**BEFORE THE**

**FEDERAL COMMUNICATIONS COMMISSION**

**WASHINGTON, D.C. 20554**

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

**To: The Wireless Telecommunications Bureau**

**COMMENTS OF**

**THE AMERICAN PETROLEUM INSTITUTE**

The Telecommunications Subcommittee of the American Petroleum Institute (“API”) hereby submits its Comments in response to the Commission’s Notice of Inquiry regarding the rules governing the 896-901/935-940 MHz band (“900 MHz Band”).[[1]](#footnote-1) As described herein, API generally supports rule changes for the 900 MHz band to allow for wider bandwidth critical infrastructure industry (“CII”) applications, including a commercial LTE service of the type proposed by PacificData Vision, Inc. (“PDV”) and the Enterprise Wireless Alliance (“EWA”). API believes there are significant potential benefits to CII from such a service and the 900 MHz band is a reasonable candidate for repurposing. Before moving forward with any transition of all or part of the 900 MHz band, however, the Commission must ensure that incumbent licensees are fully protected.

## BACKGROUND

API is a national trade association representing more than 600 companies involved in all phases of the petroleum and natural gas industries, including exploration, production, refining, marketing and transportation of petroleum, petroleum products and natural gas. Among its many activities, API acts on behalf of its members before federal and state regulatory agencies. The API Telecommunications Subcommittee evaluates and develops responses to state and federal proposals affecting telecommunications facilities used in the oil and gas industries. API is supported and sustained by companies that make use of a wide variety of wireline, wireless and satellite communications services on both a private and commercial basis.

API member companies rely on 900 MHz systems principally in refineries and chemical manufacturing plants. These two-way communication systems support critical operational, security, maintenance and safety-related functions. A typical large refinery operates 365 days-a-year, 24 hours-a-day, and employs from between 1,000 and 2,000 workers. Refinery-based mobile radio facilities, including these 900 MHz systems, are used to communicate critical operational instructions from unit control rooms to personnel responsible for task execution.[[2]](#footnote-2) 900 MHz systems are also used extensively in the transportation of refined products. This includes communications with railroad crews operating inside refineries, personnel at truck racks, and those employees responsible for operating multiple pipelines that transport various products from every refinery.

There clearly are significant safety functions associated with 900 MHz radio systems. Due to a typical refinery’s large size and often close proximity to hundreds of thousands of neighboring citizens, operators are acutely aware of their duty to protect the public’s safety. 900 MHz band systems allow workers to communicate in real time using talk groups. Coverage is designed by the licensee to be reliable within the specific facility. This allows workers to identify and address issues accurately and quickly, promoting safety of life, property, and the environment. Contrast this with typical carrier services which are not designed with coverage inside specific facilities in mind and do not permit the type of instantaneous one-to-many communications possible using two-way voice.

To ensure safe refinery operations, employees *must* have the clear and reliable radio communications capabilities that are only provided by secure private two-way radio systems. The Commission should recognize that 900 MHz band two-way voice operations often represent the most critical of applications employed by API members, including voice systems that literally are the lifeline for workers at refineries and chemical plants.

At the same time, API recognizes that a modernization around IP (Internet Protocol) is afoot. Like most other industries, the oil and natural gas industry is experiencing the IoT revolution in terms of the development of the “Internet of Things for Critical Infrastructure.” API recognizes that high performing push-to-talk services delivered over IP/LTE platforms is now a technical reality.  The appropriateness of moving that direction in a particular application is more a question of assuring RF coverage and having control over the management and restoration aspects of the network, which is commensurate with the criticality of the activity the system supports. This entails significant opportunities, but also evolving risks that come with transitioning critical systems to IP-enabled services. There is no doubt that technology is moving towards higher bandwidth applications. The options for delivery are limited, however, and tend to be driven, both in terms of allocations by the Commission and commercial offerings, largely by the consumer markets.

API’s members are some of the largest users of commercial wireless services in the U.S. There are some critical systems, however, that cannot be trusted to common carrier infrastructure not controlled by the end user, and worse, not optimized around the CII mission, and, even worse, not appropriately secure from cyber threats. API’s members firmly believe that certain applications need to stay separate from the public Internet. Unfortunately, private, internal options for CII wireless spectrum to support applications such as digital SCADA are limited almost entirely to the Part 15 bands or the piecemeal secondary markets. The options are certainly less diverse than they are for lower speed legacy analog systems. This burdens the industry’s effective migration to IP.

It against this background that the concept of a Private Enterprise Broadband (“PEBB”) service offering begins to make sense. The PEBB concept provides not only a potential spectrum option, but also addresses other issues presented by attempting to shoehorn critical systems onto carrier networks that were developed for, and still focused on, consumer markets. For example, the oil and natural gas industry expects to deploy many thousands of IoT devices. In the consumer markets updates to end user devices occur frequently and are accomplished by pushed software updates. This is an unacceptable paradigm for the oil and natural gas industry. Network components are expected to operate at remote locations for many years and upgrades are verified by trained personnel to ensure proper operations and to avoid catastrophic failures.

Although not a private, internal system in the truest sense, the PEBB concept strikes a potentially acceptable middle ground between the consumer-focused commercial services and historic site-based licensed services. API supports further exploration of the concept guided by the principles stated below.

## Any Proposal To Modify The Rules For The 900 MHz Band Must Clearly Protect Narrowband Systems.

As proposed, the PEBB concept would divide the 900 MHz band into a 3/3 MHz broadband segment (898-901/937-940 MHz) and a 2/2 MHz narrowband segment (896-898/935-937 MHz). Because the 900 MHz band is currently used entirely for narrowband land mobile operations, the PEBB licensee would relocate existing licensees that wish to continue narrowband operations to “comparable facilities” in the narrowband segment. Although there are benefits to the PEBB proposal, due to the sensitivity and importance of current uses of the 900 MHz band, API urges the Commission to conduct a diligent review of the PEBB proposal to ensure protection of current and future narrowband operations before initiating a rulemaking proceeding. API sees three potential areas that must be addressed:

1. ***There must be sufficient spectrum to accomplish incumbent relocations and account for future uses.***

The Commission must ensure that 1:1 channel replacement for incumbent narrowband licensees is practicable. API members encountered situations during 800 MHz rebanding in which 1:1 channel replacement was not realized due to a lack of available frequencies. PDV has stated that the reduction in channels currently authorized for B/ILT use from 199 to 160, will not, as a practical matter, reduce the overall number of channels available to B/ILT. The Commission must conclusively, and independently confirm this fact as an initial hurdle to moving forward with the PEBB proposal. API is concerned not only that rebanding be practicable with respect to existing systems, but that even if practicable, rebanding not deplete the availability of channels such that future modification or expansion of 900 MHz band systems is negatively impacted. Demonstration that the plan is practicable must be a threshold matter before moving forward.

1. ***Incumbents must be fully compensated for their costs of relocation.***

The degree of difficulty and cost of re-banding systems will vary significantly from one station to another. API suspects that most radios in the 900 MHz band are frequency agile. Further, by virtue of the way the 900 MHz band is laid out with channels grouped tightly together, many systems are already using ferrite transmitter combining, which should on average, lesson the number of RF cavities that need to be returned. However, for larger systems with multiple repeaters, maintaining 120 kHz channel separation as commonly recommended by combiner manufacturers will force the use of multiple combiners. This has cost, antennas, cabling and rack space ramifications. Losses introduced from new combiners may require the installation of additional infrastructure, potentially including new tower sites. Certain mission critical systems may require a new system be staged in parallel for an immediate cut over to minimize user impact. The Commission must ensure that incumbents do not bear the costs of relocating such systems.

1. ***The Commission must ensure the PEBB can coexist with narrowband users.***

The Commission must confirm that a 3x3 LTE network can operate adjacent to narrowband 900 MHz systems without causing harmful interference to adjacent channel licensees. Avoiding a repeat of the narrowband interference issues that occurred with Nextel system in the 800 MHz band should be paramount.

The OFDM (Orthogonal Frequency Division Modulation) signal used in LTE base stations requires a very clean linear system, and therefore produces less intermodulation products, and less out of band emissions than other technologies. In addition to this, the transmit filtering specified the 3GPP specification further assures that out of band emissions are low. Having said that, when BILT users are in weak signal areas, struggling to hear their own repeaters, problems may still occur if they get too close to an LTE tower. Based on its evaluation of the LTE standard, API believes that off-the-shelf LTE filtering would, in fact, create the potential to desense narrowband operations in an unacceptably wide area around each LTE base station. Additional filtering would improve such interference. The Commission must closely study the level of filtering required to prevent significant levels of harmful interference to adjacent narrowband systems and must understand the distance separations required between an LTE base station and a narrowband user to prevent loss of narrowband communications.

## The Commission Should Consider A Market-Based, Holistic, Approach To 900 MHz Band Rule Changes.

API’s members do not want to experience a repeat of the 800 MHz rebanding process. API suspects this view is widely shared, including by Commission staff. To avoid a repeat of rebanding, API urges the Commission to consider adopting any 900 MHz band rules changes in conjunction with a wider approach to business/industrial spectrum and to allow relocations of incumbents to proceed on a voluntary basis.

## *The Commission Should Consider 900 MHz In Connection With Policies For Other Bands.*

One of the reasons it makes sense to consider the 900 MHz band as part of a potential rule change is that the band has evolved differently over time than, for example, the 800 MHz band. This has resulted in more white space opportunity in certain areas at 900 MHz than in other bands. Some of the reasons for this include the absence of public safety licensees, and the corresponding lessor investment which has somewhat stunted product availability at 900 MHz, not to mention years of a band freeze during the 800 MHz re-banding. These circumstances have contributed to the current opportunity to look at doing something novel with the 900 MHz band.

The Commission reflects available white space in the 900 MHz band in a map of current licensees provided on Page 4 of the NOI. However, the Commission should not mistake a lack of congestion in the band as a whole as a lack of congestion in any one area. The 900 MHz band still fills an important niche for current and future exclusive two-radio operations and supports the most critical subset of all oil and natural gas voice communication needs.

The importance of 900 MHz is compounded by congestion in the 800 MHz band, and the threat of losing T-Band due to Congressional mandate. In many way, 900 MHz has evolved as an overflow band, used in areas in which other options are not available. It is no coincidence that many areas in which 900 MHz are used, are also markets where T-Band is available. These are some of the most congested markets in the U.S. Any rule change at 900 MHz will have much less negative impact to users if, for example, T-Band can be protected, or even expanded or if additional capacity can be allocated at 800 MHz, including by reducing speculation in that band. API cannot envision a future in which its members can accomplish their missions without both 900 MHz and T-Band. However, increased capacity at T-Band may make transition of the 900 MHz band more acceptable to many users. In addition, if the Commission can ensure capacity exists, it may be possible in certain areas to allocate more than 3X3 MHz for LTE use.[[3]](#footnote-3) The Commission should not underestimate the importance of T-Band to CII in the markets in which it is used and should, to the extent possible, strongly encourage Congress to protect and even expand T-Band for B/ILT use as a part of this proceeding.

For similar reasons, API does not support the mandated use of dynamic channel assignment technology similar to that required for the 3550-3700 MHz band in the form of Spectrum Access Systems (“SASs”). Such systems are untested, particularly from a security standpoint. Many of API’s members are exiting the 3.65 GHz band to avoid connecting critical radio systems to third-party databases. Many may be considering a potential 900 MHz LTE offering as a future replacement. Introducing SAS technology to the 900 MHz band at this time would be to the serious detriment of current and future users.

1. ***The Commission Should Allow Any 900 MHz Relocation To Proceed On A Voluntary Basis.***

The mandatory relocation process of 800 MHz rebanding resulted in significant additional time and expense for many users. The Commission should avoid a repeat. API suggests the Commission allow any reordering of the 900 MHz band to proceed on a voluntary basis. Parties should be bound by a duty to negotiate in good faith, but should not be obligated to relocate if an arm’s length transaction cannot be reached. If a threshold level of users in a given market can be relocated, that might trigger mandatory relocations for the remaining hold-outs. But otherwise, relocations should not be forced.

The Commission’s NOI make clear that even given such an approach, large portions of the country, in which no 900 MHz band B/ILT operations are present, would be available for the PEBB service immediately. In other areas, only a few licensees are present with which the PEBB licensee would need to reach agreement on relocation. In certain areas, incumbents operate large, wide area systems, and may not be interested in relocating, or interested in purchasing service from the PEBB. Such licensees should not be forced to make accommodations for the PEBB. API is open to allowing PDV to acquire spectrum under the Commission’s existing secondary market rules to being to clear the upper portion of the 900 MHz band through voluntary agreements with current licensees. This process has actually been ongoing for the past several years, and API believes it has been progressing well.

1. **CONCLUSION**

API supports moving forward with alternative uses for the 900 MHz band with the caveat that incumbents must be protected. API urges the Commission to conduct a diligent review of the issue consistent with these Comments.

**Respectfully submitted,**

**By: \_/s/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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1. *See* Review of the Commission’s Rules Governing the 896-901/935-940 MHz Band, *Notice of Inquiry*, WT Docket No. 17-200 (Aug. 4, 2017). [↑](#footnote-ref-1)
2. As older refineries and plants modernize their infrastructure, many will look to replace mobile radio communications systems. The continued availability of 900 MHz assignments for site-by-site licensing will become increasingly important. [↑](#footnote-ref-2)
3. Although the Commission would need to consider the impact to nationwide narrowband users. It is not practical for LTE to share spectrum with narrowband for two reasons, one the software is not written to “notch out” specific fixed frequencies, and more importantly, the narrowband user is not under the LTE tower’s adaptive power control, and since the LTE tower processes the incoming carriers in bulk, a single strong BILT carrier in the passband will desensitize the whole group of return carriers as the AGC (Automatic Gain Control) will respond to the one strong BILT carrier. [↑](#footnote-ref-3)