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In the Matter of	)
Defense Spectrum Sharing Request for Information	)

Comments of R Street Institute

I. Introduction

The R Street Institute has long advocated for policies that promote efficient radio operations in the United States, including spectrum sharing and innovative allocation and assignment regimes for particular bands.[1] Therefore, we appreciate the Department of Defense's (DoD) inquiry into how to utilize its existing radio operating rights efficiently.[2] Indeed, "spectrum sharing" between federal and non-federal users must continue to improve for the United States to lead the world in 5G deployments. However, as the DoD considers different options for making its existing frequency assignments available to non-federal users, it must carefully consider the approach it will take and the effect that approach will have on the existing radio ecosystem.

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[1] *See, e.g.*, Reply Comments of R Street Institute, In the Matter of Promoting Investment in the 3550-3700 MHz Band, GN Docket No. 17-258 (Jan. 29, 2018). https://www.rstreet.org/wp-content/uploads/2018/04/3.5-GHz-Reply-Comments-1.pdf; Joe Kane, "How to reduce transaction costs in spectrum markets," R Street Institute (March 13, 2019). https://www.rstreet.org/2019/03/13/how-to-reduce-transaction-costs-in-the-spectrum/; Comments of R Street Institute, In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band, WT Docket No. 18-122 (Oct. 29, 2018). https://www.rstreet.org/wp-content/uploads/2018/10/R-Street-3.7-4.2-GHz-Comments.pdf.

[2] Defense Spectrum Sharing Request for Information, Department of Defense (Sept. 18, 2020). https://beta.sam.gov/opp/4851a65e2b2d4d73865a0e9865b0c28a/view?keywords=spectrum&sort=-modifiedDate&index=&is_active=true&page=1. ("RFI")

R Street strongly urges the Department to reject calls to create a nationalized 5G network using the DoD's existing frequency allocations. The United States' private sector approach to deploy 4G networks led the world, with significant benefits to the entire technology sector.[3] It is no surprise that many of the world's largest technology companies started here in the United States. Abandoning this approach for a nationalized, government-led network in 5G threatens to deter investment in private networks as a whole at the gain of the individual companies that hold the patents on network. Instead, the DoD should continue to work to make underutilized spectrum available for private networks.

II. 5G and the Need for Licensed Mid-band Spectrum

Unlike traditional cellular networks, 5G networks will operate a wide array of different frequencies, leveraging the different characteristics of bands to provide both high speed, low latency service with widespread coverage.[4] On one end of the radio spectrum, low-band operations tend to cover more ground, allowing devices to maintain their connection to the network as the user moves further away from the connection point. On the other end of the radio spectrum, high-band operations can transmit much more data at higher speeds, but the signal does not travel far. Older generation of radio networks tended to remain in the lower frequency bands, but 5G networks will also require the higher capacity and lower latency associated with targeted, high-frequency operations.[5] Carriers have already begun deploying small wireless facilities across the country to leverage this capability, densifying their networks.

In between the two outer edges of existing radio operations are the mid-frequency band operations. These tend to be a happy medium. Unlike low-frequency operations, operators can transmit more data, both upstream and down. At the same time, the receivers can pick up the signal from much further distance than the high-frequency operations. This makes mid-band operations critical for the deployment of 5G networks, especially at the outset as carriers expand coverage. Therefore, it is critical that federal regulators allocate sufficient mid-frequency bandwidth for flexible use operations.

The FCC has begun to make significant strides on this front. Most notably, the Commission is proceeding with auctions of the 3.5 GHz CBRS6 and 3.7-4.2 GHz C-band this year.[7] But according to a recent report, even with these auctions, current mid-band allocations

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[3] "How America's 4G Leadership Propelled the U.S. Economy," Recon Analytics (2018). https://api.ctia.org/wp-content/uploads/2018/04/Recon-Analytics_How-Americas-4G-Leadership-Propelled-US-Economy_2018.pdf ("Recon Report").

[4] "5G Spectrum Guide – Everything You Need to Know," GSMA (2020). https://www.gsma.com/spectrum/5g-spectrum-guide/.

[5] "The Global Race to 5G," CTIA (April 2018).

[6] Auction 105: 3.5 GHz, Fed. Comm. Comms'n. (last visited Oct. 7, 2020). https://www.fcc.gov/auction/105.

[7] Auction 107: 3.7 GHz, Fed. Comm. Comms'n. (last visited Oct. 7, 2020). https://www.fcc.gov/auction/107/releases.

in the United States still lags behind the rest of the world.[8] The most promising frequency band to fill the mid-band spectrum gap is the 3.1-3.55 GHz band, which the DoD currently uses for radiolocation services.[9] Ideally, if the engineering allows, at least a portion of this band should be cleared for exclusively licensed use, but to the extent that may not be possible, the DoD and the NTIA must continue working diligently to make available portions of the band on a shared basis.

Currently, the FCC grants operating rights primarily through licensing. Licenses often vary significantly depending on the characteristics of a given band as well as neighboring operations and interference concerns. So long as the licensee operates within the parameters of the license (and thus the service rules of the band writ large), then the license can operate as they see fit with the legal certainty that their operations will not face harmful interference from neighbors or unauthorized operations.

This certainty provides the backbone of modern radio networks. Carriers must anticipate a multitude of different scenarios and situations. Therefore, spectrum holdings must provide enough flexibility for the operator to provide service at times of high traffic. At the same time, different holdings allow the license holder to leverage the different propagation characteristics of different frequency bands, providing both widespread coverage and high download speeds.

As the DoD continues to explore ways of sharing radio operating rights with industry, it must understand the importance of making mid-band spectrum available for licensed operations. Any proposal that would limit the ability for the DoD to make available additional capacity for 5G services must be approached with caution and an understanding of how such a proposal may impact private networks.

III. Harms Associated with a Nationalized 5G Network

In the Request for Information, the Department of Defense asks "[h]ow could DoD own and operate 5G networks for its domestic operations? What are the potential issues with DoD owning and operating independent networks for its 5G operations?"[10] Further the Request for Information asks "Should DoD consider spectrum leasing as an alternative to reallocation? If so, how could it be implemented? What, if any, legal, pol[i]cy, statutory and regulatory changes would be required to implement the proposed leasing approach? How could revenue be shared with DoD under a DSS leasing agreement or any type of leasing agreement?" This section responds specifically to this idea of a network operated by the DoD and the harms it would cause.

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[8] Enrique Duarte Melo, et al., "Building the US 5G Economy," Boston Consulting Group (2020). https://api.ctia.org/wp-content/uploads/2020/09/Building-the-5G-US-Economy-1.pdf.

[9] In the Matter of Facilitating Shared Use in the 3100-3550 MHz Band, Report and Order and Further Notice of Proposed Rulemaking, WT Docket No. 19-348 (Sept. 30, 2020). https://docs.fcc.gov/public/attachments/FCC-20-138A1.pdf.

[10] RFI at 1.

a. Decreased Investment and Delayed Deployment of 5G

As explained earlier in these comments, industry led the way to the deployment of America's 4G networks. However, to deploy these networks, ISPs invested significant resources and took on substantial risk. As the United States continues to deploy 5G networks, industry must invest billions of dollars. Unfortunately, calls for a nationalized network threaten this successful model by injecting increased risk into system.

For the DoD, or any other federal agency to build and deploy a 5G network, they necessarily do so as a subsidized entrant which will either compete directly with private networks or take the spectrum resources necessary for private deployment. Federal agencies do not pay much to acquire operating rights.[11] Worse, a federal 5G network, even if done on a wholesale basis, would enter into the market with an alternative revenue source and the necessary inputs that private market must pay billions for on the open market. This will allow the federally owned network to compete with existing 5G networks without many of the competitive constraints that the private operators must endure.

Much the same with municipal broadband, this subsidized entry into the 5G market will ultimately deter private investment in 5G networks. Adding an additional competitor will reduce potential profits for all existing firms, as well as the new entrant. If a new firm could enter a specific market successfully, we would expect to see a private firm make that investment, as there is profit to be gained.[12]

However, the United States has not seen the addition of wireless providers we would expect. In terms of actual network operators, the market has seen consolidation as Sprint was struggling to keep a sustainable business with fierce competition from AT&T, Verizon and T-Mobile.[13] And while wireline providers have begun to offer wireless capabilities, these service plans generally run over the top of one of the wireless providers networks.[14] This lack of new entrants into the 5G market indicates a lack of available profit for the new entrant.

Private operators still need to raise capital to invest in their networks. If the profit margin for 5G networks is already limited due to competition, another new entrant, even in a limited scenario, threatens to make it even more challenging for the carriers to raise the necessary revenue needed for deployment. For example, if a subsidized competitor enters a

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[11] GAO Report to Congressional Committees, "Spectrum Management: Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing," GAO-13-7 (Nov. 2012). https://www.gao.gov/assets/660/650019.pdf.

[12] Municipal Broadband at 29.

[13] Testimony of Marcelo Claure, Executive Chairman, Sprint Corporation Before the Senate Committee on the Judiciary, Subcommittee on Antitrust, Competition Policy and Consumer Rights (June 27, 2018). https://www.judiciary.senate.gov/imo/media/doc/06-27-18%20Claure%20Testimony.pdf.

[14] For example, as a condition of the Sprint/T-Mobile merger, the FCC required T-Mobile to pursue an MVNO agreement with Dish Networks. This allows Dish to own and operate the New Boost brand and offer wireless service to consumers over the T-Mobile wireless network. Letter from Charles Mathias, Associate Bureau Chief, Wireless Telecomm. Bureau, Fed. Comm. Comms'n. to Kathleen O'Brien Ham, T-Mobile Inc. DA 20-421 (Apr. 16, 2020). https://docs.fcc.gov/public/attachments/DA-20-421A1.pdf.

broadband market, we may expect to see existing market participants leaving the market.[15] As Phoenix Center scholars have explained, "[t]he asymmetric subsidization of municipal entrants (or any entrant) is a legitimate and serious concern. Entry by a subsidized government-owned firm with no regard for profit reduces the incentives of private firms to invest in modern communications infrastructure and may reduce consumer welfare."[16]

Even if the DoD proceeds with a project that would not directly compete with private providers, it would necessarily take spectrum resources and a large consumer option for private providers. This reduced profit potential will negatively impact the ability for private providers to obtain capital. As a result, American networks will see delays in deployment, meaning a longer wait for Americans to realize the benefits that the next generation wireless networks can provide.

b. Effect of Delayed Deployment on National Security

Proponents of a nationalized 5G network often argue that the government must step in to ensure the United States does not fall further behind foreign competitors in the proverbial race to 5G, as significant economic benefits stem from being the first market to deploy wireless service.[17] R Street agrees that the United States must not lag behind the rest of the world in 5G deployments, but a nationalized 5G network would not serve this goal.

With an industry-led approach to 4G, the United States became the world leader in the service and the app economy it supported.[18] Indeed, most of the world's most successful technology companies are American and our technology sector has become the envy of the world. 5G promises to provide an even greater economic benefit to the nation that leads the way, and it is critical that the United States does not fall behind.[19]

China understands this fact as well and therefore invested heavily in a more socialized approach to 5G deployment. Indeed, as R Street scholar Kathryn Waldron explained, "China is a long-term threat to the United States and its allies, and it effectively uses a variety of cyber-enabled means to achieve its tactical and strategic objectives."[20] Therefore, any delays in the deployment of American networks threatens to push the United States further behind in this race.

Oddly, proponents argue that a federal network could be deployed more rapidly and efficiently than private networks, but this argument fails for two main reasons.

First, the private, industry-led approach has already worked in the past. The United States led the world in 4G *because* of the hands-off, deregulatory approach. Certainty in the

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[15] Municipal Broadband at 10-11.
[16] *Id*. at 11.
[17] John Hendel & Margaret Harding McGill, "Trump Campaign Pushes Government Intervention on 5G," *Politico* (March 1, 2019). https://www.politico.com/story/2019/03/01/trump-campaign-5g-1230276.
[18] Recon Report at 1.
[19] "Race to 5G," CTIA (April 2018). https://api.ctia.org/wp-content/uploads/2018/04/Race-to-5G-Report.pdf.
[20] Kathryn Waldron, "Huawei and National Security," R Street Policy Study No. 204 at 9 (Sept. 2020).

market allowed private carriers to raise the necessary capital and invest it in the market. With proof that such an approach can and has worked, there is no strong argument to turn away from that approach now.

Second, there is no evidence to suggest that the DoD could run a 5G network, nor deploy that network, more efficiently that private industry. Operating broadband networks presents many challenges, and there is a reason that many municipal efforts to provide broadband end up losing taxpayers significant amounts of money. For example, Marietta, Georgia sold a system at a loss of $24 million, and Provo, Utah had to sell its system for $1, with $39 million left in debt.[21] If the DoD wishes to deploy a federal 5G network, it does so at the risk that such an effort will fail to generate the benefits it envisions. With an already proven model on the books, there is no need for the federal government to attempt to deploy its own network.

c. Risk for Taxpayers

Developing and deploying a federal 5G network necessarily comes at the expense of the taxpayers even with a wholesale model.

Most obviously, DoD is funded through the appropriations process, which means that tax revenue will ultimately be needed to fund the development of this proposed network. As explained above, there are significant risks with the federal government developing its own 5G network. If such a network fails, it will not only hurt American deployment of 5G networks, but the project will waste taxpayer money and divert funds from more important work.

In addition, if the DoD decides not to pursue a private network, it can instead make available more spectrum for a private auction. Auctions have long been the preferred method for allocating radio operating rights in the United States because the party that values them the most will pay the highest price. As highlighted above, these auctions can generate billions of dollars, and when the FCC conducts an auction, the proceeds of that auction go into the treasury.[22] By hoarding spectrum for a private 5G network, the DoD would essentially remove potential revenue which could be used for a myriad of projects or initiatives, and drive up the cost on the tax payer.

d. Patent Exploitation

Finally, if the DoD decides to pursue a wholesale network rather than some kind of direct competitor, the company with the patents on the access system stands to serve as a gatekeeper to the network, extracting monopoly rents on the carriers that seek access to the network.

For example, one proposal for a nationalized network would be to create a network that charges private carriers for access to that network's capacity. Rivada Networks has patents on a

[21] Christopher Yoo, "Municipal Fiber in the United States: An Empirical Assessment of Financial Performance, Penn Law at 2 (2017). https://www.law.upenn.edu/live/files/6611-report-municipal-fiber-in-the-united-states-an.

[22] Spectrum Auctions Program Federal Communications Commission, p. 4 (2020).

wide array of spectrum open access technologies.[23] If the DoD decides to create an open access network using Rivada's technology, then Rivada could take a piece of every transaction that goes over that network, and theoretically pick winners and losers as their technology is necessary for access to the network. As one scholar put it, "A patent owner playing gatekeeper to 5G does not make for a competitive or innovative market, despite the superficial appearance of competition among those who must pay tribute to the gatekeeper."[24]

This causes a multitude of problems. On the carrier side, access to the network will cost them. If a patent holder can leverage their monopoly on the network, especially if paired with government-granted operating rights, then carriers will be forced to pay above market rates for access to the critical mid-band spectrum needed for 5G networks. While antitrust law does not necessarily care about individual competitors, it does care about competition: "The law directs itself not against conduct which is competitive, even severely so, but against conduct which unfairly tends to destroy competition itself. It does so not out of solicitude for private concerns but out of concern for the public interest."[25] By granting spectrum rights outside of the auction process, the DoD allows a patent holder to extract monopoly rents which will drive up costs on consumers.

On the network side, the proposal would also threaten the security of the system as a whole. By allowing a patent holder to leverage their monopoly power, the DoD would eliminate competitive effects that promote security. First, multiple studies show that competition encourages firms to improve cybersecurity.[26] Without competition, a patent holder has less incentive to ensure their system has the necessary security to prevent malicious actors from causing harms or disruption. Second, by creating a single, nationalized network relying on the patents of a single firm, the federal government risks creating a monoculture.[27] A monoculture, as the literature suggests, presents an increased risk of a severe attack because there is a single vendor that malicious actors can target.[28]

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[23] Charles Duan, "A Peter Thiel-Backed Company Would Benefit Most From Trump's 5G Plan," *Fortune* (Apr. 9, 2019). https://fortune.com/2019/04/08/5g-rivada-networks-peter-thiel/
[24] Id.
[25] *Spectrum Sports, Inc. v. McQuillan*, 506 US 447, 458 (1993).
[26] Charles Duan, "Of Monopolies and Monocultures: The Intersection of Patents and National Security," *Santa Clara High Technology Law Journal* 36 (2020) pp. 369, 395. https://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1655&context=chtlj.
[27] *Id*.
[28] *Id*.

IV. Conclusion

We appreciate the Department's interest in exploring ways to better share their existing radio operating rights. As radio operations become more congested, the need for additional radio frequencies allocated for flexible use licensing is more important than ever. However, the DoD must carefully consider proposals to make available its existing spectrum resources, as many proposals for a nationalized network threaten to derail our 5G future.

Respectfully submitted,

/s/

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