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

In the Matter of	)	
	)	
Inquiry Concerning Deployment of Advanced	)	
Telecommunications Capability to All	)	GN Docket No. 25-223
Americans in a Reasonable and Timely	)	
Fashion; Nineteenth Section 706 Report	)	
Notice of Inquiry	)	

REPLY COMMENTS
OF
WTA – ADVOCATES FOR RURAL BROADBAND

WTA – Advocates for Rural Broadband ("WTA") replies herein to some of other initial comments submitted in response to the Nineteenth Section 706 Notice of Inquiry ("*NOI*"). As explained below, after reviewing the comments of the other parties, WTA continues to believe that in addition to using the present 100/20 Mbps benchmark, the Commission should also assess progress towards the long-term goal of 1 Gbps download and 500 Mbps upload as part of this year's report to Congress on "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion."[1] WTA also continues to believe that undertaking such an assessment is consistent with the policy of technological neutrality. Finally, WTA maintains that the record still does not establish that low-Earth orbit satellite broadband can reliably meet the 100/20 Mbps benchmark at the scale necessary to ensure that advanced services are presently available to all Americans.

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[1] 47 U.S.C. §1302(b).

The Inquiry Should Not Eliminate the Long-term Goal

As WTA explained in its comments, assessing the rate of progress of meeting a longer-term goal is consistent with Congress' direction in Section 706(b), as well as with Chairman Carr's embrace of the "Gretzky Rule" -- to be moving to where the puck will be, not where the puck is at present. A long-term view in addition to a near-term view is also consistent with the long-term nature of broadband investments.[2] But some of the comments contend otherwise. The Free State Foundation characterized the previous Section 706 Report's use of a 1 Gbps/500 Mbps long-term goal as:

> Seemingly yet another backdoor attempt by the Biden administration to prioritize at any cost fiber over other viable broadband distribution platforms, the mere existence of this unjustified future target threatens to skew investment decisions and encourage the federally subsidized wasteful overbuilding of existing, private infrastructure. Also, the establishment of a pie-in-the-sky unrealistic goal like 1,000/500 Mbps wrongly serves to conjure up the notion that the broadband marketplace is not competitive.[3]

The Free State Foundation also claimed that:

> In addition to the concerns expressed in the Notice that such an aspirational and unsupported benchmark stands at odds with the concept of technological neutrality found in the plain language of the statute, the Free State Foundation asserts that, as a general proposition, the Biden FCC was wrong to try to predict the future.[4]

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[2] Several other commenters also urged the Commission to retain the long-term benchmark as part of the Section 706 analysis. *See,* NRECA Comments at p. 4 ("As a policy matter, having a long-term federal goal for residential fixed broadband will help ensure that U.S. telecommunications capability does not fall behind global competitors, many of which have institutionalized aggressive long-term objectives. … Having a forward-looking, long-term objective that acknowledges global broadband market realities, and gathering data for analysis relating to that objective, is simply good policy."); NTCA Comments at p. 3 ("Stated differently, any meaningful assessment of efficient and effective deployment progress must examine whether the broadband being deployed today possesses the capacity to accommodate emerging usage patterns, ensuring that critical infrastructure investments deliver lasting value rather than create tomorrow's stranded assets."); Public Knowledge *et al*. Comments at p. 10; Incompas Comments at p. 4.

[3] Free State Foundation Comments at p. 4.

[4] Free State Foundation Comments at p. 10.

But assessing progress towards a long-term goal for purposes of informing Congress on whether we are making reasonable and timely progress towards the availability of advanced services to all Americans does not in any manner skew investment decisions, and Congress independently determines how to utilize that information in any legislation it adopts (for example, by defining "Priority Broadband Project" in a manner that looks to encourage the deployment of technologies that can meet future needs[5]). Nor is a 1 Gbps/500 Mbps a "pie-in-the-sky unrealistic goal" – many service providers, including many of WTA's members, are currently offering (and have offered for many years) gigabit broadband service, and many customers are subscribing to gigabit service.[6]

WTA also notes that the Commission regularly makes predictions about future technology trends, when, for example, the Commission allocates spectrum for emerging services or seeks to influence global spectrum allocations through the World Radiocommunications Conference processes.[7] And when the Commission makes predictions about future needs, it can rely on historic trends, going back to the old copper voice networks

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[5] IIJA § 60102(a)(1)(I) defines a "priority broadband project" as one that can:

> [E]nsure that the network built by the project ***can easily scale speeds over time*** to—
> (I) meet the ***evolving*** connectivity needs of households and businesses; and
> (II) support the deployment of 5G, ***successor*** wireless technologies, and other advanced services. (emphasis added)

[6] *E.g.,* The Benton Institute for Broadband & Society Comments at pp. 12-13.

[7] *Cf.,* CTIA Comments at p. 22, where they urge the Commission work to obtain WRC outcomes to meet future needs (despite the fact that elsewhere in its comments (at pp. 7-8), CTIA also supports the *NOI* proposal to abolish the use of long-term goals in the Section 706 proceeding):

> Finally, the Commission should work with stakeholders across government and industry to develop and promote positions for the 2027 World Radiocommunication Conference that will advance U.S. leadership in 5G and beyond wireless services. This will enable the United States to facilitate the identification and use of harmonized spectrum bands into the future—which can accelerate innovation and network deployment, promote economies of scale, and unlock as much as $200 billion in value for industry and consumers over the next 10 years.*"*

that evolved over time to foster new technologies, like fax machines, dial-up and then DSL Internet access, health monitoring devices, alarm systems and remote monitoring systems for equipment. The Commission can now anticipate increased speeds necessary to support 8K video streaming, artificial intelligence and augmented reality applications. Likewise, service providers and equipment manufacturers regularly make predictions about future broadband needs when deciding whether to invest in new deployments or upgrades to existing networks in the case of service providers, or whether to invest in R&D or expanded manufacturing capabilities in the case of equipment manufacturers. All of these decisions are based on making predictions using expertise and the best available information, not looking simply looking "into a crystal ball."[8]

Technological Neutrality

In its initial comments, WTA explained that the use of the phrase "using any technology" in Section 706's definition of "advanced services capability" did not require the Commission in determining the benchmarks for present and long-term "advanced services" speeds to set lower benchmarks in order to accommodate all technologies, regardless of whether they could functionally support the ability to "originate and receive high-quality voice, data, graphics, and video telecommunications." Several other commenters shared WTA's position that technological neutrality does not require the Commission to turn a blind eye to the different capabilities of different technologies.[9]

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[8] WISPA Comments at p. 6.

[9] *See*, Public Knowledge Comments at p. 12 ("Therefore, if satellite technology cannot consistently deliver current minimum standards, the solution is technological improvement, not abandoning aspirational goals."); NRECA Comments at p. 5 ("NRECA respectfully submits that, if certain technologies are incapable of meeting a certain service threshold informed by consumer choices already being made in the marketplace, they are not equal

In contrast, the Free State Foundation parroted the *NOI*'s rejection of the previous long-term benchmark of 1 Gbps/500 Mbps and claims that it "stands at odds with the concept of technological neutrality found in the plain language of the statute."[10] In a similar vein, the Information Technology and Innovation Foundation ("ITIF") said: "The inherent bias of the FCC for more speed would be like automotive regulators saying that cars that only can drive 90 miles an hour are not as good as cars that can drive 300 mph."[11] But recognizing different technologies' functional capabilities and limits is not inconsistent with the statute's definition of "advanced services." And with respect to ITIF's analogy, perhaps the better comparison would be between a car whose manufacturer claims to be able to go 100 mph, and an Electric Vertical Takeoff and Landing aircraft ("eVTOL") that can go 500 mph, and further recognizing that the car will get slowed down during rush-hour traffic, while the eVTOL will not.

LEO Satellite Broadband

Finally, WTA also wants to address several claims made in the comments filed by Space Exploration Holdings, LLC ("SpaceX"). SpaceX asserts that "It is high time that the Commission's section 706 reports similarly recognize the critical role of satellite services in making high-speed broadband available to all Americans."[12] WTA in its comments acknowledged the critical role that LEO satellite service can play in providing broadband

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and do not merit "neutral" treatment as compared with more capable technologies. Unequal technologies need not, and should not, be treated as equal.").

[10] Free State Foundation Comments at p. 10.

[11] ITIF Comments at pp. 2-3.

[12] SpaceX Comments at p. 3.

service in certain situations,[13] although WTA additionally explained that the Commission must also take into account the limitations that LEO satellite service faces when assessing the role that service can play in providing advanced services to "all Americans."

One critical constraint is the capacity limits on this spectrum-based service. SpaceX seeks to dismiss this limitation by claiming

> This statement, asserting that the capacity of satellite beams to deliver broadband service is limited by the capacity of satellites in operation is true, but also tautological and completely meaningless—an analogous version of this vacuous statement could equally be applied to any form of broadband service (*e.g.*, the capacity of fiber-based broadband is limited by the capacity of the strands of fiber in operation).[14]

But it is more than just the overall capacity constraints – for LEO satellite service, the capacity is dynamically shared amongst all the satellite provider's customers within the satellite's footprint, whereas with fiber broadband, sufficient capacity can be dedicated to each customer to ensure that gigabit service is assured. In contrast, with LEO broadband satellite service, the satellites' constant movement relative to the surface of the Earth means that capacity must be shared and shifted amongst customers as different satellites drift in and out of view, and capacity constraints can slow the speeds customers will experience.[15] Starlink can (and does) prioritize the frequency assignments amongst its customers, which is why it can (and does) charge higher prices for prioritized service. But the total capacity on the Starlink satellite is limited, so that prioritizing capacity to some customers means that other customers within that satellite footprint can (and do) see their speeds lowered, and if there are enough prioritized and

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[13] WTA Comments at pp. 11-12 (recognizing that LEO satellite service is a significant improvement over GEO satellite service and DSL, as well as having the capability to provide service to mobile customers in planes, ship and RVs, as well as service restoration after disasters).

[14] SpaceX Comments at pp. 4-5.

[15] SpaceX's Comments (at p. 6) acknowledge these constraints ("Moreover, to the extent that next-generation satellite services face beam capacity constraints, these constraints would primarily affect densely populated locations where advanced telecommunication capability is already available.").

non-prioritized customers within the footprint, even those prioritized customers could see their speeds slowed.[16] Moreover, this problem of slowed traffic when an "excessive" number of customers within an area are trying to access the LEO satellite system will be exacerbated as other LEO satellite systems are launched, because Starlink is required to share the finite LEO satellite spectrum with these other systems.

SpaceX asserts that the record does not support the claims regarding the limitations on capacity:

> The Commission's assertion in the 2024 Report that satellites can only support a limited number of subscribers is sourced, ultimately, to a conclusory statement in a 2017 Notice of Inquiry, citing no data or evidence.[17]

WTA contends that there is significant evidence to buttress the concerns with regard to the capacity limitations and dynamic spectrum sharing limiting the ability of LEO satellite broadband service systems to provide advanced telecommunications capability to all of its customers. The Commission's staff undertook a detailed review of the Starlink system in

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[16] According to the Starlink website (https://www.starlink.com/legal/documents/DOC-1470-99699-90?regionCode=US)

- Starlink users typically experience download speeds between 45 and 280 Mbps, with a majority of users experiencing speeds over 100 Mbps. Upload speeds are typically between 10 and 30 Mbps. Latency ranges between 25 and 60 ms on land, and 100+ ms in certain remote locations (e.g. Oceans, Islands, Antarctica, Alaska, Northern Canada, etc.). These speeds make Starlink suitable for streaming, video calls, online gaming, and other typical household internet use.
- Stated speeds below and the uninterrupted use of the Services is not guaranteed. Actual speeds may be lower than expected speeds during times of high usage. Performance varies based on location, time of day and the precedence Starlink gives your data in the network based on your Service Plan. Please see our *Fair Use Policy* for more information on how Starlink treats Deprioritized, Residential, Roam, and Priority data and how that impacts your Services under each Plan. A description of the Service Plans can be found *here*.

WTA also notes that while a very large constellation having multiple satellites in view to a customer enhances the space segment reliability, to WTA's knowledge, Starlink does not have local service technicians to deal with customer terminal problems, so a customer experiencing problems could be without service for some time, regardless of whether the satellite system continues to operate.

[17] SpaceX Comments at p. 4.

connection with the Rural Digital Opportunity Fund ("RDOF") auction, and concluded that Starlink had not shown that it was reasonably capable of fulfilling the RDOF 100/20 Mbps requirements to serve the 642,925 model locations for which it was the winning bidder.[18] That Bureau decision was upheld by the Commission in response to the Starlink Application for review.[19]

It is difficult for WTA and others to independently assess the capabilities and limitations of the Starlink system, because Starlink does not make public the technical details of its system.[20] But anecdotally, at different times the Starlink website has indicated that service in unavailable or there is a waitlist for certain areas. And Ookla has also noticed slowdowns at various times.[21]

SpaceX makes some claims in its comments about the Starlink systems capabilities, but they do not resolve the questions about the speed/capacity constraints resulting from the dynamic sharing of a finite amount of spectrum. According to SpaceX:

> Starlink alone has deployed over 7800 satellites, with more than 100 gateway sites located in the United States, delivering a total network capacity of 450 Tbps (globally)

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[18] *Rural Digital Opportunity Fund Auction Support for 80 Winning Bids Ready to Be Authorized, Bid Defaults Announced*, AU Docket No. 20-34 et al., Public Notice, DA 22-848, at 8-11 (WCB/OEA Aug. 10, 2022).

[19] *Application for Review of Starlink Services, LLC*, 38 FCC Rcd 12201, released December 12, 2023. Starlink neither filed for reconsideration nor appealed that Commission decision. https://broadbandbreakfast.com/carr-fcc-unlikely-to-restore-starlink-rdof-subsidy/

[20] In the "Starlink Capacity Analysis" cited by NRECA at n. 22 of its comments, the authors noted at p. 1:

> The analyses presented below are based, in part, on public information available through June 2025, and which may not accurately represent the full technical capabilities of Starlink satellites. Because Starlink does not publish thorough and detailed technical specifications for their satellites, the assumptions made in these analyses may be incorrect; however, citations to source materials, whenever available (e.g., Starlink FCC filings), are provided.

WTA also observed that the Commission's Application for Review decision in n. 17, *supra,* heavily redacts technical descriptions of the Starlink system.

[21] https://www.ookla.com/articles/starlink-slows-down-during-burning-man; https://www.fierce-network.com/broadband/what-do-starlinks-latest-ookla-results-mean-its-886m-rdof-winnings.

> and supplying broadband to a rapidly growing number of Americans (now exceeding 2 million), with a median peak-hour downlink speed in the U.S. of roughly 200 Mbps and a median latency of 25.7 ms.

While on the surface this sounds very impressive, SpaceX's assertions raise a significant number of questions.

SpaceX indicates a system-wide total capacity of "450 Tbps (globally)", but very little of that capacity is available to a customer in the United States. The United States comprises less than 2% of the Earth's surface, and "spare" satellite capacity covering the oceans or other countries does not compensate for any shortfalls here. The SpaceX Comments also mentions a median peak-hour downlink speed in the U.S., but says nothing about uplink speeds. However, the Section 706 definition of advanced services capabilities includes the ability "that enables users to ***originate*** and receive high-quality voice, data, graphics, and video telecommunications" (emphasis added).

The short discussion in the SpaceX Comments provides no information on how the claimed values were calculated, and the referenced source – the Starlink Network Update – provides vague descriptions on how the speed and latency figures were determined.[22] So we do not know a lot of the relevant values to assess whether or what the limit on the number or density of customers would be to trigger service degradations that would noticeably affect customers -- how the "peak period" was determined; what percentage of its customers are accessing the system during the peak periods; what loading factors were used in designing the

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[22] According to the Starlink Network Update:

> To measure Starlink's latency, we collect anonymized measurements from millions of Starlink routers every 15 seconds. In the U.S., Starlink routers perform hundreds of thousands of speed test measurements and hundreds of billions of latency measurements every day. This high-frequency automated measurement assures consistent data quality, with minimal sampling bias, interference from Wi-Fi conditions, or bottlenecks from third-party hardware.

sharing algorithms; what sampling occurred; whether the inclusion of prioritized traffic affected the measurements; and what the variation in the measured speeds and latency was.[23] And while SpaceX discusses future launches of future generation satellites,[24] we do not know the extent to which such potential increase in capacity might be offset by needing to share spectrum with other LEO satellite systems that will be launched and/or expanded in the future. In sum, while LEO satellite broadband has a role to play in the deployment of advanced services to all Americans, it is premature to declare "mission accomplished."

Respectfully submitted,

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[23] *Cf*, Starlink Network Update ("Even Starlink's lower speed tier offering currently serves customers with 100 Mbps download and 20 Mbps upload speeds in ***most*** states and territories." (emphasis added)). Given this vague Starlink statement as to performance, it is possible that customers in slightly less than half the states and territories are presently receiving service that does not meet the current benchmark.

[24] SpaceX Comments at pp. 4-5.