

**Before the
Federal Communications Commission
Washington, D.C. 20554**

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

COMMENTS OF DUKE ENERGY CORPORATION

Duke Energy Corporation (“Duke Energy”) hereby submits its comments in response to the Commission’s Notice of Inquiry (“NOI”) in the above-captioned proceeding. As described more fully below, Duke Energy opposes expanded use of the 5.925-6.425 GHz band (“Lower 6 GHz band”) and the 6.425-7.125 GHz band (“Upper 6 GHz band”) (collectively, the “6 GHz bands”), because it would restrict the amount of spectrum available for growth of utility communications systems required to support Smart Grid and other grid modernization initiatives. It would also increase the potential for interference with mission-critical fixed microwave systems that support the safe, reliable and secure delivery of essential electric service to the public.

I. Duke Energy’s Use of the 6 GHz Bands

Duke Energy is one of the largest investor owned utilities in the United States, providing electric and gas service to 7.5 million electric customers and 1.6 million gas customers in seven states—North Carolina, South Carolina, Indiana, Ohio, Kentucky, Florida, and Tennessee—with a service area of over 95,000 square miles. Duke Energy’s primary interest in this NOI is in (i) preserving the 6 GHz bands for continued use by utilities and other critical infrastructure industries for microwave operations, and (ii) protecting against interference and congestion that would likely result from expanding the use of the band for other unlicensed and licensed operations. There are more than 28,000 fixed microwave links in the Lower 6 GHz Band and there are more than 23,000 fixed microwave links in the Upper 6 GHz Band. Duke Energy has 117 links licensed in Lower 6

GHz and 56 links licensed in Upper 6 GHz. Duke Energy is actively upgrading unlicensed links to licensed Lower 6 GHz as it installs new microwave radio equipment. Duke Energy is planning to request additional frequencies in the Lower 6 GHz band in the near future as its bandwidth requirements increase.

Duke Energy uses 6 GHz microwave systems to provide backhaul capacity to support voice and data communications throughout its service territory. These systems support many mission-critical applications that control electric power generation, as well as the transmission and distribution of both natural gas and electricity, and are critical to both employee and public safety. They serve as the primary telecommunications backbone for many locations on Duke Energy's network, and carry numerous applications and services such as protective relaying for transmission and distribution facilities, supervisory control and data acquisition ("SCADA"), land mobile radio backhaul, and voice connections to substations and other remote locations. Duke Energy has invested approximately \$15 million dollars in equipment cost alone in these systems, and the proposal to share this spectrum for wireless broadband and other services threatens this investment. The critical nature of the traffic that is carried over these networks cannot be overemphasized.

II. Commission Inquiries Regarding Expanded Use of the 6 GHz Bands

In the NOI, the Commission invites comment on:

- the potential for additional wireless broadband use in the 5.925-6.425 GHz band, taking into consideration existing and future incumbent uses as well as compatibility with adjacent band services (*In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket. No. 17-183, Notice of Inquiry, FCC 17-104, ¶ 26 (August 3, 2017));
- the potential for more intensive Fixed Service ("FS") or mobile use of the 6.425-7.125 GHz band (*id.* at ¶ 36);
- whether it would be possible and technically beneficial for U-NII devices in the 5.15-5.35 GHz and 5.47-5.725 GHz bands to operate in both the 6 GHz bands and the existing U-NII spectrum (*id.* at ¶ 26);
- whether it would be feasible for the Commission to adopt techniques to mitigate

the risk of interference from unlicensed devices to licensed services in the 6 GHz bands (*id.* at ¶ 29);

- whether it may be viable to realign or retune existing incumbent operations in this band to make more efficient use of this spectrum and better facilitate sharing (*id.*);
- whether the 6 GHz bands could be shared to support licensed wireless broadband (*id.* at 31); and
- how the band may coexist with existing licensed FS and Fixed Satellite Service (“FSS”) services (*id.*).

III. The Commission Should Not Permit Expanded Use of the 6 GHz Bands for Unlicensed or Licensed Broadband Wireless Fixed and Mobile Services.

The 6 GHz band is heavily used, and prior coordination techniques employed in this band make highly efficient use of the spectrum. Terrestrial FS antennas are fixed, and are highly directional, such that links can successfully operate on the same frequency even in close proximity, so long as they do not both impinge on the same receive antenna from the same direction.

Duke Energy is concerned that expanding use of the 6 GHz bands would create congestion and cause interference on our fixed microwave systems. Interference to our operating microwave links would likely cause intermittent outages and/or data errors that could cause incorrect or missing data. This could result in something as simple as a dropped telephone call. But this also could result in widespread disruption to our communication capabilities, causing widespread disruption to service, equipment damage, and possible injury or death to an employee or member of the public. Duke Energy strongly believes that the mitigation approaches identified by the Commission regarding interference with incumbent licensed systems in the 6 GHz bands would not be sufficiently effective to protect incumbent licensees.

Duke Energy is concerned that 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 bands if they were expanded to permit widespread unlicensed operations. Resolution of interference problems is time consuming,

difficult, and expensive. Troubleshooting involves searching for unwanted frequencies with antennas and spectrum analyzer equipment. This is repeated in multiple locations, using triangulation or other logical geographic methods, in an effort to locate the source of the unwanted signals. If the source is not fixed, the problem is compounded. This process can take days or weeks. When the source is finally identified, then efforts to resolve the problem can begin. Cost to the licensee can easily be in the tens of thousands of dollars to identify and resolve a single instance of interference. For these reasons, we strongly oppose any unlicensed operations in the 6 GHz band.

Duke Energy is also opposed to any retuning of the band. This proposed retuning would be virtually impossible considering the number of microwave paths that are involved and the extent to which they are carefully coordinated with each other prior to applying for a license from the Commission. Realigning these systems would be a monumental task that would create many opportunities for problems and mistakes, and carry a high monetary cost for incumbent licensees. The Commission should refrain from compromising in this manner the microwave systems of Duke Energy and other utilities that carry mission-critical communications.

The 6 GHz band is the only remaining band available to utilities that provides the propagation needed to communicate over long distances from point to point. Duke Energy would have nowhere else to relocate to escape the congestion and interference anticipated if the proposals discussed in this proceeding are adopted. Duke Energy has made significant investments in its microwave communications systems, and would have significant stranded investment if it were forced out of the 6 GHz bands. Duke Energy does not believe its ratepayers should be forced to absorb this cost.

Smart Grid and other modernization efforts are driving the need for more bandwidth across

all frequency bands that Duke Energy uses. Utilities lack access to sufficient spectrum to meet their increasing needs, for both microwave and land mobile radio. As Duke Energy replaces TDM equipment with packet-based equipment, it is requiring more spectrum, including wider channels, to keep up with the needs of its electric system modernization efforts. Duke Energy projects the need to double and possibly quadruple the throughput capacity of its microwave radio systems over the next five years. Because of this, the Commission should look for opportunities to provide utilities with additional licensed spectrum—not to shrink or degrade the spectrum upon which they already rely.

Conclusion

For all of those reasons set forth herein, Duke Energy opposes expanded use of the 6 GHz bands for unlicensed and licensed broadband wireless fixed and mobile services. Duke Energy uses the band extensively for mission critical operations and believes that the interference mitigation approaches that the Commission is considering would not be sufficiently effective to protect Duke Energy and other licensees from harmful interference. Any benefit from the expansion of the band would be outweighed by the threat of interference to electric utilities' communications systems, and the further limiting of their access to spectrum required to support grid modernization.

Respectfully submitted this 2nd day of October, 2017.

s/ Dennis M. Hulsman

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