

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Notice and Opportunity for Public Comment)	GN Docket No. 18-122
under Section 605(b) of the MOBILE NOW)	
Act)	

**JOINT COMMENTS OF INTEL CORPORATION, INTELSAT LICENSE LLC, AND
SES AMERICOM, INC.**

I. INTRODUCTION

Intel Corporation (“Intel”), Intelsat License LLC (“Intelsat”), and SES Americom, Inc. (“SES”) (collectively, the “Parties”) are pleased to submit these comments in response to the Public Notice regarding the Federal Communications Commission’s (the “Commission” or “FCC”) report to Congress under Section 605(b) of the MOBILE NOW Act.¹ Congress has asked the Commission to submit a report “evaluating the feasibility of allowing commercial wireless services, licensed or unlicensed, to use or share use of the frequencies between [3.7-4.2 GHz].”²

Congress’ request is a timely opportunity for the FCC to share its significant progress in considering whether and how best to achieve making mid-band spectrum available for terrestrial 5G. The Commission’s spectrum reform initiatives have enabled the United States to be a leader in the deployment and delivery of mobile broadband. The agency already has conducted a Notice of Inquiry regarding mid-band spectrum (the “Mid-Band NOI”) and is drafting a Notice

¹ *Office of Engineering and Technology, International, and Wireless Telecommunications Bureaus Seek Comment for Report on the Feasibility of Allowing Commercial Wireless Services, Licensed or Unlicensed, To Use or Share Use of the Frequencies Between 3.7-4.2 GHz*, Public Notice, DA 18-446, GN Docket No. 18-122 (May 1, 2018) (“PN”).

² *See Consolidated Appropriations Act, 2018, Sec. 605(b), PL 115-141, 132 Stat 348.*

of Proposed Rulemaking (“NPRM”) to determine how best to achieve the goal of making mid-band spectrum—specifically spectrum in the 3.7-4.2 GHz C-band—available for terrestrial 5G.³

Recognizing the need to carefully balance the terrestrial mobile industry’s demand for additional spectrum with the need to protect existing and future satellite operations in the 3.7-4.2 GHz band, the Parties joined together in response to the Mid-Band NOI to put forth a cross-industry market-based proposal that will best achieve this balance (the “Joint Proposal”). Given the particular challenges of introducing a terrestrial mobile service in this band, it is critically important that the Commission make a decision that “gets it right” for both the incumbent satellite operators and their customers as well as potential terrestrial mobile carriers eager to provide service in the band. The Joint Proposal does just that, by giving the relevant parties the flexibility to address the challenges in an expedited manner that best serves the public interest. The Parties incorporate by reference their filings in the Mid-Band NOI proceeding⁴ and highlight below a few key considerations for inclusion in the Commission’s report to Congress.

II. 3.7-4.2 GHz SATELLITE OPERATIONS PROVIDE CRITICAL PUBLIC SERVICES SUPPORTING NATIONWIDE COMMUNICATIONS CONNECTIVITY.

The 3.7-4.2 GHz band is primarily used today by the Fixed-Satellite Service (“FSS”),⁵ with Intelsat and SES being the two largest providers of C-band services in the United States. Enabled by more than 40 years of private investment made in reliance on long-standing Commission regulations that confer critical operational flexibility and robust interference

³ *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, Notice of Inquiry*, 32 FCC Rcd 6373 (2017) (“*Mid-Band NOI*”). Unless otherwise noted, comments, reply comments, and *ex parte* notifications cited herein were filed in GN Docket No. 17-183.

⁴ *See* Attachment A.

⁵ *See* 47 C.F.R. § 2.106.

protection, FSS operations using the entire 3.7-4.2 GHz band expanded nationwide and provide a vital communications network.

The 3.7-4.2 GHz downlink band forms the backbone of the infrastructure for delivering premium video content to more than 100 million American television households. Indeed, virtually all national video and radio programming, regardless of how it ultimately is received by viewers, is distributed over satellites in this frequency band that have full CONUS coverage. Customers also depend on FSS in 3.7-4.2 GHz for a variety of other critical services, including emergency alerts and communications offerings vital to government users, public safety and disaster recovery. These consumers expect the continued extremely high level of availability and reliability that distribution over 3.7-4.2 GHz provides.

At the same time, characteristics of the 3.7-4.2 GHz band, as well as global 5G deployment plans, make this frequency band highly valuable and attractive for terrestrial mobile use. The Joint Proposal provides the optimal way to enable terrestrial mobile operations in the 3.7-4.2 GHz band, creating market-based incentives for FSS space station incumbents to undertake voluntarily the complicated and costly process of clearing 3.7-4.2 GHz downlink spectrum, thus opening the way for coordinated terrestrial mobile use as rapidly as possible. By allowing market forces to identify and enable the highest and best use of spectrum, the Joint Proposal benefits all interested parties and advances the public interest without the risk and delay associated with attempting to impose a sharing framework by regulatory fiat. Allowing appropriate commercial agreements with limited government involvement will help accelerate the mobile 5G transition.

The Parties encourage the Commission to adopt an approach that best serves the public interest by avoiding unnecessary disruption to – or limiting the future potential of – existing

licensed satellite operations in 3.7-4.2 GHz, while still enabling the introduction of terrestrial 5G services in the band. The Joint Proposal is the only viable option that will achieve both these objectives.

III. CO-FREQUENCY SHARING WITH FSS IS NOT A FEASIBLE SOLUTION TO MAKING SPECTRUM AVAILABLE TO COMMERCIAL WIRELESS SERVICE IN 3.7-4.2 GHz IN AN EFFICIENT AND TIMELY MANNER.

The Public Notice seeks input on “possible impacts of sharing on...users already operating in this band.”⁶ Simply put, co-frequency sharing in the C-band downlink spectrum risks both harming incumbent satellite operations and significantly constraining terrestrial 5G operations. Various comments in response to the NOI describe the technical and implementation challenges if regulators were to mandate co-frequency sharing rules in the 3.7-4.2 GHz band.

FSS receive earth stations are susceptible to interference from terrestrial transmissions and increases in interference levels could lead to disruption of services. As a result, the Commission would need to consider imposing significant protection zones around thousands of earth stations to ensure that terrestrial mobile operations do not disrupt incumbent satellite operations. The debate over how large those protection zones need to be would be highly technical, contentious and lengthy. And any Commission decision on the protection zones’ size will likely be unsatisfactory to both satellite and terrestrial mobile interests.

Indeed, stakeholders on both sides of the debate assert that resolving co-frequency sharing presents significant technical challenges and their comments in the record demonstrate that it would be a difficult, complex, controversial, and drawn-out process. NPR notes, for example, that receive earth stations in 3.7-4.2 GHz are highly vulnerable to terrestrial interference and must be separated from terrestrial transmitters by tens or even hundreds of

⁶ PN at 2.

kilometers to prevent degradation of the received satellite signal.⁷ The American Cable Association warns that lessening the primary protection of satellite operations across the band would have a hugely disruptive impact on the video programming distribution industry.⁸

Similarly, technical analyses undertaken by Ericsson and Nokia highlight the difficulty of co-frequency sharing. Ericsson’s study “concludes co-channel sharing between single [International Mobile Telecommunications] Macro base station nodes and FSS earth station receivers requires large separation distances, and considering that 65% of FSS receivers are located in urban/sub-urban locations, such large separation distances will eliminate co-channel sharing possibilities in the populated areas.”⁹ Nokia also found that “co-channel deployment could incur interference when close by, even when density of [base stations] is low.”¹⁰

In short, there is no easy path for how co-frequency “sharing [might] be accomplished... without causing harmful interference” to incumbent users without – at best – the risk and delay of a long, contentious regulatory process.¹¹ At worst, co-frequency sharing runs the risk of unnecessarily negatively impacting incumbent satellite operations and/or unnecessarily restricting use of the band for terrestrial 5G services. If 3.7-4.2 GHz spectrum is to fuel the United States in the race to 5G, the Commission has one chance to get it right. Accordingly, the Commission should report to Congress that co-frequency sharing would require lengthy and contentious analysis and must account for complex technical interference trade-offs to protect existing satellite users. Further, ensuring that incumbent users are adequately protected from interference would needlessly and inefficiently limit terrestrial 5G deployment in the 3.7-4.2

⁷ See Comments of National Public Radio, at 10-12 (Oct. 2, 2017).

⁸ See Comments of the American Cable Association, at 2-3 (Oct. 2, 2017).

⁹ See Ericsson, Notice of *Ex Parte* Presentation, at 1 (Jan. 30, 2018).

¹⁰ See Nokia, Notice of *Ex Parte* Presentation, Attach. at 20 (Jan. 22, 2018).

¹¹ PN at 2.

GHz band. Instead, by adopting the Joint Proposal, the Commission can reach an optimal, market-driven outcome.

IV. THE BAC PROPOSAL TO ALLOW POINT-TO-MULTIPOINT OPERATIONS IN 3.7-4.2 GHz SPECTRUM IS FLAWED.

The Broadband Access Coalition (“BAC”) proposal to modify licensing rules to enable terrestrial point-to-multipoint (“P2MP”) co-frequency sharing in the 3.7-4.2 GHz band¹² is incompatible with expanded terrestrial mobile 5G use of the band. Introducing co-frequency sharing by P2MP operations with FSS presents similar technical challenges to those discussed above, as the need to ensure that thousands of operational FSS earth stations are protected from interference that would result in disruption of valuable services would significantly limit the areas in which P2MP systems could be deployed. The BAC argues that it can both protect satellite operations by mitigating interference after it occurs and accommodate future changes in satellite operations. But P2MP providers have not shown that they could remedy interference by switching spectrum channels quickly enough to satisfy the high reliability requirements of video customers – particularly given the impracticality of having to contact P2MP operators near thousands of receive sites in the event a video customer needed to change frequencies. Just as importantly, it is illogical to incentivize FSS operators to clear spectrum for 5G mobile use, while also introducing other fixed operations – by BAC members – that will impair access to the spectrum for mobile operations and burden the spectrum remaining to accommodate FSS customers. Proposals to expand Fixed Service operations in the 3.7-4.2 GHz band are simply inconsistent with the expanded flexible use of the frequencies.¹³ Accordingly, the Parties urge

¹² 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 3700-4200 MHz Band, RM-11791 (filed Jun. 21, 2017).

¹³ See Remarks by FCC Commissioner Michael O’Reilly before the 6th Annual Americas Spectrum Management Conference (Oct. 13, 2017) (“I am not able to support an idea proposed

the Commission to report to Congress that the 3.7-4.2 GHz band is not suitable for the introduction of P2MP operations without impairing the potential for expanded mobile 5G use.

V. NEW SERVICES IN THE 3.7-4.2 GHz BAND ARE BEST SUITED FOR LICENSED OPERATIONS.

Evaluating whether a band is most suitable for licensed or unlicensed operation involves the assessment of several issues. Consistency of spectrum designation with adjacent bands, both in the United States and worldwide, provides benefits by allowing for equipment harmonization and economies of scale. Another key consideration, as addressed above, is the feasibility of integrating the new service into the sharing environment and related coordination complexity and future growth considerations. Finally, broad ecosystem support also plays an important role, because technology adoption will not fully develop if not endorsed by a robust array of equipment, application, and service suppliers.

In the case of the 3.7-4.2 GHz band, the above factors collectively and decisively point toward licensed use of this band. With that in mind, the Mid-Band Spectrum Coalition, consisting of a diverse cross-section of licensed and unlicensed terrestrial broadband ecosystem interests, reached consensus in advance of the FCC's Mid-Band NOI release on recommending licensed use for new services in the 3.7-4.2 GHz band.¹⁴

VI. THE JOINT PROPOSAL WILL SPEED TERRESTRIAL 5G DEVELOPMENT AND PROTECT FSS OPERATIONS.

The 3.7-4.2 GHz band's use by multiple FSS operators with non-exclusive access to the full band nationwide, and serving thousands of receive antennas that are susceptible to interference from terrestrial mobile operations, calls for a different approach to making spectrum

by some commenters that would favor fixed operations, which is counter to the flexible use policies that I have advocated for.”).

¹⁴ Intel was a founding member of the Coalition. *See* Comments of the Mid-Band Spectrum Coalition (Oct. 2, 2017).

available for terrestrial 5G and protecting satellite incumbents. As underscored in numerous filings and *ex parte* presentations,¹⁵ the Parties have offered a joint, market-based proposal that will bring highly valuable mid-band spectrum to market voluntarily, in an efficient and expeditious manner, and with minimal FCC administration, while preserving important incumbent satellite services. The proposal is a win-win for terrestrial 5G interests and FSS operators and their customers.

More specifically, the Joint Proposal would create a consortium of satellite operators (“Consortium”) to clear and make available spectrum within the 3.7-4.2 GHz band for terrestrial 5G use within 18-36 months of a Commission order, while maintaining and protecting satellite services. Further, the proposal would rely on the Consortium to handle the clearing and compensate all affected parties (including earth station and fixed microwave operators) for their reconfiguration and relocation costs, as well as for prior investment and opportunity costs for Consortium members.¹⁶ The Parties outlined for the Commission just how these private transactions could work¹⁷ and the process and timing for an NPRM incorporating the proposal.¹⁸

Because the clearing of spectrum will occur at the satellite space station level (rather than the terrestrial earth stations), the Joint Proposal would provide terrestrial mobile operators with “clean” spectrum. With the exception of a couple of dozen sites nationwide used for telemetry, tracking and command and programming contribution, terrestrial operators would not be excluded from operating in the vicinity of earth stations in this band because they will not be using the same frequencies.

¹⁵ See Attachment A.

¹⁶ Intelsat and SES, Notice of *Ex Parte* Presentations (Feb. 14, 2018).

¹⁷ See Intelsat and SES, Notice of *Ex Parte* Presentations (Feb. 14, 2018); SES and Intelsat Notice of *Ex Parte* Presentations (Feb. 21, 2018).

¹⁸ See Intelsat, SES, and Intel, Notice of *Ex Parte* Presentations (Mar. 7, 2018).

In sum, because it gives the relevant parties the flexibility to negotiate a solution that best balances the competing interests, the market-based proposal of Intel, Intelsat, and SES will make spectrum in the 3.7-4.2 GHz band available for mobile broadband use in a voluntary, efficient, and expeditious manner, while protecting critical FSS operations. The Parties urge the Commission to report to Congress that if the Joint Proposal is adopted, wireless operators would be able to quickly access new mid-band spectrum that would help accelerate the introduction of terrestrial 5G services, benefitting American consumers. Accordingly, the Parties' Joint Proposal should serve as the cornerstone of the Commission's report to Congress.

VII. CONCLUSION

The Parties appreciate the opportunity to provide these comments for the Commission's report to Congress and encourage the FCC to issue an NPRM proposing to adopt the market-based approach set forth in the Joint Proposal as soon as possible.

Respectfully submitted,

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Attachment A

Parties	Type	Docket(s)	Date
Intelsat	Notice of Oral <i>Ex Parte</i> Presentation	17-183	Jul. 19, 2017
Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Sep. 29, 2017
Intelsat and Intel	Joint Comments	17-183	Oct. 2, 2017
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Oct. 10, 2017
Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Oct. 20, 2017
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Oct. 31, 2017
Intelsat and Intel	Joint Reply Comments	17-183	Nov. 15, 2017
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Nov. 29, 2017
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Nov. 30, 2017
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Dec. 1, 2017
Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Dec. 19, 2017
Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Jan. 8, 2018
Intelsat and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Jan. 12, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Feb. 9, 2018
Intelsat and SES	Notice of <i>Ex Parte</i> Presentation	17-183	Feb. 14, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Feb. 21, 2018
Intelsat and SES	Letter	17-183	Feb. 23, 2018
Intelsat, SES, and Intel	Notice of <i>Ex Parte</i> Presentation	17-183	Mar. 7, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183	Mar. 27, 2018
Intelsat and SES	Notice of Written <i>Ex Parte</i> Presentation	17-183	Apr. 13, 2018
Intelsat and SES	Letter	17-183	Apr. 13, 2018
Intelsat, SES, and Intel	Notice of <i>Ex Parte</i> Presentation	17-183, 18-122	Apr. 20, 2018
Intelsat and SES	Notice of <i>Ex Parte</i> Presentation and Attachment C	17-183, 18-122	Apr. 23, 2018
Intelsat and SES	Letter	17-183, 18-122	May 8, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183, 18-122	May 9, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183, 18-122	May 9, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183, 18-122	May 9, 2018
SES and Intelsat	Notice of <i>Ex Parte</i> Presentation	17-183, 18-122	May 9, 2018