Before the

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

Washington, D.C. 20230

NATIONAL STRATEGY TO SECURE	**)**	**NTIA Docket No. 200521-0144**
5G IMPLEMENTATION PLAN	**)**	**RIN 0660-XC047**

To the Administration:

I. INTRODUCTION

NTCA-The Rural Broadband Association (NTCA) hereby submits comments in the above-captioned proceeding. In the instant proceeding, the National Telecommunications and Information Administration (NTIA) seeks comment on policies intended to support a "robust domestic 5G commercial ecosystem"[1] as well measures intended to ensure 5G communications networks. NTCA supports the deployment of advanced communications services throughout the Nation, consistent with the statutory mandates of the Communications Act of 1934, as amended.[2] NTCA also supports focused measures to ensure the security of those networks and the communications that traverse them. NTCA submits that these interrelated policies will be effected most fully when they reflect the conditions surrounding broadband deployment in all areas of the Nation, including rural and insular areas, and the characteristics of small businesses that deploy to provide services in those regions.[3] NTCA submits that a comprehensive and holistic understanding will enable policymakers, working alongside industry, to develop

[1] *The National Strategy to Secure 5G Implementation*, NTIA Docket No. 200521-0144, 85 Fed. Reg. 32016 (May 28, 2020); *Notice, Extension of Comment Period*, NTIA Docket No. 200521-0144, 85 Fed. Reg. 116 (June 16, 2020).

[2] 47 U.S.C. §§ 151 *et seq*.

[3] *See,* 47 U.S.C. § 254(b)(3).

successful policies to speed the deployment of secure high-capacity broadband services to users throughout the Nation.

II. DISCUSSION

A. A ROBUST 5G ECOSYSTEM WILL EMERGE FROM COMPREHENISVE DEPLOYMENT STRATEGIES THAT ADDRESS RURAL AREAS AND FIBER NETWORKS.

NTIA seeks comment on "the development of a robust 5G commercial ecosystem." As explained below, NTCA submits that robust ecosystems reflect markets with widespread deployment and user demand. NTCA further submits that the universal service policies as enunciated in the Communications Act set the stage for National deployment of advanced 5G services. Finally, these comments will demonstrate that a robust 5G system will require the deployment of fiber deep into the network. These factors, combining Congressional mandates, technological characteristics and market trends, provide a roadmap for successful policies that can fulfill the vision of the NTIA.

At the outset, a brief review of rural demographics is useful in order to create a backdrop against which specific 5G policies might be measured. By way of introduction and context, NTCA represents approximately 850 independent, community-based telecommunications companies and cooperatives in the most rural portions of the United States. NTCA members and small operators like them serve fewer than five percent of the U.S. population, yet their collective service territories cover approximately 35% of the U.S. landmass. All NTCA service provider members are historically rural telephone companies as defined by the Communications Act,[4] although they have all evolved to become the leading broadband internet service providers

[4] 47 U.S.C. § 153(44).

(ISPs) in wide swaths of rural America today.[5] As a general proposition, NTCA has engaged actively with the Federal Communications Commission (FCC) in many docketed proceedings that address spectrum-based services, and intends to address specific issues relating to 5G in the pending FCC "rural 5G docket" this week.[6] Unlike most start-ups or regional providers, rural broadband providers are situated in the communities they serve and their business decisions are influenced heavily by community need. Rural providers such as NTCA members have a background in, and dedication to, rural communities that have been recognized by Congress and policy makers since the time when plain old telephone service made its debut across the country.[7] Accordingly, NTCA has advocated for FCC policies that address suitable geographic bases for licenses, measures to promote efficient use and disaggregation or other measures aimed at enabling smaller users to obtain and use spectrum in their rural service areas. For purposes of the instant proceeding, however, NTCA offers observations on various technical aspects of 5G that should inform overall policy approaches, leaving specific spectrum allocation and similar issues to the dedicated FCC proceeding.

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[5] *See* Broadband/Internet Availability Survey Report, NTCA–The Rural Broadband Ass'n, Dec. 2019, p. 25, available at https://www.ntca.org/sites/default/files/documents/2019-12/2019%20Broadband%20Survey%20Report.pdf (last visited June 23, 2020) ("broadband speeds made available by NTCA members to customers have increased, with more than 75% of respondents' customers having access to 25 Mbps or higher broadband speed, as compared to 70.6% in 2018").

[6] *Establishing a 5G Fund for Rural America; Universal Service Reform – Mobility Fund: Notice of Proposed Rulemaking and Order,* Docket Nos. 20-32, 10-208, FCC 20-52 (2020).

[7] The Rural Electrification Act was authorized in 1947 to provide low-cost loans to rural telephone companies and cooperatives. In establishing the telephone loan programs, Congress declared a policy of "assuring the availability of adequate telephone service to the widest practical number of users." 7 U.S.C. § 921. The House committee report for the legislation supported "area coverage," which entails "planning, financing and constructing a rural telephone system so that service will be available to all the subscribers within the company's area who want, whether the installation of their particular telephone will be profitable or not." H.R. Rep. No. 246, 81st Cong. 1st Sess. 8 (1949).

As a threshold matter, NTCA addresses the question of, "How can the United States Government best facilitate the domestic rollout of 5G technologies . . ." As this line of inquiry addresses as its ultimate goal the development of a "robust 5G commercial ecosystem," NTCA submits that the ultimate viability of a market relies upon a vigorous market base. And, NTCA submits further that the strength of that market basis will rely, in part, upon policies that encourage and support deployment of the relevant technologies throughout the Nation. In visionary fashion, the Communications Act sets the tone by mandating universal service, namely, the deployment of telecommunications and advanced communications services in rural and insular areas that are reasonably comparable in both price and capability to those available in urban areas.[8] Universal service policies, accordingly, establish the principles that would instruct the deployment of 5G in rural and insular parts of the Nation. However, within the *general* mandate to deploy advanced communications services throughout the Nation, the discrete question of 5G deployment in rural areas is refined by two core, intertwined issues: the suitability of 5G as a rural broadband solution, and the need for "nearby fiber" to support 5G.

As an overarching principle, NTCA has noted in many instances the principle that "wireless needs wires." Stated differently, the transmission of wireless communication services relies upon a grounded, terrestrially based mobile switching center (MSC) facility at some point in the communications path. The MSC accepts the spectrum-based signal and transmits it for some portion of the "call" (whether a voice call or internet query) along wired, terrestrial facilities. Accordingly, the deployment of any wireless communications service, whether 3G, 4G or 5G, requires wired facilities along the general path of communications. To this end, while wireless broadband can certainly extend the reach of broadband to difficult-to-reach areas, the

[8] *See,* 47 U.S.C. 254(b)(1), (3).

role of a terrestrial facility must be contemplated in any strategic or policy undertaking. In the case of 5G, and as explained further below, the role of fiber is great, given the network capacity needed to support 5G propagation and service characteristics.

Aside from the *technical* aspects that require a wired facility alongside wireless transmissions, *policy* principles support the view that mobile and fixed services serve as complements, rather than as substitutes, for each other. NTCA supports the 2018 finding of the FCC that mobile services, while providing significant value of their own and essential for many uses, are not a substitute for fixed services.[9] In that docketed proceeding, NTCA observed,

> While wireless technologies represent a useful and necessary method of bringing broadband service to areas where a business case for other technologies is more difficult and costly, even in those instances the wireless transmission must connect relatively quickly to a fiber network in the network topology so that consumers are not dependent solely on the limited and shared capacity of spectrum beyond certain access points.[10]

NTCA submits that the need to connect "relatively quickly" to fiber is particularly relevant to 5G.

To be sure, 5G will play an important role in overall broadband deployment strategies. The predicted use-cases for 5G, including smart transportation, precision agriculture and other services that require the rapid transmission of large data sets, illustrate the maxim that broadband will continue to become increasingly intertwined in activities of daily living and industry. Nevertheless, perceptions that 5G can substitute or replace fiber broadband service warrant correction. Demand for broadband internet access is expected to grow, and a large measure of

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[9] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion: 2018 Broadband Deployment Report,* GN Docket No. 17-199, 33 FCC Rcd 1660, 1666 (2018).

[10] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion: Comments of NTCA-The Rural Broadband Association,* GN Docket No. 18-238 (Sep. 14, 2018).

this growth will be attributable to high-volume data streams that require constant access to capacity. Whereas broadband business models of the past may have been formulated on a strategy of oversubscription based on the expectation of momentary bursts in demand from various users (*i.e.,* predicting that not all individual users would consume large amounts of bandwidth simultaneously), the proliferation of connected devices in constant communication with the cloud and other devices, as well as the time-critical nature of certain of those communications, demands network deployment that contemplates far greater capabilities. By way of example, a connected home appliance that experiences a momentary "blip" does not risk the same type of damage as an autonomous vehicle or smart traffic control system that is hobbled by lack of access. As cautioned by engineering firm Vantage Point Solutions,

> If 1 Gbps is a reasonable household broadband service expectation with the 5G's equipment service life, then *tomorrow's* maximum 5G small cell throughput cell capacity on the order of 1.5 Gpbs for that timeframe – to be shared among all users, and which may seem plentiful today – will be a mediocre if not very poor solution for *tomorrow's* fixed broadband.[11]

Having established that 5G will demand high-capacity networks, the case for 5G in rural areas is then informed by the technical characteristics of those networks. In the first instance, 5G requires antennas in close proximity to each other. Referred to as "densification," this practice requires 5G facilities to be deployed approximately 500 feet apart; each cell covers about one-third of a square mile. While in urban settings this may be quite possible by taking advantage of densely placed buildings or light poles to serve as "hosts," such already-existing structures in

[11] Larry Thomspon, Warren VandeStadt, "Evaluating 5G Wireless Technology as a Complement or Substitute for Wireline Broadband," Vantage Point Solutions, Mitchell, S.D. (2017), p. 21, available at https://www.ntca.org/sites/default/files/legacy/images/stories/Documents/Press_Center/2017_Releases/02.13.17%20fcc%20ex%20parte-ntca%20letter%20submitting%202017%20technical%20paper%20wc%2010-90.pdf (last visited June 23, 2020) ("Vantage Point Report").

sufficient proximity and numbers generally do not exist in rural areas, thereby leading to a need to erect new towers or other structures. This is not a surprising outcome when considering, for example, that the average population density in rural NTCA member service areas is 10 people per square mile. Finally, each 5G facility as well as the fiber necessary for "fronthaul" must be connected to a power source.[12] These technical characteristics (structures and power to serve densification) are joined by an additional, overarching factor that informs the deployment of 5G to rural areas.

5G needs fiber. While all "wireless needs wires,"[13] the predicted performance of 5G will rely upon fiber, as copper and mobile backhaul (MBH) networks cannot scale to the amount of backhaul necessary to support 5G.[14] As noted by one systems engineer, "If 5G is to be aggressively rolled out in the coming years . . . [t]he only transport media capable of scaling to these demands is fiber meaning it'll have to be available everywhere . . ."[15] As the Vantage Point report explains, "5G wireless cells must be placed very close to the customer (often within 300 to 500 feet), which makes 5G particularly impractical for most rural applications."[16] The report continues, "if 5G wireless is going to deliver on the claims of high speeds and high capacity that many hope, it will need to be a 'deep fiber' network that is very similar to FTTH in fact," concluding "it is unclear why, when one is putting fiber *so* deep into the network to enable such

[12] *Id.* at p. 26 ("The 5G wireless solution requires commercial power at every cell site.").

[13] *See* "Wireless Needs Wires: The Vital Role of Rural Networks in Completing the Call," GVNW Consulting, Inc. (March 2006), available at https://ecfsapi.fcc.gov/file/6519535736.pdf (last visited June 23, 2020).

[15] "5G Wireless Needs Fiber, and Lots of it," Brian Lavellee, Ciena, available at https://www.ciena.com/insights/articles/5G-wireless-needs-fiber-and-lots-of-it_prx.html (last visited June 25, 2020).

[16] Vantage Point Report (*supra* n.11) at 6.

speeds and to overcome the capacity constraints [of 5G] identified in this paper, one would stop at the small cell rather than just delivering fiber to the premises a few hundred feet away – and thereby deliver the promise of much higher speeds and availability without the same kinds of capacity limitations."[17] And, as observed by a Verizon executive, "I think the best way to characterize it is wireless becomes fiber with antennas hanging off of it essentially. That's why we decided to go big into fiber. It made sense to use because we're . . . going to be densifying 4G. We saw 5G coming."[18]

Accordingly, the role of fiber – deep into the network –is clear. It was recognized as necessary even for 4G, especially in rural areas. As explained in 2011:

> 4[G] wireless networks will be designed to carry a wireless signal for only a relatively short distance before transferring it (whether it be a voice call, text message, or e-mail) to the wireline network buried underground or strung across utility poles. if the call or text message is directed to another wireless user, only when the signal reaches a wireless facility near the end-user's device does the signal leave the wired network to complete its journey wirelessly.[19]

Thus, to make true 5G work, companies will need to deploy fiber down every road in the area to be served. As a result, inasmuch as the most robust domestic 5G ecosystem, including equipment manufacturers, chip manufacturers, software developers, cloud providers, system integrators and network providers, will depend upon the development of the strongest and most robust market *for* those services, it follows that deep fiber to *support* those services is in many respects a

[17] Vantage Point Report at 22-23.

[18] "For Fiber and Small Cells, Verizon Follows an 'Integrated Engineering Process," Sean Kinnery, *quoting* Kyle Malady, Executive Vice President and Chief Technology Officer, Verizon, RCR Wireless News (Jul. 15, 2019) (https://www.rcrwireless.com/20190715/5g/fiber-small-cells-verizon) (visited Jun. 16, 2020).

[19] "The Truth About Wireless Broadband: The Myths and Challenges of Wireless Technology in Rural America," by John Staurulakis, Inc. (JSI), Monte R. Lee & Company and Palmetto Engineering (July 2011), available at https://1e0l8gnh7yv1vxgl43ivtae1-wpengine.netdna-ssl.com/wp-content/uploads/2016/05/truthaboutwirelessbroadband.pdf (last visited June 25, 2020).

prerequisite for a healthy 5G market. Finally, and in the interest of ensuring a broadly "robust domestic 5G commercial ecosystem," policies aimed at promoting 5G must not be confined only to densely populated urban regions. It can be expected, given the economies of scale in densely populated urban areas, that large network providers will focus on those areas. But, universal service mandates of the Communications Act eschew any policies that do not contemplate the deployment of advanced communications technologies in rural areas. The Communications Act establishes a mandate of "reasonably comparable" service. Accordingly, then, National policy must contemplate holistically contemplate a vision that includes, pursuant to the mandate of the Communications Act, all regions of the nation. This will, in turn, serve the aims of the robust domestic 5G market the NTIA seeks.

B. COORDINATION OF SECURITY GUIDELINES AND THE ABILITY TO SHARE SECURITY CONCERNS SHOULD BE CORE 5G SECURITY PRINCIPLES.

As noted above, widespread 5G deployment will require a significant amount of technical resources, in both rural and urban areas, including towers or other devices capable of holding 5G antennas, fiber backhaul to support the 5G devices, and a power source to which the fiber and 5G devices are able to connect. All of these elements require careful planning by providers, initially to ensure 5G can be delivered using the devices and subsequently to guard against cyber vulnerabilities. Accordingly, in response to NTIA's request for recommendations on the factors the U.S. Government should consider when developing core security principles for 5G infrastructure, NTCA encourages NTIA and other federal agencies to engage in ongoing coordination of cyber security principles and guidelines. Such coordination is essential to establishing a forward looking and consistent approach that provides clear guidance to providers whose networks form the technical foundation of 5G. Telecommunications providers, whose fiber will lay the foundation for 5G devices, often must budget and plan for deployment a year in

advance, especially in rural areas where the weather and terrain restrict laying fiber to a few months out of the year. Smaller providers also operate with tight budgets that do not allow for replacing equipment outside of the normal life cycle if equipment should be deemed a threat to national security, and thus be required to be removed, after being released commercially. Consequently, a coordinated approach among the federal agencies tasked with protecting national security in order to prospectively identify equipment that poses a threat is essential to advancing 5G deployment. A coordinated approach will simultaneously streamline federal agencies' burden in developing policies that account for the complicated and extremely important nature of protecting the individuals, products and facilities that use 5G.

NTIA also seeks recommendations on "stakeholder-driven approaches that the U.S. Government should consider to promote adoption of policies, requirements, guidelines, and procurement strategies necessary to establish secure, effective, and reliable 5G infrastructure." To this end, NTCA recommends NTIA develop methods of allowing the public (providers, vendors, manufacturers) to share perceived threats or concerns relating to the security of equipment and networks with government entities, and vice versa, without fear of civil liability. Providers are often in the best, and earliest, place to identify concerns about equipment or devices they have tested or unusual activity on their networks. Sharing this information in the earliest stages of "discovery" would at a minimum allow the provider to obtain assurance that the anomaly was merely a programming error that has been fixed or to alert other providers and/or federal officials of a potential cyber threat in its earliest stages. However, under current law, providers must be very cautious about sharing information with other providers or the government given the various causes of action that could be brought against the provider for disclosing seemingly private information. NTCA encourages NTIA to work with other federal

agencies to develop guidelines that would allow providers and other members of the public to share perceived threats to cyber security or cyber vulnerabilities securely and without fear of litigation.

III. CONCLUSION

NTCA supports NTIA's multi-faceted inquiry into developing a national strategy for 5G deployment. A national strategy that recognizes the need for, and facilitates, the deployment of fiber throughout the country and most especially in rural areas will be essential to successful 5G deployment. Coordination with other federal agencies on rules and funding for fiber deployment is essential along with the same coordination for cyber security policies and developing safeguards to allow private entities to share perceived cyber vulnerabilities without risk of litigation.

Respectfully submitted,

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