Testimony of

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Chairman Walden, Ranking Member Eshoo, Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the advancement of public safety wireless communications. I serve as the Program Manager for the Public Safety Communications Research (PSCR) program, which is a joint effort between the National Institute of Standards and Technology (NIST) and the National Telecommunications and Information Administration (NTIA) at the Department of Commerce Labs located in Boulder, Colorado.

The Public Safety Communications Research (PSCR) program serves as the technical lead for several Administration initiatives focused on public safety communications. Our longest standing program sponsor is the Department of Homeland Security's (DHS's) Office for Interoperability and Compatibility (OIC) within the Science and Technology Directorate. The PSCR program is also involved in many of DHS's key communications interoperability-related programs, including the SAFECOM Program within the Office of Emergency Communications (OEC). Additionally, PSCR is sponsored by the First Responder Network Authority (FirstNet) to advance public safety broadband communications standards, and is developing additional research projects related to public safety broadband communications that PSCR is uniquely qualified to execute. The strong partnership among OIC, OEC, FirstNet, and the PSCR program is an excellent example within the Administration of multi-agency coordination and collaboration, and is something of which we at NIST are very proud. NIST greatly appreciates, as well, the confidence that Congress

placed in NIST by allocating critical funding for public safety communications research and development in the legislation that established FirstNet.

Working alongside our Federal partners, the PSCR program has played the lead technical role in key advancements in public safety communications over the last decade. In 2010, the PSCR program, in partnership with DHS OIC, deployed in the Boulder area a first-of-its-kind fourth generation (4G) Long Term Evolution (LTE) 700 MHz Public Safety Broadband Demonstration Network. This network was developed in collaboration with industry through Cooperative Research and Development Agreements (CRADAs) between NIST, NTIA, and over 75 individual industry partners to date. This public-private partnership has resulted in one of the most vendor-diverse 4G LTE networks in the world. The Demonstration Network allows PSCR to test and evaluate key broadband features critical to public safety, including multi-vendor interoperability, indoor/in-building coverage, and extended cell coverage possibilities for rural areas. PSCR is beginning the development of test plans for two vital features of a public safety broadband network: priority access; and quality of service. These features are fundamental to public safety operations because they will allow first responders to have guaranteed access to the network and the required level of network resources needed to do their jobs, such as video transmission or location services.

As part of PSCR's Modeling and Simulation efforts, PSCR conducts performance analysis of advanced communications networks using commercially available and in-house customized network modeling and

simulation tools. In support of the nationwide public safety broadband network, PSCR develops metrics and tools used to characterize the performance of LTE networks. These tools are used to:

- Estimate the resources (e.g., radio sites) required to build out the nationwide public safety broadband network
- Evaluate the performance of LTE technologies
- Provide insights on the performance trends and tradeoffs in order to identify the key factors that affect performance
- Define common performance metrics and a modeling approach to facilitate comparisons of network scenarios and deployments

PSCR continues to lead the requirements development efforts for public safety broadband, working directly in support of the National Public Safety Telecommunication Council (NPSTC). NPSTC's Broadband Working Group has developed requirements documents for Mission Critical Voice, Local Control, and Priority and Quality of Service that clearly define public safety's expectations of the nationwide broadband network capabilities.

In December 2012, NPSTC delivered the Public Safety Broadband Launch Requirements to the FirstNet Board of Directors and the Public Safety Advisory Committee (PSAC). The launch requirements define public safety's expectations for the nationwide network at launch. More recently, NPSTC delivered Push-To-Talk over LTE requirements to FirstNet. Current requirements efforts focus on the definition of "public safety grade" as it

applies to the nationwide broadband network. These requirements documents are used as the fundamental basis of PSCR's formal standards development efforts related to LTE, on behalf of FirstNet and the public safety community.

Based upon testing and evaluation, modeling and simulation, and requirement-gathering efforts, all of which inform the standards development efforts at PSCR, there have been significant advances in the commercial LTE standards specific to public safety. In December 2012, public safety was identified as the number one priority for the current version of LTE standards being developed within the 3rd Generation Partnership Project (3GPP), which is the official Standards Development Organization (SDO) for LTE. This is a major accomplishment, given public safety's limited user base compared to the worldwide commercial wireless user base (10-20 million vs. billions). With this added momentum, and as part of the NPSTC Mission Critical Voice requirements, PSCR is addressing the two largest gaps identified in LTE's ability to support Mission Critical Voice capabilities. PSCR recently launched an effort to standardize Mission Critical Push-To-Talk over LTE within 3GPP. One critical element of PSCR's success in standards development has been coordination with international public safety users and their governments who are also working toward public safety broadband. This will lead to a global public safety LTE marketplace, which should decrease costs while increasing the availability of advanced features to the worldwide public safety community.

Based upon lessons learned from the Demonstration Network and the P25 Compliance Assessment Program, PSCR participates in the global handset test community and has created the capacity for FirstNet-specific devices to be tested for conformance against standards by third party testing laboratories.

In order to help protect the estimated $100 billion capital investment that public safety has made in Land Mobile Radio (LMR), PSCR has been working with DHS to demonstrate the ability to interconnect LMR systems with commercial cellular broadband networks. These bridging system capabilities will allow FirstNet and the public safety community a graceful migration path for public safety's eventual use of LTE for mission critical communications. In addition to this effort, PSCR is working with DHS OIC to test prototype devices delivered to DHS that merge LMR and LTE technologies into one device.

In conclusion, PSCR will continue its public safety-driven approach to advancing communications technologies for our Nation's first responders, and we look forward to continuing and expanding our valuable partnerships across public safety, local, state, tribal and Federal government organizations, and industry. Again, I am honored to be here before this Subcommittee today, and I am happy to answer any questions that you may have.

Biography for Dereck Orr

Dereck Orr is the Program Manager for Public Safety Communication Standards within NIST's Office of Law Enforcement Standards, and has held that position since December 2002. In that role, he leads the Public Safety Communications Research (PSCR) program that serves as an objective technical advisor and laboratory to the Department of Homeland Security and public safety to accelerate the adoption and implementation of the most critical public safety communication standards and technologies. From October 2003 until October 2004, Mr. Orr was detailed to the Department of Homeland Security to serve as the Chief of Staff of the SAFECOM Office within the Science and Technology Directorate, to help establish the new program. Prior to working at NIST, Mr. Orr served as a professional staff member of the Senate Appropriations Subcommittee for the Departments of Commerce, Justice, and State, and Related Agencies under Senator Fritz Hollings. In that position, Mr. Orr was responsible for the appropriations accounts relating to state and local law enforcement issues. Prior to that, Mr. Orr served four years at the Office of Community Oriented Policing Services (COPS) at the Department of Justice. Mr. Orr received a Masters in Public Policy from the College of William and Mary and a Bachelor of Arts in American History from the University of Texas at Austin.