

**Before the**  
**FEDERAL COMMUNICATIONS COMMISSION**  
**Washington, DC 20554**

In the Matter of	)	
	)	
Expanding Flexible Use of the 3.7 to 4.2 GHz	)	GN Docket No. 18-122
Band, <i>et al.</i>	)	RM-11778
	)	RM-11791

**REPLY COMMENTS OF CTIA**

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CTIA respectfully submits these reply comments in response to the Order and Notice of Proposed Rulemaking released by the Federal Communications Commission (“Commission”) seeking to identify opportunities for terrestrial, flexible use of mid-band spectrum between 3.7-4.2 GHz (“C-band”).<sup>1</sup>

**I. INTRODUCTION AND SUMMARY.**

A review of the initial comments reflects intense interest in the future of the 3.7-4.2 GHz band – from wireless stakeholders eager to gain expeditious access to this spectrum for licensed, flexible wireless use, users of C-band satellite services seeking to ensure that any repurposing protects or accommodates their interests, and C-band satellite operators keen on realizing this transition. The goals here – a speedy transition of hundreds of megahertz of spectrum in the 3.7-4.2 GHz band while accommodating incumbent uses of the band – are realistic and achievable.

CTIA takes this opportunity to focus on four issues in the record. First, as numerous commenters recognize, mid-band spectrum will be a key component in the race to 5G, and the Commission should move quickly to repurpose hundreds of megahertz of spectrum in the 3.7-4.2

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<sup>1</sup> *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Notice of Proposed Rulemaking, 33 FCC Rcd 6915 (2018) (“*Notice*”).

GHz band for new flexible-use licenses. At the same time, commenters of all stripes agree that existing satellite uses in the band are important and must be accommodated.

Second, to ensure that earth station uses are accommodated while freeing up spectrum for flexible-use, the Commission should encourage deployment of technologies that facilitate efficient spectrum use and explore a variety of distribution alternatives. The record supports exploring several options, including repacking incumbent earth stations into a smaller portion of the band, sharper filtering, and advanced compression technologies, which can serve important roles in freeing up more spectrum while preserving service. The record also supports exploring the use of fiber or other satellite bands as alternative paths to transition some current C-band earth station traffic.

Third, the record shows widespread opposition to proposals to open up dedicated spectrum in the 3.7-4.2 GHz band for point-to-multipoint (“P2MP”) operations. Commenters show that P2MP operations are fundamentally at odds with band clearing proposals, are not compatible with existing FSS services, and other, better options exist.

And finally, the Commission must ensure that any power and out-of-band emission (“OOBE”) limits support innovative operations while offering suitable protection to remaining satellite operations.

## **II. THE RECORD SUPPORTS RAPID ACTION TO REPURPOSE SPECTRUM IN THE 3.7-4.2 GHz BAND FOR TERRESTRIAL 5G WHILE PROTECTING INCUMBENT USES.**

A diverse range of commenters – including wireless, cable, broadcast, and satellite interests – have produced a collective record indicating that the 3.7-4.2 GHz band can be

repurposed for flexible use while carefully protecting or accommodating incumbent operations.<sup>2</sup> The record confirms that the band has “unmatched potential in the mid-band range to facilitate the deployment of terrestrial [5G] services.”<sup>3</sup> Commenters across the board also recognize that incumbent satellite operations are an important part of the nation’s delivery of television and other content.<sup>4</sup> The Commission can balance these interests, working to accelerate the introduction of terrestrial 5G services in the band while accommodating incumbent satellite service uses.

As other nations allocate mid-band spectrum and further their position in the race to 5G, the United States should act quickly and take up this unique opportunity to make much-needed mid-band spectrum available for 5G.<sup>5</sup> As explained in the attached Mid-Band Spectrum Global Update report prepared by Analysys Mason, Japan, South Korea, Spain, and the United Kingdom

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<sup>2</sup> See, e.g., Comments of AT&T, GN Docket No. 18-122, at 1 (Oct. 29, 2018) (“AT&T Comments”); Comments of the National Ass’n of Broadcasters, GN Docket No. 18-122, at 6-8 (Oct. 29, 2018) (“NAB Comments”); Comments of Comcast Corp. & NBCUniversal, GN Docket No. 18-122, at 2 (Oct. 29, 2018) (“Comcast Comments”); Comments of the C-Band Alliance, GN Docket No. 18-122, at 11-12 (Oct. 29, 2018) (“C-Band Alliance Comments”).

<sup>3</sup> AT&T Comments at 1; see also C-Band Alliance Comments at 11-12; Comments of Charter Communications, Inc., GN Docket No. 18-122, at 1 (Oct. 29, 2018) (“Charter Comments”); Joint Comments of Intel Corp., Intelsat License LLC, & SES Americom, Inc., GN Docket No. 18-122, at 5 (Oct. 29, 2018) (“Intel/Intelsat/SES Comments”); Comments of Nokia, GN Docket No. 18-122, at 9 (Oct. 29, 2018) (“Nokia Comments”); Comments of T-Mobile USA, Inc., GN Docket No. 18-122, at 3 n.4 (Oct. 29, 2018) (“T-Mobile Comments”); United States Cellular Comments, GN Docket No. 18-122, at 1-2 (Oct. 29, 2018) (“USCC Comments”); Comments of Verizon, at 2-3 (Oct. 29, 2018) (“Verizon Comments”).

<sup>4</sup> See C-Band Alliance Comments at 11-12; see also, e.g., American Cable Ass’n Comments, GN Docket No. 18-122, at 2-4 (Oct. 29, 2018) (“ACA Comments”); AT&T Comments at 3; Comcast Comments at 2; Charter Comments at 1-2; Comments of the Content Companies, GN Docket No. 18-122, at 5-6 (Oct. 29, 2018) (“Content Companies Comments”); Verizon Comments at 10.

<sup>5</sup> See, e.g., Intel/Intelsat/SES Comments at 6 (noting that “speed is paramount” as 5G deployment is a national priority); C-Band Alliance Comments at 58 (noting the importance of speedily clearing spectrum to further deployment of terrestrial 5G); Comments of Motorola Solutions, Inc., GN Docket No. 18-122, at 6 (Oct. 29, 2018); Nokia Comments at 8.

have auctioned or assigned mid-band spectrum since April 2018.<sup>6</sup> Several other countries, including Australia, Germany, and Japan, have confirmed that mid-band spectrum will be assigned by June 2019.<sup>7</sup> For example, Japan intends to allocate the 3.6-4.2 GHz band using five 100 megahertz blocks by March 2019.<sup>8</sup> And just this week, China announced that its three existing operators will receive a total of 460 MHz of mid-band spectrum for 5G.<sup>9</sup> Repurposing 3.7-4.2 GHz spectrum will enable the United States to harmonize spectrum with other countries – driving robust equipment markets, enabling global roaming, and reducing costs for consumers.<sup>10</sup> Opening up the 3.7-4.2 GHz band is “one of the most significant steps” the Commission can take to propel U.S. leadership in the race to 5G.<sup>11</sup>

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<sup>6</sup> See David Abecassis, Janette Stewart, Michael Kende, and Chris Nickerson, *Mid-Band Spectrum Global Update*, Analysys Mason, at 1 (Nov. 2018) (Attached). See also, Comments of CTIA, GN Docket No. 18-122, at 5-7 (Oct. 29, 2018) (“CTIA Comments”) (explaining that at least five other countries held auctions for spectrum in the 3 GHz range this year, and several other countries plan to make large blocks of this spectrum available for 5G in the coming year).

<sup>7</sup> *Id.*

<sup>8</sup> See *id.*; Japan Ministry of Internal Affairs and Communications, Opinion on Frequency Allocation for Introduction of 5<sup>th</sup> Generation Mobile Communication System, Opinion Subject to Public Invitation, Attachments 1 and 2 (Nov. 2, 2018), [http://www.soumu.go.jp/menu\\_news/s-news/01kiban14\\_02000358.html](http://www.soumu.go.jp/menu_news/s-news/01kiban14_02000358.html).

<sup>9</sup> Joseph Waring, *China Releases 5G Spectrum to State-Run Operators*, Mobile World Live (Dec. 10, 2018), <https://www.mobileworldlive.com/asia/asia-news/china-releases-5g-spectrum-to-state-run-operators/>. China Telecom and China Unicom will each receive 100 megahertz in the 3.5 GHz band, and China Mobile will receive 260 megahertz in the 2.6 GHz and 4.8 GHz bands.

<sup>10</sup> See Comments of Ericsson, GN Docket No. 18-122, at 9 (Oct. 29, 2018) (“Ericsson Comments”).

<sup>11</sup> Comments of Qualcomm Inc., GN Docket No. 18-122, at 3 (Oct. 29, 2018) (“Qualcomm Comments”); see also, e.g., AT&T Comments at 1; Verizon Comments at 3.

The 3.7-4.2 GHz spectrum represents “the sweet spot of spectrum innovation,”<sup>12</sup> as it “leverage[s] both capacity and coverage opportunities.”<sup>13</sup> Further, the band creates an opportunity to harmonize spectrum with other countries, and its adjacency to the 3.5 GHz band creates the potential to achieve equipment sharing synergies. The 3.7-4.2 GHz band, moreover, will accommodate the wide bandwidths necessary to facilitate the faster connections and low latency that 5G technology promises.<sup>14</sup> To that end, CTIA has called on the Commission to ensure that licensees can assemble 100 megahertz holdings.<sup>15</sup> CTIA and others also call on the Commission to set an aggressive benchmark in the hundreds of megahertz so that multiple licensees will have an opportunity to deliver on the full promise of 5G in the mid-band range.<sup>16</sup>

At the same time, the record supports the need to protect or accommodate current C-band uses. Commenters highlight that the C-band is important to broadcast television, multichannel video programming distribution, broadcast radio, and over-the-top video distributors and that U.S. consumers rely on these services.<sup>17</sup> CTIA and the wireless industry agree that the transition to terrestrial, flexible-use operations in the 3.7-4.2 GHz band must ensure that current C-Band uses are accommodated.<sup>18</sup> But, the collective record establishes that

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<sup>12</sup> Ericsson Comments at 6 (internal quotation omitted); *see also* Comments of the Competitive Carriers Ass’n, GN Docket No. 18-122, at 3 (Oct. 29, 2018) (“CCA Comments”); Qualcomm Comments at 4; CTIA Comments at 7.

<sup>13</sup> Verizon Comments at 7.

<sup>14</sup> *See, e.g.*, T-Mobile Comments at 3 n.4.

<sup>15</sup> CTIA Comments at 9.

<sup>16</sup> *Id.* at 9-10; *see also* Ericsson Comments at 10; Nokia Comments at 2.

<sup>17</sup> *See, e.g.*, NAB Comments at 3-6; AT&T Comments at 1-2; Intel/Intelsat/SES Comments at 4-5; Comcast Comments at 2.

<sup>18</sup> *See, e.g.*, CTIA Comments at 10; AT&T Comments at 18; USCC Comments at 4; Verizon Comments at 4.

the Commission can ensure the continued delivery of content that C-band operators provide today while seizing the opportunity to open the band to valuable terrestrial services for 5G.

### **III. THE RECORD DEMONSTRATES THAT THE COMMISSION SHOULD EXAMINE TECHNOLOGIES THAT PROMOTE EFFICIENT USE AND ALTERNATIVE TRANSMISSION MEDIA TO FACILITATE THE TRANSITION OF SOME CURRENT C-BAND TRAFFIC.**

#### **A. Commenters Recommend Repacking Incumbent Earth Stations and Examining the Use of Filtering and Advanced Compression Technologies.**

The record confirms that the Commission should encourage a variety of methods to transition some of the current C-band earth station traffic.<sup>19</sup> As an initial matter, the record supports repacking incumbent earth stations into a smaller portion of the 3.7-4.2 GHz band. Ericsson explains that earth stations can be repacked in part because of “excess capacity that exists today.”<sup>20</sup> The record also shows that satellite operators have “extensive experience” migrating services between frequencies and satellites<sup>21</sup> and “innovative technical solutions” can increase the frequency reuse in the band.<sup>22</sup>

Tools such as filters and advanced compression technologies can advance more efficient satellite use of the band and, in turn, free up more spectrum to repurpose for terrestrial use. Multiple commenters recognize that filtering can and should be used to protect earth stations, thereby enabling more terrestrial use of the band.<sup>23</sup> Filters can reject signals from terrestrial

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<sup>19</sup> See, e.g., T-Mobile Comments at 7-9; Qualcomm Comments at 5-6; Verizon Comments at 12-14; AT&T Comments at 9; Ericsson Comments at 14-15; CTIA Comments at 17-18; Comments of Information Technology and Innovation Foundation, GN Docket No. 18-122, at 3 (Oct. 29, 2018); CCA Comments at 4.

<sup>20</sup> Ericsson Comments at 14.

<sup>21</sup> C-Band Alliance Comments at 19.

<sup>22</sup> Comments of Eutelsat S.A., GN Docket No. 18-122, at 2 (Oct. 29, 2018).

<sup>23</sup> ACA Comments at 15-16; Content Companies Comments at 7-9; Comments of Microsoft Corp., GN Docket No. 18-122, at 11 (Oct. 29, 2018) (“Microsoft Comments”); NAB Comments at 6-7; NCTA – The



users and protect earth station reception. And the C-Band Alliance comments signal that sharper filtering is on its way, as the organization has already “commissioned the development of band-pass filters, received prototypes, and tested the filters’ ability to reject high-powered terrestrial 5G transmissions adjacent to the remaining satellite band.”<sup>24</sup> The Commission should encourage the development of filtering technology to support the efficient repacking of existing C-band services.

Similarly, the Commission should encourage stakeholders to explore deployment of advanced compression technologies that are available today (MPEG-4 and HEVC).<sup>25</sup> A transition from MPEG-2 to MPEG-4 can deliver video with about 50 percent of the bitrate, and a transition from MPEG-4 to HEVC provides the same gain.<sup>26</sup> As Qualcomm observes, “advanced signal coding and data compression tools allow satellites to deliver the same amount of traffic using less transponders and bandwidth” and this, in turn, is another means to free up spectrum.<sup>27</sup> Concern that compression technology is not “a workable solution” because it risks undermining future video quality enhancements diverts attention from the fact that technologies are available today that can and should be applied for more efficient use of spectrum. And the transition should benefit from this.<sup>28</sup>

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Internet and Television Association Comments, GN Docket No. 18-122, at 22-24 (Oct. 29, 2018) (“NCTA Comments”) Nokia Comments at 14-16; Verizon Comments at 24-25.

<sup>24</sup> See, e.g., C-Band Alliance Comments at 20.

<sup>25</sup> CTIA Comments at 19-20; Qualcomm Comments at 6.

<sup>26</sup> CTIA Comments at 19.

<sup>27</sup> Qualcomm Comments at 6.

<sup>28</sup> Content Companies Comments at 4; see also ACA Comments at 7 (“advancements in digital compression and modulation are weighed against demand for ever-higher resolution content.”).

**B. The Record Also Supports Exploring Delivery Alternatives Such as Fiber and the Use of Other Satellite Spectrum.**

Efforts to repurpose 3.7-4.2 GHz spectrum should not stop at repacking, however.

Multiple parties urge the Commission to consider alternative delivery mechanisms – be it fiber or other satellite spectrum such as the Ku-band or Ka-band. Charter, for example, acknowledges this, stating that any solution must include relocation of existing services to “comparable spectrum bands or transmission methods (such as fiber).”<sup>29</sup>

The record shows that fiber can substantially replace some services delivered over satellite without significant disruption to customers, particularly in urban and suburban areas.<sup>30</sup> Claims to the contrary ring hollow. For example, the suggestion that fiber cannot be an adequate substitute because it is “not available everywhere”<sup>31</sup> and is not ubiquitous, “particularly in rural America”<sup>32</sup> is a strawman. Commenters including CTIA identify fiber as an alternative to accommodate *some* current traffic in areas where it is widely available.<sup>33</sup> Although Comcast expresses concern that fiber is not ubiquitous, it nonetheless acknowledges that fiber “may work in some areas for some providers, particularly in dense urban areas.”<sup>34</sup> Indeed, as T-Mobile explains, “fiber can replace satellite use in many locations.”<sup>35</sup>

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<sup>29</sup> Charter Comments at 4.

<sup>30</sup> *See, e.g.*, T-Mobile Comments at 8-9; Verizon Comments at 14; Ericsson Comments at 15.

<sup>31</sup> C-SPAN Networks Comments, GN Docket No. 18-122, at 3 (Oct. 29, 2018) (“C-SPAN Comments”).

<sup>32</sup> NAB Comments at 5.

<sup>33</sup> *See, e.g.*, CTIA Comments at 17-18; Comcast Comments at ii; Verizon Comments at 14.

<sup>34</sup> Comcast Comments at ii.

<sup>35</sup> T-Mobile Comments at 8-9.

Moreover, concern about fiber redundancy is no reason to rule it out. One need only consider other types of services – such as cloud-based applications – that require high availability and have successfully achieved that goal using fiber delivery systems.<sup>36</sup> Communications providers have vast experience creating redundant networks with fiber, and they market the redundancy in their fiber networks.<sup>37</sup> For example, Zayo “provide[s] [] high-bandwidth infrastructure services to [ ] customers over redundant fiber facilities between critical customer locations.”<sup>38</sup>

As commenters suggest, other satellite bands like the Ku-band or the Ka-band are also viable alternatives to deliver some C-band traffic.<sup>39</sup> Some commenters raise the same strawman argument as above that the Ku-band lacks sufficient capacity to serve all existing C-band traffic.<sup>40</sup> But again, CTIA and others do not assert that the Ku-band will support *all* existing C-band traffic; to the contrary, the use of Ku-band spectrum would form part of a suite of transmission alternatives and, like fiber, would not be a wholesale replacement of all C-Band delivery. Moreover, the record shows that rain fade can be overcome. As CTIA explained, Ku-

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<sup>36</sup> Microsoft, *Microsoft’s Cloud Networks* at 2 (2015) (interconnecting over 1600 unique networks with multiple redundant points using more than 1.4 million route miles of fiber), [http://download.microsoft.com/download/9/9/a/99adce75-5f63-4e47-905c-f511ee7d3786/microsofts\\_cloud\\_networks\\_strategy\\_brief.pdf](http://download.microsoft.com/download/9/9/a/99adce75-5f63-4e47-905c-f511ee7d3786/microsofts_cloud_networks_strategy_brief.pdf).

<sup>37</sup> See Zayo Group Holdings, Inc., Annual Report (Form 10-K) at 1, 5-6 (Aug. 21, 2017), [http://www.annualreports.com/HostedData/AnnualReports/PDF/NYSE\\_ZAYO\\_2017.pdf](http://www.annualreports.com/HostedData/AnnualReports/PDF/NYSE_ZAYO_2017.pdf).

<sup>38</sup> *Id.* Likewise, WideOpenWest, Inc. (“WOW”), touts that its “self-healing” fiber rings that “provide for very rapid, automatic redirection of network traffic so that our service will continue even if there is a single point of failure on a fiber ring.” See WOW Annual Report (Form 10-K) at 12 (Mar. 14, 2017), <https://seekingalpha.com/filings/pdf/12625734.pdf>.

<sup>39</sup> See, e.g., AT&T Comments at 9; Verizon Comments at 13-14; Ericsson Comments at 15; Comments of ITC Global, Inc., GN Docket No. 18-122, at 5 (Oct. 29, 2018); Qualcomm Comments at 5.

<sup>40</sup> C-SPAN Comments at 3-4; Comments of Linkup Communications Corp., GN Docket No. 18-122, at 4 (Oct. 29, 2018) (“Linkup Comments”); NAB Comments at 5-6; NCTA Comments 14-15.

and Ka-band high throughput satellites (“HTS”) use multiple spot beams that take advantage of high antenna gain and higher transmitted signal levels to close links to earth stations at high data rates – and they do so with sufficient rain-fade margin to provide good overall link availability.<sup>41</sup> In addition, technologies like Adaptive Coding and Modulation are helping satellites in the Ku- and Ka-bands overcome rain fades, as a UMTS Forum study has found.<sup>42</sup>

#### **IV. THE RECORD REFLECTS WIDESPREAD OPPOSITION TO CREATING A DEDICATED P2MP SERVICE IN THE 3.7-4.2 GHz BAND.**

##### **A. Commenters Agree that a New Dedicated P2MP Service in the Band is Not Necessary, Would Put C-band Satellite Use at Risk, and Would Curtail Opportunities for Terrestrial, Flexible-Use Services.**

Despite claims by a handful of commenters,<sup>43</sup> the record shows overwhelming opposition to proposals to adopt a dedicated Point-to-Multipoint (“P2MP”) service in the 3.7-4.2 GHz band.<sup>44</sup> As an initial matter, the adoption of flexible-use licenses will permit operators to deploy

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<sup>41</sup> Comments of CTIA, GN Docket No. 17-183, at 10-11 (Oct. 2, 2017) (“[T]he spot beams used by HTS take advantage of high antenna gain, and in turn higher transmitted signal levels, to close links to earth stations at high data rates with sufficient rain-fade margin to provide good overall link availability.”).

<sup>42</sup> UMTS FORUM, STUDY ON SPECTRUM USES, TRENDS AND DEMANDS IN THE RANGE 3400-4200 MHz 2 (Apr. 22, 2014), [https://cept.org/Documents/ecc-pt1/17536/ecc-pt1-14-050\\_study-on-spectrum-uses-trends-and-demands-in-the-range-3400-4200-mhz-c-band](https://cept.org/Documents/ecc-pt1/17536/ecc-pt1-14-050_study-on-spectrum-uses-trends-and-demands-in-the-range-3400-4200-mhz-c-band).

<sup>43</sup> See Broadband Access Coalition Comments, GN Docket No. 18-122, at 4-5 (Oct. 29, 2018) (“BAC Comments”); Comments of Dynamic Spectrum Alliance, GN Docket No. 18-122, at 5-6 (Oct. 29, 2018) (“DSA Comments”); Comments of Frontier Communications Corp. & Windstream Services LLC, GN Docket No. 18-122, at 4-5 (Oct. 29, 2018); Comments of Google LLC, GN Docket No. 18-122, at 1 (Oct. 29, 2018); Microsoft Comments at 3; Comments of the Public Interest Spectrum Coalition, GN Docket No. 18-122, at 12 (Oct. 29, 2018) (“PISC Comments”); Comments of Starry, Inc., GN Docket No. 18-122, at 6 (Oct. 29, 2018) (“Starry Comments”).

<sup>44</sup> See, e.g., AT&T Comments at 13; C-Band Alliance Comments at 39-49; Comcast Comments at 35-36; CTIA Comments at 25-27; Comments of Cumulus Media Inc. & Westwood One, LLC, GN Docket No. 18-122, at 18 (Oct. 29, 2018); Comments of Digital Networks, LLC, GN Docket No. 18-122, at 4-5 (Oct. 29, 2018); Ericsson Comments at 16-17; Intel/Intelsat/SES Comments at 8-9; Comments of GCI Communication Corp., GN Docket No. 18-122, at 21-24 (Oct. 29, 2018); Linkup Comments at 5-6; NCTA Comments at 32; Comments of Nat’l Public Radio, Inc. Comments, GN Docket No. 18-122, at 13-14 (Oct. 29, 2018); Nokia Comments at 9-10; Comments of QVC, Inc. & HSN, Inc., GN Docket No. 18-122, at 9-10 (Oct. 29, 2018); Comments of the Satellite Industry Ass’n, GN Docket No. 18-122, at

fixed wireless broadband services – there is thus no reason to establish a dedicated P2MP service in the 3.7-4.2 GHz band.<sup>45</sup> If any provider wishes to secure use of the band for P2MP services, it can participate in whatever repurposing mechanism the Commission adopts – just like others that propose to use the spectrum for mobile wireless purposes.<sup>46</sup> Nothing the Commission has proposed in the *Notice* would preclude a flexible-use licensee from providing a P2MP service over its spectrum.

The Commission should not adopt a P2MP fixed service in any portion of the 3.7-4.2 GHz band – or create a dedicated P2MP service in the band – because such action would undermine the goal of clearing existing uses and maximizing the amount of spectrum to be repurposed for flexible-use service, including 5G mobility.<sup>47</sup> As commenters explain, a government directive for new fixed P2MP operations “would create a major roadblock to enabling access to the spectrum for mobile operations by making it more difficult for satellite operators to reassign FSS customers to uncleared spectrum.”<sup>48</sup> And longer term, any such proposal would complicate further repurposing by “unnecessarily cluttering” the band and could require the Commission “to sunset those licensees in the future.”<sup>49</sup>

Further, satellite operators and earth station users alike urge the Commission to reject proposals to add a P2MP service in the repacked portion of the 3.7-4.2 GHz band, as such

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31-33 (Oct. 29, 2018) (“SIA Comments”); T-Mobile Comments at 20-22; Comments of the Telecommunications Industry Ass’n, GN Docket No. 18-122, at 8-9 (Oct. 29, 2018) (“TIA Comments”).

<sup>45</sup> Ericsson Comments at 17.

<sup>46</sup> T-Mobile Comments at 21.

<sup>47</sup> Nokia Comments at 9.

<sup>48</sup> Intel/Intelsat/SES Comments at 4.

<sup>49</sup> TIA Comments at 8.

operations would disrupt or severely interfere with satellite operations.<sup>50</sup> Given interference concerns, the C-Band Alliance alternatively notes that the significant exclusion zones needed to protect ubiquitous earth stations would preclude introduction of P2MP operations on any significant scale.<sup>51</sup>

For these reasons, commenters oppose introducing a new, dedicated P2MP service into the C-band – especially given the flexible-use nature of the licenses envisioned for this spectrum and potential available options in other bands.<sup>52</sup> The record shows, for example, that the adjacent Citizens Broadband Radio Service (“CBRS”) band will soon provide spectrum that permits P2MP use.<sup>53</sup> Likewise, the Commission is exploring opening the 4.9 GHz band and portions of the 2.5 GHz band to commercial use.<sup>54</sup>

**B. Calls for an Opportunistic P2MP Regime in the Repurposed Portion of the Band are Misguided.**

The Commission should reject any claims to adopt opportunistic sharing in repurposed terrestrial flexible-use spectrum.<sup>55</sup> Introducing an untested third-party spectrum access regime into the band is inconsistent with the goal of the Commission, Congress, and the Administration for the United States to be first in 5G. Given the nation’s limited mid-band resources, we should

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<sup>50</sup> See, e.g., C-Band Alliance Comments at 39-49; Comcast Comments at 35-36; SIA Comments at 31-33.

<sup>51</sup> C-Band Alliance Comments at 47.

<sup>52</sup> See, e.g., SIA Comments at 24-26; CTIA Comments at 25-26; TIA Comments at 8; C-Band Alliance at 45; see also Starry Comments at 5 (asking for even more dedicated P2MP spectrum, but noting such services have access to CBRS, 5 GHz, 6 GHz, and millimeter wave bands).

<sup>53</sup> TIA Comments at 8 (“The adjacent [CBRS] band will soon be available with 150 MHz of [PAL] and [GAA] spectrum that permits point-to-multipoint use....”).

<sup>54</sup> *Id.*; CTIA Comments at 26.

<sup>55</sup> BAC Comments at 30; Comments of the Broadband Connect America Coalition, GN Docket No. 18-122, at 16-17 (Oct. 29, 2018); DSA Comments at 12; Microsoft Comments at 10; PISC Comments at 13.

not burden such a critical mid-band candidate for wide-scale 5G deployment with an untested opportunistic sharing regime.

First, certainty and transparency are crucial for operators to invest in any band. The Commission must ensure licensees have unfettered access to an environment that is free from harmful interference and must refrain from subjecting new terrestrial, flexible-use licensees to any burdens and uncertainty that are inconsistent with the licensed spectrum rights that they will be paying for. Real-time opportunistic P2MP access could delay licensees' access to the repurposed spectrum and risks interference to new 5G networks that will be deployed in the band. As such, allowing opportunistic use would discourage investment in the band, contrary to the goals of this proceeding.

Second, the 3.5 GHz CBRS "use-or-share" policy has yet to launch, and this is not the time to pursue another experimental sharing regime. As the Wireless Telecommunications Bureau and Office of Engineering and Technology recently stated in the Spectrum Pipeline Act Report to Congress, "[i]t is too soon to know whether [any] other band[] may be suitable for licensed or unlicensed use based on the techniques used in the 3.5 GHz band."<sup>56</sup> The Commission should not import that framework here.

**V. THE COMMISSION MUST ENSURE POWER AND OOB LIMITS SUPPORT INNOVATIVE OPERATIONS WHILE OFFERING SUITABLE PROTECTION.**

The Commission must carefully evaluate the technical proposals in the record to ensure that next-generation services can flourish in the 3.7-4.2 GHz band, while providing suitable protection. CTIA recognizes the C-Band Alliance's efforts and ongoing assessment of the

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<sup>56</sup> *Report to Congress Pursuant to Section 1008 of the Spectrum Pipeline Act of 2015, As Amended by the Ray Baum's Act of 2018*, DA 18-1128, ¶ 26 (rel. Nov. 2, 2018).

technical issues involved, and CTIA will continue to evaluate the technical proposals in the record, particularly the C-Band Alliance's early-filed reply comments that offer a revised approach to power levels and OOB limits different from those in its initial comments.<sup>57</sup>

As an initial matter, however, CTIA reiterates its position that the Commission should refrain from adopting the 75 dBm limit on total power of a base station.<sup>58</sup> The Commission's proposed 75 dBm limit would be summed over all antenna elements for fixed and base stations and would require operators utilizing the large bandwidths needed for 5G to reduce power density in order to comply with the overall power limit.<sup>59</sup> In practice, the proposed 75 dBm limit would mean that for a 100 MHz channel, power density would have to be limited to 316 Watts/MHz, as compared to the 1640 Watts/MHz proposed in the *Notice*. Alternatively, if a base station were operating at a maximum 1640 Watts/MHz, then the widest channel that could be used is about 19.3 megahertz before the 75 dBm total power limit would require a reduction in power density. Instead, to ensure deployment of viable macro networks consistent with the existing LTE grid, the Commission should impose no limit on total power other than the power density limit.

Second, for purposes of a fulsome record, CTIA notes that the C-Band Alliance's initial comments contained problematic proposals to restrict the power levels and OOB limits that would severely limit new flexible-use networks. The previously proposed power level was 16 dB less than the level proposed by the Commission regardless of channelization size and would

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<sup>57</sup> Reply Comments of C-Band Alliance, Technical Annex, GN Docket No. 18-122 (Dec. 7, 2018).

<sup>58</sup> CTIA Comments at 23; *see also* Ericsson Comments at 19.

<sup>59</sup> *Notice* ¶ 165.



have made deployment of 5G over wide channels virtually impossible in the band.<sup>60</sup>

Additionally, the OOB limits proposed were even lower than the Part 15 general emission limits that apply to unintentional emissions from a computer or other digital device. CTIA will review the C-Band Alliance's revised technical proposals submitted with its reply comments and looks forward to continued constructive dialogue.

## **VI. CONCLUSION.**

CTIA reiterates its support for the Commission's continuing efforts to repurpose mid-band spectrum for flexible use while protecting existing satellite uses. By taking the steps recommended herein and in CTIA's comments, the Commission will help America's efforts to lead in the race to 5G and will help meet consumer demand, promote competition, and ensure a vibrant, innovation-based mobile economy in the 5G world.

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<sup>60</sup> See e.g., CTIA Comments at 23; Ericsson Comments at 19; AT&T Comments at 20; Verizon Comments at 23-24; T-Mobile Comments at 32.

Respectfully submitted,

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