

DHS Science and Technology Directorate

MaXphone—Multi-Access Extension for Smartphones

Providing devices that embrace Land Mobile Radio (LMR) and broadband cellular networks

The First Responder Network Authority (FirstNet) is charged with creating a nationwide public safety broadband network that provides the public safety community with a boost in network capacity and capability. Still, commercial cellular broadband networks (e.g., 4G LTE and 3G) will likely remain the dominant option to support first responder broadband applications for the immediate future. Broadband networks do not provide first responders with mission critical voice capabilities (i.e., radio-to-radio or one-to-many communications) that are available on LMR networks. However, application and service development in the LMR domain stand in stark contrast to the explosive growth in the commercial broadband sector. Therefore, a reasonable, cost effective approach to creating more capable first responder devices embraces existing LMR networks and commercial broadband cellular networks by using open platforms to encourage application development.

The Department of Homeland Security Science and Technology Directorate and U.S. Customs and Border Protection partnered to address mission-critical voice over broadband, remote management (e.g., over the air programming) and network integration (i.e., ability to roam across LMR and 4G LTE) needs for end users.

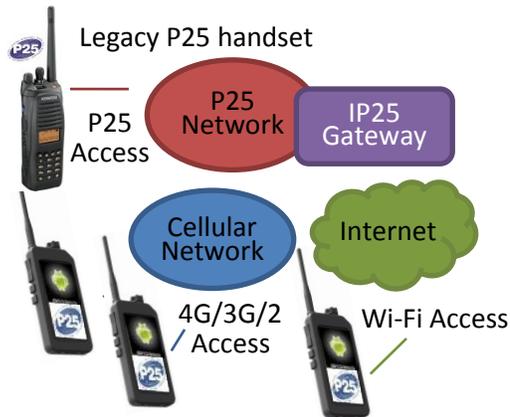
MaXphone – An open, hybrid solution

The MaXphone enables the augmentation of a Commercial Off-the-Shelf (COTS) smartphone with P25 radio capabilities. MaXjacket, an attachable smartphone jacket, hosts a LMR radio with a high-efficiency, multiband power amplifier using a high performing battery for extended use. A network gateway integrates voice services accessed over

P25, cellular/Public Switched Telephone Network voice, and Voice-over-IP. It also allows for enhanced security by providing end-to-end P25 encryption across LMR and broadband networks.

Enabling customizable, affordable applications

MaXphone leverages rapid development in commercial broadband networks and smartphone capability. Open application development environments (e.g., Android) enable novel, innovative, customizable and affordable first responder applications. An open source, fully functioning P25 software package will be available on the Android environment. MaxJacket will be based on COTS components and contain the necessary functions for the P25 solution.



MaXphone Interworking Scenario

Enhanced Capabilities

- LMR services (e.g., push-to-talk) extended to broadband cellular and Wi-Fi networks to enable interoperability between devices that currently cannot communicate.
- An open source approach for the gateway provides a more cost efficient solution.
- The LMR MaXjacket and P25 SDR smartphone application will enable first responders to roam between LMR, cellular or Wi-Fi based networks with a common set of applications.
- The smartphone platform opens a large application development community to the public safety sector, lever-ages low-cost and high-performance COTS platforms to support broadband services for first responders, and avoids potential proprietary issues.



- LMR MaXjacket:**
- Generic smartphone fit
 - SDR capability
 - Multi-mode RF front end
 - Efficient power amplifier
 - High energy battery pack
 - LMR radio features

- COTS Smartphone:**
- Cellular 4G/3G/2G access
 - Wi-Fi, Bluetooth access
 - SDR P25 radio functions
 - Public safety "Apps"

