

Our Wireless Future: Building A Comprehensive Approach to Spectrum Policy

Testimony of Tim Donovan

SVP, Legislative Affairs

Competitive Carriers Association

Before the

United States House of Representatives

Committee on Energy and Commerce

Subcommittee on Communications and Technology

July 16, 2019

Chairman Doyle, Ranking Member Latta, and Members of the Subcommittee, thank you for the opportunity to testify about how to best use finite, taxpayer-owned spectrum resources to support ubiquitous wireless services across the United States.

I am testifying on behalf of Competitive Carriers Association (“CCA”), the nation’s leading association for competitive wireless providers. CCA represents carrier members ranging from small, rural providers serving fewer than 5,000 customers to regional and nationwide providers serving millions of customers, as well as vendors and suppliers that provide products and services throughout the wireless communications ecosystem.

On the dawn of a technological evolution to next-generation technologies, it is increasingly clear that while fiber is critical to capacity and speed, consumers believe our future is wireless-centric. There are now more wireless connections than people in the United States. Just last week, the National Center for Health Statistics reported that 56.7 percent of adults live in wireless-only households. What’s more, the share of United States’ adults that primarily rely on a smartphone to access the Internet has nearly doubled since 2013. While Americans continue to cut the cord and move away from landline telephones, today’s wireless services power so much more than voice calls. Mobile connections are revolutionizing entire industries and improving consumers’ quality of life across the United States. For example, wireless technologies enable telemedicine services and remote patient monitoring, which increases patients’ access to medical care, particularly in rural areas. Precision agriculture enables farmers to increase yields while conserving resources. Distance learning puts the latest lessons and training programs at students’ fingertips, allowing them to access educational opportunities previously unimaginable. Today’s wireless services also enhance public safety, energy efficiency, economic growth, and opportunities for all Americans.

These and other services rely on a tremendous amount of wireless data. The average consumer in the United States has over 100 apps on their smartphone and, in 2018, spent nearly three hours a day using mobile apps. Mobile data use shows no signs of slowing down—on the contrary, a recent study estimates that by 2022 there will be 258 billion mobile application downloads worldwide. This data consumption represents a whopping 45 percent increase from 2017.

As impressive as existing wireless networks can be, 5G will supercharge existing services like telehealth and precision agriculture and enable new services, such as augmented and virtual reality, autonomous vehicles, and other innovations not yet invented. Providers must therefore have the tools necessary to power these technologies.

All of these technologies rely on sufficient access to spectrum. Spectrum is the invisible infrastructure that powers wireless networks. And while the potential of 5G services is exciting, without the right spectrum policies in place to make spectrum available for competitive carriers to serve rural areas, rural America will be left behind. To keep up with consumers' insatiable demand for wireless data, all carriers must have exclusive access to low-, mid-, and high-band spectrum.

Fortunately, Congress, the Federal Communications Commission ("FCC"), and the Administration have taken steps to identify and reallocate the spectrum resources necessary to support our wireless future. CCA commends these actions and urges policymakers to ensure that additional spectrum is made available to continue to meet demand. And as spectrum is brought to market, all carriers must have a meaningful opportunity to access additional spectrum resources, particularly in rural areas.

Spectrum Must Be Made Available for All Carriers

Policymakers should support smart policies to ensure that providers have access to a myriad array of spectrum resources to deploy the latest wireless technologies to not only Americans in urban

areas but also to those in rural and remote areas. Supporting the following general principles will foster fair and transparent opportunities for all carriers to access spectrum on a level playing field, regardless of the specific band under consideration.

License Size

Spectrum must be made available in sufficiently small license sizes, while respecting technological use cases and power levels, to ensure that competitive carriers that serve rural areas have a true, meaningful opportunity to gain access to additional spectrum resources. CCA commends Congress, and in particular this Committee, for supporting policies that encourage partitioning or disaggregating spectrum to make it available for carriers to serve rural areas, including in RAY BAUM'S Act. But more can be done to support widespread access. While sufficiently small license sizes are necessary for smaller entities to be able to secure access to spectrum, they also benefit taxpayers. Smaller geographic areas often produce greater revenue per MHz-pop as well, as additional entities can bid in key markets to support their business models and build-out plans.

Interoperability

In addition to sufficiently small license sizes, standards within spectrum bands must be interoperable. Interoperability is a threshold requirement to support roaming across networks to support ubiquitous, uninterrupted access for all consumers. It also is necessary to support economies of scale for both network equipment and consumer devices. Competitive carriers must be in the same equipment ecosystems as nationwide providers to support creation of network gear and devices that work seamlessly across spectrum bands.

While interoperability should be built into standards for any spectrum band being put into service for wireless use, it also is important to prevent any carrier from monopolizing a specific spectrum band or establishing enough of a head start in a band as to discourage competition from other providers

and potential providers that would otherwise invest resources to deploy spectrum in a given band. Real interoperability reduces the need for industry regulations to sustain competitive access to spectrum.

Amount of Spectrum

As spectrum is made available at auction, there must be enough spectrum included to provide all carriers with an opportunity to obtain access. The total amount of spectrum not only can affect the overall viability of next generation services, but also can lead to a more competitive marketplace. For example, larger amounts of spectrum can mean more licenses in a geographic area, which can lead to a more dynamically competitive marketplace.

Bidding Incentives

Participation in an auction is not a zero-cost effort on behalf of potential bidders. For carriers to go through the regulatory and planning processes and raise or allocate capital, they must have assurances that the largest carriers will not be able to foreclose competition from carriers and new competitive innovator companies committed to serving rural America. Indeed, spectrum licenses could end up sold to the largest carriers at a discount if competitors are discouraged from participating in an auction. And auction designs must be intelligible. They should avoid complex implementations that create strategic openings for some bidders to get more while paying less than their rivals.

The FCC therefore should continue to utilize, and Congress should continue to support, auction designs and programs that ensure an even playing field that encourages participation in auctions by a diverse group of stakeholders. Auction designs should avoid complex and unpredictable processes. Auctions should also include continued use of bidding credits and other incentives for small entities or to provide service in rural and tribal areas. These incentives also should be implemented with the goal of expanding service in underserved markets without discouraging partnerships or disqualifying entities from participation due to factors unrelated to the spectrum acquisition.

Target Resources to Identify New and Creative Spectrum Opportunities

Spectrum is a finite resource; there is no way to create spectrum. Greenfield opportunities do not exist in the frequencies best suited to support our wireless future. Smart policies that support research and development, however, may unlock new opportunities and support enhanced, efficient use of currently allocated airwaves. The Spectrum Relocation Fund can be a source to support such research and development, and CCA thanks Representatives Matsui and Guthrie for highlighting this opportunity in H.R. 3475, the “Supplementing the Pipeline for Efficient Control of The Resource for Users Making New Opportunities for Wireless Act” or the “SPECTRUM NOW Act.” We support prompt consideration of this important legislation.

Mid-Band Spectrum Balances Capacity and Coverage and Should Be Prioritized

Wireless airwaves have different properties depending on frequency. For example, low-band spectrum covers wide areas, and can penetrate through objects, but has limited capacity. High-band spectrum offers more capacity but covers a much smaller geographic area than low-band spectrum and often requires line-of-sight connectivity. For these reasons, wireless operators are currently focused on creative opportunities to acquire mid-band spectrum, which offers a near-perfect mix of capacity and coverage, particularly for deployments in more sparsely populated areas.

Other countries have seen the same types of figures and have swung into action. China, for example, plans to release more than 500 megahertz of mid-band spectrum. And countries such as Japan, South Korea, the U.K., Australia, Italy and Spain have already auctioned or otherwise made available hundreds of megahertz of mid-band spectrum.

The U.S. is critically deficient in mid-band spectrum availability, but we have an immediate opportunity to do more.. Satellite operators occupying 500 megahertz of “C-Band” mid-band spectrum

in the U.S. have identified an opportunity to reallocate a portion of this band for terrestrial wireless use.

We should seize this opportunity, with important foundational principles in place:

- Maximize the amount of spectrum made available for wireless use, to support expanded access and competition;
- Implement a transparent, reliable assignment process that ensures meaningful opportunities for all carriers to have an opportunity to acquire spectrum;
- Make spectrum available for carriers to use for wireless services as efficiently and timely as possible; and
- Ensure that the proceeds of selling licenses to use this taxpayer-owned resource benefit taxpayers, with revenues either flowing to the U.S. Treasury or used to benefit the American public as directed by Congress.

CCA recently filed with ACA Connects and Charter Communications a proposal, attached to this testimony, to rapidly make at least 370 megahertz of mid-band spectrum available for 5G deployment. This submission represents the first example in the record of a consensus proposal that brings together multiple constituencies. Under our compromise proposal, video programmers and multichannel video programming distributors would transition from satellite connections to fiber connections, using some of the proceeds of the auction to fund the transition. By reducing demand for satellite programming delivery, additional spectrum can be made available for terrestrial broadband use. And while lower bandwidth or narrowband users could continue to use C-Band satellite connections, the proposal would repack these systems to the uppermost portion of the C-Band to repurpose as much of the band as possible for terrestrial wireless services. The FCC would then assign the C-band for terrestrial use and award the resulting terrestrial licenses through a transparent system of competitive bidding that satisfies the requirements of the Communications Act.

In addition to allocating more spectrum for wireless use, our proposal has other important benefits not found in alternative proposals. Through the FCC-led auction, proceeds will flow to purposes as directed by Congress and the U.S. Treasury, rather than to shareholders of foreign corporations. Further, our consensus proposal would push fiber deeper into areas not currently served by fiber, particularly in rural areas. These broadband services will be available for household and commercial use, including as backhaul for LTE and 5G wireless services, in addition to providing the connection to deliver programming. Finally, Congress and the FCC have more than 25 years of experience in designing and conducting auctions in ways that promote an open, public, and transparent assignment of spectrum that benefit the American people, and our proposal allows this win streak to continue.

An alternative proposal advanced by a group of satellite operators lacks several of these benefits and protections. The proposal put forth by certain satellite operators would only allocate 180 megahertz for wireless use, critically constricting the benefits the band can deliver for our wireless future and the number of competitors that will ultimately use the spectrum to meet this demand. CCA also has concerns regarding the legal basis for an unprecedented private transaction pursuant to which satellite operators would “sell” terrestrial wireless rights that they do not possess. No evidence has been put forward proving that a private transaction would achieve the same public interest benefits of transparency, due process, economic opportunity and competitive fairness as an FCC-led auction. For these and other reasons, this proposal falls short of the opportunity of the moment, and could have long-term negative effects. We agree with the satellite operators’ proposal that reorganizing the C-Band is complicated and features trade-offs on how to balance the rights of all parties involved and public benefits. Yet those complexities and trade-offs only highlight that the FCC, with guidance from Congress, should make judgements that would maximize the public interest, rather than have the FCC adopt a scheme to further the profit-maximizing interest of four foreign satellite companies.

While the C-Band presents a unique opportunity to reallocate a substantial portion of mid-band airwaves for wireless use, policymakers should continue to support other opportunities to enhance access to mid-band spectrum. Those include opportunities to reallocate spectrum from federal incumbent users for wireless use in the 1675-1680 MHz and the 2350-3550 MHz ranges. Recent actions also present new opportunities for deployment in the 2.5 GHz band. Additionally, as the FCC moves to auction portions of the 3.5 GHz band, they should ensure fair auction procedures. And finally, the time has come to bring the L-band proceeding to a close and put that spectrum to use to serve wireless customers. The need for additional mid-band spectrum requires that policymakers leave no stone unturned.

Low-band Spectrum Provides a Strong Foundation for Wireless Coverage

Low-band spectrum can efficiently cover large expanses of land compared to mid-band and high-band spectrum, making it especially well-suited for rural deployment coverage and to penetrate through walls of buildings and deep into basements and parking garages. Given that 80 percent of all data consumption occurs indoors, this characteristic makes low-band spectrum an integral part of robust, high-quality, next-generation mobile broadband network.

Additional low-band spectrum recently became available when Congress directed the FCC to conduct the first-ever incentive auction. The resulting auction successfully repurposed 84 megahertz of television spectrum for wireless use and raised approximately \$20 billion for the federal government. This revenue included over \$7 billion to reduce the federal deficit. Following the auction, reverse auction winners remained on the air, and those that were reassigned to new channels moved to their new channels so that forward auction-winning license holders could commence wireless operation using the spectrum. The Commission adopted procedures to ensure a smooth post-auction transition for the television stations affected by the reconfiguration. The transition must be completed by July 3, 2020.

In a recent report, the FCC announced that the transition “is ahead of schedule both in terms of the number of stations that have already vacated their pre-auction channels and the amount of 600 MHz spectrum that has been cleared and therefore made available for use by wireless auction winners.” Wireless operations relying on 600 MHz spectrum have begun in markets across the country, bringing new competition and opportunities for 5G expansion. T-Mobile, for example, won the most licenses in the incentive auction and has already deployed LTE service to 3,500 cities and towns in 44 states and Puerto Rico using its 600 MHz spectrum. To accelerate the process of freeing up the spectrum for wireless use, T-Mobile has been working with broadcasters to assist them in moving to new frequencies. The transition should continue expeditiously so that all winners of 600 MHz spectrum can put it to use to serve their customers.

High-band Spectrum Complements Other Bands to Deliver Massive Capacity

The characteristics of high-band, millimeter wave (“mmW”) spectrum complement the strengths of mid- and low-band spectrum. The enormous data-carrying capacity of high-band spectrum can respond to high demand in densely populated areas and support data intensive applications that require low latency and high speeds. CCA recently championed efforts to ensure all carriers can access the mmW spectrum necessary to deploy next-generation technologies and services. In designing its auctions of critical mmW bands, the FCC adopted equitable procedures for several recent auctions, including Auctions 101 (28 GHz), Auction 102 (24 GHz), as well as the upcoming Auction 103 (upper 37 GHz, 39 GHz and, 47 GHz). By focusing on freeing-up additional high-band spectrum for licensed wireless use while satisfying all of the public interest objectives of the Communications Act, Congress, along with the FCC and NTIA, can help ensure that consumers all across the nation are able to reap the benefits of nationwide next-generation networks, including better service, increased competition and the proliferation of advanced technologies such Internet of Things devices.

Only a comprehensive, holistic approach to spectrum policy will ensure that Americans in *all* corners of the United States reap the benefits of that stem from next-generation wireless broadband networks and technologies. All carriers—rural, regional, and nationwide—require equitable, fair access to a spectrum pipeline with a variety of mid-, high-, and low-band spectrum resources. If the United States fails to make available the necessary spectrum resources in a timely manner, or adopt government policies that support the speedy deployment of robust next-generation mobile broadband technologies, Americans all over the nation will miss out on massive opportunities for economic growth, job creation, and world-wide leadership across industries.

Today's hearing, which considers spectrum policy in a comprehensive manner, is a step in the right direction. CCA looks forward to continuing to collaborate with Congress, the Administration, the FCC, NTIA, and other federal agencies to ensure a robust mobile ecosystem as industry verges on a new era of technology. Thank you for your leadership on these critical issues. I welcome any questions you may have.



July 2, 2019

By ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122

Dear Ms. Dortch:

The transition to 5G wireless services promises to bring about reinvigorated investment in the U.S. telecommunications infrastructure, faster mobile broadband, an explosion in the number of interconnected devices, and a cornucopia of ripple effect benefits that may change how we work and live. Mid-band spectrum will play an important role in this transition, and the C-band at 3.7-4.2 GHz represents a critical opportunity to unleash mid-band spectrum for next generation wireless services.

We are a diverse group of incumbent and prospective users. We have come together with a proposal that would free up a large amount of spectrum—at least 370 megahertz—for 5G services, while also concurrently making all existing users of the spectrum whole; provide those users with incentives to forego their rights to the C-band frequencies; endow the entire nation, including unserved rural areas, with fiber connectivity; reserve for the American public a significant portion of the proceeds from the reformatting of the spectrum; and ensure the disinfectant of sunlight—a public process free of backroom deals.

Despite the abundance of comments in the above-referenced proceeding, there is a dearth of concrete proposals on how to repurpose the C-band in a holistic way that adequately takes account of the interests of all affected stakeholder constituencies. As one example, the reformatting proposal made by the C-Band Alliance (“CBA”)—which has been featured in the trade press repeatedly—is emphatically one-sided. That proposal benefits one category of current users—the satellite operators themselves. It does not adequately consider alternatives to satellite delivery for today’s earth station users, instead assuming that they would continue to utilize satellite delivery but in a significantly reduced frequency band. Nor does it consider the interests of the 5G proponents, who are concerned that 180 megahertz of net C-band spectrum is not sufficient for bandwidth-hungry 5G applications.

In contrast, we propose a plan that considers the needs of all stakeholders. Specifically, we propose refarming for 5G use at least 370 megahertz of the 3.7-4.2 GHz band across the country, and as explained below, the amount could be greater. Thus, the minimum to be refarmed under our plan would be significantly more than the amount that the CBA promises to clear. We further propose that the refarmed spectrum be made available for flexible terrestrial wireless use through an FCC-led auction.

Critically, our proposal provides for making all of the reallocated C-band spectrum available at the same time in a single FCC-led auction. This approach best serves the public interest by ensuring that the benefits of 5G services and applications are made available to consumers as quickly and as widely as possible.

Here are the cornerstone principles underlying our proposal:

1. Almost double the amount of spectrum reallocated for 5G services compared to the CBA plan.
2. Clear the spectrum as fast as the CBA plan in most areas, and in half the time in urban areas.
3. Award the spectrum through an FCC-led auction open to all bidders using either a conventional or incentive auction.
4. Net proceeds from the auction deposited in the U.S. Treasury or used as directed by Congress.
5. The satellite industry need not launch additional satellites beyond those set forth in its own plan.
6. Equal amounts of spectrum cleared in urban and rural areas, to the extent technically feasible based on a resolution of all interference issues, and classes of C-band users, whether in urban or rural areas, always treated the same.
7. C-band customers and earth station users made whole and given long term certainty through funding (subject to true up) and reimbursement of certain costs:
 - a. For all multichannel video program distributor (“MVPD”) C-band users and MVPD programmers to transition off the C-band, funding and reimbursement to include the cost of redundant, future-proof assets that they would own and operate (fiber construction in some cases and Indefeasible Rights of Use (“IRUs”) in others); and
 - b. For all satellite industry providers and existing C-band users that remain on the C-band, funding and reimbursement to include the costs of transitioning to a reduced amount of spectrum for continued satellite service.
8. Certain additional payments to satellite operators and users, either determined by the Commission and imposed as conditions on the new licensees, or determined by the market in an incentive auction.
9. Protection for out-of-band emissions (“OOBE”) from 5G users towards C-band earth station users that will continue to utilize the band.
10. Fully-functional 5G (downlink and uplink) spectrum that will have 100% geographical availability after reallocation, allowing 5G user equipment (“UE”) to rely upon international standards.
11. Spectrum aggregation limits and licensing rules to encourage auction participation and interoperability.

I. AN FCC-LED AUCTION IS THE MOST EFFICIENT WAY TO CLEAR MOST OF THE BAND, MAKE WHOLE ALL CATEGORIES OF INCUMBENT USERS, AND PROVIDE COMPENSATION TO INCUMBENTS

Our proposal, set out in more detail below, is a win-win: it satisfies the needs of prospective 5G users by freeing up at least 370 megahertz (and likely more) of the C-band spectrum on a nationwide basis in a quick timeframe, makes whole all incumbents—including the satellite industry, its customers, and earth station users—and provides all of these stakeholders with long-term certainty. It also provides motivation for incumbent satellite operators and earth station users to give up their rights to the spectrum. Further, it results in net proceeds that will go to the U.S. Treasury.

For MVPDs and video programmers specifically, it reimburses the cost of transitioning to an alternative delivery mechanism that would serve their needs far better than relying on reduced satellite frequencies. The proposed transition of earth station users to fiber delivery of video programming will be both seamless and fast. Transition to fiber will also provide a “future-proof” delivery mechanism to MVPDs and video programmers as they offer 4K and 8K content. This transition also benefits the public in two fundamental ways: it will contribute to the goal of building fiber and providing broadband to rural America; and it will ensure that the public receives all spectrum sale proceeds beyond what is required to reimburse costs and incentivize current users. Utilizing an FCC-led auction also ensures fairness and transparency in the assignment of this valuable spectrum resource.

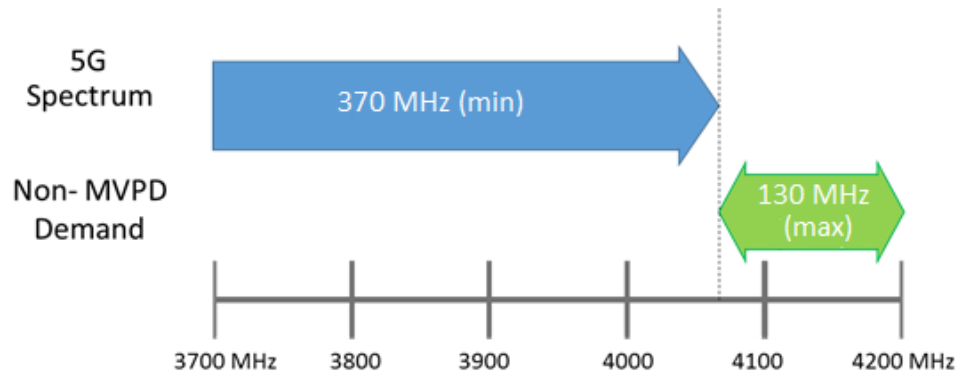
MVPDs and programming networks make extensive use of the C-band today, with backhaul of video to MVPD earth stations occupying the vast majority of available bandwidth even as these users represent less than 15 percent of all registered earth stations. To efficiently clear the amount of spectrum that is needed to deploy 5G services on a nationwide basis, it is therefore important that these users are accommodated. The key is to find an alternative delivery means for this relatively small pool of users that accounts for most of the bandwidth use.

A. Amount of C-band Spectrum to Be Refarmed

Our proposal would refarm for terrestrial wireless use a minimum of 370 megahertz. This amount could increase after more information is obtained about the residual needs for satellite service in the band.

Specifically, based on conservative assumptions, ACA Connects – America’s Communications Association (“ACA Connects”) has estimated that a total of 100 transponder equivalents, translating into a total of 130 megahertz of spectrum, are necessary to accommodate C-band narrowband customers who may wish to continue to need satellite service in the C-band. But we believe that information the FCC already has or can obtain from the satellite operators and the intensiveness of current transponder use (*e.g.*, constant or intermittent use) will allow for the relaxation of these conservative assumptions so that these needs can in fact be accommodated with fewer than 100 transponders, and correspondingly less than 130 megahertz of spectrum.

This would in turn mean that more spectrum can be refarmed without necessitating the launch of additional satellites other than the new satellites reflected in CBA's proposal.



We propose to clear the spectrum on a nationwide basis. First, rural consumers should have the same opportunities to benefit from increased spectrum as urban users. Second, clearing the spectrum at the same time is the most straightforward and efficient path. Finally, clearing the spectrum in rural areas on a stand-alone basis at a later time would be very difficult.

B. Process and Cost

Refarming would be a two-step process. First, video programmers and MVPDs would transition video programming backhaul from C-band delivery to terrestrial fiber video delivery. Programmers would purchase IRUs and obtain and install equipment necessary to deliver their programming to between 40 to 50 existing data centers across the contiguous U.S. MVPDs would purchase IRUs, deploy fiber or new wavelength services, and obtain and install equipment necessary to interconnect (over redundant paths) with the nearest data centers used by the programmers.¹ ACA Connects estimates that the transition to fiber can be accomplished within eighteen months in urban areas, within three years in the majority of the remaining areas, and within five years for a few select areas. We believe these estimates are reasonable and achievable. As a market completes its transition to fiber, it will become available for 5G deployment to winning bidders of the auction.

The Commission would also take steps to ensure that the remaining narrowband earth station end users could continue to utilize the C-band for an appropriate period, such as seven years, with minimal disruption. To achieve this outcome, simultaneous with the MVPD industry transition, satellite operators would repack services used by non-MVPD earth station users to the upper portion of the C-band.² Resources will be made available to protect all remaining customers

¹ The plan recognizes that fiber delivery is not a possible solution for remote areas of Alaska. *See, e.g.*, Reply Comments of GCI Communication Corp., GN Docket Nos. 18-122, 17-183 at 4-9 (filed Nov. 27, 2018). Suitable alternative solutions must be made available for incumbent C-Band operators who provide critical services throughout the State.

² This repacking will also require MVPD programming to move from the upper portion of the band to the lower part.

from out-of-band interference from 5G uses and other issues (including installing antenna filters; changing antennas' frequencies; changing antennas' polarization; and repointing antennas). Further, as a condition of receiving reimbursement for the foregoing costs, satellite operators would commit to continue serving non-MVPD earth station operators over the remaining spectrum without price increases for the specified reallocation period, subject to receiving reimbursement for lost revenue, as discussed further below.

All costs related to the transition would be advanced (subject to a true-up) from a fund that would be funded by the winning bidders. The fund would be financed by the 5G forward auction winning bidders,³ consistent with the obligations the Commission imposed on winning bidders in the H-block auction.⁴ From that fund, video programmers and MVPD earth station users would be advanced all costs associated with transitioning to terrestrial fiber delivery. The reimbursement would be subject to a true-up for additional costs or unused monies. Satellite operators would receive advance reimbursement for any of their costs and those of their customers and narrowband earth station users, too. The fund would be funded at 130% of estimated costs. Earth station users and satellite operators would file reimbursement claims with a fund administrator.

Clearing costs should be properly accounted for and advanced (subject to a true-up). ACA Connects has commissioned and completed a study that estimates the costs of the proposed transaction, including not only the cost of transitioning to fiber-based video delivery for both video programmers and MVPD earth station users (\$6 to \$7 billion), but also the cost of keeping whole the satellite industry and its narrowband customers. For the satellite industry in particular, the estimate includes reimbursement for lost revenue from the MVPD programming industry. This reimbursement would ensure that the satellite industry continues to serve narrowband customers, as they do today.

C. Auction Format

In order to facilitate clearance of the C-band, the FCC could hold either (1) a traditional auction or (2) an incentive auction. We discuss both options in turn below.

Traditional Auction. The Commission could exercise its clear statutory authority to reallocate the C-band for terrestrial use and then award the resulting terrestrial licenses through a system of competitive bidding that satisfies the requirements of the Communications Act. The Commission has utilized this well-grounded approach for the past 25 years to successfully repurpose a wide array of spectrum bands, including those previously allocated to satellite use. This process is fair, open, and transparent, and ensures that decisions about this critical public

³ Effectively, therefore, the fund would come from the pool of money that the 5G winning bidders are willing to pay for these frequencies.

⁴ See *Service Rules for Advanced Wireless Services H Block — Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands*, Report and Order, 28 FCC Rcd. 9483, 9546-9550 ¶¶ 160-171 (2013).

spectrum resource are made in a way that maximizes the public good and ensures 5G deployment is widespread, including to rural areas. Under this approach, the Commission would require winning bidders to reimburse the relocation costs of incumbent operators and users, including the transition of users from satellite to fiber as the distribution medium. It would also require winning bidders to compensate existing operators and users for their cost of capital based on their investments, or make incentive payments to the extent permitted by law.⁵ The FCC should establish a process for determining an appropriate schedule of reimbursable costs.

Incentive Auction. The FCC also has authority under Section 309(j)(8)(G) to provide incentives to incumbents to clear spectrum.⁶ As discussed above, a 5G auction is expected to generate proceeds well above the estimated transition cost. The CBA’s proposal would reserve all incentive payments for satellite operators. But, as ACA Connects and T-Mobile have both pointed out, earth station users have no less of a right to the spectrum than satellite operators do. In addition, according to the testimony of the satellite industry’s own economic expert, earth station users have invested more in C-band infrastructure than the satellite operators have (\$12.4 billion, compared to a satellite investment of \$7.3 billion).⁷

Nevertheless, we propose that the satellite industry receive incentive payments appropriate for the clearing of 200 megahertz of the band. The satellite operators and earth station users would each receive a portion of the incentive payments (over and above “make whole” payments) appropriate for clearing additional C-band frequencies beyond 200 megahertz.

Under this approach if pursued, the FCC would need to determine the magnitude of incentive payments that are necessary and appropriate to make to existing rights holders through some type of incentive auction. We recommend that the incentive auction be national, and satellite operators be invited to tender their national shares of in-orbit satellite capacity at progressively declining prices (a reverse auction). A satellite operator willing to tender satellite capacity for refarming at a certain price would have to lease capacity on its satellites to an operator not willing to surrender satellite capacity at that price, as necessary to preserve the latter operator’s total satellite capacity. No capacity would be cleared unless enough capacity is relinquished to allow the refarming of at least 370 megahertz.

⁵ See Letter from Elizabeth Andron, Senior Vice President, Regulatory Affairs, Charter Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 3-6 (Feb. 22, 2019).

⁶ Section 309(j)(8)(G)(i) empowers the Commission to “encourage a licensee to relinquish voluntarily some or all of its licensed spectrum usage rights in order to permit the assignment of new initial licenses . . . by sharing with such licensee a portion, based on the value of the relinquished rights as determined in the reverse auction . . . of the proceeds (including deposits and upfront payments from successful bidders) from the use of a competitive bidding system under this subsection.” 47 U.S.C. § 309(j)(8)(G)(i).

⁷ See Coleman Bazelon, The Brattle Group, *Maximizing the Value of the C-Band*, at 22 (attached as Appendix A to Joint Comments of Intel Corp., Intelsat License LLC, and SES Americom, Inc., GN Docket No. 18-122 (Oct. 29, 2018)).

In the forward auction, 5G licenses would be assigned to winning bidders so long as the amounts bid are enough to provide incumbents with the incentives resulting from the incentive auction. The estimated costs of refarming and transitioning the C-band described above could serve as the equivalent of a reserve price—*i.e.*, no spectrum is cleared unless the proceeds from the 5G auction suffice to cover at least all estimated costs. The surplus of the 5G auction proceeds over estimated costs and appropriate incentive payments would go to the U.S. Treasury.

Regardless of which of these auction formats is ultimately adopted, a Commission-led auction, unlike a privately-run auction, would ensure that the C-band is allocated in the most competitive and efficient way possible.

D. Other Elements of Proposal

Ensuring Ubiquitous 5G operations. The plan contemplates that the spectrum will be fully usable for ubiquitous 5G operations, including for both uplink and downlink operations, and without prohibitive exclusion zones. To ensure fully usable 5G spectrum, prior to reallocating or reassigning any spectrum, it is critical for the Commission to establish, among other things, the power levels and OOB from 5G phones, tablets, and other user equipment, because the UE emission mask requirements proposed by the CBA to protect adjacent satellite services from OOB are neither realistic nor reasonable, and could cripple deployment of 5G services in the band.

Based on a review of existing UE filters, existing filter technology alone cannot support the OOB requirements proposed by the CBA. Meeting the CBA's proposed protection criteria without a filter would render its uplink useless. The potential implications of these OOB requirements would be to reduce the UE output power within the 5G band as well as back off the output power of the UE by 15dB or more for the entire out-of-band span from 0 – 80 MHz (and beyond), or the creation of large isolation zones around remaining earth stations to ensure that a C-band 5G UE does not interfere with the earth station operations. CBA's proposed emission mask requirements would necessitate an exclusion zone of several kilometers around all 5,300 registered earth stations. The serving 5G base stations would need to be even further away from the earth station. The result would be an extensive span of C-band dead zones in the continental United States leading to a vastly suboptimal 5G deployment due to the significant coverage gaps. These outcomes are unacceptable.

Given the substantial adverse impact on 5G use of the C-band from the CBA's proposed OOB limits, we agree with AT&T that the Commission should promptly seek further information regarding key technical engineering matters relevant to the policy and legal issues raised in this proceeding, including the appropriate UE OOB limits.⁸ The CBA should be required to

⁸ See Letter from Raquel Noriega, Director, Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (June 6, 2019); Letter from Elizabeth Andron, Senior Vice President, Regulatory Affairs, Charter Communications, Inc. to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (June 11, 2019). In addition, the FCC should resolve potential interference that high power C-band 5G base stations would cause towards the UEs in the 3.55-3.7 GHz ("3.5 GHz" or "CBRS") band, particularly for

demonstrate why the OOBE limits set forth by 3GPP or even in CBRS will not suffice in the C-band.

Other Matters. The Commission should implement an auction plan that promotes competition and broad participation by implementing mechanisms to limit how much spectrum any one provider can acquire at auction, while also allocating sufficiently large channels for 5G services, and ensuring that equipment can operate across the entire C-band.

E. Public Interest Benefits

In addition to being grounded in precedent and benefiting the U.S. Treasury, the proposal will also bring about additional socioeconomic benefits, particularly in rural areas. Importantly, laying fiber across the U.S. will increase Internet access reliability and fiber access. It will accelerate the deployment of 5G small cells in less densely populated areas by helping deploy the fiber backhaul infrastructure necessary for 5G in these areas. It will enable smart grid and smart metering applications. And notably, it will create around 100,000 “direct” jobs and as many as another 100,000 “indirect” jobs.⁹

the General Authorized Access (“GAA”) portion of that band that is closer to 3.7 GHz. Mobile devices already are being sold that support CBRS and networks are being built to include the use of 3.5 GHz spectrum, and this ecosystem will only grow. By the time C-band equipment and services are deployed commercially, there will be large CBRS deployments whose operation must be protected from a new C-band 5G network. Currently the FCC’s record in the C-band proceeding does not address provisions for protecting GAA operations from C-band 5G emissions. Moreover, it does not address similar interference that could occur from CBRS base stations to C-band 5G UE. There are technical solutions to manage the interference between CBRS and C-band operations, but the FCC must resolve how these systems will co-exist to ensure there is no interference, particularly to deployed GAA operations, and must confirm whether these technical solutions will affect the use of spectrum in the C-band.

⁹ Estimates consistent with studies found in Hal J. Singer, *Do Municipal Broadband Networks Stimulate or Crowd Out Private Investment? An Empirical Analysis of Employment Effects*, in *Digitized Labor: The Impact of the Internet on Employment* 251, 253 (Lorenzo Pupillo et al. eds., 2018), https://books.google.com/books?id=2_RZDwAAQBAJ&lpg=PA253&ots=hAnjS-u6jC&dq=Katz%20%20Callorda%20broadband%2021.6&pg=PA253#v=onepage&q=Katz%20%20Callorda%20broadband%2021.6&f=false and in Comments of Corning Inc., WC Docket No. 17-84, at 3 (June 15, 2017).

Marlene H. Dortch

July 2, 2019

Page 9 of 9

II. CONCLUSION

The joint proposal is a win-win for all stakeholders and the American public. It provides a seamless transition mechanism that will make both earth station and satellite operators whole through a transparent process led by the FCC, will incentivize current users, and will result in billions of dollars flowing to the U.S. Treasury—all through a transparent process overseen by the FCC.

Respectfully submitted,

/s _____

Alexi Maltas
Senior Vice President & General Counsel
COMPETITIVE CARRIERS ASSOCIATION
601 New Jersey Avenue NW
Suite 820
Washington, DC 20001
(202) 747-0711

Ross Lieberman
Senior Vice President, Government Affairs
ACA CONNECTS – AMERICA'S
COMMUNICATIONS ASSOCIATION
2415 39th PI NW
Washington, DC 20007
(202) 494-5661

Elizabeth Andrion
Senior Vice President, Regulatory Affairs
CHARTER COMMUNICATIONS, INC.
601 Massachusetts Avenue NW
Suite 400W
Washington, DC 20001
(202) 621-1900