

**U.S. House of Representatives  
Subcommittee on Technology and Innovation,  
House Committee on Science and Technology**

May 27, 2010

*“Interoperability in Public Safety Communications Equipment”*

Testimony of:

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Chairman Wu, Ranking Member Smith, and members of the Committee, thank you for the opportunity to discuss interoperable public safety voice communication, and specifically the Project 25 Standard. It seems only appropriate that the Technology and Innovation Subcommittee hold this hearing, given the significant innovation and technological advancements that have occurred in public safety communications, in part, driven by the Project 25, or P25, standard.

What is the P25 Standard?

When the P25 standard was first envisioned by the Association of Public-Safety Communications Officials (APCO), the goal was to improve mission-critical communication interoperability, to see more competition in the marketplace, and to spur innovation. Through the hard work of APCO, Telecommunications Industry Association (TIA), government officials, and equipment manufacturers, the P25 standard has created a vibrant marketplace for public

safety equipment that allows all vendors to compete on a level playing field, resulting in price competition and product innovation. Motorola took an early lead in the development of P25 radios and today, over 13 equipment manufacturers sell P25 equipment to public safety users throughout the world. (See Appendix A.) In fact, the P25 standard is considered the key to achieving interoperability by industry and government alike. As such, the FCC has adopted P25 as the interoperability standard for public safety narrowband operations in the 700 MHz spectrum recently made available to public safety nationwide through the DTV transition.

#### What is the status of interoperability?

Since the P25 standard was first adopted by the FCC in 2001, thirty-six states have deployed statewide P25 networks, as have one hundred sixty-five cities and counties. (See Appendix B.) In total, nearly 70% of the U.S. population is covered by a P25 public safety network. (See Appendix C.) Practically speaking, the wide-spread adoption of the P25 standard has allowed for interoperability:

- Among public safety agencies at the federal, state, and local level,
- Between state police in neighboring states,
- For multiple jurisdictions responding to a catastrophic event, such as Hurricane Katrina, and;
- At large-scale, planned events, such as the Super Bowl and Olympics.

We have seen first-hand that effective, coordinated, and accessible communications between first responders is critical to the public safety mission, and the P25 standard has led to significant improvements in public safety interoperability.

There is still a great deal of work to be done and several factors will contribute to how quickly P25 is adopted by even more organizations. One of the biggest hurdles to ubiquitous use is that it takes very long periods of time to replace old systems and radios with P25 compliant equipment. The life-cycle of a public safety radio is anywhere from seven to fifteen years, and for a public safety network, it can be decades. Given the limited budget resources of state and local governments, Congress cannot mandate interoperability today and see it realized tomorrow unless it provides the funds to accomplish equipment replacement.

#### When Will the Standard Be Complete?

Standards work on P25 will only be complete when the standard is no longer in use. From its inception, P25 was expected to be a living document, subject to amendments, revisions, additions/deletions as technology advanced. Revisions are normal and to be expected, given that P25 replaces numerous proprietary solutions that have been sold by multiple manufacturers for decades. As more P25 systems are deployed, and more users become engaged in the process, additional requirements emerge and changes are made.

Similarly, the original P25 architecture has been significantly enhanced as the list of features and services expands. The first P25 architecture defined only five system interfaces. Interfaces are the physical locations where one component “connects” with another. Today, eleven P25 interfaces are identified. As desired features and services are added or redefined, the interfaces that make up the system architecture likewise must be reviewed and updated.

To date, TIA has published nearly two hundred documents, creating or revising almost fifty published standards utilized by industry to design and develop interoperable P25 products and systems. TIA further develops and proposes documents for interoperability testing and

standards compliance demonstration to the government. Project 25 has two phases of standards development driven by varying FCC regulatory requirements. Phase 1 products are designed to operate in a 12.5 kHz channel bandwidth and have been in use since the mid 1990s's. Phase 2 equipment is developed to operate with greater spectral efficiency and essentially double the number of voice paths that operate within a single 12.5 kHz channel.

As of May 2010, the technical specifications for Project 25's Phase 1 systems are functionally complete, with compliance testing underway and multiple manufacturers listed as meeting the National Institute of Standards and Technology (NIST) compliance requirements for their products. P25 Phase 1 allows for two critically important features. First, Phase 1 ensures that a P25 radio in the hands of a first responder can communicate directly with any other P25 radio in the same spectrum band. This means that the Michigan State Police officers who responded to Hurricane Katrina were able to directly communicate with the Louisiana State Police, in Louisiana. Second, P25 Phase 1 allows a first responder from one jurisdiction to communicate with the network itself in a neighboring jurisdiction. This allows the first responder to communicate not only with officers in the field, but with dispatch, even though they are outside the coverage area of their "home" network.

While work continues on Phase 2, keep in mind that there is no functional change that will be apparent to the officer or firefighter in the field due to Phase 2 improvements. Phase 2 essentially allows more public safety radios to utilize a given P25 network, but future enhancements to the standard will not change interoperability for the public safety official.

## How Does a First Responder Know They Are Buying P25 Equipment?

Motorola places paramount importance on our relationship with our customers in the public safety community. Motorola invented the police radio in 1930 and views our customer relationship more like a partnership.

When fire departments were concerned that firefighters who dropped their radios in a fire could not find them in darkness and smoke, Motorola responded with a glow-in-the-dark radio. Similarly, when law enforcement expressed an interest in finding ways to improve officer safety, Motorola developed emergency alerting capability in our radios. When a police or fire department orders a public safety radio and network, Motorola does not simply perform the installation and walk away. We continue to work to ensure the equipment performs as intended, including testing to validate interoperability with P25 equipment from other vendors. Motorola understands there are life-threatening consequences if equipment fails to function as intended.

In addition to the informal internal testing Motorola performs individually and with our competitors at our labs in Schaumburg, IL, Motorola also participates in the Department of Homeland Security (DHS)-defined formal compliance testing programs. The formal testing program is validated by the standards experts at the NIST. When the testing is complete, manufacturers post their results in the Responder Knowledge Base, or RKB. To date, Motorola has posted tested and validated P25 equipment for portables, mobiles, and infrastructure. (See Appendix D.)

## Recommendations to Meet Public Safety Needs

As you can see, significant progress has been made with respect to P25 standards development. The original P25 goals, created by the public safety community, have been met,

and additional standards work continues for new technology and features. In order to maintain an efficient P25 standards process, it is important to:

- Maintain a diverse group of users and industry to drive the P25 consensus process,
- Document the common goal of the group, and;
- Sustain focus on the goals.

By keeping these tenants top of mind during the standards process, P25 practitioners can continue to meet the needs of public safety in a timely manner.

#### Public Safety Needs More Spectrum for Broadband Applications

But P25, which is focused primarily on voice systems, is not the end of the interoperability story. In the past ten years, we have seen an explosion in demand for data applications in the consumer space, via text, email, pictures, and video. Likewise, public safety users are demanding high-bandwidth applications and content to facilitate greater intelligence and information sharing between local, state and federal agencies, to enhance criminal investigations, and to improve the safety of our first responders. Imagine an officer responding to a 9-1-1 call and arriving on the scene, already knowing the situation on the ground because she was able to see live video streaming in her vehicle, or a firefighter being able to look at an electronic blueprint of a building before arriving at the fire. These are just some of the innovative applications available today to public safety, however, the use of this data has been limited due to the lack of available spectrum.

Unfortunately, today's public safety officers have limited access to data services. Prior to the 700 MHz allocations, public safety lacked the spectrum to enable mobile services. Today's

public safety networks are only capable of providing the functional equivalent of commercial texting services. Of course, public safety users can buy mobile broadband service from commercial carriers, and many do, but these networks rarely provide the reliability and coverage that first responders demand from their communications networks. Motorola believes that it is imperative that the Congress act to dedicate the 10 MHz “D Block” spectrum for public safety broadband. This will provide public safety with a total of 20 MHz of 700 MHz spectrum to deploy broadband networks capable of meeting public safety demand for the foreseeable future. Our nation’s first responders deserve the same access to content as anyone with a Facebook account or cell phone.

### Conclusion

Again, I want to thank you for holding this hearing on an issue critical to public safety in this country. Interoperability saves lives and Motorola remains committed to building the mission critical communications equipment first responders have trusted for eighty years. Thank you.

Appendix A

## Project 25 systems deployed around the world



United States

Bahamas

Malaysia

Australia

Trinidad y Tobago

Nigeria

Russia

Chile

Angola

Latvia

Ecuador

Kenya

Canada

Colombia

Kuwait

Brazil

Argentina

Kurdistan

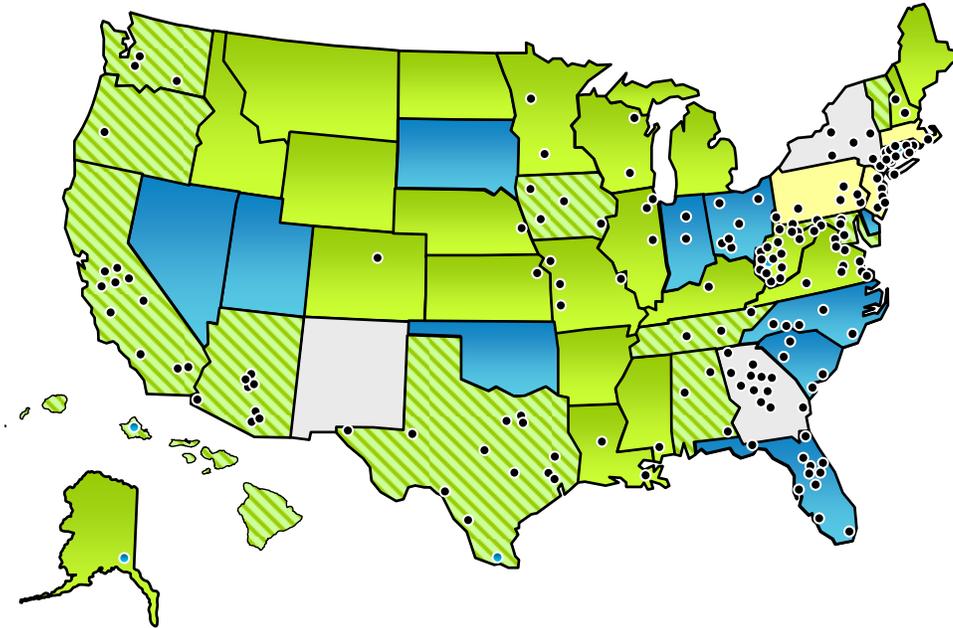
Mexico

Venezuela

Costa Rica

India

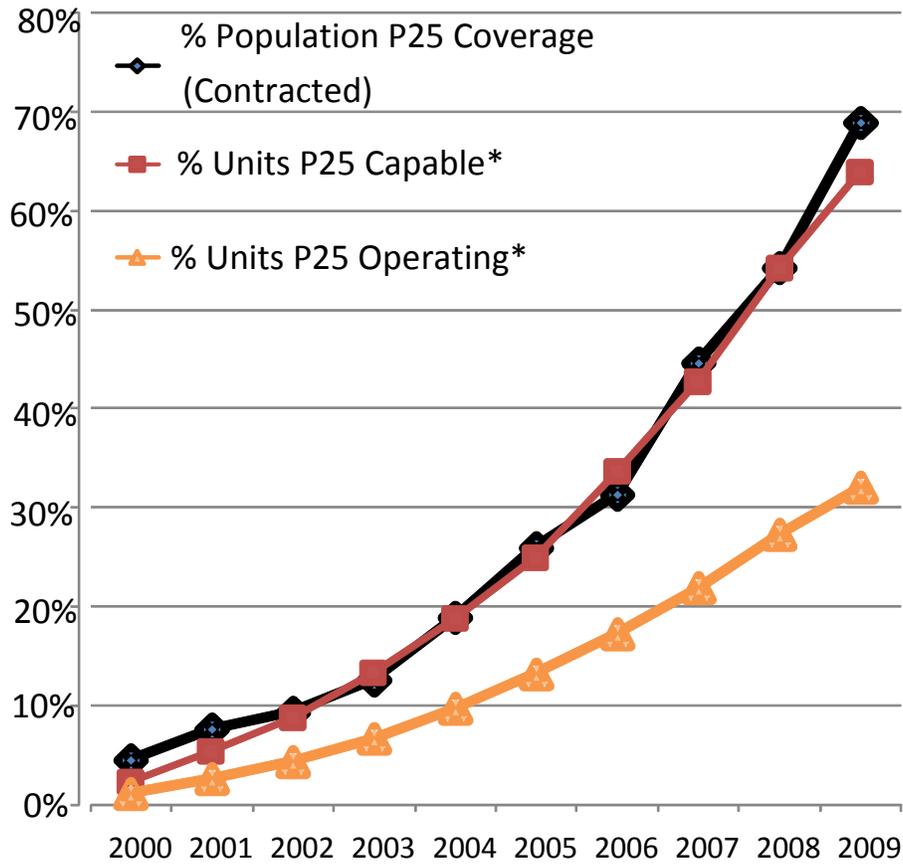
## P25 Deployment



**36** Statewide Networks  
**165** Local Project 25 Systems

-  P25 Statewide System
-  Currently Operating Non-P25 Statewide System w/Plans to Migrate to P25
-  No Current Statewide System w/Plans to Move to P25 Statewide System
-  Currently Operating or Implementing Non-P25 Statewide System
-  No P25 Statewide
-  City/County P25

## P25 Deployment Metrics



\* Estimated Units % of Mission Critical installed base per Motorola internal analysis

## Appendix D



### Motorola Leads DHS Compliance Assessment Program with First SDoCs for Multi-band Project 25 APX Family of Radios

Motorola in collaboration with the Department of Homeland Security's Compliance Assessment Program continues to advance interoperability initiatives supporting mission critical communications

May 06, 2010

SCHAUMBURG, IL – May 6, 2010 – The [Enterprise Mobility Solutions](#) business of [Motorola, Inc.](#) (NYSE: MOT) today announced the publication of the first multi-band (VHF/700/800) Project 25 (P25) portable and mobile radios on the Responders Knowledge Base website ([www.rkb.us](http://www.rkb.us)). The publication of the SDoCs (Supplier's Declaration of Compliance) and STRs (Summary Test Report) comply with the DHS Office of Emergency Communications: *Fiscal Year 2010 SAFECOM Guidance for Federal Grant Programs* for purchasing Project 25 LMR equipment/systems providing mission critical users with access to those grant funds to purchase Motorola products (<http://www.safecomprogram.gov/SAFECOM/grant/default.htm>).

The **Motorola** multi-band **APX™ 7000** portable and **APX™ 7500** mobile radios **SDoCs and STRs document the successful completion of the current DHS CAP suite of Interoperability and Performance Tests**. Specifically this documents the successful interoperability testing of the APX radios with Motorola's P25 system, with Harris Corporation's P25 system, and with an EFJohnson Technologies P25 system.

The Motorola APX radio portfolio is the industry's first Project 25 true multi-band subscriber family combining seamless VHF and 700/800 MHz operation for both FDMA and TDMA operation to have an SDoC and STR posted as part of the DHS CAP Program. The **APX radio portfolio** incorporates the most recent enhanced full rate P25 vocoder to support existing P25 Phase 1 FDMA operation while leading the way for full P25 Phase 2 TDMA operation with the enhanced half-rate vocoder.

In addition to the improvements in voice clarity gained with the enhanced P25 vocoder, **Motorola** has uniquely enhanced the overall APX audio experience through a comprehensive design integrating additional noise cancelling circuitry, noise suppression system, microphone and speaker systems to meet the needs of public safety customers.

In addition to the APX family of radios, also published on the DHS RKB website are Motorola's **ASTRO® 25** system infrastructure and Motorola's XTS® 5000, XTS® 2500, XTS® 1500, XTL™ 5000, XTL™ 2500, and XTL™ 1500 radios.

The Motorola ASTRO 25 SDoC and Summary Test Report document the successful trunked interoperability testing of Motorola's ASTRO 25 infrastructure with radios from 10 leading industry subscriber manufacturers: **Motorola**, EFJohnson Technologies, Harris Corporation, Icom, Kenwood, PowerTrunk, RELM Wireless, Tait Radio Communications, Technisonic and Thales.

Over the past 24 months, Motorola's support of the DHS CAP program included the hosting of two formal interoperability events on the **Motorola ASTRO 25** system infrastructure and the participation in three other P25 infrastructure manufacturer's interoperability events. Additionally, Motorola was in the first batch of DHS recognized labs for DHS CAP testing in May 2009.

"In addition to the P25 CAP, **Motorola** continues to provide **P25** subscriber manufacturers with opportunities to informally test on Motorola's **ASTRO 25** system infrastructure, promoting interoperability within the industry," said Brenda Herold, corporate vice president, Motorola Global ASTRO Product Solutions. "These opportunities further demonstrate Motorola's unwavering commitment to the advancement of multi-manufacturer interoperability and our support of the DHS CAP. "

For example, earlier this year, Motorola and five other manufacturers demonstrated the successful testing of interoperable communications between the **Motorola** ISSI.1 Network gateway and ISSI Gateways from the five other manufacturers.

Motorola continues to be a key technical contributor in the P25 standards body, providing technical resources to write the compliance tests outlined by TIA and referenced as part of the DHS CAP Program.

**About Motorola**

Motorola is known around the world for innovation in communications and is focused on advancing the way the world connects. From broadband communications infrastructure, enterprise mobility and public safety solutions to high-definition video and mobile devices, Motorola is leading the next wave of innovations that enable people, enterprises and governments to be more connected and more mobile. Motorola (NYSE: MOT) had sales of US \$22 billion in 2009. For more information, please visit [www.motorola.com](http://www.motorola.com).

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