BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

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

To: The Commission

REPLY COMMENTS OF LOWER COLORADO RIVER AUTHORITY

Lower Colorado River Authority ("LCRA") hereby submits its reply comments in response to the Federal Communications Commission's ("FCC" or "Commission") *Notice of Inquiry* ("*NOI*") on issues regarding the 5.925-6.425 GHz ("Lower 6 GHz") and 6.425-7.125 GHz bands ("Upper 6 GHz") bands.[1]

I. THE COMMISSION SHOULD NOT EXPAND USE OF THE 6 GHZ BAND FOR UNLICENSED USE

The record is clear that utilities across the country rely on their 6 GHz microwave systems for mission critical communications. As emphasized by Utilities Technology Council ("UTC") and Edison Electric Institute ("EEI") – "The critical nature of the traffic carried over these networks must be underscored. These microwave systems serve as the primary

[1] *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, GN Docket No. 17-183, 32 FCC Rcd 6373 (rel. Aug. 3, 2017) ("*Mid-Band MHz NOI*"). The Wireless Telecommunications Bureau extended the deadline for filing reply comments to November 15, 2017. *See* Order, DA 17-1024 (rel. Oct. 18, 2017).

telecommunications backbone for utility networks, and carry numerous applications and services."[2]

LCRA explained that its licensed microwave hops in the Lower 6 GHz and Upper 6 GHz bands support mission critical utility operations, including protective relaying, load management, physical security, water management, flood monitoring and control, Supervisory Control and Data Acquisition ("SCADA"), and voice and data communications, as well supporting LCRA's trunked radio system and a 700 MHz regional public safety system.[3] Duke Energy Corporation ("Duke Energy") stated that its 6 GHz microwave systems provide backhaul capacity to support voice and data communications and that these systems "support many mission critical applications that control electric power generation, as well as the transmission and distribution of natural gas and electricity, and are critical to both employee and public safety."[4]

Tucson Electric Power Company ("TEP") explained that it "extensively utilizes mid-band spectrum"[5] in the Lower 6 GHz and Upper 6 GHz bands for its operations and that it "uses wireless spectrum to control and protect is most critical operations,"[6] including SCADA, protective relaying, energy management, telemetry, power line fault location, and communications with field crews during restoration and maintenance operations. Southern Company Services, Inc. ("Southern Company") operates approximately 150 frequency paths in

[2] Comments of Utilities Technology Council and Edison Electric Institute at 3; GN Docket No. 17-83 (filed Oct. 2, 2017) ("UTC and EEI Comments"); *See also* UTC and EEI Comments at 4-5.

[3] Comments of Lower Colorado River Authority at 3; GN Docket No. 17-183 (filed Oct. 2, 2017) ("LCRA Comments").

[4] Comments of Duke Energy Corporation at 2; GN Docket No. 17-83 (filed Oct. 2, 2017) ("Duke Energy Comments").

[5] Comments of Tucson Electric Power Company at 2; GN Docket No. 17-83 (filed Oct. 2, 2017) ("TEP Comments").

[6] *Id.* at 3.

the 6 GHz band, which "support a variety of utility applications," such as voice and data communications between and among energy control stations, substations, generating stations, and other utilities; backhaul capacity for voice and data communications from land mobile radio systems used by field crews, and to backhaul data from SCADA systems.[7]

LCRA opposes the comments submitted by the Mid-Band Spectrum Coalition recommending that the Commission move expeditiously to a rulemaking proceeding.[8] The critical nature of the current uses of 6 GHz spectrum and the gravity of negatively affecting these utility and public safety mission critical operations warrants a cautious and careful analysis of any proposed interference protection mechanisms and a clear understanding of the hazards that are likely to result from expanded use of the 6 GHz band.

Even commenters that suggest they are open to investigating the 6 GHz band acknowledge that "it is imperative that parties seeking to use this band for unlicensed use provide a comprehensive, engineering-based demonstration that any interference protection solution can, in fact, protect point-to-point operations from interference."[9] LCRA wholeheartedly agrees with Nokia that "rigorous engineering analysis of potential interference into incumbent FS operations is required before introducing any new services, including unlicensed services."[10] While innovation is undoubtedly important, it is ultimately not in the

[7] Comments of Southern Company Services Inc. at 2-3; GN Docket No. 17-83 (filed Oct. 2, 2017) ("Southern Company Comments").

[8] Comments of Mid-Band Spectrum Coalition at 3-4; GN Docket No. 17-83 (filed Oct. 2, 2017).

[9] Comments of CTIA at 16; GN Docket No. 17-83 (filed Oct. 2, 2017); Comments of T-Mobile USA, Inc. at 17; GN Docket No. 17-83 (filed Oct. 2 2017) (stating that the FCC "should ensure that there is a firm technical foundation on which to conclude that unlicensed operations will not cause harmful interference to primary operations and should adopt appropriate technical and operational limits to protect the significant number of incumbent users and primary operations in this band.")

[10] Comments of Nokia at 16; GN Docket No. 17-83 (filed Oct. 2, 2017).

best interest of the American public to sacrifice the reliability and operability of the 6 GHz microwave systems supporting mission critical utility and public safety systems.

The Mid-Band Spectrum Coalition suggested that access to the 6 GHz band for unlicensed use is necessary to accommodate the anticipated growth of 5G broadband services, such as mobile video applications.[11] It stated that "[s]hort-range IoT devices – many of which will use mid-band spectrum – will represent the lion's share of IoT devices on mobile networks – globally, more than 15 billion such devices are projected in 2022."[12]

However, it is precisely because of the concern of such large numbers of unlicensed devices with the potential to cause harmful interference to mission critical communications that the Commission should not rush to open up the 6 GHz band. The scope of the anticipated use of the 6 GHz band by unlicensed devices largely validates the interference concerns that LCRA and others have expressed – 15 billion devices worldwide capable of operating directly in the same band and on the same frequencies as incumbent 6 GHz links that support mission critical communications will pose a significant risk of interference.[13] A database driven interference mitigation plan would not provide an adequate level of protection considering the potential impact should millions of unlicensed devices cause interference.

Other utilities agreed with LCRA that widespread unlicensed use is likely to cause congestion and interference associated with an increase in the noise floor. Duke Energy warned

[11] Mid-Band Spectrum Coalition Comments at 8.

[12] *Id*. at 8.

[13] LCRA Comments at 6 ("The likelihood that hundreds or thousands of devices technically capable of transmitting on the same frequencies as LCRA's licensed transmitters would be able to reliably sense and avoid LCRA"s use is highly doubtful."); Comments of AT&T Services, Inc. at 17; GN Docket No. 17-83 (filed Oct. 2, 2017) ("AT&T Comments") ("These fears are compounded when the potential exists for additive interference from a large number of devices, as most unlicensed technologies intend.").

that expanding use of the 6 GHz bands "could result in widespread disruption to our communications capabilities, causing widespread disruption to service, equipment damage, and possible injury or death or an employee or member of the public."[14] Southern Company cautioned that the "risks of interference from unlicensed devices are even greater than with licensed devices because it truly would be impossible for fixed service licensees to identify sources of interference or the operators of these devices."[15]

AT&T also explained the complications associated with troubleshooting interference from unlicensed operations. AT&T noted that "[e]ven if a device was malfunctioning or being operated in a malicious manner, the microwave licensee would never be able to identify the source of the interference—the itinerant nature of most unlicensed activity, even if it was identified as causing interference, means that the device may never be located, since it may be transmitting only intermittently and is likely to be in motion."[16]

LCRA explained in its initial comments that it has experienced interference to its operations in the 900 MHz band from unlicensed operations in adjacent bands and therefore it is reasonable to expect that unlicensed operations in the same band will cause interference.[17] Duke Energy echoed these concerns, stating the "noise floor in these bands will rise as a result of the aggregated operation of many unlicensed devices. This has been the case in other unlicensed bands and it is reasonable to assume it would occur in the 6 GHz band if they were expanded to permit widespread unlicensed operations."[18] Southern Company discussed that "[e]xperience

[14] Duke Energy Comments at 3.

[15] Southern Company Comments at 6.

[16] AT&T Comments at 17.

[17] LCRA Comments at 5-6.

[18] Duke Energy Comments at 3.

with the roll-out of U-NII devices illustrated that even with very clear operating requirements intended to prevent interference to critical radar systems, many users were either unaware of, or chose to ignore, those requirements."[19]

Other commenters supported the importance of the 6 GHz band and confirmed that use of the band is growing. AT&T observed that the 6 GHz bands "serve critically important functions and are densely populated spectrum bands."[20] AT&T also stated that the 6 GHz microwave links "are critical assets to the Nation's communications infrastructure because they serve very specific needs that are not capable of being satisfied using alternative technologies or higher spectrum bands."[21]

Nokia commented that with respect to the proposals to consider expanded use of the 6 GHz band that "[t]he more challenging issue, which is true throughout both the upper and lower portion of the 6 GHz band, is the thriving incumbent fixed service links in the band, comprising many tens of thousands of links."[22] Nokia further stated that "[f]ar from declining, Nokia anticipates this service will continue to be robust and grow in the future." [23] Comsearch discussed that "the Lower 6 and Upper 6 GHz bands are continuing to grow as they are the last remaining low-band frequencies from microwave links that are not susceptible to rain fading."[24] AT&T confirmed that its reliance on 6 GHz microwave will increase as its systems densify to meet future wireless needs.[25] Thus, the record submitted by utilities and other commenters

[19] Southern Company Comments at 6.

[20] AT&T Comments at 12.

[21] *Id*. at 19-20.

[22] Comments of Nokia at 15; GN Docket No. 17-83 (filed Oct. 2, 2017).

[23] *Id.*

[24] Comments of Comsearch, GN Docket No. 17-83 at 2 (filed Oct. 2, 2017).

[25] AT&T Comments at 14.

confirms that use of the 6 GHz band is growing, not declining, and that future use must be protected.

LCRA strongly agrees with AT&T's analysis that "unlicensed devices pose a significant risk to the operation of 6 GHz microwave and should not be considered in these bands."[26] As demonstrated by AT&T, there are numerous reasons why unlicensed use cannot co-exist with 6 GHz microwave links:

- Independent of the financial feasibility of splitting the 100,000 links in the 6 GHz band into 200,000 links, the links may use 6 GHz because they traverse areas where intermediate hops are infeasible. Indeed, even if a suitable alternative did exist that would not require splitting single 6 GHz hops into multiple hops and was unaffected by rain fade, the sheer magnitude of the relocation task seems insurmountable.[27]
- And while microwave beams are narrow, the area within the boresight of the antenna is typically very large, given the length of the links—the surface area where potential interferers could be covers many square miles.[28]
- Compounding the difficulty of sharing, to a microwave link, interference caused by a mobile is indistinguishable from atmospheric or environmental fade. Even very weak signals will create interference, which will reduce the effectiveness of the link's engineered fade depth.[29]

In its initial comments, LCRA stated that more information would be needed regarding proposed unlicensed operation in the 6 GHz band to evaluate the potential impact on licensed, point-to-point operations. LCRA noted that many unanswered questions remained, including what interference protection mechanisms unlicensed users would propose to protect incumbent users and how proponents of unlicensed use could ensure that licensed users would be able to quickly identify and resolve any sources of interference.

[26] *Id.* at 17.

[27] *Id.* at 15.

[28] *Id*. at 16.

[29] *Id*. at 16.

After reviewing the record, LCRA's concerns have not been alleviated. Instead, the record confirms that these questions remain unanswered and that proponents of unlicensed use have not met their burden to demonstrate – with comprehensive, rigorous, engineering-based data – that unlicensed use will not cause interference to mission critical utility operations. There is simply no firm technical foundation on which to conclude the unlicensed operations will not cause harmful interference to incumbent, fixed point-to-point operations. For that reason, the Commission should not take any further action to allow expanded use of the 6 GHz band.

II. CONCLUSION

WHEREFORE, THE PREMISES CONSIDERED, Lower Colorado River Authority respectfully requests the Commission to take action in this docket consistent with the views expressed herein.

Respectfully submitted,

LOWER COLORADO RIVER AUTHORITY

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