Motorola Solutions, Inc.
Hearing on "Interoperable Public Safety Communications"
Before the Subcommittee on Communications and Technology
Committee on Energy and Commerce
U.S. House of Representatives
May 25, 2011

SUMMARY OF TESTIMONY

- Motorola Solutions, Inc. has served the public safety community for over 82 years and remains steadfast in its commitment to providing reliable, state-of-the-art equipment and innovative solution. We are committed to open standards-based technologies and have committed significant resources to assist industry efforts to embrace open standards. We concur with the Committee's desire to ensure a robust competitive marketplace.

- Reallocation of the 700 MHz D block spectrum from commercial to public safety use is necessary to ensure that our first responders have the capacity available to effectively respond to day to day wide scale incidents.

- Public safety currently has 24 MHz of spectrum in the 700 MHz band. Of this total, 12 MHz is reserved for narrowband uses and is not able to provide the types of video and data communications described above. That leaves public safety with only 10 MHz of spectrum to accommodate mobile broadband applications – a total that the FCC has confirmed is inadequate for wide scale emergency response.

- Allocating D block to public safety means a contiguous 20MHz of spectrum that could result in significant savings-doubling public safety's network capacity with a small increase in deployment costs.

- Costs would be less with an allocation of the D Block to Public Safety than an auction of the D-Block due to unanticipated LTE service charges, lack of unlimited data plans, priority service expenses, and RF interference mitigation – in addition to decreased communications independence for public safety.

- The Phoenix Center, a nonprofit organization that studies broad public policy issues with a specialty in telecommunications reported that while the issue is complex, the economics weigh in favor of allocating the D Block to public safety.

- Adequate spectrum is necessary before broadband networks can accommodate mission critical voice traffic in addition to the video and data traffic.

- While more needs to be done, public safety has made great strides in achieving interoperability since 9/11. This is due in large part to the focus state and local government has placed on the need to improve public safety first response to major incidents, as well as the adoption and implementation of the Project 25 (P25) standard supporting public safety interoperability.

Statement of Paul Steinberg
Chief Technology Officer
Motorola Solutions, Inc.

Hearing on "Interoperable Public Safety Communications"
Before the Subcommittee on Communications and Technology
Committee on Energy and Commerce
U.S. House of Representatives
May 25, 2011

Thank you, Chairman Walden, Ranking Member Eshoo, and other members of the Subcommittee for this opportunity to testify on the topic of Interoperable Public Safety Communications.

My name is Paul Steinberg and I am the Chief Technology Officer at the newly independent Motorola Solutions, Inc., which, following its split from Motorola Mobility this past January continues to focus on the needs of the public safety community.

For almost 20 years, I have been fortunate to work at Motorola with an extremely knowledgeable and talented team of people who help deliver innovative and best-in-class technologies to our customers. Prior to being appointed CTO in January 2011, I was Chief Architect for Integrated Command and Control and Private Broadband Solutions for Public Safety Systems.

Motorola Solutions, Inc. (formerly Motorola, Inc.) has been committed to innovation in communications and electronics for over 82 years. The Company is headquartered in Schaumburg, Illinois, employs over 25,000 people in over 65 countries globally. Motorola pioneered mobile communications in the 1930s with car radios and public safety networks. We made the equipment that carried the first words from the moon in 1969. We commercialized the

first handheld portable scanner in 1980. Today, as a global industry leader, excellence in innovation continues to shape the future of the Motorola.

COMMITMENT TO INTEROPERABILITY

Motorola has served public safety continuously over these eight decades, and the company is proud of this history. Motorola has remained committed to the marketplace and has listened closely to public safety's needs, providing public safety with reliable, state-of-the-art equipment and innovative solutions.

Motorola agrees that a robust competitive marketplace can help provide interoperable services – including broadband services – to public safety in a cost-effective manner. Motorola is actively competing in the marketplace today to help public safety realize its vision to have a truly interoperable nationwide broadband network. We are committed to open standards-based technologies and have committed significant resources to assist industry efforts to embrace open standards.

REALLOCATION OF THE D BLOCK

Reallocation of the 700 MHz D block spectrum from commercial to public safety use is necessary to ensure that our first responders have the capacity available to effectively respond to wide scale incidents. But it is important to remember that it is not only the catastrophic events that can benefit from this increased spectrum. Day to day situations ranging from an overturned gasoline tanker on the beltway; a tornado in Joplin, Missouri or a hostage situation at a school can all benefit from the enhanced situational awareness and command and control that is enabled through this additional spectrum.

As FCC Chairman Genachowski has stated as recently as last Thursday at the TIA conference, broadband spectrum needs are predicted to grow 35 times in the next few years. Consumer use

and demand for broadband applications is experiencing explosive growth as are the public safety's broadband requirements.

We recently confirmed this by working with public safety officials on a network capacity analysis to understand how broadband networks can enhance emergency response and better protect the safety of all involved. This involved performing a step-by-step assessment of the communications requirements through an emergency situation's "life cycle" – from start to SWAT team deployment to resolution.

During these "stress test" scenarios, we found that a network infrastructure based solely on the existing 10 MHz public safety allocation will struggle to provide the necessary capacity. Adding the additional 10 MHz D-Block spectrum would effectively double the network capacity for public safety and improve incident response.

Commanders directing response teams need real-time situational awareness at the onset. A tightly coordinated response means all those involved need access to the right information at the right time. With multiple agencies working together to resolve the incident, interoperability is crucial to creating one shared operational view for maximum coordination. Content, including streaming video, can be sent to a command and control center from various cameras on the scene. This video can be collected, monitored and redistributed to first responders in the field with command and control serving as the "director" of the content, dynamically choosing the views and information to propagate from multiple sources.

In many incident scenarios, video information is critical. Live video feeds from well-placed specialty units, overhead aircraft, and remotely operated robots provide different angles and views that can be streamed in real time over a Public Safety broadband network. Using a wide area broadband network is much safer, and quicker to activate, than deploying a temporary local network. More importantly, it allows officers to immediately survey the area in its crucial first stages without the risk and complexities associated with establishing local communications equipment.

Applications such as real time hot-spot video to reduce crime in certain areas; in-car video that is live and networked back to command and control centers; detailed building diagrams relayed to firefighters; video of trauma patients being fed directly to emergency rooms; and wild fire thermal and weather imaging, are just a few of the broadband applications that can make a difference to public safety and the communities they serve. More spectrum is required to make this a reality, not just in certain communities, but for public safety throughout the country.

Public safety currently has 24 MHz of spectrum in the 700 MHz band. Of this total, 12 MHz is reserved for narrowband uses and is not able to provide the types of video and data communications described above. That leaves public safety with only 10 MHz of spectrum to accommodate mobile broadband applications – a total that the FCC has confirmed is inadequate for wide scale emergency response. In contrast, commercial service providers have requested an additional 500 MHz of spectrum for advanced wireless services.

Allocating the D block to public safety means a contiguous 20 MHz of spectrum that could result in significant saving – doubling public safety's network capacity with only a small increase in deployment costs. The build-out of one network that leverages existing infrastructure will cost far less at the $6.5 billion estimated by the FCC than the build-out of a second network on a non-adjacent spectrum. There is also potential for additional cost savings if other agencies are permitted to use the public safety network.

Motorola believes that costs would be less with an allocation of the D Block to Public Safety than an auction of the D-Block due to unanticipated LTE service charges, lack of unlimited data plans, priority service expenses, and RF interference mitigation – in addition to decreased communications independence for public safety. Further, should commercial carriers operate in the D block spectrum, we believe it will be necessary to use guard bands to protect current public safety operations in the adjacent spectrum and the economic impact of such guard bands could potentially be billions of dollars.

In terms of the economic value of the spectrum from a public safety standpoint, a report was issued earlier this year by the Phoenix Center, a nonprofit organization that studies broad public policy issues with a specialty in telecommunications. The Phoenix Center report concludes that while the issue is complex, the economics weigh in favor of allocating the D Block to public safety.

Highlighting that the allocation of D Block to public safety creates a unique opportunity to create a contiguous 20 MHz of spectrum for public safety broadband, the report notes that the spectrum can create significant value to public safety – which the Phoenix Center values at $2 to $6 billion.

Alternatively, assigning 10 MHz in the future in some other spectrum band would cost about $4 billion in additional deployment costs and offer inferior performance. In contrast, the Phoenix Center notes that at best, the D Block would bring auction revenues in the $1 to $3 billion range, and probably much less. Service obligations or conditions that may be placed at auction could reduce that revenue by as much as $1 billion.[1]

KEY TECHNICAL CONSIDERATIONS

Motorola concurs with the vision that LTE is the right technology for the interoperable Public Safety 700 MHz broadband network. With adequate spectrum available, a properly designed public safety network based on standardized LTE technology can support our nation's first responders in the field with the information-rich applications like high speed data and video which is currently unavailable. LTE also provides the opportunity to leverage the larger economies of scale of commercial technologies.

[1] "Public Safety or Commercial Use? A Cost/Benefit Framework for the D Block, "Phoenix Center Policy Bulletin No. 26, March 2011, George S. Ford, PhD., Lawrence J. Spiwak, J.D.,

Eventually, the integration of voice and data services over the LTE platform could provide public safety even greater operational benefits. To achieve this goal, additional efforts must be directed at addressing two critical areas.

First, public safety officials and the vendor community must collaborate to define and develop key features associated with mission critical voice on narrowband networks in order to enable their support on broadband networks.

Public safety users demand a lot from their voice communications service. For example, they expect to be able to complete a one-to-many group call set up immediately at the push of a button. They also demand to be able to communicate directly "unit-to-unit" when they are beyond network coverage.

Public safety voice systems must provide high availability to users with multiple levels of back-up. Finally, the devices must be rugged and suitable for public safety environments.
These features are currently supported as fundamental operational features in existing standards-based, mission critical voice networks. Public safety users identify these as key features that must be replicated before voice services can be transitioned to broadband networks.

However, the current LTE standards do not cover these mission critical voice services, only consumer telephony services, as the 3GPP standards committee is primarily driven by the requirements of the cellular carriers and have not addressed these services. Various federal and public safety customer associations are in the process of specifying the requirements and examining the alternatives for standardization in the various standards setting bodies. There is no firm commitment on how and when these critical standards will be completed.

Second, adequate spectrum is necessary before broadband networks can accommodate mission critical voice traffic in addition to the video and data traffic. If the majority of public safety voice operations are transitioned to the 700 MHz broadband network, then the network must support the necessary voice capacity in a completely consistent and dependable fashion as is the

case with narrowband networks today. Technical evaluations are underway to better understand the impact that moving narrowband communications from multiple frequency bands would have on the 700 MHz broadband public safety network.

The timelines to address these two considerations are subject to debate with some arguing that standards could be completed in as little as three years, while others argue that achieving the full feature and performance requirements within a coordinated set of standards could take at least five to seven years, with a completion timeframe of eight to 10 years for development of production grade equipment and deployment.

The length of time the process can take is driven by the selection of a willing standards body, creation of the necessary standards for mission critical, public safety voice services, and then followed by the product development, certification and field testing to ensure the operational requirements of public safety are being met.

SYSTEM ARCHITECTURE AND GOVERNANCE CONSIDERATIONS

From an architecture standpoint, we believe the best approach is one that deploys regionally distributed infrastructure as this will ensure more robust physical site redundancy and disaster tolerance. This would mirror the architecture currently used in commercial carrier networks where regional LTE core components are deployed into major markets to reduce overall costs.

LTE cores are actually a small fraction of overall deployment costs and will be reduced even further as low cost small scale cores emerge. The initial costs of locating cores closer to the local traffic are recouped by reduced backhaul costs. This helps avoid routing traffic from regional cell sites to a far distant core and back to the local agencies over a national backbone.

Regionally based cores also allow a first responder to access both local and national applications from anywhere within the nationwide network as needed and as authorized. Interoperability with the 911 PSAP (Public Safety Answering Point), current land mobile systems and Next

Generation 911 would also be enhanced as the network and functions are locally/regionally based.

At the same time, while we support a regional architecture approach, we believe these regional cores should share a common nationwide network identification number which will essentially result in creating a single nationwide network by enabling all devices to operate in all areas of coverage of the public safety common architecture. The only roaming required would be from the public safety network onto commercial networks.

In addition to the network ID numbers, there are other architectural and governance components that also are best managed at the national level. These include, for example, the national IP backbone, the roaming clearinghouse to commercial carriers, the deployment of national interoperability applications, and the establishment of a nationwide network numbering plan and regional partitioning.

Overall, this regionally-focused architecture model may involve varying levels of national control that will impact overall system governance. We anticipate the model to be formed through collaboration between Congress, the Administration, state/local government and public safety users. As someone who designs public safety systems, I would just note there are good operational reasons to consider some level of regional control as this will best reflect how public safety operates today through local/regional Computer Aided Dispatch and incident command structures.

PROGRESS ON NATIONWIDE INTEROPERABILITY

While more needs to be done, public safety has made great strides in achieving interoperability since 9/11. This is due in large part to the focus state and local government has placed on the need to improve public safety first response to major incidents, as well as the adoption and implementation of the Project 25 (P25) standard supporting public safety interoperability.

Today, 27 states have deployed, or are in the process of deploying, statewide P25 public safety communications systems, with another four states planning upgrades of their existing statewide networks to the standard. There are a total of 187 P25 state and local systems in place today, a majority of which have been built with the help of federal funding. The vendor community has invested heavily in the standard -- the Project 25 Technology Interest Group identifies in excess of 12 vendors that produce compliant mobile and portable subscriber equipment. Some examples of "best practices" in public safety interoperability include the following:

State of Michigan

The Michigan Public Safety Communications System (MPSCS) is P25 standards-based 800 MHz radio system that enables first responders to communicate with each other regardless of jurisdiction or geographic location. There are over 1200 local, state and federal agencies representing over 60,000 first responders utilizing the MPSCS system today.

State of Ohio

MARCS (Multi-Agency Radio Communication System) is an 800 MHz radio and data network that provides statewide interoperability to its subscribers throughout Ohio. There are currently over 33,000 voice units and over 1,800 mobile data units on the MARCS system with over 700 public safety and public service agencies utilizing the system today.

State of Colorado

The Colorado Statewide Digital Trunked Radio System (DTRS) is a P25 standard-based system using 700 and 800 MHz frequencies. Today the DTRS supports 53,000 radios from over 990 user agencies representing all levels of local, county, tribal, state and federal government. This includes the recent integration of the Pikes Peak Regional Communications Network (PPRCN), providing interoperability with the Colorado Springs metropolitan and El Paso County areas, serving an additional 5,400 public safety responders.

State of Minnesota

Minnesota has invested in the Allied Radio Matrix for Emergency Response (ARMER) system; an 800 MHz P25 standards-based communications system for public safety agencies in the state. The system was recognized by FEMA in 2007 report (U.S. Fire Administration/Technical Report Series - I-35W Bridge Collapse and Response, Minneapolis, Minnesota, USFA-TR-166/August 2007) were it identified the system as a best practice in the public safety response to the incident, stating "the new 800 MHz radio system streamlined communications and enabled successful connections among a variety of organizations and agencies."
(http://www.usfa.dhs.gov/downloads/pdf/publications/tr_166.pdf)

San Diego County, California

The San Diego County Regional Communications System (RCS) provides seamless wireless voice and data communications for public safety and public service agencies in San Diego and Imperial Counties. The San Diego RCS incorporates the P25 standard and supports 217 government agencies and 15 dispatch centers, with over 20,000 radios operating on the system today.

CONCLUSION

Mr. Chairman, Motorola welcomes the opportunity to compete in a standards-based environment to help public safety realize its vision to have a truly interoperable nationwide broadband network. We look forward to working with the Subcommittee to further realize our shared vision of a competitive market providing innovative solutions for public safety communications.

Thank you.