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
Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rules To Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band	RM-11791
Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service	RM-11778

REPLY COMMENTS OF ABS, HISPASAT, AND EMBRATEL STAR ONE

Scott Blake Harris
V. Shiva Goel
Harris, Wiltshire & Grannis LLP
1919 M Street NW
Washington, DC 20036
(202)730-1330
Counsel to the Small Satellite Operators

December 11, 2018

TABLE OF CONTENTS

INTRODUCTION AND EXECUTIVE SUMMARY

Years ago, the Small Satellite Operators ("SSOs")[1] took the risk and committed the capital necessary to build and launch satellites that improve choice, quality, and innovation for U.S. C-band customers. As a result of the SSOs' efforts, more space stations with C-band coverage of the mainland United States are now in orbit and authorized by the FCC to serve U.S. locations. Yet the self-styled "C-Band Alliance" ("CBA") of the four largest U.S. C-band satellite operators proposes to exclude the SSOs from compensation for the reduction in value of C-band assets that would result from a partial reallocation, while nevertheless claiming a right to the exact same compensation for the CBA's own members.[2] The CBA's incoherent and anticompetitive exclusion of its rivals is emblematic of a larger issue with the CBA proposal. As the record demonstrates, the CBA has failed to account for the interests not just of competing satellite operators, but also of its own customers and U.S. taxpayers as well.

In addition to stifling competition in the U.S. satellite industry and frustrating the operations of downstream users, the exclusionary CBA approach would unnecessarily delay the deployment of terrestrial 5G networks. By pitching a proposal that serves so few, the CBA would force the Commission to clear the C-band for 5G using heavy-handed regulatory mandates rather than market incentives, adding friction to the gears of the transition mechanism. If the Commission decides to pursue a market-based reallocation, it should reject the CBA's approach and instead adopt a comprehensive, equitable, and incentive-based distribution and scoring model akin to the one proposed herein, rather than the flawed, biased CBA proposal. By

---

1 Comments of ABS Global Ltd., Hispasat S.A., and Embratel Star One S.A., GN Docket No. 18-122 (filed Oct. 29, 2018) ("SSO Comments").

2 *See* Comments of the C-Band Alliance at 28, 55, GN Docket No. 18-122 (filed Oct. 29, 2018) ("CBA Comments").

clarifying the rights of all affected parties at the outset, the Commission can leave it to the market to accomplish the transition, expedite the reallocation for 5G, and ensure adequate compensation to all C-band stakeholders, taxpayers included.

I. The CBA proposal is exclusionary and anticompetitive. Although the CBA claims to represent "virtually" the entire Fixed-Satellite Service ("FSS") industry,[3] it is comprised of only the four largest incumbent satellite operators, whose aging fleets have given them every incentive to try to co-opt the C-band transition. Yet an additional four satellite operators have space stations that are authorized to serve the United States in the C-band.[4] Because the CBA has denied participation in its alliance by these other operators, the CBA does not represent all FSS operators with spectrum use rights in the lower C-band, and thus cannot achieve a voluntary clearing of the spectrum.

In an effort to mask its exclusive composition, the CBA claims that it will open participation in the CBA to any "eligible" satellite operator and compensate each operator according to an established metric. But the trick to the CBA's scheme is found in the word "eligible"; the CBA proposes to limit eligibility to satellite operators that provide existing service, and in particular proposes to limit compensation to satellite operators that had 2017 U.S. C-band revenues. Thus, under the CBA proposal, an FSS operator that has invested hundreds of millions of dollars in FCC-authorized C-band facilities to serve the United States, including operational space stations on the FCC's Permitted List, is just out of luck if its fleet did not

---

[3] *See, e.g.*, CBA Comments at i., 2, 4, 22; Comments of Intel Corporation, Intelsat License LLC, and SES Americom, Inc. at 3, GN Docket No. 18-122 (filed Oct. 29, 2018) ("Intel/Intelsat/SES Comments").

[4] Consistent with the FCC's proposal in the NPRM, the SSOs have not included operators that only cover states and territories outside CONUS. *See Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 4.2 GHz*, Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, FCC 18-91, ¶ 74 ("NPRM").

generate C-band revenues in 2017 but has significant revenue-generating potential remaining. Perhaps too conveniently, that is the precise position of the CBA's smaller competitors, whose newer satellite fleets would suffer significant future revenue losses for many years—in excess of 20 years, in some cases—from a partial reallocation of the U.S. C-band.

In addition to being self-serving and exclusionary, the CBA's focus on 2017 revenue is completely inconsistent with the CBA's own basis for compensating its members. Indeed, although the CBA completely ignores the future revenue losses of its competitors, it claims a right to compensation for the very same financial impact. As the CBA acknowledges, FSS operators must receive compensation for giving up their "non-exclusive rights" to use the reallocated portion of the C-band in the United States.[5] But these spectrum use rights are conferred by FCC grants of U.S. market access, not 2017 revenues. Likewise, the CBA believes that, when an FSS operator relinquishes those rights, the impairment of the operator's "prior investment" in the band, and the "opportunity costs" of operating satellites with a fraction of their original capacity, are the primary economic losses suffered.[6] Yet even the CBA's own economists agree that these costs must be measured on the basis of reductions in future revenue, not on historic 2017 revenues.

The CBA's criteria also conflict with the FCC's approach to spectrum management, which recognizes the substantial investments of licensees that are on the cusp of providing service. In addition, they contradict established principles of market definition, which reject the notion that firms must have existing revenues to qualify as market participants.

---

5 CBA Comments at 6.

6 *Id.* at 28; *see also* Intel/Intelsat/SES Comments at 5 & Attachment pp. 8, 25.

Department of Justice ("DOJ") and Federal Trade Commission ("FTC") guidance on competitor collaborations cannot save the CBA's incoherent proposal. In fact, the Collaboration Guidelines explicitly raise the possibility that collaborations may "foreclos[e] or limit[] competition by rivals not participating," and caution that such exclusionary effects "may prompt enforcement actions."[7] Unsurprisingly, the CBA has not articulated, and cannot articulate, a procompetitive basis for determining eligibility and compensation as it has chosen to do.

In view of the above, the FCC should reject the CBA's arbitrary 2017 revenue criteria as a basis for inclusion into the group to be compensated for the loss of C-band spectrum rights.

II. The Commission should adopt a comprehensive, equitable, and incentive-based distribution and scoring model if it pursues a market-based transition.

The market-based approach at its core is about incentivizing companies to give up spectrum use rights. Since no entity has exclusive rights to this spectrum, it follows that all current licensees, including satellite operators on the U.S. Permitted List, and users need to be rewarded for giving up the use of spectrum. Yet virtually all C-band stakeholders, other than the CBA members themselves, have raised serious concerns about the CBA's exclusionary approach in this proceeding, and even one CBA member has raised such concerns. Fueled by the CBA's complete lack of transparency, cable operators and content companies that rely on C-band satellite services have expressed deep skepticism that a CBA-managed facilitator will give their interests in the band appropriate recognition. In addition, numerous commenters correctly have

[7] *See* FTC and DOJ, Antitrust Guidelines for Collaborations Among Competitors at 2 n.5 (Apr. 2000), https://www.ftc.gov/sites/default/files/attachments/dealings-competitors/ftcdojguidelines.pdf ("Collaboration Guidelines").

recognized that U.S. taxpayers should share in the benefits of the reallocation. Yet the CBA just ignores the issue.

The CBA's exclusionary tactics would turn the voluntary and market-driven nature of a facilitator-based approach on its head and threaten the success of the C-band transition. Instead of incenting full participation and cooperation through inclusion and transparency, the CBA would rely on FCC mandates to compensate for the self-serving decisions it makes as facilitator. Indeed, the CBA has asked the FCC to clear not only "holdouts," but also stakeholders, such as the SSOs, who are willing to participate in the transition on fair and equal terms yet cannot do so because they have been excluded by the CBA's narrow, misaligned, and backward-looking criteria. In addition to being fundamentally unfair, this overly regulatory approach would add friction, raise the potential for delay, and add risk to the transition.

Thus, if the Commission decides to pursue a market-based approach to repurposing this spectrum, it should require the Transition Facilitator to follow a distribution and scoring model that is broadly representative and fair to all stakeholders—including taxpayers. To that end, the SSOs propose that the Facilitator allocate proceeds according to the following three steps:

- ***Step 1 (Earth Stations)***: Provide (1) compensation to earth station operators for their direct and indirect relocation costs, and (2) a separate incentive payment per antenna impacted by the reallocation. To encourage participation and accelerate the transition, the facilitator would provide the incentive payment in two installments, with the first due immediately upon the start of relocation, and the last due at its completion. The SSOs estimate that both payments together will account for up to 20 percent of overall transition proceeds.

- ***Step 2 (Taxpayers)***: The SSOs believe that a material percentage—the SSOs propose a range of 10 to 20 percent—of the proceeds remaining after Step 1 should be deposited with the U.S. Treasury. With an estimated 80 percent or more of funds remaining after Step 1, taxpayers could receive billions of dollars in benefits from the transition.

- ***Step 3 (Satellite Operators)***: Proceeds left over after Steps 1 and 2 should be divided among all eight satellite operators with C-band space stations that are authorized to serve the U.S. market and have coverage in the continental United States. 67 percent of Step 3 proceeds should be allocated to each satellite on the basis of a "Service Life Score" developed by the FCC or developed consensually by all of the eight operators. To account for the significant fixed costs associated with entering the U.S. market, the remaining 33 percent of Step 3 proceeds should be allocated in equal amounts to each firm with a satellite authorized to serve the United States in the C-band.

III. The SSOs are generally supportive of efforts to clear 200 megahertz of lower C-band spectrum all at once so long as their investments are adequately compensated.

The SSOs believe that alternatives to a market-based approach can work and would favor such alternatives to a flawed and exclusionary CBA-led transition that is doomed for failure. If the Commission decides to pursue an auction alternative, the SSOs urge it to clarify that all satellite operators with space stations authorized to serve the United States in the C-band are eligible to participate, regardless of whether they meet the CBA's arbitrary test of having 2017 revenues.

I. THE CBA PROPOSAL IS UNREASONABLY EXCLUSIONARY AND DEEPLY ANTICOMPETITIVE.

The CBA has pursued a nakedly exclusionary approach that conflicts with established competition policy, spectrum management policy, and key elements of the CBA's own proposal in this proceeding. Without a course correction by the CBA—one that its own member Eutelsat appears to believe is necessary—Commission approval of the CBA proposal would be arbitrary and unlawful. It would also undermine competition and innovation for U.S. satellite consumers.

A. The CBA's Claim of Full Representation of FSS Operators Is False.

The CBA and its members repeatedly and incorrectly claim that their alliance represents "virtually all of the C-band service providers in the continental United States,"[8] and that the CBA's members serve customers that consume "all or virtually all of the 500 MHz of C-band Downlink spectrum available today."[9] They likewise assert that the CBA has assumed the mantle of protecting the interests of the entire "FSS industry,"[10] and that their proposal "demonstrate[s] . . . industry alignment" on how to proceed with the reallocation.[11]

While the SSOs agree with the CBA that full representation is essential to "make the Market-Based Approach a reality,"[12] the CBA's claim of full representation is simply false. Eight FSS operators, and not just the four largest U.S. satellite incumbents that comprise the CBA, operate space stations that cover the United States in the C-band,[13] and have applied for and received grants from the FCC to serve the U.S. market using those satellites.[14] Having successfully completed the FCC's rigorous application process for inclusion on the Permitted List, the four non-CBA satellite operators have the same non-exclusive spectrum use rights as do CBA members, albeit for a newer fleet of FSS satellites. Indeed, the largest two U.S. incumbents, Intelsat and SES, operate a C-band fleet with a (weighted) average age of nearly 12

---

8 CBA Comments at i, 2.

9 *Id.* at 48.

10 Intel/Intelsat/SES Comments at 3.

11 CBA Comments at 5.

12 *Id.* at 4.

13 As explained above, *see supra* note 4, the eight operators do not include companies that only provide coverage outside CONUS.

14 The SSOs represent three of the remaining four satellite operators with C-band satellites authorized to serve the United States, and would welcome membership by the other.

years—more than twice the average of the SSO fleet, which includes recently launched satellites with C-band coverage of the United States.

It is no wonder, then, that Intelsat and SES are fighting tooth and nail to exclude the SSOs and just about every other C-band stakeholder from meaningful (if any) compensation under their proposal. With precious little service life remaining across their respective satellite fleets, both companies are now confronting enormous upcoming capex needs while continuing to manage strained balance sheets bloated with debt. While Intelsat and SES are entitled to fair compensation for relinquishing their spectrum use rights, they should rely on capital markets, and not an arbitrary hoarding of C-band proceeds, to navigate the difficult financial waters before them, just like any other company. The Commission should not allow them to fundraise on the backs of competing operators, their own customers, and U.S. taxpayers, which is what the CBA's exclusionary approach would do.

B. The CBA's Self-Serving Eligibility Criteria Are Inconsistent With Its Own Proposal, and Contradict Established Competition and Spectrum Management Policies.

The CBA suggests that its exclusive composition provides no cause for concern because the alliance will permit "all eligible C-band satellite companies to join" and receive "reimbursement of their prior investment and opportunity costs."[15] The CBA's claim to open and equitable participation, however, is pure smoke and mirrors. Indeed, the CBA has carefully crafted its eligibility criteria to include the alliance's current membership alone, and to exclude new entrants that would force it to compete. As explained below, the CBA's approach to

[15] CBA Comments at 28.

eligibility lacks any analytical basis, and has resulted in a CBA proposal that is incoherent, internally inconsistent, and unlawful.

According to the CBA, "[t]he C-Band Alliance is open to all C-band satellite operators that *provide service* to all or a portion of CONUS."[16] The CBA likewise proposes to allocate proceeds for prior investment and opportunity costs to any operator with "2017 CONUS C-band satellite service revenues."[17] But as the SSOs have explained, ABS, Hispasat, and Star One have launched fully operational satellites equipped with C-band transponders that were designed to—and do—cover the mainland United States.[18] These satellites have been granted market access and are on the U.S. Permitted List, and a reallocation would substantially reduce their revenue-generating potential, just as it would for the satellites operated by CBA members. Nevertheless, the CBA would offer nothing to the SSOs for the reduction in potential future revenues.

There is no rational basis for excluding SSO capacity when evaluating the breadth of CBA's representation or determining eligibility for compensation from the Transition Facilitator. Yet that is precisely what the CBA has done—against the apparent public dissent of its one of its own members.[19] Eutelsat, a CBA member, filed separate comments proposing the alternative of making any operator "eligible to join the Alliance," so long as the operator has full or partial United States "coverage" in the C-band,[20] a criterion that would permit participation by all FSS

---

16 *Id.* at 35.

17 *Id.* at 28.

18 *See* SSO Comments at 1-6.

19 *See* Comments of Eutelsat at 10, GN Docket No. 18-122 (filed Oct. 29, 2018) ("Eutelsat Comments") ("The Alliance already includes the four companies that are responsible for nearly all of the C-band satellite communications services that are provided in CONUS. Others that have CONUS coverage would be eligible to join the Alliance.").

20 *Id.*

operators in the U.S. C-band industry, including smaller competitors that have invested substantially in the band.

Perhaps most tellingly, the CBA's eligibility criteria are inconsistent with its own proposed plan for compensating its members. The CBA claims it will allocate proceeds to compensate CBA members for their "prior investment and opportunity costs (in addition to compensation for their reconfiguration and relocation costs)."[21] Non-members, on the other hand, would be eligible for reconfiguration and relocation only, without compensation for prior investment and opportunity costs.[22] While the SSOs agree with the CBA that FSS operators should be compensated for their prior investment and opportunity costs, the question of whether an FSS operator will suffer impairments to its prior investment in the U.S. C-band, and incur opportunity costs by giving up rights to operate in the cleared portion of the U.S. C-band, depends on the operator's ability to use its C-band assets to generate U.S. C-band revenue *in the future*—and thus has little to do with whether the operator had U.S. C-band revenue *in 2017*. Indeed, as the SSOs explained, "operators whose satellites recently launched may have *more* to lose per dollar invested in the band than operators that already have provided service for years,"[23] because those recently launched satellites will be able to "generate revenues further into the future relative to space stations launched years ago."[24] The CBA cannot reasonably claim a members-only right to compensation for impaired "prior investment" and for "opportunity costs," while simultaneously denying membership to operators who would experience the exact

---

21 CBA Comments at 28.

22 *Id.* at 27-28

23 SSO Comments at 9.

24 *Id.*

same impacts—and whose claim to such compensation is, in important ways emphasized by the CBA itself,[25] even more compelling.

Along the same lines, the CBA repeatedly acknowledges that any transition will have to account for "FSS operators' non-exclusive spectrum rights."[26] Yet the SSOs have the same non-exclusive rights to serve the U.S. market in the C-band as do CBA members, even though they do not meet the CBA's arbitrary criteria for participation. As discussed, the SSOs' C-band satellites have completed the demanding process of petitioning for and receiving U.S. market access and are on the FCC's Permitted List of satellites that can communicate to and from U.S. locations. Thus, even under the CBA's own understanding of the principles that should guide the transition, the SSOs should be permitted to participate in the Transition Facilitator, and to receive compensation for the reduction in value suffered when they give up their rights to use this spectrum.

Unsurprisingly, CBA members' own economic analysis exposes the arbitrariness of the 2017 revenue metric. In the paper written by Intelsat's, Intel's, and SES's economic expert, Dr. Coleman Bazelon explains that the "economic value of lost satellite assets" forms the largest component of "transition costs" to FSS operators, "because they reflect capital costs that must be written off as a result of the spectrum clearing."[27] Dr. Bazelon further explains that this reduction in value can be estimated by "calculating the lost profits to satellite providers from

---

[25] *See* Intel/Intelsat/SES Comments at Attachment p. 15 (explaining that compensation for prior investments and opportunity costs must be calculated on the basis of losses in future revenue from C-band facilities that are decommissioned prematurely due to a partial reallocation).

[26] CBA Comments at 2, 6, 27, 63.

[27] Intel/Intelsat/SES Comments at Attachment p. 15.

leasing C-Band transponder capacity."[28] According to Dr. Bazelon, those lost profits exist regardless of 2017 revenues. They "will be equal to the ***net present value of the profits of C-Band transponders over the remaining service life of the satellite,"*** an amount that Dr. Bazelon calculates by discounting "annual revenue stream[s]" generated on a going forward basis.[29]

The CBA's exclusive focus on existing service and 2017 revenue also directly conflicts with guidance published by the antitrust agencies and the FCC's own approach to identifying market participants. The unstated assumption behind the CBA's proposal is that FSS operators with existing FCC authorizations, operational C-band satellites covering the mainland United States, and enormous investments committed to the U.S. C-band *do not qualify as market participants* unless they have past C-band revenues. But the 2010 Horizontal Merger Guidelines explicitly address the issue of which firms count as participants in a relevant market.[30] And under the Guidelines, while "[a]ll firms that currently earn revenues in the relevant market are considered market participants," so are "***[f]irms not currently earning revenues in the relevant market, but that have committed to entering the market in the near future***[.]"[31]

The latter category of market participants are called "rapid entrants," and include firms that "produce the relevant product" in adjacent markets, have large "[s]unk costs," or "possess the necessary assets to supply into the relevant market rapidly."[32] The SSOs, of course, share all three characteristics. They are established FSS operators with decades of experience in the

---

28 *Id.*

29 *Id.* at Attachment pp. 15-16 (emphasis added).

30 *See* Horizontal Merger Guidelines, U.S. Dept. of Justice & Fed. Trade Comm'n, § 5 (Aug. 19, 2010), https://www.justice.gov/sites/default/files/atr/legacy/2010/08/19/hmg-2010.pdf ("HMG").

31 HMG at 5.1, pp 15-16 (emphasis added).

32 *Id.* at 5.1, p. 16.

satellite business. They have existing U.S. sales in other bands, and existing C-band sales in other geographic markets. They have committed vast amounts of capital, hundreds of millions of dollars, to launch technologically advanced satellites that are equipped with C-band transponders covering the United States, and they are depending on U.S. revenues to recoup those sunk investments. The SSOs thus have every ability and incentive to compete, and to do so vigorously, in the U.S. C-band satellite market. And their fleets likewise represent a genuine competitive choice for satellite customers that need C-band capacity to serve the United States.

Each SSO also successfully has completed the FCC's rigorous space station application process to receive grants of U.S. market entry and inclusion of their satellites on the FCC's Permitted List. Some SSO members have also taken the step of obtaining authorization from the FCC to construct and operate their own earth station in the United States.[33] Combined with their hard assets in the C-band, these authorizations permit the SSOs to provide C-band service rapidly to U.S. customers and U.S. end points. Thus, if the Commission wishes to avoid creating unintended anticompetitive consequences, and exposing the spectrum transition to violations of the antitrust laws, it must ensure that all operators with stranded U.S. C-band facilities, and not just the four largest, are permitted to participate in the Transition Facilitator on equal terms.

Importantly, under the Horizontal Merger Guidelines, even firms that do not meet the definition of a "rapid entrant" are considered competitors in a relevant market if their entry will be timely enough, likely enough, and sufficient enough to constrain pricing of market participants.[34] The Commission repeatedly has relied on this more expansive understanding of

---

[33] *See* ABS Global Ltd., Application for Earth Station Authorization, Call Sign E180019, IBFS File No. SES-LIC-20180213-00118 (granted Mar. 29, 2018).

[34] HMG § 9.

how to identify competitors in a given market,[35] and has pursued an even more permissive approach in its recent decision-making.[36] These precedents cannot be squared with the CBA's apparent position that providers like the SSOs, which have tremendous sunk investments in U.S. facilities, are somehow not committed to serving the U.S. market.[37]

In addition to conflicting with established principles of market definition, the CBA's self-serving requirement that a consortium member provide service and have 2017 revenues is inconsistent with the FCC's spectrum management policies. When pursuing other reallocations, the FCC has routinely recognized the investments made by incumbents with FCC authorizations, even in the absence of existing service.[38] For example, to pave the way for 5G services in millimeter wave spectrum, the Commission permitted incumbent LMDS licensees to obtain flexible use licenses regardless whether they provided service, and in fact extended deadlines for achieving a substantial service requirement.[39] Satellite operators that have progressed significantly through the satellite lifecycle, but have yet to lease capacity in a particular service area, are, if anything, more deserving of rights to participate in a transition mechanism. Not only

---

35 *See, e.g.*, *Bus. Data Servs. in an Internet Protocol Env't*, Report and Order, 32 FCC Rcd. 3459, 3483-84, 3490 ¶¶ 49-53, 67 (2017) ("*2017 BDS Order*") (finding that a "competitor does not need to be already offering service"); *Applications of Charter Commc'ns, Inc., Time Warner Cable Inc., & Advance/Newhouse P'ship*, Memorandum Opinion and Order, 31 FCC Rcd. 6327, 6355 ¶ 63 (2016); *Petition of Qwest Corp. for Forbearance Pursuant to 47 U.S.C. S 160(c) in the Phoenix, Arizona Metro. Statistical Area*, Memorandum Opinion and Order, 25 FCC Rcd. 8622, 8635 ¶ 28 (2010); *Application of Worldcom, Inc. & MCI Commc'ns Corp. for Transfer of Control*, Memorandum Opinion and Order, 13 FCC Rcd. 18025 (1998).

36 *See 2017 BDS Order* at 3467, 3468, 3483-84, 3484 ¶¶ 13, 15, 50, 53 (competitors include firms that may enter "over the medium term," i.e., "three to five years"); *Bus. Data Servs. in an Internet Protocol Env't*, Order Denying Stay Motion, 32 FCC Rcd. 5537, 5543 ¶ 16 & n.45 (2017) (recognizing that the concept of "medium term" entry may go beyond the analysis provided in the Merger Guidelines).

37 *See* Reply Comments of the CBA at 48, GN Docket No. 18-122 (filed Dec. 7, 2018) ("CBA Reply Comments") (claiming that "[a]ny stated 'intent' to serve the United States is belied by" the SSOs lack of existing revenue).

38 SSO Comments at 10.

39 *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Servs.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014, 8031, 8091-92 ¶¶ 41-42, 219-220 (2016).

do satellite licenses and grants of U.S. market access require substantially more time and effort to obtain, but satellite operators also must commit more resources in reliance on their FCC authorizations before they begin commercial operations.

Knowing full well that its discriminatory proposal cannot survive legal muster, the CBA resorts to maligning the SSOs' efforts to serve the United States. In doing so, however, the CBA gets its facts wrong, fundamentally miscomprehends the nature of the satellite market, and once again faults the SSOs for characteristics shared by CBA membership itself.

As explained, the SSOs have made enormous commitments of engineering, manufacturing, and capital resources in order to design, launch, and operate satellites equipped with C-band transponders that cover the United States, and to complete the FCC's exacting Part 25 space station authorization process to make good on that investment. One SSO has also applied for and received an earth station license to operate a gateway in Hudson, New York, that enables service to and from the United States.[40] These acts and these achievements demonstrate the clearest possible intent to serve the United States, especially because "shelf space" on each satellite launched into space is so scarce. When a satellite operator decides to equip a satellite with transponders that cover a part of the world with significant demand for communications, it is because the operator plans to offer service in those areas in that spectrum. The fact that entry in the satellite industry can take time changes none of this.

---

[40] The CBA curiously states that ABS's New York earth station would be unable to provide service as a technical matter due to its low elevation angle. *See* CBA Reply Comments at n.179. Under Section 25.205 of the Commission's rules, however, earth stations are *required* to operate with a minimum elevation angles of 5° in frequency bands that are shared with terrestrial services, as is the case at C-band. Moreover, as CBA members are well aware, a low elevation angle alone does not determine whether communications can be provided. Antenna size, carrier characteristics, and carrier power levels must also be considered, and make the Hudson location completely viable. In addition, ABS-3A is not limited to using the facilities in Hudson and can communicate with third-party teleports located in the United States.

Only when it comes to the SSOs does the CBA appear to disagree. For example, the CBA incorrectly suggests that the SSOs are not committed to the U.S. satellite market because they offer coverage and services elsewhere in the world. But as CBA members well understand, a key advantage to satellites with global footprints that cover both U.S. and international locations is that they provide opportunities for U.S. content companies to reach lucrative overseas markets, for U.S. end users to benefit from overseas programming, and for multinational companies to connect American employees to cross-border networks. Moreover, even if it had merit, the CBA's own critique would apply doubly to the CBA's largest members. While the CBA is quick to suggest that the SSOs' sources of revenue demonstrate of a lack of U.S. commitment, it neglects to disclose that U.S. C-band revenues impacted by the CBA proposal account for a tiny fraction—approximately 3 percent—of Intelsat's and SES's total revenue worldwide.[41]

The CBA's meritless discussion of ABS-3A underscores the double standard. The relevant C-band beam aboard ABS-3A covers a number of critical U.S. metros and areas well suited to the construction of gateways that enable services throughout the United States. In fact, CBA members operate satellites with coverage characteristics similar to ABS-3A—including Intelsat 37e, which, at 18°W.L., covers only the eastern United States in the C-band. Moreover, contrary to the CBA's claim that a 10° elevation angle "renders . . . service difficult as a

[41] *See* Intelsat S.A., JPM HY Conference Presentation at 2 (Feb. 27, 2018) (Intelsat global revenue of ~$2.15B); SES S.A., FY 2017 Consolidated Statements (Feb. 23, 2018) (SES global revenue of ~2.40B); *see also* Comments of the Satellite Industry Association at 21, GN Docket No. 17-183 (filed Oct. 2, 2017) (estimating $340M in total U.S. C-band revenue across all 500 megahertz of the lower C-band, which supports an estimate of $136M in impacted revenue under a 200 megahertz clearing scenario).

technical matter,"[42] many operators provide service services to earth stations with low elevation angles—even lower than 10°.[43]

The CBA is also wrong to claim that, because Hispasat received initial commitments on Amazonas-3 to serve non-U.S. locations, Hispasat cannot "commit much of its C-band capacity to the United States as early as 2019," as it had planned.[44] What the CBA fails to mention is that capacity is rarely committed for the entire life of a satellite. Term contracts for capacity roll off in the normal course of business, which is precisely what is happening to Hispasat here. Capacity committed when Amazonas-3 first launched will free up in a matter of months, and Hispasat's turn to the United States—which has already proven successful for Hispasat in the Ku- and Ka- bands[45]—to fill the void is now a virtual impossibility in the portion of the C-band proposed to be reallocated, and will result in far less revenue than its potential if this proceeding concludes in a reallocation.

Finally, the CBA's offer to throw table scraps at the SSOs to cover unspecified types of relocation costs adds no coherence to its arbitrary and inconsistent proposal.[46] As explained, all FSS operators that give up spectrum use rights are entitled to compensation for the loss in their ability to serve the United States in the reallocated portion of the C-band, and thus all market-access grantees should receive compensation for those losses, and not just what the CBA decides

---

42 CBA Reply Comments at 46.

43 *See also supra* note 40.

44 CBA Reply Comments at 46 (quoting SSO Comments at 8).

45 *See* Letter from Scott Blake Harris, Counsel, Hispasat, to Marlene H. Dortch, Secretary, FCC, at Attachment p.3, GN Docket No. 18-122 (filed Oct. 15, 2018) (noting that Hispasat provides existing service in the United States in the Ka- and Ku- bands). As a result, the CBA's characterization of the SSOs as "No Customer, No Revenue" satellite operators, which is based on the CBA's apparent belief that the SSOs "have no CONUS customers and no CONUS revenue," is just wrong.

46 CBA Reply Comments at 45.

to count as relocation. At the very least, if the Commission were to accept the CBA's arbitrary metric for excluding the SSOs, the Commission should ensure that the CBA treats its members similarly. Indeed, if the provision of 2017 service to a U.S. C-band customer were the only act worthy of compensation, as the CBA contends, then *no* satellite operator would be rewarded for anything more than the cost of relocation required to maintain historic revenue.

C. CBA's Exclusionary Tactics Would Harm U.S. Consumers—and Cannot Be Sanctioned as a Procompetitive "Collaboration."

The CBA claims its proposal "has been carefully crafted to comply with antitrust law."[47] To demonstrate compliance, the CBA relies almost exclusively on the DOJ's and FTC's Guidelines on competitor collaborations. Based on those guidelines, the CBA repeatedly asserts that the antitrust agencies "recognize the benefits of . . . collaborations" like the CBA, and that a CBA Transition Facilitator would qualify as an "integrated economic venture" falling squarely within the scope of collaborations viewed as procompetitive by the DOJ and the FTC.[48]

There is just one problem. The Collaboration Guidelines focus exclusively on the potential for a given collaboration to limit competition among participants in the collaboration and between participants and the collaboration—and *expressly disclaim* consideration of whether the collaboration's exclusion of competitors as participants would be unlawful:

> These Guidelines take into account neither the possible effects of competitor collaborations in foreclosing or limiting competition by rivals not participating in a collaboration nor the possible anticompetitive effects of standard setting in the context of competitor collaborations. Nevertheless, these effects may be of concern to the Agencies and may prompt enforcement actions.[49]

---

47 CBA Comments at 32.

48 *Id.* at 27 n.59, 32.

49 Collaboration Guidelines at 2 n.5.

As a result, the Commission cannot rely on the Collaboration Guidelines to ensure that a private facilitator does not violate antitrust laws. It must separately consider the proposed facilitator mechanism's exclusionary effects.

Yet the CBA barely tries to defend its proposal against such exclusionary effects. It simply states that the "C-Band Alliance is open to all C-band satellite operators" that meet its eligibility criteria—criteria which, for the reasons discussed above, are backward-looking and patently exclusionary.[50] The CBA also summarily concludes that its proposal "will . . . avoid anticompetitive harm by preserving competition in the FSS industry," which it claims is "vibrant."[51] But the record shows concern among U.S. purchasers that "C-band competition is limited."[52] Moreover, the Commission explicitly recognized in the NPRM that the "reduction in industry capacity" created by a repacking of the lower C-band could "increase[e] the price of FSS services and consequently of downstream services."[53] Robust competition from the SSOs thus will be necessary to expand the industry capacity available to serve the United States and guard against these risks to consumers. Such competition will be less available if the Commission facilitates concerted exclusionary action on the part of the CBA, which has adopted criteria that would categorically exclude new entrants by definition.

The simple truth is that, if the FCC were to adopt the current CBA proposal, the FCC would be creating a mechanism for the largest four C-band providers not only to forcibly impair the investments of their competitors, but also to usurp the gains of that impairment. By allowing

---

50 CBA Comments at 34-35.

51 *Id.* at 35.

52 *See* Comments of the American Cable Association at 15, GN Docket No. 18-122 (filed Oct. 29, 2018).

53 NPRM ¶ 63.

the big-four providers to hoard the resources necessary to rebuild and reinvest in the portion of the C-band that remains, the FCC would encourage further concentration of the U.S. satellite market, place upward pressures on price, and stifle innovation, in direct contravention to the Commission's procompetitive statutory mandate and longstanding FCC satellite licensing objectives.[54]

Moreover, the CBA has not identified any conceivable benefit to competition from the exclusion it has proposed. A facilitator-based approach can work just as well—and indeed, better—in the absence of the CBA's self-serving restrictions. As an initial matter, even proponents of a market-based approach have acknowledged that the more participation among licensed FSS operators in the clearing process, the better.[55] These commenters recognized that the CBA proposal could only succeed if the facilitator "achieve[s] . . . consensus on the part of *at least . . . most*" FSS operators, not just four out of eight.[56] Furthermore, there should be no concern that equitable participation will empower speculators or open the floodgates to an unmanageable transition. As the SSOs explained, a facilities-based approach to defining eligibility would include SSOs that invested heavily in C-band facilities and obtained their FCC authorizations well before the Commission initiated this rulemaking.[57]

---

54 *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic & Int'l Satellite Serv. in the United States et al.*, 12 FCC Rcd. 24094, 24097 ¶4 (1997) (U.S. market access procedures intended to "facilitate greater competition" for U.S. consumers).

55 *See* Comments of Verizon at p.3 of Attachment, GN Docket No. 18-122 (filed Oct. 29, 2018) ("Verizon Comments").

56 *See Id.* at Attachment p.3 (emphasis added); *see also* AT&T Comments at 17 ("[A] C-band auction, or secondary market transaction conducted by CBA or a proxy, should be fair and equitable."). The SSOs represent three of the four remaining FSS operators with C-band satellites on the FCC's permitted list.

57 *See* SSO Comments at 1, 3-7.

II. IF THE COMMISSION PURSUES A MARKET-BASED TRANSITION, IT SHOULD ADOPT A COMPREHENSIVE AND INCENTIVE-BASED DISTRIBUTION AND SCORING MODEL.

As explained above, the CBA has not developed reasonable criteria for participation in the Transition Facilitator or for a reasonable allocation of transition proceeds. Even after filing its initial comments, the CBA seems to have doubled-down on its aggressively exclusionary approach.[58] The FCC thus cannot trust the CBA to serve as the exclusive decision-maker in a Facilitator-led transition. If given that authority, the CBA already has revealed the outcome that the FCC can expect: exclusionary practices that threaten to cut off U.S. satellite competition from operators who have made significant investments to build, launch, and operate satellites designed to provide C-band services in the United States.

Importantly, the problem goes well beyond satellite competition and the CBA's treatment of rival FSS operators. Participants from all corners of the C-band ecosystem have raised serious doubts concerning the CBA's ability and incentive to administer the transition in a reasonable and effective manner. For example, Comcast explained that, without proper oversight, the CBA "would be motivated to short-change downstream" earth station "users to maximize [its members'] windfall."[59] Noting that the CBA has "every incentive to cut corners," Comcast further observed that the CBA had failed to "work[] out critical implementation details that supposedly would make its proposal work" for all stakeholders.[60] Comcast thus urged the Commission to "ensure the negotiation process accounts for the interests of all stakeholders that

---

58 *See* Letter from Michele C. Farquhar, Counsel, CBA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (filed Nov. 19, 2018); *see generally* CBA Reply Comments.

59 Comments of Comcast and NBC Universal at iii, 26, GN Docket No. 18-122 (filed Oct. 29, 2018) ("Comcast/NBCU Comments").

60 *Id.*

have interests in the band" if it adopts "any kind of market-based reallocation mechanism," emphasizing that the CBA "bears the burden to demonstrate" the merits of plan "through specifics rather than vague generalities and a 'just trust us' proposition."[61]

NCTA likewise observed that the CBA's incentives "may not be co-extensive with the interests" of cable operators and programmers.[62] NCTA therefore urged the Commission to require the CBA to publish the details of its transition plan, including details about the distribution of proceeds, and to scrutinize the plan carefully with the benefit of notice and comment.[63] A group of leading content companies similarly noted that the "CBA's commitments" do not "go far enough to ensure that video delivery and the critical role FSS spectrum plays in the video marketplace will remain fully protected."[64] Numerous commenters also raised concerns about the fairness of the CBA plan to taxpayers—an issue that the CBA simply ignored in its comments.[65]

Companies shortchanged or altogether excluded by the CBA would have no efficient mechanism to protest under the CBA proposal. Instead, the CBA proposes simply to eliminate the rights of these interest holders through a heavy-handed regulatory clearing process.[66] While

---

61 Comcast/NBCU Comments at 24-25.

62 NCTA Comments at 28-29.

63 *Id.*

64 Comments of CBS Corporation, Discovery, Inc., The Walt Disney Company, 21st Century Fox, Inc., Univision Communications Inc., and Viacom Inc. at 5, GN Docket No. 18-122 (filed Oct. 29, 2018) ("Content Companies Comments").

65 *See, e.g.*, Comments of T-Mobile USA, Inc. at 12, GN Docket No. 18-122 (filed Oct. 29, 2018); Comcast/NBCU Comments at ii; Comments of the Public Interest Spectrum Coalition, GN Docket No. 18-122 (filed Oct. 29, 2018).

66 CBA Comments at 28 (proposing to address so-called "holdouts" by eliminating primary status for satellite services).

the CBA characterizes this operation as necessary to address potential "holdouts,"[67] many entities affected by it would be nothing of the sort. To the contrary, these entities could include firms that hold the same non-exclusive spectrum use rights that CBA members possess and are willing to relinquish them at reasonable levels of compensation, but have been excluded from the process by the self-serving dictates of the group seeking to anoint itself as the mandatory counterparty to a secondary market agreement.

The predictable result of the CBA's "just trust us" approach will be protracted negotiations and disputes that result not only in the unjust treatment of key C-band stakeholders, but also a slower and less successful reallocation. A market-based approach that is based upon the discriminatory entry and compensation criteria devised by the CBA would leave itself vulnerable to conflicts with the many entities left out in the cold, and could significantly delay the transfer of C-band spectrum to wireless operators.

Thus, if the Commission decides to pursue a market-based transition, the SSOs urge it to "insist on ground rules"[68] that foreclose the exclusionary approach envisioned by the CBA in favor of an inclusive, incentive-based transition that encourages full and voluntary cooperation.[69] Common-sense measures tailored to that objective include requiring fair and adequate representation in facilitator governance, and undertaking a mandatory review and approval of the facilitator's transition plan. Nevertheless, the SSOs believe that the most important step that the Commission can take to accelerate intensive terrestrial use of this spectrum is to adopt a

---

67 *Id.*

68 Comments of AT&T Services, Inc. at 18, GN Docket No. 18-122 (filed Oct. 29, 2018) ("AT&T Comments").

69 *See* SSO Comments at 11; Comcast/NBCU Comments at 28.

distribution model that accounts for all stakeholder interests, is equitable to all stakeholders, and provides meaningful incentives for broad participation.

To that end, the SSOs propose the following model for incentive-based distribution, which in three steps would allocate proceeds to (i) earth station operators, (ii) U.S. taxpayers, and (iii) the eight satellite operators authorized to provide C-band satellite services in the United States.

The first step would compensate earth station operators. Because of the fragmented ownership of earth stations in the lower C-band, the Commission must provide financial incentives to ensure near-full cooperation. Thus, the SSOs propose that the facilitator provide two components of compensation to earth station operators: direct and indirect relocation costs for transitioning out of the cleared part of the band ("Relocation Costs"), and a separate incentive payment to expedite the relocation of certain impacted antennas ("Incentive Payment"). Specifically, the SSOs propose that earth station operators receive a fixed Incentive Payment for each antenna that must communicate with a new C-band transponder as a result of the band-clearing, with half due at the start of relocation, and the remaining half due upon its completion. The SSOs further propose that the Incentive Payment be substantial, and a significant multiple of the typical costs of relocation, in order to ensure that the band is cleared effectively and efficiently.

The SSOs estimate that a reasonable Incentive Payment amount could result in earth station operators receiving up to 20 percent of the overall transition proceeds. This estimate assumes that all earth station operators will incur Relocation Costs associated with the installation of a 5G rejection filter at each of the approximately 19,000 antennas operating in the

C-band,[70] as expected, and that a substantial percentage will incur more significant Relocation Costs associated with migrating their antennas to a new transponder, and thus will also require an Incentive Payment to timely complete the relocation.

The second step would ensure that U.S. taxpayers receive a material percentage of the proceeds remaining after compensating earth station operators. The SSOs propose a percentage of between 10 and 20 percent of proceeds remaining after Step 1, which would provide taxpayers with 8 to 16 percent or more of the total amount generated by secondary market transactions (assuming 20 percent of the proceeds would be used in Step 1). Considering the expected value of the spectrum, even a percentage on the low end of the range proposed would likely provide billions of dollars in benefits to the taxpayer.

Finally, as a third and final step, any leftover proceeds would be distributed among the eight satellite operators with C-band space stations that are authorized by the FCC to serve the U.S. market and have coverage in the continental United States. The facilitator would divide Step 3 proceeds according to a "Satellite Allocation" and an "Operator Allocation." The Satellite Allocation would allocate 67 percent of Step 3 proceeds among the C-band satellites on the Approved Space Station List (*i.e.*, that are either FCC-licensed or on the Permitted List) according to an established scoring metric. The SSOs propose that the Commission develop for this purpose a "Service Life Score" driven by the number of service years left for each satellite, or allow all eight operators develop a scoring model jointly. The Operator Allocation would distribute the remaining 33 percent of Step 3 proceeds equally among each firm with a satellite authorized to serve the U.S. market in the C-band. This payment would compensate operators

[70] The SSOs estimated the number of earth stations in the lower C-band based on data available on IBFS.

for the enormous fixed costs associated with entering the U.S. market that are incurred irrespective of the number of satellites launched and operated.

This approach would more than adequately compensate the CBA members under any reasonable measurement of their future losses in C-band revenue in the United States. Indeed, medium-sized operators that have joined the CBA may especially benefit from a distribution and scoring model with more analytical support.

By adopting a comprehensive, transparent, and incentive-based distribution methodology, such as the one proposed above, the Commission can ensure that market forces determine price and quantity, while relying on voluntary cooperation rather than regulatory mandates to clear the band. At the same time, guidance from the Commission on the apportionment of transition proceeds will help to forge a consensus at the outset of the reallocation. Importantly, Section 309(j)(8) does not foreclose the Commission from adopting the distribution model proposed. On its face, the provision applies only to proceeds generated from "competitive bidding."[71]

III. THE SSOS ARE OPEN TO OTHER REALLOCATION MECHANISMS IF THEIR C-BAND INVESTMENTS ARE GIVEN APPROPRIATE RECOGNITION.

The CBA claims that alternatives to a Transition Facilitator proposed "in the NPRM reflect a misunderstanding of the complex FSS ecosystem, ignore market forces, require significant and time-consuming government involvement, and would be opposed vigorously by satellite operators and their customers."[72]

Once again, the CBA incorrectly assumes that it has the right to speak on behalf of satellite operators not included in the CBA. But the SSOs do not agree with CBA's conclusions.

---

[71] 47 U.S.C. § 309(j)(8)(A).

[72] CBA Comments at 6.

While the SSOs believe that the distribution model proposed above is the best way to address deficiencies with the CBA's current proposal, the SSOs also believe that there is merit in the capacity auction process described in the NPRM, provided that the proceeds would be used to compensate earth station operators, taxpayers and satellite operators in an equitable manner.[73] Ultimately, the market-based approach is similar to (if not identical to) a capacity auction, except that the Transition Facilitator would run the auction process instead of the FCC.

In view of the CBA's exclusionary entry criteria, as well as its clear anti-competitive behavior, the SSOs believe that, if the FCC were to decide on some type of spectrum auction mechanism, then it might be preferable to have the FCC run the auction and reimburse satellite operators, including those satellite operators (like the SSOs) on the U.S. Permitted List, rather than permit the CBA to proceed with an exclusionary, anticompetitive approach. After all, the claimed benefit to a market-based approach is that it would proceed on a voluntary basis. Yet the CBA never explains how a voluntary clearing would be possible under the exclusionary transition that it has proposed, which would permit participation by only half of the operators with non-exclusive rights to use this spectrum.

The SSOs also disagree with the CBA assertion that the market-based approach is the only process that would quickly clear the spectrum for 5G, while any other approach managed by the FCC would delay the process.[74] The FCC has extensive experience with spectrum allocation auctions. The SSOs would thus favor, as an alternative to the so-called market-based approach, an FCC-run, non-discriminatory capacity auction approach coupled with the SSOs' proposed

---

[73] *See* NPRM ¶ 104.

[74] CBA Comments at 34.

compensation distribution mechanism to the reallocation of the C-band spectrum, at least so long as the CBA proposal is driven by discriminatory entry and compensation criteria.

As the Commission evaluates various alternatives, the SSOs urge it to protect the spectrum use rights of all space station operators that have invested to launch space stations with U.S. C-band coverage. FSS operators with space stations on the FCC's permitted list should be considered holders of non-exclusive rights to operate in the spectrum for which they are authorized, regardless of whether they meet the CBA's arbitrary test of having earned revenues in 2017.

Indeed, SSOs made these substantial investments in the C-band for a reason. The record demonstrates substantial and continued interest in C-band satellite services by U.S. customers,[75] driven by the C-band's resilience to attenuation, substantial coverage, and the availability of existing C-band network assets.[76] Customers that rely on the C-band also noted the "critical" role the band plays for "video service delivery, . . . onsite newsgathering and live event coverage," and "providing broadband access to rural and remote areas."[77] They also reported that the C-band supports critical public safety, national security, and U.S. government services, capabilities that the SSOs recognize, support, and are well-positioned to deliver once this proceeding concludes.[78] As the SSOs explained, "Hispasat has seen robust interest in its C-band capacity in light of the broader coverage available, improved resistance to rain fade, and limited

---

[75] *See* Comments of NCTA—The Internet & Television Association at 4, GN Docket No. 18-122 (filed Oct. 29, 2018) ("NCTA Comments").

[76] SSO Comments at 5-6.

[77] NCTA Comments at 5.

[78] *Id.*; *see also* SSO Comments at 4.

Ku-band capacity available relative to the very high demand among broadcast customers,"[79] and "C-band capacity is also well suited for cellular backhaul, including in times of disaster, and for the delivery of telehealth and tele-education services to rural parts of the country."[80] CBA members similarly explained that the C-band "has become the backbone of U.S. content distribution and an invaluable failsafe for viewers and listeners due to its unmatched reliability and ubiquity."[81]

CONCLUSION

The SSOs do not oppose the clearing of 200 megahertz of the lower C-band so long as their investment in the spectrum is given fair recognition and compensation. The CBA proposal, however, would unreasonably exclude competitors to the four largest satellite providers from the transition. These elements of the CBA approach are arbitrary and unlawful, and would threaten the success of a market-based reallocation. Accordingly, the FCC should reject the CBA's approach.

If the Commission pursues a market-based approach, it must ensure that the Transition Facilitator accounts for the interests of all C-band stakeholders and proceeds as quickly and with as little friction as possible. To accomplish that objective, the Commission should adopt the comprehensive, incentive-based, and equitable distribution and scoring model proposed herein, and should reject the CBA's arbitrary 2017 revenue criterion as a basis for compensation of satellite operators.

---

79 SSO Comments at 6 (noting that U.S. companies could leverage millions of existing terminals overseas to expand the reach of their content).

80 *Id.* at 5.

81 Intel/Intelsat/SES Comments at 2; *see also* Eutelsat Comments ("C-band satellite services provide highly reliable coverage of large geographic areas with minimal rain attenuation.").

Should the Commission decide to auction rights to the spectrum or adopt the distribution scoring model, the SSOs urge it to ensure that all FSS operators with stranded C-band facilities are compensated in a fair manner.

Respectfully submitted,

Scott Blake Harris
V. Shiva Goel
Harris, Wiltshire & Grannis LLP
1919 M Street NW
Washington, DC 20036
(202)730-1330

Counsel to the Small Satellite Operators

December 11, 2018