



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

Comments of the North American Broadcasters Association

The North American Broadcasters Association (NABA)¹ respectfully submits the following comments concerning **Expanding Flexible Use of the 3.7 to 4.2 GHz Band, Notice of Proposed Rulemaking - GN Docket No. 18-122**.

As previously noted, NABA is concerned that new terrestrial uses in the C-Band downlink spectrum will cause significant harm to existing satellite users.² NABA recognizes that as 5G technology evolves this may necessitate changes in the allocation of spectrum that historically has been used by broadcasters for delivery and collection of content and services. The principle of **NO HARM** to the broadcasting ecosystem and the public that it serves must be at the core of any rule making considerations, including adequate compensation for operations, equipment and site changes and upgrades, which will be required.

In these comments NABA recommends several policies to help avoid potential harm.

1. The Commission Should Avoid Frequency Sharing with FSS in the C-Band Downlink Spectrum

NABA strongly opposes overlay co-frequency sharing with new wireless broadband services in the C-Band downlink frequencies, either mobile services or fixed point-to-multipoint services. The Commission acknowledges that C-Band satellite “signals received at the earth stations are extremely weak [and] terrestrial mobile operations could cause harmful interference to the earth station receivers...”³ Extensive and rigorous studies⁴ have been performed in recent years that determined the requirement for significant separation zones to protect FSS earth stations from new wireless broadband services. The studies conclude that due to the large number and wide geographic distribution of earth stations throughout the

¹ The North American Broadcasters Association (NABA) is a non-profit association of the most influential broadcasting organizations in North America committed to advancing the interests of broadcasters at home and internationally, and to identify and take action on technical, operational and regulatory issues affecting North American broadcasters. Both public and private network broadcasters in Canada, Mexico and the United States, work together to provide a common voice for the North American broadcast community. As a member of the World Broadcasting Unions (WBU), NABA creates the opportunity for its members to share information, identify common interests and reach consensus on issues of an international nature. For further information about NABA, please visit: www.nabanet.com.

NABA members include: Ad-ID LLC; AT&T; Avid; Bell Media*; CBC/Radio-Canada; CBS Broadcasting, Inc.; CenturyLink; Corus Entertainment; Dejero Labs, Inc.; Dell; Disney/ABC Television Group; Dolby Laboratories, Inc.; Emmis Communications; Eutelsat America Corp.; Fox Entertainment Group, Inc.; Grupo Televisa S.A.; HERE Technologies; Imagine Communications; Inmarsat; Intelsat; Microsoft; National Association of Broadcasters; National Public Radio; NBCUniversal; Nautel; Panasonic; Pearl TV; Public Broadcasting Service; SES; Sinclair Broadcast Group; TimeWarner, Inc.; Turner Broadcasting System, Inc.; TV Azteca S.A. de C.V.; Univision Communications, Inc.; and Xperi.

*Bell Media abstains from this submission.

² See Comments of NABA, “Expanding Flexible Use in Mid-Band Spectrum between 3.7 and 24 GHz,” GN Docket 17-183, filed September 29, 2017.

³ *Expanding Flexible Use of the 3.7 GHz to 4.2 GHz Band*, Order and Notice of Proposed Rulemaking, FCC 18-91, GN Docket No. 18-122, ¶ 50 (July 13, 2018) (“NPRM”).

⁴ See, e.g., ITU-R S.2368, “Sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands”

country and the large separation requirements, sharing of frequencies is not feasible.⁵

2. The Commission Should Not Limit the Ability to Build, Register, and Use New Earth Stations in the 3700-4200 MHz Band

The use of C-Band FSS is essential for the broadcasting business. There is no alternative distribution means that delivers the necessary service reliability that broadcasting provides to its customers. Moreover, without the ability to build, register and use new earth stations in this band, broadcast distribution will be frozen in time with no ability to grow to meet new demands. The Commission should not hamstring the enhancement of the broadcasting service, which has relied on this efficient program distribution capability as it seeks to reallocate spectrum for other uses. Just as the broadcasting business changes over time with modifications to operations and new operations, so should the ability to modify build, register, and use new C-Band FCC earth stations.

3. Consideration of Point-to-Multipoint Operations in C-Band Should Be Deferred

Several parties propose that the Commission should open any spectrum not allocated for flexible use on a primary basis to be made available for fixed point-to-multipoint (P-MP) use.⁶ This proposal should be deferred and not included with the current rule-making proceeding regarding spectrum for mobile wireless broadband. Any consideration of fixed P-MP operations must start with a complete technical analysis that considers nearby spectrum uses, including spectrum that may be reallocated for mobile use in this proceeding as well as new uses below 3.7 GHz (*i.e.*, CBRS). Because interference from out-of-band emissions is not simply additive noise, but also involves non-linear effects including low-noise amplifier saturation and intermodulation, that analysis cannot possibly be conducted prior to knowing the outcome of the proposed mobile reallocation, the technical specifications of such operations, and the practical effects of CBRS operations.

If the P-MP proposal is taken up for consideration in the future, the aggregate effects of interference including adjacent band leakage into FSS downlinks should be of primary concern considering the extent of increased emissions for new entrants to the band. Further, consideration and establishment of the guidelines and processes for sharing between FSS and P-MP operations increases the complexity of this current docket and will frustrate the Commission's goal of leadership in 5G. Within its primary spectrum allocations, FSS operations should not be fettered by the introduction of new services that impede and hamper the flexibility and deployment of FSS.

4. If Spectrum Re-allocations are Made, Determination of the Appropriate Amount of Transition Spectrum Should Be Based Upon Rigorous Laboratory and Field Testing

In considering any possible reallocation of c-band spectrum, the Commission should be aware of the inherent technical challenges and trade-offs associated with locating any terrestrial service adjacent to the extremely weak signals in the FSS downlink band. There is consensus that operating terrestrial mobile transmissions adjacent to FSS downlink transmissions require the creation of a buffer or transition band to ensure that the FSS transmissions are protected from the much more powerful terrestrial signals. In such cases, C-Band earth stations will need to be fitted with filters in order to suppress the much more powerful terrestrial signals, and for these filters to function properly, some transition spectrum is needed. Therefore, if part of the C-Band downlink is repurposed for terrestrial mobile use, this transition spectrum results in a greater portion of C-Band spectrum becoming unusable for FSS or terrestrial mobile use.

⁵ See, e.g., Comments of Nokia, "Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz," GN Docket 17-183, filed January 18, 2018 ("Nokia Study"); Comments of Ericsson, "Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz," GN Docket 17-183, filed January 30, 2018 ("Ericsson Study").

⁶ See, e.g., Reply Comments of the Broadband Access Coalition, GN Docket 17-183, November 17, 2017; Comments of Vivint Wireless, Inc., GN Docket 17-183, October 2, 2017.

Because of the practical limitations of receiver and filter designs, a substantial amount of transition spectrum must separate terrestrial and satellite uses. The size of the transition spectrum depends on many factors that must be carefully considered, such as the 5G band plan, terrestrial base station power levels, out-of-band emissions, antenna heights, separation distances from legacy FSS receive sites, FSS receiver sensitivity, etc. It is estimated that repurposing 100 MHz of C-Band spectrum only results in 360 MHz remaining for FSS use. Therefore, repurposing 20% of the C-Band spectrum results in a 28% loss of usable spectrum by FSS. Similarly, repurposing 200 MHz of C-Band spectrum results in only 260 MHz remaining for FSS use. That is, repurposing 40% of the C-Band spectrum results in a 48% loss of usable spectrum by FSS.

In addition to state-of-the-art out-of-band emission filtering and adjacent-band receiver interference filtering, adopting strict limits on power level, antenna height and other parameters of an adjacent terrestrial service could potentially reduce the amount of transition band spectrum that is needed and thus improve the overall efficiency of spectrum use. The Commission should consider the overall efficiency of spectrum allocation for all applications, including the potential impact of additional losses of available spectrum by incumbents in satellite capacity. In making frequency allocation decisions the Commission should not limit itself solely to consideration of allocated spectrum for mobile use.

In order to properly consider all of the alternatives and make the best decisions on allocations, rigorous laboratory and field testing must be performed in order to inform the Commission's decision-making process.

In light of the above, NABA recommends that no more than 100 MHz of the lower part of C-Band (3700-3800MHz) be cleared for mobile allocation leaving sufficient spectrum for video delivery.

5. International/Cross-Border Coordination Requirements Must Be Settled as Part of This Proceeding

NABA membership, which includes broadcasting representation across North America, recommends that the Commission's bilateral frequency coordination processes be brought forward and dealt with upfront as opposed to being something held off to deal with later to avoid service disruptions in other countries and to avoid uncertainty about specific protection requirements. FSS signal footprints are typically large and FSS services are widely used across all of North America (including Canada, Mexico, and the Caribbean nations).

Earth stations in Canada and Mexico that are close to the common border with the U.S. may experience co-channel or adjacent channel interference from mobile operations in the U.S. in newly repurposed spectrum in C-Band. The U.S. must ensure that new users protect existing downlink sites on both sides of the border and that bilateral agreements are in place to ensure that cross-border coordination processes will ensure that non-U.S. earth stations are not subject to interference.

Given that the ITU has not identified the 3.7–4.2 GHz band for IMT, the FCC must ensure that FSS use in neighboring countries, which is operated in conformity with ITU Table of Frequency Allocations, is fully protected. NABA suggests that the FCC adopt the same power flux density (PFD) criterion used to protect the FSS in the 3.4–3.7 GHz band. Namely, before an administration brings into use a (base or mobile) station of the mobile service in this band, it shall ensure that the PFD produced at 3 m above ground does not exceed $-154.5 \text{ dB (W/(m}^2 \cdot 4 \text{ kHz))}$ for more than 20% of time at the border of the territory of any other administration.⁷

In addition to Canada and Mexico, U.S. territories and other countries use C-Band for the distribution of

⁷ See footnotes 5.431B, 4.432A, 5.434, etc. in Article 5 of the ITU Radio Regulations.

television services. Many C-Band satellites, including non-U.S. domestic satellites such as those serving the Caribbean, have service footprints that overlap with those of U.S. satellites. These services can also be negatively affected by a repurposing of C-Band spectrum. The FCC must ensure that no interference results to FSS operations in those neighboring countries.⁸

6. The Commission Must Ensure that there is No Loss of Trade Due to Reallocation of Spectrum

A substantial amount of entertainment program content is distributed from the U.S. to international markets, including Canada and Mexico, using C-Band. Up to 50% of prime time in Canada can be made up of foreign programming (mostly U.S.) and is usually fed to Canada from the U.S. over C-Band. Conversely, content is also distributed from international locations into the U.S.⁹ As an example, content is distributed from Mexico to serve Spanish speaking viewers in the U.S. and could be negatively affected by the loss of C-Band spectrum within the U.S. A substantial loss of trade would result if these distribution channels were disrupted. An effective reduction in C-Band capacity by non-domestic C-Band satellite providers would have a significant negative impact on program providers in the U.S. and in other countries in delivering their content to out of country clients. The FCC must ensure that all of the satellite operators affected by new allocation regimes are involved in any proposed reallocation.

7. The Commission Should Maintain the Current Full-Band/Full-Arc Licensing and Protection Scheme for FSS Operations in Any Reduced C-Band

NABA strongly opposes any changes, as part of this rule-making, to reduce the current full-band/full-arc protection and licensing structure for earth stations operating in the C-Band. Earth stations need to be able to continue to be permitted to reorient adaptively by switching to alternate transponders operating on different frequencies in the band and pointing toward alternate satellites for enhanced redundancy and increased reliability. The adaptability of full-band and full-arc transmission is especially important in the case of FSS occasional use, an essential source of news, sports and special events programming for broadcasters and content producers. Also, the assumption that C-Band downlink antennas are “static” and that their use should be perpetually defined by a single month of documented operation fundamentally undermines the operational flexibility required to achieve the 99.999% reliability desired for content distribution.¹⁰ Additionally, disasters like Hurricane Sandy in the New York City area, Hurricane Maria in Puerto Rico, Hurricane Harvey in Houston, Hurricane Mathew in the Carolinas and Haiti, and the recent disastrous Hurricane Michael in Florida, as well as numerous industry experiences with “backhoe outages” continue to demonstrate the frailty of fiber connections and the crucial role that FSS services - particularly C-Band - play in ensuring the continuity of news and emergency information to the public.

8. Reallocation Should be a Long-term Plan that Facilitates a Fair and Orderly Process for All Industries

A multi-step phased transition plan that takes geography and population into account and balances the need for 5G deployment and spectrum re-allocation with the difficulties of upgrading and/or re-locating FSS receive sites has merits that should be considered. A phased plan should include a timeline that will enable pragmatic and coordinated execution by all industries, maintain a competitive marketplace for FSS and alternative services and provide full cost reimbursement to impacted FSS operators and users,

⁸ For example, the U.S. Virgin Islands are proximate to the British Virgin Islands, and the Dominican Republic is proximate to Puerto Rico.

⁹ For broadcast stations, the CRTC presently requires that 60% yearly, and at least 50% of prime-time programming, 6:00 pm to midnight, be of **Canadian** origin. In May 2011 the CanCon **requirement** for private **television** broadcasters was lowered to 55% yearly.

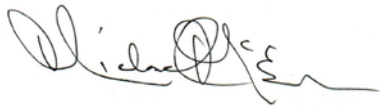
¹⁰ GTE Lenkurt, Engineering Considerations for Microwave Communications Systems (San Carlos, California: Lenkurt Electric Co, 1972), p. 55.

including signal senders and receive sites, regardless of whether they choose to continue use of FSS or to adopt alternatives where such are available and compelling.

Conclusion

New terrestrial uses in the C-Band downlink spectrum have the potential to cause significant harm to existing satellite users. For the reasons stated herein, NABA urges the Commission adopt the recommendations reflected in these comments and base its decisions on rigorous technical testing of interference in order to minimize adverse effects and protect the significant Users of the C-Band spectrum.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael McEwen".

Michael McEwen
Director-General, NABA

A handwritten signature in blue ink, appearing to read "Richard Friedel".

Richard Friedel (21CF)
President, NABA

October 29, 2018