



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.

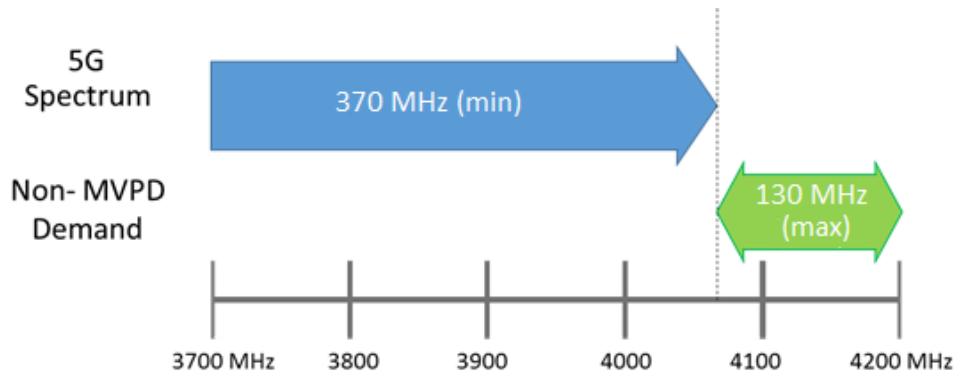
MVPDs and programming networks make extensive use of the C-band today, with backhaul of video to MVPD earth stations occupying the vast majority of available bandwidth even as these users represent less than 15 percent of all registered earth stations. To efficiently clear the amount of spectrum that 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 Andrion, 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 _____

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