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July 7, 2011

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

In Re: PS Docket No. 06-229
Ex Parte Notification

Dear Ms. Dortch:

On July 5, 2011, I, Michael Simpson, Todd Early, and Cynthia Cole representing the State of Texas, along with Bruce High, Doug Adkinson, Robert Cavazos, Barbara Armstrong, and Patty Kenyon representing Harris County, TX, and Mark Poulin from Motorola Solutions, Inc., met with Jennifer Manner, Gene Fullano, Pat Amodio, Behzad Ghaffari, Yoon Chang, Dan Richey, and Erika Olsen, all of the FCC Public Safety and Homeland Security Bureau.

The topic of the meeting was to discuss with the Public Safety and Homeland Security Bureau the attached draft Executive Summary portion of the *Interoperability Showing - Technical and Operational Response for the State of Texas 700 MHz Broadband Public Safety Network.*

Respectfully Submitted,

/s/ Michael Simpson
Michael Simpson
Assistant Director for Law Enforcement Support
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cc: (via email)

Jennifer Manner	Behzad Ghaffari	Pat Amodio	Erika Olsen
Gene Fullano	Yoon Chang	Dan Richey	

State of Texas

Public Safety LTE Interoperability Showing Technical and Operational Response

July 4, 2011

DRAFT

A. Executive Summary

A.1 Introduction

This Interoperability Showing Technical and Operational Response is intended to demonstrate the technical and operational proficiency of the State of Texas (the "State") necessary to achieve operability and interoperability of public safety broadband networks in accordance with FCC Waiver Orders adopted on May 11, 2010, December 10, 2010, and January 25, 2011, docket number PS 06-229. This document will also outline, to the extent they are understood at this juncture, the strategies, methods and process the State of Texas intends to implement in order to achieve a statewide Public Safety Interoperable LTE network which achieves the stated objectives of achieving a fair and competitive procurement environment for Public Safety agencies desiring to build-out in Texas under authority granted to Texas in the FCC May 12, 2011 Waiver Order, and subsequent spectrum lease to Texas by the Public Safety Spectrum Trust (PSST), the nationwide licensee for the public safety broadband frequencies of 763-768/793-798 MHz.

As a state which has historically led the nation in annual federal disaster declarations, Texas is dedicated and committed to statewide cooperation and a collaborative effort in building and operating public safety LTE infrastructure to provide the highest level of prevention, protection, response, and recovery from acts of terrorism and other catastrophic events in the State and nation[1]. The State of Texas also commits in this showing, that the State will ensure early deployments are developed to be consistent with the overall plan for intra-state and intra-regional interoperability, serve as a single interface with the PSST and the FCC's Emergency Response Interoperability Center (ERIC), and facilitate coordinated equipment development and purchases[2].

The State of Texas will deploy a 700 MHz interoperable public safety wireless broadband network which is in compliance with these orders, and will implement the statewide network in phases, beginning with the BIG-Net[3] project as the first phase being implemented for the Houston metropolitan and coastal region. As such, implementation details of the BIG-Net project are included herein. Additional interoperability showings will be presented to the FCC in advance of construction of future infrastructure phases. The State of Texas intends to promote a competitive multi-vendor environment in future phases of network implementation. The State of Texas will work closely with the Commission to ensure that compliance is maintained through each phase of the deployment with interoperability showing updates and quarterly reports to the Commission. Indeed, the FCC acknowledged that "to the extent that Texas plans to deploy its network in phases, we expect that each phase would carry independent obligations to submit an interoperability showing under this Order".[4]

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[1] *See* "*Petition by the State of Texas For Waiver of the Commission's Rules to allow Establishment of a 700 MHz Interoperable Mobile Public Safety Broadband Network*", filed by the State of Texas, Mike Simpson, September 10, 2010, page 4.

[2] *Id.* page 5.

[3] BIG-Net is the brand name for the Broadband Interoperability Gateway Network

[4] See Waiver Order, "*Requests for Waiver of Various Petitioners to Allow Establishment of 700 MHz Interoperable Public Safety Wireless Broadband Networks*", PS Docket 06-229, page 5.

A compliance summary for Harris County BIG-Net is provided in Appendix E. Additionally, this showing is intended to demonstrate capabilities to comply with any and all future FCC rules and orders under said docket.

A.2 State of Texas Objectives for PS LTE

In recognition of the dramatic and potentially transformational benefit that Public Safety (PS) LTE broadband services will bring to Public Safety users in our region, the State of Texas has made the deliberate decision to pursue early deployments of PS LTE in Texas. This leadership is evidenced by the Texas Petition for 700 MHz waiver, the granting of such waiver by the Commission, the execution of a lease for the spectrum lease with PSST in a timely fashion, the FCC's approval of that lease, and the willingness on the part of a leading Public Safety wireless provider in the state, Harris County, to proceed with an early deployment one this interoperable showing received Commission approval. In taking on the early deployment, the State understands this endeavor will result in additional risks, costs and burdens on State resources and projects. Other public safety agencies within Texas have indicated an eagerness to get started. The State is acutely aware of the critical need to guide and direct them toward a viable, interoperable solution. As a committed partner in the vision toward a National Public Safety Broadband Network, the State of Texas is willing to take on some of the initial burdens in order to put the technology into the hands of Texas' first responders sooner, and help pave the way for similar deployments across the nation.

The State of Texas recently released[5] a clear set of high level objectives associated with the early deployment of PS LTE:

- To create an effective and interoperable 700 MHz Interoperable Mobile Public Safety broadband network service which, when fully deployed, will enable Public Safety users operating in Texas to be safer, more responsive, and more effective in the saving of lives and property.
- To enable an early deployment of an interoperable 700 MHz PS LTE network in Texas.
- To facilitate an open, standards-based 3GPP LTE environment which supports a healthy, competitive multi-vendor procurement of network infrastructure and terminal devices, while enabling LTE suppliers to innovate and produce sustainable products and services.
- To support the eventual deployment of a Nationwide Public Safety Broadband Network by working closely with agencies within Texas, other states within Region VI, federal agency partners such as the Commission, PSCR and of course, working with the nationwide network governance entity (NNGE), once it is established.
- To aggressively explore possibilities for Private/Public partnerships in order to leverage existing commercial capabilities and associated economies of scale. Among the more urgent areas for this partnership is the need to leverage commercial 3GPP Conformance and Interoperability Testing (IOT) programs.

[5] Released in invitation to Region VI Public Safety LTE Interoperability Forum

A.3 Multi-Vendor System Architecture Summary

As described later in this document, the State of Texas is embarking upon a focused effort to determine an effective and manageable approach to incorporate multi-sourcing into the State of Texas PS LTE environment. The State will be gathering information from key industry players regarding which interoperability interfaces are most critical, where the risks are and how these choices impact interoperability. Multi-source designs will be pursued at the EPC core layer, examined regarding the HSS and the eNodeB layers, this investigation is being pursued vigorously by the LTE Forum program described in section C.1; an illustration used to spark a lively debate at the session is shown below. Especially for LTE device certifications, the State plans to lean heavily on the carriers and the PTCRB process also in development.[6]

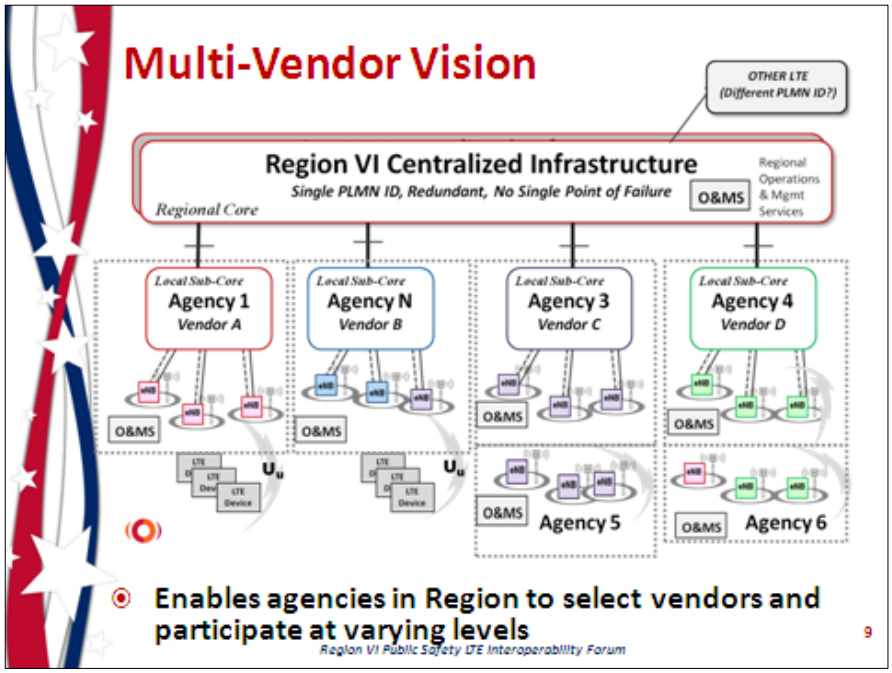

Figure 0 – This illustration, used to introduce the discussion at a recent session, shows a Multi-Vendor architecture concept needed to maintain an open, multi-vendor and competitive procurement environment.

The applications planned for the network are in their formative stages and will be further refined as the needs and requirements of the end users are examined. For the initial system rollout of BIG-Net, the system will support: internet access, authorized VPN access, status/information homepage, ICS access and field base data and server applications.

As the network expands and evolves, the State of Texas is looking toward the full range of potential applications, including: streaming video, video transfer, silent dispatch by CAD/MDT, location services, SMS/MMS, federal database access, fingerprint identification, automatic license plate reader, intelligent transportation systems, medical telemetry and access to hazmat, building plans and critical infrastructure information.

[6] *See Interoperability Order*, ¶18

Implementing a network with the level of reliability and availability required by mission critical public safety networks requires a variety of approaches at all stages of network planning and maintenance. The State of Texas PS LTE network will provide high reliability and high availability components for all layers of the network: HSS, network operations center, EPC, WAN/transport and the RAN/eNodeB's. The specifics of this design as it relates to the broader multi-vendor architecture will be developed as part of the broader network design and requirements process.

All other aspects of the network design including security services, authentication, encryption, RF design, RF coverage, interference will be approached per the guidance and recommendations of the Commission, PSST, ERIC, NPSTC and PSCR, among others. The State will be paying particular attention to the guidance documents published by the ERIC PSAC working groups.

More technical details on these and other topics are provided in the sections below.

A.4 Summary

In summary, it should be emphasized that the State is in an early stage of project planning. As directed by the original Waiver Order[7], the State of Texas will submit quarterly reports to provide progress on the planning, funding, deployment and interoperability testing. The following sections provide more detail on the programs we have undertaken to begin the network design, demonstrations, trial network and planning efforts.

The State of Texas would like to once again emphasize the deep commitment toward developing the strategies, programs and processes needed to ensure that the State of Texas Public Safety LTE network is compliant with 3GPP LTE standards, that it is fully interoperable with a nationwide network and other regional networks and that it be deployed and managed in a way that allows the State to sustain and evolve its interoperable capabilities.

B. Processes for Establishing and Sustaining Interoperability for PS LTE

The most central questions posed by the request for an Interoperability Showing involve precisely how the State of Texas will develop the multiple processes needed to design, procure, implement, and sustain an interoperable network, all while maintaining the appropriate autonomy and specific needs of Public Safety partners and users. Especially during early deployment (the phase of the greatest uncertainty), the State will be working closely with all of its deployment partners to ensure they meet the requirements and policies set forth by the State and the Commission. Without such compliance, as the designated 700 MHz waiver recipient, the State would have the right to withhold approval to constituent jurisdiction to operate on the broadband frequencies..

Thus far, the State of Texas has identified the following process development initiatives, with applicable milestones captured in the State of Texas Milestone chart in Appendix B.

- **Individual Jurisdiction Application to Texas Department of Public Safety (TxDPS) to Host a Public Safety LTE Broadband Layer in a Given Geographic Area of Texas** – A jurisdiction wishing to host a public safety LTE broadband layer in

[7] *See Waiver Order, Requests for Waiver of Various Petitioners to Allow Establishment of 700 MHz Interoperable Public Safety Wireless Broadband Networks*, May 12, 2010 PS Docket 06-229, ¶64

a given geographic area of Texas shall make application to TxDPS. Applicant shall, at a minimum, provide: 1) A summary of major elements of the applicant's LTE broadband plan, identification of the proposed geographic area to be covered, and an explanation of how all eligible entities within the proposed LTE broadband geographic footprint were given an opportunity to participate in the planning process and to have their positions heard and considered fairly, and whether such entities endorse the application to TxDPS; 2) Records of open meetings held by applicant with eligible entities, including dates, times, and locations of meetings, meeting agendas, meeting notes, names of individuals invited and individuals in attendance, individual titles, agency names, agency addresses, phone numbers, and individual email addresses; and 3) Details of applicant's proposed funding and construction plan, with identified timeline and milestones.

- **Participation in the PSCR Demonstration Network** – Any manufacturer wishing to sell infrastructure equipment to the State of Texas, or a local Texas jurisdiction, to become a part of the Texas PS LTE network must have sufficient proof or certification that the manufacturer is "participating" in the PSCR network demonstration program.
- **State of Texas PS LTE Architectural Requirements & Guidelines Process** – The State of Texas will develop procurement and design guidelines by October 1, 2011 for public safety entities wishing to procure an LTE infrastructure layer,.
- **Conformance, IOT and End-to-End Validation Plan** – As described in the Testing section below, the State will support all aspects of conformance and IOT on all operational devices as required to ensure compliance to applicable standards; the State also plans to perform End-to-End Validation testing. No device model will be allowed on the network without passing the required tests, performed by an authorized or accredited entity.
- **Interoperability Monitoring, Issue Tracking, and Escalation Service Plan** – Once the systems are deployed, the State will establish within a consolidated customer service center, the ability to handle any complaints or problems experienced by users roaming onto the Texas PS LTE network. This special "help desk" program will ensure that these issues are properly diagnosed and resolved. An escalation process to escalate to the upper management of the Texas Department of Public Safety will also be implemented.
- **Requirements on Other FCC 700 MHz Broadband Waiverees to Connect to the Texas PS LTE Network** – Other FCC 700 MHz public safety broadband waiverees wishing to connect to the Texas PS LTE network shall make application to TxDPS, in which applicant shall include, at a minimum, documentation proving that applicant: 1) Has been granted an FCC 700 MHz public safety broadband waiver for a specific geographic area; 2) Has a valid spectrum lease with the PSST, which has been approved by the FCC; 3) Has submitted an Interoperability Showing to the FCC, which has been approved; and 4) Agrees to conform with all current and future FCC orders pertaining to 700 MHz public safety broadband interoperability.

C. State of Texas Leadership Initiatives

The following sections provide a high level view of four key initiatives the State of Texas has undertaken to accomplish the goals and visions described. As early adopters of a highly complex technology, the State has endeavored to develop unique and creative programs to drive innovation and program goals forward, despite the complexity of the commercial, political and governmental frameworks involved.

C.1 The Region VI Public Safety LTE Interoperability Forum

In examining the challenges associated with achieving the goals stated above, the State of Texas realized that a vitally important endeavor would be to bring together the leading equipment manufacturers into a forum that would enable the State to achieve its objectives. To this end, the State of Texas announced that it would be hosting a series of "Region VI Public Safety LTE Interoperability Forums" (Forums) expressly for the purpose of tackling the issues associated with achieving an early, multi-vendor PS LTE deployment. The stated objectives of the LTE Forum are as follows:

- Create a productive and organized Forum hosted by a large user, which will allow the exchange of ideas, visions, strategies, and issues among the leading vendors and organizations involved.
- Identify key issues which need to be subsequently managed, tracked, and monitored going forward in the Region VI LTE implementation process, develop an order in which such issues should be discussed, and set a future schedule for follow-up meetings and meeting locations.
- Avoid duplication of other efforts, by focusing on issues specific to LTE implementation in Region VI, and not duplicate efforts of organizations such as the FCC, ERIC, DHS-OEC and NIST/NTIA-PSCR, 3GPP, or other entities also working on broadband LTE for Public Safety.

The purpose of the first Forum meeting was to bring together the leading manufacturers into a discussion to determine exactly what issues and risks the State needed to monitor and manage in order to be successful. Although announced just two weeks before the session was to be held in Austin, Texas, the event attracted a remarkable 85 participants, including lead technologists from major LTE suppliers in the US, including senior representatives from Alcatel-Lucent, Cassidian, Ericsson, Harris Corporation, Huawei, IP Wireless, Motorola Solutions, Nokia Siemens Network, Northrup Grumman, and Raytheon. The Forum was also attended by PSCR, DHS-OEC and roughly 18 agencies outside of the Texas Department of Public Safety. For clarity, the stated goals of the meeting, which were clearly accomplished, are included here:

- Create a productive and organized forum hosted by a large user, which will allow the exchange of ideas, visions, strategies, and issues among the leading vendors and organizations involved.

- Identify key issues which need to be subsequently managed, tracked, and monitored going forward in the Region VI LTE implementation process, develop an order in which such issues should be discussed, and set a future schedule for follow-up meetings and meeting locations.
- Avoid duplication of other efforts, by focusing on issues specific to LTE implementation in Region VI, and not duplicate efforts of organizations such as the FCC, ERIC, DHS-OEC and NIST/NTIA-PSCR, 3GPP, or other entities also working on broadband LTE for Public Safety.

C.1.1 Results of PS LTE Forum I Meeting

The LTE Forum organizers published an Executive Summary and detailed Meeting Notes which summarized the many issues and topics discussed in the meeting. In a frank and open discussion, the manufacturers, users, and federal participants recommended various actions and areas to pursue in the near term. Armed with these insights, the State of Texas has assigned a group of organizers, process experts, and expert technologists to drive further investigations and program progress.

In summary, the initial May 23 "Forum #1" presented a clear view of the some of the most questions to *ask*. Subsequent Forums and sponsored Working Groups will pursue *answering* the questions, enabling the State to tackle the key issues and challenges most effectively.

To facilitate open dialog and sharing among interested parties across the nation, the LTE Forum has an established DHS First Responder Communities of Practice website[8], enabling the State to efficiently share information, ask questions and communicate with its stakeholders.

Next Region VI PS LTE Interop Forum: July 21, Albuquerque, NM

In order to maintain momentum toward achieving the overall goals stated, the State of Texas recently announced the date and location of the Region VI Public Safety LTE Interoperability Forum #2 on July 21, 2011 in Albuquerque, NM. The LTE Forum support team has begun identifying potential discussion topics for the session and will be circulating those for prioritization and feedback from the invited participants and stakeholders.

LTE Forum #3 is scheduled for the September/October timeframe and is planned to be held in Boulder, CO to coincide with a PSCR waiveree event planned for the same week.

Establishment of LTE Forum Working Groups

The State of Texas has begun launching Working Groups slated to tackle the most pressing issues identified, and in particular, those which are not being addressed in any of the many Working Groups working to support PS LTE.

The first LTE Forum Working Group will launch to determine the various alternatives possible and practical to achieve multi-vendor, multi-sourced infrastructures within the State of Texas and Region VI. With the early deployment plans moving steadily forward as described, the

[8] https://communities.firstresponder.gov/web/region-vi-public-safety-long-term-evolution-lte-interoperability-forum/home?p_p_id=10010&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=5

Working Group has a level of urgency to determine viable architectural alternatives in the next few months.

Other Working Groups will be launched depending upon needs and priorities identified by the LTE Forum participants and stakeholders.

C.2 Participation in PS LTE Multi-Vendor Demonstration Network

In parallel with this activity, the State is exploring interest in a temporary PS LTE Multi-Vendor Demonstration Network. Most of the major manufacturers have expressed interest, as bringing a multi-vendor demonstration test network on line will aid in proving interoperability concepts. This would be done in collaboration with PSCR, and could be integrated into the intended PSCR demonstration project, or remain separate. The temporary PS LTE Vendor Demonstration Network Project would have these preliminary objectives:

- Develop and validate viable connectivity methods which can be reliably and cost effectively procured, deployed and managed across multiple manufacturers to achieve not only interoperability but “interchangeability” among supplier equipment.
- Provide a demonstration and trial environment to showcase the capabilities to agencies in Texas, from agencies and entities in Region VI, federal partners and other interested parties from across the nation. A number of the seven BTOP-funded waiveree jurisdictions have also expressed interest in participating. The network would be setup to allow out-of-state visitors to experience the Texas PS LTE network, hear about our challenges, and learn and share as much as possible about deployment and interoperability.. *(NOTE: This is not intended to be a “production” network for live mission critical public safety operations, but a temporary demonstration network for testing and proving interoperability.)*
- Capture lessons learned along the way to assist other LTE early-deployments in the US, future regional endeavors.