

Michael T. McMenamin  
Global Govt & Public Affairs

1100 New York Avenue, NW  
Suite 640 West  
Washington, DC 20005  
Phone +1 202 312 5916  
Fax +1 202 312 5904  
mcmenamin@alcatel-lucent.com

10 July 2007

*VIA ELECTRONIC FILING*

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, S.W.  
Washington, DC 20554

**Re: Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules, WT Docket No. 06-169; The Development of Operational Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communication Requirements Through the Year 2010, WT Docket No. 96-86.**

Dear Ms. Dortch:

The 700 MHz band offers an unprecedented opportunity for policymakers to establish a framework to serve the communications needs of first responders both today and for years to come. Stakeholder participation in this proceeding is essential. Alcatel-Lucent ("ALU") values the decision by many parties in this proceeding to present technical views on the array of available options. Such open discourse is important to developing spectrum policy that maximizes the benefits of the 700 MHz public safety spectrum.

ALU takes this opportunity to respond to some concerns raised by the Hennepin County (MN) Sheriff's Office regarding the comparative capabilities of broadband and wideband technologies to serve the public safety community.<sup>1</sup> These issues are illustrative of the broader debate between broadband manufacturers and Motorola over the utility of introducing wideband systems in the 700 MHz public safety spectrum proposed for broadband designation. ALU below provides further detail on its public safety broadband system, the coverage capabilities of the broadband solution, and its costs. In addition, as noted below, if the Commission ultimately decides to make available an option to deploy wideband, it should proceed with adoption of the exclusive broadband designation and re-pack the narrowband allotments to free up spectrum that could be used for wideband.

As an initial matter, ALU is committed to working with the public safety community to deliver mission-critical wireless broadband solutions to first responders. ALU has developed, manufactured and deployed hundreds of large and small wireless networks across the globe – including the country's first public safety broadband network in the 700 MHz band, recently deployed in the National Capital Region. ALU welcomes the opportunity to work hand-in-hand

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<sup>1</sup> See Letter to the Federal Communications Commission from the Hennepin County Sheriff's Office, WT Docket No. 96-86 and PS Docket No. 06-229, (June 14, 2007) ("Letter").

with public safety agencies to design communications systems that meet the needs of first responders – after all, it is these first responders who put their lives on the line to protect the public.

ALU's broadband technologies provide comparable or greater coverage than wideband, with significantly higher system capacity and better cell-edge data rates, at a lower price per site and, with a well-engineered design, at a comparable system-wide cost. Throughout this proceeding, ALU has demonstrated that broadband solutions offer clear advantages over wideband.<sup>2</sup> This conclusion is true for both CDMA2000 EV-DO Rev A and the UMTS HSDPA technology standards.

*The ALU Public Safety Broadband Solution.* The current public safety broadband solution that ALU is deploying in the National Capital Region is based on the CDMA2000 EV-DO Rev A standard, a technology that offers sufficient flexibility to engineer deployments to meet varying public safety system needs. For example, based on a public safety system's needs (and its budget requirements), reliable data service can be provided over wide areas – while maintaining system capacity and cell-edge data rates superior to wideband.<sup>3</sup>

ALU is deploying the country's first public safety broadband network in the 700 MHz band in the National Capital Region, and the system will serve the needs of up to 35,000 local first responders spread across nearly 2,500 square-miles in the District of Columbia and 18 other jurisdictions in Maryland and Virginia.<sup>4</sup> The NCR system is designed to provide peak downstream data rates of 3.1 Mbps and upstream data rates of 1.8 Mbps.

Phase 1 of the initial National Capital Region system deployment includes 17 radio sites, redundant packet core infrastructure, with one primary and a second redundant, geographically diverse packet core, management infrastructure, and design and installation services. Because the core infrastructure can be used by all jurisdictions in the region, no additional core infrastructure is needed to complete the build out of the system. Each additional county will only have to acquire radio access sites to establish coverage. Finally, we note that several commercial broadband vendors competed for the opportunity to serve the National Capitol Region, allowing the NCR to obtain the best possible cost for its network. We note that in the context of a proposed wideband deployment, the ability for public safety to have several vendors compete for a wideband contract is largely absent.

*Coverage Analysis.* For purposes of providing an example of the capabilities of ALU's broadband technology in contrast to Motorola's wideband, ALU has created a design example for Hennepin County. ALU's design would provide coverage reliability to 95 percent of Hennepin

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<sup>2</sup> See e.g., *Comments of Lucent Technologies, Inc.*, WT Docket No. 96-86, June 6, 2006; *Comments of Alcatel-Lucent*, WT Docket Nos. 06-150, 06-169, 96-86 & PS Docket No. 06-229, May 23, 2007; *Reply Comments of Alcatel-Lucent*, WT Docket Nos. 06-150, 06-169, 96-86 & PS Docket No. 06-229, June 4, 2007.

<sup>3</sup> At like data rates, broadband achieves range comparable to wideband using industry-standard 3-sector antennas. Further broadband range enhancements can be accomplished through one or more of the following: Tower Top Low Noise Amplifiers, (greater than 3-sector) Multi-sector bases station configuration and repeaters.

<sup>4</sup> We note that the overall value of the contract is \$110 million. This figure represents the total value of an Indefinite Delivery Indefinite Quantity (IDIQ) contract, which allows the National Capital Region *and other regional systems* in other states outside the National Capital Region to purchase against this contract vehicle. Under this contract, multiple regions/states/state agencies have the ability to purchase from the contract up to a total amount of \$110 million.

County using three antenna sites, the same number of sites as the Motorola wideband system.<sup>5</sup> ALU's solution, however, would achieve substantially higher edge data rates – approximately 256 kbps for both forward and reverse link.

ALU can provide a broadband solution covering over 95 percent of Hennepin County with just three antenna sites by deploying a system using a coverage-based design.<sup>6</sup> This three high-site broadband system exceeds the current capacity needs of the county, providing for future growth of public safety data use.<sup>7</sup> Two primary factors determine the size of a cell and thus the number of antenna sites: coverage requirements (the fraction of a cell area that must be engineered to provide a minimum data rate) and capacity requirements (the total amount of traffic generated in a cell's coverage area). We note that the number of public safety broadband sites required to cover an area often will be lower than the number of sites deployed by commercial service providers over the same area. With roughly 100 times more commercial wireless customers than public safety users, higher volumes of commercial traffic trigger capacity requirements that typically limit the commercial wireless cell size in cities and suburbs; smaller cells are needed when the load generated in a coverage area typically exceeds the carrying capacity of a service provider's spectrum. In contrast, in our network design for Hennepin County, the size of the cells is determined by coverage requirements due to the low aggregate traffic requirements. More broadly, many public safety deployments can expect to deploy high-site towers for a given traffic demand and obtain greater coverage per cell site. Further, coverage-limited public safety broadband deployments will be able to achieve broader range because of the superior propagation characteristics of the 700 MHz band, allowing fewer sites to cover greater areas, combined with the use of high-site transmission towers.<sup>8</sup>

*Cost of the ALU Broadband System.* ALU agrees that “the cost driver” in public safety systems is “largely the number of antenna sites required.”<sup>9</sup> As described above, ALU's Hennepin County system would use three sites, just as the Motorola wideband system. ALU also agrees that “the cost per antenna site for high site broadband and high site wideband were comparable” when the cost of the switch is separated out<sup>10</sup> In this case, the cost per site for ALU's broadband

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<sup>5</sup> The three site system discussed here is based on an EV-DO Rev A system built to cover Hennepin County only. The attachment to ALU's June 11 ex parte presentation referenced Hennepin County coverage with two sites, an assessment that was based on an eight-county regional system deployment.

<sup>6</sup> ALU's design example is based on the following parameters: an average antenna height of 85m (Minneapolis site was set at 60m and the other two at ~95m – on par with sites listed in the Request for Waiver); a 24.8 dBm EIRP for the devices (the assumption was reflective of a device hooked up to a rooftop vehicle antenna); a 20 W base station transmitter power output; a 16 dBi 62° antenna (3 per site); a mix of urban, suburban and rural morphologies based on our understanding of the environment; and a 95% coverage reliability (as established in the RFP). Loading was set at 72% of pole capacity leading to a 5.5 dB noise rise on the inbound link. No building penetration or vehicle losses were considered. Our design indicates that 96.6% of the 611 sq-miles or so can be covered when designing for a nominal data rate of 153 Kbps for both inbound and outbound links. Because of the way EV-DO Rev A operates (e.g. effect of early termination) and in view of our field experience, the corresponding effective rates can become 256 Kbps and higher for both links.

<sup>7</sup> Aggregate traffic across the whole county, based on an average busy hour traffic profile suggested in the RFP, is less than 1 Mbps for either inbound or outbound link.

<sup>8</sup> In addition, ALU also points out that its system solution would provide coverage in Hennepin County with far fewer antenna sites than the proposals put forward by IBM and Northrop Grumman as described in the record. While ALU does not have access to the IBM or Northrop Grumman proposals, a number of factors are relevant to any comparative assessment, including whether the proposals relied on cellularized or high-site architectures, whether sector antennas were used, the designed data rate at the edge of a broadband cell footprint, and the morphology employed. These factors, alone or in combination, could have significant effect on the system design.

<sup>9</sup> Letter at 2.

<sup>10</sup> *Id.*

system is less expensive than Motorola's wideband system. Moreover, ALU's budget estimate for a core switching infrastructure serving three 3-sector broadband base stations (cell sites) would be priced at less than \$1.5 M – less than the amount that was estimated for a wideband switch.<sup>11</sup> This same core switching infrastructure would serve the 3 sites in Hennepin County as well as 15 additional sites throughout the Metropolitan Emergency Services Board's coverage area.

*Wideband in the Narrowband Allocation.* Finally, if the Commission decides that it must provide an opportunity for public safety agencies to deploy wideband systems in the 700 MHz band, it should only allow such operations in the narrowband spectrum. The Commission should not shortchange broadband, or the promise of interoperable broadband communications, and re-packing the narrowband allotments preserves these important policy goals. There is a process available to do this: as part of the consolidation of the narrowband spectrum, the current 700 MHz narrowband allotments can be re-packed to free up frequencies for other uses including possibly wideband. The Commission should consider this viable solution that protects the integrity of its tentative conclusion to designate half of the 700 MHz public safety spectrum for broadband use.

In accordance with Section 1.1206(b)(1) of the Commission's rules, this letter is being filed electronically with your office. Please contact the undersigned with any questions in connection with this filing.

Respectfully submitted,



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Michael T. McMenamin

cc: Erika Olsen  
Bruce Gottlieb  
Barry Ohlson  
Renee Crittendon  
Aaron Goldberger  
Angela Giancarlo  
Derek Poarch  
Dana Shaffer  
Jeff Cohen  
Fred Campbell  
Jim Schlichting

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<sup>11</sup> *Id.* ALU's system design uses EV-DO Rev A as an example of broadband technology.