## Before the FEDERAL COMMUNICATIONS COMMISSION Washington, D.C. 20054

In the Matter of	)	
	)	
AST&Science LLC	)	
	)	IBFS File Nos. SAT-PDR-20200413-00034,
	)	SAT-APL-20200727-00088, and
Petition for Declaratory Ruling Granting	)	SAT-APL-20201028-00126
Access to the U.S. Market for a	)	
Non-U.SLicensed Non-Geostationary	)	Call Sign S3065
Orbit Satellite Constellation	)	

## CONSOLIDATED RESPONSE AND OPPOSITION TO PETITIONS TO DENY

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#### EXECUTIVE SUMMARY

Transformative technologies disrupt. This fact has spurred both broad support and vocal responses to AST&Science LLC's ("AST") request from the International Bureau for access to V band spectrum.<sup>17</sup> In partnership with leading aerospace companies, AST will construct and launch SpaceMobile, an innovative Low Earth Orbit ("LEO") satellite constellation that will serve the entire United States with cost-effective, high-speed wireless broadband services. SpaceMobile's innovative broadband solution transcends the challenges of terrestrial broadband connectivity in hard-to-reach areas, where topography, an inability to recover deployment costs, and other issues relegate American citizens and entire communities to the wrong side of the digital divide. SpaceMobile's services – compliant with all emission limits governing both V band and terrestrial wireless frequencies – will be available to any licensee electing to enter into an agreement with AST.

Such a groundbreaking network – unsurprisingly – may be a revelation to some, and certainly AST intends to coordinate with the wireless community about the best approach. As Chairman Pai remarked,

Whenever a technological innovation creates uncertainty, some will always have the knee-jerk reaction to presume it's bad. They'll demand that we do whatever's necessary to maintain the status quo. . . . Regulate new services with the paradigms of old. But we should resist that temptation. . . . History tells us that it is not preemptive regulation, but permissionless innovation made possible by competitive free markets that best guarantees consumer welfare. A future enabled by the next generation of technology can be bright, if only we choose to let the light in.<sup>2/</sup>

<sup>&</sup>lt;sup>1/</sup> AST&Science LLC, Petition for Declaratory Ruling Granting Access to the U.S. Market for a Non-U.S. Licensed Non-Geostationary Orbit Satellite Constellation, SAT-PDR-20200413-00034, SAT-APL-20200727-00088 and SAT-APL-20201028-00126 (filed April 13, 2020) (amended July 27, 2020 and October 28, 2020) ("PDR").

<sup>&</sup>lt;sup>2/</sup> Remarks of FCC Chairman Ajit Pai at the Resurgent Conference, Austin, TX (Aug. 3, 2018).

Free markets, and the right of American consumers to be connected regardless of where they live or work, should prevail. So long as other users are protected, which AST has demonstrated can be done, terrestrial wireless licensees should be allowed to address the digital divide through any technology. Indeed, FCC leadership has recognized the role of satellites in achieving this goal, with Chairman Pai noting that "NGSO[] constellations could be a game changer, benefiting Americans across the country and making highspeed Internet access a reality for more consumers-particularly those in remote and hard-to-serve areas."<sup>3/</sup> And Commissioner Starks explained that "satellite providers can provide service to everyone once their satellites are operational, regardless of where they live or the population density of their community. Next-gen satellite broadband technology holds tremendous promise for connecting people in the hardest-to-reach communities in rural America."4/ Similarly, Commissioner Rosenworcel has determined that universal broadband is "a right... no longer a luxury,"<sup>5/</sup> calling for "a national policy of 100 percent of our households online . . . No individual, household or community is going to have a fair shot at success in the 21st century without it."<sup>6</sup>/ Furthermore, the U.S. Senate Appropriations Committee just noted the importance of providing universal service through direct satellite to cellular capability such as what

<sup>&</sup>lt;sup>3/</sup> *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 4156 (2020), Statement of Chairman Pai.

<sup>&</sup>lt;sup>4/</sup> *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 4156 (2020), Statement of Commissioner Starks.

<sup>&</sup>lt;sup>5/</sup> Remarks of Commissioner Rosenworcel, Brookings Webinar "What's being done to address the growing US digital divide" (April 8, 2020), noted in <u>https://www.meritalk.com/articles/mobility-broadband-no-longer-a-luxury-fcc-commissioner-says/</u>.

<sup>&</sup>lt;sup>6/</sup> Damare Baker et al., *Democrats Call for Narrowing Digital Divide to Help Students During Pandemic*, THE HILL, Sept. 10, 2020, https://thehill.com/policy/technology/515947-democrats-call-for-narrowing-digital-divide-to-help-students-during.

SpaceMobile will provide, encouraging the FCC to address regulatory hurdles to deployment.<sup>7</sup>/

The Commission should approve AST's Petition for Market Access. Most importantly, AST is seeking authority in this proceeding only to operate feeder links at fixed locations on V band frequencies. AST's request here, contrary to the suppositions in some comments, is not to provide mobile services on V band frequencies and is not to operate on exclusively terrestrial frequencies. Petitions filed related to wireless terrestrial frequencies must be dismissed as moot. Service to handsets on frequencies authorized to terrestrial users will be provided pursuant to lease agreements with terrestrial licensees, with any required regulatory relief addressed at that time.<sup>8/</sup> Interested parties will have a fair opportunity then to comment on the proposed cooperative use of mobile spectrum pursuant to leasing arrangements. This approach is entirely consistent with the Commission's goals and legal requirement to enable technological innovation that is in the public interest.<sup>9/</sup>

<sup>&</sup>lt;sup>7/</sup> U.S. Senate Appropriations Committee's Explanatory Statement of the Financial Services and General Government Appropriations Bill for Fiscal Year 2021, p. 58 (rel Nov. 10, 2020).

<sup>&</sup>lt;sup>8/</sup> AST&Science Amendment to Petition for Declaratory Ruling, SAT-APL-20200727-00088, SAT-PDR-20200413-00034, at 7 (Oct. 28, 2020) ("October Amendment").

<sup>&</sup>lt;sup>9/</sup> See, e.g., Encouraging the Provision of New Technologies and Services to the Public, Notice of Proposed Rulemaking, 33 FCC Rcd 2512 at ¶ 8 (2018) (noting that Section 7 of the Communications Act "reflects clear Congressional intent to encourage and expedite provision of technological innovation that would serve the public interest.").

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Orbit Satellite Constellation	)	-

## CONSOLIDATED RESPONSE AND OPPOSITION TO PETITIONS TO DENY

AST&Science LLC ("AST"), pursuant to Section 25.154(c) of the rules of the Federal

Communications Commission ("FCC" or "Commission"),<sup>10/</sup> files this Consolidated Response

and Opposition to Petitions to Deny<sup>11/</sup> and comments<sup>12/</sup> addressing AST's Petition for

Letter from Samantha Fonder, Representative to the Commercial Space Transportation Interagency Group Human Exploration and Operations Mission Directorate, Launch Services Office, NASA, to Ms. Marlene Dortch, Secretary, FCC, SAT-PDR-20200413-00034 (Oct. 29, 2020) ("NASA "Letter"); Comments of the Boeing Company, IBFS File Nos. SAT-PDR-20200413-00034, SAT-APL-20200727-00088, SAT-APL202001028-00126, Call Sign S3065 (filed Nov. 2, 2020) ("Boeing Comments"); Comments of Kuiper Systems, LLC, Call Sign S3065 File Nos. SAT-PDR-20200413-00034, SAT-APL-20200727-00088 (filed Nov. 2, 2020) ("Kuiper Comments"); Comments of Telesat Canada, SAT-PDR-20200413-00034 and SAT-APL-20200727-00088 (filed Nov. 2, 2020) ("Telesat Canada Comments"); Comments of TechFreedom, SAT-PDR-20200413-00034 SAT-APL-20200727-00088 (filed Nov. 2, 2020) ("Tech Freedom Comments"); Comments of Sirius XM Radio Inc., SAT-PDR-20200413-00034, SAT-APL-20200727-00088, & SAT-APL-20201028-00126 (filed Nov. 2, 2020); Letter from Stephen J. Berman, Counsel, Globalstar, Inc., to Marlene Dortch, Secretary, FCC, SAT-PDR-20200413-00034, SAT-APL20200727-00088, & SAT-APL-20201028-00126 (filed Nov. 2, 2020) ("Globalstar Letter").

<sup>&</sup>lt;sup>10/</sup> 47 C.F.R. § 25.154(c).

<sup>&</sup>lt;sup>11/</sup> Petition to Deny of CTIA, SAT-PDR-20200413-00034 SAT-APL-20200727-00088 SAT-APL-20201028-00126, Call Sign S3065 (filed Nov. 2, 2020) ("CTIA Pet."); Petition to Deny of T-Mobile USA, Inc., SAT-APL-20200727-00088, SAT-PDR- 20200413-00034 & SAT-APL-20201028-00126 (Nov. 2, 2020) ("T-Mobile Pet."); Petition to Deny of Hughes Network Systems, LLC, EchoStar Mobile Limited, and EchoStar Global Australia Pty Ltd (collectively, "EchoStar"), SAT-PDR-20200413-00034 SAT-APL-20200727-00088 SAT-APL-20201028-00126, Call Sign S3065 (filed Nov. 2, 2020) ("EchoStar Pet."); Petition to Deny of Verizon, SAT-PDR-20200413-00034 SAT-APL-20200727-00088 SAT-APL-20201028-00126, Call Sign S3065 (filed Nov. 2, 2020) ("Serizon Pet.").

Declaratory Ruling, as amended ("PDR").<sup>13/</sup> AST seeks authority to allow its 243-satellite Low Earth Orbit ("LEO") SpaceMobile constellation to operate on V band frequencies in the United States. For the reasons discussed below, the FCC should grant AST's request expeditiously.

#### I. INTRODUCTION

On April 13, 2020, AST requested authority to operate SpaceMobile in the United States. AST's NGSO SpaceMobile satellite network will allow terrestrial wireless licensee partners to offer their customers access to service throughout all U.S. states, Puerto Rico, the U.S. Virgin Islands, and all U.S. territories using off-the-shelf, unmodified user equipment such as LTE and 5G mobile phones.<sup>14/</sup> The SpaceMobile network will be a major step in bridging the digital divide – the Commission's highest priority<sup>15/</sup> – by allowing carriers to provide universal broadband access, regardless of the availability of terrestrial infrastructure. AST's satellites will be able to bring the benefits of broadband to Americans in geographic areas that remain unserved because the economic use case to bring terrestrial wireless broadband to those areas simply does not exist – whether due to prohibitive costs, low population density, challenging topography, or land use issues.<sup>16/</sup>

AST will accomplish this through a system that will eventually consist of 243 satellites operating in sixteen orbital planes.<sup>17/</sup> AST anticipates that 18 satellites will be launched in the initial stage, a number that eventually will grow to 243 satellites providing full global coverage

<sup>&</sup>lt;sup>13/</sup> See PDR.

<sup>&</sup>lt;sup>14/</sup> PDR at 2.

<sup>&</sup>lt;sup>15/</sup> Ajit Pai, *Bridging the Digital Divide*, FCC BLOG (July 13, 2017, 2:25 PM), https://www.fcc.gov/news-events/blog/2017/07/13/bridging-digital-divide.

<sup>&</sup>lt;sup>16/</sup> PDR at 2.

<sup>&</sup>lt;sup>17/</sup> PDR at 3.

through the utilization of beamforming and MIMO technology.<sup>18/</sup> AST is working with wellestablished aerospace companies to build and launch the SpaceMobile system.

AST subsequently amended its application, on July 27, 2020 and October 28, 2020. While in its July 27 amendment, AST clarified requested frequencies,<sup>19/</sup> in the second amendment, filed on October 28, 2020, it requested authority for AST to operate in the V-band, but not in spectrum allocated to terrestrial services.<sup>20/</sup> AST explained that all provision of service to handsets on frequencies authorized for service to terrestrial users will be done pursuant to lease agreements with terrestrial licensees that will permit SpaceMobile to access a terrestrial licensee's spectrum, in line with the Commission's secondary market policies.<sup>21/</sup>

### II. DISCUSSION

## A. Grant of AST's Application Serves the Public Interest, Convenience, and Necessity

The Commission will grant an application for a space station authorization when an application is "legally, technically, and otherwise qualified," the proposed facilities are in compliance with the rules, and doing so will "serve the public interest, convenience, and necessity."<sup>22/</sup> Here, AST has demonstrated that its application for authority to operate the SpaceMobile constellation in the United States meets all of these factors.

<sup>&</sup>lt;sup>18/</sup> PDR at 3.

<sup>&</sup>lt;sup>19/</sup> AST&Science Amendment to Petition for Declaratory Ruling, SAT-APL-20200727-00088, SAT-PDR-20200413-00034, at 6 (July 27, 2020) ("July Amendment").

<sup>&</sup>lt;sup>20/</sup> October Amendment.

<sup>&</sup>lt;sup>21/</sup> See Id.

<sup>&</sup>lt;sup>22/</sup> 47 C.F.R. § 25.156(a).

Numerous parties attest that AST is well qualified to operate the constellation and that allowing SpaceMobile access to the U.S. market is clearly in the public interest.<sup>23/</sup> By granting the application, the Commission will promote the provision of much needed broadband services to unserved and underserved communities as well as serving public safety and others in times of emergencies. These parties specifically note that approving SpaceMobile's application for market access would further the Commission's long-standing goal of closing the digital divide.<sup>24/</sup> As the Commercial Spaceflight Federation and Midland Development Corporation point out, AST's technology will "play a critical role in filling gaps with terrestrial broadband cellular coverage in the United States."<sup>25/</sup> Likewise, AT&T calls SpaceMobile a "promising new technology"<sup>26/</sup> that would "allow carriers to extend their coverage in areas where deploying additional infrastructure is logistically difficult or cost prohibitive."<sup>27/</sup> Samsung NEXT Fund agrees, further stating that approval of this application "will allow the United States to be the

See Letter from Eric W. Stallmer, President, Commercial Spaceflight Federation, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034/SAT-APL-20200727-00088 (filed Oct. 21. 2020) ("CSF Letter"); Letter from Wesley Bownds, Chairman, Midland Development Corporation, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034/SAT-APL-20200727-00088 (filed Oct. 8, 2020) ("MDC Letter"); Letter from Ted Cruz, U.S. Senator, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200 ("Cruz Letter"); Letter from Ted Cruz, U.S. Senator, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034 (filed Oct. 21, 2020) ("Cruz Letter"); Letter from K. Michael Conaway Member of Congress, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034/SAT-APL-20200727-00088/ (S3065) ("Conaway Letter"); Letter from Benjamin L. Cardin, U.S. Senator, to Marlene H. Dortch, Secretary, FCC, AST&Science Application; SAT-PDR-20200413-00034/SAT-APL-20200727-00088/ (S3065) (filed Oct. 30, 2020) ("Cardin Letter"); Letter from Brendon Kim, Head, Samsung NEXT Fund LLC, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034/SAT-APL-20200727-00088 (filed Oct. 15, 2020) ("Samsung Letter"); Azita Arvani, General Manager, Rakuten Mobile Americas, to Marlene H. Dortch, Secretary, FCC, SAT-PDR-20200413-00034/SAT-APL-20200727-00088 (filed Oct. 15, 2020) ("Rakuten Letter").

<sup>&</sup>lt;sup>24/</sup> See e.g., Rakuten Letter at 1.

<sup>&</sup>lt;sup>25/</sup> CSF Letter at 1; MDC letter at 1.

<sup>&</sup>lt;sup>26/</sup> Letter from Michael, P. Goggin, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, Call Sign S3065, IBFS File Nos. SAT-PDR-20200413-00034, SAT-APL 20200727-00088, SAT-APL-20201028-00126 (filed Nov. 2. 2020) ("AT&T Letter").

<sup>&</sup>lt;sup>27/</sup> Id.

first nation to potentially offer broadband connectivity to every citizen at any location."<sup>28/</sup> Rakuten Mobile Americas refers to AST's SpaceMobile technology as "transformational" and notes that if the Commission were to approve this application, it would "further the FCC's wireless leadership and support innovative solutions for rural coverage challenges of wireless broadband services."<sup>29/</sup>

Senators Ted Cruz and Ben Cardin further note that AST's technology will provide commercial benefits to the public. As Senator Cardin's letter points out, SpaceMobile will "fill critical connectivity gap[s] that so many American's face."<sup>30/</sup> This is particularly true in areas with "longstanding geographic and economic challenges that have made it difficult, costly, and at times physically impossible to provide broadband-speed wireless connectivity."<sup>31/</sup> Furthermore, beyond the economic benefit to consumers living in rural and underserved areas, Senator Cruz and Representative Michael Conaway point out that this technology will support first responders and "prove essential to life-saving services"<sup>32/</sup> in part by serving as a back-up communications network during "national emergenc[ies] and natural disaster[s], when ground infrastructure is often vulnerable to extended outages."<sup>33/</sup>

Some parties question whether approval is in the public interest, asserting that doing so would undermine the Commission's long established exclusive use policies.<sup>34/</sup> This argument is misleading, as the entire crux of AST's proposed business plan is that terrestrial licensees with

<sup>&</sup>lt;sup>28/</sup> Samsung Letter at 1.

<sup>&</sup>lt;sup>29/</sup> Rakuten Letter at 1.

<sup>&</sup>lt;sup>30/</sup> Cardin Letter at 1.

<sup>&</sup>lt;sup>31/</sup> Cruz Letter at 1.

<sup>&</sup>lt;sup>32/</sup> Conaway Letter at 1.

<sup>&</sup>lt;sup>33/</sup> Cruz Letter at 1.

<sup>&</sup>lt;sup>34/</sup> CTIA Pet. at 9-10; Verizon Pet. at 3, 11-12; T-Mobile Pet. at 11-12; Kuiper Comments at 2-3.

exclusive access to spectrum will be able to *choose* to allow SpaceMobile access to their frequencies *only with their approval and under their control*. AST has never suggested that it would operate unilaterally in terrestrial frequencies; indeed, AST has made clear that it only seeks access to wireless frequencies "for satellite connectivity, with the permission of partner spectrum holders."<sup>35/</sup>

One party even goes so far as to assert that AST's application cannot serve the public interest because it would actually undermine its efforts to bridge the digital divide through other means.<sup>36/</sup> But market forces should determine what technologies may be used to close the digital divide. Similarly, several parties express concern that SpaceMobile would undermine mobile wireless providers' existing networks, but this argument is misguided for the same reason.<sup>37/</sup> Providers who determine that the SpaceMobile system is not a good fit with their networks may simply decline to go into business with AST. The Commission has never involved itself in these types of business decisions, and there are no reasons for it to do so here.<sup>38/</sup>

Others suggest that the application should be dismissed because of perceived "procedural defects,"<sup>39/</sup> including that AST has not yet filed for earth station licenses.<sup>40/</sup> These arguments are

<sup>38/</sup> When that issue is ripe for consideration, AST will show that use of a nationwide (or nearnationwide) frequency reduces the prospect for interference to co-channel operators in adjacent geographic areas, thereby resolving the co-channel interference concerns alluded to in some comments here.

<sup>39/</sup> T-Mobile Pet. at 8.

<sup>40/</sup> CTIA Pet. at 8.

<sup>&</sup>lt;sup>35/</sup> PDR at 6.

<sup>&</sup>lt;sup>36/</sup> T-Mobile Pet. at 12-13.

<sup>&</sup>lt;sup>37/</sup> T-Mobile Pet. at 12; *see also* October Amendment at 7 ("AST is not requesting authority to operate in the spectrum allocated to terrestrial services, as all the provision of service to handsets on frequencies authorized for service to terrestrial users, such as mid-band frequencies governed by Parts 24 and/or 27 of the Federal Communications Commission's ("Commission" or "FCC") rules, will be done pursuant to lease agreements with terrestrial licensees that will permit AST to access a terrestrial licensee's spectrum.").

mere distractions at best and in some instances utterly wrong. Even assuming AST's applications were somehow "defective," the rules provide that space station applications may be accepted either when accompanied by a waiver request or under the Commission's own motion.<sup>41/</sup> Here, however, the Commission has accepted AST's Petition. Regarding the status of AST's earth station application, the rules provide that space station operators must file for earth station licenses separately from space station authorizations,<sup>42/</sup> a process that the FCC currently is considering reforming.<sup>43/</sup> The fact that AST has not coordinated its proposed earth stations with UMFUS licenses – something that need not occur until it files an application for earth station authority – has no bearing on the present application for market access by the constellation. Notably, no satellite operator filing in this proceeding raised these concerns.

In sum, there are no valid reasons to dismiss AST's application.

## **B.** SpaceMobile Can Compatibly Share the Requested V Band Frequencies and its Requested Waivers Should Be Granted

AST has demonstrated that SpaceMobile can compatibly operate with other NGSO systems operating in its requested V band frequencies. AST's proposed use of the V band frequencies for the SpaceMobile system is limited, as satellites will transmit to only two earth station locations in the United States.<sup>44/</sup> SpaceMobile will use these frequencies for gateway services, not user links. SpaceMobile's use of these frequencies therefore can be successfully coordinated without affecting existing licensed operators.

<sup>&</sup>lt;sup>41/</sup> 47 C.F.R. § 25.122(b). This rule allows substantially complete applications, even if somehow found to be incomplete, need not be dismissed, something that would only cause administrative burdens for the staff.

<sup>&</sup>lt;sup>42/</sup> 47 C.F.R. § 25.115.

<sup>&</sup>lt;sup>43/</sup> *Further Streamlining Part 25 Rules Governing Satellite Services*, Report and Order, IB 18-314 (draft released Oct. 28, 2020).

<sup>&</sup>lt;sup>44/</sup> PDR at 4.

EchoStar suggests that AST must demonstrate that SpaceMobile will meet international coordination rules with regard to other NGSO satellite operators in the same bands.<sup>45/</sup> All frequency assignments to be used by SpaceMobile have been filed with the International Telecommunications Union ("ITU") by the Administration of Papua New Guinea (*i.e.*, NICTA) in strict accordance with the ITU Radio Regulations, under the MICRONSAT filing designation. Papua New Guinea ("PNG") is one of a handful of countries, along with Luxembourg and the Isle of Man, commonly used by satellite operators to register and license their space segments; operators such as Intelsat, Asia Broadcast Satellite, Satmex, and Measat have satellites registered with PNG. PNG s a Party to the Radio Regulations, which AST has done up to now and commits to continue doing.<sup>46/</sup> Requiring such a "demonstration" is therefore inappropriate, unfeasible (as there is no forward-looking mechanism with which to "demonstrate" continuing adherence), and unheard of in this context.

EchoStar also suggests that AST's authorization must be conditioned on coordination being achieved.<sup>47/</sup> This is also an unreasonable request that is not in line with FCC or ITU requirements. RR 11.41 enables notification of a constellation without completing coordination with all affected potential systems.<sup>48/</sup> This provision was adopted because there is general recognition that it is not always possible to conclude coordination within the period of validity of the filing, mainly with systems that are listed as potentially affected but which exist only on

<sup>&</sup>lt;sup>45/</sup> EchoStar Pet. at 2 and 7.

<sup>&</sup>lt;sup>46/</sup> See Letter to Jose Albuquerque, Chief, Satellite Division, International Bureau, Federal Communications Commission, from Sallye Clark, Attorney for AST&Science LLC, at 4, IBFS File No. SAT-PDR-20200413-00034, Call Sign S3065 (filed July 6, 2020) ("IB Response Letter").

<sup>&</sup>lt;sup>47/</sup> EchoStar Pet. at 2 and 7.

<sup>&</sup>lt;sup>48/</sup> ITU Radio Regulation 11.41.

paper and may never be built, and therefore, cannot yet be coordinated with. Similarly, in the United States, coordination for NGSO systems occurs after detailed operational conditions are shared by other operators.<sup>49/</sup>

AST has met the criteria for grant of its requested waivers to operate gateway feeder links on the requested V band frequencies. For these frequencies, AST's requested operations would be on a non-interference, non-protected basis, which means that SpaceMobile would alter operations if necessary to protect other users. Those that claim that the SpaceMobile operations would require a rulemaking proceeding to operate on the V band misstate AST's requested operations.<sup>50/</sup> AST has requested only to operate gateway links at fixed locations in the V band, and has not sought to provide any type of mobile satellite services, such as to user handsets, on these frequencies.<sup>51/</sup> There are no good reasons proffered for denial of AST's waiver requests.

### C. V Band Processing Round Matters Should Not Bar Grant of the Application

Several parties oppose AST's request for waiver of the Commission's processing round rules.<sup>52/</sup> SpaceMobile will operate on these frequencies with only two earth stations in the United States, located outside urban areas (*i.e.*, Midland, TX and Kapolei, HI). The requested frequencies will be used only for feeder links, not as service bands.<sup>53/</sup> This limited use justifies AST's waiver requests. Should the Commission determine that a new processing round is necessary, there is no need to defer AST's request until such a proceeding concludes. The

<sup>&</sup>lt;sup>49/</sup> 25 C.F.R. § 25.261.

<sup>&</sup>lt;sup>50/</sup> CTIA Pet at 9; Verizon Pet. at 11.

<sup>&</sup>lt;sup>51/</sup> PDR at 4-6.

<sup>&</sup>lt;sup>52/</sup> See PDR at 2; see also Kuiper Comments at 2-4; Telesat Canada Comments at 2; Boeing Comments at 3; Echostar Pet. at 4-6.

<sup>&</sup>lt;sup>53/</sup> PDR at 6.

Commission can grant AST authority to operate on a non-interference, non-protected basis during the pendency of a second processing round.<sup>54/</sup>

With regard to AST's request for SpaceMobile to operate on 42-42.5 GHz and 45.5-47 GHz, Boeing suggests that the Commission must first establish a cut off deadline and open a processing round prior to considering AST's request.<sup>55/</sup> While AST would be open to participating in such a processing round, the lack of a cut off deadline should not bar the Commission from considering AST's proposed use right now. AST's request is to operate on a non-interference, non-protected basis.<sup>56/</sup> Had AST requested to operate on an equal basis to other users, a processing round might be necessary. In this instance, it is not.<sup>57/</sup> The Commission has granted waivers to other satellite operators to operate on similar non-interference, non-protected bases, without requiring participation in a new processing round,<sup>58/</sup> and there is no reason that it cannot do so in this instance.

<sup>&</sup>lt;sup>54/</sup> See, e.g., Space Norway AS, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the Arctic Satellite Broadband Mission, Order and Declaratory Ruling, 32 FCC Rcd 9649 (2017) (granting waiver to allow operations on 19.7-20.2 GHz on a non-conforming basis, on an unprotected basis, until the effective date of changes made to Ka band plan).

<sup>&</sup>lt;sup>55/</sup> Boeing Comments at 2-3.

<sup>&</sup>lt;sup>56/</sup> PDR at 7-8.

<sup>&</sup>lt;sup>57/</sup> As Boeing points out, it is unclear how the FSS sharing rules would function when sharing with the Mobile Satellite Service. However, as AST is only requesting to operate on a non-interference, unprotected basis to any MSS licensees, there is no need for the Commission to resolve this question in the present proceeding, and no rulemaking is necessary.

<sup>&</sup>lt;sup>58/</sup> O3b Limited; Request for Modification of U.S. Market Access for O3b Limited's Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service and in the Mobile-Satellite Service, Order and Declaratory Ruling, 33 FCC Rcd 5508 (2018) (granting waiver of Section 2.106 to allow MSS operations on a non-interference, non-protected basis when MSS service rules had not been adopted); *Audacy Corporation; Application for Authority to Launch and Operate a Non-Geostationary Medium Earth Orbit Satellite System in the Fixed- and Inter-Satellite Services*, Order and Authorization, 33 FCC Rcd 5554 (2018) (granting partial waiver to allow operations on the 54.25-56.9 GHz and 57.0-58.2 GHz frequency bands on a non-interference, non-protected basis); *Telesat Canada, Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat's Constellation*, Order and Declaratory Ruling, 32 FCC Rcd 9663 (2017) (granting waiver of the U.S. Table of Frequency Allocations for operations in the 17.8-18.6 GHz band based on willingness to operate on an unprotected, non-interference basis).

## D. AST's Proposed Secondary Market Access Approach, While Not the Subject of this Proceeding, Is in Line with the Commission's Flexible Use Policies

Certain parties make much of the fact that AST will work with wireless operators to offer service on terrestrial wireless frequencies.<sup>59/</sup> Under the FCC's 5G FAST Plan, the Commission has been pursuing a comprehensive strategy to facilitate the rollout of 5G technology in the United States.<sup>60/</sup> One of the three main elements of this plan is to modernize outdated regulations. Just as the Commission has made other frequency bands available for flexible use to promote its 5G initiatives, it certainly can do the same in this instance.<sup>61/</sup>

As AST has explained, however, the provision of these services to terrestrial licensees should be addressed by the Wireless Telecommunications Bureau at a later date.<sup>62/</sup> Ultimately, when this innovative service proposal comes before that Bureau for consideration, the specific path forward can be determined. The mere fact that the Commission will, in the future, be considering AST's pioneering service proposal does not warrant dismissal of the present application. When the issue is ripe for FCC consideration, the Commission must then take a "hard look" at the matter because the "agency's discretion to proceed in difficult areas through general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances."<sup>63/</sup>

<sup>62/</sup> PDR at 7-8; October Amendment.

<sup>&</sup>lt;sup>59/</sup> CTIA Pet. at 6-7; T-Mobile Pet. at 5; Verizon Pet. at 4-6.

<sup>&</sup>lt;sup>60/</sup> See <u>https://www.fcc.gov/5G</u>.

<sup>&</sup>lt;sup>61/</sup> See Expanding Flexible Use in the 3.7 to 4.2 GHz Band, Report and Order and Order on Proposed Modification, 35 FCC Rcd 2343 (2020).

<sup>&</sup>lt;sup>63/</sup> WAIT Radio v. FCC, 418 F.2d 1153, 1157 (D.C. Cir. 1969). And of course, as noted above, interested parties may comment on this approach when that time comes.

At this time, however, the Petitions to Dismiss filed based on concerns with AST operations on terrestrial frequencies must be dismissed for lack of standing and mootness.<sup>64/</sup> The Commission requires parties in interest to "allege facts sufficient to demonstrate that grant of the subject application would cause it to suffer direct injury."<sup>65/</sup> Moreover, the party must establish that "the injury can be traced to the challenged action and that the injury would be prevented or redressed by the relief granted."<sup>66/</sup> Here, because AST is not seeking access to exclusively wireless frequencies in the present application, these parties do not have standing to allege any injury, however speculative. Pursuant to the Commission's rules, these Petitions should be dismissed as moot.<sup>67/</sup>

# E. All Technical Concerns Regarding SpaceMobile Can Be Resolved through Clarification

1. All Orbital Debris Matters Will be Managed Properly

Some parties have raised questions regarding AST's orbital debris management and post-

mission disposal plans for the SpaceMobile satellites.<sup>68/</sup> AST is well aware of its responsibilities

<sup>&</sup>lt;sup>64/</sup> CTIA Pet. at 4-6 (seeking dismissal because AST's future request falls outside of the Commission's spectrum leasing rules); EchoStar Pet. at 2 (suggesting that the International Bureau require AST to clarify that it will not provide satellite services through spectrum leases that are governed by the Wireless Bureau); T-Mobile Pet. at 3; Verizon Pet. at 4.

<sup>&</sup>lt;sup>65/</sup> AT&T Applications of AT&T Mobility Spectrum LLC, New Cingular Wireless PCS, LLC, Comcast Corporation, Horizon Wi-Com, LLC, NextWave Wireless, Inc., and San Diego Gas & Electric Company For Consent To Assign And Transfer Licenses, Memorandum Opinion and Order, 27 FCC Rcd 16459, 16465-66 (2012).

<sup>&</sup>lt;sup>66/</sup> *Id.* at 16466.

<sup>&</sup>lt;sup>67/</sup> 47 C.F.R. § 1.939(g). See also Lockheed Martin Corporation Application To Launch and Operate a Geostationary Orbit Space Station in the Radionavigation Satellite Service at 133° W.L., Order and Authorization, 20 FCC Rcd 11023, 11030 (2005) (determining that an amendment to the requested frequencies resulted in the mooting of certain petitions to deny.)

<sup>&</sup>lt;sup>68/</sup> NASA Letter; Echostar Pet. at 6-7; and TechFreedom Comments.

in this regard<sup>69/</sup> and has provided detailed information on its orbital debris mitigation plan.<sup>70/</sup> AST is partnering with leading aerospace companies to manufacture and operate its satellites, using equivalent or as stringent flight operations safety measurements as NASA uses to operate their own spacecraft. SpaceMobile's safety measures involve the implementation of best industry practices and will include: 1) employing a launch and on-orbit conjunction analysis and mitigation process, and associated thresholds; and 2) working with NASA and other users of space on orbital debris mitigation best practices, which govern needed spacecraft reliability levels and disposal practices to minimize the production of space debris. AST is collaborating with NASA, whose comments were filed before discussions commenced and the agency had access to details regarding the spacecraft, which only can be shared on a confidential basis. After sharing confidential technical information regarding the SpaceMobile system with the agency, AST is confident that it will provide NASA with the reassurances that it needs.

With regard to other commenters, their positions are groundless and based on inaccurate conjecture. Notwithstanding the extensive orbital debris information provided by AST in accordance with FCC rules, EchoStar asks for even more information, such as the amount of fuel reserved for post-mission disposal.<sup>71/</sup> TechFreedom's concerns are based on incorrect information.<sup>72/</sup> SpaceMobile satellites fly edge on, like a Frisbee, and therefore the cross-section that is along the direction of motion is comparable to a smallsat. The satellite cross-section is

<sup>&</sup>lt;sup>69/</sup> AST's Chief Scientist for Space Systems also serves as Director of the University of Maryland's Center for Orbital Debris Education and Research, and in this role, has worked both with NASA and the FCC on orbital debris policy.

<sup>&</sup>lt;sup>70/</sup> See End-of-Life Disposal and Orbital Debris Mitigation Response, attached to PDR; IB Response Letter at 5-8; and Further Orbital Debris Analysis, attached to July Amendment.

<sup>&</sup>lt;sup>71/</sup> EchoStar Pet. at 7.

<sup>&</sup>lt;sup>72/</sup> TechFreedom Letter at 1-2.

only about 3 m<sup>2</sup>. The satellite planform area is around 450 m<sup>2</sup>, as noted in AST's Amendment. <sup>73/</sup> The comments clearly lack any basis for denying or delaying AST's Petition. AST has responded and fully addressed questions from the International Bureau on these matters.<sup>74/</sup>

### 2. SpaceMobile Transmissions will Protect Wireless Users

Several parties question the impact of the operations of SpaceMobile on frequencies licensed exclusively to wireless operators. As discussed above, this issue is moot in this proceeding, as no exclusive use terrestrial frequency operations are before the Bureau.<sup>75/</sup> AST, of course, agrees that terrestrial licensees have exclusive rights to operate on their frequencies for the benefit of their customers. Carriers should be able to decide how to best serve their customers and what services and partnerships may make their investments more valuable. While the Commission has a role in ensuring that technical rules are followed so that no harmful interference is caused to other licensees – and SpaceMobile will not cause such interference – it should leave it to the free market to determine whether SpaceMobile services should be used to aid in the provision of services.

Some wireless industry parties seek further information regarding the impact of SpaceMobile's transmissions to user handsets.<sup>76/</sup> Indeed, several suggest that the entire Petition should be dismissed because AST has not provided sufficient technical demonstration with

<sup>&</sup>lt;sup>73/</sup> See Further Orbital Debris Analysis, attached to July Amendment. The 900 m<sup>2</sup> number was an artifact from an early concept that was inadvertently included in the PDR and therefore was clarified by the Amendment.

<sup>&</sup>lt;sup>74/</sup> See supra note 62.

<sup>&</sup>lt;sup>75/</sup> Indeed, the International Bureau does not have authority to make such a decision. 47 C.F.R. § 0.261.

<sup>&</sup>lt;sup>76/</sup> See generally CTIA Pet.; T-Mobile Pet.; Verizon Pet.

regard to protection of terrestrial mobile systems.<sup>77/</sup> Verizon even questions how SpaceMobile can provide quality service to off-the-shelf handsets and how the system determines which handsets receive communications.<sup>78/</sup> These are questions for wireless terrestrial licensees to consider when determining whether to offer SpaceMobile services to their customers. They are not questions that are rightfully before the International Bureau or ones that must be answered prior to a decision on the present V band application. As necessary, AST can further demonstrate to the Wireless Bureau the ability of SpaceMobile to comply with all rules established to protect exclusively licensed terrestrial licensees.<sup>79</sup>/

3. There Is No Need to Clarify Power Flux Density Limits

Some parties assert, incorrectly, that SpaceMobile's use of 37.5-40 GHz appears to exceed the power flux density ("PFD") limits for the band.<sup>80/</sup> These parties claim to have calculated values for varying angles of arrival and compared them to the maximum PFD levels that AST indicates it meets for transmitting Beams QDNL and QDNR, and they erroneously conclude that "the PFD levels for Beams QDNL and QDNR as provided in Schedule S, which overlap with UMFUS operations, would greatly exceed the maximum allowable limits in Section 25.208(r)."<sup>81/</sup> Based on this erroneous conclusion, some suggest that the Commission should seek clarification from AST concerning its PFD levels and how it is complying with the

<sup>80/</sup> CTIA Pet. at 10; T-Mobile Pet. at 9; Verizon Pet. at 11.

<sup>81/</sup> CTIA Pet. at 11; *see also* T-Mobile Pet. at 9; Verizon Pet. at 11.

<sup>&</sup>lt;sup>77/</sup> CTIA Pet. at 3; *see also* Verizon Pet. at 5-6.

<sup>&</sup>lt;sup>78/</sup> Verizon Pet. at 6-7.

<sup>&</sup>lt;sup>79/</sup> AST already has demonstrated that SpaceMobile can protect users in adjacent market areas down to a level of I/N < -20 dB, which is far more protective than the current Part 24 and Part 27 requirements, which equate to -4 dB. *See* Technical Sharing Analysis, submitted with IB Response Letter.

Commission's PFD limits,<sup>82/</sup> while Verizon claims that this should be cause for dismissal of

AST's Petition.<sup>83/</sup> In fact, these analyses are incorrect as they:

- ignore the maximum downlink effective isotropic radiated power ("EIRP") density level for use in unfaded conditions provided by AST in its Technical Statement for the 37.5-40 GHz band;
- use instead in their analysis AST's PFD values provided *for the 40-42 GHz frequency band and not 37.5-40 GHz*;
- incorrectly assume that the PFD values calculated for this frequency band by AST for specific angles of arrival are constant throughout ranges of angles of arrival;
- compare the values for 40-42 GHz band with the Section 25.208(r) FCC limits for transmissions in unfaded conditions *in the 37.5-40 GHz frequency band*; and
- not surprisingly, erroneously conclude that AST's PFD levels for Beams QDNL and QDNR greatly exceed the maximum allowable limits in Section 25.208(r).

Indeed, AST clearly states in Section A.7 of its Technical Statement<sup>84/</sup> that the maximum EIRP density that SpaceMobile can transmit in the frequency band 37.5-40 GHz under faded conditions is -40.6 dBW/Hz, and that this value will be reduced by 12 dB in unfaded conditions. Use of the maximum EIRP density level of -52.6 dBW/Hz for unfaded conditions in the 37.5-40 GHz frequency band, with the appropriate path loss for each angle of arrival, and for the lowest satellite height of 730 km, will indeed show that the maximum allowable limits in Section 25.208(r) will always be respected. In fact, the margins over the limits will be the same as those indicated in Table 2 of the Technical Statement for faded conditions because, for unfaded conditions, both the AST PFD levels and the FCC limits shown in that table would be scaled down by 12 dB.<sup>85/</sup> For these reasons, the Commission does not need additional clarification from

<sup>&</sup>lt;sup>82/</sup> CTIA Pet. at 11; *see also* Verizon Pet. at 11.

<sup>&</sup>lt;sup>83/</sup> T-Mobile Pet. at 9.

<sup>&</sup>lt;sup>84/</sup> Technical Statement attached to PDR at pg. 9.

<sup>&</sup>lt;sup>85/</sup> *Id.* at 9-10.

AST concerning its PFD levels and how it will comply with the Commission's PFD limits, as all elements to demonstrate such compliance already are in possession of the Commission in the Technical Statement provided by AST.

## 4. AST is Not Requesting Operations on S Band Frequencies Allocated to MSS

Finally, several satellite operators address the prospect of SpaceMobile operations on S band frequencies.<sup>86/</sup> AST has explained that SpaceMobile will conduct Telemetry, Tracking, and Control ("TT&C") on S band frequencies outside of the U.S. under terms of an agreement with a teleport company that holds S band authorizations outside of the U.S.<sup>87/</sup> Thus, these operations will occur on frequencies already authorized, and no S band satellite frequencies are being requested by AST.

EchoStar expresses concerns about possible SpaceMobile cross-border emissions that may affect its operations on 1980-2010 MHz and 2170-2200 MHz in Mexico.<sup>88/</sup> AST already has demonstrated the ability of SpaceMobile to address potential cross-border interference issues.<sup>89/</sup> In its technical sharing analysis, AST shows that SpaceMobile can meet ITU protection criteria and will protect users in neighboring countries down to a level of I/N < -20 dB.<sup>90/</sup> EchoStar then argues that AST cannot request SpaceMobile access to S band MSS frequencies (2000-2020

<sup>&</sup>lt;sup>86/</sup> EchoStar Pet. at 2-4; Globalstar Letter at 1-2.

<sup>&</sup>lt;sup>87/</sup> IB Response Letter at 4-5.

<sup>&</sup>lt;sup>88/</sup> EchoStar Pet. at 2.

<sup>&</sup>lt;sup>89/</sup> See Technical Sharing Analysis, submitted with IB Response Letter. Again, this -20 dB of protection greatly exceeds the -4 dB protection required among terrestrial wireless services operating under Parts 24 and 27.

<sup>&</sup>lt;sup>90/</sup> Id.

MHz and 2180-2200 MHz) without a new processing round.<sup>91/</sup> AST has not requested authorization for these frequencies and does not intend to operate on MSS S band frequencies.<sup>92/</sup>

Globalstar also notes concern about the possibility of SpaceMobile use of 2483.5-2500 MHz, which, as Globalstar indicates, it already has been assured that AST does not intend to use.<sup>93/</sup>

Similar to the other opposition filed in this proceeding, these arguments also do not present any valid reason to deny AST's Petition.

### **III. CONCLUSION**

AST's application for U.S. market access, as amended, demonstrates that the SpaceMobile system will serve the public interest by meeting an unmet need in the United States of providing universal service. AST, with its partners, is well-suited to use this authority to offer

communications services to Americans anywhere in the United States, without necessitating the purchase of new devices or agreement to costly service plans. No party has shown any valid reasons to deny AST's request. Accordingly, the Commission should grant AST's application without delay.

Respectfully submitted,

/s/ Sallye Clark

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November 12, 2020

<sup>91/</sup> EchoStar Pet. at 4.

<sup>92/</sup> IB Response Letter at 1 and 3-4; October Amendment.

<sup>&</sup>lt;sup>93/</sup> Globalstar Letter at 1-2.

#### **CERTIFICATE OF SERVICE**

I, Laura Stefani, hereby certify that on November 12, 2020 a copy of the foregoing Consolidated Response and Opposition to Petitions to Deny was filed electronically via the International Bureau Filing System (IBFS), and copies were also served on the following by First Class Mail, postage pre-paid, with courtesy copies by electronic mail:

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