

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

In the matter of)
)
Review of the Commission's Rules Governing the) WT Docket No. 17-200
896-901/935-940 MHz Band)
)

**COMMENTS OF DUKE ENERGY CORPORATION REGARDING NOTICE OF
PROPOSED RULEMAKING**

Respectfully submitted,

DUKE ENERGY CORPORATION

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INTRODUCTION

Duke Energy Corporation (“Duke Energy”) is pleased to provide the following comments in response to the Notice of Proposed Rulemaking (“NPRM”) in the above-captioned matter. As set forth in more detail below, Duke Energy is strongly in favor of the Commission granting additional sub-one GHz spectrum to enable the development of a private broadband LTE network to support Duke Energy’s continually growing broadband networking needs. Duke Energy, like many other energy utilities,¹ has undertaken multiple initiatives to modernize and transform its energy generation and delivery systems to be more eco-friendly, efficient, secure, and reliable. Modern energy generation and delivery infrastructure requires a modernized communications network to properly monitor, manage, and control that infrastructure. The need for an enhanced communication network is driven by the need to provide significantly greater bandwidth, security, reliability, and connectivity to the ever-growing number of communicating intelligent control points used for measuring, monitoring, and controlling the modern energy delivery grids. As these communicating intelligent control points are being deployed throughout Duke Energy’s service

¹ Duke Energy uses the term “energy utilities” throughout these comments to refer to both electric and gas utilities.

territories, the most effective communication technology to serve them is a broadband wireless network. The recent dramatic growth in the number of communicating intelligent devices is anticipated to continue to grow at an ever-expanding rate for the foreseeable future, which, in turn, drives the ever-expanding need for enhanced broadband wireless communications networks to provide reliable and secure networking capabilities between them. Duke Energy also needs to enhance its wireless networks in order to provide real-time voice and high-speed data services for its mobile energy generation and transmission/distribution support staff.

The energy utility industries have learned over the years that commercial carriers' networks do not provide the resiliency and reliability that energy utilities require to support their energy delivery systems. As a result, energy utilities have developed their own communications networks, which are designed to provide mission critical reliability through major weather and other natural disasters that impact the energy delivery grids. Recognizing energy utilities' need for mission critical communication systems, the Commission has over the years offered narrowband licensed wireless frequencies and channels to provide for the energy utilities' needs for voice and data connectivity. However, as energy utilities' need for broadband wireless bandwidth has grown, the Commission has allocated the limited available broadband wireless spectrum to other entities, such as those supporting public safety, as well as commercial carriers providing wireless services to the general public. As a result, energy utilities have been forced to rely heavily on the broadband wireless services offered by commercial carriers. However, these commercial networks have not been designed and implemented to provide the robust and highly reliable mission critical communications services required by energy utilities. A private LTE system owned, operated and maintained by energy utilities for their exclusive use would improve both capacity and connectivity, and would provide such utilities with a wireless network 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. *See also* Duke Energy's October 2, 2017 Comments in this docket at pages 5-6 regarding why private LTE networks for energy utilities are much preferable over commercially available options.

Duke Energy would prefer that the Commission grant or otherwise make available to energy utilities sub-one GHz LTE-capable spectrum in a band other than the 900 MHz band (896-901/935-940 MHz) currently designated for narrowband private land mobile radio ("PLMR") communications by Business/Industrial/Land Transportation ("B/ILT") licensees and for Specialized Mobile Radio ("SMR") providers. Reallocating the current 900 MHz PLMR band into the 3/3 MHz broadband segment and the 1.5 and .5 MHz narrowband segments will cause significant disruption to the existing incumbent users, such as Duke Energy, and will subject incumbents to higher levels of interference as their existing channels are crowded into the proposed 1.5 and .5 MHz narrowband segments.

However, Duke Energy is pleased that the Commission is proposing to make licensed broadband spectrum available in the sub-one GHz band that could be used by energy utilities to build private LTE systems that would provide the robust, reliable broadband connectivity so desperately needed by energy utilities. By providing dedicated, licensed broadband spectrum in the sub-one GHz band for private broadband LTE networks, the Commission would enable Duke Energy and other energy utilities to implement purpose-built wireless broadband networks specifically designed to effectively and reliably monitor, manage, and control the energy generation and distribution resources of the future. Thus, if the 900 MHz band is the only spectrum the Commission is willing to consider for such use, Duke Energy supports the proposed realignment of the band, so long as (1) the only entities that would be eligible for use of the 3/3

MHz broadband segment are current PLMR incumbents, and (2) the Commission ensures that the interference protections created by the realignment are at least as robust as under the current rules at 47 C.F.R. § 90.672 for non-cellular 800 MHz licensees. *See* Duke Energy Comments in response to NPRM ¶ 73 *infra*.

BACKGROUND

A. Duke Energy’s Electric and Gas Distribution Grids

Duke Energy is one of the largest Investor Owned Utilities (“IOU”) 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 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 its North Carolina and South Carolina service territories, and all of its Florida service territory. For these 900 MHz B/ILT bands, Duke Energy currently holds 49 discrete PLMR licenses covering a total of 173 discrete frequency pairs allocated amongst 115 base station repeater sites.

Duke Energy is currently undertaking a major expansion and modernization of its energy delivery grids and supporting infrastructure, as well as 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 scope and nature of the communications networks necessary to support them. This modernization is driving the expansion and upgrade of Duke Energy’s communication systems for monitoring, managing, and controlling its energy

delivery infrastructure.

The network communications system or grid —sometimes referred to as the Third Grid by Duke Energy—is now being properly recognized for its criticality. As the energy delivery grids evolve with ever more sophisticated and intelligent electronic monitoring systems and control equipment, there is the concurrent requirement for greater levels of capacity, reliability, and security of the communications networks 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 investments in modernizing and adding 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. Exploration of Private LTE Network for Duke Energy

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 its current and future mission critical communications network needs. 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 and eNodeBs to provide the required networking coverage, capacity, and reliability. This need for broadband spectrum in the sub-one GHz range to enable energy utilities to continue to serve the American public with safe, reliable, and affordable energy cannot be over-emphasized.

Duke Energy submitted comments in opposition to the original Petition for Rulemaking as proposed by the Enterprise Wireless Alliance and Pacific Data Vision, Inc. (“EWA/PDV”), RM-

11738. Though Duke Energy does agree with the premise of the current NPRM to establish a broadband section of spectrum in the sub-one GHz band, thereby providing urgently needed broadband spectrum to enable energy utilities to implement private LTE systems, Duke Energy is concerned with the way the NPRM is proposing to reallocate the 896-901/935-940 MHz spectrum due to the major disruption to Duke Energy's existing PLMR systems currently using this band. The proposed reallocation of the 896-901/935-940 MHz PLMR band, as specified in the current NPRM, would be very disruptive to Duke Energy's business operation and likely would significantly affect its ability to deliver energy to its customers in a safe and reliable manner.

Notwithstanding the above stated concerns, Duke Energy is currently evaluating the feasibility of establishing a private LTE system that would utilize the 3/3 MHz broadband segment of the 900 MHz spectrum as proposed in this NRPM, and other broadband segments including the use of the CBRS band, and the 2.3 GHz spectrum segment offered by one of the commercial cellular carriers. However, utilizing spectrum greater than two GHz, as being offered by one of the commercial carriers, or greater than three GHz as may be available in the CBRS band, would severely restrict Duke Energy's ability to deploy an enterprise-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 tower sites to locate the private LTE base station equipment and antennas in order to deploy a private LTE system in these bands with sufficient range and reach to effectively support Duke Energy's wireless broadband networking needs. The cost to establish and maintain a private LTE system with this large number of remote sites and the associated backhaul circuit costs would limit Duke Energy's ability to continue to provide low-cost energy services to the public. Access to broadband LTE spectrum in the sub-one GHz range, on the other hand, would reduce the number of remote tower

sites and the associated backhaul circuit costs significantly, allowing Duke Energy to continue to provide low cost and reliable energy services to the public.

COMMENTS

Regarding certain of the specific items on which the Commission requests comment beginning at ¶ 8 of the NPRM, Duke Energy responds as follows:

8. We believe that realigning the 900 MHz band will create opportunities for robust broadband networks that fully support critical communication systems and that ensure the low latency and ultra-high reliability required by electric and other utilities, as well as other B/ILT and SMR spectrum users. Accordingly, we propose to realign the 900 MHz band to enable broadband deployment, and we seek comment on how to realign the band, how to conduct a transition, and the technical rules needed to make the realignment a reality.

Duke Energy agrees that the realignment of the 900 MHz band would allow development of a broadband network that could specifically support energy utilities' requirements for reliable and secure connectivity for growing smart grid initiatives. As an incumbent narrow band segment license holder in the 900 MHz B/ILT band with 49 active discrete Private Land Mobile Radio licenses with 173 discrete licensed frequency pairs, Duke Energy recognizes the very significant challenges in realigning this band while retaining the capabilities necessary for the continued support of the critical infrastructure of the energy delivery grids. If the Commission elects to enact the realignment rule changes contained within this NPRM, Duke Energy urges the Commission to ensure these rule changes also include sufficient interference protection for the current B/ILT incumbents as they are relocated to the resulting 1.5 MHz and .5 MHz segments allocated for narrowband channels. See Duke Energy comments in response to NRPM ¶ 73 *infra*. More specifically, we urge the Commission to adopt rules limiting interference from any broadband license holders operating in the realigned 3/3 MHz segment to levels no greater than those defined

in Part 90.672 of the Commission's rules as currently applicable to non-cellular 800 MHz license holders. *Id.*

11. We propose a 3/3 megahertz broadband segment. We anticipate that paired three megahertz blocks would be most suitable to create a viable broadband service in this band, and that paired 1.5 and .5 megahertz blocks could provide enough spectrum for 900 MHz narrowband operations. Three megahertz blocks are supported by wireless technical standards such as Long Term Evolution (LTE), and they are also favored by commenters. Our goal is to open the 900 MHz band for additional uses that will facilitate increased efficiency and encourage innovation, while continuing to accommodate narrowband incumbents. We seek comment on our proposed approach, including its costs and benefits.

Duke Energy agrees that providing a 3/3 MHz broadband segment could provide energy utilities with much-needed broadband spectrum to enable the development of private broadband wireless network to support their ever-growing need for reliable and secure broadband services. However, Duke Energy with its currently licensed 173 discrete 900MHz narrowband frequency pairs is very much concerned with the overcrowding that will naturally occur as a result of realigning the 900 MHz band as Duke Energy and other current incumbents are required to relocate their channels out of the 3/3 MHz broadband segment. As the proposed changes will condense the number and spacing of the narrowband channels into the 1.5 and .5 MHz segments blocks, the ability of the incumbent narrowband license holders to space their required channels in both the frequency and geographic distance necessary to provide adequate and mandated interference protection in some highly congested regions may well prove to be impossible.

12. Given that the broadband segment of 3/3 megahertz is less than what the Commission has designated for other flexible-use broadband services in the past, we anticipate that the end users of 900 MHz broadband services may not be traditional wireless retail consumers. A 3/3 megahertz broadband link would have relatively limited capacity and speed compared to existing nationwide and regional 4G networks and, by itself, might not be able to serve direct-to-consumer demand in densely populated areas. Further, because of the challenges of

clearing 900 MHz narrowband incumbents from the broadband segment, we believe that this spectrum is more likely to be used to serve PLMR customers. 900 MHz broadband licensees may be better positioned to focus on business, enterprise, and government customers whose needs are not being met by the consumer-driven, nationwide, 4G service offerings. We ask commenters to describe specifically how the proposed realignment would or would not help PLMR users or other potential users meet their current and future broadband needs. Commenters also should discuss whether we should adopt any particular requirements designed to ensure that 900 MHz broadband services meet the operational requirements of B/ILT entities.

Duke Energy agrees that the 3/3 MHz band will not properly serve direct-to-consumer demand that is provided by broadband wireless service providers. Duke Energy further agrees that this 3/3 MHz band is much better positioned to serve the needs of the current PLMR band users exclusively. As such, Duke Energy encourages the Commission to limit the use of this 3/3 MHz broadband spectrum block and the services derived from for the exclusive use of the current PLMR incumbents. Duke Energy urges the Commission to consider basing the performance requirements for the use of this 3/3 MHz segment upon the build out of coverage over time of the geographic areas in and around PLMR users' infrastructure and served customers, and not on a requirement of covering and offering service to a general population base (*see* response to NPRM ¶ 61, *infra*).

18. We also seek comment on the extent to which our proposal would benefit current narrowband users by helping them meet their broadband needs. We recognize that many narrowband incumbents have broadband communications needs that are currently unmet. For example, the Western Farmers Electric Cooperative, after conducting an 18-month engineering study to assess its long-term telecommunications requirements, concluded that its future needs cannot be met by traditional networks that lack broadband capacity.⁴⁵ Electric and other utilities need broadband capacity to support smart grid and other next generation communications systems.⁴⁶ The oil and natural gas industry expects to deploy thousands of Internet of Things (IoT) devices for its critical systems but struggles to find reliable and secure commercial networks.⁴⁷ We seek comment on the need for such broadband capacity, on its importance for critical infrastructure industries, and on the adequacy of existing commercial broadband services to meet such needs.

Duke Energy and other energy utilities view wireless communications as an indispensable and mission critical technology for properly monitoring, managing, and controlling energy generation and delivery systems. The use and importance of wireless systems to energy utilities has steadily grown over the years and today serves as an integral and indispensable part of energy delivery systems. The need for greater bandwidth and data throughput of the wireless systems continues to accelerate at an ever-increasing rate to meet the continuously evolving needs of the Smart Grid and to enable the nation's industries and the general public to proactively monitor, manage, and control their energy use. These needs, along with the evolving need to monitor, manage, and control the ever-growing number of distributed generation systems and services, further intensifies the need for licensed and highly reliable broadband wireless services. Energy utilities' needs for highly reliable and secure wireless systems and services has grown dramatically over the last few years from limited reach voice and Kilo bit per second (Kbps) data services to the current needs for enterprise wide wireless service coverage supporting voice, video, and data services ranging in capacity from multi Mega bit per second (Mbps) to multi Giga bit per second (Gbps).

However, the ability of energy utilities to implement wireless systems with the reliability and security required to efficiently generate and deliver safe, secure, and reliable energy services to meet the needs and expectations of industry and the general public has been inhibited by the lack of suitable licensed broadband wireless spectrum. Electric utility access to licensed broadband spectrum to develop their own dedicated broadband wireless services in the sub-one GHz bands is quickly becoming a critical requirement in order to provide safe and reliable energy services. Experience has proven the existing commercial wireless broadband services serving the

general public have not been implemented with the level of redundancy and reliability necessary to meet the mission critical service needs of energy utilities like Duke Energy.

19. Newly designated narrowband segment. Under our proposal, in the markets that are transitioned to broadband use through one or more of the mechanisms described in Section III.B, the 896- 897.5/935-936.5 MHz and 900.5-901/939.5-940 MHz bands would no longer have a distinction between B/ILT and SMR blocks, but instead they would be designated as the narrowband segment available for site-based operations. Designating the narrowband segment in this way would make it easier for existing operations of both B/ILT and SMR site-based licensees to be relocated from the broadband segment to achieve band realignment. We seek comment on the rule modifications that may be necessary to facilitate band realignment and the creation of separate narrowband and broadband segments. Specifically, how should the Commission grant access to the narrowband segment and determine eligibility for narrowband segment licenses? To what extent will the Commission's interference protection criteria need to be modified to account for the existence of incumbent users and new licensed operations in the narrowband segment? We also seek comment on whether any necessary rule changes may vary depending on the specific transition mechanisms discussed in Section III.B that the Commission may implement.

Currently there are 199 discrete frequency pairs or channels in the 5 X 5 MHz segment of the 900 MHz spectrum allocated for B/ILT use. Reallocating the spectrum band into a 3 X 3 MHz broadband segment and two segments of 1.5 and .5 MHz respectively for B/ILT narrowband use will reduce the number of discrete frequency pairs or channels available to less than 160. Thus, all incumbents currently taking advantage of 199 channels will be required to relocate into a pool of fewer than 160 channels. This will very likely lead to significant channel crowding issues in many congested areas requiring closer spacing of neighboring channels leading to the increased potential for co-channel and cross channel interference from adjacent channels.

Duke Energy urges the Commission to be mindful of the significant potential for increased co-channel and cross channel interference that will likely occur resulting from the channel crowding as will be required to accommodate the current narrowband incumbents into the

significantly reduced number of available narrowband channels. Without undertaking a significant design effort to design a potential frequency plan for all current narrowband users in which they are all relocated together into the 1.5 and .5 MHz narrowband segments, it is impossible to state the magnitude and extent to which this co-channel and cross channel interference will occur. Further, it is impossible to specify if there will always be enough channels available to provide the required spacing in frequency and in distance to allow the same degree of reliability and interference-free operations experienced today. We urge the Commission to be mindful of these concerns and to ensure any narrowband incumbents that may need to relocate to the new 1.5 and .5 MHz narrowband segments are afforded the level of reliability and interference-free operations in the new 1.5 and .5 MHz narrowband segments as proposed in Duke Energy's response to NPRM ¶ 73 *infra* before incumbents are required to move to the new narrowband segments.

21. Geographic licensing. Consistent with our approach in several other bands used to provide fixed and mobile services, we propose to license the broadband segment on a geographic area basis. Geographic area licensing promotes spectrum efficiency and expedites deployment of flexible use services. It also provides licensees with flexibility to adjust and coordinate spectrum usage quickly, based on changing market conditions. We seek comment on this approach, including on the costs and benefits of adopting a geographic area licensing scheme.

Duke Energy agrees with the proposal to license the broadband segment on a geographic area basis. Further, Duke Energy contends that the smaller these areas for licensing are, the better these areas can be made to match the necessary geographic footprint for broadband wireless coverage of a utility like Duke Energy so that it includes only those areas in which it has customers and infrastructure. This would not only allow Duke Energy and other energy utilities to extend the reach of their broadband wireless networks to areas in which such networks are needed, it would

do so without significantly encroaching on adjacent areas that may be needed by neighboring utilities to develop their own broadband wireless networks.

22. We seek comment on the appropriate geographic licensing area for the broadband segment.⁵³ We believe that the 900 MHz broadband licensing structure should be flexible enough to support and encourage next-generation services. We note that the appropriate geographic licensing area may vary depending on the specific transition mechanism the Commission ultimately uses to realign this band. For example, due to wide variations in levels of incumbent use of 900 MHz band across geographic areas, we seek comment on issuing broadband licenses on a county-by-county basis. The Commission has used county-based licensing for other bands that will be used for 5G and IoT services, such as the 28 GHz band and 3.5 GHz band.⁵⁵ Counties or other smaller geographic areas also may better align with the needs of electric utilities and other B/ILT eligibles wishing to obtain licenses to meet their own broadband needs.⁵⁶ We seek comment on whether licensing 900 MHz broadband spectrum by county would help foster flexible and innovative use of the 900 MHz band in all areas by providing a consistent, relatively small license size appropriate for a wide range of possible network deployments. We also seek comment on whether to base such a county licensing scheme on 2017 county boundaries, the most recent county boundaries currently available through the Census Bureau, as used in the 3.5 GHz band.⁵⁷ As an alternative, we seek comment on issuing broadband licenses over a larger geography.

Duke Energy supports the concept of licensing the broadband segment on a geographic area basis with the licensing areas being defined as counties or county equivalents.

56. We propose to designate the 900 MHz broadband service as a Miscellaneous Wireless Communications Service governed by Part 27 of the Commission's rules. Broadband licensees in the 900 MHz broadband segment would be required to comply with licensing and operating rules that are applicable to all Part 27 services, including foreign ownership reporting, renewal criteria, permanent discontinuance of operations, partitioning and disaggregation, and spectrum leasing. We seek comment on this approach and ask commenters to identify any aspects of our general Part 27 service rules that should be modified to accommodate the characteristics of the proposed 900 MHz broadband segment. As set forth below, we also propose to adopt service-specific rules for the 900 MHz broadband segment, in addition to requirements that apply generally to Part 27 licensees. Commenters should discuss the costs and benefits

associated with the following proposals and any alternatives. In the alternative, we ask commenters to address whether 900 MHz broadband licenses should be regulated under Part 90 of our rules so that broadband licensees and narrowband incumbents in the 900 MHz band would be operating under a single set of rules. Commenters favoring this approach should identify the Part 90 rules that would need to be amended and suggest specific rule language.

Duke Energy agrees it would be appropriate for the 3/3 MHz broadband segment of the 900 MHz band be regulated under Part 27 of the Commission's rules. However, Duke Energy would encourage the Commission to retain the governance for the 1.5 and .5 MHz band segment reserved for narrowband use under Part 90 of the Commission's rules as modified in this NPRM Appendix A Proposed Rules changes to Part 90 of the Commission's rules.

57. Eligibility. *As discussed in Section III.B.1, in the event the Commission adopts a voluntary exchange process for transitioning the 900 MHz band, we propose specific eligibility restrictions for a new 3/3 megahertz broadband license. Alternatively, if the Commission adopts an overlay or incentive auction approach for realigning the band, consistent with the Commission's approach to date toward flexible use geographic licensing, we seek comment on adopting an open eligibility standard for such licenses in the 900 MHz broadband segment. The Commission has determined with respect to a number of services that eligibility restrictions on licenses should be imposed only when open eligibility would pose a significant likelihood of substantial harm to competition in specific markets and when an eligibility restriction would be effective in eliminating that harm. Would adopting an open eligibility standard for the licensing of 900 MHz broadband spectrum through competitive bidding, where appropriate, encourage efforts to develop new technologies, products, and services, while helping to ensure efficient use of this spectrum? Commenters should discuss the costs and benefits of the open eligibility proposal on competition, innovation, and investment.*

As stated *supra* in response to NPRM ¶ 12, Duke Energy encourages the Commission to limit eligibility of prospective broadband license holders in the 3/3 MHz broadband spectrum and the services derived from it to the current PLMR incumbents.

58. Mobile spectrum holdings policies. Spectrum is an essential input for the provision of wireless services, and the Commission has developed policies to ensure that spectrum is assigned in a manner that promotes competition, innovation, and efficient use. We seek comment generally on whether and how to address any mobile spectrum holdings issues involving 900 MHz broadband spectrum to meet our statutory requirements and to ensure competitive access to the band. We note that the broadband segment of 3/3 megahertz is less than what the Commission has designated for other flexible-use broadband services in the past, and use of this segment is likely to be focused on business, enterprise, and government customers whose needs are not being met by the consumer-driven, wireless service offerings. Given these characteristics, we are not inclined to include the 900 MHz broadband segment in the Commission's spectrum screen, which helps to identify markets that may warrant further competitive analysis when evaluating proposed secondary market transactions. Commenters advocating for inclusion of the 900 MHz broadband segment in the screen should address specifically the suitability of this spectrum for use in the provision of mobile telephony/broadband services. Commenters should further discuss and quantify the costs and benefits of any proposals to apply mobile spectrum holdings policies to the proposed 900 MHz broadband segment.

Use of the 3/3 MHz broadband segment should be focused on incumbent PLMR users, such as energy utilities, whose needs are not being met by consumer-driven, wireless service offerings. As aforementioned, Duke Energy's growing needs for highly reliable and secure broadband wireless across its service territories is, in fact, not being met by current commercially-available wireless offerings. Duke Energy has historically developed its own highly reliable private network system and services as needed to properly operate and maintain its critically important energy delivery grids. In order to continue providing those highly reliable energy services in the future, it is becoming increasingly and critically important that Duke Energy and other energy utilities have the opportunity to develop their own private, highly reliable and secure wireless broadband networks which they own, operate, control, and maintain for their exclusive use.

As previously stated, the limited bandwidth of the 3/3 MHz broadband segment severely limits it from effectively serving the general networking desires and demands of the general public. Realizing this bandwidth limitation, we strongly urge the Commission to reserve this 3/3 MHz segment for the exclusive use of incumbent PLMR users, so that energy utilities can continue to provide vitally important governmental entities, industries, and the general public with safe and reliable energy services.

59. License term. Part 27 licenses vary in length. For some broadband licenses, the Commission has adopted longer terms, particularly where, as here, the licensee would face “relocation and band clearance issues.” We propose to adopt a 15-year term for licenses in the 900 MHz broadband spectrum. We seek comment on the costs and benefits of this proposal. In addition, we seek comment on whether and to what extent we should adopt shorter terms for subsequent renewal terms, given that relocation, band clearance, and initial performance requirements already will have been satisfied upon renewal of a given 900 MHz broadband license. We invite commenters to submit alternate proposals for the appropriate license term, which should similarly include a discussion of the costs and benefits.

Duke Energy proposes an initial license term of 20 years, which, as opposed to the Commission’s proposal of a 15-year term, would better match the expected lease duration of any lease agreement for the use of the 3/3 MHz spectrum segment from the broadband license holder to the energy utilities.

61. We also seek comment on whether the proposals discussed above represent the appropriate balance between license-term length and a significant final buildout requirement. We seek comment on the proposed buildout requirements and any potential alternatives. For example, given the potential use of the 900 MHz broadband segment by private wireless users such as electric utilities or other B/ILT eligibles, we seek comment on what alternative metrics would be necessary, if any, to accommodate such users. Should we adopt specific performance requirements tailored to account for use of the spectrum for private business purposes? We also seek comment on whether small entities face any special or unique issues with respect to buildout requirements such that they

would require certain accommodations or additional time to comply. Finally, commenters should discuss and quantify how any proposed buildout requirements will affect investment and innovation, as well as discuss and quantify other costs and benefits associated with the proposal.

As stated *supra*, Duke Energy strongly urges the Commission to reserve the 3/3 MHz broadband segment for the exclusive use incumbent PLMR users, so that energy utilities can operate, maintain, and control the critically important energy delivery grids providing governmental entities, industry, and the general public with safe, reliable energy services. In light of same, Duke Energy proposes that the Commission adopt alternative performance requirements based on geographic customer based area coverage over time. Duke Energy proposes that the Commission revise proposed § 27.1511 to replace the provisions regarding offering services to a percentage of the population with performance requirements requiring the effective coverage by a private wireless network of an area containing the PLMR users' infrastructure serving 30 percent of the PLMR user's customers within 6 years and 60 percent within 12 years.

63. *We also seek comment on whether to similarly apply a broadband deployment requirement if the Commission uses an incentive or overlay auction to transition the 900 MHz band. Alternatively, depending on the transition mechanism the Commission adopts, should we apply a more general flexible use standard to the proposed performance requirements? For example, should we provide 900 MHz broadband licensees the flexibility to provide other narrowband services such as narrowband- Internet of Things (NB-IoT)? We note that NB-IoT services and other CII-related uses may be potentially less suited to a population-coverage metric, and licensees that wish to provide such services may benefit from an alternative performance benchmark metric. We seek comment on the appropriate metric to accommodate such service offerings, such as a performance metric based on geographic-area coverage (or presence in a license area). We also seek comment on these coverage metrics and any alternative levels of coverage that might be appropriate, including the costs and benefits of the coverage metrics discussed and any alternatives.*

Duke Energy supports the adoption of rules allowing both NB-IoT and broadband services over the 3/3 MHz broadband segment. The extended effective range and reach of a NB-IoT service may be the most appropriate service offering in certain areas where the primary need is to support multiple lower bandwidth end devices that are beyond the effective range of the broadband network services.

73. We propose to make broadband licensees responsible for preventing harmful interference to narrowband operations and for resolving any interference in the shortest time practicable. We note that, under existing 900 MHz co-channel separation requirements, co-channel systems generally must comply with a minimum spacing criteria of at least 113 kilometers (70 miles) separation distance between base stations. We seek comment on applying existing minimum spacing criteria to 900 MHz broadband base station operations as a means of protecting co-channel narrowband licensees. In addition, section 90.672(a)(1)(i)(A)-(B) currently defines unacceptable interference in the 900 MHz B/ILT Pool as a median desired signal strength of -88 dBm or higher as measured at the radiofrequency input of the receiver of a mobile unit, or -85 dBm or higher as measured at the radiofrequency input of the receiver of a portable station. Some commenters, however, propose to define harmful interference as receiving a median desired signal strength of -98 dBm or higher as measured at the radiofrequency input of the receiver of a mobile unit, or -95 dBm or higher as measured at the radiofrequency input of the receiver of a portable station (hand-held device), and suggest that we account for environmental noise by incorporating fade margins of 10 dB. We seek comment on whether these criteria are appropriate, or whether we should adopt technical standards and procedures that more closely align with the existing rules regarding unacceptable interference to non-cellular 800 MHz licensees from 800 MHz cellular systems or Part 22 Cellular Radiotelephone systems, and within the 900 MHz B/ILT Pool. We also ask whether it is practical to adopt a single standard to protect all narrowband operations from broadband operations, or whether separate criteria are needed for different circumstances, such as if the 897.5-900.5 MHz/936.5-939.5 MHz band is being used for broadband operations in one area but an adjacent area has not transitioned to the new band alignment.

Duke Energy agrees with maintaining the current rules regarding co-channel separation requirements. However, Duke Energy also notes that the channel crowding that will occur by

reducing the available 900 MHz narrowband channels from the 199 currently allocated in section 90.613 for B/ILT use to less than 160 channels will make meeting the co-channel separation requirements difficult to achieve, and in some highly congested areas, likely impossible to achieve.

With respect to unacceptable and harmful interference, Duke Energy proposes that the Commission adopt as applicable to the 900 MHz band those interference limits in 47 C.F.R. § 90.672 currently applicable to 800 MHz licensees. Specifically, Duke Energy urges the Commission to apply to the 900 MHz band a harmful interference definition of those unwanted or undesired signal or signals which occur to a victim receiver when that victim receiver is receiving a desired signal level of -104 dBm or higher and -101 dBm or higher for mobile and portable transceivers respectively. Further, Duke Energy proposes that the Commission apply to the 900 MHz band current 47 C.F.R. § 90.672(a)(1)(ii)(B) identifying unacceptable interference as that undesired signal or signals which cause the measured Carrier to Noise plus Interference ($C/(I + N)$) ratio of the receiver section of said transceiver to be less than 20 dB. Adopting the forgoing definitions as applicable to the 900 MHz band would provide the interference protection needed to ensure the proper and effective operations of the narrowband users.

CONCLUSION

Duke Energy is concerned that the proposed realignment of the 900 MHz spectrum will inevitably result in interference to incumbents in that band, such as Duke Energy, and concomitant potential damage to such incumbents' operations. While allocation of sub-one GHz spectrum for use by energy utilities to pursue private LTE networks is absolutely necessary to support the energy grids of the future, Duke Energy would prefer that the Commission allocate sub-one GHz spectrum other than the 900 MHz band for such use by utilities. However, if the 900 MHz band is the only

spectrum the Commission is currently willing to consider for such use, Duke Energy supports the realignment of the band as proposed in the NPRM, but only if (1) the only entities that would be eligible for use of the 3/3 MHz broadband segment created would be current PLMR incumbents, and (2) the Commission ensures that the protections from the interference created by the realignment are at least as robust as under the current rules in § 90.672 for non-cellular 800 MHz licensees. Finally, any actions the Commission may take regarding the realignment of the existing 900 MHz PLMR band must take into account the full impact of such realignment on critical incumbent narrowband services and ensure those services can continue to operate at their current levels of reliability and functionality.

Duke Energy looks forward to continuing to work with the Commission on the matters raised in this docket, which are of critical national import.

Respectfully submitted this 3rd day of June, 2019.

s/ William R. Godwin
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