

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of:	)	
	)	
Expanding Flexible Use in Mid-Band Spectrum	)	GN Docket No. 17-183
Between 3.7 and 24 GHz	)	
	)	

**COMMENTS OF  
THE NATIONAL ASSOCIATION OF BROADCASTERS**

October 2, 2017

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**I. INTRODUCTION AND SUMMARY**

In considering appropriate ways to expand spectrum opportunities, the Commission's first priority should be to avoid creating irreconcilable interference issues that undermine the value of the spectrum for both incumbents and new users. Particularly in bands that are already extensively used, the Commission should take care to protect incumbent operations by allowing expanded operations only if they are technologically compatible and can realistically co-exist with those incumbent operations.

The bands identified in the Commission's Notice of Inquiry<sup>1</sup> in this proceeding are currently put to extensive use. This does not necessarily mean that these bands cannot accommodate additional users, but it does mean that the Commission should proceed with caution in authorizing any such additional use. The National Association of Broadcasters respectfully submits that two important principles should guide the Commission's consideration of expanded operations in the bands under consideration.

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<sup>1</sup> *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, GN Docket No. 17-183, FCC 17-104 (rel. Aug. 3, 2017) (NOI).

First, the FCC should require specific technical proposals for any expanded use of the band to allow stakeholders to provide responsive technical analysis, and to ensure that any Commission decision is based upon a sound engineering foundation. Current users of the bands the Commission is examining in this proceeding cannot be expected to demonstrate or even understand specific harms that may be associated with expanded operations without an actual proposal to which they can respond. The Commission should not draw any inferences from a lack of specific technical analyses when stakeholders have nothing substantive to analyze.

Second, the Commission should not seek to fit a square peg into a round hole by allowing expanded operations that are technically incompatible with existing operations in a given band. Forcing fundamentally incompatible services to share a spectrum band will only undermine the value of the spectrum for those services by setting the stage for inevitable and harmful interference. We urge the Commission to carefully consider how expanded operations might coexist with incumbent users, and not simply to assume that technological fixes will materialize.

## **II. THE COMMISSION SHOULD PROTECT EXISTING USERS OF THE C-BAND**

### **A. The C-Band is Used Extensively**

Virtually every U.S. television and radio household relies on C-Band satellite operations for content distribution in some manner. Hundreds of broadcast television stations and thousands of radio stations in the U.S. rely on Fixed Satellite Service (FSS) earth stations to receive network and other syndicated programming that these television and radio stations then transmit to viewers and listeners. C-band operations also distribute programming to several thousand cable, DBS and telecommunications service provider headends. In addition,

transportable FSS uplink and downlink systems are used for thousands of live events that are broadcast each year. These systems are used to bring viewers coverage of live breaking news, sporting events, such as NFL and college football games and professional golf tournaments, and entertainment events such as the Academy Awards. The C-band is also used for the distribution of content to local radio stations.

Alternatives, such as fiber, may supplement satellite delivery in some circumstances – but cannot provide reliable service on the same scale as C-band satellite operations. This is particularly true in rural areas, where it is economically or practically infeasible for small providers to rely on fiber feeds, and in areas with high precipitation, where the C-band provides reliable service even through significant rain. Even in those cases where fiber is a feasible alternative as a primary means of distribution, C-band operations provide critical redundancy.

The NOI states that there are approximately 4,700 C-band earth stations registered in the FCC's database.<sup>2</sup> Beyond registered earth stations, there are a large number of additional earth stations that are not required to register, because the Commission generally does not allow registration of receive-only antennas smaller than 4.5 meters in diameter. Further, even for earth stations with antennas larger than 4.5 meters, registration is voluntary. NAB believes there are thousands of unregistered earth stations operating in the C-Band.<sup>3</sup> Many of these stations are used at cable, satellite and telco headends across the U.S. to receive

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<sup>2</sup> NOI at ¶ 14.

<sup>3</sup> Historically, tens of thousands of fixed microwave links operating in the 3.7-4.2 GHz band effectively prevented the frequency coordination necessary for earth station registration even though those earth stations could operate satisfactorily. Although many of those fixed microwave links have now apparently been discontinued, these unregistered earth stations continue to operate without interruption.

programming. Any cost benefit analysis of expanded use of the C-band must take into consideration *all* existing uses of the band, not only registered users.

The C-band is also used to distribute television and radio programming, as well as other content, in Canada and Mexico and other countries around the world, suggesting that it is unlikely that expanded use domestically would eventually be harmonized with use in other countries. In addition to the thousands of earth stations that rely on the C-band, a large number of satellites operate in the band. Of the 411 satellites in geosynchronous orbit as of 2015, 54 percent (222 satellites) used C-Band,<sup>4</sup> representing an investment of several tens of billions of dollars or more. In short, the C-band is subject to extensive, worldwide use and fulfills a critical role in the distribution of content that cannot be economically replicated by other means.

**B. The Commission Must Maintain Full-Band, Full-Arc Licensing in the C-band**

The NOI discusses a proposal set forth last year by the Fixed Wireless Communications Coalition, Inc. (FWCC) that sought to eliminate full-band, full-arc licensing to order to allow expanded use of the C-band.<sup>5</sup> In considering options for expanded fixed use of the C-band, the Commission should reject any proposal to eliminate or constrain its longstanding and highly successful full-band, full-arc earth station licensing policy, under which FSS earth stations may coordinate across the entire frequency band over the entire geostationary arc.

Preserving the longstanding flexibility that full-band, full-arc licensing provides is essential to broadcasters and other users that rely on satellite services. Such flexibility has allowed satellite operators to recoup sunk investments in space station facilities through

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<sup>4</sup> See Satellites in Clark Belt, available at: <http://www.geosats.com/satlist.html>.

<sup>5</sup> Fixed Wireless Communications Coalition, Inc. Petition for Rulemaking, RM-11778 (Oct. 11, 2016) (FWCC Petition).

growth in the fixed satellite service, has promoted competition among satellite operators and has allowed satellite operators to respond rapidly to changing customer requirements and to restore service in the event of transponder or satellite failures.

Broadcasters' earth station facilities must have the flexibility that full-band, full-arc licensing has provided to maintain programming to the public. Broadcast stations routinely need to access programming from different network feeds or other sources, which may be on almost any transponder or satellite. There are a wide range of situations that make such flexibility necessary, such as loss of a transponder or loss of capacity on a particular satellite that would require service to be temporarily or even permanently moved from one satellite to another. These situations cannot be predicted ahead of time. In addition, users must have the capability and flexibility to switch rapidly to different satellite suppliers for business reasons such as when existing service contracts end. For example, east coast and west coast network feeds may use different satellites and channels, and a station that is unable to receive one feed can often utilize the other. "Sun outages," where electromagnetic radiation from the Sun overwhelms satellite signals, occur regularly, making certain satellites completely unavailable for periods of time.

Absent the backup capability assured by full-band, full-arc licensing, such outages can disrupt stock markets and other financial transactions as well as distribution of radio and television programming. More fundamentally, all earth stations operate as part of an overall network and no earth station licensee can be assured that it will be able to rely on a single satellite over the long term. As the Commission considers expanded use of the C-band, it should maintain its longstanding full-band, full-arc license flexibility on which broadcasters and other users rely.

### **C. Mobile Operations Cannot Coexist with Existing C-band Users**

A balanced and fact-based approach to spectrum policy will acknowledge that there are some types of operations that are not technologically compatible, and that attempting to force these operations to coexist will only destroy the value of the spectrum. The Commission has undertaken significant and ongoing efforts to identify additional bands for mobile operations. Mobile broadband service in the C-band, however, cannot be accommodated without harming the operations and investment of existing C-band users. There is simply no practical means for the Commission to authorize mobile operations in the C-band without causing widespread and harmful interference to existing users and creating massive disruption in service to over-the-air and MVPD television viewers as well as radio listeners.

As described above, the C-band is used extensively, with thousands of earth stations across the country that play a critical role in the distribution of television and radio content to viewers and listeners. Because these earth stations must reliably receive signals that have traveled a great distance – and are thus faint – receivers must be very sensitive. Any terrestrial operations in the same band will be much stronger than distant space station signals, and thus create the potential for harmful interference.

To protect earth station operations, the Commission would need to establish large exclusion zones that would significantly impair the value of the spectrum for new users. Research confirms that very large separation distances would be required.<sup>6</sup> At least with

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<sup>6</sup> See A First Look at the Potential Interference from Mobile Devices Operation in the 3.5 GHz Band on DVB Based Satellite Links Operating in the C Band (October 2015) (available at: [http://montreal.ieee.ca/files/2015/11/C-bandInterference\\_PRES.pdf](http://montreal.ieee.ca/files/2015/11/C-bandInterference_PRES.pdf)); Report ITU-R S.2368-0, Sharing studies between International Mobile Telecommunication-Advanced systems and geostationary networks in the fixed-satellite service in the 3400-4200 MHz and 4500-4800 MHz frequency bands in the WRC study cycle leading to WRC-15 (June 2015) (available at: [https://www.itu.int/dms\\_pub/itu-r/opb/rep/R-REP-S.2368-2015-PDF-E.pdf](https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-S.2368-2015-PDF-E.pdf)).



respect to additional fixed operations in the C-band, it might be possible to develop an accurate database of all C-band earth stations that could be used to authorize fixed use outside of these exclusion zones. However, we again emphasize that all existing C-Band satellite users, whether presently registered or not with the FCC must be protected.

Mobile operations, however, cannot be effectively prevented from operating in an exclusion zone. Any user with a mobile device operating on C-band frequencies could easily travel near an earth station. Even though base stations could be excluded from operations in the area, the user's mobile device would continue to attempt to make contact with a base station – and those attempted uplink transmissions could cause harmful interference to nearby earth stations. NAB is aware of no effective means of geofencing mobile users or mobile handsets from operation in exclusion zones. Mobile operations are fundamentally incompatible with existing use of the C-band, and cannot be authorized without setting the stage for widespread harmful interference that will disrupt television service and upend billions of dollars in investment.

The NOI states that the Commission has previously expanded spectrum availability for mobile operations by adding mobile allocations to what are now the PCS and AWS bands – previously used for fixed, point-to-point services.<sup>7</sup> This is correct. However, in order to accommodate mobile operations in these bands, the Commission relocated existing incumbent fixed use to other bands. In this case, relocating incumbent C-band users to other bands would disrupt tens of billions of dollars of U.S. investment – even if other suitable bands could be identified. Further, the ongoing international use of C-Band through Intelsat

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<sup>7</sup> NOI at ¶ 40.

and other satellite operators would necessitate preserving some C-Band satellite facilities in the U.S.

The NOI also asks if incentive auctions might prove a suitable vehicle for reallocating spectrum in the 3.7 to 24 GHz band. NAB respectfully suggests that, given the tremendous uncertainty facing repacked broadcasters following the close of the broadcast spectrum incentive auction, future incentive auctions may be tenuous at best. Under the Commission's existing rules and based on currently available funding, repacked broadcasters have no assurance that they will be treated fairly. Incumbent users in any band are unlikely to volunteer for further incentive auctions before knowing more about how the first incentive auction ultimately plays out.

### **III. THE COMMISSION SHOULD PROTECT EXISTING USERS OF THE 5.925–6.425 GHZ AND 6.425–7.125 GHZ BANDS**

Individual broadcasters, networks, and production companies make extensive use of the spectrum at 6425–6525 MHz (the “6.5 GHz band”) for Broadcast Auxiliary Services (BAS) including electronic news gathering (ENG) and other purposes, using a variety of itinerant and mobile facilities. These uses occur daily and in virtually all broadcast markets. Besides the 2025-2110 MHz BAS band (the “2 GHz band”), the 6.5 GHz band is the most heavily utilized spectrum for ENG. It is used to relay video from portable cameras to production trucks, to relay produced and raw video to central receive sites and studios, and to relay video from airborne platforms such as helicopters. As the Society of Broadcast Engineers has stated, use of this band is unpredictable, and the paths, and path lengths, vary hourly.<sup>8</sup> Coordination

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<sup>8</sup> Comments of the Society of Broadcast Engineers Incorporated, ET Dockets 12-338 and 15-99 (August 31, 2015).

among broadcasters is done on a real-time basis and use often cannot be planned in advance.

The NOI states that there are 139 BAS stations (plus 26 CARS and 243 Part 101 stations) listed in the FCC's database.<sup>9</sup> NAB respectfully submits that this significantly understates the actual use of the band. In addition to those stations specifically licensed to operate in the 6.5 GHz band, there are thousands of additional stations that are not individually licensed but utilize this band frequently. Section 74.24 of the Commission's rules allows broadcasters to make use of the 6.5 GHz band (as well as other spectrum) without specific authorization from the FCC. This rule is intended to facilitate ENG and other uses without creating a need for Commission staff to issue special temporary authorizations, in recognition of the fact that breaking news events are unpredictable and time critical.

There is no alternative spectrum available that can support these uses. Alternatives to the 6.5 GHz band are highly constrained. BAS spectrum in the 2 GHz band is overcrowded with users. Additionally, AWS operations in the adjacent band above 2110 MHz cause widespread and significant interference that renders the upper portions of the 2 GHz band unusable. There are Department of Defense (DoD) and NASA users currently sharing the 2 GHz band at a number of locations, and NAB is working with DoD to allow additional sharing in that band. As a result, 6.5 GHz BAS mobile users cannot shift to the 2 GHz band. The 6.5 GHz band is thus critical and irreplaceable spectrum for broadcasters in accomplishing its public service mission. Additional uses in this band, whether fixed or mobile, will constrain and interfere with ENG operations ultimately to the detriment of the public.

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<sup>9</sup> NOI at ¶14.

The 6.875–7.125 GHz band (“7 GHz band”) is used extensively by broadcasters for fixed point-to-point links as well as some mobile and temporary operations. This band was recently identified by the FCC for use by wireless microphones as a partial substitute for loss of access to significant portions of the UHF Television band.<sup>10</sup> Fixed wireless backhaul was also recently added to this band.<sup>11</sup> The NOI indicates that there are 4,900 fixed point-to-point licenses presently in the Commission’s database for the 7 GHz band. While many of these operations are carefully engineered to facilitate some spectrum sharing, it is important to recognize that the Commission’s ULS database is frequently inaccurate, and significant additional sharing may not be possible. We urge the Commission to consider expanded sharing only based on specific technical characteristics of potential new operations and only based on accurate information regarding incumbent operations.

Finally, NAB urges the Commission to protect existing users in the 5.925-6.425 GHz band, which currently includes both satellite uplink and fixed terrestrial services. To provide more meaningful input with respect to potential use of the band, NAB would need to understand more about specific technical proposals for expanded use.

#### **IV. CONCLUSION**

As the Commission considers expanded use of the spectrum bands identified in this proceeding, it should require proponents of such expanded use to submit specific and detailed technical proposals for such expanded use. That is the only way to allow stakeholders to provide informed comments and analysis to guide the Commission’s decision-making process.

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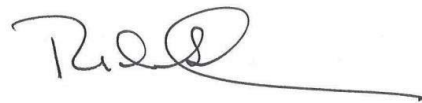
<sup>10</sup> Report and Order, GN Docket 14-166, “Promoting Spectrum Access for Wireless Microphone Operations,” Adopted August 5, 2015.

<sup>11</sup> WT Docket 10-153

The Commission should also recognize the tremendous value of existing use of these bands, and not introduce new operations that will destroy the value of the spectrum for incumbents. The C-band is subject to extensive, worldwide use based on tens of billions of dollars of investment and plays a critical role in the distribution of content. There is no available substitute that is practical or economically viable. Broadcasters also make extensive use of the 6.5 GHz and 7 GHz BAS bands for program distribution, electronic news gathering, and other purposes. Any consideration of expanded operations in these bands must prioritize the protection of existing users. In particular, the Commission should not consider mobile operations in these bands, as there is no effective means to protect incumbent users from such operations.

Respectfully submitted,

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A handwritten signature in dark ink, appearing to read 'Rick Kaplan', with a long horizontal line extending to the right.

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Rick Kaplan  
Patrick McFadden

Bruce Franca  
Alison Neplokh  
Robert Weller

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