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

In the Matter of )  
 ) ET Docket No. 18-21  
Spectrum Horizons )

**COMMENTS OF T-MOBILE USA, INC.**

T-Mobile USA, Inc. (“T-Mobile”)<sup>1/</sup> submits these comments in the above-referenced proceeding in which the Commission proposes rules for the licensed use of the 95-100 GHz, 102-109.5 GHz, 111.8-114.25 GHz, 122.25-123 GHz, 130-134 GHz, 141-148.5 GHz, 151.5-158.5 GHz, 174.5-174.8 GHz, 231.5-232 GHz, and 240-241 GHz bands (collectively, “spectrum above 95 GHz”).<sup>2/</sup> T-Mobile applauds the Commission’s spectrum management efforts. Adoption of rules governing terrestrial operations in the spectrum above 95 GHz will facilitate use of the bands for mobile wireless broadband backhaul. In adopting rules governing these bands, the Commission should consider the following:

- The rules should contemplate a path to potential mobile use of the spectrum above 95 GHz.
- While the regulations governing the 70/80/90 GHz bands are generally appropriate for the spectrum above 95 GHz, the Commission should modify the rules applicable to antennas operating above 95 GHz; the 70/80/90 GHz bit rate requirement should be relaxed as proposed; and performance reporting requirements should be imposed.
- Radio astronomy service (“RAS”) and earth exploration satellite service (“EESS”) can be protected by terrestrial operations in the spectrum above 95 GHz.
- The Commission should not reflexively extend satellite access to the bands in which it proposed to adopt terrestrial service rules.

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<sup>1/</sup> T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

<sup>2/</sup> *Spectrum Horizons, et al.*, Notice of Proposed Rulemaking and Order, ET Docket No. 18-21, *et al.*, FCC 18-17, at ¶ 31 (2018) (“*NPRM*”).

## I. INTRODUCTION AND SUMMARY

T-Mobile, including the MetroPCS brand, offers nationwide wireless voice, text, and data services to 74 million subscribers.<sup>3/</sup> In the first quarter of 2018, T-Mobile added 1.4 million net customers – marking twenty straight quarters of adding more than 1 million customers every quarter.<sup>4/</sup> T-Mobile also saw continued growth in postpaid phone customers – with postpaid net additions expected to lead industry for the seventeenth consecutive quarter<sup>5/</sup> – and continued success at MetroPCS.<sup>6/</sup> Moreover, T-Mobile is continuing to deploy and expand new technologies. It announced that it will build out Fifth Generation (“5G”) technology in thirty cities this year using its 600 MHz and millimeter wave band spectrum.<sup>7/</sup>

T-Mobile’s continued growth is representative of consumers’ surging demand for mobile data capacity. By 2022, the average traffic per subscriber in North America will be 22 GB per month.<sup>8/</sup> This trend – and the corresponding demand for wireless network capacity – will continue. Wireless network growth, in general, and the deployment of denser networks with additional base station facilities, in particular, means there will be a need for more backhaul capacity. The proposed use of the spectrum above 95 GHz may be able to help meet that demand. However, the Commission should modify the proposed rules in several ways that will

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<sup>3/</sup> See T-Mobile News Release, *T-Mobile Celebrates 5 Years as a Public Company with Record-Low Churn, Industry-Leading Customer Growth, and Strong Profitability*, (May 1, 2018), <https://newsroom.t-mobile.com/news-and-blogs/q1-2018-earnings.htm>.

<sup>4/</sup> See *id.*

<sup>5/</sup> See *id.*

<sup>6/</sup> See *id.*

<sup>7/</sup> T-Mobile News Release, *T-Mobile Building Out 5G In 30 Cities This Year...And That’s Just The Start* (Feb. 27, 2018, 11:45 AM), <http://investor.t-mobile.com/file/Index?KeyFile=392359656>.

<sup>8/</sup> ACCENTURE, *HOW THE WIRELESS INDUSTRY POWERS THE U.S. ECONOMY* (2018), <https://api.ctia.org/wp-content/uploads/2018/04/Accenture-Strategy-Wireless-Industry-Powers-US-Economy-2018-POV.pdf>.

make the spectrum above 95 GHz even more productive – now and in the future – for terrestrial operations.

## **II. ADDITIONAL CAPACITY WILL BE REQUIRED FOR 5G BACKHAUL**

Backhaul, which is typically accomplished using either fiber or microwave spectrum, provides base station facilities the two-way connections needed to create a wireless network. Wireless backhaul can be preferable to fiber in cases where fiber has high installation costs and geographical limitations. Wireless backhaul with high-bandwidth capacity, in particular, could be important to the success of 5G as the technology evolves and the demand for wireless data increases.<sup>9/</sup> High-speed wireless backhaul will help enable T-Mobile and other wireless providers to deliver a high quality of service to consumers for business, communications, and entertainment purposes.

5G mobile broadband technology – including T-Mobile’s use of millimeter wave spectrum – will require far more cell sites.<sup>10/</sup> Estimates indicate that over 800,000 new small cells will be deployed by 2026.<sup>11/</sup> These additional cell sites will be required for several reasons. *First*, 5G networks will make increasing use of higher band spectrum, which has more limited

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<sup>9/</sup> See Comments of Chairman Pai, Mobile World Congress, [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-349432A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-349432A1.pdf) (“Of course, 5G infrastructure isn’t just about small cells; it’s also about backhaul.”). Indeed, the Commission’s Technological Advisory Council convened a new working group to examine “how antennas are regulated and whether there are rules that could get in the way of technology.” *Antennas, 5G Getting Attention as TAC Launches Work on Busy Agenda*, COMMUNICATIONS DAILY, Apr. 13, 2018, <https://communicationsdaily.com/article/view?s=216825&id=545841>.

<sup>10/</sup> David Abecassis, Chris Nickerson, & Janette Stewart, GLOBAL RACE TO 5G – SPECTRUM AND INFRASTRUCTURE PLANS AND PRIORITIES, ANALYSIS MASON 5 (2018), [https://api.ctia.org/wp-content/uploads/2018/04/Analysys-Mason-Global-Race-To-5G\\_2018.pdf](https://api.ctia.org/wp-content/uploads/2018/04/Analysys-Mason-Global-Race-To-5G_2018.pdf) (“Mobile networks are already being densified to support the substantial increase in data traffic that networks are now carrying; it is widely expected that 5G will result in a greater need for small-cell deployment. This is particularly true for initial deployments using high band spectrum above 6 GHz (24, 28, 39 GHz), where the signal travels far less distance than existing low and mid band frequencies.”).

<sup>11/</sup> CTIA, *Infrastructure*, <http://www.ctia.org/positions/infrastructure/> (last visited Apr. 16, 2018).

propagation characteristics – meaning more antennas will be required to cover a geographic area using that spectrum. *Second*, in order to increase capacity, spectrum will be re-used more often, employing antennas with lower power and lower height. While current broadband networks incorporate wireless backhaul in order to link cell sites, the anticipated increase in the number of cell sites will produce a greater need for wireless backhaul capacity. Therefore, making additional spectrum available for 5G backhaul is important to maintaining U.S. leadership in wireless technologies.<sup>12/</sup>

The spectrum above 95 GHz is well-suited to support 5G backhaul. *First*, these spectrum bands can support wide bandwidths – up to 5 GHz – which means that they can carry high-bandwidth wireless traffic “where installation of a fiber optic line is difficult.”<sup>13/</sup> Their ability to carry data over short ranges makes the spectrum bands an ideal candidate for 5G backhaul. *Second*, these bands feature narrow beamwidths. Many links can coexist in the same geographical area because tighter beams are less likely to cause interference. As discussed in the *NPRM*, the narrow beams in the spectrum above 95 GHz “greatly reduce the likelihood of alignments that would produce main beam coupling with other users of the spectrum.”<sup>14/</sup>

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<sup>12/</sup> In total, the Commission could make 36 gigahertz of spectrum in the 95-275 GHz range available for backhaul applications.

<sup>13/</sup> *NPRM* ¶ 13.

<sup>14/</sup> *Id.* ¶ 25.

### III. THE COMMISSION MUST CONSIDER POTENTIAL CONVERSION TO MOBILE SERVICES

The Commission proposes service rules covering fixed use of the spectrum above 95 GHz available for licensing. Most of that spectrum is also allocated for mobile operations.<sup>15/</sup> However, the Commission proposes no mobile service rules for the spectrum. T-Mobile generally supports this approach. However, while technology does not exist today to support mobile applications in frequencies above 95 GHz, it may in the future. Technology can accomplish today what was considered inconceivable only a few years ago. For example, in the Spectrum Frontiers proceeding, the Commission permitted mobile use of spectrum in, among others, the 24 GHz, 28 GHz, and 39 GHz bands – all of which were initially designated by the Commission for fixed operations with little consideration that they might be capable of mobile use in the future.<sup>16/</sup>

In authorizing *fixed* use of the spectrum above 95 GHz, the Commission should therefore be mindful of the potential to use the spectrum for *mobile* service in the future. As noted above, the Commission recently adopted rules permitting licensees of some millimeter wave spectrum to use mobile technologies.<sup>17/</sup> This approach was feasible because the Commission employed geographic area licensing throughout the bands, which allows licensees to coordinate uses.<sup>18/</sup>

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<sup>15/</sup> *Id.* ¶ 3, Table 1.

<sup>16/</sup> *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, ¶¶ 30-31, 76 (2016); *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988, ¶ 22 (2017).

<sup>17/</sup> *Id.*

<sup>18/</sup> *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, ¶¶ 30, 79 (2016).

On the other hand, converting spectrum for mobile use does not appear feasible at 70 and 80 GHz because, among other reasons, of the proliferation of individual links throughout the bands. As discussed below, T-Mobile generally supports the Commission’s approach to using the 70/80/90 GHz band rules as a model for spectrum use above 95 GHz. Nevertheless, as demonstrated by the difficulty in permitting mobile use in the 70/80/90 GHz bands in the Spectrum Frontiers proceeding, the Commission should consider now how it might permit use of the bands above 95 GHz for mobile use in the future. At a minimum, entities that use the spectrum for point-to-point operations must be on notice that geographic licensing of the spectrum for mobile use may be permitted in the future and their operations may be subject to that use.

#### **IV. THE 70/80/90 GHZ APPROACH IS GENERALLY A REASONABLE BLUEPRINT**

The Commission proposes to extend the rules that currently govern the 70/80/90 GHz bands for fixed point-to-point operations to the spectrum above 95 GHz,<sup>19/</sup> and seeks comment on whether the existing rules should be modified based on operational experiences with 70/80/90 GHz systems.<sup>20/</sup> The 70/80/90 GHz rules serve as a reasonable baseline from which to create rules for the spectrum above 95 GHz. The light licensing approach is well-suited to provide rapid access to point-to-point links in the 70 GHz and 80 GHz bands which, in turn, permits quick deployment of high speed connections between access points and T-Mobile’s core network.<sup>21/</sup> However, adoption of rules covering the spectrum above 95 GHz should differ from

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<sup>19/</sup> *NPRM* ¶¶ 33-34, 36. The Commission clarifies that certain rules for the 70/80/90 GHz band are different for the 70/80 GHz bands in comparison to the 90 GHz band. *See id.* ¶ 33.

<sup>20/</sup> *Id.* ¶¶ 36-37.

<sup>21/</sup> *See* Letter from John Hunter, Sr. Director, Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-153, WT Docket No. 15-244, at 1-2 (filed Jan. 18, 2018) (“T-Mobile January 2018 Letter”).

those governing the 70/80/90 GHz band in several ways. *First*, as noted above, the rules must contemplate that the bands above 95 GHz may be used for mobile operations in the future.

*Second*, the Commission should adjust the proposed antenna standards. The Commission particularly seeks comment on whether its current antenna gain standards for the 70/80 GHz bands allow the use of small planar antennas that are necessary for the deployment of 5G.<sup>22/</sup> The antenna standards the Commission proposes – that are generally applicable to the 70/80/90 GHz bands – would *not* permit the use of those antennas and are *not* well-suited to the deployment of devices likely to be used in the spectrum above 95 GHz. The record in related proceedings indicates that those standards will prevent use of antennas best suited to support existing LTE and future 5G networks.<sup>23/</sup> T-Mobile has supported those recommended changes.<sup>24/</sup> The inability to deploy these smaller antennas is particularly problematic when municipalities and zoning boards increasingly demand such small cell architecture because of aesthetics. Therefore, the Commission should adopt more flexible antenna standards for the spectrum above 95 GHz that are in line with the proposals of the Fixed Wireless Communications Coalition (“FWCC”), Aviat Networks (“Aviat”), and CBF Networks, Inc., d/b/a Fastback Networks (“Fastback”).<sup>25/</sup> In particular, T-Mobile agrees with others that have recommended the following changes to the

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<sup>22/</sup> NPRM ¶ 37.

<sup>23/</sup> *Id.* ¶¶ 36, note 104. See Comments of the Fixed Wireless Communications Coalition in Response to the Commission’s Notice of Inquiry, WT Docket No. 10-153 (filed Oct. 5, 2012) (“FWCC NOI Comments”); Aviat Networks, Request for Waiver, WT Docket No. 15-244 (filed Apr. 5, 2013) (“Aviat Waiver Request”); Aviat Networks, Amendment to Request for Waiver, WT Docket No. 15-244 (filed Mar. 24, 2014) (“Aviat Amended Waiver Request”); CBF Networks, Inc., Request for Waiver, WT Docket No. 15-244 (filed June 19, 2015) (“Fastback Waiver Request”).

<sup>24/</sup> T-Mobile January 2018 Letter at 2.

<sup>25/</sup> FWCC NOI Comments; Aviat Amended Waiver Request; Fastback Waiver Request.

rules governing the 80/90 GHz bands – changes that should be extended to the spectrum above 95 GHz:

- *Relax the antenna gain standards* – The Commission proposes a minimum antenna gain of 43 dBi. As FWCC and others have pointed out, an appropriate minimum antenna gain is 38 dBi.<sup>26/</sup>
- *Permit wider maximum beamwidth* – The Commission proposes a maximum beamwidth of 1.2 degrees. Instead, the Commission should adopt a maximum beamwidth of 2.2 degrees.<sup>27/</sup>
- *Apply the co-polar discrimination requirement to a range of angles 2.5-5 degrees from the centerline.* The proposed rules contemplate application of the standard between 1.2 and 5 degrees from the centerline.<sup>28/</sup>
- *Relax the required cross-polarization discrimination to 21 dB.* The proposed rules would require that cross polarization be at least 25 dB.<sup>29/</sup>
- *Reduce the required magnitude of co-polar discrimination from to G-33 dB.* The rules would require co-polarization to be G-28 dB, where G is the antenna gain in dBi.<sup>30/</sup>

In addition, the Commission should:

- *Allow for Category A and Category B Antennas* – The proposed rules do not contemplate different classes of antennas, which is inconsistent with the Commission’s treatment of antennas in other microwave bands. As FWCC has explained, more stringent Category A antennas will likely continue to be used for traditional microwave applications, such as point-to-point rooftop interconnections. The adoption of a Category B will allow the deployment of small, visually inoffensive planar antennas for installation closer to street level in support of high-capacity, small-cell urban backhaul.<sup>31/</sup>
- *Allow for Polarizations  $\pm 45$  degrees.* The proposed rules only permit horizontal and vertical polarizations. As the FWCC has noted, polarizations at  $\pm 45$  degrees – slant

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<sup>26/</sup> Comments of Google Inc. and Google Fiber Inc., GN Docket No. 14-177 *et. al*, at 5 (filed Sept. 30, 2016); FWCC 2012 Comments at 6; Aviat Waiver Request at 11.

<sup>27/</sup> FWCC 2012 Comments at 6.

<sup>28/</sup> Aviat Waiver Request at 10; Letter from Mitchell Lazarus, Counsel, Fixed Wireless Communications Coalition, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-153, at 2 (filed Mar. 24, 2014) (“FWCC March 2014 Letter”).

<sup>29/</sup> Aviat Waiver Request at 10,12; FWCC March 2014 Letter at 2.

<sup>30/</sup> Aviat Amended Waiver Request at 2-3; FWCC March 2014 Letter at 2.

<sup>31/</sup> T-Mobile January 2018 Letter at 2; FWCC 2012 Comments at 5.

polarizations – will likely provide several benefits, such as enhancing coordination efforts in congested areas and helping operators avoid interference.<sup>32/</sup> With respect to flat antennas, slant polarizations are preferable because they improve azimuth and elevation radiation patterns.<sup>33/</sup>

These changes would permit deployment of small, unobtrusive antennas without causing additional interference or precluding others from using the band. It would allow all parties to make better use of the spectrum above 95 GHz and incentivize deployment in the bands.

*Third*, the Commission should eliminate the bit rate requirement. Under the Commission’s current rules, systems in the 70/80 GHz bands using digital modulation must have a minimum bit rate of 0.125 bits/second/Hz, and systems in 90 GHz bands using digital modulation must have a minimum bit rate of 1 bit/second/Hz. The Commission proposes adopting the 70/80 GHz bit rate requirement for the spectrum above 95 GHz.<sup>34/</sup> But even that limit may be unnecessary. A bit rate requirement is contrary to the Commission’s general practice of not imposing operational standards.<sup>35/</sup> Licensees should be permitted to choose a bit rate that is most appropriate for the applications that links are intended to support. While the Commission may appropriately wish to ensure that spectrum is used efficiently, several factors should ameliorate that concern in this case. The links that will likely be used in the bands above 95 GHz will likely be narrow and comparatively short. Therefore, even less efficient use of the spectrum by one licensee should not impede its use in the same area by others. Further, if, as recommended below, the Commission imposes performance reporting requirements, spectrum

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<sup>32/</sup> FWCC NOI Comments at 7-8.

<sup>33/</sup> *Id.*

<sup>34/</sup> *NPRM* ¶ 33.

<sup>35/</sup> *See, e.g., Amendment of the Commission’s Rules to Establish New Personal Communications Services*, Memorandum Opinion and Order, GN Docket No. 90-314, 9 FCC Rcd 4957, ¶ 162 (1994) (“We continue to believe that a flexible approach, applying only those standards necessary to prevent interference, is appropriate.”).

availability will increase – based on the deletion of inactive links from the databases – even if less efficient links are installed.

*Finally*, contrary to the proposed rules, T-Mobile recommends that the Commission impose a performance reporting requirement at the end of the time permitted for construction of individual links. Currently, as the FWCC points out, “[f]or a registration to be compliant with the Commission’s rules . . . it must be accurate within one second (longitude/latitude) and one meter (vertically) of where the equipment is deployed.”<sup>36/</sup> To comply with this rule, licensees often “reserve” links – receiving additional registrations at various location sites and heights for one single transmit site – without having used them.<sup>37/</sup> The Commission proposes requiring link construction to be completed within 12 months of registration.<sup>38/</sup> A construction deadline alone, however, is not enough. Licensees should be required to certify that the facilities associated with the site registration and the frequencies are in use. Without a performance reporting requirement, the Commission is unaware of whether a licensee’s registrations are in use. Failure to report construction should then, as FWCC recommends, result in deletion of unused database registrations.<sup>39/</sup> Database managers must also actively remove registrations for links that licensees never built.

Without implementing a construction notification requirement, the Commission will be unaware of the frequencies that are actually being used, which will limit the use of spectrum by

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<sup>36/</sup> Letter from Cheng-yi Liu & Mitchell Lazarus, Counsel, Fixed Wireless Communications Coalition, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-153, RM-11610, at 4 (filed Nov. 30, 2016) (“FWCC November 2016 Letter”).

<sup>37/</sup> Letter from Cheng-yi Liu & Mitchell Lazarus, Counsel, Fixed Wireless Communications Coalition, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-153, RM-11610, at 4-5 (filed Feb. 13, 2018).

<sup>38/</sup> *NPRM* ¶ 32.

<sup>39/</sup> FWCC November 2016 Letter at 4.

others. The performance reporting requirement informs the Commission of the spectrum that is available for current licensees and subsequent licensees.<sup>40/</sup> Moreover, without a reliable representation of the available spectrum, the Commission will be potentially unable to convert the spectrum to mobile use in the future, if it pursues that option. This is one of the challenges facing the potential use of the 3.7-4.2 GHz band for mobile broadband today. As multiple parties have noted, the Commission’s database does not accurately reflect the earth stations that may be using the spectrum because Fixed Satellite Service (“FSS”) incumbent users do not routinely cancel authorizations for stations not in use. The Commission must avoid this outcome with respect to the spectrum above 95 GHz.

## **V. PROTECTION OF OTHER SERVICES**

The Commission seeks comment on protecting existing radio astronomy services (“RAS”) and Earth Exploration Satellite Service (“EESS”) operations from harmful interference while also expanding the uses of the spectrum above 95 GHz to fixed and mobile operations.<sup>41/</sup> As T-Mobile has demonstrated with respect to the 32 GHz and 50 GHz bands, 5G deployments can coexist with RAS by adopting reasonable exclusion zones and the EESS by implementing modest operating constraints.<sup>42/</sup> Adopting exclusion zones – based on the operational characteristics of 5G systems likely to be deployed in the band – around authorized RAS sites

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<sup>40/</sup> *Id.*

<sup>41/</sup> *NPRM* ¶¶ 43-45.

<sup>42/</sup> *See* Letter from Steve Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (filed Oct. 2, 2017). In response, the National Radio Astronomy Observatory, the Green Bank Observatory and the Long Baseline Observatory (collectively, “NRAO”) submitted a proposal that confirms T-Mobile’s essential assertion – that 5G deployments and radio astronomy can coexist in the band by adopting reasonable exclusion zones. *See* Letter from Harvey S. Liszt, Astronomer and Spectrum Manager, National Radio Astronomy Observatory, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177, *et al.*, (filed Feb. 7, 2018).

can ensure that they operate without suffering harmful interference, while constraining mobile broadband coverage to less than two percent of the United States' population in a worst-case scenario. Notably, T-Mobile's 32 GHz and 50 GHz study relied on conservative inputs that overstate the potential likelihood of harmful interference to RAS and EESS operations. The study shows that even under worst-case assumptions and conditions, the Commission can protect RAS, EESS, and other passive services against harmful interference by adopting reasonable exclusion zones (for RAS) or modest operating constraints (for EESS) on new 5G broadband services.<sup>43/</sup> Similar exclusion zones and operating constraints, based on the bands' propagation characteristics, can be developed for the spectrum above 95 GHz.

The Commission also seeks comment on extending the 70/80/90 GHz bands proposal to the bands above 95 GHz that have shared allocations with FSS or Mobile Satellite Service ("MSS") operations.<sup>44/</sup> The Commission believes that sharing here would be similar to the proposed sharing arrangements between Upper Microwave Flexible Use Service and FSS in the 27.5-28.35 GHz band and 37.5-40 GHz band. The Commission should not adopt this proposal for several reasons. *First*, as T-Mobile and others have demonstrated in the Spectrum Frontiers proceeding, any proposed FSS use of spectrum designated for terrestrial operations will necessarily limit terrestrial providers' ability to deploy the spectrum.<sup>45/</sup> *Second*, and more

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<sup>43/</sup> See Letter from Steve Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (filed Oct. 2, 2017).

<sup>44/</sup> *NPRM* ¶¶ 39, 46-48. The bands above 95 GHz that have shared allocation with FSS are: the 158.5-164 GHz, 167-174.5 GHz, 209-226 GHz, 232-235 GHz, 238-240 GHz, and 265-275 GHz bands. *Id.* ¶ 46.

<sup>45/</sup> See, e.g., Opposition to Petitions for Reconsideration of T-Mobile, GN Docket No. 14-177 *et. al.*, at 17 (filed Jan. 31, 2017) ("The requests by the satellite industry, however, would decrease the utility of millimeter wave spectrum for mobile terrestrial use. While there may be small rural areas that would be better or more quickly served by satellite broadband, it would be contrary to the public interest and the purpose of the proceeding to inhibit terrestrial mobile services' use of these bands nationwide in order to benefit only a small fraction of the public."); Opposition to Petitions for Reconsideration of 5G Americas,

fundamentally, the Commission’s continued attempts to create additional capacity for satellite operations is simply misguided – particularly when it requires limitation of other services. There has been no demonstrated requirement for use of this spectrum by satellite providers, unlike the need for terrestrial use, where backhaul requirements are demonstrable. Therefore, the Commission should not adopt service rules at this time for satellite use of the spectrum. If there is a demonstrated requirement in the future, the Commission can revisit the issue then. By that time, there may be more information on the use cases for terrestrial operations and therefore more information on how terrestrial operations can be protected.

## **VI. CONCLUSIONS**

The spectrum above 95 GHz is poised to help propel the deployment of 5G services. Facilitating the efficient use of this spectrum would help meet the growing need for additional backhaul facilities. Using the rules for the 70/80/90 GHz bands as a guide, the Commission should consider ways to convert this spectrum from fixed use to flexible use. The Commission, however, should not adopt the 70/80/90 GHz rules for the spectrum above 95 GHz without modifying its current antenna standards.

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GN Docket No 14-177, *et. al*, at 5 (“The satellite Petitioners in effect ask for approximately 10 GHz of spectrum, with no demonstration that they would be able to deliver services at 5G speeds. 5G Americas believes it is not good public policy to allocate such a substantial amount of spectrum on a co-primary basis to providers that can only deliver services at speeds that are two generations behind. Such a reconsideration of the Commission’s decision would not ensure our Nation’s 5G future, but would in fact threaten it, and threaten the U.S. leadership in wireless broadband.”) (filed Jan. 31, 2017); Opposition to Petitions for Reconsideration of CTIA, GN Docket No. 14-177, *et. al*, at 9 (filed Jan. 31, 2017) (“CTIA notes that Boeing’s proposals, if adopted, would artificially limit the flexibility needed to provide mobile broadband services. . . . The Commission should therefore reject this argument as counterproductive to the agency’s expressly stated purpose in this proceeding.”).

Respectfully submitted,

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