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Ms. Marlene H. Dortch
Secretary,
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

In Re: 700 MHz Interoperable Broadband Public Safety Network
PS Docket No. 06-229; WT Docket No. 06-150

Dear Ms. Dortch:

On Thursday, July 30, 2009, Stacey Black, Assistant Vice President of AT&T Services, Inc. ("AT&T") and the undersigned met with Jeff Cohen, Jean Ann Collins, Jerome Stanshine, Ahmed Lahjouji, Kurian Jacob, Brian Marenco and Behzad Ghaffari of the Public Safety and Homeland Security Bureau, Ziad Sleem, Paul D'Ari and Erik Salovaara of the Wireless Telecommunications Bureau, Jon Peha of the Office of Strategic Planning and Policy, and Walter Johnston of the Office of Engineering and Technology to discuss the development and design of interoperable broadband public safety networks in the 700 MHz band. During this meeting, AT&T indicated its support for the public safety community's proposal to reallocate the 10 MHz of 700 MHz D Block commercial spectrum (*i.e.*, 758-763/788-793 MHz) to public safety services for use in tandem with the existing 10 MHz of 700 MHz public safety broadband spectrum (*i.e.*, 763-768/793-798 MHz). AT&T agrees with public safety that this action represents the last, best opportunity for public safety to develop a state-of-the-art broadband network with sufficient capacity to accommodate 4G applications.

Eight major public safety agencies recently announced a "consensus position" to "petition Congress to reallocate the D Block creating a single 20 MHz block of broadband spectrum for use by public safety."[1] As detailed in the attached presentation that was distributed to the FCC staff in attendance, AT&T fully supports public safety on this issue and believes the allocation of 20 MHz of contiguous spectrum is necessary to meet public safety's communications needs. The tragedies of 9/11 and Hurricane Katrina provided a searing lesson regarding the need for reliable, interoperable public safety communications. Despite this lesson – which the 9/11 Commission memorialized in its

[1] *See* "Public Safety Associations Meet to Form Consensus on the Development of a Nationwide Broadband Network," APCO Press Release (May 28, 2009) ("May 2009 APCO Press Release"), *available at* http://www.apco911.org/new/news/nationwide_broadband_network.php. Other public safety agencies also have articulated support for reallocating the D Block spectrum to public safety. *See* NYC Request at 11 ("The City urges that the D-Block spectrum be made available directly to public safety nationwide. Understanding that the Commission cannot unilaterally allocate the D-Block spectrum without Congressional approval, the City respectfully requests that the Commission support our efforts to petition Congress to undertake such allocation to public safety.").

Final Report over five years ago[2] – there is still no adequate plan for addressing it. Combining the contiguous 700 MHz D Block and 700 MHz public safety broadband spectrum represents the last, best chance to build a cost effective, interoperable broadband network that will serve public safety's needs for the future.

Similarly, AT&T endorses the position of several public safety agencies that support the use of Long Term Evolution ("LTE") technologies for constructing public safety networks capable of providing state-of-the-art communications services and applications. For example, the Association of Public-Safety Communications Officials ("APCO") and the National Emergency Number Association ("NENA") have endorsed "LTE as the technological standard to be used in the development of a nationwide interoperable broadband network in the 700-MHz band assigned to public safety."[3] Subsequently, the National Public Safety Telecommunications Council ("NPSTC"), a federation of associations representing the broad scope of public safety activities, has "unanimously endorsed LTE . . . technology as the air interface for a nationwide 700 megahertz band broadband network for public safety."[4] Most recently, the Public Safety Spectrum Trust ("PSST") unanimously endorsed LTE as the fourth-generation air interface for a nationwide broadband public safety network.[5]

By relying on LTE technologies, public safety can leverage existing LTE infrastructure and equipment and partner with commercial service providers and manufacturers to reduce network deployment and operation costs. Public safety, including first responders in smaller communities, will benefit from a huge marketplace for 700 MHz LTE products as the overwhelming majority of commercial 700 MHz broadband networks will utilize 3rd Generation Partnership Project ("3GPP") LTE technology or a commercially available standard air interface that will evolve to LTE.[6]

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[2] *9/11 Commission Final Report*, at 397 (July 22, 2004) ("The inability to communicate was a critical element at the World Trade Center, Pentagon, and Somerset County, Pennsylvania, crash sites, where multiple agencies and multiple jurisdictions responded. The occurrence of this problem at three very different sites is strong evidence that compatible and adequate communications among public safety organizations at the local, state, and federal levels remains an important problem . . . Congress should support pending legislation which provides for the expedited and increased assignment of radio spectrum for public safety purposes.").

[3] *See* "APCO & NENA Endorse LTE as Technology Standard for the Development of Nationwide Broadband Network," APCO Press Release (June 9, 2009), available at http://www.apco911.org/new/news/nena_endorse_lte.php.

[4] "NPSTC Endorses LTE as Air Interface for Nationwide 700 MHz Band Network," TR Daily (June 10, 2009).

[5] "PSST Endorses LTE for Nationwide 700 MHz Band Network," TR Daily (July 24, 2009).

[6] A majority of the top ten winning bidders in Auction 73 have stated their intention to use LTE in the 700 MHz band including, AT&T, Verizon Wireless, MetroPCS, Cox Wireless, King Street Wireless, and CenturyTel Broadband Wireless. Two of the remaining top 10 bidders – Frontier Wireless (Echostar) and Qualcomm – are presumably using their spectrum for video delivery. The remaining two bidders – Cellular South and Vulcan Spectrum – have not stated what technology they will use for their spectrum.

Furthermore, since many of the features and benefits of LTE are independent of the actual frequency band being used, public safety will benefit from the on-going developments and future versions of the 3GPP LTE standards. Among other things, these standards will facilitate 3G roaming for public safety users and ensure priority of service for emergency calls, negating the need for public safety to have to develop its own standards in these areas.[7] While the needs of public safety and commercial providers may differ, public safety applications will run on top of the IP-based protocols within LTE and will still leverage the world-wide design and development of LTE networks and devices.[8] Further, public safety's use of commercial LTE standards will facilitate partnerships with small and midsize commercial carriers and manufacturers. AT&T envisions a model in which a commercial partner's opportunities could range from providing turn-key solutions to simply hosting base stations, all depending on the unique needs of the public safety entity.

More importantly, LTE will be the most advanced and spectrally efficient technology for the foreseeable future. In the 3GPP Release 8 assessment of LTE 4G Class, the estimated feasible peak data rates range from greater than 100Mbit/sec to over 300Mbit/sec in the downlink direction under certain channel spectrum bandwidths and deployment models.[9] In the LTE-Advanced enhancements specifications, 3GPP anticipates supporting 4G peak channel downlink data speeds of up to 1 Gbit/sec as a function of the mobility environment, available channel spectrum bandwidths and deployment option models within the technology definition.[10] LTE has the advantage of global economies of scale derived from user pools exceeding two billion and compatibility with future networks.[11] LTE supports many advanced radio features for

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[7] The 3GPP standards will provide seven levels of priority service. *See* "3GPP TR 22.952 V8.0.0 2008-12; 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Priority service guide," Release 8.

[8] As a world-wide standard, LTE will provide greater economies of scale and a larger ecosystem of products compared to other technologies.

[9] *See* "3GPP TR 25.912 V8.0.0; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Feasibility Study for Evolved Universal Terrestrial Radio Access (UTRA) and Universal Terrestrial Radio Access Network (UTRAN)," Release 8, at Section 13.1 (Dec. 2008), *available at* http://www.3gpp.org/ftp/Specs/2009-06/Rel-8/25_series/.

[10] *See* "3GPP TR 36.913 V8.0.1; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Requirements for Further Advancements for Evolved Universal Terrestrial Radio Access (E-UTRA) (LTE-Advanced)," Release 8, at Section 7.1 (Mar. 2009), *available at* http://www.3gpp.org/ftp/Specs/2009-06/Rel-8/36_series/.

[11] 4G technology selection work is actively under way in the ITU-R (under the terminology IMT-Advanced) with full participation by global industry and governments. To date, no technologies have been sanctioned as 4G. However, the 4G requirements, evaluation criteria, and timelines have been defined by ITU-R, and the LTE enhancements meet/exceed these criteria. 3GPP will submit "LTE-Advanced," which is planned as Release 10 of LTE, as the preeminent 4G candidate. Final industry-wide candidate technology submissions will be made in October 2009 to ITU-R as entries in the defined ITU-R IMT-Advanced (4G) selection/confirmation process, see http://www.itu.int/ITU-R/index.asp?category=study-groups&rlink=rsg5-imt-advanced&lang=en.

improved coverage and capacity. These include transmit diversity for enhanced coverage and reliability and also MIMO (multi-input, multi-output) for enhanced throughput. Through LTE, public safety will be able to take full advantage of bandwidth intensive 4G applications with quality of service (QoS), including:

- Optical license plate recognition systems
- Indoor and outdoor access and transmission of streaming video
- Access to high resolution building schematics
- Location-based services
- Telemetry, including wireless patient tracking, health monitoring and diagnostic services
- Integrated dispatch
- Database transactions
- Collaboration tools
- VoIP applications
- Push-to-talk voice
- Messaging
- Mobile office
- Web-browsing
- Virtual, secured private networking

These advanced, bandwidth intensive 4G applications, however, will require a full 20 MHz of contiguous spectrum (10 MHz uplink and 10 MHz downlink). Based on many hard learned lessons, anything less than a full 20 MHz of contiguous spectrum simply will not be cost effective and will not allow implementation of the 4G applications required by public safety. Combining the two 5 MHz channels allocated to the commercial D Block with the two 5 MHz channels allocated for 700 MHz public safety broadband communications offers the best technical solution. With both 5 MHz blocks combined in a single 10 MHz paired allocation, broadband and multi-media applications can be supported for a larger number of users. Also, by utilizing the 10 MHz of spectrum into a single channel, complicated network sharing agreements can be avoided and the need to build two separate networks (or at least two separate radio channels) can be eliminated.

Further, public safety's demand for bandwidth will only intensify with the advent of advanced 4G wireless applications and services, making anything less than a 20 MHz allocation unacceptable.[12] Historically, public safety's demand for bandwidth has grown at exponential rates, and there is no reason to expect the demand to plateau. In the 1980s, for example, public safety used low-bandwidth text-based mobile data terminals. Eventually, public safety's communications preferences evolved to PC-based Internet and

[12] Although compression techniques will increase spectrum efficiency over time, the demand for greater bandwidth will easily outpace any efficiency gains as new applications and services become available.

web applications. Indeed, since the introduction of 3G technologies, public safety has adopted high bandwidth applications such as streaming video, high resolution imagery, geographic information systems, and victim, patient and evidence tracking systems. As public safety adopts 4G technologies like LTE, public safety's need for additional spectrum for bandwidth-intensive 4G applications and tools will only increase. And this need for ample bandwidth will be even greater during multi-agency response efforts in discrete geographic area. Without 20 MHz of broadband spectrum, the network congestion caused by the more advanced services and applications may foreclose some public safety users from accessing the network, thereby impacting interoperability and potentially stranding roaming first responders.

Further, providing public safety with this critical mass of spectrum at the beginning of network development will allow public safety to take advantage of operational efficiencies. LTE, as standardized by 3GPP, will support varying channel bandwidths from 1.4 MHz to 20 MHz channels. The base station hardware to support a 5 MHz channel will be priced similarly to that required for a 10 MHz channel. Thus, a single 10 MHz channel will be a cost effective way for public safety to deploy a broadband network with adequate capacity for future uses. Expanding public safety's capacity by using the spectrum immediately adjacent to the public safety broadband spectrum, *i.e.*, the D Block spectrum, will limit the number of separate frequency bands that must be supported which will help limit the costs of devices.

Providing a contiguous 20 MHz block of spectrum for public safety use is more effective spectrum management than preserving the existing allocation of two 10 MHz blocks – one for commercial uses and one for public safety. If not combined with other spectrum, the 10 MHz of commercial D Block spectrum is sub-optimal for new services, will not be cost effective, and does not make sense to move forward with implementation. While new spectrum allocations are ultimately beneficial for commercial applications, not all spectrum is fungible and blocks of non-contiguous spectrum are not attractive for public safety for technical as well as financial reasons (*e.g.*, increased device costs to support another frequency band, limited radio channel bandwidth, etc.). In contrast, combining the D Block with the contiguous public safety broadband spectrum at 700 MHz maximizes the value of the two allocations, and enables public safety to limit device and network costs. Moreover, the D Block and the public safety broadband spectrum are the last available contiguous 20 MHz of spectrum under 2.5 GHz available for public safety.

AT&T therefore supports public safety's proposal to "petition Congress to reallocate the D Block creating a single 20 MHz block of broadband spectrum for use by public safety."[13] It is simply the right thing to do for the public safety community.

Pursuant to Section 1.1206 of the Commission's rules, an electronic copy of this letter is being filed for inclusion in the above-referenced docket.

Respectfully Submitted,

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Attachment

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Erik Salovaara
Jon Peha
Walter Johnston

[13] *See* May 2009 APCO Press Release.

Public Safety Broadband

July 30, 2009

Public Safety Will Need 20MHz of Contiguous Spectrum

A solution that combines the D Block (758-763 MHz and 788-793 MHz bands) and the lower half of the public safety spectrum (763-768 MHz and 793-798 MHz bands) and reallocates that 20MHz of spectrum for use by public safety will be required for bandwidth intensive, 4G applications, including optical recognition systems, streaming video, VoIP applications, and collaboration tools that cannot be supported with only 10 MHz.

•The latest LTE standard is defined in 3GPP release 9 and provides for up to 20 MHz of continuous spectrum and provides a natural migration path to 4G.

• The 3GPP Release 10 standard is expected in early 2011 and will provide the standards for "LTE advanced" or "true 4G" and it is anticipated that the bandwidth requirement will be up to 100 MHz of spectrum.

• **It must be recognized that the 700 MHz D-Block spectrum is public safety's last opportunity for building a cost effective, interoperable broadband network.**

Current and Proposed Band Plan

- In the current band plan, CMRS (758-763 MHz and 788-793 MHz bands) and PS (763-768 MHz and 793-798 MHz bands) are each allocated a 5 MHz paired block (5 MHz Downlink + 5 MHz Uplink) for broadband services in the Upper 700 MHz band. While this may allow both commercial and PS operators to launch service, it should be recognized that looking forward these spectrum blocks would be sub-optimal for public safety. This would limit each public safety network to a single 5 MHz radio channel and this will limit performance as the networks continue to add users and new services.
    - While any new spectrum could be said to be attractive for commercial services, it must also be recognized that blocks of non-contiguous spectrum may not be attractive for technical as well as financial reasons (e.g. increased device costs to support another frequency band, limited radio channel bandwidth, etc.).

- To provide PS with a more future-proof system the full 10 MHz paired allocation (10 MHz + 10 MHz) or (758-768 MHz and 788-798 MHz bands) should be fully allocated to PS.
    - LTE, as standardized by 3GPP, will support 1.4 MHz to 20 MHz channels. The base station hardware to support a 5 MHz channel will be similar to that for a 10 MHz channel. Thus, a single 10 MHz channel will be a cost effective way for PS to begin using broadband services. In addition, it could also be argued that a single 10 MHz radio network will cost less than 2 separate networks that are each using separate 5 MHz radio channels.

Providing Public Safety With a Future-Proof Network

• To get the "biggest bang for the buck" and to provide PS with a more future-proof network, the best solution is to use the spectrum that is adjacent to the current PS allocations in Upper 700 MHz. This has several advantages:

- Using the adjacent spectrum block in Upper 700 will limit the number of separate frequency bands that must be supported and this will help to limit the costs of devices.
- With both 5 MHz blocks combined into a single 10 MHz paired allocation, broadband and multi-media applications can be supported for a larger number of users.
- Complicated spectrum sharing agreements can be avoided and the need to build two separate networks (or rather two separate radio channels) can be eliminated.
- The localized nature of public safety will increase the chances of congestion in a single cell sector. Having all 20MHz available will provide public safety the necessary bandwidth in order to accommodate a high number of users in a small geographic area during and an incident

Capabilities of 4G LTE

• LTE will make it possible for public safety to engage in real-time visual networking, transmit videos wirelessly from a camcorder, or download full-motion video of road conditions or other hazardous conditions.

• Applications and Services with QoS attributes offered simultaneously require LTE type data rates. Examples of these applications include; web browsing, mobile voice, push to talk (PTT) voice, indoor video, outdoor video, location services, database transactions, messaging, network operations data, dispatch data, generic traffic, telemetry, and virtual private networking.

•As a world-wide standard, LTE will provide greater economies of scale and a larger ecosystem of products compared to other technologies. While the needs of PS may be different than commercial services, PS applications will run on top of the IP-based protocols within LTE and will still leverage the world-wide design and development of LTE networks and devices.

LTE Will Supply PS a State of the Art System With Advanced Features

- To provide public safety a state of the art, packet based, system with advanced features, including MIMO and QoS, and with the most capacity that is possible in the current band plan, LTE should be utilized in a 10 MHz paired allocation (10 MHz D block-758-763 MHz and 788-793 MHz bands) + 10 MHz Public safety(763-768 MHz and 793-798 MHz bands). This cannot be done with existing 700 MHz spectrum assignments.

- LTE supports many advanced radio features for improved coverage and capacity. These include transmit diversity for enhanced coverage and reliability and also MIMO (multi-input, multi-output) for enhanced throughput.
    - At this point, most commercial systems are targeting the use of 2x2 MIMO using two transmitters at each base station sector and two receivers within each mobile device. Thus, the system can adaptively switch between using transmit diversity and MIMO depending on the location and signal characteristics of each user.

The Leveraged Network Model

A bold new approach that meets the needs of public safety and government– an approach that will provide public safety exclusive access to the 20 MHz of 700 MHz spectrum using fully-dedicated radio access network (RAN) equipment while driving cost-efficiencies by leveraging the core network systems of commercial operators. Here's how a "leveraged network model" would work:

• The 700 MHz D Block(758-763 MHz and 788-793 MHz bands) would be reallocated as public safety spectrum providing a total of 20 MHz of contiguous spectrum for public safety broadband use. This will require a statutory amendment.

•Congress would allow public safety to use new or existing grant programs to fund the purchase of dedicated RAN equipment and managed broadband services.

•Public safety entities would use a standard RFP processes to determine capital and operational expense projections, select the network management model that best meets their needs, and apply for grants from existing federal programs or other sources.

•The FCC would establish minimum network standards to ensure interoperability and grant 20 MHz broadband licenses conditioned on timely construction of a network and compliance with the national interoperability standards.

The Leveraged Network Model (Cont.)

•Public safety would negotiate agreements with commercial operators, system integrators, infrastructure vendors, or tower site vendors for network equipment and systems based on their preferred network management model.

•Public safety would enter into spectrum manager leases with a commercial operator to enable the connection of their dedicated 700 MHz public safety RAN equipment to the operator's core networks, providing them with access to provisioning, billing and other IT systems to support the public safety services. Leveraging core network assets already deployed will significantly reduce the overall cost to the government and the time needed to deploy the public safety systems.

•This model works by dedicating essential spectrum and RAN network resources to public safety while maximizing economies of scale for network support services, leveraging operators' 24/7 network operations, Service Quality Management and device provisioning systems, and help desk support already in place. This approach essentially provides a "private network inside a commercial network" experience.

•The leveraged network model will also bring the benefits of broadband to both rural and urban public safety agencies, to create a path for immediate broadband access as well as long-term use of dedicated 700 MHz spectrum sufficient to meet growing 21st century public safety needs.