

**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)	GN Docket No. 17-183
Spectrum Between 3.7 and 24 GHz)	

To: Federal Communications Commission

COMMENTS OF XCEL ENERGY SERVICES INC.

Xcel Energy Services Inc., on behalf of its public utility operating company affiliates, Northern States Power Company – Minnesota, Northern States Power Company – Wisconsin, Public Service Company of Colorado, and Southwestern Public Service Company (collectively, “Xcel Energy”) hereby submits its comments in response to the Federal Communications Commission’s (“Commission” or “FCC”) Notice of Proposed Rulemaking in the above-captioned proceeding.¹ Xcel Energy opposes expanding the 6 GHz band to include unlicensed operations because of the potential for harmful interference to fixed, point-to-point licensed microwave systems that support critical utility operations.

Xcel Energy, an electric and natural gas company based in Minneapolis, Minnesota, provides a comprehensive portfolio of energy-related products and services to approximately 3.6 million electricity customers and approximately 2 million natural gas customers in eight states –

¹ *Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Proposed Rulemaking, ET Docket No. 18-295 and GN Docket No. 17-183, FCC 18-147 (rel. Oct. 24, 2018) (“*6 GHz NPRM*”). The 6 GHz NPRM was published in the Federal Register on December 17, 2018. See 83 Fed. Reg. 64506 (Dec. 17, 2018).

Colorado, Michigan, Minnesota, New Mexico, North Dakota, South Dakota, Texas and Wisconsin.

I. UTILITIES RELY ON LICENSED 6 GHZ LINKS FOR CRITICAL OPERATIONS

In 2017, when the Commission began to evaluate the potential for unlicensed use in the 6 GHz band, numerous critical infrastructure industry entities discussed the importance of the 6 GHz band to support utility operations and the harm that would result from increased congestion and interference caused by unlicensed operations.² Xcel Energy shares the concerns expressed in that proceeding that unlicensed services would pose a serious and unacceptable risk of interference to point-to-point microwave systems that support mission critical utility operations.

Xcel Energy hold 157 microwave Industrial/Business Pool licenses (Radio Service MG) in the 5925-7125 MHz (“6 GHz”) band, with approximately 225 point-to-point microwave paths in the 5925-6425 MHz (U-NII-5) and 136 point-to-point microwave paths in the 6525-6875 MHz (U-NII-7) bands. Xcel Energy operates a 6 GHz microwave system throughout its extensive service area, including in rural areas.

Like other utilities, Xcel Energy relies on its private, internal communications network to support the safe and reliable generation, transmission, and distribution of energy services to its customers. Xcel Energy’s 6 GHz facilities support a variety of mission critical services, such as backhaul capacity for land mobile radio voice and data communications, protective relaying for transmission and distribution facilities, load management and Supervisory Control and Data Acquisition (“SCADA”) systems. Xcel Energy’s 6 GHz fixed microwave system helps it to remotely monitor and control devices throughout the power grid in order to ensure that it is able

² See e.g., Comments of the Utilities Technology Council and the Edison Electric Institute, GN Docket No. 17-183 (filed Oct. 2, 2017); Reply Comments of the Utilities Technology Council and the Edison Electric Institute, GN Docket No. 17-183 (filed Nov. 15, 2017).

to safely and efficiently deliver electric and gas service, minimize outages, and protect the safety of the public and its workers.

Xcel Energy relocated to the 6 GHz band from the 2 GHz band after that band was reallocated for other wireless services. Xcel Energy lacks a realistic alternative to using the 6 GHz band. While Xcel Energy does utilize other frequency bands, including the 11 GHz band, the 6 GHz band provides the best option to achieve the necessary level of reliability because of the favorable propagation needed to communicate over long distances, often in rural and in mountainous areas, throughout Xcel Energy's extensive footprint.

Xcel Energy selected the 6 GHz band in the mountainous areas because of its propagation characteristics compared to the 11 GHz band or higher frequency bands. Generally, in the mountains it equates to longer paths where the 6 GHz band outperforms higher frequencies. The 6 GHz band also has better Fresnel zone clearances and fewer weather obstructions or interference problems that otherwise occur in those regions. When transmitting from mountain top to mountain top, the distances are typically longer with fewer options to shorten a path opposed to the flat land areas.

Xcel Energy has invested significant financial resources to deploy its 6 GHz network and would not be able to relocate to another band without incurring significant costs and undergoing extensive reengineering of its network.

II. THE FCC MUST PROTECT LICENSED UTILITY 6 GHz OPERATIONS

Because of the importance of the 6 GHz band in supporting essential utility services, it is imperative that the Commission not allow unlicensed use in the band because it could threaten the reliability of existing utility point-to-point operations and preclude the ability of utilities to expand their systems to meet the increasing demands placed on the power grid. Xcel Energy is extremely concerned that allowing unlicensed devices to transmit in the U-NII-5 and U-NII-7

bands, even under the parameters set forth in the *6 GHz NPRM*, would result in unacceptably high levels of risk of harmful interference.

As demonstrated on the record in this proceeding, there are numerous and significant flaws in the engineering studies that purport to demonstrate that unlicensed operations in the 6 GHz band would not cause harmful interference to fixed microwave systems.³ Instead, the evidence demonstrates that interference is certain to occur and the Commission should not permit unlicensed devices to operate because they would cause harmful interference to fixed links carrying critical communications. The FWCC provided detailed technical analysis that pointed out the serious problems with the studies supporting unlicensed use, including that they analyzed only non-line-of-sight propagation while ignoring line-of-sight propagation, relied on incorrect statistical standards, and incorrectly claimed that multipath fading only occurs after midnight when unlicensed activity would be low.⁴ Commenters also discussed how the studies ignored the impact on fixed microwave links in rural areas and focused primarily on urban areas.⁵ Xcel Energy operates 6 GHz links to support critical utility operations in many rural and mountainous areas and is extremely concerned about the potential for harmful interference to its operations in those areas.

If mission critical utility operations experience interference from unlicensed devices, it will be difficult to track down the source because of the transient nature of unlicensed operations.

³ See *FWCC Ex Parte*, GN Docket No. 17-183 (March 13, 2018); *AT&T Ex Parte*, GN Docket No. 17-183 (March 19, 2018), *AT&T Ex Parte*, GN Docket No. 17-83 (March 26, 2018); *Nokia Ex Parte*, GN Docket No. 17-83 (March 28, 2018).

⁴ *FWCC Ex Parte* at 10-12, GN Docket No. 17-183 (March 13, 2018).

⁵ *FWCC Ex Parte*, Studies Regarding RFK's Frequency Sharing Proposal for Radio Local Area Networks in the 6 GHz Band at 18, GN Docket No. 17-183 (March 13, 2018) (discussing that RFK's exclusion of rural areas from consideration is concerning); *Nokia Ex Parte* at 1, GN Docket No. 17-183 (March 28, 2018).

Utilities should not be required to accept a sharing regime that exposes them to significant risk of interference and forces them to mitigate or attempt to resolve interference after it has occurred.

In the U-NII-5 and U-NII-7 bands, the Commission proposes to allow unlicensed standard power access points to operate on frequencies determined by an Automated Frequency Coordination (“AFC”) system.⁶ The AFC system would rely on data in the Commission’s Universal Licensing System (“ULS”) for fixed service systems⁷ to determine an exclusion zone, an area inside of which unlicensed devices would not be allowed to operate co-channel with such fixed service systems.⁸ However, the Commission does not propose to protect fixed links operating on adjacent channels.⁹ The Commission also seeks comment on whether to allow indoor low-power access point operations in the U-NII-5 and U-NII-7 bands without the need for authorization from an AFC system.¹⁰

Xcel Energy is concerned that the proposed AFC system would not sufficiently protect against interference to utility microwave systems. As an initial matter, the ULS database may not be entirely accurate through no fault of incumbent licensees. Some licenses may predate the Commission’s implementation of an electronic database. As a result, the information reflected in ULS may be incomplete because certain information may not have been entered into ULS when the Commission converted from paper copies. Licensees sometimes also update their license records because advances in GPS technology enable them to obtain more accurate site location information.

⁶ 6 GHz NPRM at ¶¶ 22-36.

⁷ *Id.* at ¶ 39.

⁸ *Id.* at ¶ 37.

⁹ *Id.* at ¶ 44.

¹⁰ *Id.* at ¶ 73.

Licensees should not lose interference protection when they are updating ULS to provide information that may be missing or to provide more accurate location information.¹¹ Harmful interference to critical utility operations should never be allowed to occur simply because of record keeping discrepancies. Relying on ULS data alone would also fail to take into account situations where microwave systems may be deployed under conditional authority prior to obtaining a grant of authorization or where they are authorized by blanket operation. Instead of relying solely on ULS data, Xcel Energy urges the Commission to require prior frequency coordination for standard power access point operations, including outdoor and indoor operations. Several commenters, such as the Fixed Wireless Communications Coalition (“FWCC”), have demonstrated how ULS is unsuitable to protect fixed links against harmful interference from unlicensed devices.¹²

As noted by many commenters, there is an industry standard measurement within the utility sector of Five-9’s reliability for telecom microwave network path performance. Xcel Energy has adopted 99.999% annual availability for any given microwave path. As discussed above, Xcel Energy has chosen primarily 6 GHz for its long haul microwave carrier paths because of its performance characteristics.

This change to allow unlicensed use of the 6 GHz band would eliminate Xcel Energy’s ability to maintain its current Five-9’s reliability design on 6 GHz. Equally important, it would increase Xcel Energy’s security risk and safety risk. Xcel Energy would have unlicensed unknown sources using the same bandwidth that is used for SCADA, monitoring and remote control of the electric grid and gas infrastructure. This would compromise Xcel Energy’s future

¹¹ Xcel Energy also supports the Fixed Wireless Communications Coalition’s (“FWCC”) suggestion that the Commission consider an amnesty of filing fees for Part 101 corrections. FWCC *Ex Parte*, GN Docket No. 17-183, ET Docket No. 18-295 (Oct. 15, 2018).

¹² See FWCC *Ex Parte*, GN Docket No. 17-183 (Aug. 28, 2018).

plans of increasing utilization of this bandwidth as it moves further into automation of its networks. The increased additional use of the 6 GHz band could cause congestion and lag which would be outside of Xcel Energy's ability to control.

Xcel Energy also disagrees with the Commission's suggestion that adjacent channel protection is unnecessary. Xcel Energy agrees with the FWCC that adjacent channel protection is necessary to protect fixed links against interference and that reliance on out-of-band emission ("OOBE") limits is not sufficient to adequately protect fixed microwave links against harmful interference.¹³ Xcel Energy concurs with the FWCC that it would be necessary to adopt a frequency coordination system with adequately conservative interference protection criterion of 1 dB fade margin degradation (I/N ratio = -6 dB).¹⁴ Xcel Energy supports FWCC's conclusion that a free space path loss propagation model that assumes line-of-sight should be used for each microwave path.¹⁵ Xcel Energy agrees with the Commission that standard-power access point location information would need to be accurate to ensure that such devices do not operate inside any exclusion zones.¹⁶ Thus, to the extent that the Commission adopts a propagation model that includes any degree of uncertainty around the locations of standard-power access points and designs the exclusion zone contours based on a typical installation height, the Commission should require the location information to be periodically updated and should only allow the client devices to transmit when both the client devices and the master controllers are located outside the exclusion zones.

¹³ See e.g., FWCC *Ex Parte*, GN Docket No. 17-183, ET Docket No. 18-295 (Oct. 15, 2018); FWCC *Ex Parte*, GN Docket No. 17-183 (July 17, 2018), FWCC *Ex Parte*, GN Docket No. 17-183 (June 25, 2018).

¹⁴ FWCC *Ex Parte*, GN Docket No. 17-183 at 14.

¹⁵ 6 GHz NPRM at ¶ 48 (citing FWCC *Ex Parte* at 5, GN Docket No. 17-183 (June 25, 2018)).

¹⁶ 6 GHz NPRM at ¶ 50.

Finally, Xcel Energy opposes allowing indoor low-power access point operations in the U-NII-5 and U-NII-7 bands without the need for authorization from an AFC system.¹⁷ Xcel Energy agrees with FWCC that indoor access point devices in tall buildings could cause unacceptable degradation in the fade margin of a fixed service link.¹⁸ Indoor operations, especially in tall buildings where even devices at low power could cause interference, pose significant potential for interference and should be subject to the same level of frequency coordination as required for outdoor operations.

III. CONCLUSION

Xcel Energy respectfully requests the Commission to take action in this docket consistent with the views expressed herein.

Respectfully submitted,

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¹⁷ *Id.* at ¶ 73.

¹⁸ *6 GHz NPRM* at ¶ 73 (*citing FWCC Ex Parte* at 6, Attach. 2, GN Docket No. 17-183 (June 25, 2018)).