

**Testimony of Dr. George Rittenhouse, Vice President of Technology Integration for Bell Labs at
Alcatel-Lucent
Before the House Energy and Commerce Committee;
Subcommittee on Telecommunications and the Internet
Thursday, March 22, 2007
Achieving Interoperability for Public Safety Communications**

Background: Bell Labs has a rich background in wireless technologies – having first invented the concept of cellular networks back in 1947 and continuing through today with a leading edge research and innovation program in all major areas of wireless networking.

Prompt deployment of a national interoperable mobile communications capability is essential to the ability of public safety agencies to respond effectively to emergencies. This capability must include seamless interoperability across multiple jurisdictions and among various types of first responders (*e.g.*, police, firefighters, emergency medical personnel and others), and support advanced and high-bandwidth data applications. Further, such interoperability must be accomplished cost effectively while using the public-safety spectrum in an efficient manner.

National Capital Region: The deployment of an interoperable broadband network shared by multiple public safety agencies in the 700 MHz public safety band will achieve all of these objectives. Such a shared network is being successfully deployed in the National Capital Region (“NCR”), which incorporates 18 different jurisdictions in Maryland, Virginia and Washington, D.C. NCR is in the process of implementing a regional broadband wireless network in the Public Safety 700 MHz band. These efforts demonstrate that it is possible, through the deployment of a single shared regional network, for multiple public safety agencies across multiple jurisdictions to achieve cost-effective broadband interoperability in a spectrally efficient manner. There are three key ingredients to making this happen: using the right spectrum, employing the right technologies and centralizing what are now disparate networks. Testimony will address these key points:

- I. 700 MHz public safety band is ideally suited to accommodate interoperable broadband public safety communications on a national basis
- II. Broadband Technologies offer superior performance at a lower cost and therefore should be adopted by the public safety community for nationwide interoperability, benefits include: increased spectral efficiencies, higher data rates and throughputs, turnkey interoperability and leveraging commercial markets to reduce costs.
- III. To best address the needs of public safety, a shift is required from the prevailing model of regionally coordinated, individually owned and operated public safety networks to networks shared across multiple jurisdictions.

Conclusion: Our nation’s first responders deserve immediate access to interoperable broadband communications capabilities. The best way to accomplish this goal is by ensuring that the public safety community has access to, and the ability to deploy, broadband technologies already available in the commercial marketplace. Such technologies offer a turn-key solution to the nation’s ongoing interoperability challenges, while also providing the public safety community with the ability to support the most advanced communications applications, *i.e.*, greater spectral efficiencies, higher data rates, and higher throughputs. Further, by deploying shared networks using commercial broadband technologies, public safety can make the most efficient use of its limited financial resources. Such shared broadband networks can enable the public safety community to move from today’s disparate and disconnected communications capabilities to an advanced, fully interoperable system seamlessly accessible by numerous agencies and across multiple jurisdictions nationwide. The FCC’s recent waiver allowing the NCR to bring broadband communications capabilities to our nation’s first responders in the 700 MHz public safety band is an important and productive step towards achieving this objective. The FCC should proceed with the 700 MHz commercial auction as expeditiously as possible.

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Good morning Chairman Dingell, Chairman Markey, Ranking Member Barton, Ranking Member Upton and Members of the Subcommittee. My name is George Rittenhouse. I am the Vice President of Technology Integration for Bell Laboratories at Alcatel-Lucent – one of the world’s largest suppliers of telecommunications and networking infrastructure. Thank you for the opportunity to be here with you today to speak about this issue, which is so critical to the support of our public safety community. I would like to thank the Chairman and this committee for your efforts to ensure the 700 MHz commercial auction proceeds as expeditiously as possible, as well as the FCC for the steps taken to date in reviewing the utilization of the upper 700 MHz band. As you may know, Bell Labs has a rich background in wireless technologies – having first invented the concept of cellular networks back in 1947, and continuing through today with a leading edge research and innovation program in all major areas of wireless networking. I have a brief opening statement, and then I look forward to answering any questions you may have.

Prompt deployment of a national interoperable mobile communications capability is essential to the ability of public safety agencies to respond effectively to emergencies. This capability must include seamless interoperability across multiple jurisdictions and among various types of first responders (*e.g.*, police, firefighters, emergency medical personnel and others), and

support advanced and high-bandwidth data applications. Further, such interoperability must be accomplished cost effectively while using the public-safety spectrum in an efficient manner. The deployment of an interoperable broadband network shared by multiple public safety agencies in the Public Safety 700 MHz band will achieve all of these objectives.

Such a shared network is being successfully deployed in the National Capital Region (“NCR”), which incorporates 18 different jurisdictions in Maryland, Virginia, and Washington, D.C. NCR is in the process of implementing a regional broadband wireless network in the Public Safety 700 MHz band. These efforts demonstrate that it is possible, through the deployment of a single shared regional network, for multiple public safety agencies across multiple jurisdictions to achieve cost-effective broadband interoperability in a spectrally efficient manner. Let me spend the next few minutes discussing three key ingredients to making this happen: using the right spectrum, employing the right technologies and centralizing what are now disparate networks.

I. THE PUBLIC SAFETY 700 MHz BAND IS IDEALLY SUITED TO ACCOMMODATE INTEROPERABLE BROADBAND PUBLIC SAFETY COMMUNICATIONS ON A NATIONAL BASIS

As the committee is aware, the Public Safety 700 MHz band is ideally suited to support interoperable broadband communications. The spectrum already is allocated for public safety use, thereby avoiding the need for lengthy regulatory proceedings to identify and allocate appropriate spectrum resources. Further, after the broadcast television licensees expire in February 2009, it will be unused. As a result, new network infrastructure can be deployed across the band without disrupting existing incumbent users of the spectrum and without requiring public safety officials to discard that which they have already put in place. Moreover, 700 MHz spectrum offers favorable radio frequency propagation characteristics that enable enhanced coverage over large geographic areas as well as superior building penetration. This results in

substantially lower deployment costs for wide-area deployments when compared with higher frequency public safety spectrum allocations, such as the 4.9 GHz band. In addition, the close proximity of the Public Safety 700 MHz band to commercial spectrum bands on which broadband technologies already are, or soon will be, deployed will facilitate the sharing of commercial network infrastructure and technology between first responders and the private sector, which has the potential to substantially reduce the public safety community's deployment costs.

II. BROADBAND TECHNOLOGIES OFFER SUPERIOR PERFORMANCE AT A LOWER COST AND THEREFORE SHOULD BE ADOPTED BY THE PUBLIC SAFETY COMMUNITY FOR NATIONWIDE INTEROPERABILITY

Now let me turn to the technology piece of the equation. Most importantly, by leveraging the economies of scale and research and development expenditures of the massive commercial wireless market, broadband technologies are extremely cost effective in urban, suburban and rural deployments. Commercial broadband technologies are uniquely suited to provide first responders with technically superior high-bandwidth data capabilities that are both interoperable and highly cost efficient. Compared with wideband solutions and other older data technologies that have been considered by the public safety community for use in the 700 MHz band, broadband offers spectral efficiencies that approach the theoretical limit, superior data rates, long range and higher user throughputs. In addition, all commercial broadband technologies are inherently designed to offer enhanced voice and data interoperability, as well as backward compatibility across prior generations of equipment.

Increased Spectral Efficiencies. Broadband technology allows first responders to make much more efficient use of their existing spectrum. Specifically, broadband technologies enable all available channels to be used in every cell throughout a broadband network, *i.e.*, frequency reuse of one, where the same radio frequency channel is reused across an entire network. As a

result, a broadband network can carry more than ten times more data than a wideband network with the same bandwidth, thus allowing more simultaneous users to send and receive more data. Thus, broadband is ideally suited to accommodate the large number of first responders that are likely to respond to a major catastrophe. As a result of broadband's higher aggregate capacity, more data-intensive applications can be accessed by each first responder, and a larger number of users can be supported in a coverage area than is possible with other wide area public safety wireless technologies. Moreover, the single-carrier frequency reuse enabled by third-generation broadband technologies eliminates the need for detailed frequency coordination between local, state, and regional jurisdictions.

Higher Data Rates and Throughputs. Broadband technologies also offer the high data rates required to support the advanced, data-intensive applications required by today's first responders. All current commercial broadband technologies offer reliable data rates in excess of 500 kbps. These data rates far exceed of the capabilities of currently deployed public safety communications systems and are superior to other data technologies under consideration by first responders. Further, given sufficient spectrum resources, much higher data rates can be supported by the most recent generation of broadband technologies as new higher-bandwidth advanced applications are developed.

Turn-Key Interoperability. Seamless interoperability across both geographic deployments and multiple generations of technology are hallmarks of commercial broadband technologies. In fact, such capabilities are demanded by the commercial wireless market. Accordingly, first responders will be able to travel anywhere in the country with confidence that their communications equipment will be fully compatible with the networks of other jurisdictions. In addition, because commercial broadband technologies provide a high degree of

backward compatibility across prior generations of equipment, public safety agencies will be able to upgrade their communications equipment without stranding previously deployed equipment, disrupting existing users, or reducing overall interoperability. Further, broadband technologies provide native support of packet-switched Internet Protocol (“IP”) technologies, and hence are interoperable with other IP-based communications technologies.

Leveraging Commercial Markets to Reduce Costs. Adoption of commercial broadband technology will enable the public safety community to benefit from the decades of innovation funded by the private sector, as well as the substantial economies of scale available to the commercial markets. Driven by the competitive need to deploy new, revenue-generating services, commercial wireless providers and their technology vendors continually push the cutting edge of wireless technology. By adopting commercial broadband technologies, first responders can leverage the private sector’s research and development expenditures, thereby spreading the cost of innovation over a user base that is orders of magnitude larger than the public safety community standing alone. Not only can first responders leverage what commercial providers have developed to date, but they can continue to benefit from the ongoing technology improvements in the fiercely competitive commercial space by aligning themselves with commercial technologies. Also, the standardization required by commercial wireless providers results in massive economies of scale, which can dramatically reduce the cost of network infrastructure and each of the individual components that comprise user devices. Such continually decreasing costs have transformed commercial wireless service from a luxury item affordable by very few in the 1980s to a commodity enjoyed today by over 230 million American consumers. A substantial portion of these economies of scale will benefit the public safety

community if commercial broadband technologies are adopted by first responders, thereby providing the greatest benefit to the American people for such efforts as search-and-rescue.

III. THE PUBLIC SAFETY COMMUNITY SHOULD SHIFT FROM THE PREVAILING MODEL OF REGIONALLY COORDINATED, INDIVIDUALLY OWNED AND OPERATED PUBLIC SAFETY NETWORKS TO NETWORKS SHARED ACROSS MULTIPLE JURISDICTIONS

This Committee understands, as do those in the public safety community, that as a nation we need to shift from the prevailing model of regionally coordinated, individually owned and operated public safety networks to networks shared across multiple jurisdictions. To date, first responder networks generally have been deployed and operated at the local level using a “stove pipe” model in which each local public safety entity manages its individual network and pool of frequencies. Such a de-centralized approach does provide flexibility to individual agencies. However, this flexibility has had unintended negative consequences. Most notably, fragmented use of public safety spectrum and a patchwork of incompatible systems has restrained the development of interoperable communications across geographic regions and among various agencies. Further, it has resulted in inefficient use of spectrum. Accordingly, a shift to public safety networks shared across jurisdictions is necessary to promote interoperability.

IV. CONCLUSION

Our nation’s first responders deserve immediate access to interoperable broadband communications capabilities. The best way to accomplish this goal is by ensuring that the public safety community has access to, and the ability to deploy, broadband technologies already available in the commercial marketplace. Such technologies offer a turn-key solution to the nation’s ongoing interoperability challenges, while also providing the public safety community with the ability to support the most advanced communications applications, *i.e.*, greater spectral efficiencies, higher data rates, and higher throughputs. Further, by deploying shared networks

using commercial broadband technologies, public safety can make the most efficient use of its limited financial resources. Such shared broadband networks can enable the public safety community to move from today's disparate and disconnected communications capabilities to an advanced, fully interoperable system seamlessly accessible by numerous agencies and across multiple jurisdictions nationwide. The FCC's recent waiver allowing the NCR to bring broadband communications capabilities to our nation's first responders in the Public Safety 700 MHz band is an important and productive step towards achieving this objective.

Thank you for your time and attention. I appreciate the opportunity to share with you the work that Alcatel-Lucent and our partners are doing to secure the National Capitol Region. Additionally, I would like to invite all Members of this committee to come and kick the tires to see what we can accomplish today with commercially available off-the-shelf technology. With that, I am happy to answer any questions you might have.