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Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C., 20554

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

Dear Ms. Dortch:

AT&T Services, Inc., on behalf of the subsidiaries and affiliates of AT&T Inc. (collectively, “AT&T”) submits this *ex parte* to discuss transition issues for content services that currently utilize the C-band for distribution, including proposals that would require a mandatory transition to fiber. In particular, AT&T addresses the practical ramifications of implementing higher efficiency video encoding and elimination of standard definition (“SD”) in the content distribution system used by WarnerMedia (“WM”). It seems clear from public statements, including statements by Commissioners, that the FCC is likely to reallocate 300 MHz for terrestrial mobile use, rather than the 200 MHz previously proposed by the C-Band Alliance (“CBA”).¹ Although such capacity-saving measures have been broadly discussed as necessary to enable clearing 300 MHz of the C-band, no formal proposal for how such a transition could be accomplished has been placed on the record.² As discussed below, the process for converting all WM-affiliate head-ends to high efficiency video encoding (“HEVC”) and switching off SD is considerably more complex than a simple repack of transponder use. Such a transition will require rebuilding significant aspects of the post-reception signal processing framework for

¹ See, e.g., Eggerton, John, “C-Band Constituents Jockey As FCC Readies to Saddle Up,” Multichannel News (Oct. 21, 2019); available at: <https://www.multichannel.com/news/c-band-constituents-jockey-as-fcc-readies-to-saddle-up> (last visited October 21, 2019); Dano, Mike, Light Reading, “FCC to Free 300MHz of C-Band for 5G in November, Analysts Say (Aug. 27, 2019); available at: <https://www.lightreading.com/mobile/5g/fcc-to-free-300mhz-of-c-band-for-5g-in-november-analysts-say/d/d-id/753723> (last visited Oct. 23, 2019); Allevan, Monica, FierceWireless, “FCC’s O’Rielly suggests freeing up 200-300 megahertz of C-Band spectrum” (Apr. 19, 2018), available at: <https://www.fiercewireless.com/wireless/fcc-s-o-rielly-suggests-freeing-up-200-300-megahertz-c-band-spectrum> (last visited Oct. 23, 2019); TR Daily, “Carr Stresses Need for 200-300 MHz of C-Band Spectrum” (Sept. 17, 2019); available at: <https://lrus.wolterskluwer.com/news/tr-daily/carr-stresses-need-for-200-300-mhz-of-c-band-spectrum/95143/> (last visited Oct. 23, 2019).

² See, Weller, Bob, “Siren Song in the C-Band,” NAB Policy Blog (Aug. 5, 2019); available at: <https://blog.nab.org/2019/08/05/siren-song-in-the-c-band/> (last visited Oct. 21, 2019) (noting “[c]learing anything beyond 200 MHz will be based on supposition and guesswork because the necessary changes move back from the receiver into the guts of the distribution and network systems, and there the various systems become divergent” and “[s]ome suggest that more spectrum can be reallocated if higher-efficiency compression is used”).

video services, including substantial reconfiguration of new hardware to integrate into individual affiliate's systems. While this technical overhaul can be accomplished, the undertaking warrants additional safeguards to avoid disrupting the delivery of high-value programming to a substantial portion of the U.S. public.

If the C-band transition contemplates HEVC upgrades and the elimination of SD, it is imperative that the Commission and stakeholders provide the content industry—both the networks like WM and the affiliates across the country—with transparency on: (i) the overall process, (ii) the roles of different stakeholders, (iii) overall cost estimates as well as a full understanding by all affected parties of the types of expenses that would be reimbursable to various stakeholders; and (iv) timing. For precisely these reasons, AT&T has urged that the transition plan be introduced on the record and stakeholders be permitted to comment.³ AT&T further believes that with the potential disruption that could be engendered by an incomplete transition, that costs for the entire transition be guaranteed—in other words, the actual costs must be known on an affiliate-by-affiliate basis and an auction reserve and transition escrow implemented. The failure to take these basic precautions opens unacceptable business discontinuity risks for the entire video distribution ecosystem, as well as threatening to delay the deployment of 5G services by those who would purchase licenses to operate on the cleared, reallocated portion of the band.

To date, the transition process as proposed by CBA has focused doing what would be necessary to clear 200 MHz—repacking transponder use in the C-band, coupled with the launch of new satellites, to rearrange and consolidate FSS use. This process might entail the installation of some new earth stations or repointing, but largely is concerned with the installation of earth station receiver filters to avoid harmful interference from parts of the C-band that would be occupied by 5G transmitters. In contrast, to clear 300 MHz will likely require the elimination of SD and the universal adoption of more efficient HEVC encoding. This process will require significant and difficult hardware installation and configuration at thousands of affiliate reception sites—installations that vary in significant details from provider to provider and even within the various head-ends of a single provider.

To enable the Commission and other stakeholders to better understand some of the key steps involved, AT&T has broken the transition process into three components—research and design, bandplan-specific transition engineering, and execution. The major workstreams in each category are discussed in further detail below, as well as the key interdependencies associated with the various phases. Given the need for close coordination across the pay TV ecosystem, however, we urge the Commission to test this framework in light of input from satellite operators, programmers and other interested parties. We look forward to collaborating with such parties to free up additional mid-band spectrum while protecting the interests of incumbent C-band users and the consumers who rely on them.

Research and Design. The research and design phase is necessary to document the current video distribution system in place at various affiliates' facilities and to plan appropriate

³ Reply Comments of AT&T Services, Inc., GN Docket No. 18-122 at 7-9 (Dec. 11, 2019).

technology upgrades for HEVC implementation and SD elimination. Among other things, the research and design phase requires investigation of the rapidly developing HEVC format itself. Ideally, in fact, the decision regarding what form of HEVC to implement would occur as late as possible to enable WM and other content providers to take the greatest advantage of continuing increases in encoder efficiency. That said, at some point the decision on the specifics of how HEVC will be implemented in WM's network will have to be formalized for other work to proceed. At that point, WM would be able to identify the technology upgrades it would have to make to its own transmission systems to provide an HEVC-compatible signal for its affiliates to receive.

Importantly, the decision formalizing the format decisions would not, however, be sufficient to enable WM to create a bill of materials or work plan for each of its affiliates. As an initial matter, WM does not have visibility into the plant that is deployed by each affiliate. WM will have to survey each affiliate and obtain specific information on the exact hardware used by the affiliate to decode WM's transmissions and prepare those streams for distribution in the affiliate's plant. This requires not only knowing what hardware models are present, but also how those systems are configured and whether various compatibility or signal output modules and options are installed. Although this is a process that WM would ideally conduct through interactions with its affiliates, the scope of the database reconciliation would almost invariably require hiring third-party consultants if it is to conclude in any reasonable timeframe. Knowing what equipment is present at the affiliate end, and how that equipment is optioned and configured, will drive what needs to be changed or added and the ultimate bill of materials for transitioning that head-end.

Bandplan-Specific Transmission Engineering. Even if WM understands perfectly what equipment exists at affiliate head-ends and how that equipment is configured, WM cannot re-engineer the affiliate reception and decoding process until the C-band end state transponder plan is known. Specifically, WM will not know whether the affiliate's dishes are pointed at the correct satellite and whether a dish (which may receive content from more than one provider) will still be able to receive all of the signals needed from the satellite at which it is pointed or whether additional dishes may need to be added. Today, a significant amount of video content is consolidated into a satellite "neighborhood," so key content streams can be accessed from a limited number of dishes. WM has no assurance on the current record that this will be the case post-transition. In fact, WM anticipates that the very first step in the bandplan-specific engineering phase—after the Commission adopts a spectrum target—would be engaging in a dialog with WM's satellite vendors to minimize the number of neighborhood-related disruptions that may arise.

Once the transponder plan is finalized, WM can finally begin the process of determining what changes are necessary to each affiliate's plant, and how that equipment needs to be configured, to ensure continued reception of WM content in an environment where SD has been eliminated and HEVC has replaced other high definition ("HD") encoding formats. Some of this work can be undertaken in parallel with efforts to reconcile records on the affiliates' plant, but ultimately the database reconciliation step has to be completed before a bill of materials and workplan can

be finalized for all affiliates—a pre-requisite to understanding the full costs of the transition. Those costs will need to flow into the overall transition budget to set a reserve price for the auction, so these steps must occur prior to the auction.

Importantly, none of the activities defined in the Research and Development phase or the Bandplan-Specific Engineering phase are workstreams that WM would undertake but for the need to clear the C-band, and hence should be costs that are compensated from the relocation fund. And, some of these costs are anticipated to be necessary prior to the auction to ensure a reasonable conclusion of the transition.

Transition Plan Execution. The final aspect of the transition would be execution—actually purchasing the equipment that would need to be installed at WM’s transmission hubs to support HEVC and at the affiliate head ends to decode those signals, and then configuring and installing that equipment. While implementation of transmission system changes at WM’s end is important and is expected to take some time, the time and effort involved to upgrade the affiliates’ equipment and ready them for the C-band end state is likely to be significantly greater. WM will need to stage the upgrades, both for physical space and professional resource reasons. Once deliveries begin to arrive, WM engineers will need to install the equipment in testbeds at its facilities and test to ensure the equipment is operating in specification and appropriately optioned. Engineers will then need to configure the equipment for a specific affiliate’s purposes and, once the configurations are entered, retest the equipment to ensure that the output is consistent with expectations. After that, the equipment will need to be repackaged and shipped to the affiliate. Upon arrival, WM engineers will work with the affiliate to install the equipment, which may include deployments to the affiliate’s earth station sites, and ensure that the affiliate will continue to receive the WM content it needs—in the format it needs—at the end of the transition.

The speed at which this work can be done is constrained by several factors. This is not business-as-usual, so the engineering tasks will require content programmer personnel to be re-tasked from other activities. Moreover, there is a limit to the ability to scale engineering capacity to speed this process, because of the specialized nature of the deployment issues. Indeed, because this type of activity is not usual for WM, physical space for receiving and warehousing the equipment is also likely to be a problem, to say nothing of the laboratory space needed to test and configure the equipment.

Similarly, the affiliates are also likely to be resource constrained in transition implementation. Each programmer affiliate will generally have to be undertaking a similar, but separate process for each channel group it receives today through the C-band. Indeed, because each channel and channel group are not necessarily received, decoded, and formatted the same way, the affiliate cannot simply duplicate changes made in coordination with one content provider across other content streams, but will have to engage with each content provider it contracts with to make changes to the way their content streams are received. That may create resource problems for these head-ends, since these types of activities would require re-tasking engineering personnel or hiring consultants.

Thus, although it is possible to potentially secure substantial additional C-band capacity for terrestrial services through changes in the video content distribution framework that exists today, the types of changes that will be necessary—SD elimination and HEVC implementation—require much more technically complex and challenging transition measures than the simple repack of transponders that was originally contemplated. Because the costs and timing aspects of these changes must be known to avoid unacceptable risks to the delivery of high-value content, the transition must be fully documented, affected parties made aware of expectations and the costs explored through a public process.

Wholesale, mandatory replacement of C-band FSS with fiber networks is not feasible in any reasonable timeframe. Some parties in this proceeding have suggested that substantial additional capacity can also be derived from the C-band by mandating that certain video content distribution functions be moved to fiber optic networks.⁴ AT&T has previously noted that fiber has different operational characteristics than C-band FSS for the video and audio backhaul distribution market. While fiber is a reliable, cost effective platform for many use cases, it may not be the best solution for all business cases. As such, AT&T strongly believes that content providers and other C-band users should retain control of their technology choices and should not be forced to adopt a specific technology in a competitive market. Indeed, given that the Commission has generally pursued policies of technology neutrality, a sudden mandate requiring adoption of fiber and eliminating FSS as an option could face weighty legal challenges that could delay the conversion of C-band spectrum to mobile use. Fiber and C-band FSS, among other transmission choices, have different reliability and capabilities, and therefore serve different applications in the marketplace. The Commission should not override a customers' choice of technology by regulatory fiat.

Currently, fiber networks are an integral part of the video wholesale distribution segment, used both as a backup transmission system behind C-band FSS, and in other cases as the primary platform with C-band serving as backup. For specific case uses, therefore, these two distribution platforms are effective substitutes. That said, in order for fiber to serve as a full substitute to C-band for video distribution, the fiber network across the entire ecosystem would need to be upgraded to ensure that uplink and downlink venues—and the paths in between—have sufficient redundancy, resiliency, path diversification and provider diversification to ensure the “five 9s” of reliability that exists today in the C-band-supported video backhaul distribution market segment. This task would entail major construction projects across the country and coordination across thousands of disparate stakeholders, many of whom (certainly many of the fiber network providers) are not even licensees in the C-band or associated with licensees in the C-band. For example, because content affiliate contracts typically specify transmission parameters for the

⁴ See, e.g., Letter from Ross Lieberman, ACA Connects – America’s Communications Association (“ACA”), Alexi Maltas, Competitive Carriers Association (“CCA”), and Elizabeth Andrion, Charter Communications, Inc. (“Charter”), to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (filed July 2, 2019) (“ACA Coalition Proposal”); Letter from Pantelis Michalopoulos, Counsel for ACA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (filed July 9, 2019), Attachment (“Cartesian Study”).

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content being transmitted, AT&T alone would be forced to renegotiate almost every one of its thousands of content affiliate deals.

On balance, any plan that involves a forced migration from C-band to fiber appears to substantially complicate and delay the transition of C-band spectrum.⁵ Even ignoring the legal issues, individualized fiber solutions would have to be investigated for each and every content affiliate location, proposals that ensured provider and path diversity. The solutions would then need to be priced in order to build a realistic cost model for the transition, which would have to be done before C-band spectrum sale could take place. This process thus requires planning and diligence that is substantially more complex than the transponder migration proposed by CBA.

Again, we welcome the opportunity to work closely with satellite operators and other interested parties to free up additional mid-band spectrum while protecting the interests of incumbent C-band users. Should any questions arise concerning this *ex parte*, please do not hesitate to contact me at (202) 457-2055.

Sincerely,

/s/ Michael P. Goggin
Michael P. Goggin

⁵ AT&T notes that ACA Connects, which has proposed a forced migration to fiber, has filed a recent *ex parte* that underscores many of the points AT&T has made above regarding HEVC compression and SD elimination, but with ACA Connects concluding that “a plan to clear 300 MHz would require significantly more than three years to complete and would cause irreparable harm to all industries that rely on the C-band, particularly the pay TV industry.” Letter from Brian Hurley, Vice President of Regulatory Affairs, ACA Connects, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 18-122 (filed Oct. 22, 2019). The complexity of an HEVC/SD transition, in AT&T’s view, compels a comprehensive plan that is subject to public notice and comment. Until such a plan is developed on the record, ACA’s self-serving conclusions must be seen as premature, at best.