

TABLE OF CONTENTS

I.	INTRODUCTION AND SUMMARY	1
II.	THE RULES FULLY PROTECT AERONAUTICAL RADIONAVIGATION SERVICES	5
III.	ADDITIONAL PROTECTIONS FOR THE CITIZENS BROADBAND RADIO SERVICE ARE UNNECESSARY AND ANTITHETICAL TO COMMISSION SPECTRUM MANAGEMENT POLICIES	8
IV.	TT&C/GATEWAY SITES WERE ADEQUATELY ADDRESSED AND ACCOMMODATED	12
	A. The Commission Should Not Expand Protections for TT&C/Gateway Sites	12
	B. The Commission Should Not Extend the Deadline for TT&C/Gateway Sites	16
V.	THE PFD AND OOB LIMITS ARE APPROPRIATE	18
VI.	CONCLUSION	20

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

In the Matter of)
)
Expanding Flexible Use of the 3.7 to 4.2 GHz Band) GN Docket No. 18-122
)

OPPOSITION OF T-MOBILE USA, INC.

Pursuant to Section 1.429 of the Commission’s rules,^{1/} T-Mobile USA, Inc. (“T-Mobile”)^{2/} submits this Opposition to the petitions seeking reconsideration and/or clarification^{3/} of the Commission’s *C-band Order*^{4/} reallocating the 3.7-3.98 GHz portion of the 3.7-4.2 GHz band (“C-band”) for next-generation, including fifth-generation (“5G”), wireless services. The Commission should reject these petitions and proceed to implement the carefully-considered rules that will make available mid-band spectrum for 5G services.

I. INTRODUCTION AND SUMMARY

Making mid-band spectrum like the C-band available to terrestrial licensees is vital to ensuring the Nation’s leadership in the race to 5G. As the Commission notes, “American leadership in 5G is important because 5G networks will power a digital economy of applications

^{1/} See 47 C.F.R. § 1.429.

^{2/} T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company. T-Mobile and Sprint are now one company operating under the name T-Mobile. The merger closed on April 1, 2020.

^{3/} See Petition for Partial Reconsideration of the 3.7-4.2 GHz Band Report and Order of Aerospace Industries Association *et al.*, GN Docket No. 18-122 (filed May 26, 2020) (“Aviation Petition”); Petition for Reconsideration of Charter Communications, Inc., GN Docket No. 18-122 (filed May 26, 2020) (“Charter Petition”); Petition for Expedited Reconsideration or Clarification of Eutelsat S.A., GN Docket No. 18-122 (filed May 26, 2020); Intelsat License LLC Petition for Reconsideration, GN Docket No. 18-122 (filed May 26, 2020) (“Intelsat Petition”); Petition for Clarification and/or Reconsideration of the International Telecommunications Satellite Organization, GN Docket No. 18-122 (filed May 26, 2020) (“ITSO Petition”).

^{4/} See *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Report and Order and Proposed Modification, 35 FCC Rcd 2343 (2020) (“*C-band Order*”).

and services that themselves will transform our economy, boost economic growth, and improve our quality of life.”^{5/} The *C-band Order* represents a significant effort by the Commission to achieve that goal, striking the right balance between the interests of the many stakeholders in the proceeding. It affords incumbent licensees significant protections and time to clear the band (and substantial payments for doing so) and also adopts flexible polices and technical rules that will allow 5G networks to flourish.

The Commission’s rules provide that a petition for reconsideration may be granted if it relies on facts or arguments that have not previously been presented to the Commission because circumstances changed since the FCC’s decision was made, they were unknown before the Commission made its decision, or the Commission determines that consideration of the facts or arguments is required in the public interest.^{6/} The rules also provide that petitions may be dismissed or denied because, among other things, they fail to identify any material error, omission, or reason warranting reconsideration or rely on arguments that have been fully considered and rejected by the Commission within the same proceeding.^{7/} None of the petitions addressed here satisfy the Commission’s requirements for reconsideration.

First, the Aviation Petitioners argue that the *C-band Order* fails to take into account evidence showing the potential harmful interference that terrestrial wireless services can cause to radio altimeters and Wireless Avionics Intra-Communications (“WAIC”) systems operating in the adjacent 4.2-4.4 GHz band. However, the Commission reviewed and considered the very evidence that the Aviation Petitioners cite and appropriately determined that harmful interference

^{5/} *C-band Order* ¶ 3.

^{6/} *See* 47 C.F.R. § 1.429(b).

^{7/} *See* 47 C.F.R. § 1.429(1); *see also, e.g., Application of Jefferson-Pilot Communications Co.*, Memorandum Opinion and Order, 10 FCC Rcd 12120, ¶ 4 (1995) (“[R]econsideration will not be granted for the purpose of debating matters on which we have already deliberated and spoken.”).

would likely not result under reasonable scenarios and that there is no need to protect those systems for worst-case scenarios. Because the Aviation Petitioners' arguments have been fully considered and rejected by the Commission, and they fail to demonstrate that such rejection was incorrect, the Commission must reject the Aviation Petitioners' request. In any case, the Commission implemented sufficient safeguards, including a large guard band and technical rules that will sufficiently protect radio altimeters and WAIC systems.

Second, Charter Communications, Inc. ("Charter") asserts that the Commission must reconsider its decision not to require C-band terrestrial licensees to synchronize their operations with adjacent 3.5 GHz Citizens Broadband Radio Service ("CBRS") users and users upon request. Similar to the Aviation Petitioners' request, Charter's request was already considered and dismissed by the Commission, and Charter fails to demonstrate why that analysis was materially flawed. It provides no evidence for its premise – that there will be no cooperation between C-band and CBRS users – a particularly suspect claim based on the fact that, because C-band licensees themselves are expected to utilize Time Division Duplex ("TDD"), they will have an incentive to synchronize operations. The precedent it cites is also off-base – while the Commission has authority to impose technical rules, it does not generally mandate the licensees share the technical parameters of each other's operations. It would also contravene the Commission's established policy of limiting technical requirements on licensees. And even if Charter was correct that the Commission erred, Charter failed to explain the parameters of its proposed synchronization requirement.

Third, Intelsat License LLC ("Intelsat") and the International Telecommunications Satellite Organization ("ITSO") urge the Commission to make greater accommodations for Telemetry, Tracking, and Command ("TT&C")/Gateway sites than are included in the *C-band*

Order, including protections across the full 500 megahertz of spectrum and for international services, changes in the required filter, and an extension of the consolidation deadline. Not only have their assertions been addressed, but those petitioners also fail to provide any additional information that warrants adjustment to the protections of TT&C/Gateway sites. The Commission has already determined that it is more important to foster terrestrial operations than to provide full protections to TT&C/Gateway sites. And it is disingenuous to suggest that satellite operators cannot comply with the Commission's established deadlines for consolidating TT&C/Gateway sites because they have already elected to receive substantial accelerated relocation payments in addition to relocation costs to clear the spectrum.

Finally, Intelsat contends that the power flux density ("PFD") and out-of-band emissions ("OOBE") limits in the *C-band Order* do not adequately protect earth stations and urges the Commission to adopt more stringent requirements. But, as the record demonstrates, the Commission already concluded that the OOBE and PFD limits are appropriate because they are consistent with past Commission practice and 3GPP standards, and Intelsat fails to show why that conclusion is wrong.

In sum, the petitioners' proposals were already considered and rejected by the Commission. The petitioners highlight no material errors or omissions and raise no new arguments that justify overturning the thoughtful and balanced decisions the Commission made in this proceeding. The FCC's rules and the public interest require that the Commission deny the petitions.

II. THE RULES FULLY PROTECT AERONAUTICAL RADIONAVIGATION SERVICES

The Aviation Petitioners contend that despite the Alion study that T-Mobile submitted in the record,^{8/} with which the Commission concurred,^{9/} there is substantial evidence demonstrating potential harmful interference to radio altimeters and WAIC systems in the 4.2-4.4 GHz band from terrestrial licensees in the 3.7-3.98 GHz band.^{10/} In addition to the preliminary report submitted by the Aerospace Vehicle Systems Institute (“AVSI”) in October 2019, the Aviation Petitioners base their assertions on a supplemental report submitted by AVSI in February 2020 and an *ex parte* letter submitted by the aviation and aerospace industry – all of which were considered and noted by the Commission in its decision.^{11/} The Aviation Petitioners nevertheless argue that the supplemental report and the *ex parte* letter respond to the Alion study, suggest that the Alion study misunderstood AVSI’s methods, and demonstrate that harmful interference to radio altimeters is possible.^{12/} The Aviation Petitioners therefore urge the Commission to collaborate with industry stakeholders to identify and address the potential for interference, including adopting mitigation measures as needed for deployments in the 3.7-3.98 GHz band (or portions thereof) to protect radio altimeters.^{13/}

The Commission should dismiss the Aviation Petitioners’ requests. The Commission reviewed all the materials submitted by the Aviation Petitioners and stated that, on balance, it

^{8/} See Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering policy, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 1 (filed Jan. 22, 2020).

^{9/} See *C-band Order* ¶ 395.

^{10/} See Aviation Petition at 9-12.

^{11/} See *id.* at 11-14; Letter of Edward A. Yorkgitis, Jr., Counsel to ASRI, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 12-13 (filed Feb. 20, 2020).

^{12/} See Aviation Petition at 14.

^{13/} See *id.* at 17-18.

“agree[d] with T-Mobile and Alion.”^{14/} Specifically, it agreed that only “reasonable scenarios” should be considered when assessing harmful interference to radio altimeters and WAIC systems instead of “all foreseeable” scenarios, as suggested by the Aviation Petitioners.^{15/} The Aviation Petitioners themselves acknowledge that the Commission considered the evidence that was submitted by the aviation industry.^{16/} They are merely upset that “the Commission was poised to ‘agree with T-Mobile and Alion . . .’”^{17/} But that is exactly what the Commission is permitted to do – it may agree or disagree with parties on the record. Provided that it fully considered the record, which it did here, there is no reason to overturn the Commission’s decision.

The Aviation Petitioners also raise no new issues or evidence that have not already been considered and addressed by the Commission. For example, the Aviation Petitioners continue to contend that “all foreseeable” scenarios must be considered.^{18/} But they provide no additional information to support that contention other than to reiterate that aviation safety systems must be certified by the Federal Aviation Administration under all foreseeable aviation configurations and thus the same standard should be used here. The Commission disagreed with that approach, and the Aviation Petitioners fail to demonstrate that the decision was a material error – they simply disagree with the Commission’s decision.

Although T-Mobile recognizes the importance of radio altimeters to aviation and aeronautical services and supports the safe operation of radio altimeters and WAIC systems in

^{14/} *C-band Order* ¶ 395; Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering policy, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at attachment (filed Jan. 22, 2020).

^{15/} *See C-band Order* ¶ 395; Aviation Petition at 12.

^{16/} *See* Aviation Petition at 13.

^{17/} *Id.* at 13.

^{18/} *See id.* at ii, 11-12.

the 4.2-4.4 GHz band,^{19/} there is no need to overprotect these services at the expense of terrestrial use of the C-band. The Commission can accommodate both services. In fact, the *C-Band Order* already provides significant protections to aviation operations. For example, the Commission provides a 220-megahertz guard band between terrestrial users in the 3.7-3.98 GHz portion of the C-band and radio altimeters and WAIC services in the 4.2-4.4 GHz band^{20/} – a significant amount, particularly when compared to the also-appropriate guard band for space station and earth station operations, which are only afforded a 20-megahertz guard band.^{21/} In fact, the guard band between the C-band and WAIC services is, at 220-megahertz, larger than the WAIC allocation of 200 megahertz itself. Moreover, the Commission adopted rules governing power and emissions limits for terrestrial services that will sufficiently protect radio altimeters and WAIC systems.^{22/}

The Commission has already addressed the possibility that there may be technical matters that may require further analysis as terrestrial services are deployed in the C-band.^{23/} In particular, the Commission noted that AVSI and other aviation interests can establish a multi-stakeholder group to address any matters relating to harmful interference from terrestrial wireless use.^{24/} The Aviation Petitioners do not demonstrate why the Commission’s suggestion is

^{19/} See, e.g., Comments of T-Mobile USA, Inc., GN Docket No. 18-122, at 33 (filed Oct. 29, 2018).

^{20/} See *C-band Order* ¶ 391.

^{21/} See *id.* ¶ 31.

^{22/} See *id.* ¶ 395.

^{23/} See *id.*

^{24/} See *id.*

insufficient and why industry cannot resolve any issues that arise in the manner the Commission contemplates.^{25/}

III. ADDITIONAL PROTECTIONS FOR THE CITIZENS BROADBAND RADIO SERVICE ARE UNNECESSARY AND ANTITHETICAL TO COMMISSION SPECTRUM MANAGEMENT POLICIES

Charter requests that the Commission reconsider its decision not to require terrestrial licensees to synchronize their operations with CBRS licensees and users upon request.^{26/} It claims that, without such a synchronization requirement, adjacent C-band base station operations will overwhelm CBRS base station operations and significantly impede the ability of CBRS base stations to communicate with CBRS user equipment in both the Priority Access and General Authorized Access portions of the 3.5 GHz band.^{27/} It adds that, while carriers with spectrum in both bands will have an interest in engaging in internal coordination, C-band licensees without CBRS operations will have little incentive to enter into voluntary commitments with competitors operating in the CBRS band.^{28/}

As an initial matter, Charter's request was already considered and rejected by the Commission.^{29/} As the Commission explained, in some instances CBRS and C-band operations may be synchronized when they are deployed as part of one carrier's network and, in other instances, synchronization of two different carriers can be implemented using traditional 3GPP

^{25/} In fact, one of the technical working groups established to generally address C-band technical issues is already considering the coexistence of C-band terrestrial and adjacent band aeronautical operations.

^{26/} See Charter Petition at 1; *C-band Order* ¶ 396 (encouraging but not requiring TDD synchronization).

^{27/} See Charter Petition at 4-7.

^{28/} See *id.* at 3, 7-10.

^{29/} See *C-band Order* ¶ 396 n. 854; Letter from Elizabeth Andrion, Senior Vice President, Regulatory Affairs, Charter, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 *et al.* (filed Feb. 21, 2020).

methods on an absolute timing reference.^{30/} Charter fails to demonstrate why the Commission’s rejection was wrong as a matter of fact or law.

First, while Charter claims some C-band licensees that do not also have CBRS operations may refuse to coordinate TDD operations, it provides no credible basis for asserting that C-band licensees will act in the anti-competitive way it suggests. It suggests that C-band licensees “could” have the incentive to resist cooperation.^{31/} But carriers’ experience is just the opposite – they have a demonstrated history of cooperation to ensure that all licensees can maximize the use of their assigned spectrum. Indeed, the Commission has recognized that licensees routinely engage in spectrum exchanges to promote the most efficient use of their spectrum.^{32/} Moreover, as the Commission and others observe, 5G operations in the C-band are expected to use TDD in any case.^{33/} Because, as Charter points out,^{34/} multiple TDD networks can create interference issues among one another, *all* C-band licensees will have an incentive to engage in synchronization efforts with CBRS operators regardless of whether they also operate in the

^{30/} See *C-band Order* ¶ 397.

^{31/} See Charter Petition at 3.

^{32/} See *Partitioning, Disaggregation, and Leasing of Spectrum*, Notice of Proposed Rulemaking, 34 FCC Rcd 1758, ¶¶ 5, 10 (2019) (reporting that, over the last 10 years, “[t]he Commission has received over 1,000 assignment applications involving partitioning and disaggregation pertaining to more than 4,000 licenses” and “more than 8,000 spectrum lease applications and notifications pertaining to approximately 26,000 licenses”).

^{33/} See, e.g., *C-band Order* ¶ 75 (adopting unpaired, rather than paired, spectrum blocks because they will “enable[] time division duplex operations, which has become increasingly prevalent in deployments of digital broadband networks”); GSMA, *5G Spectrum, GSMA Public Policy Position*, at 4 (Mar. 2020) (“GSMA Policy Position”), <https://www.gsma.com/spectrum/wp-content/uploads/2020/03/5G-Spectrum-Positions.pdf> (“All 5G bands above 3 GHz – including the vital 3.5 GHz range and mmWave bands – will adopt TDD.”).

^{34/} See Charter Petition at 2; see also GSMA Policy Position at 4 (explaining that “base stations and end-user devices on TDD networks transmit using the same channel at different times” which “can create interference issues within and between different 5G networks”).

CBRS band. There is no reason to believe that C-band licensees will not voluntarily support synchronization when asked because doing so will also protect them from harmful interference.

Each of the potentially anti-competitive behaviors that Charter asserts may occur without a synchronization requirement is merely speculation.^{35/} Speculations are not facts that justify reconsideration of the Commission’s decision. And, in the unlikely event that a provider uses a refusal to coordinate for anti-competitive purposes, the Commission has other tools to address that behavior.^{36/} Imposition of a rule requiring good behavior is unnecessarily prescriptive.

Second, Charter is wrong when it asserts that the Commission routinely uses its authority to require provider-to-provider coordination and cooperation. All of the examples it cites relate to the imposition of technical requirements, and the Commission has used that authority in this case to impose rules governing the operations of C-band licensees. And, indeed, those technical obligations are often intended to benefit in-band and out-of-band licensees. But none of the instances that Charter cites relate to an imposition of forced cooperation with other licensees *in addition to the technical rules*. Requiring providers to share system parameter information would also potentially require them to make available sensitive proprietary information.

Third, to the extent Charter suggests that the Commission has authority to impose a synchronization obligation as a technical rule governing the C-band,^{37/} it is precisely the type of technology mandate that the Commission has sought to avoid. In the CBRS proceeding itself, the Commission stated that its “longstanding policies promot[e] technological neutrality and competition in emerging bands.”^{38/} Consistent with that policy, C-band licensees should be

^{35/} See Charter Petition at 7-9.

^{36/} See, e.g., 47 C.F.R. § 1.711 *et seq.*; 47 U.S.C. § 208.

^{37/} See Charter Petition at 10-11.

^{38/} *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, ¶

afforded the flexibility to enter into technical arrangements with CBRS licensees as they deem appropriate, just as they are allowed to do with respect to other aspects of their operations, including roaming, leasing, and other arrangements.

Fourth, Charter does not account for the fact that the CBRS spectrum immediately adjacent to terrestrial C-band operations are designated for use by General Authorized Access (“GAA”) users. Section 96.35(c) of the rules provides that “General Authorized Access Users have no expectation of interference protection from other General Authorized Access Users”^{39/} Imposing a coordination requirement on C-band terrestrial licensees would provide CBRS users with more out-of-service protection than they have from in-band operations, an outcome plainly inconsistent with the rules.

Finally, even if Charter is somehow correct that the Commission erred in deciding not to impose a synchronization requirement, Charter provides no information about how its proposed synchronization would occur or the consequences of a licensee failing to engage in the synchronization. Charter cannot now assert that the Commission should reconsider a decision not to impose a synchronization obligation when it failed – before and now – to propose regulations governing that obligation.

228 (2015); see also *Expanding Access to Broadband and Encouraging Innovation Through Establishment of an Air-Ground Mobile Broadband Secondary Service for Passengers Aboard Aircraft in the 14.0-14.5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 6765, ¶ 101 (2013) (stating that the Commission “strive[s] to establish technology neutral rules that allow for competing technologies and changes in technology over time without the need to change our rules”).

^{39/} 47 C.F.R. § 96.35(c).

IV. TT&C/GATEWAY SITES WERE ADEQUATELY ADDRESSED AND ACCOMMODATED

A. The Commission Should Not Expand Protections for TT&C/Gateway Sites

The *C-band Order* requires TT&C links to be consolidated at four locations by December 5, 2021 and affords protection to those TT&C operations in the 3.7-4.0 GHz band at the consolidated locations until December 5, 2030.^{40/} Intelsat argues that the *C-Band Order* fails to recognize that continued protected use of the full 500 megahertz of the C-band at Intelsat's two consolidated TT&C/Gateway sites is required to ensure continuity of services, including programming uplinked outside the United States that is distributed inside continental United States.^{41/} The ITSO similarly insists that the Commission allow international gateway services in the 3.7-4.0 GHz band at all four to-be-designated TT&C sites on a protected basis to reduce the risk of adverse consequences for international satellite services and increases in the cost of backhaul.^{42/}

Similar to the petitions submitted by the Aviation Petitioners and Charter, the Commission already considered Intelsat's arguments, and Intelsat has provided no evidence that the Commission's decision was wrong. Intelsat previously requested TT&C/Gateway site protections for the full 500 megahertz.^{43/} In response, the Commission determined to afford protections only to those TT&C/Gateway sites that are consolidated at the four designated

^{40/} See *C-band Order* ¶¶ 375-79 (explaining that operations that are not relocated by December 5, 2021 and operations that are relocated but used for international gateway operations may continue on an unprotected basis).

^{41/} See Intelsat Petition at i, 2-7.

^{42/} See ITSO Petition at ii, 6-7, 15 (adding that in selecting the four sites, the Commission should clarify that the satellite operators should take into account backhaul costs).

^{43/} See Letter from Michelle V. Bryan, Executive Vice President, General Counsel and Administrative Officer, and Susan H. Crandall, Associate General Counsel, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (filed Feb. 21, 2020).

locations in the 3.7-4.0 GHz band by December 5, 2021.^{44/} Intelsat claims that the Commission’s only proffered reason for refusing to do so is because it would place too “big a burden” on terrestrial operations which, it says, is not supported by the record.^{45/} Not only is the Commission’s decision supported by the record, but there is even less support for Intelsat’s position that without full C-band protection, satellite operators cannot deliver services “substantially similar” to those they currently provide.^{46/} Intelsat fails to demonstrate why the technical limitations imposed by the FCC on TT&C/Gateway operations prevent them from providing the service they provide today. Its vague allegations of harm cannot support its assertion that the Commission erred.

The ITSO failed to raise its arguments on the record and therefore is precluded from doing so now because it raises no new facts or arguments that are due to changed circumstances, were unknown before the Commission made its decision, or consideration of which is required in the public interest. Even if the ITSO had raised its arguments regarding international gateway services, the Commission already considered how to address those services, and the ITSO fails to demonstrate why the Commission’s decision was flawed. As the Commission explained, the National Association of Broadcasters did raise the issue of international gateway services, and the Commission agreed that “it is in the public interest to allow earth stations located at the four designated TT&C sites to continue to use the 3.7-4.0 GHz band for international gateway, and other purposes, on an *unprotected* basis during the TT&C transition period.”^{47/} The Commission also noted that SES and the C-Band Alliance requested interference protections for international

^{44/} See *C-band Order* ¶ 375; see also *id.* ¶ 385.

^{45/} See Intelsat Petition at 6-7.

^{46/} See *id.* at 7.

^{47/} *C-Band Order* ¶ 380 (*emphasis added*).

gateway services, but the Commission determined it would not afford such protections because that could harm terrestrial operations, which is inconsistent with the Commission's goals for this proceeding.^{48/} The ITSO makes no argument that the Commission improperly balanced the goals of this proceeding, opting instead merely to reiterate that international gateway services could be harmed without protections. The Commission considered those concerns and decided otherwise.

Intelsat and the ITSO also fail to explain why addressing TT&C/Gateway interference concerns through private negotiations, as the Commission determined,^{49/} is an inadequate remedy. Allowing a satellite operator to work directly with the terrestrial operator to ensure interference-free operations will not only ensure that any interference issues faced by TT&C/Gateway sites are addressed promptly, but also that the protection measures are specifically tailored to the needs of that TT&C/Gateway site. As the Commission observed,^{50/} private negotiations will have the added benefit of flexibility, including allowing in some cases early access to the C-band by terrestrial licensees or prolonged TT&C operations in other cases. Neither Intelsat nor the ITSO demonstrate why this approach is not sound.

Moreover, Intelsat and the ITSO downplay the fact that there will only be a limited number of TT&C/Gateway sites. They provide no justification for adopting broad protections for a few TT&C/Gateway sites, particularly when those protections could have a detrimental

^{48/} *See id.*

^{49/} *See id.* ¶ 377.

^{50/} *See id.* (“Alternatively, TT&C operations could negotiate to relocate to another country that is maintaining C-band FSS or a remote shielded location in the United States that is not heavily populated.”).

impact on terrestrial operations. As T-Mobile noted,^{51/} and similar to radio altimeters and WAIC systems, protecting extreme satellite scenarios as if they will be routine will have an outsized preclusive effect that potentially creates holes in the use of this spectrum for 5G services. The Commission has clearly stated that it would not afford protections to TT&C/Gateway sites in a manner that will undermine the of transition this band for 5G services, and neither Intelsat nor the ITSO explain why that decision is incorrect.

Intelsat adds that the Commission's failure to allow fully protected gateway operations at the TT&C/Gateway sites will jeopardize Intelsat's ability safely to operate its satellites because the Commission's adopted TT&C filter requirements that are technically unachievable and thus are not capable of being implemented.^{52/} It suggests that if the Commission does not afford protected status for use of the full 500 megahertz at the two remote consolidated TT&C/Gateway sites, which would eliminate the need for a TT&C-specific filter, it must revise the filter specifications for TT&C antennas to ensure their feasibility.

T-Mobile agrees that earth station receive filters can and should be improved. As T-Mobile explained,^{53/} the Commission should ensure that earth stations are equipped with high-quality filters that provide sufficient resistance to interference and allow flexible 5G operations. But, as Intelsat acknowledges, the Commission already considered Intelsat's concerns regarding

^{51/} See Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 5 (filed Feb. 21, 2020) ("T-Mobile Feb. 21, 2020 *Ex Parte* Letter").

^{52/} See Intelsat Petition at i-ii , 3, 8-11.

^{53/} See Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering policy, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 9 (filed Oct. 2, 2019).

the Commission’s filter requirement and found the need for a broader guard band as “excessive.”^{54/}

B. The Commission Should Not Extend the Deadline for TT&C/Gateway Sites

Intelsat argues that the Commission should reconsider its decision to set a December 5, 2021 deadline to consolidate TT&C/Gateway sites and instead allow space station operators until December 5, 2023.^{55/} Intelsat claims that the deadline of December 5, 2021 is not achievable because of the many time and resource-intensive activities that are required.^{56/}

Intelsat, however, provides no reasonable basis for the Commission to extend the deadline to consolidate TT&C/Gateway sites.^{57/} The record clearly reflects the importance of making the C-band available as soon as possible in order to secure U.S. leadership in 5G.^{58/} As recently reported by Analysys Mason, the U.S. is far behind in terms of licensed mid-band spectrum currently available – it is tied in last place with Canada and France with no mid-band spectrum currently available.^{59/}

^{54/} See Intelsat Petition at 9.

^{55/} See *id.* at ii, 20-22.

^{56/} See *id.* at ii (adding that those existing TT&C/Gateway sites therefore will have protected use of the full 500 megahertz until the Phase II deadline in those areas and there is therefore no need for the TT&C/Gateway site consolidation to be completed two years earlier).

^{57/} The Commission should also avoid extending other deadlines to the greatest extent possible. See, e.g., Intelsat Petition at 24 (petitioning the Commission to confirm that it will entertain waivers of penalties for missed clearing deadlines that are the result of COVID-19 delays outside of satellite operators’ control). T-Mobile recognizes that there may be circumstances that, as *C-band Order* contemplates, maybe “beyond the control of the incumbent space station operator.” See *C-band Order* ¶ 294. But space station operators can seek a waiver if and when those circumstances occur – there is no reason to make that determination now.

^{58/} See *C-band Order* ¶¶ 1-4.

^{59/} See Analysys Mason, *5G Mid-Band Spectrum Global Update*, at 3-5 (Mar. 2020), <https://api.ctia.org/wp-content/uploads/2020/03/5G-mid-band-spectrum-global-update-march-2020.pdf>.

Intelsat asserts that it will be required to purchase a new or existing facility, contract with one or more third-party teleport operators, upgrade the core infrastructure at both facilities (power, cooling, etc.), build more than twenty large antennas and pads at each of two new sites, and test all the new antennas to ensure that the satellites can be controlled effectively.^{60/} But those relocation costs will be reimbursed. Indeed, of the \$1.690 billion Intelsat is seeking in relocation costs, \$95 million has been allocated for teleport migration.^{61/} And Intelsat has explained that it has already initiated several migration activities that will allow it to meet the December 5, 2021.^{62/}

In addition, in exchange for agreeing to clear the spectrum on an accelerated basis, Intelsat will receive \$4.865 billion in accelerated relocation payments – above and beyond its relocation costs.^{63/} Although satellite operators will not receive relocation costs until after expenses are incurred and will not receive accelerated relocation payments until the transition deadlines,^{64/} that outcome is no different than in other relocation contexts – costs are routinely reimbursed after they are incurred. And Intelsat is already pursuing debtor-in-possession financing of \$1 billion that would provide it with immediate access to \$500 million to satisfy its upfront costs associated with clearing the spectrum.^{65/} Intelsat cannot therefore claim that it will

^{60/} See Intelsat Petition at 21.

^{61/} See Intelsat C-Band Clearing Transition Plan at 51, *attached to*, Letter from Michelle V. Bryan, Secretary, Intelsat License LLC, and Executive Vice President, General Counsel and Chief Administrative Officer, Intelsat US LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 18-122 and 20-173 (filed June 19, 2020) (“Intelsat Transition Plan”).

^{62/} See Intelsat Transition Plan at 18-20.

^{63/} See *C-band Order* ¶ 232.

^{64/} See *id.* ¶¶ 260-62, 297, 300.

^{65/} See *In re Intelsat S.A., et al.*, No. 20-32229-KLP (Bankr. E.D. Va. May 15, 2020) (explaining that the \$1 billion loan would help Intelsat defray what it then estimated as \$1.2 billion in relocation costs).

not have the resources it needs to clear the spectrum, including by consolidating TT&C/Gateway sites.

V. THE PFD AND OOBE LIMITS ARE APPROPRIATE

Intelsat urges the Commission to reconsider the PFD and OOBE limits for terrestrial licensees, arguing that the current limits may subject earth stations to harmful interference even if base stations are operating within the technical rules.^{66/} According to Inteslat, the PFD level adopted by the Commission, which is based on assumed elevation angle of 19 degrees, will not protect all earth stations because many earth stations have elevation angles that are lower than 19 degrees.^{67/} Additionally, Intelsat believes that the lack of antenna height limits on flexible-use base stations will exacerbate the antenna elevation issue.^{68/} Intelsat suggests that the Commission change the -124 dBW/MHz/m² OOBE protection (elevation angle 19 deg) to -134 dBW/MHz/m² (elevation angle 6 deg) to account for low elevation angle interference.^{69/}

The arguments that Intelsat makes in its petition have been fully addressed by the Commission, and Intelsat does not demonstrate why the Commission's resolution was factually or legally wrong. For example, Intelsat previously argued that the elevation angle for several earth stations in the U.S. is much lower than 20 degrees, resulting in a higher gain toward the interferer.^{70/} It therefore urged the Commission to adopt a PFD limit of -134 dBW/MHz/m².

The Commission, however, dismissed these concerns in the *C-band Order*, stating that the PDF

^{66/} See Intelsat Petition at 14-17.

^{67/} See *id.* at 14-15.

^{68/} See *id.* at 15.

^{69/} See *id.* at 17.

^{70/} See Letter from Michelle V. Bryan, Executive Vice President, General Counsel and Chief Administrative Officer, Intelsat, to Ms. Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122, at 3-4 (filed Feb. 21, 2020).

limit it adopted and the parameters used to calculate the PDF “will adequately protect earth stations from OOBE.”^{71/}

Accordingly, the PFD and OOBE limits that the Commission adopted – a -124 dBW/MHz/m² PFD limit at earth station antenna, a PFD limit of -16 dBW/m²/MHz across the entire 3.7-3.98 GHz band, and -13 dBm/MHz OOBE limit at the channel edge – remain appropriate. As the Commission noted, they will ensure that adjacent operations are protected while also accommodating the wider bandwidths needed for robust 5G deployment and promoting consistency with other 5G bands.^{72/} Indeed, the OOBE limits have long been used in the AWS bands to protect adjacent operations from harmful interference and will accommodate equipment for both base stations and user equipment in 3GPP Band Class n77. More stringent PDF and OOBE limits, however, would diminish the utility of the band, in the present and in the future, by preventing user equipment from being certified for use in the U.S., and threaten coverage.

^{71/} See *C-band Order* ¶ 363.

^{72/} See *id.* ¶ 344.

VI. CONCLUSION

T-Mobile urges the Commission to deny the petitions filed by the Aviation Petitioners, Charter, Intelsat, and ITSO. Each of the petitions presents issues that the Commission has thoroughly considered and deliberated, and no party demonstrates any flaws in the Commission's decision. In contrast, modifying the rules as the petitioners suggest could adversely affect the availability of this important mid-band spectrum for terrestrial wireless use – the Commission's primary purpose of this proceeding.

Respectfully submitted,

/s/ Steve B. Sharkey

Steve B. Sharkey

John Hunter

Christopher Wiczorek

T-MOBILE USA, INC.

601 Pennsylvania Avenue, N.W.

Suite 800

Washington, DC 20004

(202) 654-5900

June 26, 2020

CERTIFICATE OF SERVICE

I certify that on June 26, 2020, a copy of the foregoing Opposition of T-Mobile USA, Inc. was served by electronic mail^{1/} on the following:

David Silver
Vice President, Civil Aviation
Aerospace Industries Association
1000 Wilson Boulevard
Suite 1700
Arlington, VA 22209
david.silver@aia-aerospace.org

Dr. David Redman
Director
Aerospace Vehicle Systems Institute
754 HRBB – 3141
Texas A&M University
College Station, TX 77843
dredman@avsi.aero

Capt. Steve Jangelis
Aviation Safety Chair
Air Line Pilots Association, Int'l
1625 Massachusetts Avenue, NW
Suite 800
Washington, DC 20036
steve.jangelis@alpa.org

Grazia Vittadini
Chief Technology Officer
Airbus
2 rond-point Emile Dewoitine
31700 Blagnac, France
grazia.vittadini@airbus.com

Andrew Roy
Director of Engineering
Aviation Spectrum Resources, Inc.
180 Admiral Cochrane Dr., Suite 300
Annapolis, MD 21401
acr@asri.aero

Clayton Barber
Principal Engineer
Garmin
1200 E. 151st Street
Olathe, Kansas 66062
clay.barber@garmin.com

Jens C. Henning
Vice President, Operations
General Aviation Manufacturers Association
1400 K Street, NW, Suite 801
Washington, DC 20005
jhennig@GAMA.aero

Cade Clark
Vice President of Government Affairs
Helicopter Association International
1920 Ballenger Ave.
Alexandria, VA 22314
cade.clark@rotor.org

^{1/} Pursuant to Section 1.47(d) of the FCC's rules, the party to be served may agree to accept service in an alternative form. *See* 47 C.F.R. § 1.47(d). Counsel for each of the petitioners has agreed to service by electronic mail of this Opposition.

John Messier
Vice President
Honeywell International Inc.
2600 Ridgway Parkway
Minneapolis, MN 55413
john.messier@honeywell.com

John McGraw
Vice President, Regulatory Affairs
National Air Transportation Association
818 Connecticut Avenue, NW
Washington, DC 20006
jmcgraw@nata.aero

Elizabeth Andrion
Senior Vice President, Regulatory Affairs
Colleen King
Vice President, Regulatory Affairs
Charter Communications, Inc.
601 Massachusetts Avenue, NW
Suite 400W
Washington, DC 20001
elizabeth.andrion@charter.com
colleen.king@charter.com

Wladimir Bocquet
Director, Spectrum and Regulatory Affairs
Eutelsat S.A.
70 rue Balard
75015 Paris, France
wbocquet@eutelsat.com

Douglas Lavin
Vice President, Member and External
International Air Transport Association
1201 F Street, NW, Suite 650
Washington, DC 20004
lavind@iata.org

Howard J. Symons
Johanna R. Thomas
Gregory R. Capobianco
Jenner & Block LLP
1099 New York Avenue, NW
Suite 900
Washington, DC 20001
hsymons@jenner.com
jthomas@jenner.com
gcapobianco@jenner.com
Counsel to Charter

Carlos M. Nalda
Richard R. Cameron
LMI Advisors, LLC
2550 M Street, NW, Suite 300
Washington, DC 20037
cnalda@lmiadvisors.com
rcameron@lmiadvisors.com
Counsel for Eutelsat S.A.

Michelle V. Bryan
Executive Vice President, General Counsel
and Chief Administrative Officer
Susan H. Crandall
Associate General Counsel
Intelsat US LLC
7900 Tysons One Place
McLean, VA 22102-5972
michelle.bryan@intelsat.com
susan.crandall@intelsat.com

Laura H. Phillips
Qiusi Y. Newcom
Faegre Drinker Biddle & Reath LLP
1500 K Street, NW
Suite 1100
Washington DC 20005
laura.phillips@faegredrinker.com
qiusi.newcom@faegredrinker.com
Counsel for Intelsat License LLC

Stephen L. Goodman
Stephen L. Goodman, PLLC
532 North Pitt Street
Alexandria, VA 22314
stephenlgoodman@aol.com
Counsel to ITSO

Patrick Masambu
Director General and Chief Executive Officer
International Telecommunications Satellite
Organization
4400 Jenifer Street, NW
Suite #332
Washington, DC 20015

Edward A. Yorkgitis, Jr.
KELLEY DRYE & WARREN LLP
3050 K Street, NW
Suite 400
Washington DC, 20007
cyorkgitis@kelleydrye.com
*Counsel to Raytheon Technologies
Corporation*

/s/ Christen B'anca Glenn
Christen B'anca Glenn