind the rest of the world, especially when we see this tremendous export market, and the broadband should be a major part of any infrastructure package.

Thank you.

Mr. SPELLMEYER. Next year, Senator.

Senator KLOBUCHAR. OK. Got that. Thanks.

The CHAIRMAN. Thank you, Senator Klobuchar.

I think we have one member who still would like to ask questions. I'd ask if he could just indulge us for a little bit longer. We'll wrap up here momentarily.

Since Senator Klobuchar referenced this and it has been referenced other times today, I think it's important to address this, we have a bill that I introduced along with Senator Schatz and we're trying to build bipartisan support for it that gets at the issue that Senator Klobuchar raised called the Streamline Act and it is

designed to expedite and make it easier to get some of these projects sited and permitted that creates a shock clock, a certain amount of time in which local governments would have to act on that.

There's been pushback from some local governments. We've tried to work with them. We want to make sure that we respect their prerogatives in this, but we think it's really important as we race to 5G that we make it easier, not harder, to invest and build out and deploy some of these projects.

I don't know if you had an opportunity to look at that yet, but could you comment on the STREAMLINE Act and how that might bear on the ability to get some of these projects up and going faster?

Mr. SPELLMEYER. Absolutely, Senator, Mr. Chairman. I believe you and Senator Schatz have found a great compromise with the legislation you've put forward. We're fully supportive of it and it will no doubt expedite deployment of 5G in rural areas. So thank you.

Mr. LAW. Senator or Mr. Chairman, I would also echo support for it and perhaps tie something to it that's not perhaps as readily apparent.

While the focus is on 5G specifically, as it relates to 5G, 5G is heavily dependent on a very rich and deep fiber network which affects providers, such as myself, and so the ability to have the Streamline Act in terms of the permitting and that aspect of it will have potentially direct impact not only on that level of broadband but deployment, as well.

The CHAIRMAN. Thank you.

Senator Wicker.

STATEMENT OF HON. ROGER WICKER,
U.S. SENATOR FROM MISSISSIPPI

Senator WICKER. I know the Chair is delighted to see me breathlessly come into the room here after everybody else had supposedly finished.

We've had problems with scheduling today, as you might imagine, and I understand there have been questions about the map and about the Challenge Process, about the fact that there is additional time, but that alone, we still don't have a comfort level that this is going to get the right information to the decisionmakers with regard to this Mobility Fund and so let me follow up on that to Mr. Spellmeyer.

Will we be able to challenge all geographic areas presumed to lack unsubsidized 4G LTE service within the allotted time that's now been extended and why is it so important to get the map right before the Mobility Fund Phase II Auction begins?

Mr. SPELLMEYER. Senator, we absolutely will not be able to get to all of the areas that we'd like to get to.

I talked in my testimony, you know, we've taken 16 million readings. We've spent $2 million doing so and we've only gotten to 3 percent of our ETC footprint and there are a whole lot more places we need to go.

I've got 20 drive test teams in the field in a dozen states right now and we're going as fast as we can but we're going to run out of time before we get to the end of the extended Challenge Process.

It's crucial to get it right because, you know, these maps are just wildly inaccurate in a number of states and we're going to lock those states into the state they are today, the condition they are today for the next 10 years and it's going to be 2030 before we can go back and bring some of these places up to five megabits per second at a time when by then 5G will be running around urban areas at a gigabit a second and it's going to crack open a digital divide that's far worse than what we've seen previously when people in urban areas have, you know, self-driving cars and remote health care and we're going to be lacking the kind of precision agriculture and all those other benefits that we need in rural areas.

Senator WICKER. That's certainly the apprehension that I have and I think a lot of Members of Congress have.

Do you have any legislative steps that you would like to suggest to the members of this Committee to address this problem?

Mr. SPELLMEYER. So, Senator, I think the FCC has all the tools they need to get this right. There just hasn't been enough time and attention devoted to it. Certainly, I would urge Congress——

Senator WICKER. What if they're not convinced that the steps need to be taken?

Mr. SPELLMEYER. Well, I would like to see the FCC directed to stand down and if they're not willing to fix it, then we give it to NTIA. Administrator Redl has talked about doing so. There are ways to do this and to do it in a relatively efficient timeframe so that we get this right.

I think the FCC's tried. I don't mean to be overly critical today, and this is challenging, but we can do better than what we have.

Senator WICKER. Thank you, and I agree. Thank you, Mr. Chairman.

Senator KLOBUCHAR. Mr. Chairman.

The CHAIRMAN. Thank you, Senator Wicker.

Senator Klobuchar.

Senator KLOBUCHAR. Yes, since Senator Wicker is here, I just wanted to ask a question about the work that we've done together on the Precision Agriculture Connectivity Act, which identifies gaps in coverage and encourages broadband deployment on farms and ranchland.

In addition, Mr. Law, to poor coverage data, what are some of the funding challenges associated with deploying broadband on farmland because we know everyone is—you know, we want to be as up-to-date as the equipment and be able to take advantage of using less water or using less pesticides or being smart economically as well as environmentally and that's a bill that we passed.

So could you tell me why this is important?

Mr. LAW. Thank you, Senator, for your question. I concur that the amount of computing power required today to run today's modern agriculture, family owned, I'm not talking corporate anything, family owned agriculture operation is absolutely staggering.

The connectivity needs and the corporate computing power from the probably millions, if not billions, of data points that they have,

I think, is a great example of why broadband in the farming and ag area is so important.

The challenge from the deployment perspective is typically farms are spread quite apart. The broadband network benefits from density, density of customers, density to spread those costs amongst other users.

However, in terms of importance, I think, you know, your example and your legislation points out a great example of perhaps no more important provision than the connected ag issue.

Senator KLOBUCHAR. Thank you.

Senator WICKER. And if I might add to that, Mr. Law, there is an efficiency aspect to this need, that there is an American productivity aspect to this need, and also there's a very important environmental aspect to this need.

We can limit the amount of pesticides and insecticides and fertilizer that are applied by these family farms by getting the data right, isn't that correct?

Mr. LAW. Absolutely agree with you, Senator Wicker. The ability to produce additional resources from existing land with more data that is available than ever before, I think we're probably at the beginning of this, not at the end in terms of where this may go and the freedoms that that probably allows the rest of us who aren't directly involved in production agriculture to have.

Senator WICKER. Thank you, and thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Wicker, Senator Klobuchar. Good endorsement for your legislation, sounds like.

Senator KLOBUCHAR. Very good.

Senator WICKER. We both like our bill.

Senator KLOBUCHAR. It did pass. It is in the Senate Farm Bill.

The CHAIRMAN. There you go. You're not alone. You have a lot of support out there.

But precision agriculture is something that is profoundly important in the types of advancements that have already been made and the sky's the limit in terms of what we can do as far as yields and everything else. Anybody who's climbed on to one of those big rigs now and drives around in them can appreciate the calibration and everything that goes into application of chemicals and seed and everything else that's involved, it's really, really remarkable. So we're fortunate, but we have to keep it going and to do that, we've got to make sure that we're making the investments in the right area to keep up with the technologies that are going to keep coming out.

So we appreciate all of you being here. Thank you. It was very helpful, and we will keep the record open for a couple of weeks. I'm sure Members will have follow-up questions that they'd like to submit for the record. If you could get your responses back to those as soon as possible but certainly within that two-week timeframe, we'll make sure that's made a part of the permanent record.

And I'm glad we're able to wrap it up. So I apologize again for the late start. As my colleague said, there's a lot going on right now around here and so we've had multiple commitments but thank you for your patience and your indulgence and for making the time to be with us here today.

I know Mr. Law has to get back for a football game tomorrow night in South Dakota and we know you all have lots of commitments and obligations. So thank you for your time.

With that, this hearing is adjourned.

[Whereupon, at 12:48 p.m., the hearing was adjourned.]

APPENDIX

The Utilities Technology Council (UTC) thanks the Committee on Commerce, Science, and Transportation for the opportunity to submit these comments for the record regarding the above-referenced hearing. As the Committee considers the challenges and opportunities regarding rural broadband deployment, UTC would like to note that several of its members are supporting broadband deployment by both providing access to utility infrastructure for third-party broadband providers and, where allowed, actually providing broadband services in unserved and underserved areas.

Established in 1948, UTC is the global association representing energy and water utilities on their needs related to the deployment of reliable and resilient information and communications technology (ICT). Energy and water utilities use ICT networks as the backbone for the infrastructure that delivers safe, reliable, and secure energy and water services. These networks are essential for reliability, safety, resiliency, and security.

UTC applauds the Committee for holding this important hearing. Our membership represents utilities of all sizes and ownership types, from large investor-owned utilities serving millions of customers in multiple states to publicly and consumer-owned utilities located in smaller towns and rural areas. Although our membership is diverse, they all share the belief that access to affordable and reliable broadband is a key economic driver for our Nation. Indeed, electric utilities in particular enable broadband access in multiple ways, including through pole-attachment processes.

Additionally, where not prohibited by state or local statute, a number of utilities are actually providing broadband services themselves in areas where private firms have decided not to deploy such services. Most of these locations are in rural areas.

For electric utilities, the decision to provide broadband services to their customers and beyond is a natural progression because in most cases these utilities have already built communications networks to enhance electric reliability and resiliency; these networks include wireline and wireless services that have narrowband and broadband features. Electric utilities can therefore use both their existing knowledge and, in some cases, their infrastructure to deliver broadband. Electric utilities can deploy future-proof, often fiber-based, networks offering robust, affordable and reliable broadband to potential customers inside and outside their service territories. Importantly, utility broadband services are reasonably comparable to the cost and quality of broadband available in urban areas.

In addition, some electric utilities are willing and able to provide wholesale services and infrastructure access to third-party commercial communications service providers to enable broadband deployment. As stated above, electric utilities have extensive infrastructure that includes wireline and wireless communications networks, as well as power poles and rights of way. Many utilities offer wholesale capacity and dark fiber services over their communications infrastructures at rates, terms and conditions that are just and reasonable.

Most obviously, utilities empower broadband deployment by providing voice, data, and cable suppliers affordable access to utility poles found all across the country. Utility poles are essential to delivering reliable and affordable electricity to everyone in the country, no matter where they live. Additionally, many, if not all, of these poles carry cable, broadband, and other services. As this Committee knows, the regulation of these pole-attachment policies is carried out by the Federal Communications Commission (FCC) for poles owned by investor-owned (private, for-profit) utilities. The FCC has used pole-attachment policies as a means to promote rural broadband.

We would note, however, that the FCC's pole-attachment policies are not a panacea to expanding rural broadband. Despite pronouncements that reducing regulatory requirements and fees will spur rural broadband, the reality has proven otherwise. In fact, evidence suggests that lower pole-attachment rates have no bearing on the deployment of rural broadband. Indeed, state governmental agencies have

found no conclusive evidence linking lower pole fees to rural broadband expansion. The Virginia State Corporation Commission concluded, in a 2011 report, that, "No persuasive evidence was submitted in this proceeding that proved lower pole-attachment rates would directly result in additional broadband deployment."[1] Additionally, the communications industry has advocated that the only way to bridge the rural Digital Divide is through Federal subsidies. Finally, the FCC's own records demonstrate that broadband is not being deployed on a reasonable and timely basis, despite the continued reduction of pole attachment rates and the imposition of additional requirements.

UTC recommends this Committee, as it looks to encourage broadband deployment, consider the following:

- Supporting broadband-funding programs that promote the deployment of future-proof networks which provide robust, reliable and affordable broadband services to all Americans; and,
- Supporting pole attachment policies that promote safety, reliability and security of electric utility infrastructure while accelerating broadband deployment.

Ensuring that all Americans have access to affordable, reliable broadband is just as important today as electricity was for the growth of the Nation a century ago. Now as then, electric utilities are critical partners in doing so and stand ready to assist.

UTC thanks the Committee for holding this important hearing and appreciates the opportunity to submit this statement. We look forward to working with the Committee in ensuring that all Americans have access to robust, affordable and reliable broadband networks and services.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO DENNY LAW

Question 1. Streamlined Application Process—Reading through the GAO report on partnerships I noticed many of the same concerns that tribal communities have are shared by those in rural areas more generally. Specifically, under section titled "Grant Application Requirements," the report says quote "Representatives from eight of the tribes we contacted told us that in general, the language included in the Federal grant applications is difficult to understand or the administrative requirements of Federal grants are burdensome." This is similar to concerns I have heard from others in both tribal and nontribal rural areas in Nevada.

Do you believe streamlining the application processes for broadband programs would be helpful for encouraging broadband buildout?

Answer. Yes. As you noted, applications for Federal grants are often burdensome and complicated for providers of all kinds—especially smaller operators. In fact, many of the companies applying for Federal broadband related grants and loans are smaller, rural providers with limited staff and resources to help navigate the byzantine application and review processes. The review procedures can take substantial amounts of time, undermining the ability to plan for and deploy broadband infrastructure. In addition, the lack of coordination and standardization in application and approval processes across Federal agencies further complicates the deployment of broadband infrastructure. While not specifically regarding Federal applications, the terms of local franchises, pole attachments, and railroad crossings can also create substantial costs and concerns in deploying broadband infrastructure.

Question 2. Rural Input—The GAO report makes reference to the Broadband Opportunity Council, which was established in 2015, saying quote: "Recognizing the need to reduce barriers to expand broadband deployment, the Broadband Opportunity Council issued a report stating that Federal agencies should use all available and appropriate authorities to identify and address regulatory barriers that may unduly impede broadband deployment."

Do you believe it is important to have entities like the Broadband Opportunity Council to ensure rural America has a voice in the Federal government?

Answer. Yes. The Broadband Opportunity Council and other Federal tasks forces and councils related to broadband deployment can consider holistically what is needed to ensure that broadband is advanced and also sustained in rural America. Reducing regulatory barriers to build new infrastructure and streamlining complex application processes is certainly one way that such groups can help improve the con-

[1] "Report on Electric Cooperative Pole Attachment Issues." Commonwealth of Virginia State Corporation Commission, November 1, 2011. Link to text: *http://www.scc.virginia.gov/ docketsearch/DOCS/2h%40m01!.PDF*

ditions for rural broadband deployment, but it is important to note that the single biggest challenge in rural America is simply making the business case to deploy any broadband at all. Put another way, permitting barriers and other impediments to construction are no barriers at all if one cannot justify even building a network in the first place. Without such resources, any effort is likely to be effective only on the margins or in very limited respects, leaving behind many areas that still lack broadband access and/or putting at risk investments already made to deploy advanced broadband networks in deeply rural areas. It is important therefore that the council and individual agencies focus not only on perceived barriers to deployment in the form of permitting and processes, but also on the economics of rural broadband in the first instance.

Question 3. RUS and E-Rate—Looking at the recent GAO Report on partnerships on tribal lands, there is a focus on ways RUS could help tribes obtain funding to expand broadband deployment on their lands—including through RUS's grant program. I understand that there are 60,000 mostly rural K–12 Native students who attend federally-supported schools that do not have the broadband infrastructure required for digital learning in the classroom.

Are any of you aware if there are ways that RUS grant programs could be leveraged to provide the matching funds for the FCC'S E-Rate program in order to connect these students?

Answer. I am not aware of ways to leverage RUS grants to provide matching funds for the E-Rate Program.

Question 4. Rural Spectrum—In Nevada we have two main metropolitan areas and the rest of the population lives in small towns and rural areas often separated by hundreds of miles. Tribal communities in these areas are not only separated by distance but also mountainous and remote terrain. Another challenge is that this land is almost always owned by the Federal government, so we have a very unique situation in Nevada as we try to build out broadband to some of the rural and tribal communities that live in these areas. One of the issues that has arisen is that wireless spectrum works differently in mountainous areas than it does on flat land or in a city.

What challenges arise with getting the right spectrum to bring fixed wireless to these areas?

Answer. Policymakers should take steps to ensure that multiple interested parties (including smaller, local providers) have an opportunity to obtain scarce wireless spectrum to ensure that advanced mobile voice and broadband services are fully deployed in hard-to-serve areas such as mountainous areas. At the same time, it is important to take realistic stock of whether, when, and to what degree wireless services can deliver meaningful service options on a widespread basis throughout rural America. In all cases, "wireless needs wires"—meaning that spectrum resources, whether used for 4G or 5G services or in a fixed or mobile service context, must rest upon a robust foundation of fiber that can handle the massive amounts of data already being consumed and the exponential growth in data demands to come. As performance of broadband in the form of speed and latency and usage limits (or the lack thereof) become increasingly important, and as topographical and other geographic challenges limit the capabilities of wireless access, it will be essential to ensure that both wired and wireless networks are available to keep pace with and fulfill evolving consumer and business demands.

Question 4a. What challenges arise with getting infrastructure built on Federal lands?

Answer. As noted in my testimony, barriers to broadband deployment on or through Federal lands must be addressed as part of any holistic plan to promote and sustain infrastructure investment. Small providers often face infrastructure rules and burdensome permitting processes in seeking to build broadband networks across Federal lands.

While not all-inclusive, I would suggest the following areas require immediate attention.

- Eliminate disparate application forms across Federal agencies and standardize on a specific application format which perhaps could include agency-specific addendums.
- Standardize application process (and perhaps a shot-clock) for broadband deployment that proposes to utilize *existing road right-of-way* and/or previously disturbed areas across Federal lands. A separate application process (or perhaps a longer shot-clock) could be used for broadband deployment that is *not* utilizing road right-of-way, or is traversing native or undisturbed habitat.

- Implement a tracking system for each application received by a Federal agency. Currently, broadband providers have limited visibility into the status of an application once it is submitted to the respective Federal agency, requiring countless phone calls inquiring on the status of the application.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JON TESTER TO DENNY LAW

Question 1. In reviewing FCC and RUS broadband funding programs, GAO found less than one percent has gone directly to tribes to expand broadband service. How do we get funds to tribes? Should there be set-asides? Partnerships? Both?

Answer. Making the application process less burdensome should help improve access to RUS broadband funding programs for both tribal broadband companies and non-tribally owned companies that serve tribal lands, such as Golden West Telecommunications. Many of the companies applying for Federal broadband related grants and loans are smaller, rural providers with limited staff and resources to help navigate the byzantine application and review processes. The review procedures can take substantial amounts of time, undermining the ability to plan for and deploy broadband infrastructure—especially in those areas of the country with shorter construction seasons due to weather. Golden West Telecommunications has made significant investments on tribal lands in South Dakota—which could not be done without the Universal Service Fund (USF). Providing sufficient support for the USF High-Cost Program is critically important to help build networks to reservation communities. While RUS lending programs finance the substantial upfront costs of network deployment, the USF High Cost Fund helps to make the business case for such construction and then sustains ongoing operations at affordable rates.

Question 2. These maps are not working. What can be done to make these more accurate? Who should be responsible for correcting these maps?

Answer. Accurate, more granular data on service availability is needed to ensure that government efforts to support broadband target resources as efficiently as possible. Better data helps ensure support is not withdrawn due to "false positives" in the form of a competitive network that does not in fact exist to serve a given location. In addition, it helps avoid "false negatives"—support for duplicative infrastructure where a network already exists. NTCA and many other stakeholders—including operators, associations, and NTIA and the FCC—are currently evaluating options to promote greater accuracy and granularity in the data, and NTCA is optimistic that some of the ideas being considered will yield better identification of broadband availability.

This being said, no matter what mapping mechanism is ultimately adopted, there will still be a need for a "challenge process" to vet and validate any maps that are developed. Precisely because any map (no matter how granular) will incorporate and rely in the end upon self-reported data from operators in some form, it is essential that a process be in place that permits others that have a stake in the area at issue to challenge whether service is or is not in fact available at a given location or in a given area.

Question 3. Would you say the challenge process for the FCC maps is a reasonable process to dispute data coverage? How would you improve it?

Answer. As discussed above, regardless of how much more granular any coverage reporting and maps may get, a robust challenge process will remain essential to validate the data given it will be based upon otherwise unverified self-reporting.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO MONA THOMPSON

Question 1. Streamlined Application Process—Reading through the GAO report on partnerships I noticed many of the same concerns that tribal communities have are shared by those in rural areas more generally. Specifically, under section titled "Grant Application Requirements," the report says quote "Representatives from eight of the tribes we contacted told us that in general, the language included in the Federal grant applications is difficult to understand or the administrative requirements of Federal grants are burdensome." This is similar to concerns I have heard from others in both tribal and nontribal rural areas in Nevada.

Do you believe streamlining the application processes for broadband programs would be helpful for encouraging broadband buildout?

Answer. The RD application process for Rural Broadband Access is cumbersome and streamlining the application processes for broadband programs would definitely help encourage broadband buildout on tribal lands.

C.R.S.T. Telephone Authority utilized an engineering firm in 2009 to write the loan design and application at a cost of approximately $46,000. The loan was approved and ultimately, C.R.S.T. Telephone Authority built out FTTH over 4,600 square miles in our service territory. However, we would not have had the ability to complete the application without the expertise of our engineering firm.

Question 2. Tribal Expertise—In the GAO report on partnerships one of the concerns mentioned is that tribes often do not have some of the technical expertise necessary to access some of the funding that is available. This is also a concern that stakeholders have raised with me as one of the major problems for getting some of this funding to where it is truly needed. The GAO notes that the Rural Utilities Services has provided some funding for technical assistance for applicants, funding that enabled RUS to address some of the barriers tribes face. However, according to the report, RUS has not adequately taken steps to identify or address the barriers tribes face when applying for RUS grant funding, including lack of expertise.

What can the Federal government do better to bring some technical help to tribes?

Answer. The Federal government can provide free educational seminars/workshops and technical resources to Tribes that are interested in providing broadband services on their tribal lands.

Question 3. Are Federal workshops helpful?

Answer. Federal workshops would be helpful but should be provided in every state so Tribal leaders can attend. Travel expenses can be prohibitive if held in a regional format rather than state by state.

Question 4. Telemedicine—In Nevada, we've recently completed the Nevada Broadband Telemedicine Initiative. It has been a great example of a public-private partnership, including Switch, a Nevada tech company and the Nevada Hospital Association, as well as local and Federal cooperation to improve the rural quality of life in the state. For example, when Desert View Hospital in Pahrump recently celebrated their connectivity they talked about how they are able to triage mental health issues via telemedicine without the unnecessary costs of transport to Las Vegas, as an example.

I am very excited about this and how these applications can work for our native communities in Nevada, many of whom live hundreds of miles from the nearest population center.

Are there any unique challenges for rural tribal communities accessing telemedicine that may differ from other remote places?

Answer. While distance to health care facilities create many challenges for rural Americans in general, rural tribal communities face greater and unique challenges. And telemedicine is definitely a tool that can help bridge those challenges. Here on the Cheyenne River Sioux Tribe reservation, the outlying tribal communities have access to broadband but they don't all have access to a community clinic. Those in need of health care still have to drive a distance to the community clinic and they are not open every day of the week.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JON TESTER TO MONA THOMPSON

Question 1. In reviewing FCC and RUS broadband funding programs, GAO found less than one percent has gone directly to tribes to expand broadband service. How do we get funds to tribes? Should there be set-asides? Partnerships? Both?

Answer. The National Tribal Telecommunications Association (NTTA), which C.R.S.T. Telephone Authority is a member of, recently submitted a Tribal Area Solution proposal for addressing the digital divide that currently exists between rural Tribal areas and the rest of the United States to the FCC. C.R.S.T. Telephone Authority supports this proposal and it is attached with this response.

Question 2. These maps are not working. What can be done to make these more accurate? Who should be responsible for correcting these maps?

Answer. C.R.S.T. Telephone Authority understands the importance of the broadband maps however they are inaccurate due to the length of time it takes to update the maps. We just viewed the maps yesterday and the data is from June 2017, which is well over a year old.

Question 3. Would you say the challenge process for the FCC maps is a reasonable process to dispute data coverage? How would you improve it?

Answer. C.R.S.T. Telephone Authority has not challenged the process to dispute data coverage for the FCC maps.

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Filed Via ECFS—October 25, 2018

MARLENE H. DORTCH, Secretary,
Federal Communications Commission
Washington, DC.

Re: *In the Matter of Connect America Fund and Lifeline and Link-Up Reform and Modernization,* WC Docket Nos. 10–90 and 11–42; *National Tribal Telecommunications Association's Tribal Area Solution for Universal Service Reform*

Dear Ms. Dortch:

On behalf of the National Tribal Telecommunications Association (NTTA), attached please find NTTA's Tribal Area Solution proposal for addressing the digital divide that currently exists between rural Tribal areas and the rest of the United States. This proposal recommends revisions to existing Federal support mechanisms for carriers serving predominantly rural Tribal areas and urges the Commission and other stakeholders to comprehensively address the associated issues surrounding broadband affordability and adoption.

Please contact the undersigned if you have any questions.

Sincerely,

DOUGLAS K. KITCH, CPA,
Principal,
Alexicon Telecommunications Consulting,
On Behalf of The National Tribal Telecommunications Association.

cc: Matthew Duchesne, ONAP
Attachment

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NATIONAL TRIBAL TELECOMMUNICATIONS ASSOCIATION

TRIBAL AREA SOLUTION FOR FEDERAL UNIVERSAL SERVICE SUPPORT

EXECUTIVE SUMMARY

The National Tribal Telecommunications Association (NTTA) consists of Tribally-owned communications companies and broadband providers including Cheyenne River Sioux Telephone Authority, Fort Mojave Telecommunications, Inc., Gila River Telecommunications, Inc., Hopi Telecommunications, Inc., Mescalero Apache Telecom, Inc., Saddleback Communications, San Carlos Apache Telecommunications Utility, Inc., Tohono O'odham Utility Authority, and Warm Springs Telecom, as well as associate members Nez Perce Tribe and Sacred Wind Communications. NTTA's mission is to be the national advocate for telecommunications service on behalf of its member companies and to provide guidance and assistance to members who are working to provide modern telecommunications services to Tribal lands.

The digital divide in rural Tribal areas—the difference in broadband service availability and affordability as compared to other and more urban areas of the United States—is a reality for many Native Americans. Even with the substantial efforts undertaken at the federal, state, and in some instances, the local, levels, Tribal areas are consistently on the wrong side of this divide. There are many causes of this persistent divide, including the rural and high cost nature of many Tribal areas, the chronic economic problems in Tribal areas, and the generally lower-income nature of Tribal residents. While solving these problems will take efforts from many disciplines, NTTA offers herein a proposal to address the insufficient and unpredictable support available to rate-of-return carriers serving Tribal areas, and urges the FCC, Congress and other stakeholders to tackle adoption/affordability, and broadband mapping issues in an expedited manner.

NTTA, consistent with past advocacy, proposes a Tribal Area Solution to revise current Federal universal service programs for RoR carriers. These revisions, proposed for the High Cost Loop Support, Connect America Fund Broadband Loop Support, and Alternative Connect America Cost Model support programs, recognize the unique challenges faced by carriers serving rural Tribal areas of the lower 48 states in the country. The additional support generated by NTTA's proposals would be ac-

companied by additional public interest obligations placed on support recipients, and would be subject to an inflation-adjusted cap on the total support generated.

I. Introduction and Summary

NTTA has worked on the problem of access to and affordability of broadband Internet access services in Tribal areas of the United States continuously since the Federal Communications Commission (FCC) declared broadband Internet access service (BIAS) to be part of the definition of universal service in 2011. Since then, as shown below in Table 1, Federal universal service support for NTTA members in total has remained basically constant—while at the same time, NTTA members are expected to do more, such as provide universal BIAS at affordable rates. While broadband availability, depending on the fluid definition adopted by the FCC in its annual deployment report, has slightly improved in Tribal areas, there still exists a digital divide between these areas and the rest of the country.

In this Tribal Area Solution, NTTA takes another step to address the digital divide that exists between rural Tribal and other areas of the country. The data is incontrovertible that the divide is there, but action at the Federal level continues to lag. Two years ago NTTA presented a solution for additional funding in Tribal areas served by rate-of-return (RoR) regulated carriers, upon which the FCC has yet to act. Since then, the FCC has made several changes to the Federal programs, has several proposals pending, and has addressed one major problem experienced by carriers serving Tribal areas. And yet, no comprehensive solution has been adopted.

In order to move this important process forward, NTTA presents a package of revisions to the current Federal universal service fund programs to better calibrate support for deployment, operations, maintenance, and affordability in Tribal areas. These revisions will address high cost programs as well as the low-income consumer Lifeline program under the theory that deploying a network does no good unless the network can be operated and maintained, services can continue to be provided on a cost-efficient basis, and customers can afford to subscribe to the services offered.

II. Background

NTTA's position on support for broadband, and voice, services in Tribal areas has consistently called for additional attention, policies, and support for Tribal areas where the digital divide is the greatest. NTTA has presented unrefuted evidence on the record that Tribal areas of the United States are continually on the wrong side of the digital divide, are more difficult and costly to serve, and carriers serving these areas incur unique and higher levels of costs. NTTA has also demonstrated that Americans living on Tribal lands require more support in order to make even subsidized voice and broadband services affordable.

NTTA's Tribal Broadband Factor (TBF), not to be confused with the FCC's recent proposal of the same name, consisted of a simple method to increase support to Tribal areas served by RoR carriers while at the same time ensuring support was used effectively and efficiently.[1] The TBF called for a 25 percent increase in support to RoR carriers serving locations in census blocks located on Tribal lands. In return, TBF recipients would be obligated to meet certain build out obligations commensurate with the amount of additional support received. In addition, NTTA made clear that TBF support would also help with continuing operations and maintenance of voice and broadband networks. Table 1 shows the level of support for all NTTA members since 2011:[2]

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[1] *See e.g.,* In the Matter of Connect America Fund, WC Docket No. 10–90, Further Notice of Proposed Rulemaking (FCC 16–33, rel. March 30, 2016) at 368–382; *Also see* Letter from Godfrey Enjady, NTTA President, to Marlene H. Dortch, filed in WC Docket No. 10–90 on June 19, 2015.
[2] USAC High Cost Program Disbursements tool, includes NTTA members Cheyenne River Sioux, Fort Mojave, Gila River, Hopi, Mescalero Apache, Sacred Wind, Saddleback, San Carlos Apache, and Tohono O'odham.

Table 1

NTTA Member Federal HCLS and ICLS/CAF BLS
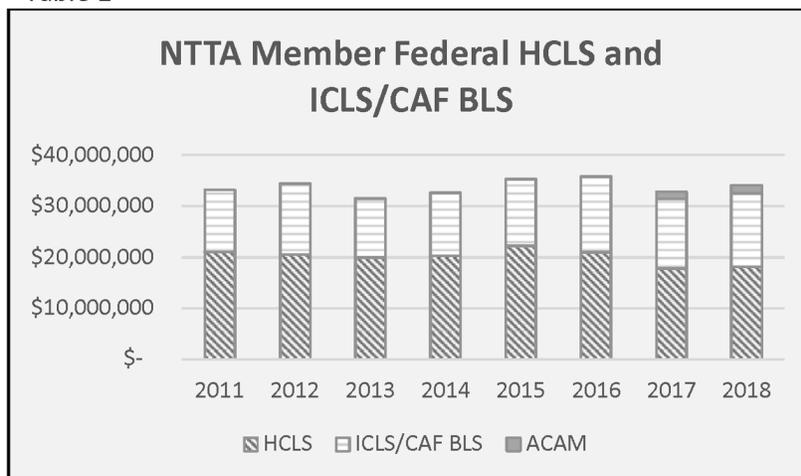
In continuance of and consistent with NTTA's goal of ensuring all Native Americans have access to quality, affordable services, NTTA advocated for relief from the FCC's operating expense limitation.[3] In order to recognize the unique level and types of expenses related to serving Tribal areas, NTTA requested the FCC increase the allowance for carriers serving these areas, which the FCC partially granted.[4] Unfortunately, one of the conditions placed on receiving this relief caused some carriers to be improperly excluded, as evidenced by petitions file by two carriers.[5]

To address affordability and adoption of broadband services, NTTA advocated for an increase in the enhanced Tribal Lifeline credit, originally adopted by the FCC in 2000.[6] Due to the addition of broadband to the list of services to be supported by the Federal Lifeline program, NTTA recommended the FCC further consider an increase to the current enhanced Tribal credit of $25 to recognize these facts. The FCC thus far has declined adopt NTTA's proposal.

The FCC, Congress, and other stakeholders have recognized the necessity to focus resources on Tribal areas to address the twin challenges of availability and affordability. This recognition includes the aforementioned enhanced Tribal Lifeline credit, the FCC's commitment to working with Tribal governments on a peer-to-peer basis,[7] statements made in the National Broadband Plan that Tribal areas require more support in order to meet national broadband goals,[8] and statements made in the 2011 USF/ICC Transformation Order regarding the challenges faced in Tribal areas.[9] The FCC also adopted Tribal-specific Connect America Fund (CAF) programs to address at least part of the problem, and recognized the need for Tribal governments to have a substantive say in how services are deployed and provided in their areas.[10]

Recent activities have continued this trend—the FCC recently proposed to adopt local priority filing windows for rural Tribal nations in relation to transforming the

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[3] *See e.g.,* NTTA Comments, filed May 12, 2016 in WC Docket No. 10–90 and NTTA September 16, 2016 Ex Parte communication filed in WC Docket No. 10–90.

[4] *In the Matter of Connect America Fund,* WC Docket No. 10–90 (FCC 18–37, rel. April 5, 2018)

[5] Petitions for Reconsideration Filed by Mescalero Apache Telecom, Inc. on May 30, 2018 and Sacred Wind Communications, Inc. on May 31, 2018

[6] *In the Matter of Federal-State Joint Board on Universal Service; Promoting Deployment and Subscribership in Unserved and Underserved Areas, Including Tribal and Insular Areas,* Twelfth Report and Order, Memorandum Opinion and Order, and Further Notice of Proposed Rulemaking, CC Docket No. 96–45 (FCC 00–208, rel. June 30, 2000)

[7] *In the Matter of Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes,* Policy Statement (FCC 00–207, rel. June 23, 2000)

[8] *Connecting America: The National Broadband Plan,* rel. March 16, 2010, at p. 152, Box 8–4

[9] *In the Matter of Connect America Fund,* Report and Order and Further Notice of Proposed Rulemaking, WC Docket No. 10–90 (FCC 11–161, rel. November 18, 2011) at 1059

[10] *Id.,* Tribal Mobility Phase I and II funds; adoption of Tribal Engagement Rules

2.5 Ghz spectrum band,[11] proposed a revision to the RoR carrier ACAM support calculation to include more locations located in Tribal areas in the model,[12] and provided operating expense limitation relief to a limited set of RoR carriers as mentioned above. Further, the so-called Ray Baum's Act was included in the 2018 Consolidated Appropriations Bill that, among other things, requires the FCC to issue a report by 2020 to address the lack of broadband availability in Tribal areas. Finally, the United States Government Accountability Office (GAO) recently released a report on broadband data in Tribal areas and concluded that the FCC's information overstates availability.[13]

When considered in totality, the efforts to bring universal broadband availability to Tribal areas has, at least on paper, been fairly substantial. However, the facts are clear—Tribal areas, especially rural Tribal areas in the lower 48 states, lag significantly behind the rest of the country in regards to broadband availability. According to the FCC's latest broadband availability report (which, according to the GAO, overstates access in Tribal areas),[14] 64.6 percent of Americans living on Tribal lands have access to fixed broadband with speeds of at least 25/3 Mbps, compared 92.2 percent of the country in total. Over time, the digital divide, measured here as the difference in availability, has barely narrowed:

Table 2
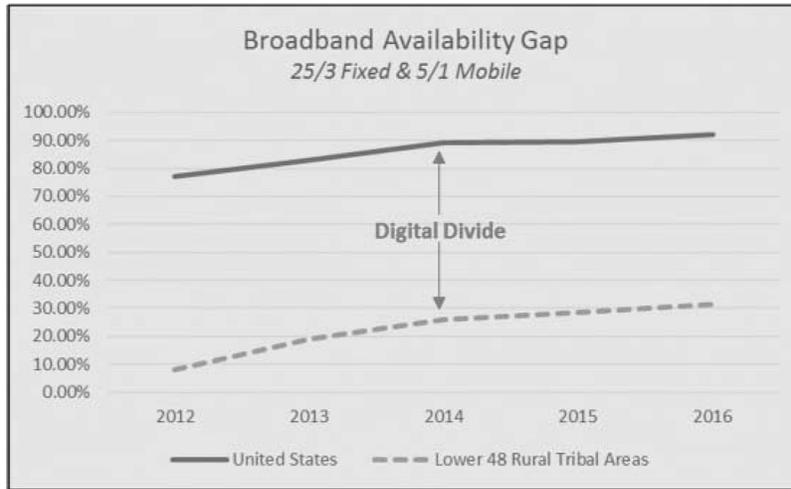
In 2018, Congress passed, and the President signed the Consolidated Appropriations Act.[15] Section 508 of this Act, a portion of what is commonly known as Ray Baum's Act, addresses Tribal digital access. Pursuant to Section 508, the FCC is to submit a report to Congress evaluating broadband coverage in Indian country, and is to complete a proceeding to address the unserved areas identified in the report. This will clearly be a substantial effort, and must include an investigation into the topics raised in this paper, including but not limited to, sufficiency and predictability of broadband universal service support, affordability and adoption, broadband mapping, and Tribal sovereignty. NTTA looks forward to assisting the FCC with this report and subsequent proceeding, and requests the FCC take into consideration the proposals made below.

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[11] *In the Matter of Transforming the 2.5 GHz Band,* Notice of Proposed Rulemaking, WT Docket No. 18–120 (FCC 18-59, rel. May 10, 2018)

[12] *In the Matter of Connect America Fund,* Report and Order, Third Order on Reconsideration, and Notice of Proposed Rulemaking, WC Docket No. 10–90 (FCC 18–29, rel. March 23, 2018) at 120 (*RoR USF Budget Order/NPRM*)

[13] GAO Report: Broadband Report, *FCC's Data Overstate Access on Tribal Land*s, GAO–18–630, September 2018

[14] *In the Matter of Inquiry Concerning Deployment of Advanced Telecommunications Services to All Americans in a Reasonable and Timely Fashion,* GN Docket No 17–199, 2018 Broadband Deployment Report (FCC 18–10, rel. February 2, 2018)

[15] Consolidated Appropriations Act of 2018 (HR 1625)

As a result of the above, NTTA once again implores the FCC, Congress, and other policy makers to address the serious digital divide that exists between rural Tribal areas and the rest of the country. To this end, NTTA offers several policy proposals in the remainder of this paper.

III. NTTA's Tribal Area Solution

In order to address the clear digital divide that exists between rural Tribal areas and the rest of the United States, and to better recognize circumstances in existence in Tribal areas, including Tribal sovereignty, historically depressed economies, sparse populations, and high costs of service, NTTA offers Tribal Area Solution (TAS) that proposes simple revisions to the FCC's current Federal high cost support programs. As partial evidence that the areas served by NTTA members are substantially higher cost than the average across the United States, consider Table 3:[16]

Table 3

Company	2016 CPL
Cheyenne River Sioux Telephone Authority	$ 2,364.69
Fort Mojave Telecommunications, Inc.	$ 2,916.50
Saddleback Communications	$ 1,940.07
Tohono O'Odham Utility Authority	$ 1,498.09
Mescalero Apache Telecom, Inc.	$ 1,668.55
Gila River Telecommunications, Inc.	$ 2,657.28
San Carlos Apache Telecommunications Utility, Inc.	$ 1,935.10
Sacred Wind Communications	$ 3,141.98
NTTA Average	**$ 2,265.28**
National Average	*$ 1,129.97*

A. Address the Overall Budget

The first action the FCC and other policymakers must take is to address the insufficiency of the current RoR high cost fund (HCF) budget. The FCC recognizes this problem in its latest rulemaking proceeding,[17] and received substantial comment on the need to increase the budget and fix the budget control mechanism.[18] NTTA agrees with parties arguing for a rebasing of the RoR HCF and then applying an inflation factor on an ongoing basis. However, the budget should include a separate and specific amount allocated to cover the support increases for Tribal areas in the revisions offered by NTTA below.

B. Connect America Fund Broadband Loop Support (CAF BLS)

CAF BLS was adopted by the Commission to provide high cost support for broadband only lines that were previously excluded from High Cost Loop Support (HCLS) and Interstate Common Line Support (ICLS).[19] CAF BLS provides support for data only broadband line (DOBB) costs, determined via FCC rules, above a per-line threshold, currently set at $42 per month.[20] In essence, the $42 per month threshold establishes the amount that DOBB customers should be expected to contribute toward their monthly broadband Internet access service.

NTTA proposes to increase CAF BLS funding to Tribal areas served by RoR carriers by reducing the $42 per month threshold by 25 percent to $31.50. This will provide more support to the affected carriers, which can then reduce the pressure on customers to be able to pay for this vital service. The 25 percent reduction is

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[16] Source: National Exchange Carrier Association total HCLS cost per loop data (excludes Hopi Telecommunications, Inc. due to ACAM election)

[17] *RoR USF Budget NPRM* at 107

[18] *See e.g.,* Letter to Marlene H. Dortch from ITTA, USTelecom, NTCA, and WTA, filed in WC Docket No. 10–90, *et. al.,* on October 1, 2018

[19] *See In the Matter of Connect America Fund,* WC Docket No. 10–90, Report and Order (FCC 16–33, rel. March 30, 2016)

[20] 47 C.F.R. §54.901

consistent with (1) NTTA's original TBF, and (2) the FCC's proposal in the latest RoR USF NPRM.

C. High Cost Loop Support (HCLS)

HCLS is designed to support higher than average loop costs related to voice tele-communications services. The HCLS calculation, which has been in effect in one form or another since the 1990s, provides support for loops costs in excess of a national average, according to the algorithm contained in the FCC's rules.

NTTA proposes to revise the HCLS algorithm for carriers serving Tribal areas in the following manner:

- The current formula provides for study areas with 200,000 or fewer loops, and for study area costs per loop between 115 percent and 150 percent of the national average cost per loop, HCLS covers 65 percent of the study area loop costs. NTTA proposes to increase this amount to 81.25 percent (a 25 percent increase).

- For study areas with loop costs in excess of 150 percent of the national average, the HCLS covers 75 percent of the study area's costs. NTTA proposes to increase that to 93.75 percent (a 25 percent increase)

Again, the 25 percent adjustment is consistent with past proposals made by both the FCC and NTTA. Furthermore, this adjustment works within the FCC's current HCLS rules and thus does not constitute a new support mechanism.

D. Alternative Connect America Cost Model Support

The FCC proposed a revision to the Alternative Connect America Cost Model (ACAM) that it termed a "Tribal Broadband Factor" (TBF).[21] This revision, which was meant to draw more carriers serving Tribal areas into the ACAM support regime, would lower the funding threshold from $52.50 by 25 percent to $39.38. As shown in NTTA's comments in response to the proposal, the ACAM revision would not result in sufficient support for most NTTA members.[22] However, one NTTA member (Hopi Telecommunications) elected to receive ACAM support and would thus otherwise not be eligible for the TAS revisions outlined above. In addition, there may be other ACAM recipients that would otherwise be eligible for a support increase under the TAS proposal. In order to address these situations, NTTA recommends a solution similar to the Commission's "TBF" where current recipients, if deemed eligible under the criteria discussed below, would receive revised offers of support at the reduced funding threshold for locations served on Tribal lands.

E. Other Issues

Eligible areas and carriers should be consistent with NTTA's previous TBF proposal; namely eligible areas are those located in Tribal areas, served by RoR carriers. Any relief provided will be accepted by RoR carriers on a voluntary basis and will be provided for a specific term of years. The support increase caused by NTTA's proposals will be limited to RoR carriers with service areas consisting of at least 50 percent Tribal areas.

In order to identify areas eligible for support via the TAS, NTTA proposes to begin with FCC Form 477 data, but that potentially affected carriers be able to provide supplemental information in order to prove additional eligible areas. This step is necessary due to the inherent inaccuracies of the Form 477 data in Tribal areas as documented in recent petitions for reconsideration filed before the FCC and in the September 2018 Government Accountability Office (GAO) report.

Carriers accepting the additional support offered via the revisions to HCLS and CAF BLS outlined above will incorporate additional buildout and reporting obligations. In addition to the baseline buildout obligations assigned to the receipt of HCLS and CAF BLS, NTTA proposes that a specific number of obligations in terms of locations lacking 10/1 Mbps or 25/3 Mbps service be attached to the increased support discussed herein. Specifically, and consistent with past NTTA proposals, a certain percentage of new support, equal to the percentage of CAF BLS and HCLS expended on capital expenditures and depreciation expense, be applied to a per-location allowance to arrive at the required new locations to be built out during the term of support. This method recognizes that the CAF BLS and HCLS programs help to support not only deployment but also ongoing operations and maintenance of broadband capable networks.

NTTA proposes to limit the total support offered and accepted by eligible carriers under the TAS to $25 million per year. NTTA proposes that the total amount be

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[21] *RoR USF Budget NPRM* at 120
[22] NTTA Comments, filed May 25, 2018 in WC Docket No. 10–90 at 4

funded from CAF reserves. As stated above, and consistent with advocacy by other industry groups for the overall RoR USF budget, NTTA proposes to adjust any cap on the support provided via the above-discussed USF program revisions to reflect inflation.

IV. Affordability

Any attempt to address broadband availability in Tribal areas must also address affordability. The main methods the FCC and other policymakers use to address affordability and adoption issues are Federal and state Lifeline programs. NTTA has advocated for an increase in the enhanced Tribal Lifeline discount, currently $25 per month ($34.25 in total), to recognize the addition of broadband service to the list of supported services, and in recognition of the cost of such service.[23]

A recent study discussed the correlation, if any between the availability of high-speed broadband services in rural areas and economic benefits.[24] The study, unsurprisingly, concluded that affordability and adoption plays a significant role in if and how broadband services benefit rural economies.

Conclusion

It is imperative that the FCC, Congress, and other stakeholders address, in earnest, and take immediate action to remedy, the challenges in making universal broadband service in Tribal areas a reality. While many actions have been taken that attempt to address these challenges, the fact remains that the digital divide between Tribal areas and the rest of the United States stubbornly persists.

NTTA has constantly and consistently advocated for policies to help ensure universal voice and broadband access in Tribal areas. NTTA now offers the Tribal Area Solution that proposes revisions to current Federal Universal Service programs designed to better allow RoR carriers serving Tribal areas to deploy, operate, and maintain broadband-capable networks. These proposals will help ensure support for carriers serving Tribal areas is sufficient, and perhaps more importantly, predictable. Currently, support for Tribal areas broadband service access is neither. NTTA also urges the FCC, Congress, and other stakeholders to seriously address adoption and affordability, as it does little good to deploy, operate, and maintain a broadband network if customers cannot afford the services offered.

NTTA Members

Cheyenne River Sioux Telephone Authority
Fort Mojave Telecommunications, Inc.
Gila River Telecommunications, Inc.
Hopi Telecommunications, Inc.
Mescalero Apache Telecom, Inc.
Saddleback Communications
San Carlos Apache Telecommunications Utility, Inc.
Tohono O'odham Utility Authority
Warm Springs Telecom

Associate Members

Nez Perce Tribe
Sacred Wind Communications

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO GRANT B. SPELLMEYER

Question 1. Streamlined Application Process—Reading through the GAO report on partnerships I noticed many of the same concerns that tribal communities have are shared by those in rural areas more generally. Specifically, under section titled "Grant Application Requirements," the report says quote "Representatives from eight of the tribes we contacted told us that in general, the language included in the Federal grant applications is difficult to understand or the administrative requirements of Federal grants are burdensome." This is similar to concerns I have heard from others in both tribal and nontribal rural areas in Nevada.

Do you believe streamlining the application processes for broadband programs would be helpful for encouraging broadband buildout?

Answer. Yes, and let me offer two suggestions. First, to the greatest extent possible, it would help for grant applications and requirements to be written and organized in a simplified fashion. We consider our company to be relatively sophisticated

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[23] NTTA Comments filed August 31, 2015 in WC Docket No. 11–42
[24] American Action Forum: A Look at Rural Broadband Economics, August 14, 2018

when it comes to making applications for various grant programs, and yet we often find the process and costs to be challenging. We consult with attorneys experienced in the process, who sometimes must communicate directly with government officials to help us understand various requirements. We have a team of engineers, experienced in designing networks. We have financial analysts able to ascertain for the government whether a project will be sustainable over a five-year period. Many of these assets are not readily available to Tribal governments who have never run a telecommunications network. Simplifying the process, including the language, will assist them in navigating the process. Simplifying reporting requirements will make it more likely that applicants will apply.

Second, and just as important, there should be a consolidation of data and baseline requirements for similar programs. Two examples: First, there should be one standard for what constitutes a baseline level of broadband required of a Federal government grantee, whether it be the FCC's universal service program or the RUS's new e-Connectivity Program. If the prevailing expectation for acceptable mobile broadband is 25 Mb throughput down and 3 Mb throughput up, then all programs should drive to that standard. Second, all broadband programs should be operating off of the same baseline data concerning where funds are needed, that is, everyone should be operating off of a single map for both fixed and mobile broadband, so that each dollar invested by the Federal government is accurately targeted. Having such a resource would also help states and Tribes that have grant or universal service programs identify areas for investment.

Finally, we suggest that partnerships between established carriers and Tribal governments or Tribal telecommunications companies can be mutually beneficial, however there are few incentives for private businesses to undertake such partnerships today. That is, there's not enough reason to assess opportunities on Tribal lands from a different perspective than any other place, which can depress investment in remote areas. Increasing such incentives should be explored, so that the expertise that telecommunications companies have can be combined with a Tribal entity to accelerate broadband deployment. It is not a one size fits all solution—there must be solutions tailored to the demographics, geography, and particular needs of Tribes in different parts of the nation, and having different challenges.

Question 2. Rural Input—The GAO report makes reference to the Broadband Opportunity Council, which was established in 2015, saying quote: "Recognizing the need to reduce barriers to expand broadband deployment, the Broadband Opportunity Council issued a report stating that Federal agencies should use all available and appropriate authorities to identify and address regulatory barriers that may unduly impede broadband deployment."

Do you believe it is important to have entities like the Broadband Opportunity Council to ensure rural America has a voice in the Federal government?

Answer. Yes. Increasing broadband investment on Tribal lands requires focused entities such as the Broadband Opportunity Council, who not only have a mission, but specific goals and measurements for success.

Question 3. RUS and E-Rate—Looking at the recent GAO Report on partnerships on tribal lands, there is a focus on ways RUS could help tribes obtain funding to expand broadband deployment on their lands—including through RUS's grant program. I understand that there are 60,000 mostly rural K–12 Native students who attend federally-supported schools that do not have the broadband infrastructure required for digital learning in the classroom.

Are any of you aware if there are ways that RUS grant programs could be leveraged to provide the matching funds for the FCC'S E-Rate program in order to connect these students?

Answer. For the most part, schools that are most in need, those having the highest rates of students living in poverty, receive a 90 percent discount from the FCC's E-Rate program. 47 C.F.R. Section 54.505. It does not seem to be a productive use of RUS grant funds to provide the additional 10 percent of funding for those schools, given the necessary "friction" involved in the administrative steps needed to transfer funds between programs and make any eligibility determinations. Instead, the FCC could simply be directed to move to a 100 percent discount for such schools and avoid the administrative work needed to transfer funds between programs.

In remote areas, if there is fiber running to a cell tower, it is possible to extend fast broadband by either extending fiber or point-to-point microwave from the tower to the school, often at a very low cost. Accordingly, we believe a better way to leverage RUS funds would be to encourage and incentivize RUS Community Connect Grant Program applicants who propose to deliver middle-mile or last-mile fiber to schools that are eligible for the 90 percent discount.

Question 4. Rural Spectrum—In Nevada we have two main metropolitan areas and the rest of the population lives in small towns and rural areas often separated by hundreds of miles. Tribal communities in these areas are not only separated by distance but also mountainous and remote terrain. Another challenge is that this land is almost always owned by the Federal government, so we have a very unique situation in Nevada as we try to build out broadband to some of the rural and tribal communities that live in these areas. One of the issues that has arisen is that wireless spectrum works differently in mountainous areas than it does on flat land or in a city.

What challenges arise with getting the right spectrum to bring fixed wireless to these areas?

Answer. In remote areas, accessing unlicensed spectrum that can provide fixed wireless to rural and Tribal communities is not difficult, because low population density does not exceed the capacity. Fixed wireless providers operate on several low-band and medium band unlicensed frequency blocks that offer different propagation characteristics. The low-band frequencies go farther and penetrate buildings and trees better, while the mid-band frequencies generally have higher capacity, but cover shorter distances.

I do not believe access to spectrum is a large barrier for companies attempting to provide fixed wireless broadband to remote areas. The biggest barrier is sparse population density and lack of a sustainable business model. As evidence, I note that in the recent Connect America Fund Phase II auction, electric cooperatives and other wireless Internet service providers won significant amounts of CAF support. These companies have the assets needed to reach rural and Tribal lands, but they cannot do it without some form of support to defray construction and operating costs.

Question 5. What challenges arise with getting infrastructure built on Federal lands?

Answer. Over the years, the biggest challenge for mobile wireless carriers has been tower siting. On lands managed by the U.S. Forest Service, the Bureau of Land Management, and the Bureau of Indian Affairs, acquiring permits to erect towers can be very difficult, even where there are public roads traversing Federal lands that have no service and are remote and very dangerous in bad weather. I'm aware of other companies having to wait several years until a new communications plan is adopted before the application process can even begin.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JON TESTER TO GRANT B. SPELLMEYER

Question 1. In reviewing FCC and RUS broadband funding programs, GAO found less than one percent has gone directly to tribes to expand broadband service. How do we get funds to tribes? Should there be set-asides? Partnerships? Both?

Answer. Senator, my sense is that funding Tribes directly will not be productive unless there is an established Tribal telecommunications company that has experience operating a telecommunications network. I believe that partnerships between established carriers and Tribal governments or Tribal telecommunications companies can be mutually beneficial, however today there are few incentives for private businesses to undertake such partnerships. That is, there's not enough reason to assess opportunities on Tribal lands from a different perspective than any other place, which can depress investment in remote areas. Increasing such incentives should be explored, so that the expertise that telecommunications companies have can be combined with a Tribal entity to accelerate broadband deployment. It is not a one size fits all solution—there must be solutions tailored to the demographics, geography, and particular needs of each Tribe.

Question 2. These maps are not working. What can be done to make these more accurate? Who should be responsible for correcting these maps?

Answer. With respect to improving the accuracy of broadband maps, we favor an "all of the above" approach. Federal and state resources must be combined to improve our maps so that future investments are accurately targeted. Until 2015, the Federal government developed the National Broadband Map, a national resource that drew upon data from Federal and state sources, however funding ran out and the Broadband Map has not been updated. Earlier this year, NTIA received an appropriation from Congress that includes a directive to "update the national broadband availability map, in conjunction with the FCC and previously developed partnerships with the states." 83 Fed. Reg 24747 (May 23, 2018). We fully support NTIA's efforts to coordinate resources and data to improve accuracy.

In terms of the FCC's Mobility Fund, which is currently hamstrung by maps that appear to significantly overstate coverage, carriers cannot correct the issues because they are far too big. We have invested over $2 million in the challenge process to date, and we've tested only a small fraction of the areas that we could test. Smaller carriers are less able to undertake the cost and burden of testing substantial rural areas, sometimes covering tens of thousands of square miles in remote lands.

To make the maps more accurate, in the short term the FCC could require carriers to refile maps using model inputs that better reflect industry practices as were originally suggested by U.S. Cellular and many others when the challenge maps were adopted. Better maps would expose more areas as unserved and improve map accuracy because the parameters suggested aligned with how carriers design and build networks.

In addition to new maps, the Commission could require its Field Operations Bureaus and USAC drive testers to help. Field Operations Bureaus around the country employ engineers capable of investigating harmful radiofrequency interference. They are capable of conducting drive tests of a statistically significant data sample of roads to help determine how big the problem is. USAC performs drive tests of our network when we access Mobility Fund support—surely they can drive test areas to determine how big the differences are between coverage on maps and coverage on the ground. In the short term, we need the Federal government to meaningfully contribute to solving this problem by testing enough areas and comparing the results with carrier maps. That will drive how big the problem is and what the solution should be.

Longer term, we think that NTIA should be permitted to do its work, as authorized by Congress, and given all of the tools and resources that it needs to develop accurate maps of fixed and mobile broadband availability nationwide.

Question 3. Would you say the challenge process for the FCC maps is a reasonable process to dispute data coverage? How would you improve it?

Answer. Senator, having a challenge process is fine, provided, (i) the underlying maps are generally accurate, reducing the amount of testing that needs to be done to verify them, (ii) the process for challenging is reasonable, and (iii) the FCC plays a meaningful role in verifying data and conducting independent testing. None of those are happening today.

On the first point, with the maps so significantly overstating where mobile broadband is available at 5 Mbps of speed, it is impossible for private industry to test all of the areas that should be opened up to new investments. It is a non-starter for small and medium sized carriers. The solution has to begin by improving map accuracy so as to minimize challenges, which by the way was the FCC's stated goal when it developed the challenge process.

On the second point, the FCC's procedures to submit a challenge are so difficult as to make it all but impossible for even a diligent challenger to succeed. Breaking the Nation into 1 square kilometer blocks and requiring each block to be individually tested, with multiple tests conducted at specified distances, all but ensures failure. For a very low cost, we can drive test a series of roads forming a ring and determine with certainty where coverage is on the roads, and with near certainty whether there is coverage inside the ring—areas oftentimes remote and inaccessible. The FCC's challenge process is expensive, time consuming, and allows no such assumptions concerning areas where we may have specific local knowledge of where other carriers are providing service.

On the third point, beyond improving map accuracy, the Commission should use its Field Operations Bureaus, its USAC drive testers, its crowd-sourced speed test application, as well as input from state officials collecting such data (for example, California has extensive broadband availability data), to improve map accuracy. This has to be an "all of the above" efforts, because rural Americans are clamoring for improved broadband and they will never get it in areas that the FCC deems to be served.

I trust that these responses will prove to be useful. Should you require further information, please contact me any time and we'll be happy to follow up.

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO GODFREY ENJADY

Question 1. Tribal Expertise—In the GAO report on partnerships one of the concerns mentioned is that tribes often do not have some of the technical expertise necessary to access some of the funding that is available. This is also a concern that stakeholders have raised with me as one of the major problems for getting some of this funding to where it is truly needed. The GAO notes that the Rural Utilities

Services has provided some funding for technical assistance for applicants, funding that enabled RUS to address some of the barriers tribes face. However, according to the report, RUS has not adequately taken steps to identify or address the barriers tribes face when applying for RUS grant funding, including lack of expertise.

What can the Federal government do better to bring some technical help to tribes?

Answer. "Additional funding for training would be helpful. There is a great need for more expertise in Tribal communities. Native communications companies, like all small carriers, face many staff hours complying with filing requirements of the FCC and other entities. Lifting some of this administrative burden would free-up resources that could be used to serve their customers. As to grants, they are appreciated and useful. However, most grants are for capital expenses. Once new infrastructure and/or facilities are operational, they must be maintained and updated. Ongoing operational expense funding must accompany any grants."

Question 2. Are Federal workshops helpful?

Answer. "Any time an agency reaches out for a meeting it is appreciated. Some workshops are useful, others not-so-much. Many times it depends on location, timing and expense as to the cost effectiveness of any given workshop. NTTA does see a need for better consultation with Tribal entities so that government agencies can understand the challenges and sovereignty issues of Native communities."

Question 3. Telemedicine—In Nevada, we've recently completed the Nevada Broadband Telemedicine Initiative. It has been a great example of a public-private partnership, including Switch, a Nevada tech company and the Nevada Hospital Association, as well as local and Federal cooperation to improve the rural quality of life in the state. For example, when Desert View Hospital in Pahrump recently celebrated their connectivity they talked about how they are able to triage mental health issues via telemedicine without the unnecessary costs of transport to Las Vegas, as an example.

I am very excited about this and how these applications can work for our native communities in Nevada, many of whom live hundreds of miles from the nearest population center.

Are there any unique challenges for rural tribal communities accessing telemedicine that may differ from other remote places?

Answer. "The record at the FCC is clear about higher costs necessary to serve Tribal areas, and thus the need for additional funding (not just the equivalent to other rural carriers), which isn't happening. Without sufficient to keep the network modernized and provide for robust broadband, telemedicine becomes less of an option."

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RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JON TESTER TO
GODFREY ENJADY

Question 1. In reviewing FCC and RUS broadband funding programs, GAO found less than one percent has gone directly to tribes to expand broadband service. How do we get funds to tribes? Should there be set-asides? Partnerships? Both?

Answer. "Set-asides or carve outs are helpful. NTTA has put forward such a plan at the FCC that was unopposed during the comment period and was not approved. Because of sovereignty issues, partnerships can prove to be difficult."

Question 2. These maps are not working. What can be done to make these more accurate? Who should be responsible for correcting these maps?

Answer. "The entire industry is working on this. For small Tribal carriers, better mapping equals more time and resources spent, thus the need for adequate funding. The use of census blocks does not work in most Tribal communities."

Question 3. Would you say the challenge process for the FCC maps is a reasonable process to dispute data coverage? How would you improve it?

Answer. "NTTA members provide broadband and other services to their communities. As a part of their local, Tribal community, NTTA members know where services have been deployed. Larger carriers need to do a better job of mapping and location."

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