

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

In the Matter of)	
)	
Unlicensed Use of the 6 GHz Band)	ET Docket No. 18-295
)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz)	GN Docket No. 17-183
)	

**REPLY COMMENTS OF
UNITED STATES CELLULAR CORPORATION**

United States Cellular Corporation (“USCC”) hereby files these Reply Comments in response to the Notice of Proposed Rulemaking (“NPRM”) released October 24, 2018 in the above-captioned proceedings, in which the Commission proposes to authorize unlicensed operations in portions of the 5.925-7.125 GHz (“6 GHz”) band.¹

INTRODUCTION

As will be discussed below, USCC makes extensive use of both 5.925-6.425 GHz (the “lower 6 GHz band”) and 6.425-7.125 GHz (the “upper 6 GHz band”) for the microwave systems which interconnect its base stations and connect those stations to its core network. Those fixed service (“FS”) facilities are essential to the continuing viability of USCC’s mobile network. Many of these 6 GHz FS facilities are links used to provide backhaul in hard to reach rural areas in which few, if any, economically feasible alternatives exist to provide mobile voice and broadband services. Accordingly, USCC previously urged the Commission to proceed with

¹ *Unlicensed Use of the 6 GHz Band*, Notice of Proposed Rulemaking, 33 FCC Rcd 10496 (2018) (“NPRM”). All comments cited herein were filed on February 15, 2019 in the above-captioned proceedings.

great caution in allowing new, potentially interfering usages in the 6 GHz band.² However, USCC is also cognizant of the possible suitability of mid-band spectrum for next generation wireless services, on both a licensed and unlicensed basis.

USCC has carefully assessed the various proposals put forward by commenters in response to the NPRM. As discussed below, USCC agrees with CTIA’s proposal to create a new, licensed service in the upper 6 GHz band, while moving present FS and other licensees to the 7.125-8.5 GHz band. However, USCC believes the Commission must not allow unlicensed operations in the lower 6 GHz band without adequate protections for incumbent FS licensees.

I. USCC’S MICROWAVE LICENSES ARE VITAL TO ITS NETWORK

USCC, founded in 1983 and headquartered in Chicago, Illinois, is one of the few remaining mid-sized wireless carriers, serving approximately 5.1 million customers nationwide, many of whom are located in rural areas of the United States. USCC has sought to compete with other carriers, including the national carriers, by means of maintaining a superior network and providing excellent customer service.³ Ninety-nine percent of USCC’s customers have access to 4G LTE speeds. Moreover, USCC recently signed contracts with Ericsson and Nokia to bring Fifth Generation (5G) services to its customers,⁴ reflecting its intention to compete on even terms with the national carriers.

² See Comments of United States Cellular Corporation, GN Docket No. 17-183 (Oct. 2, 2017); Reply Comments of United States Cellular Corporation, GN Docket No. 17-183 (Nov. 15, 2017).

³ In 2018, for the fourth consecutive year, J.D. Power ranked USCC as having the highest “wireless network quality performance” in the North Central Region, which is comprised of Wisconsin, Illinois, Indiana, Michigan, and Ohio. See J.D. Power 2018 U.S. Wireless Network Performance Study – Volume 2.

⁴ See USCC Press Release, U.S. Cellular, *U.S. Cellular Selects Ericsson for 5G Deployments* (Feb. 28, 2019) (available at www.uscellular.com/about/press-room/2019/USCellular-selects-Ericsson-for-5G-deployments.html); Press Release, Nokia, *Nokia and U.S. Cellular Sign Multi-Year 5G Network Modification Detail* (Mar. 5, 2019) (available at www.nokia.com/about-us/news/releases/2019/03/05/nokia-and-us-cellular-sign-multi-year-5g-network-modernization-deal/).

As noted above, USCC's microwave facilities are now and will remain an essential component of its network. At present, USCC has 2,680 microwave "locations" which transmit in the 5.925-6.425 GHz band, and 776 "locations" which transmit in the 6.425-7.125 GHz band. USCC has a total of 2,053 6 GHz microwave licenses in 23 states.

II. THE UPPER PORTION OF THE 6 GHz BAND SHOULD BE REASSIGNED TO EXCLUSIVE USE, FLEXIBLE RIGHTS LICENSED SERVICES

CTIA and Ericsson make a strong case that some of the 6 GHz band should be "repurposed" for licensed use to preserve an appropriate balance between licensed and unlicensed mid-band spectrum.⁵ USCC agrees with those commenters that the appropriate spectrum to be repurposed should be 6.425-7.125 GHz.

USCC also concurs in their arguments that such a frequency reassignment can only work if 6 GHz microwave incumbents are reimbursed for their expenses in relocating to different spectrum bands. USCC agrees that the procedures established in "clearing" incumbents from 2 GHz authorizations used for PCS in the early nineties and later in the AWS-1 and AWS-4 proceedings should be applicable here as well. These procedures were not without difficulties and complexities, but could work in this context provided the Commission remains vigilant in enforcing the reimbursement rules against any recalcitrant new licensees in the band.

As both CTIA and Ericsson note, making such repurposing work also would be dependent on the Commission working with NTIA and other federal stakeholders to make available a portion of the 7.125-8.5 GHz band, now allocated for federal use only, to relocated 6 GHz licensees. CTIA cites persuasive data demonstrating that the 7.125-8.5 GHz band has the capacity to accommodate relocated FS incumbents.

⁵ See Comments of Ericsson, pp. 5-16; Comments of CTIA, pp. 9-16.

USCC notes, however, that it is vital that spectrum in the 7.125-8.5 GHz band be made actually available for licensing before any 6 GHz FS incumbent is displaced by any incoming licensee. If the Commission adopts this course of action, it would have to do so with the understanding that 6 GHz FS incumbents (as well as other affected incumbents) should always have access to sufficient spectrum to operate their networks, and thus, to carry out their public interest responsibilities.

III. USCC SUPPORTS EXTENSIVE SAFEGUARDS FOR INCUMBENTS IN THE LOWER 6 GHz BAND

As noted above, USCC now depends and will continue to depend on the 6 GHz band for microwave services vital to its network operations. And even if the Commission adopts CTIA's proposals with respect to the upper 6 GHz band, USCC will of course continue to use for backhaul the lower 6 GHz band, in which the majority of its FS operations are concentrated.

As the NPRM recognizes, 6 GHz FS facilities are critically important to the nation's communications networks.⁶ And certain of the comments filed, particularly those of the Fixed Wireless Communications Coalition ("FWCC"), AT&T and CTIA, demonstrate that unlicensed use of the 6 GHz band poses a serious risk of harmful interference to incumbent uses, of a type which is difficult to identify and correct, and thus will pose a real threat to FS operations.

FWCC, for example, forcefully challenges other commenters' contentions that: (1) placing FS receivers on high towers makes antenna "boresights" safe from ground level interference; (2) radio local area networks ("RLANs") can safely operate indoors on an unregistered basis; and (3) statistical analysis can reliably predict interference into FS receivers.⁷ FWCC also explains why every indoor RLAN in the 5.925-6.425 GHz (U-NII-5) and 6.525-

⁶ See NPRM, 33 FCC Rcd at 10499-500.

⁷ See Comments of FWCC, pp. 9-12.

6.875 GHz (U-NII-7) bands, at any useful power level, must be under the control of an automated frequency coordination (“AFC”) system.⁸

FWCC provides a comprehensive discussion of how any AFC system would have to operate if it is to provide adequate protection to FS incumbents.⁹ That discussion includes, among other matters, protection criteria, appropriate signal propagation models, and the need for guard bands. FWCC also stresses that the AFC system must be tested thoroughly prior to deployment, and then be first deployed in a few locations on a trial basis to ensure that real world results match theoretical expectations. USCC urges the Commission to adopt FWCC’s recommendations. And USCC strongly agrees with FWCC’s opposition to both higher RLAN power in rural and underserved areas and to RLAN operations in moving vehicles and drones.¹⁰

AT&T echoes those concerns, noting the need for high levels of reliability in FS systems and describing the serious risk of disruption to those systems which unlicensed operations will pose.¹¹ AT&T rightly argues that the Commission cannot permit unlicensed use of the 6 GHz band without requiring rigorous technical analyses and adopting robust protections for FS incumbents.¹² AT&T also emphasizes that FS incumbents are entitled to the level of protection afforded to incumbents in other bands, such as the Citizens Broadband Radio Service. AT&T maintains that, if unlicensed use is to be permitted at all in the 6 GHz band, then incumbent licensees should be entitled to levels of protection beyond those contemplated in the NPRM.¹³

⁸ *See id.* at 18-22.

⁹ *See id.* at 22-23.

¹⁰ *See id.* at 33-34.

¹¹ *See* Comments of AT&T Services, Inc., pp. 6-14.

¹² *See id.* at 15-17.

¹³ *See id.* at 18-20.

USCC considers AT&T's arguments persuasive and strongly urges the Commission to adopt rules which reflect the principles which AT&T supports.

CTIA also proposes safeguards to protect incumbent FS operations from new, unlicensed services.¹⁴ USCC urges the Commission to adopt those safeguards, incorporating FWCC's proposed technical requirements for AFC systems and AT&T's protection principles. First, CTIA would place the burden of interference elimination on future unlicensed users of the 6 GHz band. Second, an AFC system acting as a "positive control" mechanism would be required to authorize both outdoor and indoor unlicensed "access point" operations before such operations could begin, and would employ robust security requirements to ensure that access point operations comply with AFC requirements. Third, CTIA recommends that the Commission select and "certify" AFC providers to ensure that incumbent operations will be protected. Fourth, the AFC system would be required to use both the data contained within the Universal Licensing System ("ULS") database and data from a detailed "third-party database" that can be updated more quickly than ULS and that would need to be regularly monitored by the AFC system.¹⁵

CTIA also correctly urges the Commission to require the registration of access points to ensure they can be held accountable if they cause interference to FS operations and to treat as an access point any mobile device capable of operation as a Wi-Fi "hotspot." CTIA and USCC support an efficient process by which the AFC system identifies the source of any interference reported by an incumbent FS operator and then remedies the interference either by shutting off the interfering access point or by moving the access point's operations to a different channel.

¹⁴ See Comments of CTIA, pp. 17-24.

¹⁵ See also Comments of Comsearch, pp. 15-17 (providing additional support for supplementing ULS as a source of information for AFC providers).

