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

In the Matter of	)	
	)	
Nineteenth Annual Report on the State of	)	WT Docket No. 16-137
Competition in Mobile Wireless, Including	)	
Commercial Mobile Radio Service	)	

COMMENTS
of
UNITED STATES CELLULAR CORPORATION

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SUMMARY

The Commission's analysis and findings regarding the state of mobile wireless competition have taken on increased significance as mobile wireless has become one of the most important sectors of the national economy. Preserving and promoting mobile wireless competition are an important Commission objective, and the Commission's success in pursuing this goal is critical in order to ensure that American consumers can access the benefits of mobile wireless voice and broadband services.

There are, however, strong reasons to be concerned that the Commission's competitive analysis and findings are a house of cards teetering on a wobbly foundation. The Commission's conclusions regarding the extent of mobile wireless broadband coverage—especially in rural areas—are a key component of its competitive findings, but these conclusions have been compromised by reliance on bad data and the use of an imperfect measurement methodology.

The Commission continues to utilize data from Mosaik Solutions, even though the Commission has acknowledged that this data likely overstates mobile wireless network coverage, in part because it relies on carriers' advertised broadband speeds. The Commission's competitive analysis will also utilize FCC Form 477 data, even though the Commission has not fully assessed the accuracy of this data and has not given interested parties sufficient opportunity to suggest ways in which Form 477 data could be improved and made more reliable.

In addition, the Commission continues to rely on a flawed methodology to determine the extent to which Census Blocks have coverage from mobile wireless broadband networks delivering benchmark speeds set by the Commission. Under this "centroid" method, if the designated center point of a Census Block has coverage, the Commission deems the entire Census Block to

be covered. This approach likely overstates coverage, especially in large rural Census Blocks, and it also ignores circumstances in which 4G LTE service is available at the centroid point, but only much slower throughput speeds are available at cell edges at other locations in the Census Block.

These data and measurement problems need to be fixed. The Commission must be able to accurately measure the extent of mobile wireless broadband network coverage—particularly in rural areas—before it can reach informed conclusions concerning the state of mobile wireless competition, and before it can develop and pursue policies and make decisions that effectively promote access to mobile broadband services for all Americans.

If the Commission continues to reach conclusions concerning mobile broadband coverage that are based on bad data and a flawed measurement method, then its findings regarding the state of mobile wireless competition will continue to be undermined, as will its efforts to adopt and implement effective policies for promoting mobile wireless competition and facilitating network deployment.

The best way to fix these problems is for the Commission to work with stakeholders to explore, develop, and implement solutions that will generate more accurate data and more reliable measurement methods. The Commission therefore, as a first step, should initiate a proceeding to give interested parties an opportunity to comment on these issues.

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United States Cellular Corporation ("U.S. Cellular"), by counsel, hereby submits these Comments in response to a Public Notice issued by the Wireless Telecommunications Bureau ("Bureau") in the above-captioned proceeding, seeking input and comment with respect to the Commission's preparation and issuance of its Nineteenth Annual Report on the State of Competition in Mobile Wireless, Including Commercial Mobile Radio Services ("*Nineteenth Report*").[1]

I. INTRODUCTION.

"I don't know any problem that I've ever solved without measuring it first …."[2] Those words, spoken by Senator Maria Cantwell at a recent Senate Committee on Indian Affairs hearing

[1] *Wireless Telecommunications Bureau Seeks Comment on the State of Mobile Wireless Competition*, WT Docket No. 16-137, Public Notice, DA 16-450 (Apr. 29, 2016) ("*Public Notice*"). Comments are due May 31, 2016, and reply comments are due June 15, 2016. *Id*. at 1.

[2] *The GAO Report on, "Telecommunications: Additional Coordination and Performance Measurement Needed for High-Speed Internet Access Programs on Tribal Lands": Hearing Before the S. Comm. on Indian Affairs*, 114th Cong. (Apr. 27, 2016) ("*April 27 Senate Hearing*"), Oral Statement of Senator Maria Cantwell (statement beginning at 1:29:17), *accessed at* http://www.indian.senate.gov/hearing/oversight-hearing-gao-report-telecommunications-additional-coordination-and-performance.

examining the quality of the FCC's broadband data, should be a wakeup call for Commission action to improve data used to measure competition and implement related federal programs. Over the course of several years, the Commission has become increasingly convinced that the job of building out high-quality mobile 4G LTE broadband networks is largely complete. It has relied upon advertising maps submitted by parties having no interest in revealing the lack of mobile wireless competition in rural America, or in contributing to the Connect America Fund. The Commission has never independently vetted carrier-provided data used to measure mobile competition, for example with drive tests.

Data overstating 4G LTE coverage not only distorts the state of competition, but it directly harms rural citizens who are unable to reliably use their phones in areas the FCC deems covered. Citizens living in such areas may *never* benefit from investments needed to deliver seamless coverage and high-quality mobile broadband, much less from adequate competition that drives sufficient choices for all consumers. The consequences are enormous. Without adequate mobile broadband competition and coverage, citizens are denied access to economic development opportunities, advanced telecommunications and information services, critical public safety functions such as advanced 911 services, educational opportunities, and, more generally, access to advanced broadband services that are reasonably comparable to those available in urban areas.

In sum, there is ample evidence to conclude that the Commission's mapping data on the state of mobile broadband in rural America is so flawed that an accurate assessment of competition cannot be made, crippling the agency's ability to make critical policy choices in an informed manner. Additional work must be undertaken to develop reliable data that can inform the public as to the state of competition and can drive future policy choices. If the Commission takes these steps, U.S. Cellular believes that the resulting data will show that many rural areas lack any access to 4G

LTE broadband networks, and consumers in many more rural areas do not have any competitive choices for LTE services.

II. THE COMMISSION CANNOT EFFECTIVELY GAUGE THE LEVEL OF MOBILE WIRELESS COMPETITION UNLESS IT IMPLEMENTS MORE ACCURATE MEASURES OF BROADBAND COVERAGE, THROUGHPUT, AND THE AVAILABILITY OF HIGH-QUALITY BROADBAND SERVICE.

The Bureau indicates that it anticipates "using Form 477 coverage data, as well as Mosaik [Solutions] data" to analyze the extent of mobile wireless network deployment in the *Nineteenth Report*, and it asks for comment on this approach "and on ways to best ensure the accuracy of the [*Nineteenth*] *Report*'s coverage data."[3] U.S. Cellular addresses these issues in the following sections.

A. The Commission's Continuing Reliance on Flawed and Unreliable Coverage Data Undermines Its Competitive Analysis.

U.S. Cellular agrees with Verizon's statement that "[c]onsumers consistently rank network performance and coverage as key variables in choosing a service provider."[4] Effective mobile wireless competition depends upon high levels of coverage, throughput, and high-quality service availability. Without all three, from more than one provider, consumers do not receive the benefits of effective competition.[5] As detailed below, the Commission's methodology for determining

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[3] *Public Notice* at 4.

[4] Verizon Comments, WT Docket No. 15-125 (filed June 29, 2015), at 13.

[5] *See, e.g.*, *Application of AT&T Mobility Spectrum LLC and Club 42CM Limited Partnership for Consent to Assign Licenses*, WT Docket No. 14-145, Memorandum Opinion and Order, 30 FCC Rcd 13055, 13070 (para. 34) (2015) (footnotes omitted) (indicating that, "[g]enerally, in undertaking our [competitive] analysis, we consider various competitive variables that help to predict the likelihood of competitive harm .… These competitive variables include … the total number of rival service providers; … the number of rival firms that can offer competitive service plans; the coverage by technology of the firms' respective networks; … the amount of spectrum suitable for the provision of mobile telephony/broadband services controlled by the combined entity; and the spectrum holdings of each of the rival service providers"); *Implementation of*

coverage, throughput, and service availability overstates, potentially significantly, the level of service that rural consumers actually receive.

The Commission indicates in the *Eighteenth Report* that 99.9% of the U.S. population lives "in a census block with mobile wireless coverage."[6] The Commission makes this declaration, caveated by the following:

> It is important to note that the number of service providers in a census block represent network coverage only. Network coverage does not necessarily reflect the number of service providers from which any particular individual or household in a given area may choose. Coverage calculations based on Mosaik data, while useful for measuring developments in mobile coverage, have certain limitations that likely result in an overstatement of the extent of mobile coverage.[7]

Coverage is measured using data from Mosaik Solutions, which admittedly overstates coverage, largely because much of the underlying data is derived from carrier advertising maps, without taking any steps to independently verify whether actual coverage matches the submitted mapping data.[8] In addition to using unverified advertising data, network coverage was measured in

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Section 6002(b) of the 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. 15-125, Eighteenth Report, 30 FCC Rcd 14515, 14539 (para. 48) (WTB 2015) ("*Eighteenth Report*") (footnote omitted) (stating that "[c]ompetition in the mobile wireless marketplace will be better promoted by multiple service providers having the opportunity to access both low-band spectrum that can provide coverage and in-building penetration, as well as high-band spectrum that can provide the increased throughput for mobile broadband applications").

[6] *Eighteenth Report*, 30 FCC Rcd at 14539 (para. 36).

[7] *Id*. at 14542 (para. 38) (Chart III.A.3, "Estimated LTE Coverage in the U.S. by Census Block: Mosaik, July 2015," source note). *See Public Notice* at 4 (stating that "among other drawbacks, the Mosaik data likely overstate the coverage actually experienced by consumers").

[8] *See* U.S. Cellular Comments, WC Docket No. 10-90, *et al*. (filed Dec. 21, 2012) ("U.S. Cellular December 2012 Comments"), at 18-19 (footnotes omitted) (internal quotation marks omitted) (explaining that "[r]eliance on advertising claims—as opposed to drive test results, for example—could inherently create an upward bias in the extent of coverage. Such an upward bias, by reducing the number of census blocks eligible for [Mobility Fund] Phase II support, could create the erroneous impression that, even with limited

the *Eighteenth Report* using the "centroid" method. If the designated center point of a Census Block was deemed covered, the FCC treated the entire Census Block as having coverage.[9] By definition, the centroid methodology overstates coverage because oftentimes less than 100% of a Census Block is actually covered by mobile broadband service, especially in rural areas where Census Blocks are larger than urban areas.

The centroid method also ignores the level of service provided both at the centroid point and throughout the remainder of the Census Block. When a centroid point is covered by 4G LTE signal strength, but out at the cell edge, with only 100 kbps of available throughput to a customer, the Commission treats the entire Census Block as "covered" by 4G LTE service. Put another way, that Census Block is considered as equal to another Census Block which has 20 MBps of throughput available throughout its entire geographic area. Although it repeatedly concedes in its publications that the centroid methodology overstates coverage and service availability,[10] the Commission has never taken any action to determine how much this methodology actually overstates coverage in rural areas to the detriment of rural consumers.

Phase II funding, the Commission's support disbursements would be operating effectively to speed deployment to the greatest number of unserved areas."). *See* Ken Schmidt, "We Assessed the Accuracy of Wireless Coverage Maps per Carrier, and the Results Disappoint," STEEL IN THE AIR (Jan. 25, 2016) (noting that "[c]overage maps are generated by either the marketing department or the radio frequency department, and are intended to fulfill specific purposes. In my opinion, both AT&T and Verizon have antiquated website coverage mapping tools that simply show equal coverage across large areas. While both AT&T and Verizon do have better coverage empirically …, their coverage maps are simple marketing tools intended to convince viewers that coverage and capacity exists ubiquitously across a large area."), *accessed at* http://www.steelintheair.com/Blog/2016/01/we-assessed-the-accuracy-of-wireless-coverage-maps-per-carrier-and-the-results-disappoint.html. (Mr. Schmidt also noted that "Sprint and T-Mobile have more realistic coverage maps that show actual gradients in quality of coverage and more closely represent realistic conditions." *Id*.)

[9] *Eighteenth Report*, 30 FCC Rcd at 14537-38 (para. 34).

[10] *See*, *e.g.*, *id*. (explaining that the "centroid methodology … has the potential to overstate coverage in certain blocks").

Historically, the use of Mosaik data and the centroid methodology has not permitted the Commission to state with any certainty what level of service rural consumers actually receive, much less the state of competition. For example, in the *Eighteenth Report*, the FCC states that, "the available data suggest quite extensive mobile wireless coverage."[11] However, the FCC concedes that the data presented does not permit it to conclude anything about the state of competition:

> The percentages of population located in census blocks with coverage by a certain number of mobile wireless or mobile LTE broadband providers does not necessarily mean that those service providers offered service to residents in the census block. In addition, we emphasize that a service provider reporting mobile wireless or mobile LTE broadband coverage in a particular census block may not provide coverage everywhere in the census block. For both these reasons, the number of providers in a census block does not necessarily reflect the number of choices available to a particular individual or household, **and does not purport to measure competition**.[12]

Recently, the Commission has solicited coverage data from carriers on FCC Form 477,[13] however, it has never conducted any independent verification of that data, whether by questioning the underlying methodologies used by carriers, or by independently testing a statistically significant sample of the coverage assertions to assess whether the data is accurate, or whether consumers are receiving acceptable 4G LTE broadband throughput consonant with that displayed in the maps.

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[11] *Id*. at 14539 (para. 36).

[12] *Id*. at 14539 (para. 36 n.75) (emphasis added).

[13] FCC Form 477, Local Telephone Competition and Broadband Reporting.

U.S. Cellular has expressed concerns regarding the accuracy of Form 477 data,[14] and also has asked the Commission to seek comment regarding various issues relating to Form 477 data.[15]

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[14] *See*, *e.g.*, Ex Parte Notice from David A. LaFuria, Counsel for U.S. Cellular, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-208, *et al*. (Feb. 25, 2016), Attachment, "Universal Service Reform—Mobility Fund (WT Docket No. 10-208), Connect America Fund (WC Docket No. 10-90), Ex Parte Presentation of United States Cellular Corporation," at 18 (indicating that FCC 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"). The Rural Wireless Association also has questioned the Commission's assumptions regarding FCC Form 477 data:

> Form 477 data generally shows where carriers have reported that mobile wireless coverage is available, with the assumption that the advertised speeds are available throughout an entire area at all times. As the Commission knows, there are a number of factors that impact a consumer's experience on a mobile wireless network:
>
> • Signal strength is not constant throughout an entire cell sector.
>
> • Signal strength is weaker at the edge of a cell site.
>
> • Though a consumer can connect to a cell site, the connection may not be strong enough to maintain a voice call or transfer data at advertised speeds.
>
> • Download and upload speeds are not constant throughout an entire cell sector.

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.

[15] *See* Rural Wireless Carriers ("RWC") Comments, WC Docket No. 10-90, *et al*. (filed Aug. 8, 2014) ("RWC Comments"), at 36 (suggesting that the Commission seek comment on the extent to which Form 477 reporting requirements are producing more accurate information, and on possible changes to the reporting requirements "to further improve the level of accuracy of the collected data"). (The Rural Wireless Carriers are comprised of U.S. Cellular and 10 other carriers.) The Commission has not acted on U.S. Cellular's suggestion. At a recent Senate subcommittee hearing, Senator Joe Manchin asked various industry witnesses if the Commission should seek public comment on the network coverage measurement issue, or had engaged with any of them directly regarding the development of better methods to obtain and analyze coverage data. The response was that the FCC should seek comments, and that the FCC had not engaged any of the witnesses directly. *Ensuring Intermodal USF Support for Rural America: Hearing Before the Subcomm. on Communications, Technology, Innovation, & the Internet of the S. Comm. on Commerce, Science & the Internet*, 114th Cong. (Feb. 4, 2016) ("*February 4 Senate Hearing*"), Oral Statement of Senator Joe Manchin (statement beginning at 1:23:25), *accessed at* http://www.commerce.senate.gov/public/index.cfm/hearings?ID=7F34FC04-A778-4CA2-A64B-D50BFA4DD165. In response to an inquiry from Senator Jerry Moran, Chairman Wheeler has indicated that, "given the importance of this issue [*i.e.*, measuring wireless network coverage], the Commission remains open to working with stakeholders regarding additional data sources, including new third party sources, and methods that we can employ to obtain more reliable information on mobile broadband coverage." Letter from Tom Wheeler, Chairman, FCC, to Sen. Jerry Moran (Apr. 4, 2016) at 1. In U.S. Cellular's view, the best and most appropriate

Nor has the Commission taken action to verify the accuracy of underlying advertising maps provided to Mosaik Solutions, which form the basis for the Commission's publicly available mobile coverage data. This should have been done long ago, simply because, as U.S. Cellular has explained, 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.[16] Given that the Commission never adopted rules for how to prepare and submit such maps, it should be self-evident that varying standards used by multiple companies would result in inconsistent results.

Additionally, the Commission never required companies submitting maps to provide data for the quality of signal available in any area. Accordingly, in the Mosaik-driven maps, any signal is sufficient to conclude that there is coverage, with no examination of whether the signal is strong enough to maintain a voice call, or to transmit data at speeds sufficient to actually be useful. With respect to the Form 477 data, the Commission has indicated that "[t]here is no predefined dBm level associated with the mobile coverage maps. Instead, the coverage areas should reflect where customers can expect to receive service at the reported speeds/bandwidths for the particular technology and spectrum band."[17] Carriers are required to certify where consumers should expect

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way for the Commission to work with stakeholders is for the Commission to publicly solicit comment on these issues.

[16] See note 8, *supra*, and accompanying text (citing U.S. Cellular December 2012 Comments). *See* Ex Parte Notice 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), Attachment, CostQuest Associates, *Mobile Voice and Broadband Coverage: An Analysis of Sources, Measures and Reporting Methods* (Dec. 19, 2014), at 4 (explaining that "while [carriers'] advertised maps appear to represent near uniform coverage, what a subscriber experiences at a given location, at a given point in time may differ from this advertised uniformity.… As we debate mobile voice and broadband coverage, it is critical to understand the relevance of advertising coverage maps relative to what a subscriber actually experiences.").

[17] FCC Form 477, "Frequently Asked Questions (FAQs)," at 27, *accessed at* https://transition.fcc.gov/form477/477faqs.pdf.

service, but of course no executive can certify exactly what service is available at any one place, in the absence of a drive test using sophisticated tools.

B. Allowing Inaccurate Coverage Data to Drive Policy Choices Harms Consumers and Rural Communities.

When the Commission assesses the state of mobile wireless competition, especially in rural areas, any significant error in the data upon which the Commission is relying leads to inaccurate conclusions that drive incorrect policy choices in other areas. The Commission's policies for the allocation of spectrum, for data roaming requirements, and for its universal service programs must be informed by robust and reliable data that enables the Commission to reach accurate and detailed conclusions concerning the level of competition in the mobile wireless marketplace. When the Commission, as in present circumstances, is forced to use flawed and incomplete data, then, in effect, it finds itself making policy decisions in the dark.[18]

For example, the Commission repeatedly latches on to industry-supplied data to find that 98% of Americans have access to 4G LTE service.[19] That statistic is mistakenly cited by some

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[18] *See February 4 Senate Hearing*, Oral Testimony of LeRoy T. Carlson, Jr., Chairman, U.S. Cellular (testimony beginning at 1:43:31) (indicating that "the FCC [should] not take any significant action with the current fund [Mobility Fund Phase II] until they produce maps about the quality of coverage in rural America so they can know what they are doing, because today they are blind.").

[19] *E.g.*, *Implementation of Section 6002(b) of the 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 Rcd 15311, 15340-41 (para. 59) (WTB 2014) (footnote omitted) ("*Seventeenth Report*") (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"); *Eighteenth Report*, 30 FCC Rcd at 14622 (App. A) (Table III.A.iv., "Estimated Mobile Wireless 3G or Better Coverage by Census Block Excl. Federal Land, July 2015") (showing that 99.9% of total U.S. POPs and 98.4% of total U.S. road miles have 3G or better coverage). *But see* Letter from Sen. Joe Manchin, to Sen. Roger Wicker, Chairman & Brian Schatz, Ranking Member, Subcomm. on Communications, Technology, Innovation & the Internet of the Senate Comm. on Commerce, Science & Transportation (Oct. 1, 2015), at 1-2:

> [S]ignificant coverage gaps still exist in West Virginia and across rural America.… The FCC has a statutory mission to make sure all Americans

carriers and industry representatives to depict a world where 98% of Americans have **high-quality** 4G LTE service where they live, work, and travel.[20] Yet, the Commission's own data directly contradicts this notion. In its *2016 Broadband Progress Report*, the Commission's stated that 87% of the population in our nation's rural areas lack access to 4G LTE broadband at a 10/1 Mbps service level.[21]

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

	LTE Technology		10 Mbps/1 Mbps	
	Population	Percentage of Population	Population	Percentage of Population
United States	1.682	1%	171.486	53%
Rural Areas	1.519	3%	52.231	87%
Urban Areas	0.163	0%	119.255	45%

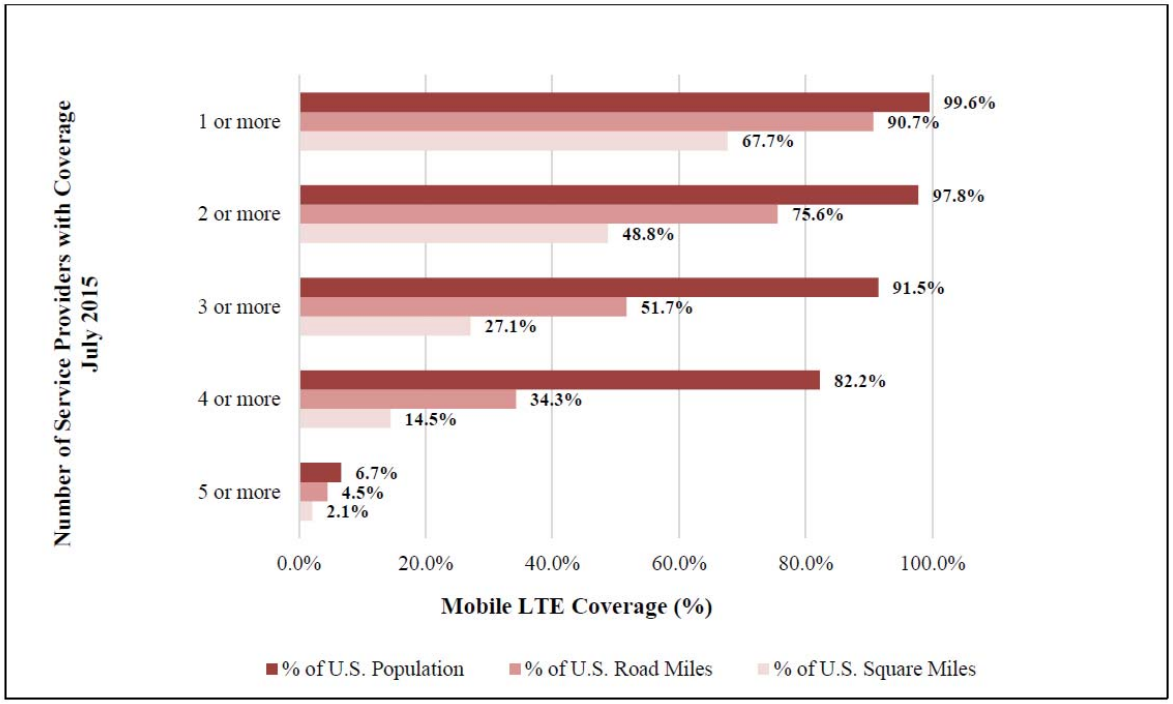
> have access to comparable communications services.… As we look forward to the rollout of wireless and broadband technologies across much of America, we cannot forget the millions of people who still lack access to these services. We have an opportunity to invest millions of dollars in wireless infrastructure if the FCC will move forward with the second round of grants from the Mobility Fund.

[20] *See, e.g.*, CTIA–The Wireless Association®, "U.S. Leads Europe in LTE Coverage" (Mar. 2, 2015) (noting that, "[s]ince the launch of LTE service in 2010, 98.5 percent of the U.S. has 4G/LTE coverage. Europe is expected to reach 83 percent LTE coverage by 2020, which is 11 years after the launch of LTE services in Europe."), *accessed at* http://www.ctia.org/resource-library/facts-and-infographics/archive/lte-coverage; Verizon, "America's Largest and Most Reliable Network" (stating that "Verizon's super-fast 4G LTE network is 100% LTE [and c]overs over 98% of Americans"), *accessed at* http://www.verizonwireless.com/biz/xlte/4g-lte/); AT&T Comments, GN Docket No. 15-191 (Sept. 15, 2015), at 3 (footnote omitted) (stating that, "[a]s the Commission's own annual reports to Congress on the state of the mobile wireless services industry acknowledge, more than 98 percent of Americans live in areas where at least two carriers offer 4G LTE service and more than 80 percent have access to four").

[21] *See 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, 735 (para. 83) (2016) ("*2016 Broadband Progress Report*") (Table 4, "Americans Without Access to Mobile Broadband Services").

Elsewhere, in the *Eighteenth Report*, the Commission reported that nearly 25% of our nation's road miles and over 50% of square miles do not receive coverage by two or more carriers, and this data is based on Mosaik data.[22]

Chart III.A.3
Estimated LTE Coverage in the U.S. by Census Block: Mosaik, July 2015



So, while the FCC's mobile wireless competition reports state that 98% of Americans have access to mobile LTE coverage, the *2016 Broadband Progress Report* states that 87% of rural Americans cannot access LTE at a 10 Mbps/1 Mbps service level. The Commission's 98% figure is based on Mosaik data as of July 2015, and substantially caveated,[23] without any explanation of

[22] *See Eighteenth Report*, 30 FCC Rcd at 14542 (para. 38) (Chart III.A.3, "Estimated LTE Coverage in the U.S. by Census Block: Mosaik, July 2015").

[23] The caveat states:

what it really means. U.S. Cellular believes it means that 98% of Americans can access a 4G LTE signal somewhere within the area where they live, work, and travel, but it says nothing about the state of competition, *i.e.*, whether a consumer has a choice in mobile service providers, especially in our nation's rural areas. Moreover, due to the divide between CDMA and GSM technologies,[24] it may be necessary for a single customer to subscribe to service from multiple carriers in order to achieve the 98% coverage statistic.

So, in U.S. Cellular's view, the 98% statistic should be treated as irrelevant for purposes of assessing the state of mobile wireless competition.[25] The statistic that 87% of rural Americans cannot get 10 Mbps/1 Mbps mobile broadband is far more relevant. Many areas have coverage, even adequate coverage, but most consumers using service near a cell's edge do not receive 10 Mbps/1 Mbps service levels using today's technology.

> It is important to note that the number of service providers in a census block represent network coverage only. Network coverage does not necessarily reflect the number of service providers from which any particular individual or household in a given area may choose. Coverage calculations based on Mosaik data, while useful for measuring developments in mobile coverage, have certain limitations that likely result in an overstatement of the extent of mobile coverage.

Id. at 14544 (para. 41) (Chart III.A.5, "Estimated Mobile LTE Coverage in Non-Rural and Rural Areas by Census Block: Mosaik, July 2015," source note).

[24] *See* Sascha Segan, "CDMA vs. GSM: What's the Difference?", PC MAGAZINE (Feb. 6, 2015) (explaining that "[t]wo basic technologies in mobile phones, CDMA and GSM[,] represent a gap you can't cross. They're the reason you can't use many AT&T phones on Verizon's network and vice versa."), *accessed at* http://www.pcmag.com/article2/0,2817,2407896,00.asp.

[25] *See* Competitive Carrier Association ("CCA") Reply Comments, WT Docket No. 15-125 (filed July 14, 2015) at 5-6 (footnotes omitted) ("urg[ing] the Commission to scrutinize exaggerated claims that 98 percent of Americans have access to 4G LTE networks and to refrain from relying on this coverage estimate in assessing competition in the mobile wireless marketplace. This inordinately high coverage calculation is unsupported by the realities in service availability, particularly in rural areas. Studies commissioned by CCA indicate that there are significant gaps in population coverage at the county and sub-county levels, particularly in rural areas.").

These shortcomings have been repeatedly identified by Members of Congress and have been the subject of legislation introduced in the Senate. Last fall, Senator Joe Manchin wrote to the Commission on this issue, stating:

> The Commission appears to believe that all Americans have sufficient and reliable wireless coverage. The agency's coverage maps indicate 99.9% of Americans live in a census block that has access to some wireless service, but the reality in my state is far different than what the maps indicate. Wireless service is spotty or non-existent for far too many West Virginians.[26]

On February 4, 2016, the Subcommittee on Communications, Technology, Innovation, and the Internet of the Senate Committee on Commerce, Science, and Transportation held a hearing considering ways to ensure intermodal Universal Service Fund support for rural America.[27] At that hearing, Senator Dean Heller described hearing from small communities in Nevada "about how poor their Internet service is."[28] Senator Jerry Moran addressed "the map the FCC shows us about coverage[,]" observing that "my impression … based upon my own experience in my own state [Kansas] is that that map does not accurately reflect actual service."[29] Senator Steve Daines remarked how important mobile broadband coverage is to economic development.[30] Multiple witnesses presented testimony on the need for substantial additional investment in mobile broadband

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[26] Letter from Sen. Joe Manchin, to Thomas Wheeler, Chairman, FCC (Sept. 22, 2015), at 1, *accessed at* http://www.manchin.senate.gov/public/index.cfm?a=files.serve&File_id=D660F970-2859-46B3-8145-CFE461A47719.

[27] *See February 4 Senate Hearing*.

[28] *Id.*, Oral Statement of Senator Dean Heller (statement beginning at 1:12:24). Senator Heller noted that "[t]his is serious business for them out there. This is about quality of life. This is a way that they want to improve their ability to move forward. It's [about] the basic needs that they have.… I'm concerned that these small towns get the quality they need in their Internet services." *Id.*

[29] *Id.*, Oral Statement of Senator Jerry Moran (statement beginning at 1:05:49).

[30] *Id.*, Oral Statement of Senator Steve Daines (statement beginning at 1:33:26).

to benefit rural Americans, including Darrington Seward, a planting company executive who explained how important mobile broadband is to modern agricultural businesses.[31]

U.S. Cellular's Chairman, LeRoy T. Carlson, Jr., testified concerning the insufficiency of mobile broadband deployment in rural America today and 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.[32]

On March 1, 2016, nine U.S. Senators wrote to the Commission, stating, among other things:

> 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.… The 2016 Broadband Progress Report acknowledges the limitations that prevent the FCC from reporting geographic areas that lack advanced mobile services with reliable accuracy. We believe that you must partner with industry and other stakeholders to solve this problem. We cannot afford to ignore it any longer.[33]

This spring, Senators Manchin and Heller introduced an amendment to S. 2644, the FCC Reauthorization Act, requiring the Comptroller General to report to Congress, among other things,

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[31] Statement of Darrington Seward, Seward & Son Planting Company, Louise, Miss., Before the Subcomm. on Communications, Technology, Innovation, & the Internet, United States Senate (Feb. 4, 2016), *accessed at* https://www.commerce.senate.gov/public/_cache/files/86a9b24c-e124-4b4b-a701-f0fe165be074/F3297DD6CC57D51B9EA2A54F209F07E3.darrington-seward-testimony.pdf.

[32] 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), *accessed at* https://www.commerce.senate.gov/public/_cache/files/ab3bf837-edb5-45f9-9ba1-5a234183a06f/48FE428BEFDC05BA42A6C7AF89EC4896.leroy-carlson-testimony.pdf.

[33] *See* Letter from Sen. Joe Manchin, Sen. Cory Gardner, Sen. Kelly Ayotte, Sen. Deb Fischer, Sen. Gary C. Peters, Sen. Amy Klobuchar, Sen. Jerry Moran, Sen. Brian Schatz, & Sen. Steve Daines to Thomas Wheeler, Chairman, FCC (Mar. 1, 2016), at 1, *accessed at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-338960A2.pdf.

how the FCC ensures that broadband data it collects is accurate, complete, and reliable, and to report on the extent to which agencies authorized to distribute grants for broadband projects rely on such data.[34]

Senator Manchin introduced a second amendment to S. 2644, proposing to "require the FCC to study the feasibility of conducting mobile broadband coverage drive testing in rural areas to map where coverage exists, and, even more importantly, where it still needs to be delivered."[35] Both amendments were adopted and included in S. 2644.[36]

The issue of whether the Commission's broadband data is accurate (including data relating to mobile wireless broadband) came to a head at a recent hearing conducted by the Senate Committee on Indian Affairs on April 27, 2016. There, an FCC official conceded that the Commission's broadband coverage methodology is "not the most accurate way to measure"[37] coverage, and another federal official characterized the Broadband Map as "a very large cudgel" because, as a result of using Census Blocks, "in many places the way [broadband] is being measured is not terribly accurate."[38] As aptly put by Senator Cantwell:

> [Broadband] is a key tool to economic development. So … what is always challenging for us is to get a clear and crisp picture of exactly

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[34] *See* Sen. Joe Manchin, Press Release, "Manchin Provisions to Improve Broadband Coverage Included in FCC Reauthorization Act" (Apr. 29, 2016), *accessed at* http://www.manchin.senate.gov/public/index.cfm/2016/4/manchin-provisions-to-improve-broadband-coverage-included-in-fcc-reauthorization-act.

[35] *Id*.

[36] *Id*. S. 2644 was reported by the Committee on Commerce, Science, and Transportation on April 27. Further action is currently pending. *See* Congress.gov, *accessed at* https://www.congress.gov/search?q=%7B%22source%22%3A%22legislation%22%2C%22congress%22%3A%22114%22%2C%22search%22%3A%22s.+2644%22%7D.

[37] *April 27 Senate Hearing*, Oral Testimony of Gigi B. Sohn, Counselor to the Chairman, FCC (testimony beginning at 1:36:31).

[38] *Id*., Oral Testimony of Mr. Mark Goldstein, Director, Physical Infrastructure Issues, U.S. Government Accountability Office (testimony beginning at 1:32:10).

> where these programs are reaching and where they're not reaching.… [W]e just keep talking and talking about … these available programs and we don't even know what they're actually accomplishing.[39]

Disputing the Commission's claim at the hearing that 59% of Tribal lands have access to broadband at the FCC's specified benchmark speed, Senator Heidi Heitkamp said:

> That number is unreliable.… That [number] doesn't mean anything to me. So I need to know what the current condition is.… [S]o many people in this demographic area—or this census block—they connect wirelessly.… Their only connection to the Internet is on a cellphone or on a mobile device. So we've got to figure out how we [can] fashion a solution for [this] population … and make sure we're not building fiber to places where no one is going to use it. They need cell towers.[40]

Senator Heitkamp went on to describe how her constituents transfer homework assignments to a cell phone and then travel to the top of a hill where they attempt to transmit it to the teacher.[41] This illustration of the "homework gap," which the Commission has been seeking to resolve, cannot be properly addressed if maps show these areas in North Dakota to be "covered" by mobile broadband. In addition to Senators Heitkamp and Cantwell, Senators Franken, Udall, Murkowsky, and Tester all expressed concerns during the hearing about the unreliability of the Commission's mapping data.

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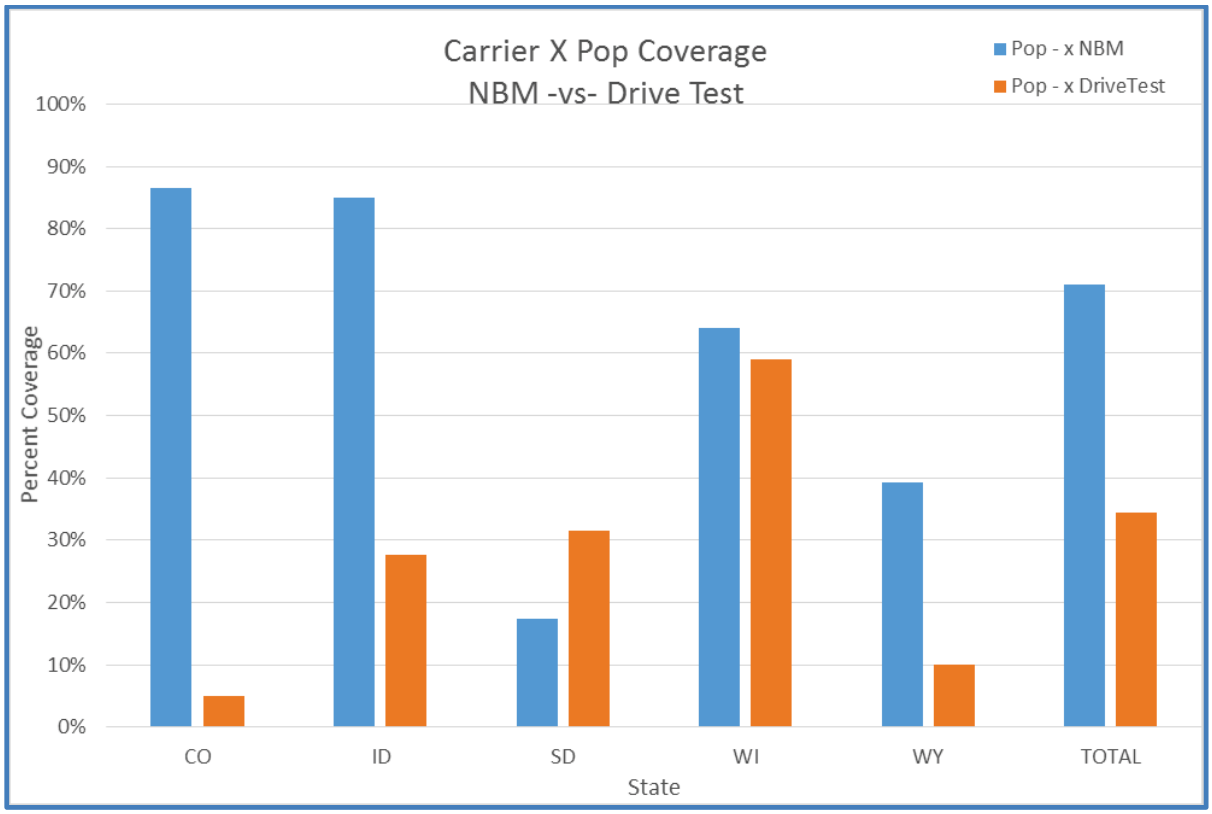
[39] *Id*., Oral Statement of Sen. Maria Cantwell (statement beginning at 1:29:16).

[40] *Id*., Oral Statement of Sen. Heidi Heitkamp (statement beginning at 1:42:33).

[41] *Id*.

There is ample reason to believe that coverage issues noted by Members of Congress are more than just anecdotal evidence.[42] In the past, U.S. Cellular has commissioned studies to compare commercial drive tests to the National Broadband Map.[43] As shown in the chart below, drive testing demonstrated lower levels of coverage than represented by the NBM, and in some cases dramatically lower levels, in all but one instance:



Sources: National Broadband Map, Mobile Pulse & CostQuest Associates Analysis[44]

[42] Although, to be fair, the experiences of a group of Senators, who routinely travel their respective states to visit constituents and campaign, in attempting to access mobile wireless voice and broadband networks, provide a compelling reason to conclude that the statement, "99% of Americans have access to 4G LTE" deserves a thorough and data-driven vetting.

[43] The National Broadband Map ("NBM") was created by the National Telecommunications and Information Administration ("NTIA") in partnership with Commission and the states, certain U.S. territories, and the District of Columbia. The NBM can be accessed at http://www.broadbandmap.gov/.

[44] Source: 2014 Mosaik data.

U.S. Cellular's drive test results alone are not definitive, but the totality of evidence in the record should cause the Commission to reassess its view on the state of mobile wireless competition, as well as the allocation of scarce Mobility Fund support, which is based largely on this data. If, in fact, mobile broadband coverage is being significantly overstated, and the coverage gaps are much greater than the available mapping data shows, then the size of the Mobility Fund Phase II support mechanism must be recalibrated to fulfill the Congressional objective to ensure that consumers living in rural areas have access to "advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas.…"[45]

The Commission's broadband progress reports and mobile wireless competition reports do not contain accurate and reliable data which would lead the Commission to conclude that mobile broadband consumers are benefiting from a competitive marketplace,[46] or that the Commission's universal service policies are working to ensure that all Americans, particularly those in rural areas, have access to advanced mobile broadband services that are reasonably comparable to those living in urban areas.

Currently, the Commission allocates a disproportionate share of universal service support to fixed wireline networks ($73 billion) compared to only $15 billion for mobile networks:

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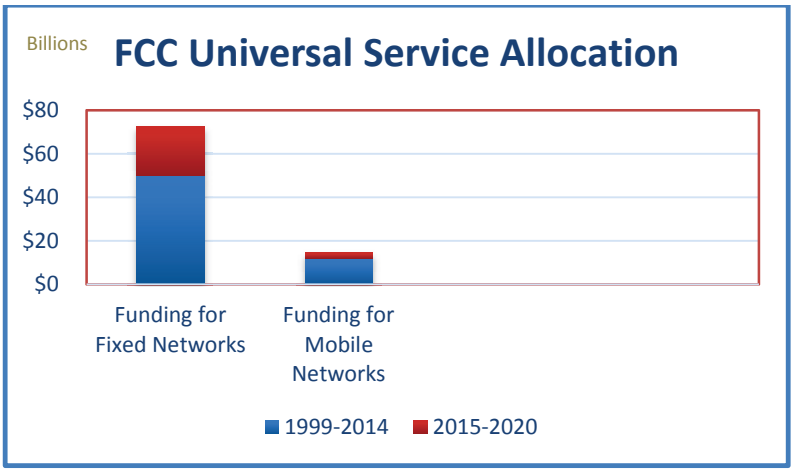
[45] Section 254(b)(3) of the Communications Act of 1934, 47 U.S.C. § 254(b)(3) (as amended by the Telecommunications Act of 1996).

[46] The Commission, in recent mobile competition reports, has refrained from making a finding that the mobile wireless service marketplace is competitive. *See Eighteenth Report*, 30 FCC Rcd at 14518 (para. 5) (footnote omitted) (indicating that "this *Eighteenth Report* does not reach an overall conclusion or formal finding regarding whether or not the CMRS marketplace was effectively competitive, but rather it provides an analysis and description of the CMRS industry's competitive metrics and trends"); *Seventeenth Report*, 29 FCC Rcd at 15315 (para. 6).



If it were accurate that 98% of Americans have access to high-quality 4G LTE service, with adequate coverage and throughput, the Commission could conclude that the job of building out service to rural Americans is largely done and the allocation shown above might be appropriate. However, if one accepts other Commission data, that fully 25% of the nation's roads require additional investment, or if the drive testing data shown in the above chart is accurate, then presumably there would be a greater sense of urgency to develop policies that expand universal service support for mobile wireless infrastructure and accelerate mobile broadband investment, including expanding the amount invested in our nation's mobile broadband infrastructure. At a minimum, there needs to be a more robust assessment of the state of affairs in rural America *before* implementing Mobility Fund Phase II.

C. The Commission Should Shift Its Focus to the Task of Developing and Utilizing More Reliable Coverage Data.

While U.S. Cellular understands the expense of drive testing the entire nation, it is important to note the incongruity of the FCC's unwillingness to perform even minimal drive testing in the face of compelling evidence that its current methodologies to analyze the extent of mobile

wireless network deployment (including its reliance on Mosaik data)[47] do not provide useful tools for assessing the state of competition. Indeed, the Commission understands fully the importance of having accurate drive test data. Before making final distribution of support to winning bidders under Mobility Fund Phase I, the Commission requires carriers to submit drive test data, and it is U.S. Cellular's understanding that the Commission then hires an independent firm to conduct an additional drive test to verify the carriers' drive test results. In U.S. Cellular's case, such FCC-commissioned drive tests have been conducted to confirm the results of drive tests submitted to the FCC by U.S. Cellular.

In annually assessing the state of mobile competition pursuant to Congressional mandate, the Commission relies on data that is facially caveated in the reports' very text. The bulk of data that the FCC relies upon is produced by industry participants that have made no secret of their desire to not pay into the federal universal service fund, and who benefit most by the FCC's concluding that there is robust competition, so that regulatory requirements can be minimized and universal service programs made unnecessary.[48]

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[47] *Public Notice* at 4 (noting that, "[i]n the *Nineteenth Report*, we anticipate using Form 477 coverage data, as well as Mosaik data[,] to maintain continuity" in measuring mobile wireless network deployment).

[48] *See* Verizon Comments, WT Docket No. 15-125 (filed June 29, 2015) at 3 (arguing that "[t]here is consensus across industry analysts that mobile competition is robust"). Verizon also advocated (in response to the Commission's proposal to establish a Mobility Fund) that the Commission should phase out universal service support for mobile voice services. Comments of Verizon and Verizon Wireless, WT Docket No. 10-208 (filed Dec. 16, 2010), at 8.

One would expect the FCC to be more aggressive in seeking out ways to demonstrate to Congress and the public that its data is reliable. In Mobility Fund Phase I, the Commission committed $300 million,[49] and Mobility Fund Phase II could be $500 million or more, annually.[50] These are large commitments of public monies that are being made, or will be made, based on unreliable data.

If the Commission addresses the current data shortcomings, so that it can accurately measure mobile wireless network deployment in rural areas, then the Commission can take effective action to increase competition and deployment. Data provided for the National Broadband Map, the Broadband Progress Reports, and the Mobile Competition Reports must be reliable, because policy decisions involving billions of taxpayer dollars are made based on what those maps and charts say. In testimony on Capitol Hill and in submissions to the Commission, U.S. Cellular has maintained that the only way to determine whether maps are accurate is to employ drive testing and third-party data sources to determine coverage.[51]

In sum, it behooves the Commission to step up efforts to obtain high quality data that will produce an accurate assessment of mobile wireless competition and inform rational policy judgments in related areas. The data being used to assess the state of mobile competition and broadband progress is significantly unreliable and rural citizens are being harmed. If accurate data were available, U.S. Cellular believes there would be a much greater urgency to increase investment in

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[49] *Connect America Fund et al*., WC Docket No. 10-90 *et al*., Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17778 (para. 314) (2011), *aff'd sub nom. In re FCC 11-161*,703 F.3d 1015 (10th Cir. May 23, 2014)

[50] *Id*. at 17711 (para. 126).

[51] *See*, *e.g*., *February 4 Senate Hearing*, Written Statement of LeRoy T. Carlson, Jr., Chairman, U.S. Cellular, *accessed at* http://www.commerce.senate.gov/public/_cache/files/ab3bf837-edb5-45f9-9ba1-5a234183a06f/48FE428BEFDC05BA42A6C7AF89EC4896.leroy-carlson-testimony.pdf.

mobile broadband infrastructure in rural areas. These investments would increase competition for mobile services and they would help fulfill the Congressional imperative that rural citizens have access to advanced telecommunication and information services that are reasonably comparable, both in quality and price, to those in urban areas.

III. CONCLUSION.

The extraordinary importance of mobile wireless voice and broadband services for consumers and for the national economy underscores the need for the Commission to develop and implement policies that ensure mobile wireless competition, and that promote the deployment of advanced mobile broadband networks that bring access to consumers and businesses in every corner of America.

These Commission policies must be informed by a solid foundation of facts that deliver a clear and accurate picture of the state of mobile wireless competition. Unfortunately, that picture is out of focus because the Commission continues to rely on data and a measurement methodology that overstate the extent of mobile network coverage, particularly in rural areas. U.S. Cellular respectfully urges the Commission to take the necessary steps—including formally requesting

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comments from stakeholders and other interested parties—to ensure that its competitive analysis is informed by reliable data and measurement methods that are free from imperfections.

Respectfully submitted,

UNITED STATES CELLULAR CORPORATION

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