Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
ETC Annual Reports and Certification	)	WC Docket No. 14-58

OPPOSITION TO PETITION FOR RECONSIDERATION OF HUGHES NETWORK SYSTEMS, LLC

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TABLE OF CONTENTS

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The Association of Missouri Electric Cooperatives, Midwest Energy Cooperative, HomeWorks Tri-County Electric Cooperative, Alger Delta Cooperative Electric Association, Great Lakes Energy, NTCA–The Rural Broadband Association, the Utilities Technology Council, and the National Rural Electric Cooperative Association (collectively, the "Rural Coalition") respectfully submit this opposition to Hughes Network Systems, LLC's ("Hughes") petition for reconsideration of the Commission's March 2, 2017 Connect America Fund Auction Order[1] ("*CAF II Auction Order*").[2] As explained below, Hughes's petition raises no new arguments to justify disturbing the Commission's carefully crafted and balanced Order. Moreover, Hughes does not explain the basis for the factual assumptions that underlie its arguments. Those arguments also overlook the fact that high latency services remain unable to support several important

[1] *In re Connect America Fund*, Report and Order and Order on Reconsideration, 32 FCC Rcd 1624 (2017) ("CAF II Auction Order").

[2] *See* Petition for Reconsideration of Hughes Network Systems, LLC, *In re Connect America Fund*, WC Docket Nos. 10-90, 14-58, at 3 (filed Apr. 20, 2017) ("Hughes PFR"); Petitions for Reconsideration of Action in Rulemaking Proceeding, 82 Fed. Reg. 20,558, 20,558 (May 3, 2017) (setting forth May 18, 2017 deadline to respond to Hughes's petition for reconsideration).

applications, including some that are critical to public health and safety. Accordingly, the Commission should deny Hughes's petition.

I. Hughes's Petition Raises No New Arguments.

It is well settled that parties should not use petitions for reconsideration to "relitigate issues" that the Commission has already decided unless "new facts or circumstances" call the Commission's decision into question[3]: "[R]econsideration will not be granted merely to rehash matters already treated and resolved."[4] Hughes's petition raises no new facts or circumstances, and it should therefore be denied.

Hughes's primary concern with the *CAF II Auction Order* appears to be that the Commission has weighted high latency, lower speed broadband service too heavily.[5] Citing the example of a bid that is nearly 75 percent of the reserve price, Hughes argues that its high latency, lower speed broadband services will be unable to compete in the auction,[6] and that this result is in tension with the Commission's goal of operating a technology-neutral CAF Phase II Auction.[7] Yet these arguments are not new. To the contrary, Hughes raised these precise arguments before, and the Commission addressed and rejected them in its *CAF II Auction Order*.

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[3] *In re Application of Hispanic Information and Telecommunications Network, Inc.*, Order on Reconsideration, 20 FCC Rcd 816, 819, para. 10 (2005).

[4] *In re Implementation of the AM Expanded Band Allotment Plan*, Memorandum Opinion and Order, 12 FCC Rcd 3361, 3365, para. 10 (1997).

[5] Hughes PFR at 3.

[6] *Id.* at 3–5.

[7] *Id.* at 8.

Specifically, prior to the adoption of the *CAF II Auction Order*, Hughes argued in the record that "there is no basis to impose a greater [weighting] factor for higher latency" service.[8] It proposed weighting high latency bids no more than 10 points on the ground that "satellite providers will not be able to compete" because they need upwards of "$185 per customer per month" in public subsidies.[9]

The Commission did not ignore the arguments that Hughes made before; rather, it explicitly considered and rejected them. Indeed, the Commission declined to adopt a "narrower [latency] weight like 10" points as Hughes had suggested.[10] Directly addressing the arguments that Hughes makes yet again in its petition for reconsideration, the Commission reasoned that high latency providers' claims of improving service quality "do not address the concerns raised by commenters about the inherent limitations of high latency services—particularly for interactive, real-time applications and voice services."[11] The Commission found this concern to be especially salient in the context of the CAF Phase II Auction because "high latency providers may be the only voice providers in the area."[12] After examining the real limitations of high latency service and considering the full range of proposals for weighting latency in the record, which ranged from 10 to 100, the Commission adopted a weight of 25 for high latency.

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[8] Letter from Jennifer A. Manner, Senior Vice President, Regulatory Affairs, Hughes Network Systems, LLC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2 (filed Feb. 2, 2017).

[9] Letter from Jennifer A. Manner, Senior Vice President, Regulatory Affairs, Hughes Network Systems, LLC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1–2 (filed Feb. 14, 2017).

[10] *CAF II Auction Order*, 32 FCC Rcd at 1638, para. 34.

[11] *Id.*

[12] *Id*.

The Commission also previously considered and rejected Hughes's now-repeated argument that the goal of a "technology-neutral"[13] auction requires the Commission to guarantee that particular technologies will win support.[14] Instead, the Commission rightly and reasonably interpreted its technology-neutral objective as requiring that different technologies have the "opportunity" to win support.[15] The Commission pointed out that Hughes's interpretation of technological neutrality would require the Commission to expend scarce universal funds on technologies that consumers might find undesirable even where more desirable services are available at competitive rates.[16] By contrast, the current weighting framework strikes an appropriate balance, giving Hughes and all types of providers a reasonable "opportunity" to win support while recognizing the relative value of differing performance capabilities.

Hughes has not identified any reason that would warrant reopening the Commission's settled reasoning on any of these points. In "rehash[ing] matters already treated and resolved,"[17] Hughes is now asking the Commission to abandon its recent and well-reasoned decision, put a thumb on the scale in favor of lower speed, high latency services, and discourage higher speed, low latency services—which are in fact "reasonably comparable"[18] to those available in urban areas—from competing. As discussed below, this result is not technology neutral, risks misspending finite universal service funds, and does not comport with the Commission's statutory obligations to ensure reasonably comparable service.

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[13] *In re Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 5949, 5956, para. 14 (2016).

[14] *See* Hughes PFR at 8.

[15] *CAF II Auction Order*, 32 FCC Rcd at 1634, para. 27.

[16] *Id.* at 1630, para. 23.

[17] *Implementation of the AM Expanded Band Allotment Plan*, 12 FCC Rcd at 3365, para. 10.

[18] 47 U.S.C. § 254(b)(3).

II. Hughes Does Not Explain Its Assumptions Regarding Its Weighting Example, Which if Accurate, Undermine Its Cost Effectiveness Claims.

The predicate of Hughes's petition for reconsideration is that Hughes needs a certain monthly subsidy to compete and, as weighted, its bids may not be competitive. But if Hughes is correct that it requires such a subsidy to provide broadband service in the CAF Phase II Auction, it may not be as cost effective as other technologies—which would contradict earlier claims, indications, and assumptions in the record about the purported benefits of lower speed, higher latency technologies.

To support its petition for reconsideration, Hughes claims that satellite providers are likely to require a subsidy of approximately $187 per location per month to provide satellite broadband under the terms of the CAF Phase II Auction.[19] Hughes assumes a hypothetical reserve price of $250 per location per month, and, in the example, Hughes bid $187, which is nearly 75 percent of the reserve price.[20] After adjusting for weighting (+45 weight for 25/3 Mbps and +25 weight for high latency), Hughes would score 145, which is far higher than the score for what Hughes assumes would be a high speed, low latency bid for 100 percent of the reserve price.[21]

Hughes, however, never explains the factual basis for a monthly support of $187 per month per household. Although Hughes states that materials "submitted in the record" support the $187 figure, the only citation that Hughes provides is to one of its own prior *ex parte* filings.[22] That filing, in turn, contains no details and merely asserts without justification or evidence that "satellite

[19] Hughes PFR at 4.

[20] *Id*. at 4–5.

[21] *Id.*

[22] *Id.* at 3–4 & n.7 (citing Feb. 14, 2017 Letter from Jennifer A. Manner to Marlene H. Dortch 1–2).

providers will require total revenue in the range of $275 per customer per month," and, because Hughes has a "revenue expectation from customers of $88 per month," Hughes will require a $187 monthly subsidy per location passed.[23]

As a threshold matter, although the petition indicates that Hughes would need $187 of support per month, it is unclear if such a high per-location support will even be available in the CAF Phase II Auction. Previously, the Commission capped the per-location monthly support available to price cap carriers and rate of return carriers at $146.10.[24] Although the Commission is including the extremely high cost areas in the CAF Phase II Auction, the Commission has not set the per-location funding cap for this auction.[25] If the Commission adopts the same funding cap as it has in the past, $187 per month would exceed the maximum support available per location by over $40. In other words, if Hughes truly needs $187 per month, such level of support may not even be available through the CAF Phase II Auction process. And, if such a subsidy is in fact necessary, it undermines the argument that services offered by Hughes are a more cost-effective means of achieving universal service than other technologies.[26]

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[23] Feb. 14, 2017 Letter from Jennifer A. Manner to Marlene H. Dortch 1–2.

[24] *See In re Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 13,775, 13,778, para. 8 (2016); *In re Connect America Fund*, Report and Order, Order and Order on Reconsideration, and Further Notice of Proposed Rulemaking, 31 FCC Rcd 3087, 3107, para. 52 (2016). The amount of support per location is capped at $198.60 per month, which the Commission reduced by the $52.50 that it estimated would be recovered from customers, for a total of $146.10. *Connect America Fund*, 31 FCC Rcd at 3107, para. 52.

[25] *CAF II Auction Order*, 32 FCC Rcd at 1626, para. 9 ("Next, we intend to release a Commission-level public notice that will seek comment on specific details regarding the mechanics of the Phase II auction, including the auction format and reserve prices."); *Connect America Fund*, 31 FCC Rcd at 5979, para. 90 ("[T]he specific reserve prices will be adopted in a future *Auction Procedures Public Notice*, after the opportunity for further comment.").

[26] In effect, if Hughes's estimates are correct, Hughes would have the Commission receive "fewer Lamborghinis and more Chevys" while nonetheless paying the cost of the former. Hughes PFR at 7 (quoting *CAF II Auction Order*, 32 FCC Rcd at 1668 (O'Rielly, Comm'r, approving in part and

Indeed, such a high level of support may also be in tension with previous filings in the record suggesting that satellite broadband service can be provided at a lower cost than terrestrial broadband services. Hughes previously suggested that satellite is more "cost-effective[]" than other technologies,[27] but data from the Rural Broadband Experiments suggest that these other technologies can require subsidies of far less than $187 per month per location.[28] Moreover, ViaSat has contended that "satellite broadband is one of the most cost-effective and efficient means of . . . serving the maximum number of households within the very limited CAF II budget" and used satellite's "relative cost efficiency" to justify "why the Commission should fully leverage" satellite broadband "in achieving the objectives of the CAF."[29]

What is more, Hughes's focus on the cost of homes passed understates the actual cost of connecting each household; a home passed is not the same as a home connected. In areas where members of the Rural Coalition have deployed high-speed, low-latency broadband services, take rates are high and ordinarily exceed 60 percent and, in some areas, 70 percent.[30] Yet in the Commission's latest Section 706 Report, the Commission "continue[d] to observe significant

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dissenting in part)). By contrast, data from the Rural Broadband Experiments show that other fixed providers may be significantly more cost effective.

[27] Letter from Jodi Goldberg, Associate Corporate Counsel, Hughes Network Systems, LLC to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 3 (filed Sept. 29, 2016).

[28] For example, as adverted to above, in the Rural Broadband Experiments, Midwest Energy Cooperative bid to serve 421 locations with fiber for just $41.87 per month per location.

[29] Reply Comments of ViaSat, Inc., WC Docket No. 10-90 et al., at 2, 10 (filed Aug. 5, 2016).

[30] Letter from Rebekah P. Goodheart, Counsel for Association of Missouri Electric Cooperatives, Midwest Energy Cooperative, HomeWorks, Alger Delta & Great Lakes Energy, et al. to Marlene H. Dortch, Secretary, FCC, at 4, WC Docket No. 10-90 (filed Feb. 14, 2017); *see also* NTCA–The Rural Broadband Association, NTCA 2015 Broadband/Internet Availability Survey Report 7 (2016) ("Survey results indicate an overall broadband take rate from NTCA member companies of 73%, up slightly from 70% a year ago.").

differences involving . . . adoption patterns between fixed terrestrial and fixed satellite services," and explained that below-average satellite take rates could be explained by "differences in available speeds, pricing, data allowances, capacity, and latency" that favored terrestrial services.[31] Indeed, satellite has consistently comprised only a small fraction of residential connections in the United States,[32] despite the widespread availability of satellite services throughout the nation.[33] ViaSat itself has noted that it is "extremely unlikely" that "winning satellite broadband bidders" in the prior auction will be able to "surpass a 32 percent subscription rate by 2020."[34]

Finally, the Commission should consider the actual per household connected cost when evaluating claims of cost effectiveness. Even assuming a 35 percent take rate, which may be generous given the ViaSat filing, using Hughes's $187 per-month support in a hypothetical census block with 20 locations, and a monthly reserve price of $250 per location, the Commission would be using finite universal service resources to subsidize each low-speed location at over $6,400 annually (or, corrected to note the maximum subsidy of $146.10 per location, over $5,000 annually). To invest such a significant amount of finite universal service resources per connected home in a service that so few Americans choose—a service that even its proponents say is

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[31] *In re 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*, 2016 Broadband Progress Report, 31 FCC Rcd 699, 720, para. 47 & n.161 (2016).

[32] *See* FCC, Wireline Competition Bureau, Internet Access Services: Status as of December 31, 2015, at 18 (2016) (showing that of 92,330,000 fixed connections in the United States with at least 3 Mbps/768 Kbps service in December 2015, satellite accounted for only 1,744,000).

[33] *See id.* at 6 (noting that "[s]atellite service providers report offering Internet access at bandwidths of at least 10 Mbps downstream and 1 Mbps upstream in 99.1% of developed census blocks").

[34] *See* Petition for Reconsideration and Clarification of ViaSat, Inc., *In re Connect America Fund*, WC Docket Nos. 10-90, 14-58 & 14-259, at 3 (filed Aug. 8, 2016).

"extremely unlikely" to achieve even a one-third adoption rate three years from now—would not be the most efficient use of universal service funds. To turn a phrase that Hughes cites in its petition for reconsideration, this would be tantamount to paying Lamborghini prices for Ford Pintos.[35]

III. The Commission's Decision Comports with the Commission's Statutory Obligations.

Congress gave the Commission a mandate to ensure that "those in rural, insular, and high cost areas" have access to telecommunications services that are "reasonably comparable" to those available in urban areas.[36] This mandate is an "evolving" one, recognizing that as urban telecommunications services evolve over time due to technological improvement, the Commission must modernize its rules and funding approach accordingly.[37]

The CAF Phase II auction term is 10 years.[38] To meet the statutory directive to ensure "reasonably comparable" service throughout the duration of the auction, the Commission must design the CAF II Auction to meet the "reasonably comparable" standard not only today, "but also over the full life of the supported assets."[39] In the context of rapidly increasing urban download speeds and service with low latency, the Commission's mandate requires some recognition of the

[35] Hughes PFR at 7.

[36] 47 U.S.C. § 254(b)(3).

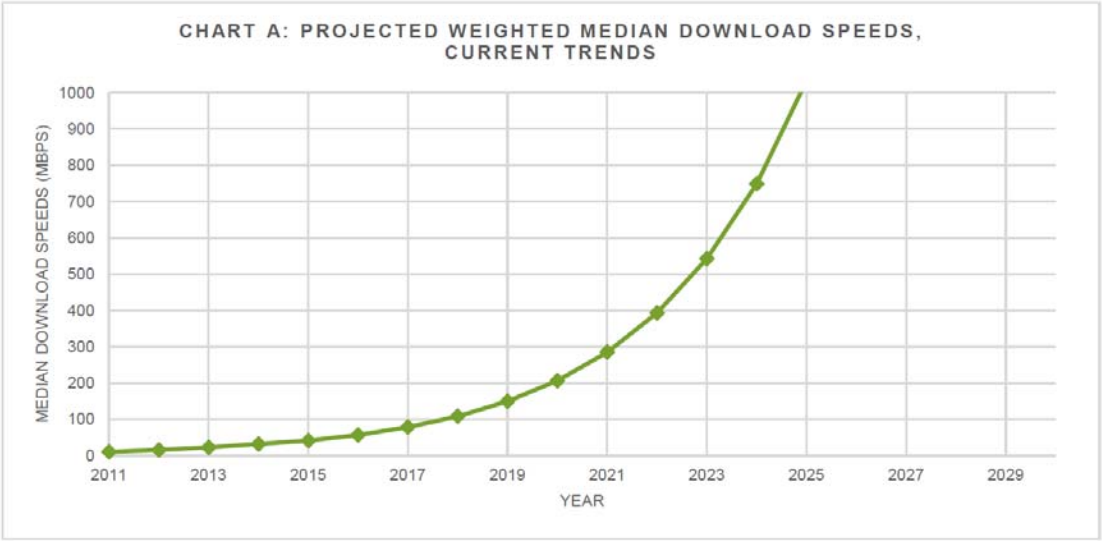
[37] *Id.* § 254(c)(1); *CAF II Auction Order*, 32 FCC Rcd at 1631, para. 24.

[38] *CAF II Auction Order*, 32 FCC Rcd at 1631, para. 24.

[39] Letter from Rebekah P. Goodheart, Counsel for Association of Missouri Electric Cooperatives, Midwest Energy Cooperative, HomeWorks, Alger Delta & Great Lakes Energy, et al. to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 6–7 (filed Jan. 19, 2017).

value of providers that can deliver in higher-speed, low-latency tiers and are thus "capable of meeting future demand."[40]

There is no question that consumers in urban areas are increasingly demanding Internet service that delivers faster speeds, more capacity, and low latency.[41] Indeed, according to the Commission, the median download speed nationwide has quadrupled in recent years, from approximately 10 Mbps in March 2011 to more than 40 Mbps by the end of 2015.[42] This trend is likely to continue: As the Rural Coalition has previously explained using the FCC's own data, at current growth rates, median download speeds throughout the nation will far exceed 250 Mbps within a decade.[43]



[40] *In re Connect America Fund*, WC Docket No. 10-90, Report and Order, 29 FCC Rcd 15,644, 15,655–56, para. 29 (2014).

[41] *CAF II Auction Order*, 32 FCC Rcd at 1631, para. 24.

[42] FCC, 2016 Measuring Broadband America Fixed Broadband Report 15 (2016).

[43] Jan. 19, 2017 Letter from Rebekah P. Goodheart et al. to Marlene H. Dortch 4–5 & n.9. Chart A relies on data from the FCC's 2016 Measuring Broadband America report. The projections for 2016–2030 rely on the assumption that median download speeds will continue to increase at the compound annual growth rate ("CAGR") of the 2012–2015 period (38.004 percent). Figures for 2012–2015 represent September measurements. The figure for 2011 represents a March measurement.

By considering the value of high-speed and low-latency services, the FCC's weighting for the CAF Phase II Auction is appropriately calibrated to recognize that rural areas should not be prevented from receiving "reasonably comparable" service over the ten-year funding term, and also fulfills the Commission's statutory duty to focus on those services to which a "substantial majority of residential customers" have subscribed.[44] The Commission's approach is also efficient: given current trends, building networks with speeds of 10/1 Mbps or 25/3 Mbps today—and particularly in 2028—would not only leave rural areas with services that are not reasonably comparable when compared to urban areas,[45] but would also require ratepayers to rebuild these networks in the future, wasting finite public resources.[46] Undoing the Commission's careful balance to favor services with lower speeds and high latency risks ignoring our nation's longstanding commitment to ensuring that rural communities can compete on an even technological playing field, and creates a need for a second round of costly infrastructure investment in the future.

IV. The FCC's Weighting Reflects a Reasonable and Appropriate Means of Capturing the Value of Low Latency in the Broadband Consumer Experience.

The Rural Coalition understands and shares the desire to provide as many Americans as possible with access to broadband—and submits that the current weighting system strikes a reasonable balance that enables every kind of technology and network platform to bid and prevail

[44] 47 U.S.C. § 254(b)(3), (c)(1)(B).

[45] *See* Reply Comments of the American Cable Association, In re Connect America Fund, WC Docket No. 10-90, at 4 (filed Aug. 5, 2016).

[46] *See* Letter from Jack Richards, Keller & Heckman LLP, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1 (filed Feb. 16, 2016) (attaching letter signed by numerous organizations representing various rural interests urging the Commission to adopt a framework that promotes the deployment of future-proof broadband networks).

in the CAF Phase II competitive bidding process. At the same time, it cannot be forgotten that in the wake of the CAF Phase II Auction, the winning bidder in a given area will likely be the *only* network in that area for voice and broadband services in the future: By definition, if an award is made, it represents the Commission's determination that the area is unserved and thus is unlikely to have service without support.[47] As a practical matter, this means that the provider that is awarded CAF Phase II support through the competitive bidding process will become the twenty-first century "provider of last resort" for the area it serves. High latency poses a serious challenge for a provider in this position.

First and foremost, latency adversely impacts voice communications. The Commission has consistently identified the reliability of voice services in rural areas as a paramount policy concern;[48] adopting a CAF Phase II framework that now diminishes the importance of such communications would be a striking departure indeed. In this context, networks that render "emergency services unavailable during twice yearly, recurring network sun outages" and

[47] Even if a price cap carrier operates a network in that area, the availability of CAF Phase II support there indicates the area is deemed unserved today. Once another carrier receives CAF Phase II support to serve an area, the price cap carrier may very well look to "exit" the area, given the Commission's forbearance from eligible telecommunications carrier obligations when another provider is receiving high-cost support. *Connect America Fund*, 29 FCC Rcd at 15,663–64, para. 51.

[48] *See, e.g.*, *In re Rural Call Completion*, Order on Reconsideration, 29 FCC Rcd 14,026, 14,026–27, para. 1 (2014) ("The *Rural Call Completion* Order reflected the Commission's commitment to ensuring that high quality telephone service must be available to *all* Americans."); *see also id*. at 14,061 (statement of Comm'r Pai) ("When you dial a phone number, you expect your call to go through. And yet, when many try to call a family member or a business in rural America, they hear an endless series of rings, dead air, or a busy signal even when someone is ready to answer on the other side. No one deserves such a broken system."); *id.* at 14,059 (statement of Comm'r Clyburn) ("The core of the FCC's mission is to guarantee that networks are reliable and resilient so that every consumer can make and receive a telephone call."); *id.* at 14,062 (Comm'r O'Rielly, concurring) ("Americans expect their calls to be completed no matter where they live.").

otherwise experience recurring delays during basic voice calls present real problems.[49] Nor is this an issue that technology can easily surmount; Hughes itself has previously acknowledged that "the laws of physics make compliance with a 100 millisecond threshold"—*i.e.*, the standard that has been deemed "reasonably comparable" in every other universal service context—"impossible."[50] Since voice services require low latency and reliable network uptime, it was not only appropriate, but necessary, for the Commission to assign a reasonable amount of weighting to high latency networks.

The impact of high latency is particularly problematic in the context of voice calls in rural communities. In areas where CAF Phase II Auction support is awarded, the prevailing bidder may ultimately be the only network available in that area for both broadband *and* voice service. Yet, as Vantage Point has explained in the attached Appendix, in an area where the only network available suffers from high latency, "the delay is compounded because of the 'double-hop' of the signal traveling up and down to the satellite multiple times."[51] This delay is a serious consideration when the call in question is not to just any neighbor, but to a neighboring public-safety entity in the event of an emergency. Given the critical importance that the Commission has assigned to ensuring that voice calls can be completed, it should not revisit and revise the weighting structure in a manner that risks exacerbating call-completion concerns.

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[49] *CAF II Auction Order*, 32 FCC Rcd at 1637 n.73 (quoting Reply Comments of Percipio Industries, LLC, WC Docket No. 10-90, at 3 (filed Aug. 5, 2016)).

[50] Letter from L. Charles Keller, Wilkinson Barker Knauer, LLP, Counsel to Hughes, to Marlene H. Dortch, Secretary, Commission, GN Docket No. 14-126, at 12 (filed Oct. 15, 2014).

[51] Larry Thompson & Brian Enga, Vantage Point, Latency Considerations for Satellite Broadband 4 (2017) ("Appendix").

Nor is the significance of latency limited to voice alone, as there are other important latency-sensitive applications. The typical terrestrial network over which all applications run well offers latency in the 12 to 58 millisecond range.[52] By contrast, the Commission has estimated that median satellite latency is in the 599 to 629 millisecond range.[53] Distance learning, telemedicine, and videoconferencing—applications that are particularly important in rural areas—will not operate effectively, if at all reliably, on such high latency networks. This is also true of applications like the Video Relay Service for the hard-of-hearing community or Virtual Private Networks that are important for businesses and telecommuters deciding whether to operate in rural America.[54] Although next-generation satellites have made some improvements, and there are promises of further progress in the future, such promises have been heard before and, as Hughes itself has acknowledged, the "laws of physics" ultimately represent a significant barrier to overcoming latency concerns.[55] It would therefore be imprudent to "bet on the come" in such a manner when it comes to scarce universal service resources.

Perhaps the best evidence of the need to weight latency is the market itself, which captures the value that users place on low-latency services. Adoption rates of services atop networks that offer lower speed, higher-latency services are low and growing slowly, whereas adoption rates of networks with greater capacity and low latency are high and increasing rapidly.[56] Additionally,

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[52] *Id.*

[53] *Id*.

[54] *See, e.g.*, Comments of the United States Telecom Association, WC Docket No. 10-90, at 2, 5–8 (filed July 21, 2016).

[55] Oct. 15, 2014 Letter from L. Charles Keller to Marlene H. Dortch 12.

[56] For example, the Commission's own data indicate that satellite-based services had 2,079,000 connections as of June 2016, up just over 100,000 connections from two years earlier; by contrast, cable modem connections increased by more than 5,000,000 during the same period, and fiber-to-the-premises ("FTTP") connections increased by just under 2,000,000. FCC, Wireline

developments in wireless networks confirm that the marketplace views latency as an important value proposition and an essential part of the user experience. Moreover, as Vantage Point has observed, "new network equipment and technologies, including 5G wireless, are making significant investments to ensure low latency."[57] And though Hughes claims there is a lack of data showing marketplace dissatisfaction with high latency services,[58] there are data in the record with respect to relative consumer perceptions.[59] The choices of consumers in the marketplace and of providers in designing their networks validate the need to emphasize low latency in making the most efficient and effective use of CAF resources.

Further, although Hughes notes that the majority of broadband network data is not latency-sensitive,[60] this argument ignores that low latency is necessary to support growth areas, such as the "Internet of Things" and the increasing use of touch interfaces that do not tolerate delay.[61] Moreover, Hughes's focus misses the point. Consumers are currently leaving rural America in part because of the lack of reliable broadband and the ability to use applications that broadband enables. Individuals—and certainly the businesses that would employ them—will not move to

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Competition Bureau, Internet Access Services: Status as of June 30, 2016, at 15 (2017). Put another way, just the *growth* in cable modem connections doubled the *total* number of satellite connections over the past two years, and the *growth* in FTTP connections over that same time roughly equaled the *total* number of satellite connections.

[57] Appendix at 3 (footnote omitted).

[58] Hughes PFR at 8–9.

[59] *See* Letter from Michael R. Romano, Sr. Vice President, NTCA, to Marlene H. Dortch, Secretary, Commission, WC Docket No. 10-90, at 20 (filed Nov. 7, 2013) (attaching Vantage Point, Analysis of Satellite-Based Telecommunications and Broadband Services (2013)) ("As shown in Figure 4-5, satellite providers, such as Hughes Network Systems and WildBlue Communications, have VoIP service classified as 'Very Annoying' using the [Mean Opinion Score] scale.").

[60] *See* Hughes PFR at 9–10.

[61] Appendix at 3.

rural America without robust and reliable broadband that does not have inherent limits on the utility of important applications. If rural Americans cannot reliably call their neighbors or public-safety officials without frustrating delays, telecommute to work for distant employers, or participate in distance learning or video conferences, rural America as a whole will feel the demographic and economic impact.

In short, the Commission was right when it concluded just a few months ago, "[c]onsumers clearly value . . . lower latency services."[62] If the broader public policy goal of the CAF Phase II and universal service initiatives is to support the viability and sustainability of rural communities, deploying a network that cannot reliably support an increasingly important set of applications that consumers and businesses depend upon risks falling far short of that goal.

V. Conclusion

The Rural Coalition shares the objective of providing broadband to as many people as possible. The Commission adopted reasonable weighting rules that give all technologies a reasonable "opportunity" to participate and prevail in the auction based upon realistic assumptions of value and a well-developed record analyzing costs. The Commission should not revisit these determinations and tilt weighting to enable high latency, slower speed services to be successful—especially if the rationale is because they are less efficient than originally explained and anticipated. As the Commission has recognized, such a result would constitute an inefficient waste of taxpayer funds and is not technology neutral.[63] The Commission's technological neutrality objective is met if different technologies have the "opportunity" to compete with one another to determine the most cost effective bids after weighting is applied.

[62] *CAF II Auction Order*, 32 FCC Rcd at 1631, para. 24.

[63] *Id.* at 1630, para. 23.

For these reasons, the Commission should deny the Hughes petition for reconsideration and proceed promptly to implement the auction so that the households and businesses in rural America who have been awaiting broadband since the CAF program was first adopted in 2011 can finally start to realize the benefits of that program without further delay.

Respectfully submitted,

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Martha A. Duggan
Senior Director, Regulatory Affairs
National Rural Electric Cooperative Association

May 18, 2017

CERTIFICATE OF SERVICE

I, Beth Gulden, hereby certify that on the 18th day of May, 2017, I caused a true and correct copy of the foregoing document to be sent by first class mail or electronic mail to:

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Appendix

Latency Considerations for Satellite Broadband

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1 Executive Overview

Hughes Network Systems ("Hughes") has recently requested that the FCC reconsider the latency weighting for purposes of the CAF Phase II auction.[1] In its petition, Hughes argues first that high latency in a network rarely impacts a customer's satisfaction or broadband experience, contrary to both technical consensus and the FCC's own prior findings. Secondly, Hughes uses unrealistic scenarios to argue that the latency weighting for the CAF Phase II auction is too high. However, from a technical perspective, we believe the FCC's current weightings accurately reflect the importance of latency on an advanced broadband network.

The FCC has consistently recognized that increased latency reduces network usefulness. We agree, and we therefore recommend that the FCC sustain the reasonable weighting for latency as adopted in the CAF Phase II Order.[2]

2 Importance of Low Latency

There is an inverse relationship between the amount of latency on a network and that network's usefulness. As network latency increases, fewer applications can be used without degrading their utility. High latency can limit consumers' ability to use "real-time" applications such as voice, video conferencing, Virtual Private Networking, remote learning, and telemedicine, among others.

It is true that most one-way broadband traffic is not very sensitive to high latency. As the FCC itself has previously recognized, however, in adopting performance expectations for networks built leveraging ratepayer-funded CAF resources, many of the applications and data sources we have historically considered as one-way "broadcast" models are requiring networks capable of more reliable, two-way interactive capabilities. As applications are moving from a historically one-way broadcast model to this two-way interactive model, low latency becomes increasingly important.

A number of applications that offer perhaps the greatest long-term promise of the broadband experience depend upon low latency networks; for example, eHealth and E911 require low latency for public safety reasons. As policymakers are consistently recognizing, use of telemedicine and distance learning applications that require real-time video conferencing are essential and surging, especially in rural areas.[3] As these applications become more interactive,

[1] Petition for Reconsideration for Hughes Network Systems, LLC, in The Matter of Connect America Fund ETC Annual Reports and Certifications, Apr. 20, 2017. (https://ecfsapi.fcc.gov/file/104200793226445/Hughes%20CAF%20Weighting%20Recon%20Petn%20%26%20Attachment%2020170420%20FINAL.pdf).

[2] In the Matter of Connect America Fund, WC Docket No. 10-90 and 14-58, Report and Order and Order on Reconsideration, Released Mar. 2, 2017 ¶ 17. (https://apps.fcc.gov/edocs_public/attachmatch/FCC-17-12A1.pdf).

[3] 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, Feb. 4, 2015, p. 22 (https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-10A1.pdf); *see also* Public Notice, FCC Seeks Comment and Data on Actions to Accelerate Adoption and Accessibility of Broadband-

a small amount of latency may just be an annoyance to the user; however excessive latency will negatively impact public safety, healthcare, education, and commercial services.

Low latency is also needed to support large growth areas such as machine-type communications, also called the "Internet of Things," and the increasing use of touch interfaces where delay requirements of less than 1 ms can be required.[4] In apparent recognition of the value of low latency and the concerns raised by higher latency, new network equipment and technologies, including 5G wireless,[5] are making significant investments to ensure lower latency. It would appear contrary to the FCC's pursuit of a robust 5G agenda in one set of proceedings[6] to then tolerate in the CAF context networks that are unable to facilitate such connections across much of rural America.

It makes sense, therefore, that the FCC recognized the importance of low latency in its 2016 Broadband Progress Report, stating, "Latency is an important measurement of broadband network performance because it significantly impacts the performance of interactive, real-time applications, including VoIP, online gaming, videoconferencing, and VPN platforms."[7] New broadband investments must ensure sufficiently low latency to support quality voice services and other real-time applications. The FCC has consistently recognized the importance of low latency in rural networks when the agency required latency of no more than 100 ms for Rural Broadband Experiments[8] and CAF Phase II commitments, and also as a significant weighting factor for the CAF Phase II auction.[9]

Latencies of 12 ms - 58 ms are typical today for terrestrial based providers.[10] However, due to the 22,000+ mile orbit above the earth, high latency is a characteristic of geostationary satellite

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Enabled Health Care Solutions and Advanced Technologies, Apr. 24, 2017, pp. 5-6 ("While broadband is not a complete answer, there are a growing number of broadband-enabled solutions that can play an important role in improving population health; addressing health needs beyond the hospital; expanding access to primary, acute, preventive and specialist care, especially for those Americans living in rural and underserved areas; providing more cost-effective solutions; improving the quality of care; and better engaging consumers in their health. Put simply, health care is being transformed by the availability and accessibility of broadband-enabled services and technologies and the development of life-saving wireless medical devices.") (http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0424/FCC-17-46A1.pdf).

[4] Nokia 5G Use Cases and Requirements, p. 4 (http://resources.alcatel-lucent.com/asset/200010).

[5] 5G Wireless requires less than 4 ms of latency for the User Plan RF Interface, ITU Document 5/40-E 22, Minimum requirements related to technical performance for IMT-2020 radio interface(s), Feb. 2017.

[6] Notice of Proposed Rule Making and Notice of Inquiry, In the Matter of Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment, Mar. 30, 2017. (https://apps.fcc.gov/edocs_public/attachmatch/DOC-344160A1.pdf).

[7] 2016 Broadband Progress Report, Jan. 29, 2016, pg. 28 (https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf).

[8] Report and Order and Further Notice of Proposed Rulemaking, In the Matter of Connect America Fund ETC Annual Reports and Certifications, July 14, 2014, ¶¶ 26, 27. (https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-98A1.pdf).

[9] Consumer Guide, Connect America Fund Phase II FAQS, June 6, 2016. (http://transition.fcc.gov/cgb/consumerfacts/Connect-America-Fund-FAQs.pdf).

[10] 2016 Measuring Broadband America Fixed Broadband Report, pp. 20-21 (http://data.fcc.gov/download/measuring-broadband-america/2016/2016-Fixed-Measuring-Broadband-America-Report.pdf).

systems resulting from the long distance the signals must travel. This impacts satellite broadband provider services such as ViaSat Exede and HughesNet. Because the delays are primarily due to the laws of physics, newly deployed geostationary satellite platforms do not resolve this issue.

The FCC's 2016 Measuring Broadband America report measured median satellite latency at 599 to 629 ms.[11] This delay is especially undesirable in two-way communications including voice and video conferencing. Hughes itself has recognized that it is not possible to meet the 100 ms requirement that the FCC has consistently required otherwise, stating, "[t]hus, the laws of physics make compliance with a 100 millisecond threshold impossible for broadband provided via GSO satellites."[12] Often when communicating with a neighbor or local business that also utilizes a satellite service – such as would be the case if the only network in a given area is a CAF-supported satellite network – the delay is compounded because of the "double-hop" of the signal traveling up and down to the satellite multiple times.

Because of the increasing need for lower latency in broadband connections, it is necessary to classify high latency networks as lower quality since they do not meet the requirements for many increasingly critical broadband applications. This is not to say that such networks cannot play a useful part in addressing broadband availability; they certainly have a role in addressing broadband availability challenges, and this is why it makes sense to enable their participation in an auction intended to find the right kind of solution for broadband in all sorts of areas. But as an engineer designing a network that is intended to last for over a decade, and in considering both the applications available already today and those likely to come, a substantial weighting for latency is appropriate when considering the relative value of a broadband network that can deliver *all* services and applications compared to a network that is unable to deliver the same kind of reliable voice, video conferencing, and other latency-sensitive applications that consumers and businesses are increasingly demanding. This is especially true for networks that are intended to last for over a decade and must be able to deliver applications available today as well as future applications that will likely be more adversely impacted by high latency.

The FCC's weightings are appropriate due to the limitations of services affected by high latency.

[11] *Ibid*. p. 21.
[12] Notice of Ex Parte Presentation – GN Docket No. 14-126, Wilkinson Barker Knauer, LLP, Oct. 15, 2015, p. 12, (https://ecfsapi.fcc.gov/file/60000973555.pdf).

About the Authors

Larry Thompson is a licensed Professional Engineer and CEO of Vantage Point Solutions. Larry has a Physics degree from William Jewell College and a Bachelor's and Master's degree in Electrical Engineering from the University of Kansas. He has been working in the telecommunications industry for more than 25 years, which has included both satellite and ground station design and engineering in the 1 to 30 GHz range. Larry was on the engineering team for the Tracking and Data Relay Satellite System (TDRSS), Geostationary Environmental Orbital Satellite (GOES) ground station, T-Star, and other satellite systems. Larry has helped hundreds of telecommunications companies be successful in this rapidly changing technical and regulatory environment. He has designed many wireless and wireline networks as he has assisted his clients in their transition from legacy TDM networks to broadband IP networks.

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