

**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)	

REPLY COMMENTS OF UNITED STATES CELLULAR CORPORATION

United States Cellular Corporation (“USCC”) hereby files its Reply Comments in the above-captioned proceeding. In our Comments, USCC stressed that use of the 5.925-6.425 GHz and 6.245-7.125 GHz bands for common carrier fixed microwave service (“FS”) is absolutely vital to the continuing viability of USCC’s wireless network. Accordingly, USCC urged the Commission to proceed with great caution regarding new, potentially interfering uses of the 6 GHz band, and noted that the proposals set forth in the Notice of Inquiry (“NOI”)¹ present a clear danger to 6 GHz microwave operations.² Numerous other comments lend support to both of these arguments, while proponents of expanded use of the 6 GHz band fail to demonstrate that present and future FS operations in the 6 GHz band are compatible with new licensed or unlicensed use of the band.

I. MOST COMMENTERS ACKNOWLEDGE THE NEED TO PROTECT FS SERVICE IN THE 6 GHz BAND

Virtually all commenters referring to the issue acknowledge that: (a) the 6 GHz band is widely used for licensed FS operations; (b) the FS allocation is valuable to the nation; and (c)

¹ *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373 (2017). All comments cited herein were filed in GN Docket No. 17-183 on October 2, 2017 in response to the NOI.

² USCC notes that the 6.425-6.525 GHz band, which is allocated to the Broadcast Auxiliary Service (“BAS”) and the Cable TV Relay Service (“CARS”), has no FS allocation. While the 6.875-7.125 GHz band has primary allocations for BAS and CARS, FS links are permitted on a non-interference basis to television pickup stations.

existing FS usage of the band should be protected. CTIA's formulation is typical:

Given those important [*e.g.*, FS] uses, it is imperative that parties seeking to use this band for unlicensed use provide a comprehensive engineering-based demonstration that any interference solution can, in fact, protect point-to-point operations from interference.³

Those sentiments are echoed by virtually all stakeholders, including commenters endorsing new frequency allocations in the 6 GHz band.⁴ There is a broad consensus that any newly-authorized use of the 6 GHz band must be inextricably linked to the need to protect FS and other incumbent users of the band. A basic question before the Commission is whether such “flexible” use of the band is, in fact, compatible with incumbent protection.

II. SPECTRUM SHARING IN THE 6 GHz BAND PROBABLY IS NOT POSSIBLE

The most compelling and technologically sophisticated comments filed in response to the NOI strongly support the idea that expanded use of the 6 GHz band probably is not possible without massive interference to existing operations. AT&T, for example, takes a strong position against unlicensed use of the 6 GHz band, stressing that the entire 6 GHz microwave band, both the 5.925-6.425 GHz and 6.425-7.125 GHz sub-bands, serve critically important functions and are heavily used by FS and other licensees. AT&T notes that 6 GHz microwave links are used in all parts of the country, and it cites various technical reasons why 6 GHz microwave remains a critical component of the nation's communications network. AT&T also makes the case that microwave use of the 6 GHz band will grow significantly with the continued densification of

³ Comments of CTIA, p. 16.

⁴ *See, e.g.*, Comments of AT&T Services, Inc., pp. 12-15 (“AT&T Comments”); Comments of Verizon, pp. 21-22 (“Verizon Comments”); Comments of the National Association of Broadcasters, pp. 8-10 (“NAB Comments”) (“The Commission should protect existing users of the 5.925-6.425 and 6.425-7.125 GHz bands”); Comments of the Fixed Wireless Communications Coalition, pp. 6-12 (“FWCC Comments”); Comments of The Utilities Technology Council and the Edison Electric Institute, pp. 6-12; Comments of the Mid-Band Spectrum Coalition, p. 14; Comments of All Points Broadband, *et al.*, pp. 10-12.

wireless networks. Under these circumstances, AT&T argues that continued access to 6 GHz microwave spectrum by carriers should be viewed as essential.

AT&T cites interference data to demonstrate that new unlicensed terrestrial mobile uses of the 6 GHz band cannot feasibly co-exist with microwave operations because microwave licensees will not be able to determine whether interference is occurring from unlicensed use. Rather, they will simply find that the efficiency of a given path has diminished. Moreover, if an unlicensed device were to malfunction or be operated in an illegal manner, the microwave licensee would never be able to identify the source of the interference.⁵

For these reasons, AT&T encourages the Commission to continue to investigate the possibility of reallocating other mid-band spectrum for flexible use, noting that 72% of the spectrum between 3.5 GHz and 24 GHz either is exclusively licensed to the federal government or shared by federal and non-federal users.⁶

The Fixed Wireless Communications Coalition (“FWCC”), a coalition of companies, associations, and individuals actively involved in fixed microwave services, also makes a powerful case against new uses of the 6 GHz band. FWCC notes that relatively few bands are allocated to and used by the FS, and that most of these bands carry microwave transmissions that are critical to the safety of life and property, and thus, must be operated at extremely high levels of reliability. FWCC emphasizes that, as “a matter of physics, not regulation,” these are the only FS bands suitable for long paths.⁷

FWCC notes that the FS bands at 5.925-6.425 and 6.525-6.875 GHz are densely used, with 9,400 transmit frequencies operating nationwide, making unlicensed use of those bands

⁵ AT&T Comments at 12-16.

⁶ *Id.* at 17-19.

⁷ FWCC Comments at 1-2.

simply not feasible. FWCC states that an unlicensed transmitter using just 10 milliwatts of power could cause interference to an FS receiver from at least 5.5 miles away. To protect FS would require real-time frequency coordination at a level of reliability that has not yet been demonstrated.⁸

FWCC also explains how relocating 6 GHz incumbents is not feasible because there are no options for relocation given that no other FS band has the propagation characteristics necessary to accommodate the long path lengths that are routine at 6 GHz.⁹ FWCC takes no position regarding Commission action on the 6 GHz sub-bands, including the 6.425-6.525 GHz and 6.875-7.125 GHz bands, in which no or few FS licensees operate. However, as other commenters have shown, incumbent operations in those bands also pose large obstacles to new 6 GHz allocations.¹⁰

AT&T and FWCC make strong practical and technical arguments against any new uses of the 6 GHz band. Those arguments should be a focus of the Commission in this proceeding.

III. NEW 6 GHz ALTERNATIVES ALSO POSE A THREAT TO CRITICAL PUBLIC SAFETY SERVICES

The National Public Safety Telecommunications Council (“NPSTC”), a coalition of state public safety officials, also opposes new uses of the 5.925-6.425 GHz band.¹¹ NPSTC notes the extensive use of the band by public safety licensees and the history of the 2 GHz band previously used by public safety licensees. The Commission originally sought to protect public safety operations in the 2 GHz band when the PCS service was created, but concluded in 1994 that

⁸ *Id.* at 2.

⁹ *Id.* at 12-13. FWCC also provides an extensive and detailed technical appendix demonstrating the interference potential involving in sharing the 6 GHz band.

¹⁰ *See, e.g.*, NAB Comments at 9-10.

¹¹ *See* Comments of the National Public Safety Telecommunications Council, pp. 4-9.

public safety had to be relocated out of the band. NPSTC argues that it is essential that the Commission understand the complexity of public safety microwave networks, as well as the significant risks to the public if new entrants to a band cause interference.

NPSTC discusses the reliability requirements of public safety systems, which exceed even those applicable to the common carrier microwave systems employed by wireless carriers. NPSTC also notes that it has never been made clear how the Commission could guarantee that an unlicensed Wi-Fi device or a licensed CMRS device would not be operated on the upper story of an office building that happened to be close to a microwave receive site, thus causing interference. As a result, the proponents of spectrum sharing have not demonstrated that no impact to the reliability of critical fixed microwave links will occur.

NPSTC disputes the idea that the unlicensed networks actually need additional spectrum, noting, as USCC did in its comments, NTIA's recent conclusion that no viable interference solution exists for U-NII devices to share the 5.35-5.47 GHz band with incumbent federal systems.¹² The story would be similar in the 6 GHz band. NPSTC also argues that existing unlicensed operations already enjoy sufficient spectrum in the 5 GHz band, and that there are no credible studies proving that additional spectrum is needed. Those conclusions are echoed by the Association of Public-Safety Communications Officials-International, Inc., the nation's oldest and largest organization of public safety professionals, which concludes that the use of both the lower and upper 6 GHz bands "could be detrimental to public safety communications."¹³

¹² *Id.* at 6.

¹³ See Comments of APCO International, p. 3.

The Commission should consider all of these interference issues on an inter-related basis given that interference can arise simply as a result of increased overlapping adjacent frequency usage, even where interference protection provisions have been employed.

IV. THE COMMISSION SHOULD NOT DIFFERENTIATE BETWEEN THE LOWER AND UPPER 6 GHz BANDS

USCC has 1,113 microwave stations providing service in the 5.925-6.425 GHz band, and 937 microwave stations providing service in the 6.425-7.125 GHz band. USCC's upper 6 GHz facilities are every bit as vital to the continuing performance of its network as are its lower 6 GHz stations. The situation is no doubt similar for other FS licensees.

Despite that, various commenters have suggested that the upper and lower 6 GHz bands might be treated differently, with the upper band perhaps being a better candidate for flexible use operations owing to an absence of federal incumbents and the existing 100 megahertz mobile allocation in the upper 6 GHz band.¹⁴

USCC submits that there is no reason why FS licensees in the upper 6 GHz band should receive a lesser degree of interference protection than licensees in the lower 6 GHz band. Verizon also acknowledges this, noting that, with respect to the upper 6 GHz band, the Commission "must also take a measured approach and ensure adequate protections to incumbent and future microwave deployments."¹⁵ We agree.

CONCLUSION

For the foregoing reasons, as well as those set forth in USCC's initial comments, the Commission should leave the existing spectrum allocations for the 6 GHz band alone.

¹⁴ See, e.g., Comments of T-Mobile USA, Inc., pp. 12-20; Verizon Comments at 22.

¹⁵ Verizon Comments at 22.

Respectfully submitted,

**UNITED STATES CELLULAR
CORPORATION**

By: /s/.

Grant B. Spellmeyer
Vice President
Federal Affairs and Public Policy
United States Cellular Corporation
500 N. Capitol Street, N.W., Suite 210
Washington, DC 20001
Phone: 202-290-0233
Email: grant.spellmeyer@uscellular.com

**UNITED STATES CELLULAR
CORPORATION**

By: /s/.

Peter M. Connolly
Leighton T. Brown
Holland & Knight LLP
800 17th Street, N.W., Suite 1100
Washington, DC 20006
Phone: 202-862-5989
Email: peter.connolly@hklaw.com
Its Attorneys

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