CDE #77090

SPECTRUM OF OPPORTUNITIES

The new opportunities 4.9 GHz spectrum provides for public safety.

By Stephen Devine

In 2000, the federal government began the process of reclassifying the 4940-4990 MHz band (the 4.9 GHz Band) from federal to public safety use in response to a spectrum assessment that found public safety had insufficient spectrum to meet its communication needs. More spectrum was needed to improve public safety communications. When the 4.9 GHz spectrum transitioned from federal use to the FCC for state and local use, Part 90 rules were developed for the 4.9 GHz band, outlining eligibility requirements, permissible operations, technical standards and emissions for the band.

PUBLIC SAFETY COMMONS LICENSING MODEL

Initially, the proposed use of the band was developed with a licensing model unique to public safety, which provided licensees authority to use the full 50 MHz of the band geographically within their state, city and county jurisdictions. This licensing model provided no details as to a licensee's operation or use of the band. It just showed the entire band being used somewhere within the licensee's jurisdiction/area of operation.

This licensing model was created to allow the 4.9 GHz band to be used within a new public safety commons model intended to drive innovation and enable public safety to benefit from existing commercial technologies. There was an expectation that public safety could better access the heightened availability and cost efficiencies of commercial technologies by using 4.9 GHz spectrum. During the initial licensing period, 802.16 (WiMAX) and 802.11 technologies were being introduced in the commercial marketplace in the nearby 5 GHz UNII band, and the hope was that public safety could leverage those opportunities with the 4.9 GHz spectrum. Unfortunately, the small public safety market couldn't develop the characteristics of successful commercial markets, namely, high-performing, cost-effective chipsets with high availability and viable products.

The licensing model set up for 4.9 GHz didn't result in public safety's widespread adoption or use of the band. Additionally, the necessary, robust device ecosystem of cost-effective 4.9 GHz equipment that could further public safety's broadband needs was never developed, resulting in a lack of available products to implement in the band

A NEED TO OPERATE IN AN INTERFERENCE-FREE ENVIRONMENT

The initial geographic licensing model created by the FCC contributed to an environment in which public safety licensees had no confidence in the use of the band and its ability to operate effectively in an interference-free environment. Simply put, public safety agencies were not confident in the band's ability to provide the services they needed, when they needed it most — during mission-critical incidents.

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The public safety community perceived the band's reliability as low due to its lack of frequency coordination and the belief that it could not operate in an interference-free environment. This lack of confidence (and use of the band) led to fewer 4.9 GHz band products being available in the already small public safety user device marketplace, along with a hesitance for agencies to use the 4.9 GHz band to leverage current commercial technologies in support of its mission-critical operations.

Geographic licenses generally do not provide sufficient details of a licensee's use of the band, making band coordination and coexistence between licensees and their users difficult. There are just too many variables in the 4.9 GHz band with the use of geographic licenses, including channel size and emissions, to be confident that a solution implemented in the band will support public safety users when needed.

The lack of frequency coordination, a multitude of band channel allotments and configurations, along with uncertainties about how the 4.9 GHz band could be used by licensees in both channel size and technology, led to little participation from the vendor community. Frequency coordination protocols have historically been developed for the public safety spectrum to promote efficient interference-free operation of the band. As an uncoordinated public safety band, the result was few products available to public safety agencies seeking to support their users with the 4.9 GHz band.

Uncertainties associated with the use of the band by public safety led to a small, non-diverse ecosystem (microsystem) of 4.9 GHz hardware and applications available to public safety. Subsequently, when products using the band became available, the equipment's price reflected the lack of a robust hardware ecosystem.

It should be noted that, initially, the FCC's licensing model issued geographic licenses authorizing entities to operate the full band (4940-4990 MHz) throughout their jurisdiction (area of operation, city, county, state) only for base/mobile operation and temporary fixed operation. As many licensees began to implement permanent fixed operations using 4.9 GHz in 2009, the FCC indicated that the geographic licenses in place did not authorize the implementation of permanent fixed operations and changed its rules requiring licensees to modify their geographic license with the site details of permanent fixed operations they had implemented under their geographic license. Some agencies modified their licenses to reflect their true use of the band in detail per the commission's rules; others did not.

As of December 2024, there were approximately 3,400 geographic 4.9 GHz public safety licenses (Radio Service Code PA).

A NEW, NATIONWIDE APPROACH TO 4.9 GHZ BAND

Given that limited use of the band after 25 years of public safety availability required a new vision for the band and the fact that 4940-4990 MHz had become part of a larger commercial 5G NR band n79, the FCC understood changes were needed in public safety's use of the band. In the Seventh Report and Order (Docket 07-100) issued in January 2023, the FCC established a nationwide approach to managing the 4.9 GHz band for public safety. In support of that approach, the FCC announced, among other things, that each current public safety licensee would be required to provide granular technical data regarding their use of the band by filing new applications in the Universal Licensing System on or before June 9, 2025. The deadline was eventually extended by 30 days to July 9, 2025.

Licensees would license permanent fixed sites under radio service code PF (point to point and point to multipoint) and base/mobile and temporary fixed systems under radio service code PB. Under this approach, each PF transmitter has its own call sign, resulting in a greater number of 4.9 GHz licenses than under the previous geographic licensing process.

The need for this granular data from 4.9 GHz licensees is critical. As outlined above, the lack of technical detail shared among users in the licensing process, including any parameters and characteristics of use (antenna site information, antenna height, power levels, emissions, etc.) consistent with the FCC's geographic licensing model, instilled little confidence for use of the band. For frequency coordination to exist in the band, which will be a responsibility of the new 4.9 GHz band manager (see below), it requires site-specific technical details, including location information, antenna placement, power levels, channel bandwidth, emissions and more.

As a result of the granular data collection process outlined above, the FCC's Universal Licensing Service showed the following number of applications granted and pending as of September 26, 2025:

- 4.9 GHz Permanent Fixed Operations (PF)-Licenses granted 5,284; applications pending 394
- 4.9 GHz Base/Mobile, Mobile Only and Temporary Fixed Operations-Licenses granted 228; applications pending 45

A NEW WAY FORWARD

In October 2024, FCC's Eighth Report and Order (07-100) created a 4.9 GHz band manager and tasked the entity 4.9 GHz band manager with the following responsibilities:

1. Frequency coordination and interference protection for 4.9 GHz band incumbent public safety operations.
2. Incentivizing the band's use of the latest commercially available technologies, including 5G.
3. Facilitating non-public safety use of the band.
4. Establishing and managing a share agreement with the First Responder Network (FirstNet) Authority pursuant to 90.1207 (h) and 2.103 (b).
5. Filing an annual report with the FCC.

Developing a detailed outline as to the engineering principles related to the coordination of the 4.9 GHz band would benefit scope and performance. A band manager should identify all the criteria necessary and steps to coordinate the band. The band manager should also provide the FCC with the understanding and approach as to the complexities of said coordination criteria and how its application can lead to successful coordination and enhanced public safety use of the 4.9 GHzband.

To ensure that public safety retains priority access, the order requires the band manager to enter into a sharing agreement with the FirstNet Authority, which will oversee how 5G services may use the 4.9 GHz band without interfering with public safety operations.

In its requirement for a band manager, the FCC acknowledges that complex coordination is necessary to protect incumbent operation of the band AND introduce new 5G technologies, in order to meet public safety's broadband communication needs and maximize its use of the band.

Combined with the collection of incumbent user data and technical parameters, the FCC has gathered the necessary information

to successfully coordinate the use of the band and instill confidence in its use.

With increased 4940-4990 MHz spectrum availability, a band manager responsible for coordinating the band and its use, along with new awareness of incumbent operating parameters, public safety is well equipped to leverage broadband communications technologies, solutions and applications.

The implementation and role of public safety broadband capabilities in day-to-day and mission critical communications operations of America's first responders continues to grow. APCO will continue its advocacy of ensuring that public safety's evolution is always focused on improving the communications capabilities of the responder in the field and in the emergency communications center. ●

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CDE EXAM #77090

1. What was the initial purpose of reclassifying the 4.9 GHz band in 2000?
   a. To enhance commercial use
   b. To improve public safety communications
   c. To increase internet speed
   d. To support military operations

2. What was the FCC's initial licensing model for the 4.9 GHz band?
   a. Site-specific licensing
   b. Permanent licensing
   c. Temporary licensing
   d. Geographic licensing

3. Why did the public safety community lack confidence in the 4.9 GHz band?
   a. High cost of equipment
   b. Insufficient bandwidth
   c. Lack of frequency coordination
   d. Limited geographic coverage

4. What technology was hoped to be leveraged by the 4.9 GHz band during its initial licensing period?
   a. 4G LTE
   b. WiMax and 802.11 technologies
   c. 3G
   d. Satellite communication

5. What was one of the reasons for the limited adoption of the 4.9 GHz band by public safety agencies?
   a. Lack of available products
   b. High cost of licensing
   c. Insufficient training
   d. Limited government support

6. What change did the FCC make in 2009 regarding the 4.9 GHz band?
   a. Introduced new licensing fees
   b. Increased the bandwidth allocation
   c. Required modification of geographic licenses for Permanent Fixed operations
   d. Allowed commercial use of the band

7. As of 2024, approximately how many geographic 4.9 GHz public safety licenses were there?
   a. 3,400
   b. 5,000
   c. 2,000
   d. 1,000

8. What was the purpose of the FCC's Seventh Report and Order (Docket 07-100)?
   a. To reduce licensing fees
   b. To introduce new technologies
   c. To increase the bandwidth allocation
   d. To establish a nationwide approach to managing the 4.9 GHz band

9. What is one of the responsibilities of the 4.9 GHz band manager created by the FCC's Eighth Report and Order?
   a. Frequency coordination and interference protection
   b. Issuing new licenses
   c. Reducing equipment costs
   d. Providing training to public safety agencies

10. What is one of the key responsibilities of the band manager in coordinating the GHz band?
    a. To develop new 5G technologies for public safety agencies.
    b. To enter into a sharing agreement with the military installations.
    c. To provide the FCC with a detailed outline of engineering principles as they relate to coordination of 4.9 GHz.
    d. To manage customer interactions with DHS more effectively.

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