Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act

GN Docket No. 16-245

COMMENTS
of
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SUMMARY

The Commission decided in its 2016 Broadband Progress Report that mobile broadband service is as essential to consumers as fixed broadband service, and that consumers will be deemed to have access to advanced telecommunications capability, for purposes of the Commission’s analysis of broadband progress pursuant to Section 706 of the Telecommunications Act of 1996, only to the extent that they have access to both mobile and fixed broadband service.

The Commission now must ensure that its Section 706 determinations concerning mobile broadband deployment are based on accurate and reliable data, and it also must develop a reasonable speed benchmark for mobile broadband services. The Commission should focus its analysis on mobile broadband network deployment in rural areas—many consumers throughout rural America continue to lack access to advanced mobile broadband networks and considerable investment is needed to extend access throughout rural areas.

If the Commission makes an honest assessment of the state of mobile broadband networks in rural areas, one based on fact and not wishful thinking, it should conclude that mobile broadband networks are not being deployed in a reasonable and timely manner in rural areas. Such a realistic and fact-based conclusion will help the Commission to make the informed decisions necessary to move forward with adequate plans and funding to incent carriers to close the “digital divide” that currently exists in rural America.

Data Sources for Mobile Broadband Service Analysis

Data sources and methodologies currently used by the Commission for its Section 706 analysis of mobile broadband deployment—including FCC Form 477 data, other industry-supplied data, and the centroid methodology—are substantially flawed, leading to an overstatement of current mobile broadband coverage, especially in rural areas. The Commission should cease relying
on this flawed data, and instead focus on identifying other sources of data that will be more accurate and reliable.

U.S. Cellular suggests that the Commission implement a nationwide drive test program, since drive testing is a well-proven option for generating accurate and detailed data regarding mobile broadband coverage. The Commission also should explore options for utilizing crowdsourcing initiatives that use mobile speed test apps to gauge mobile broadband network performance. In addition, the Commission should solicit comment to develop other innovative and creative ideas to achieve a more accurate picture of what remains to be done to improve mobile broadband coverage in rural areas.

The low adoption rates for mobile broadband shown in the 2016 Broadband Progress Report may reflect the fact that, especially in rural areas, many consumers do not have access to mobile broadband networks that are capable of delivering reliable coverage and fast connections to the Internet. This possibility, combined with the Commission’s finding that mobile broadband is an essential service for consumers, underscores the need for the Commission to take necessary remedial action to ensure the availability of advanced mobile broadband networks with no gaps in coverage throughout rural America.

**Mobile Broadband Speed Service Benchmark**

U.S. Cellular supports a speed benchmark of 10 Mbps/1 Mbps for mobile broadband. A 10/1 benchmark is appropriate because, according to the Commission, mobile broadband is already available to nearly half of all Americans at or above this speed. The benchmark, however, will serve as an impetus to promote further deployment in rural areas, where (again, according to the Commission’s data) at least 87 percent of the population currently lacks access to mobile broadband at the 10/1 benchmark speed.
The Commission should not consider the speed benchmark to be met in a geographical area (e.g., a census block) unless at least one mobile broadband provider delivers service at the 10/1 speed, measured throughout the census block.

**A Fast Track for Rural Mobile Broadband Deployment**

The best way for the Commission to make mobile broadband available to all Americans, especially those in rural areas, is to remove barriers to broadband infrastructure investment by increasing the Mobility Fund Phase II budget and by adopting policies that ensure the elimination of coverage gaps in 10/1 deployment.

Doing away with the substantial funding disparities between fixed wireline and mobile wireless broadband services, and giving priority to universal service contribution reform, will enable the Commission to convert Phase II into an engine that can drive mobile broadband deployment in rural America.
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COMMENTS
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UNITED STATES CELLULAR CORPORATION

United States Cellular Corporation (“U.S. Cellular”), by counsel, hereby submits these
Comments, in response to the Commission’s Twelfth Broadband Progress Notice of Inquiry in the
above-captioned proceeding.1

U.S. Cellular provides mobile wireless voice and broadband service in nearly 200 markets
across 24 states located in regional clusters across the country. The overwhelming majority of the
geography served by U.S. Cellular is in rural America. U.S. Cellular is a long-time participant in the
Commission’s universal service program, using support to construct and operate mobile wireless net-
works in small towns and on rural roads that otherwise would not receive mobile wireless voice and

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1 Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, GN Docket No. 16-245, Twelfth Broadband Progress Notice of Inquiry, FCC 16-100 (rel. Aug. 4, 2016) (“Notice”).
broadband service, because it would not be economically feasible to deliver service in these areas without universal service funding.

I. INTRODUCTION.

The Commission, in the 2016 Broadband Progress Report, determined that “consumers have advanced telecommunications capability only to the extent that they have access to both fixed and mobile broadband service.”

This finding should serve as a trigger for Commission actions and policies designed to promote and facilitate investment in advanced mobile broadband networks serving rural America. As the Commission continues its ongoing process of evaluating the “availability of advanced telecommunications capability to all Americans[,]” it should keep its focus on the availability of mobile broadband to all Americans, including rural consumers.

While mobile broadband increasingly serves as consumers’ preferred pathway to the Internet, many consumers in rural America continue to find themselves without any access to this pathway. Given the Commission’s findings that mobile broadband and fixed broadband are equally

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2 Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, GN Docket No. 15-191, 2016 Broadband Progress Report, 31 FCC Rcd 699, 706 (para. 17) (emphasis added) (2016) (“2016 Broadband Progress Report”). U.S. Cellular had advocated for this result, noting that “[i]n the likely event that this inclusion of mobile broadband [in the Commission’s analysis of the availability of advanced telecommunications capability] leads to a finding that mobile broadband networks are not being deployed in a reasonable and timely manner, especially in rural areas, the Commission should act aggressively to promote investment in mobile broadband.” U.S. Cellular Comments, GN Docket No. 15-191 (Sept. 15, 2015) (“U.S. Cellular September 2015 Comments”), at 3.

3 U.S. Cellular makes recommendations in these Comments for actions and policies the Commission should implement to accelerate mobile broadband deployment in rural areas. See Sec. IV., infra.

essential to all Americans, and that “mobile broadband will play an increasingly central role in American culture, business, and the economy[,]” the Commission should pay particularly close attention to whether sufficient progress is being made in providing rural consumers with access to mobile broadband.

Statistics cited by the Commission and by other sources demonstrate that smartphones utilizing mobile broadband networks are becoming the “go to” device for consumers accessing the Internet. For example, monthly data usage per mobile service subscriber with data capable units has increased nearly 600 percent from 2010 to 2013. CTIA has indicated that overall U.S. mobile data traffic, in 2015, was 749 petabytes per month, a 137 percent increase over reported traffic for 2014. The smartphone share of mobile phones used by American consumers increased to 77 percent in November 2015, from 50 percent two years earlier.

Today there are more than 350 million mobile wireless subscriptions in the U.S., with many consumers using mobile wireless devices “having far more computing power than Apollo 11” to access the Internet. In 2015, consumers using mobile devices spent 2.8 hours per day accessing the Internet (compared to 2.4 hours of daily Internet access by desktop computer users), an increase

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6 Id.
7 Id.
10 Written Statement of LeRoy T. Carlson, Jr., Chairman, United States Cellular Corporation, Before the Subcomm. on Communications, Technology, Innovation, and the Internet, U.S. Senate Comm. on Commerce, Science, and Transportation (Feb. 4, 2016) (“Carlson Statement”) at 3 (footnote omitted) (explaining that, “[w]hen it comes to broadband, I agree that we as a nation should be setting big and audacious goals and working toward them”), accessed at https://www.commerce.senate.gov/public/ cache/files/ab3bf837-edb5-45f9-9ba1-5a234183a06f/48FE428BEFDC05BA42A6C7AF89EC4896.leroy-carlson-testimony.pdf. The Carlson Statement is attached to these Comments.
of more than 800 percent from 2008, and an increase of 75 percent from 2012.11 American businesses, large and small, are rotating their Internet presence away from traditional web sites to mobile platforms.12 Such businesses depend on high quality mobile broadband networks.

While mobile broadband is having a transforming effect on the way in which consumers communicate and access the Internet, not enough progress is being made to ensure that rural Americans are able to share the benefits of mobile broadband. Many Americans living in “rural areas … are being left behind …”13

In the 2016 Broadband Progress Report, the Commission indicated that 1.5 million Americans living in rural areas lack any access to LTE services, and 52.2 million rural Americans (87 percent of the rural population) lack any access to LTE services with a minimum advertised speed of 10 Mbps/1 Mbps (“10/1”).14 U.S. Cellular believes that the Commission’s data overstates speed and coverage data, and, as a result, the true disparity in rural America is likely even greater.

The Telecommunications Act of 1996 (“1996 Act”) requires the Commission to work toward closing the rural/urban divide by ensuring that services—including mobile broadband services—available to consumers in rural areas are reasonably comparable to those available in urban

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13 2016 Broadband Progress Report, 31 FCC Rcd at 702 (para. 6). The Commission observed that “the rural-urban disparity in deployment of these [mass market] broadband services also disproportionately impacts the ability of small businesses operating in rural areas to successfully compete in the 21st century economy.” Id. at 701 (para. 4).

14 Id. at 735 (para. 83).
areas.\textsuperscript{15} Yet, some of the Commission’s policies are having the inadvertent effect of undercutting this goal. For example, in revamping its universal service funding policies, the Commission phased out legacy support for mobile wireless services, proposed a demonstrably inadequate Mobility Fund budget,\textsuperscript{16} and provided a disproportionately large amount of support for wireline services.\textsuperscript{17}

This proceeding provides the Commission with an opportunity to make informed findings regarding the extent to which progress is being made in bringing mobile broadband to rural consumers, and to “take immediate action to accelerate deployment” if it finds that such action is necessary.\textsuperscript{18} This action should begin with improving the Commission’s coverage and throughput data for mobile broadband, so that its Mobility Fund Phase II (“Phase II”) program properly targets a sufficient level of funding to areas that need high quality service.

The Commission’s evaluation of whether access to mobile broadband networks is being made available to all Americans (and especially those who live, work, or travel in rural areas) in a reasonably and timely manner will be enhanced by several Commission actions and policies, including the following:

\textit{First}, the Commission should address the fact that its analysis of mobile broadband deployment is being skewed by its reliance on flawed data sources that are incapable of producing accurate and reliable data. The Commission must give priority to fixing this problem, in order to ensure the reasonableness of its findings regarding mobile broadband deployment, especially in rural areas.

\footnotesize{\textsuperscript{15} 47 U.S.C. § 254(b)(3).} \\
\footnotesize{\textsuperscript{16} See, e.g., U.S. Cellular September 2015 Comments at 2, 8.} \\
\footnotesize{\textsuperscript{17} Id. at 8.} \\
\footnotesize{\textsuperscript{18} 47 U.S.C. § 1302(b).}
Second, the Commission should adopt a 10/1 speed benchmark for mobile broadband. This benchmark is appropriate as a benchmark for mobile broadband, especially in rural areas where many consumers currently do not have access to LTE with 10/1 speeds, but where the Commission should concentrate its efforts to promote further deployment of advanced mobile broadband networks.

And, third, if the Commission determines in its next Broadband Progress Report that mobile broadband networks are not being deployed in a reasonable and timely fashion, especially in rural areas, then the Commission should take all appropriate steps to incentivize carriers to accelerate broadband network deployment, such as by providing adequate funding through the Commission’s universal service program.

II. DATA SOURCES FOR MOBILE BROADBAND SERVICE ANALYSIS.

The Commission cannot expect to make informed analyses and findings pursuant to Section 706 if it does not have accurate and reliable data. As Senator Maria Cantwell recently observed, “I don’t know any problem that I’ve ever solved without measuring it first ….”19 If the Commission cannot accurately measure mobile broadband deployment, especially in rural areas, it will be handicapped in its efforts to promote investment in mobile broadband networks to serve rural America.

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A. Deployment Data for Mobile Broadband Service.

The Commission must have the ability to make an accurate, data-driven assessment of the extent to which rural consumers are able to access advanced mobile broadband networks, because this assessment will determine whether the Commission is required to initiate actions pursuant to Section 706(b) to accelerate mobile broadband deployment in rural areas. Unfortunately, the Commission’s assessment currently is being hampered by flawed data sources.

1. Flawed Mobile Broadband Data.

The Commission explains that, “[i]n determining whether advanced telecommunications capability is being made available to all Americans on a reasonable and timely basis, [it] first considers the physical presence of broadband networks meeting [its] speed benchmarks.”20 The problem the Commission faces, particularly in rural areas, is a dearth of data that is sufficiently accurate and reliable to enable the Commission to make informed decisions concerning the availability of mobile broadband service.

There are growing concerns regarding the inadequacy of data on which the Commission currently is relying to determine the scope of mobile broadband coverage. Earlier this year nine U.S. Senators, in a letter sent to the Commission, stated that:

There is an obvious disconnect between official FCC statistics and our own and our constituents’ real-world experiences, and we urge you to work with stakeholders to identify more accurate ways to measure available mobile wireless coverage…. We believe that you must partner with industry and other stakeholders to solve this problem. We cannot afford to ignore it any longer.21

20 Notice at para. 57. This examination of “physical presence” focuses on deployment results. Id. at para. 57 n.121.

U.S. Cellular has consistently maintained that the Commission “must develop an accurate record about the quality of mobile broadband coverage in rural areas, to assess whether substantial investment should be targeted within existing carrier networks and at the edges, to fill in dead zones that leave consumers without service in critical areas where they live, work, and travel.”

The problem is that the Commission has been in the position of having to rely on an inaccurate record.

**Form 477 Data.**—The Commission seeks comment on its use of FCC Form 477 data for measuring mobile broadband deployment. In U.S. Cellular’s view, Form 477 “do[es] not provide the FCC with accurate data that allows reasonable conclusions as to what needs to be done and what it will cost to make services in rural areas reasonably comparable” to services available in urban areas.

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23 FCC Form 477, Local Telephone Competition and Broadband Reporting (“Form 477”).

24 Notice at para. 62.

The currently available Form 477 data assumes “that … advertised speeds [reported by carriers] are available throughout an entire area at all times[,]”\(^{26}\) even though this ignores various factors that affect network performance throughout a carrier’s service area. The result is that Form 477 is likely to overstate mobile broadband coverage in rural areas. Further, the Commission has not carried out any independent verification to assess whether its Form 477 data is accurate.

The Commission has not examined methodologies used by carriers, or tested a statistically significant sample of the coverage assertions contained in Form 477 reports.\(^{27}\) Moreover, the Commission has not yet made any carrier-specific Form 477 data collected from carriers available for public inspection, thus depriving itself of public input concerning the accuracy and reliability of the data.

**The Centroid Methodology.**—The Commission asks whether “the centroid methodology [is] an appropriate way to measure mobile broadband coverage ….”\(^{28}\) It is not.

Under the centroid methodology, if the designated center point of a Census Block or other service area is covered by a mobile broadband network’s signals, then the Commission treats the entire service area as having coverage from that network.\(^{29}\) The methodology unavoidably overstates mobile broadband coverage in rural areas, where large Census Blocks often are not completely covered by a mobile broadband provider’s service.

\(^{26}\) See Ex Parte Letter from Caressa D. Bennet, General Counsel, Anthony K. Veach, Sr., Regulatory Counsel, & Erin P. Fitzgerald, Regulatory Counsel, Rural Wireless Ass’n, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-208, et al. (Apr. 13, 2016), at 3.

\(^{27}\) U.S. Cellular May 2016 Comments at 6.

\(^{28}\) Notice at para. 62.

\(^{29}\) Eighteenth Report, 30 FCC Rcd at 14537-38 (para. 34).
A further problem with the methodology is that it “ignores the level of service provided both at the centroid point and throughout the remainder of the Census Block[,]” leading the Commission to assume incorrectly that the mobile broadband network’s signal strength is the same at the center point and at the cell edge of a service area. Once a centroid point is deemed covered, it matters not whether the signal strength provides robust or weak coverage, or whether a useful Internet connection is available. The result is the same—the entire Census Block is deemed covered and thus ineligible for new universal service investment.

Industry Coverage Data and Claims.—The Commission’s publicly available mobile broadband coverage data relies on carrier-developed advertising maps, but, as U.S. Cellular has discussed, the Commission has not sought to verify the accuracy of these advertising maps. The problem is that “the methodology for developing advertising maps can vary among carriers, and even assuming good faith and best efforts, advertising maps can be expected to stretch the coverage picture as far as reasonably possible.” In addition, the Commission has not required companies submitting maps to provide data showing the quality of broadband service’s signal available in any area.

There also have been widespread industry claims that 98 percent of Americans have access to 4G LTE service. The Commission, relying on industry-supplied data, has expressed the same view. These claims are inconsistent with the reality of mobile broadband coverage in rural areas.

30 U.S. Cellular May 2016 Comments at 5.
31 Id. at 8.
33 See 2016 Broadband Progress Report, 31 FCC Rcd at 735 (para. 83, Table 4) (showing that 1 percent of the total U.S. population lacks access to LTE mobile broadband); Implementation of Section 6002(b) of the
The problems with Form 477 data, the inaccurate assumptions generated by reliance on the centroid methodology, unreliable industry data, and exaggerated industry claims regarding mobile broadband coverage in rural areas all underscore the need for the Commission to take the necessary steps to fix these data problems.

The Commission should not move forward with implementing Phase II until it has taken these steps to eliminate data deficiencies that have led to an overstatement of mobile broadband coverage in rural areas. The Commission’s decisions regarding the Phase II budget, the eligibility of service areas for Phase II support, and other Phase II issues should be based on accurate and reliable data.

2. Alternative Data Sources.

The Commission also seeks comment on alternatives to the centroid methodology. U.S. Cellular suggests that drive testing will produce more accurate and reliable coverage data.

The Commission should consider the feasibility of implementing a nationwide drive test program for the purpose of producing accurate information relating to mobile broadband coverage.

Drive testing is a well-proven option for generating accurate and detailed data for use in connection

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Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 13-135, Seventeenth Report, 29 FCC Red 15311, 15340-41 (para. 59) (WTB 2014) (footnote omitted) (finding that, “[a]s of January 2014, 98.5 percent of the population lived in census blocks that were covered by an LTE network, compared to 67.5 percent of the population in January 2012”); Commissioner Michael O’Rielly, A Path for Mobility Fund Phase II? (July 25, 2016), accessed at https://www.fcc.gov/news-events/blog/2016/07/25/path-mobility-fund-phase-ii (arguing that “[a] key goal should be to fund only those areas that do not already have wireless service of at least 4G capabilities. As such, this should limit any Mobility Fund to narrow areas of America not already overlapped by our nationwide carriers. In particular, the Commission’s Eighteenth Mobile Wireless Competition Report indicates that 99.6 percent of all Americans and 90.7 percent of the country’s geographic area has at least one provider of LTE.”).

34 Notice at para. 62.
with the Commission’s Section 706 analysis, and for other purposes, such as determining the eligi-
gibility of service areas for Phase II support and assessing the extent of competition in the mobile wireless marketplace. Indeed, the Commission already requires Mobility Fund Phase I support recipients to perform drive testing to demonstrate that network deployment requirements have been met, and the Commission conducts further drive testing to verify performance.\textsuperscript{35}

Problems associated with data sources used by the Commission for its Section 706 analysis and for other purposes have become so acute that Senator Joe Manchin recently introduced an amendment to S. 2644 (which was adopted), proposing to require the Commission to study the feasibility of conducting mobile broadband coverage drive testing in rural areas to map where coverage exists, and where it still needs to be delivered.\textsuperscript{36}

In a letter to the Commission last year, Senator Manchin expressed concern regarding the accuracy of broadband maps purporting to show the extent of mobile broadband network coverage in rural areas, stating that “the reality in my state is far different than what the maps indicate.”\textsuperscript{37} Given the importance of accurate data, and the problems the Commission faces regarding the shortcomings of existing data sources, exploring drive testing as a source of mobile broadband performance data is warranted.

\textsuperscript{35} 47 C.F.R. §§ 54.1006(a), 54.1006(b). \textit{See} U.S. Cellular May 2016 Comments at 20.

\textsuperscript{36} \textit{See} U.S. Cellular May 2016 Comments at 15.

\textsuperscript{37} Letter from Sen. Joe Manchin, to Thomas Wheeler, Chairman, FCC (Sept. 22, 2015), at 1, \textit{accessed at http://www.manchin.senate.gov/public/index.cfm?\textbackslash a=files.\textbackslash serve&\textbackslash File id=D660F970-2859-46B3-8145-CFE46147719}. \textit{See} Carlson Statement at 10 (footnote omitted) (indicating that, “[i]n testing [U.S. Cellular’s] networks, and those of our competition, we can confirm that the National Broadband Map and other publicly available mapping resources significantly overstate where rural citizens can actually use their devices to access rapid mobile broadband service, especially on rural secondary roads and in agricultural areas”).
The Commission’s objective should be to replace the centroid methodology (which, as U.S. Cellular has discussed, uses data showing coverage of a small portion of a service area as a basis for assuming that the entire service area has coverage) with a methodology that produces information regarding actual coverage throughout a coverage area. Drive testing is a mechanism that will produce this result by “provid[ing] an accurate real-world capture of the [radio frequency] environment under a particular set of network and environmental conditions. The main benefit of drive testing is that it measures the actual network coverage and performance that a user on the actual drive route would experience.” In addition, drive testing is a useful means of evaluating mobile broadband performance, including speed, latency, and service consistency.

The Commission should also explore leveraging mapping technologies developed by Apple, Google, and other sources as a means of producing comprehensive maps showing actual and detailed mobile broadband coverage. For example, there are a number of commercial services that are pursuing opportunities to utilize data leveraging both private sector transportation companies and public sector transportation organizations to supplement assessments of mobile broadband coverage in rural areas.

B. Other Issues Concerning Mobile Broadband Service Data Sources.


The Commission should explore options for expanding its utilization of crowdsourcing initiatives that use mobile speed test apps to gauge mobile broadband network performance. Companies such as SpeedTest and Sensorly, for example, provide mobile speed test apps using data

collected anonymously and shared with users of the mobile apps. The purpose of these apps is to collect and provide relevant data regarding the quality of service a consumer “might experience while using a particular wireless network.”\textsuperscript{39} T-Mobile, for example, is now providing a crowdsourced, customer-verified network coverage map that reflects actual customer usage data points. The map incorporates speed test data from third party apps showing average download speeds from customer speed tests.\textsuperscript{40}

Reliance on these crowdsourcing initiatives would be helpful in gaining an increased level of understanding of mobile network performance at a more granular level. If the Commission is able to address some issues associated with mobile speed test apps,\textsuperscript{41} these crowdsourcing initiatives could deliver accurate data that would enhance the Commission’s Section 706 analysis. In addition, the Commission should solicit comment on other innovative and cost-effective means of developing a clearer picture of the scope of mobile broadband deployment in rural America.

2. **Estimates of Consumer Adoption Rates.**

The Commission seeks comment on how it should use existing data sources (\textit{e.g.}, Form 477, Pew Research Center data) in its analysis of consumer adoption of advanced fixed and mobile broadband services.\textsuperscript{42} It also asks for comment on data sources relating to adoption rates that it should utilize for its determination concerning the availability of both fixed and mobile Internet

\textsuperscript{39} Sensorly Website, \textit{accessed at} \url{http://www.sensorly.com/about-us}.


\textsuperscript{41} The Commission observes in the \textit{Notice}, for example, that “manual testing [using speed apps] can lead to biased results when performed only at specific times or places, and may provide a less accurate picture of overall broadband performance.” \textit{Notice} at para. 70 n.158.

\textsuperscript{42} \textit{Id.} at para. 80.
services, and for its “consideration of disparities between rural and urban areas.” As part of its discussion, the Commission displays the following table relating to consumer adoption:

<table>
<thead>
<tr>
<th>Table 1 – Estimates of Adoption Rates for Households and Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Service (Any Type)</td>
</tr>
<tr>
<td>Fixed Internet</td>
</tr>
<tr>
<td>Both Fixed &amp; Mobile Internet</td>
</tr>
<tr>
<td>Only Mobile Internet</td>
</tr>
</tbody>
</table>

The statistics from various data sources presented in the above table illustrate that consumer adoption rates for fixed Internet services exceed adoption rates for mobile Internet services. U.S. Cellular suggests that the Commission should determine the extent to which this disparity in adoption rates is attributable to the fact that, especially in rural areas, many consumers do not have access to advanced mobile broadband networks that provide reliable coverage and fast connections to the Internet. This lack of reliable coverage and service levels may be limiting rural consumers from subscribing to mobile broadband services.

The Commission has found that “mobile broadband is as essential as fixed broadband service[,]” and that “fixed and mobile broadband are both critically important services that provide different and complementary capabilities, and are tailored to serve different consumer needs.”

43 Id.

44 Id. at para. 78 (footnotes omitted).


46 Id. at 707 (para. 17) (footnote omitted); see id. at 710 (para. 24) (footnotes omitted) (finding that “today fixed and mobile broadband are often used in conjunction with one another and, as such, are not functional substitutes. We base this finding on the capabilities both services offer to consumers, the manner in which
Given these findings, if there is a basis for concluding that lack of access, especially in rural areas, to reliable mobile broadband service is a substantial factor in accounting for the disparity between consumer adoption rates for fixed and mobile Internet service, then this would be one of several grounds for the Commission to give priority to taking remedial action.\textsuperscript{47}

**III. MOBILE BROADBAND SPEED BENCHMARK.**

The *Notice* seeks comment on whether a mobile speed benchmark of 10/1 is appropriate to reflect current customer usage patterns for mobile broadband services, and “whether a 10 Mbps/1 Mbps edge speed is an accurate measure of advanced telecommunications capability.”\textsuperscript{48}

This issue is important because the Commission “has ultimately defined advanced telecommunications capability primarily in terms of download and upload speeds ….”\textsuperscript{49} The Commission has explained that “a mobile speed benchmark will need to take into account the unique technical characteristics of mobile wireless communication[,]”\textsuperscript{50} and that it “aim[s] to establish a benchmark for mobile broadband that reflects the critical importance of speed as one of the primary factors influencing user experience, in conjunction with consistency and latency ….”\textsuperscript{51}

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\textsuperscript{47} U.S. Cellular discusses, in Sec. IV., *infra*, steps the Commission should take to accelerate mobile broadband deployment in rural areas.

\textsuperscript{48} *Notice* at para. 39.

\textsuperscript{49} 2016 *Broadband Progress Report*, 31 FCC Rcd at 721 (para. 49).

\textsuperscript{50} *Id.* at 725 (para. 61).

\textsuperscript{51} *Notice* at para. 38.
U.S. Cellular supports the use of a 10/1 speed benchmark for mobile broadband, for purposes of the Commission’s Section 706 analysis and findings. Any geographical area lacking actual access to mobile broadband speeds of 10/1 should be treated as unserved by mobile broadband. A 10/1 speed benchmark will serve as a useful measurement and a “big and audacious” near-term goal in rural areas, reflecting current consumer preferences as well as services that might be available to them in the near future.

U.S. Cellular also suggests that, for purposes of the Commission’s Section 706 analysis and findings, a geographical area should not be treated as having access to mobile broadband service that meets the 10/1 speed benchmark unless (1) service meeting the benchmark is available from at least one service provider in the area; and (2) the service meets the speed benchmark throughout the area, including all measured cell edges within the area.

Setting the benchmark at 10/1 is appropriate because many if not most Americans living in urban and suburban areas currently have access to mobile broadband at those download and

52 See Carlson Statement at 15 (footnote omitted) (explaining that, “[w]hen it comes to broadband, I agree that we as a nation should be setting big and audacious goals and working toward them”).

53 See Ex Parte Letter from David A. LaFuria, Counsel for U.S. Cellular, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-208, et al. (Mar. 3, 2016), Attach. at 22 (proposing that the Commission should “[d]eclare now, and in the next 706 proceeding, that any area lacking actual access to 10/1 speed is unserved by mobile broadband”).

54 See Notice at para. 38.
upload speeds.\textsuperscript{55} Yet, 87 percent of the population in rural areas lacks access to 10/1 mobile broadband.\textsuperscript{56} Adopting a 10/1 benchmark should drive universal service policies that will increase investment that, in turn, increases rural consumers’ access to mobile broadband. As U.S. Cellular has explained, “[t]he critical role of universal service is to ensure that broadband technologies being deployed and commonly used in urban areas are made available to our rural communities in a timely manner. This is no different than any other infrastructure, whether it be roads, electricity, or water.”\textsuperscript{57}

Moreover, many mobile broadband services that consumers are choosing today, and that may be available in the near future,\textsuperscript{58} support a conclusion that a 10/1 benchmark for mobile broadband is appropriate. For example:

**Health Care.**—Consumers currently are able to choose mobile devices and applications capable of augmenting diagnostic, monitoring, and treatment functions. These devices and applications are “exploding into the marketplace and revolutionizing health care[,]”\textsuperscript{59} improving medical outcomes, and increasing the efficient delivery of services. A recent report indicated that there is an estimated $42 billion annual market for mobile health care services.\textsuperscript{60}

\textsuperscript{55} The Commission reported in the 2016 Broadband Progress Report that approximately 47 percent of Americans had access to a mobile wireless LTE service with a speed of at least 10/1. 2016 Broadband Progress Report, 31 FCC Rcd at 735 (para. 83, Table 4), cited in Notice at para. 37 n.77.

\textsuperscript{56} Id. (showing that 87 percent of the population in rural areas lacks access to 10 Mbps/1 Mbps mobile broadband). As U.S. Cellular has explained, this percentage likely understates the lack of coverage in rural areas, because the Commission has been relying on flawed Form 477 data and other unreliable data that overstate 10/1 mobile broadband coverage. See Sec. II.A., supra.

\textsuperscript{57} Carlson Statement at 15.

\textsuperscript{58} Notice at para. 38.

\textsuperscript{59} Carlson Statement at 5.

\textsuperscript{60} Mylea Charvat, *The Growing Pains of Mobile Health*, CRUNCH NETWORK.COM (May 19, 2016), accessed at https://techcrunch.com/2016/05/19/the-growing-pains-of-mobile-health/.
Paramedics and hospital emergency teams are benefiting from the growing mobility and reliability of telemedicine, made possible by the advanced technology of smartphones and tablets. A recent report explains that mobile devices are allowing “telemedicine providers to virtually assess patients, and have the potential to improve stroke care and reduce emergency department traffic.”\(^{61}\) In addition, a study conducted two years ago concludes that 4G LTE broadband has the capability to support higher-bandwidth applications used for mobile health care, such as video and high-definition imagery.\(^{62}\)

**Education and Mobile Learning.**—Mobile devices and applications utilizing advanced broadband technologies are enabling more and more students to access learning materials, do homework, create presentations, and communicate with teachers.\(^{63}\) For example, a recent study focusing on higher education concludes that “[m]obile technology is ubiquitous in the lives of today's college students … chang[ing] how they communicate, gather information, allocate time and attention, and potentially how they learn.”\(^{64}\)

The study finds that “[t]he mobile platform’s unique capabilities—including connectivity, cameras, sensors, and GPS—have great potential to enrich the academic experience. Learners are


\(^{63}\) Carlson Statement at 6.

no longer limited to the classroom’s geographical boundaries [and] mobile technology platforms let individuals discuss issues with their colleagues or classmates in the field.”

In the workplace context, “[o]ver the next five years, mobile learning is expected to account for 57% of all learning technologies.” The convenience and flexibility of mobile learning are driving its growing popularity. “Mobile learning offers learners the ability to access training on demand … in between tasks, on breaks, or going to and from work, directly on their mobile device.”

**Internet of Things.**—The Commission notes that “the number of devices and connected sensors comprising what is commonly referred to as the ‘Internet of Things’ … is expected to grow by orders of magnitude in the coming years.” A recent Ericsson report indicates that 6 billion connected devices are forecasted to join the Internet of Things (“IoT”) by the end of 2021, and that IoT is set to overtake mobile phones as the largest category of connected devices by 2018.

A forecast published last year by Gartner, Inc., indicates that 20.8 billion IoT devices will be in use worldwide by 2020. Business Insider forecasts that “[n]early $6 trillion will be spent

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65 *Id.* (footnote omitted).


67 *Id.*

68 *Notice* at para. 42.


on IoT solutions over the next five years[,]”\(^71\) and a McKinsey Global Institute report published last year estimates that “[i]f policy makers and businesses get it right, linking the physical and digital worlds [through IoT] could generate up to $11.1 trillion a year in economic value by 2025.”\(^72\) Further, T-Mobile recently completed a business arrangement that “will provide wireless connections for a new service from communications startup Twilio” aimed at the growing IoT market.\(^73\)

Finally, while it is true that IoT connected devices will achieve more optimum use in a 5G environment, “new implementations of LTE” have been designed to facilitate the use of IoT-connected devices.\(^74\)

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> Customers will capture most of the benefits. We estimate that IoT users (businesses, other organizations, and consumers) could capture 90 percent of the value that IoT applications generate. For example, in 2025 remote monitoring could create as much as $1.1 trillion a year in value by improving the health of chronic-disease patients.

*Id.*

\(^73\) *T-Mobile Offers Internet of Things Connections via Twilio Deal*, FORTUNE.COM (May 24, 2016), accessed at [http://fortune.com/2016/05/24/t-mobile-offers-internet-of-things-connections-via-twilio-deal/](http://fortune.com/2016/05/24/t-mobile-offers-internet-of-things-connections-via-twilio-deal/). Under Twilio’s offering, “developers will be able to tap the company for wireless voice, text or data service that can be embedded into Internet-connected devices or sensors. A connected drone or water meter could use Twilio’s service to send information over T-Mobile’s wireless network back to a customer’s data center, for example.” *Id.*

IV. ACCELERATING MOBILE BROADBAND DEPLOYMENT IN RURAL AMERICA.

If the Commission determines, based on its Section 706 analysis utilizing a 10/1 speed benchmark for mobile broadband, that consumers, especially those in rural areas, are not being provided with access to advanced mobile broadband services in a reasonable and timely manner, then the Commission must take action to fix this problem.\textsuperscript{75}

Fortunately, a course of action is readily available: The Commission should tailor its Phase II and other universal service policies, and redirect its universal service budget, toward promoting further investment for the deployment of advanced mobile broadband networks across rural America. However, as U.S. Cellular has discussed,\textsuperscript{76} the Commission should not implement Phase II until it has fixed the data problems that have led to an overstatement of mobile broadband coverage in rural areas. The Commission’s decisions regarding the Phase II budget, the eligibility of service areas for Phase II support, and other Phase II issues must be based on accurate and reliable data.

The Commission’s finding in the 2016 Broadband Progress Report that mobile and fixed broadband services are equally essential compels re-examination of a universal service budget that has been and continues to be heavily weighted to support fixed services. Between 1999 and 2014 the Commission allocated over $50 billion in support to fixed networks and less than $12 billion to mobile networks. Over the next five years, fixed networks are projected to receive $22.5 billion in federal funding, while mobile networks are projected to receive $2.5 billion.\textsuperscript{77}

\textsuperscript{75} 47 U.S.C. § 1302(b).
\textsuperscript{76} See Sec. II.A.1., supra.\textsuperscript{77} See Carlson Statement at 13. One example of the adverse effects of this imbalance in universal service funding is that it fails to make sufficient funding available for the deployment of mobile broadband networks in rural areas that have challenging terrain. U.S. Cellular recently explained the high cost of constructing cellular towers in more mountainous regions of the country, noting that:
These glaring disparities need to be addressed and fixed. The Commission should craft a more realistic and effective funding strategy for bringing mobile broadband to rural America, including an overhaul of its universal service contribution policies.

Providing sufficient funding for Phase II support mechanisms is a critical issue because rural Americans increasingly depend upon mobile voice and mobile broadband services, and, as

Higher costs have been largely driven by leasehold improvements, principally the need to construct roads and extend utility service to sites located in steep and challenging terrain. At a more granular level, these costs include obtaining construction permits, zoning approvals, site preparation, road construction, NEPA review, installation of power, storm water control, trenching, and landscaping.

Ex Parte Letter from David A. LaFuria, Counsel for U.S. Cellular, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-208, et al. (May 31, 2016), at 1.

78 Arguments defending these funding disparities, and supporting further limits on Mobility Fund support, rely on Commission data reflecting widespread LTE broadband network deployment across nearly the entire country, including in rural areas. See, e.g., note 32, supra, and accompanying text (discussing Commissioner O’Rielly’s position that Mobility Fund support should be limited, relying on data in the Eighteenth Report purporting to show extensive LTE coverage). The fact is, however, that this data overstates LTE coverage in rural areas. Reliance on this faulty data cannot be a basis for continuing to underfund mobile broadband deployment in rural America. There is no support for any “misleading claim that the job of providing mobile broadband to rural America is largely finished.” Carlson Statement at 9 (footnote omitted). In fact, based on U.S. Cellular’s experience, “the state of mobile broadband is nowhere near developed enough to conclude that rural Americans have access to a strong 4G LTE signal throughout the area where they live, work, and travel.” Id. at 10 (emphasis in original).

79 In this regard, U.S. Cellular supports Commissioner Clyburn’s view that:

The [2016 Broadband Progress] Report’s finding that mobile is necessary for advanced telecommunications capability heightens the need to move swiftly on the mobility fund so we can close any remaining gaps in mobile broadband coverage. While I applaud the levels of private sector investment, there are places that still lack coverage, and other areas that only have service because of the ongoing support from the universal service fund. A permanent mobility fund should be expressly targeted to reach these areas.


80 For example, the Competitive Carriers Association has indicated that “88 percent of rural Americans have a cell phone and over 42 percent of rural adults live in a wireless-only household. Over half of all rural Americans now own smartphones, and of this group, 15 percent report their only form of home broadband Internet access is with a smartphone.” Testimony of Steven K. Berry, President & Chief Executive Officer, Competitive Carriers Association, Before the Subcomm. on Communications, Technology, Innovation, and the Internet, U.S. Senate Comm. on Commerce, Science, and Transportation (Feb. 4, 2016), at 3.
U.S. Cellular has discussed, consumers have recognized that mobile broadband is uniquely capable of delivering valuable consumer benefits relating to public safety, health care, education, agriculture, and IoT. If the Commission is successful in establishing Phase II mechanisms and funding levels that promote new investment in mobile broadband infrastructure, this “will have multiplier effects, creating jobs and stimulating economic growth.”

A more equitable and effective universal service budget will provide the levels of investment necessary to ensure that 10/1 mobile broadband networks are being deployed to all Americans, especially those who live, work, or travel in rural areas, in a reasonable and timely manner.

In addition to recalibrating its allocation of universal service support between fixed wireline and mobile wireless services, the Commission can make the task of sufficiently promoting investment in mobile broadband networks easier by reforming its universal service contribution policies. U.S. Cellular has been a strong supporter of contribution reform, arguing that “[t]he Commission’s defense of its austerity budget, in which the goal appears to be to drive down the level of support as much as possible, rings hollow as the Commission fails to move forward with

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81 See Sec. III., supra.
82 Carlson Statement at 5-6. In addition, “[f]or households that cannot afford to purchase a desktop computer and subscribe to both mobile and fixed networks, a single mobile device is capable of meeting voice communications and Internet needs.” Id. at 6.
83 Id. (footnote omitted).
contribution reform.”85 Fixing contributions is another important step toward enabling the Commission to rework the Phase II budget, so that Phase II can be effective in promoting mobile broadband deployment.

V. CONCLUSION.

In light of the serious flaws in data on which the Commission has relied to evaluate the extent of mobile broadband coverage for purposes of its Section 706 analysis and findings, U.S. Cellular respectfully suggests that the Commission should give priority to identifying and utilizing data sources capable of providing more accurate and reliable data.

U.S. Cellular also respectfully suggests that the Commission, for purposes of its Section 706 analysis and findings, should adopt a 10 Mbps/1Mbps speed benchmark for measuring mobile broadband deployment.

Finally, the Commission should give priority to increasing universal service support available for mobile broadband deployment, to levels that will be sufficient to ensure that advanced mobile broadband services are available to Americans who live, work, and travel in rural areas.

Respectfully submitted,

UNITED STATES CELLULAR CORPORATION

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85 U.S. Cellular CAF Reply Comments at 3-4.
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September 6, 2016
WRITTEN STATEMENT

of

LeROY T. CARLSON, JR.

CHAIRMAN,

UNITED STATES CELLULAR CORPORATION

before the

SUBCOMMITTEE ON COMMUNICATIONS, TECHNOLOGY,
INNOVATION, AND THE INTERNET

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

FEBRUARY 4, 2016
Chairman Wicker, Ranking Member Schatz, and members of the Subcommittee, my name is LeRoy T. Carlson, Jr., and I am Chairman of United States Cellular Corporation. Thank you for the opportunity to discuss the need for mobile broadband in our nation’s rural areas and the important role that the Federal Universal Service Fund can play to address this need.

**Introduction.**

U.S. Cellular provides wireless service in nearly 200 markets across 24 states located in regional clusters across the country, including many of the states represented on this Committee such as Missouri, New Hampshire, Nebraska, Kansas, West Virginia, Wisconsin, and Washington. The overwhelming majority of the geography we serve is rural in character. We have participated in the FCC’s universal service program for many years, using support to construct and operate network facilities in small towns and on rural roads that would not otherwise receive service, because they would never prove to be economically feasible without assistance.

In each of our company’s previous appearances before this Committee to discuss universal service, we have made the point that Congress directed the FCC to ensure that rural citizens have access to modern telecommunications and information services that are reasonably comparable to those available in urban areas.¹

Based on our deep experience in rural America, we have concluded that the current and proposed Mobility Fund mechanism lacks the necessary size and focus to ensure that rural communities have timely access to high-quality mobile broadband services needed to compete,

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¹ See, 47 C.F.R. § 254(b)(3).
here in the United States and around the world, for jobs and economic opportunities. We fear that policy makers have grossly underestimated the amount of work that remains to be done in rural America before mobile broadband can be deemed comparable to what exists in our nation’s urban areas.

As explained below, we urge the Committee to direct the FCC to develop a more accurate picture of mobile coverage and mobile broadband availability in rural America, and to estimate how much it will cost to bring mobile broadband networks in rural America up to the reasonably comparable standard that Congress set. Once these tasks are done, Congress can make the policy choice as to how best to complete the task.

Today, my testimony touches upon three things: (1) The critical role that mobile broadband plays in enabling public safety, education, and our rapidly expanding information economy; (2) the insufficiency of mobile broadband deployment in rural America today to meet stated goals; and (3) the need to make smart and creative policy choices to allocate and target scarce federal universal service funds to rural and high-cost areas to maximize the value of such investments in extending the reach of mobile broadband service.


In the 1980s, experts projected that there could be 800,000 mobile phones in use by 2000. They came up short by 10,000,000. Today there are over 350 million mobile wireless subscriptions in the US. In 1984, the first commercial cell phone sold for $3,995.00. Today, there are more types of mobile wireless devices than I can list, capable of performing thousands upon thousands of tasks, at a small fraction of the 1984 price, with many having far more computing power than Apollo 11. However, looking back at how we have benefited from
mobile services dramatically undersells the future that consumers will enjoy, because we’re just getting started.

At a time when consumer preferences are rapidly shifting to mobile broadband, policymakers must refocus universal service mechanisms to ensure that citizens in rural areas have access to high-quality service. For example, the Pew Research Center reports that adults living in households with a cellphone but no landline, and the number of households that rely solely on a smartphone for broadband have increased dramatically:²

These compelling statistics gain further meaning when you consider just a few of the many benefits that mobile services provide:

- **Public Safety.** The ability to use 911/E-911/Text-to-911 depends 100% on high quality coverage, to fully enable location-based services.\(^3\) When disaster strikes, first responders depend on mobile wireless and broadband networks, which are the first to return to service. The value and utility of FirstNet, our nation’s mobile broadband public safety network, increase every time a new cell tower is constructed, as it provides a place to locate critical public safety communications equipment.

- **Health Care.** Mobile devices and applications capable of diagnosing, monitoring and treating various conditions are exploding into the marketplace and revolutionizing health care.\(^4\) These advances improve patient outcomes, and increase efficient delivery of services. It is now possible for a diabetic patient to continuously monitor, store, and transmit glucose levels to health care providers through a mobile device.\(^5\) Mobile video conferencing is increasingly important to emergency medical services and in delivering health care to remote areas where facilities are not easily accessible. 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. Gartner expects 21 billion devices to be deployed by 2020.\(^6\) According to General Electric, the Industrial Internet, defined as the combination of Big Data and the Internet of Things, may be responsible for $15 trillion (not a typo) of worldwide GDP by 2030.\(^7\) Most of these connected devices, numbering

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\(^3\) As of November, 2015, the FCC estimates that 70% of 911 calls are placed from wireless phones, and that percentage is growing. See, [https://www.fcc.gov/consumers/guides/911-wireless-services](https://www.fcc.gov/consumers/guides/911-wireless-services).

\(^4\) A list of mobile medical applications can be found at: [http://www.fda.gov/MedicalDevices/DigitalHealth/MobileMedicalApplications/ucm368743.htm](http://www.fda.gov/MedicalDevices/DigitalHealth/MobileMedicalApplications/ucm368743.htm)

\(^5\) [http://www.dexcom.com/g5-mobile-cgm](http://www.dexcom.com/g5-mobile-cgm). 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/](https://verily.com/).


in the tens of billions, will need the flexibility that mobile wireless provides. The amount of data flowing through mobile broadband networks will dwarf what we see today. Cisco predicts that, between 2014-2019, U.S. mobile data traffic will rise seven-fold, driven by four billion new mobile connections, a 2.5X increase in throughput speeds, and mobile video traffic reaching 72% of all traffic.¹

- **Education.** Students are increasingly using mobile devices to access learning materials, do homework, create presentations, and communicate with teachers. Students with connectivity throughout the community are more likely to meet educational goals, especially in an age where learning through the Internet is essential.

- **Agriculture.** Connected tractors, irrigation systems, livestock management, commodity tracking, and many more applications depend upon mobile wireless connectivity.

- **Low-income households.** For households that cannot afford to purchase a desktop computer and subscribe to both mobile and fixed networks, a single mobile device is capable of meeting voice communications and Internet needs.

If the Committee takes nothing else away from these examples of how mobile wireless is enriching our lives, it should be this: *None of the benefits described above will adequately benefit rural Americans unless high-quality mobile broadband coverage is available everywhere they live, work, and travel.*

In areas where emergency calls cannot connect, or where medical devices cannot transmit data, lives will be lost. In areas where tablets and laptops don’t work, educational opportunities will be foreclosed. The enormous power of the Internet of Things cannot be fully realized without ubiquitous mobile broadband. As Deere & Company has previously noted to the FCC, a lack of connectivity on our nation’s farmlands costs productivity and wastes water

The lack of mobile broadband denies low-income households the opportunity to fully participate in our nation’s economy. Mobile broadband, which didn’t exist thirty years ago, and was considered a luxury item just ten years ago, is now an essential part of our lives.

I cannot emphasize enough how important it is for Congress and the FCC to foster development of robust mobile broadband networks in rural areas. We are in just the second inning of a huge revolution in how Americans live their lives, a revolution that may never come to rural Americans who live in areas where it is too expensive to make a business case to build and upgrade networks. We at U.S. Cellular provide our customers with access to the applications they use, because we enable all of them. If coverage is weak or throughput is slow, devices will not work as designed.

We note that new investments in mobile broadband infrastructure each year will have multiplier effects, creating jobs and stimulating economic growth. One wireless industry job supports over six additional jobs in the economy, almost one and one half times higher than that of the U.S. manufacturing sector. Each dollar of investment in wireless results in $2.32 of economic activity. In our experience, rural areas continue to support a tremendous amount of manufacturing, as well as a growing distributed service economy (for example, call centers


12 Id.
and medical clinics). We hear directly from our employees and customers that managers and educated professionals no longer consider rural areas that lack high-quality mobile wireless services to be attractive to locate to, or to stay in. I’m sure members of this subcommittee have heard the same thing from their rural constituents.

This is not just anecdotal evidence. Rural areas have large gaps with urban areas, which gaps need to be closed. Data from the Department of Agriculture reveals that “2010-2014 is the first period of overall population decline on record for rural America as a whole.”¹³ The same report shows employment growth since the 2008 recession heavily skewing in favor of our nation’s urban areas and a persistent rural/urban educational attainment gap:

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One of the best ways to stimulate economic activity, attract talented people to areas needing an employment boost, and to increase educational opportunities, is to build mobile broadband infrastructure. It is therefore vital for policymakers to have accurate data about the state of mobile deployment in rural America. As a Committee that is forward-looking, I urge you to consider the essential role that mobile broadband services will play in the future, and to ensure that the universal service program provides sufficient resources to realize that future in rural areas.

2. **Mobile Broadband Deployment in Rural America is Insufficient.**

Let me continue by acknowledging that we are well aware of the misleading claim that the job of providing mobile broadband to rural America is largely finished.\(^\text{\textsuperscript{14}}\) When the FCC proposed Phase II of its Mobility Fund in 2014, it stated, “According to some sources, nearly

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99.5 percent of the U.S. population today (and the road miles associated with that population) is covered by some form of mobile broadband technology.”

That statistic cannot be right. Based on our experience, the state of mobile broadband is nowhere near developed enough to conclude that rural Americans have access to a strong 4G LTE signal throughout the area where they live, work, and travel. In a recent letter to the FCC, Senator Manchin astutely called out problems with available mapping resources, stating “the reality in my state is far different than what the maps indicate.”

Senator Manchin’s experience is far from an isolated case and I’m sure each of you know from personal experience in your own states that mobile broadband coverage with a strong signal is far from complete and dead zones remain to be covered. In testing our networks, and those of our competition, we can confirm that the National Broadband Map and other publicly available mapping resources significantly overstate where rural citizens can actually use their devices to access rapid mobile broadband service, especially on rural secondary roads and in agricultural areas.


17 For example, we’ve heard directly from Senator Tester that he can’t get any signal on and around his working farm in Montana, and from Senator Brown that southeastern Ohio lacks coverage.
In its recently released Eighteenth Mobile Competition Report, the FCC states that 25% of road miles and 50% of square miles in the US do not have coverage by two or more carriers, and concedes that its data sources likely overstate coverage.\footnote{See, \textit{Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Eighteenth Report, FCC 15-1487 (Dec. 23, 2015) at p. 28, Chart III.A.3 ("Eighteenth Mobile Competition Report")}.} This is significant because there continue to be two incompatible wireless network technologies in use today – the GSM standard and its 3G successors, used by AT&T, T-Mobile, and a number of other carriers, and the CDMA standard, used by Verizon, Sprint, U.S. Cellular, and a number of other carriers.

A person with a CDMA-only phone cannot complete a call when they are in an area served only by GSM, and vice-versa. As a result, the current reality in rural areas is a patchwork quilt of coverage by incompatible technologies, frustrating the goal of seamless access. Accordingly, for public safety, it is critical that rural Americans have access to wireless networks capable of connecting both kinds of devices, just as those who live in cities do.

In the run up to the FCC’s 2011 Connect America Fund reforms, we warned of universal service mechanisms that pick a single winner in the auction room rather than allowing consumers to pick winners in the market. By limiting support to a single carrier, the current mechanism is promoting service by one carrier and one technology, thus limiting consumer choice in many areas that would otherwise support competition, and requiring additional regulation. We urge the Committee to encourage the FCC to adopt universal service mechanisms that direct support to high-cost rural areas without picking a winner in advance.
Last year, we inaugurated new coverage and mobile broadband service in Paw Paw, West Virginia, a town of 500, a project that would not have been possible without the federal universal service program.\textsuperscript{19} There are many more towns similar to Paw Paw that we would like to serve or upgrade, if support mechanisms provide us with a reasonable opportunity to succeed. It is low population density and traffic levels that make new construction infeasible and make necessary an effective universal service mechanism.

Today mobile broadband coverage and throughput speeds in rural America must receive a grade of “Incomplete.” Using the “reasonably comparable” standard set by Congress in 1996, anyone telling you that rural Americans have access to mobile broadband networks that are reasonably comparable to those in urban areas has not taken a drive across this great nation. And that’s not a surprise - no carrier can be expected to invest unless there’s at least the possibility of earning a return. If it could be done, we wouldn’t need a universal service mechanism because it would have happened already.

In sum, we cannot base critical policy choices on conflicting data and maps that the government admits overstate coverage. We must have accurate data in order to target funds where they are needed.

3. Allocating Scarce Federal Universal Service Funds Effectively Requires Smart Policy Choices.

Over the years, we have consistently advocated for a robust federal universal service fund that provides rural consumers with access to both mobile and fixed networks. We believe the FCC’s historical allocation of support to wireless networks has been insufficient to close up coverage gaps and deliver mobile broadband to many areas. As shown in the chart below, between 1999 and 2014 the FCC allocated over $50 billion in support to fixed networks and less than $12 billion to mobile networks.\(^{20}\) Over the next five years, fixed networks are projected to receive $22.5 billion in federal funding, while mobile networks are projected to receive $2.5 billion, a disparity in the universal service mechanism going forward of nearly 90/10.\(^{21}\)

![FCC Universal Service Allocation Chart](https://www.fcc.gov/general/federal-state-joint-board-monitoring-reports)

With wireless consumers nationwide now contributing nearly half of the total federal Universal Service Fund of $9 billion (which includes E-Rate, Lifeline, Connect America Fund, E-Learning),


\(^{21}\) The fixed network allocation is estimated by summing Connect America Fund support with projected support for rate of return carriers. The mobile network allocation derives from the FCC’s Further Notice, *supra*. 
Mobility Fund, and Rural Health Care)\(^{22}\) the proposed funding for mobile broadband does not accurately reflect consumer usage, preferences, and infrastructure needs in rural areas. Given rapidly expanding demand for high-quality coverage and fast broadband connections, the current level of funding shortchanges rural Americans who increasingly rely on mobile services.

Nor does the FCC’s proposed budget account for investments that mobile wireless carriers have made over the years. Many carriers, including U.S. Cellular, have used support to build towers in areas so remote that revenues are insufficient to meet ongoing operating expenses and to earn a reasonable return. These investments were made with the understanding that support for ongoing operations would be made available, either in the original fund, or in Mobility Fund Phase II.

Although the FCC proposed to use at least some of Mobility Fund Phase II support to cover operating expenses on towers, it recently proposed to change course based on “substantial marketplace developments,” nothing more than fallacious claims by some carriers that the job of covering rural America is largely done.\(^{23}\) This course change may prove to be catastrophic for rural citizens in small communities, which often do not generate enough revenue to meet a tower’s operating expenses.

In addition to our experience and the weight of data, I am troubled by these FCC claims of substantial marketplace developments leading toward a conclusion that a Mobility Fund of

\(^{22}\) The most recently available FCC report from 2011 containing assessable carrier revenues for universal service can be accessed at: https://transition.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/quarterly_roll-upsasof050112.pdf .

\(^{23}\) See, Further Notice, supra, FCC Rcd at 7126-29.
less than $400 million annually may be appropriate. When it comes to broadband, I agree that
we as a nation should be setting big and audacious goals and working toward them.24 In last
week’s 2016 Broadband Progress Report, the FCC reported that 87% of rural Americans lack
access to mobile broadband at 10 Mbps/1 Mbps:

Table 4
Americans Without Access to Mobile Broadband Services (Millions)

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<th></th>
<th>LTE Technology</th>
<th>10 Mbps/1 Mbps</th>
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<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Percentage of Population</td>
</tr>
<tr>
<td>United States</td>
<td>1.682</td>
<td>1%</td>
</tr>
<tr>
<td>Rural Areas</td>
<td>1.519</td>
<td>3%</td>
</tr>
<tr>
<td>Urban Areas</td>
<td>0.163</td>
<td>0%</td>
</tr>
</tbody>
</table>

Because the above data for LTE technology is based largely on advertised coverage at a single
point within a census block, I don’t agree that the job of populating rural areas with LTE
technology is largely done. That said, if the data on 10/1 availability is even in the ballpark, it is
beyond dispute that the job of getting to an adequate level in rural America is only beginning.

Because the big carriers continue to provide their customers with access to many rural
areas by using the networks of rural carriers, it is fair to conclude that the future of 10/1 Mbps
service depends on a universal service policy that encourages rural carriers to invest, as well as
an FCC spectrum policy that ensures rural carriers have access to sufficient bandwidth to deliver
speeds of the future. The critical role of universal service is to ensure that broadband
technologies being deployed and commonly used in urban areas are made available to our rural
communities in a timely manner. This is no different than any other infrastructure, whether it
be roads, electricity, or water.

24 See, Separate Statement of Commissioner Jessica Rosenworcel, at:
My takeaway from the past several years of uncertainty is that the FCC has not devoted sufficient attention to determining how best to maintain the investments that have already been made, how much it will cost to fill in slow broadband zones and dead zones, and what it will cost to deliver 5G services, and more, to rural citizens in the coming years. The Mobility Fund Phase I auction left many areas still without coverage, and bidders forfeited back to the FCC nearly 25% of the $300 million in original funding, for a variety of reasons. The Commission has yet to act on our petition to distribute forfeited support to “next in line” bidders who could move quickly to build towers in many states that need investment. Moreover, the amount projected for Mobility Fund Phase II is insufficient to do the job on a reasonable schedule. In sum, the Mobility Fund program has not fulfilled the goal of fostering, “an environment in which the widest possible variety of new technologies can grow and flourish.”

We also believe that the reverse auction approach for distributing mobile broadband support did not produce equitable results across the nation. Because reverse auctions allocate funds first to areas that cost less to serve, mountainous parts of the country are served last, or not served at all if funding runs out. I predict that with a reverse auction mechanism, many of you on this committee representing mountainous regions will never see your states receive meaningful assistance, even though the rhetoric of the program gives you false hope. And, we can assure members of the Committee representing flatter states that, based on our experience, the program is insufficient in those areas as well.

\(^{25}\) See, https://www.fcc.gov/news-events/blog/2015/08/03/leading-towards-next-generation-5g-mobile-services.
In recognition of the fact that the fund is finite and consumer willingness to fund programs is an important factor, we suggest that the FCC solicit new ideas for how to leverage existing federal funds, in combination with state universal service mechanisms, and private investment, to provide an incentive for competitors to invest and improve service. Several states, such as for example, Nebraska, Colorado and New Mexico, have begun developing their own broadband universal service mechanisms, any of which could be trialed in a pilot program, something the FCC has recently done in the fixed service arena.

We suggest that the FCC consider a grant program in which the combined federal and state support funds could be used in a targeted way to address those areas most in need of mobile broadband coverage. States may be in the best position of all to know what is adequately covered and what is not. States that have been shortchanged by the legacy program (paying into the fund far more than they have drawn out for mobile voice, let alone mobile broadband coverage) and are willing to contribute state funds to the mechanism, should be given an opportunity to access some level of support, especially where the need for expanded coverage has been established. Equitable distribution of funding will likely not occur if the fund is administered at the federal level in an auction format, which disfavors the highest cost rural areas.

Separately, Congress can make all universal service fund support go farther by passing legislation to exclude universal service support from taxable income, similar to funds provided under the American Recovery and Reinvestment Act. By excluding support from taxation, we will be able to use 100% of the support received for investments in rural areas and not just the net amount after taxes.
Concluding Remarks

Just last month, Verizon announced an intent to begin limited deployments of 5G technology as early as 2017, technology that will provide speeds perhaps 50 times faster than 4G. National carriers will continue to focus on urban areas, and they will invest billions upgrading networks to 5G. But make no mistake, these investments will take priority over building new coverage and upgrading rural areas that make less economic sense. In sum, if we fail to foster robust mobile broadband networks in rural areas, they will likely never have access to the amazing things described above.

Having studied this industry for many years, I’m humble enough to know that this task is easier said than done, in part because in a nation of entrepreneurs and risk takers and innovation, if there were a business plan to cover all of rural America, the free market would have done it long ago. Making rural infrastructure reasonably comparable is a big and multi-faceted task, as evidenced by the enormous efforts the FCC has made in over twenty years since the 1996 Act.

This year, we celebrate the sixtieth anniversary of Eisenhower administration’s enduring achievement, the federal interstate highway system. My sense is that broadband networks will be as important to our nation’s success in the next sixty years as our interstate highway system has been over the past sixty. Just as our highway needs have expanded, so too will our broadband needs, and it will be up to this Committee to give the FCC proper direction to ensure

that rural Americans fully participate in modern life and remain comparable with their urban counterparts.