



# Delivering Interoperability on Demand:

Motorola APX™ P25 Multi-Band Radios



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## Facing the Interoperability Challenge

When every second counts, first responders must talk to each other—no matter which agencies they work with. The cold truth is that years after the September 11th attacks, public safety agencies still face radio interoperability issues. When arriving on a disaster scene where communications are destroyed, like a hurricane, first responders typically lack an initial capability to talk to each other. The absence of seamless, two-way communication across agencies, departments, and jurisdictions can jeopardize effective response.

Even in daily tasks, radio interoperability issues can reduce departmental efficiency. Consider the state trooper who communicates using the VHF public safety band. Two-way voice communication works fine until the trooper moves into local jurisdictions that use 700/800 MHz bands, forcing the trooper to switch back and forth between the VHF and 700/800 radio for vital communications. Encumbered by the need to handle two different radios can add risk to the trooper's mission—especially during a high-speed pursuit or other high-stress situations.

resources and directives on how to achieve inter-agency interoperability. One vital building block toward attaining this interoperability is the multi-band two-way radio, which has the ability to switch seamlessly between multiple public safety bands. In addition to multi-band, the optimal platform should support current and legacy communication protocols, large channel capacity, and programmable hot buttons so users can jump easily to key channels. With two-way multi-band, multi-protocol radios, mission critical users can communicate with multiple agencies no matter where they are, and no matter when.

### **Multi-band – A Key Enabler for Mission Critical Tasks**

With multiple federal and industry communication initiatives, public safety agencies now have several



## The Motorola APX Multi-Band Two-way Radio – Delivering Interoperability on Demand

With over 75 years of expertise creating products for federal and public safety agencies, Motorola understands that achieving a truly useful interoperable solution takes significant research and development. Two-way radios for mission critical require extremely high Radio Frequency (RF) performance, excellent transmit range, and superior receive sensitivity. The multi-band radio design must also ensure that one band does not interfere with other bands, and contains an antenna optimized to receive and transmit across different bands while still delivering exceptional performance.

Motorola's exceptional experience in mission critical ergonomics, usability, and functionality served as the cornerstone for the APX design process. Created with the needs of the first responder as requirement number one, APX delivers a no-compromises approach to two-way, multi-band audio communications, resulting in an effective, user-centric form factor. APX incorporates multi-band frequencies, dual-sided ergonomics, and functional grouping based upon importance and relatedness.

### Two Radios Combined into One

Designed with direct customer interaction, APX radios integrate the 700/800 MHz and VHF public safety bands with GPS into one ergonomically designed two-way radio package. Multiple frequency bands combined in a single radio the size of a traditional single band public safety radio allow users to switch between channels quickly without worrying about which frequency they are on, or the weight and size of two radios. With APX, departments no longer need different radios for different bands. Now, agencies can install one mobile radio per vehicle, equip teams with one portable, and contain acquisition and training costs.

In stressful situations, mission critical users base their activity on instinct and an eyes-off/hands-on approach. For the emergency responder, the radio's technology is abstract information that has nothing to do with a high-speed pursuit, fighting a fire, or other potentially lifesaving tasks. APX's multi-band, ergonomic design allows users across federal, EMS, fire, and public safety departments to interact with one radio.

### Designed through the Power of Innovation

Reducing channel interference so first responders can communicate clearly is but one challenge facing multi-band radio designers. FCC and public safety specifications require two-way radios to achieve strict adjacent channel performance. In addition, the radio must minimize intermodulation interference (IM) while ensuring the signal meets tight parameters. To enable exceptional communications, Motorola designed the APX transmission and antenna system to support a wide range of frequencies while meeting or exceeding stringent public safety requirements.

Because 700/800 MHz channels transmit at three Watts, while VHF transmits at six watts, two-way radio power consumption is critical. In fact, VHF transmissions can drain a battery twice as fast as 700/800 MHz transmissions. Additionally, the APX radio contains state of the art, custom power control circuits to limit current drain. Users no longer need to worry which channel they are on or how much power their radio consumes. APX hides the complexity so that the user can focus on their mission—not the technology.

***APX radios are optimized to receive and transmit across different bands while delivering exceptional performance.***



### Wide-Band Scanning Helps Boost Team Communications

During emergencies, agency collaboration often requires that teams use multiple channels. Manually determining which channels to scan and in what frequency band only adds to the confusion, especially while a user is under stress. The APX multi-band radio contains a wide-band scanning capability that searches for voice activity across a list of channels in multiple frequencies and protocols. Users can program the scan list to search through all channels, or prioritize specific channels across the bands and eliminate the need for two radios and scan feeds.

For the team carrying APX portable radios, or a fleet of vehicles with APX mobile radios installed, wide-band scanning streamlines equipment configuration. Users configure scan lists and protocols once, and share the data with other APX radios for fast, efficient programming. Data sharing leverages the Programming Over Project 25 (POP25) capability available in all ASTRO® 25 network subscribers. Additionally, users can program the radio to operate in multiple systems and multiple user IDs. While on duty, law enforcement officers, fire fighters, and EMS responders can quickly switch the APX to an alternate protocol or scan list by simply changing the channel.

### An Expandable, Flexible, Future-proofed Radio Platform

Today's public-safety solutions require designs built for the rigors of the job and the needs of the future. Motorola designed each element of the APX radio to deliver true interoperability, scalability, and flexibility.

Multi-band is just one of numerous technologies the APX platform supports including Project 25 (P25) Phase 1, Time Division Multiple Access (TDMA), and upgradeable to P25 Phase 2 and Bluetooth in the future. Offered in both mobile and portable configurations, the APX design stands out as a platform solution, setting the stage for future designs targeted at the unique missions of law enforcement, fire departments, and federal agencies.

Public safety agencies in the near future are looking for spectrum efficient solutions using Project 25 Phase 2 TDMA. An ASTRO 25 system may have mixed capabilities, Phase 1 & Phase 2. Motorola has developed Dynamic Dual Mode which provides the intelligence to allow an APX radio operating on a mixed ASTRO 25 system to dynamically switch between TDMA and P25 Phase 1. Dynamic Dual Mode not only provides the maximum flexibility in configuring an ASTRO 25 system but also allows the APX radio user to focus on their mission without needing to manually switch between technologies. The radio is intuitive and knows what to do automatically- putting flexibility in the hands of the user.

“Information sharing is a priority in the State of North Carolina, especially in the area of voice communications where Motorola’s state-wide infrastructure currently supports over 25,000 users and is still being implemented. APX provides cross-discipline interoperability, increased functionality, and is a cutting-edge tool for communications.”

– Eugene Vardaman, Executive Director,  
North Carolina Criminal Justice Information Network



## APX Helps You Meet the Interoperability Challenge

The APX P25 multi-band radio optimizes and merges two public safety radios into a single, compact, ergonomic form factor that meets or exceeds today's stringent public safety requirements. When facing either large disasters or daily tasks, mission critical teams can now benefit from reliable operation across 700/800 MHz and VHF bands while boosting operational efficiency. Delivering interoperability on demand, the APX two-way radio enables seamless, multi-agency collaboration, allowing first responders to coordinate and respond more effectively.

With the APX P25 multi-band radio, Motorola has once again revolutionized mission critical communications technology. Now, more than ever, first responders can be rest assured that their two-way radios stand ready to maintain an interoperable communication lifeline, freeing them up to focus on their mission—empowered by Technology That's Second Nature™.



# **MOTOA<sup>4</sup>**

## *Mission Critical Portfolio*

### Technology That's Second Nature™

The APX Two-Way radios are part of the MOTOA4 Mission Critical Portfolio of products that offer seamless connectivity between first responders. Motorola puts real-time information in the hands of public safety personnel to provide better information that enables better decisions for better outcomes. It's Technology That's Second Nature.

#### **APX P25 Multi-Band Radios**

Additional information and resources such as product information, brochures, and white papers are available on the APX product website found at [motorola.com/apx](http://motorola.com/apx).





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