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

In the matter of	)	
	)	
Review of the Commission's Rules Governing the 896-901/935-940 MHz Band	)	WT Docket No. 17-200
	)	
Realignment of the 896-901/935-940 MHz Band to Create a Private Enterprise Broadband Allocation	)	RM-11738 (Terminated)
	)	
Amendment of the Commission's Rules to Allow for Specialized Mobile Radio Services Over 900 MHz Business/Industrial Land Transportation Frequencies	)	RM-11755 (Terminated)

COMMENTS OF DUKE ENERGY CORPORATION

Duke Energy Corporation ("Duke Energy") is pleased to provide the following comments in response to the Notice of Inquiry in the above-captioned matter. As set forth in more detail below, Duke Energy opposes any realignment of the 900 MHz band because it will threaten the safety and reliability of Duke's transmission and distribution operations. However, Duke Energy is strongly in favor of the Commission granting additional sub-one GHz spectrum to electric utilities to build private broadband LTE networks to use for their ever-expanding broadband needs resulting from grid modernization. While Duke Energy would prefer that the Commission grant utilities that spectrum in a band other than the 900 MHz band, if the Commission is only willing to consider allocation of the 900 MHz band for that purpose, Duke Energy sets forth a proposal below to minimize such disruption.

OVERVIEW

A. Duke Energy's Electric and Gas Distribution Grids

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. To provide reliable voice and narrowband data communications services to its field crews, Duke Energy owns and operates several Private Land Mobile Radio ("PLMR") systems in North Carolina, South Carolina, Indiana, Ohio, Kentucky, and Florida. Of these several PLMR systems, Duke Energy utilizes the 900 MHz B/ILT bands in a large portion of the North Carolina and South Carolina service territories, and all of the Florida service territory. For these 900 MHz B/ILT bands, Duke Energy currently holds 48 discrete PLMR licenses covering a total of 173 discrete frequency pairs.

Duke Energy is currently undertaking a major expansion and modernization of its energy delivery grids and supporting infrastructure, as well implementing significant changes in the character of that equipment. The changing sources of generation, the growing availability and implementation of distributed energy resources, and the growth of consumer energy management systems will continue to have a dramatic impact on the nature of Duke Energy's network communications systems. This modernization is requiring the expansion and upgrading of Duke's communication systems for monitoring, managing, and controlling its energy delivery infrastructure.

As the energy delivery grids evolve to incorporate ever more sophisticated and intelligent electronic monitoring systems and control equipment, they concurrently require more capacity, reliability, and security of the network systems connecting them. To this end, Duke Energy is embarking on a significant enhancement of its information systems technology and operational network systems. This includes significant investment in modernizing and implementing additional wireline and wireless systems and services. Not only must the reach of the network

systems be expanded, but their capacity, reliability, and security must be substantially enhanced as well.

B. Establishing a Private Broadband LTE Network

Duke Energy is currently evaluating the potential for establishing its own private broadband LTE system that could provide the enhanced network systems and services necessary to support both current and future mission-critical network system needs. Duke Energy is currently evaluating the feasibility of utilizing broadband spectrum provided by one of the commercial cellular carriers to do so. However, accessing spectrum greater than 2 GHz, as is being offered by these commercial carriers, would severely restrict Duke Energy's ability to deploy a system-wide private broadband LTE system in a cost-effective manner. The restricted propagation characteristics of radio frequency signals above 2 GHz would require the acquisition and use of a very large number of towers to locate the private LTE antennas and remote equipment in order to deploy a private LTE system in these bands. The cost to establish and maintain a private LTE system with this large number of towers and the associated backhaul circuit costs would limit Duke Energy's ability to provide low-cost energy services to its customers.

Access to broadband LTE spectrum in the sub-one GHz range, on the other hand, would reduce the number of towers sites and the associated backhaul circuit cost significantly. A private LTE system also would provide utilities with a network system with better capacity and connectivity, and that is inherently more reliable, more secure, and less susceptible to disruptions or other malicious activity, than are the commercial services and other private network systems currently available.

Crucial to the evaluation of potentially developing a private broadband LTE system is the availability of broadband spectrum suitable for building out a *cost-effective* private LTE system.

In order to be cost-effective, this potential LTE system must have access to broadband spectrum in the sub-one GHz range to minimize the number of LTE tower sites required to provide the necessary coverage, capacity, and reliability. The critical nature of electric utilities' need for broadband spectrum in the sub-one GHz range in order to serve the American public with safe, reliable, and affordable energy cannot be over-emphasized.

As Duke Energy stated in its comments in opposition to the original Petition for Rulemaking by the Enterprise Wireless Alliance ("EWA") and Pacific DataVision, Inc. ("PDV") (RM-11738), although Duke Energy agrees with the premise of establishing a broadband section of spectrum in the sub-one GHz range—thereby providing urgently needed broadband spectrum to enable utilities to implement private LTE systems—the ways in which the petition proposed reallocating the 896-901/935-940 MHz spectrum would have caused major disruption to Duke Energy's existing PLMR systems currently using this band. Rather than adopting the EWA/PDV proposal, Duke Energy proposes that the Commission reallocate spectrum in the sub-one GHz range to create broadband spectrum suitable for establishing regional private LTE systems to be owned, operated, and maintained by primary incumbent utilities for their benefit and for the potential use and benefit of other municipal and cooperative utilities, other first responders, and public safety entities within these service areas. Duke proposes that this broadband spectrum be created in a sub-one GHz range other than the 896-901/935-940 MHz PLMR band, as reallocating these bands would be very disruptive to Duke Energy's business operation and would significantly affect its ability to deliver energy to its customers in a safe and reliable manner.

COMMENTS

Duke Energy opposes any reallocation of the 900 MHz band because of the disruption to Duke's communications—and thus to the safe and reliable provision of power to Duke Energy's

customers—that would result. Instead of adopting PDV/EWA's proposal, Duke Energy proposes that the Commission reallocate sub-one GHz spectrum other than the 900 MHz band (therefore avoiding disruption to utilities' existing operations in that band) for use by electric utilities to create private broadband LTE systems to support the modernization of the electric grid. However, if the Commission sees fit to allocate spectrum for that purpose, but the only band of spectrum it will consider for such purpose is the 900 MHz band, Duke Energy proposes a plan below with respect thereto.

Regarding certain of the specific items on which the Commission seeks comment beginning in Section III, ¶ 17 of the NOI, Duke Energy responds as follows:

> ***17. In this NOI, we broadly seek comment on whether the public interest would be served by making changes to the existing regime in the 900 MHz band. We invite commenters to address factors that would affect this public interest determination, including, but not limited to, whether any changes to improve the technical and operational flexibility and efficiency of the 900 MHz band are appropriate; 900 MHz band users' current and future needs; whether those needs would be adequately fulfilled by alternate spectrum bands that have been allocated to or will be available to B/ILT users; and the financial and non- financial impacts of any changes on existing users' operations. We specifically invite affected entities to provide up-to-date information, including economic data, to supplement the overview of the needs of various groups of B/ILT 900 MHz band users.***

It is imperative that utilities have access to sub-one GHz broadband spectrum so they may develop and deploy cost-effective private broadband LTE systems. The need of utilities to monitor, manage, and control the energy distribution and delivery grids in near real-time will continue to grow dramatically as the number of intelligent grid field monitoring and control devices increases. A private broadband LTE system is the most appropriate multipurpose communications system to meet that need. In addition, the ongoing adoption throughout the electric utility industry of the North American Energy Standards Board's Open Filed Message Bus

("Open FMB")[1] will necessitate the development of communications networks and systems with higher capacity, extremely low latency, higher availability, higher reliability and inherent redundancy, and enhanced quality of service ("QOS") capabilities—all of which can best be provided with a private broadband LTE system.

Not only can a private LTE system support these enhanced network capabilities, but it can also provide enhanced security. That is because, with a private broadband LTE system, electric utilities can implement tighter and customized access controls (as opposed to commercial networks where the carrier sets such controls rather than the electric utility). Further, a private broadband LTE system can achieve greater availability and throughput by implementing customized QOS policies.

While utilities need to have access to sub-one GHz broadband spectrum so that they may deploy cost-effective private LTE systems, reallocating the 900 MHz B/ILT band channels to provide this broadband spectrum is not in the best interest of Duke Energy or its customers. Any changes to the existing 900 MHz B/ILT band and channel assignments would be very disruptive to Duke Energy's operational capabilities and efficiencies because of the interference that would result from the reallocated channel assignments. In addition, given that Duke Energy currently utilizes 173 of the 199 B/ILT channels identified in Title 47 CFR Part 90, it is doubtful that Duke Energy would be able to secure the required number of unencumbered and non-interfering channels to provide the same coverage and capacity currently enjoyed following any reallocation of channels and frequencies that would reduce the B/ILT channels to any number less than the 199 currently available. Reduced communications capacity and the resultant inability to properly manage, control, and maintain the energy delivery grids may lead to conditions that are unsafe for

[1] https://www.naesb.org/pdf4/retail_open_fmb052915w2.docx.

utilities' staff, other first responders, and the general public. And paradoxically, this degraded communications capacity would come with a high price tag. Duke Energy estimates that the cost to purchase the base station equipment and other field equipment necessary to accommodate new channel assignments alone would be in the range of $3,000,000—a figure that does not include any new repeater sites that might be required.

> ***18. More generally, we seek comment on how to ensure that the 900 MHz band is put to its best and highest use for the American public. Commenters should discuss current and future needs, narrowband or broadband, of existing or new potential users and suggest how these needs can be met within the 900 MHz band. We seek additional comment on various specific options for the future use of the 900 MHz band that have been proposed in the records of the rulemaking petitions, but also invite commenters to present alternative approaches, including the costs and benefits of such options. We hope to develop a comprehensive record on which the Commission may, if the record warrants, propose further action to ensure that the 900 MHz band is an efficiently managed resource that meets current and future users' needs.***

The best and highest use of the 900 MHz band for the American public is the current use of this band, which provides discrete narrowband channels to support utilities' highly reliable PLMR voice and narrowband data communications used for operating and maintaining the energy delivery grids. Any modifications to the existing 900 MHz band and the current channel assignments the Commission may adopt must include a comprehensive plan for how the critical PLMR communications services provided today will be maintained during any transitions and in the final configuration.

If the Commission is intent on reallocating the 900 MHz band, Duke Energy proposes that the Commission allow incumbents to temporarily use other channels with which their existing PLMR system would be compatible in order to free up the broadband spectrum necessary to develop a private LTE system capable of supporting the utilities' mission critical voice and data

communications needs. Once the current voice and data services were migrated to a new private LTE system, the temporarily assigned PLMR channels could be reclaimed for other uses. This could take the form of initially reallocating the current 5 x 5 MHz band into a 2 x 2 MHz band to provide temporary narrowband channels to sustain the current PLMR system and freeing up a 3 x 3 MHz band to implement a private LTE system. Once a new private LTE system is operational and the current PLMR voice and data communications migrated to it, the then unused 2 x 2 MHz band could be concatenated with the 3 x 3 MHz band. This would result in the creation of a broadband 5 x 5 MHz band that would support a private LTE system with even greater capacity.

An additional benefit of this two-step approach in that the second stage could be implemented on a regional basis. For example, utilities in some geographic regions may elect to retain the channelized 2 x 2 MHz and the broadband 3 x 3 MHz configuration if the incumbent utilities in those areas do not wish to implement a private LTE system or if they do not wish to migrate their PLMR voice and narrowband data to a private LTE system. Other incumbent utilities in other geographic regions may choose to implement a private LTE system in the 3 x 3 MHz band initially and then subsequently choose to expand their LTE system to take advantage of the 5 x 5 MHz bandwidth as may be available in their geographic regions.

22. We also seek comment on the effect that expanding commercial service on 900 MHz B/ILT channels would have on traditional B/ILT licensees. Would making SMR entities eligible for 900 MHz B/ILT spectrum force traditional B/ILT entities to purchase access to this spectrum from commercial providers? Would sufficient spectrum remain available for them to operate and expand their private internal communication systems? What about on other bands? Are the ongoing needs for narrowband communication sufficient to warrant less flexibility? We note that B/ILT eligibility is a relatively low barrier to gain access to the band and that, once authorized, a B/ILT eligible already has the ability to convert the authorization to commercial use. What impact has this had?

Expanding commercial service on 900 MHz B/ILT channels would impair the ability of

utilities and other B/ILT eligible entities to use this band for its originally intended purpose—enabling B/ILT eligible entities free and open access to the narrowband channels as necessary to conduct their business. *In the Matter of Amendment of Parts 2, 15, and 90 of the Commission's Rules and Regulations to Allocate Frequencies in the 900 MHz Reserve Band for Private Land Mobile Use*, Report and Order, 2 FCC Rcd 1825 (July 24, 1986). Commercial encroachment would impact utilities' ability to establish and grow their PLMR communication capabilities as necessary to properly serve their customers with safe and reliable energy. In particular for Duke Energy, it would impair Duke's ability to grow and expand the capacity of its PLMR systems to provide necessary connectivity in new areas or expanded capacity in existing areas with a growing customer base.

27. Band plan. If the Commission were to create a narrowband and a broadband segment, what would be the most suitable bandwidth to create a broadband service in the 900 MHz band, taking into account the evolution of wireless technical standards such as Long Term Evolution (LTE)? What would be the minimum viable size for a broadband service? For example, would 3 x 3 megahertz paired blocks be sufficient to create a commercially viable broadband service while ensuring sufficient spectrum for traditional narrowband operations in the band? Where should the broadband spectrum be located, i.e., on one or the other edge of the 900 MHz band, or in the middle with narrowband segments on each side?

The 3rd Generation Partnership Project (3GPP)—consisting of seven international telecom technical groups responsible for the ongoing development of LTE standards worldwide—defines the minimal bandwidth required for broadband LTE service as 1.4 MHz, but also specifies bandwidth options of 3, 5, 10, 15, and 20 MHz for broadband LTE services. Duke Energy agrees that a 3 x 3 MHz band would be sufficient to provide minimal broadband LTE services, but having access to a band of 5 x 5 MHz would allow the expanded capabilities utilities will need to accommodate the rapidly-growing, intelligent energy delivery grid.

30. License assignment. In the event the Commission reconfigures this band to facilitate the development of a broadband service, we inquire about how the licenses should be assigned. We request that commenters explain the extent to which such policies would be consistent with the Commission's obligations under the Communications Act, the costs and benefits of different approaches, and whether and to what extent the policies would benefit users.

In light of the fact that the licensing costs to B/ILT eligible entities today are comprised of minimal licensing and/or administrative fees, if the Commission were to adopt a position similar to the one originally proposed by PDV/EWA (RM-11738), it would be logical to expect the re-banded spectrum would be available at the same or an even lower cost, since the quality of the 2 x 2 band into which the incumbent utilities would be relocated would be inferior to the current configuration.

31. Should the license in each service area be assigned to the entity holding a particular amount of 900 MHz spectrum? If so, what is the appropriate threshold? We also seek comment on whether using spectrum holdings to select the broadband licensee would allow the licensee to obtain a windfall benefit without having to pay for it, and, if so, whether cost to the public of that windfall is outweighed by the benefits of rebanding. If more than one licensee in a service area meets the established spectrum holding threshold, what mechanism should we adopt to decide which licensee is assigned the license?

It would be logical to recognize that the larger B/ILT eligible entities in a region should have access to any re-banded spectrum for only a nominal fee, if any, as is the case today. If Duke Energy were granted access to the broadband 900 MHz PLMR spectrum in its service territories, and it were to develop a private LTE system covering all of its service territories, this broadband LTE system could then potentially be used to provide private LTE services to other municipal and cooperative utilities and government services entities within the Duke Energy service territories—thus benefitting those entities as well. While this private LTE network would not be a commercial venture, it would be reasonable to expect all additional users would bear the

cost of deploying any incremental infrastructure and incremental operational services beyond those required by Duke.

> ***35. Finally, we seek comment on the appropriate license area if the Commission designates a broadband segment of the 900 MHz band. Should we consider geographic units larger than MTAs, or even a nationwide broadband license? How would a proposal to license broadband operation over a larger area affect the considerations discussed above, such as the services that could be provided or the means of selecting the broadband licensee(s)?***

With regards to the licensing area for a broadband segment of the 900 MHz spectrum, Duke Energy recommends the Commission consider licensing on a BTA area basis. Licensing on a BTA area basis would allow incumbent utilities to much more closely match licensed areas to their service territories. Licensing on MTA or larger area basis would force a utility to obtain licenses for areas that would in many cases extend well beyond their service territories just to ensure they had the licenses to cover their entire service area. This would also interfere with the rights of other neighboring utilities that share portions of a common MTA to obtain licenses in these bands. For example, MTA 13 is shared by Duke Energy, Tampa Electric, Florida Power and Light, and the Orlando Utilities Commission.

CONCLUSION

For all those reasons set forth herein, Duke Energy opposes any realignment of the 900 MHz band because of the disruption to its communications systems that would result and the concomitant threat to the safety and reliability of its transmission and distribution operations. While Duke Energy and other electric utilities have urgent need for sub-one GHz spectrum for the establishment of private broadband LTE networks to support the ongoing modernization of the electric grid, Duke Energy requests that the Commission consider spectrum other than the 900 MHz band for that purpose.

Respectfully submitted this 2nd day of October, 2017.

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