

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

In the Matter of:)	
)	
Office of Engineering and Technology,)	GN Docket No. 18-122
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.)	

**COMMENTS OF
NATIONAL PUBLIC RADIO, INC.**

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Introduction

National Public Radio, Inc. (“NPR”) hereby submits its comments in response to the *Public Notice* in the above-captioned proceeding. These comments are offered on behalf of the public radio system, a uniquely American public service, not-for-profit media enterprise broadcasting to more than 42 million American listeners weekly. NPR specifically responds to the Office of Engineering and Technology, International, and Wireless Telecommunications Bureaus’ (the “Bureaus”) request for information on the feasibility of allowing commercial wireless services to use or share use of the 3.7-4.2 GHz band (“C-band”).¹

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*, Notice and Opportunity for Public Comment under Section 605(b) of the MOBILE NOW Act, FCC GN Dkt. No. 18-122 (May 1, 2018)(“*Public Notice*”).

In considering C-band spectrum for mobile and fixed wireless broadband use, it is important for the Commission to preserve critical existing and planned non-Federal capabilities, including the Congressionally-sanctioned longstanding and planned future use of a small portion of the spectrum by the Public Radio Satellite System (“PRSS”). The PRSS distributes emergency alerting on a national basis and approximately 450,000 hours of public radio programming each year for and by 1,270 local public radio stations for over-the-air broadcast to 42 million Americans on a weekly basis in all fifty states, the District of Columbia, the U.S. Virgin Islands, Puerto Rico, and Guam. Eighty percent of this programming is broadcast live. Additional commercial use of the C-band spectrum, particularly for mobile broadband, should be permitted only to the extent that it does not threaten the public’s access to public radio station broadcasts of *Morning Edition*, *All Things Considered*, *Marketplace*, and local journalism centers such as Harvest Public Media, based at KCUR 89.3 in Kansas City, Missouri, reporting on food and agriculture along with its network of reporters and partner stations throughout the Midwest Heartland.²

² Additional local and regional journalism collaborations include:

- *Fronteras: The Changing America Desk*, based in Arizona and focused on the Southwest;
- *Innovation Trail*, comprised of five upstate New York public media outlets;
- *Earthfix*, a collaboration of stations in the Northwest with an environmental focus;
- *Arizona Science Desk*;
- *Alaska Energy Desk*;
- *Arkansas Public Media*;
- *Detroit Journalism Cooperative*;
- *Great Lakes Today*;
- *New England News Collaborative*;
- *Ohio Valley Resource*;
- *Inside Energy*, based in Colorado, Wyoming and North Dakota;
- *Keystone Crossroads* in Pennsylvania;
- *American Homefront*, covering military life and veterans’ issues, with partners in North Carolina, California, Florida, Texas, and New York; and
- *Side Effects*, focusing on health and medical news.

The PRSS is completely dependent on extremely low-power satellite-to-earth station C-band downlinks, which are particularly susceptible to interference. Consequently, public radio's ability to provide vital news, programming, and public safety information to its substantial and growing weekly audience will be significantly impaired if the same frequencies are shared with mobile wireless users.

NPR recommends that the Bureaus use the information collected in this proceeding to assess the real-world, practical impacts on current C-band end-users that rely on C-band downlink spectrum to distribute radio and television programming and provide other services. Likewise, NPR suggests that any future rulemaking by the Commission be informed by responses to this proceeding and a more complete understanding of the current critical C-band uses, as well as whether non-C-band alternative means of transmission for such services are available, reliable, and affordable.

In considering whether and how sharing might be accomplished without causing harmful interference to current C-band users, rather than co-frequency sharing, the Bureaus should consider allocating a limited portion of the C-band for exclusive use by commercial wireless services and reserving the remaining C-band spectrum for exclusive fixed satellite use. This approach depends on ensuring that the existing users of any reallocated spectrum can and will be accommodated within the remaining C-band without disrupting the availability and reliability of their services or increasing their costs. NPR cautions against any plan that would mandate sharing of the same spectrum by both commercial wireless services and existing fixed satellite service users or that would otherwise harm the operations and reliability of critical incumbent C-band services like the PRSS.

I. The Bureaus Should Use Disruption and the Public Interest as the Tests of Feasibility.

A. Feasibility Requires Avoiding Disruption of Existing End-Users and Services

The Bureaus have asked for comment on how they should assess the operations and possible impacts of sharing on Federal and non-Federal users already operating in the C-band.³ NPR suggests that the degree of disruption and existence of affordable, reliable and available alternatives for incumbent users should be the primary tests for whether a proposal to share C-band spectrum should be pursued. If, after thorough review and study of a potential approach, the Bureaus conclude that the plan would not lead to disruption of existing services or substantially increase their costs, then it would be worthy of serious consideration. For example, the Commission could consider the feasibility of spectrum sharing through the subdivision of a given range of frequency between mutually incompatible, exclusive spectrum uses, such as mobile broadband wireless and fixed satellite. In doing so, it should evaluate whether it would be possible to accomplish this while ensuring that all existing C-band users can be accommodated in the portion of C-band spectrum dedicated to fixed use without significantly increasing their costs or degrading their services.

In considering scenarios that could displace existing C-band end-users, the Bureaus should focus on three key factors, taking into account the nature of the underlying services and service providers at issue:

³ *Public Notice* at 2.

1. Availability: Are alternative means of transmission *available* for displaced users?
For example, terrestrial/fiber-based systems are not available in certain rural and remote parts of the country.⁴
2. Reliability & Suitability: Are alternative means of transmission proven and *reliable*? Reliability is essential for public radio, because 80 percent of programming is broadcast live and considering the critical emergency-related alerts and information provided to local communities during and after natural disasters and other emergencies. Are alternative means of transmission *suitable* for the service? For example, for radio and video programming, the C-band is uniquely suited for content delivery, because the propagation characteristics of other spectrum bands result in lower quality transmissions that are easily disrupted by adverse weather conditions.
3. Affordability: Are alternative means of transmission *affordable* for displaced users now and into the future, considering both initial transition costs *and* continuing operation costs for ensuing years? Plans to compensate existing users to transition to other means of transmission should include compensation for increased costs of ongoing operation.

Simply put, the Bureaus should disfavor any proposal with the potential to disrupt existing services unless it includes a plan to protect or relocate existing services so they have reliable and suitable means of transmission while compensating them for any transition costs and any increased costs of ongoing operation.

⁴ A more detailed discussion of the issues with fiber-based alternatives for public radio distribution is set forth in the Reply Comments of National Public Radio, Inc., In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, FCC GN Dkt. No. 17-183, at 5-8 (Nov. 15, 2017)(incorporated herein by reference).

B. Consideration of the Public Interest and Congressional Intent

Another important factor in the Bureaus' evaluation should be the impact on the public interest. While we recognize the public interest in clearing additional spectrum for next generation wireless services, at the same time, this must be balanced with the continued public interest in distribution of critical programming and public safety information via established services.

In the case of the PRSS, the public interest in preserving nationwide distribution of public radio programming via satellite is well-established and has longstanding and continuing Congressional support. Simply put, public radio could not serve more than 42 million Americans each week without the PRSS and would not exist without the indispensable, highly efficient programming distribution methods currently employed. The PRSS is used by a large variety of program producers, syndicators and distributors; national, state, and local organizations; and public radio stations. The PRSS reaches stations in geographically diverse areas, from remote villages in northern Alaska and Native American lands in the Southwest, to major market stations such as WNYC in New York and KUSC in Los Angeles. Programs distributed over the PRSS span a variety of formats, including news, cultural information, public affairs, drama, documentaries, classical music, and jazz, and come from a wide variety of producers and distributors in addition to NPR, including American Public Media (APM), Public Radio International (PRI), and more than 100 others.

By enabling its interconnected stations to receive and send programming across the satellite interconnected network, the PRSS is able to bring important voices to listeners throughout a state, a region, or the country.

Rural communities in particular rely on their local public radio station and, in turn, the PRSS, as an important and sometimes exclusive source of news, public affairs, cultural programming, and emergency information.⁵

The PRSS's contribution to the public interest is supported by a long-standing and substantial Federal interest. In the Public Broadcasting Act of 1967, Congress authorized the establishment of one or more interconnection systems to provide program suppliers with the means to distribute programs to local public television and radio stations.⁶ In 1978, public television and radio became the first extensive broadcasting systems in the nation to switch from a system of land-line distribution to satellite interconnection.⁷ Congress subsequently authorized and appropriated to the Corporation for Public Broadcasting a substantial portion of the funding for the refurbishment of the PRSS in 1988,⁸ with the stated purpose of continuing and expanding the nationwide, satellite-interconnected system of distributing public telecommunications services.⁹ Congress's commitment to the PRSS follows from its policy, as declared in the Public

⁵ See, e.g., Comments of National Public Radio, In the Matter of Response Efforts Undertaken During 2017 Hurricane Season, FCC PS Dkt. No. 17-344 (Jan. 22, 2017) (describing how the PRSS's satellite downlinks allow public radio stations to receive and broadcast news coverage and emergency information even when other communications networks are down).

⁶ Pub. L. No. 90-129, § 201, 81 Stat. 365, 370 (1967) (codified, as amended, at 47 U.S.C. § 396(g)(1)(B)).

⁷ H.R. Conf. Rep. No. 825, 100th Cong., 2d Sess. 11 (1988).

⁸ Pub. L. 100-626, 100th Cong., 2d Sess., 102 Stat. 3207 (amending Section 396(k) of the Communications Act of 1934). Congress appropriated \$200 million for both the public television and public radio satellite systems. Pub. L. No. 100-436, 102 Stat. 1680, 1708-09 (1988) (appropriating \$57.5 million); Pub. L. No. 101-166, 103 Stat. 1159, 1185 (1989) (appropriating \$76.25 million); Pub. L. No. 101-517, 104 Stat. 2190, 2217 (1990) (appropriating \$66.94 million).

⁹ See H. Rep. No. 825, 100th Cong., 2d. Sess. 10-15 (1988); S. Rep. No. 444, 100th

Broadcasting Act, that it “is in the public interest to encourage the growth and development of public radio and television broadcasting, including the use of such media for instructional, educational, and cultural purposes.”¹⁰

Most recently, Congress has appropriated \$90 million in initial funding for the next generation of the public radio and public television interconnection systems,¹¹ including \$20 million in the same Consolidated Appropriations Act in which the MOBILE NOW Act was included.¹² The fact that Congress, at the same time that it directed the Commission to review use of C-band spectrum, also appropriated funds for the PRSS’s continued use of C-band-based satellite distribution, demonstrates a clear intent to preserve the PRSS’s unhindered use of the C-band. This conclusion is reinforced by a colloquy between Congressman Blumenauer and House Energy and Commerce Committee Chairman Walden regarding this report on C-band spectrum, in which Chairman Walden expressed his commitment to ensuring that public broadcasters are not disadvantaged in any spectrum reallocation.¹³

For these reasons, whatever conclusion the Bureaus reach in assessing the feasibility of sharing C-band spectrum with commercial wireless services should be based on the principles of

Cong., 2d Sess. 6-10 (1988).

¹⁰ 47 U.S.C. § 396(a)(1).

¹¹ See Consolidated Appropriations Act, 2016, Pub. L. 114-113, § 407, 129 Stat. 2242, 2642-43 (Dec. 18, 2016); Consolidated Appropriations Act, 2017, Pub. L. 115-31, § 405, 131 Stat. 135 (May 5, 2017).

¹² See Consolidated Appropriations Act, 2018, P.L. 115-141, Division H, Title IV, appropriations for Corporation for Public Broadcasting (including an additional \$20 million for the “interconnection system”) and Division P, the Repack Airwaves Yielding Better Access for Users of Modern Services (“RAY BAUM’S Act”). Title VI of RAY BAUM’S Act is the Making Opportunities for Broadband Investment and Limiting Excessive and Needless Obstacles to Wireless Act or MOBILE NOW Act.

¹³ Chairman Walden: “I know there are multiple uses [of C-band], and we want to make sure that those [public broadcasters] using these frequencies are not disadvantaged.” 115th Cong., 2d Sess., 164 Cong. Rec. H 1398, H 1412 (daily ed. Mar. 6, 2018) (statement of Rep. Walden, Chairman, H. Comm. on Energy & Commerce, upon House passage of RAY BAUM’S Act).

non-disruption of existing end-users and services and protection of the public interest in both new and existing services.

II. “Sharing” C-Band Requires Reserving Spectrum for Certain Exclusive Use

A. Spectrum Splitting May Be Possible, but True Spectrum Sharing Is Not

The Bureaus also ask how “sharing” might be accomplished “without causing harmful interference to Federal and non-Federal users already operating in this band, and in which parts of the band would such sharing be feasible.” NPR’s experience as the operator of the PRSS over three decades has led it to conclude that co-frequency sharing of C-band spectrum in a way that preserves incumbent uses is simply not possible with current technology. There is no panacea for the interference created by wireless mobile devices, whose roaming, dynamic signals cannot be coordinated with the fixed, low-power downlinks on which public radio stations depend. Instead, opening up the PRSS’s C-band frequencies for sharing by wireless broadband devices will result in widespread interference that will disrupt public radio broadcasts and could destroy the PRSS as a reliable, cost-effective means of program distribution across the nation.

As an example, consider the uplinks and downlinks that connect NPR’s headquarters on North Capitol Street in downtown Washington D.C. with the PRSS: If mobile wireless devices were permitted to operate in the same frequencies as these earth stations, then, suddenly, every cell phone in every car driving down this major thoroughfare would have the potential to disrupt the entire public radio system by interfering with the PRSS uplinks and downlinks. This scenario would replicate itself on a smaller scale near every other public radio uplink and downlink site across the country.¹⁴ For this reason, any plan to protect incumbent uses of C-

¹⁴ Interference in PRSS’s uplink frequencies would degrade signals by introducing phase-noise on the outbound carrier that could cause lost data packets being transmitted. Interference of the downlink frequencies would result in problems receiving programming, which would translate to dead air.

band spectrum would likely require prohibiting spectrum sharing between incompatible uses: low-power satellite downlinks and roaming, ubiquitous sources of interference like mobile broadband devices.

B. Current Technologies Like Shielding and Filtering Cannot Prevent Harmful Interference on Nearby Frequencies

Potential disruption to the PRSS is not limited to devices on precisely the same frequency. Any transmitter that operates on nearby frequencies poses interference disruptions to public radio downlinks and uplinks. Some stakeholders have proposed shielding and filtering as solutions,¹⁵ but these are old, inflexible technologies whose benefits are limited. Shielding can be effective in limited circumstances to remediate interference between two fixed devices, but there is currently no shielding technology that could provide the kind of dynamic, all-encompassing protection that would be required to protect against interference from mobile devices.¹⁶

Similarly, filtering can be useful to block out interfering signals within a certain range, but it reduces the effectiveness of the downlink signals it protects, and it does not create the kind of clear, interference-free transmission zone that is essential to public radio's programming distribution needs. Moreover, unless mobile devices are required to operate within spectrum blocks more strictly than is currently the case, filters would be ineffective against emissions that fall within the frequency range of the earth station downlink. And even if mobile devices were manufactured to generally keep their emissions more narrowly within allowable frequencies, it

¹⁵ See, e.g., *In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, FCC GN Dkt. No. 17-183, at ¶¶ 12, 18, 22 (Aug. 3, 2017) ("NOI"), Comments of T-Mobile USA, Inc. at 24; Comments of Verizon at 15.

¹⁶ See Comments to NOI of the Satellite Industry Association at 34-41.

seems highly unlikely that, among the millions of devices manufactured by multiple factories and companies, there would not be some number of errant devices that emit on frequencies within the band protected for satellite. Appropriate mask emission limits and geographic separation based on a conservative estimate of path-loss between the interfering devices and the earth station might afford sufficient protection to the downlink earth stations, but those measures would completely undermine the utility of a terrestrial mobile broadband service. Neither shielding nor filtering, then, can provide a reliable solution to the interference to C-band downlink earth stations caused by mobile devices.

Instead, the only feasible way to “share” the C-band spectrum without causing harmful interference to current users is to subdivide it, and in so doing to ensure adequate protections for existing uses through guard bands and appropriate licensing requirements.

Conclusion

For these reasons, NPR urges the Bureaus to proceed carefully in evaluating any additional use of the C-band spectrum that could disrupt the PRSS and the public’s access to public radio programming and emergency information.

Respectfully submitted,
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