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Emerging Communications Technologies and Public Safety Networks

Just as mobile communications and broadband have revolutionized other sectors of the economy, emerging communications technologies are transforming public safety and emergency services. The 1960s and the threat of nuclear war in the cold war era gave birth to the loud beeps of the Emergency Broadcast System (EBS) blaring from televisions and radios. The 1970s and 1980s brought 911 voice telephone service to shorten the time for obtaining emergency aid, which was later enhanced with caller location information on each call. More recently, the explosion of mobile communications devices, the Internet and mobile broadband has spawned a whole new generation of services that enable sending and receiving voice, data, photos, and video, all with immense potential to enhance public safety and rapid delivery of emergency services.

This hearing will provide an overview of California's deployment of these new communications technologies for emergency and public safety services, with emphasis on Next Generation 911 (Next Gen 911), including imminent 2013 and 2014 milestones for rolling out texting to 911. The hearing also will address local agency deployment of reverse 911 emergency alert systems, the Commercial Mobile Alert System (CMAS) established by the Federal Communications Commission (FCC) and the Federal Emergency Management Agency (FEMA) available to wireless customers since April 2012, and public safety broadband networks now in the planning stage with substantial federal funds. The goal of the hearing is to gain answers to the following questions:

- What is the status of California's deployment of emergency and public safety systems and networks available to the public and first responders with emerging communications technologies?
- Are California state and local agencies coordinating to ensure timely and efficient infrastructure deployment and avoid duplication or unnecessary redundancy?
- What is the plan for funding new emergency systems and public safety communications networks, and is California maximizing all opportunities for federal funding?
- What legislation or policy direction from the Legislature is needed to ensure that California effectively deploys new communications technologies to improve public safety and emergency response?



Next Generation 911 Emergency Communications Service

Next Gen 911 refers to an Internet Protocol (IP) –based, two-way communications system that will enable real-time transmission of emergency-related voice, text, data, photos, and video between the public and public safety agencies. Next Gen 911 will build upon, and eventually replace, the existing 911 voice system that operates on the legacy switched telephone network.

Existing 911 System

California's existing statewide 911 system, established pursuant to the Warren 911 Emergency Assistance Act of 1976, includes about 460 local agency Public Safety Answering Points (PSAPs) that receive about 25 million 911 voice calls per year, which are dispatched to local first responders including police, ambulance, fire, medical and other emergency service providers. Incoming calls from landline customers include automatic number and location information. Calls to 911 from wireless devices, which now account for nearly 75 percent of all calls to 911, identify caller location by longitude and latitude (or by cell tower location on some older systems).

The California Technology Agency (CTA) administers the state 911 system, reviews local PSAPs 911 equipment and operations, and reimburses their reasonable costs for planning, implementation, and maintenance of approved 911 systems. CTA's current practice is to review PSAP requests for equipment upgrades every five years, but it recently proposed changing this to every seven years to save costs. The California Emergency Number Association (CalNENA) is the organization that represents the state's PSAPs and provides research, planning, and training to support 911 dispatchers and the state 911 system. A state 911 Advisory Board advises CTA on operation, funding, and long-range planning for PSAPs and the state 911 system.

911 Funding

The 911 program costs are paid from the State Emergency Telephone Number Account (SETNA) funds, which are derived from a statewide 911 surcharge on telephone customer bills, including landline, wireless and Voice over Internet Protocol (VoIP) services. The surcharge is capped by statute at 0.75 percent of charges for intrastate service and currently is set at the statutory minimum at 0.50 percent.

The SETNA currently is in a structural deficit, with annual surcharge revenue declining from about \$133 million in 2005-06 to \$86 million in 2010-11, with a projected reduction to \$78 million in 2013-14. Reasons cited for the revenue decline include customer migration off landline service, wireless plans with multiple devices paying only one surcharge, and growth of prepaid wireless service where surcharge payment is uncertain. Moreover, new technologies such as health monitoring devices automatically call 911 for patients in distress, but are not captured by the current surcharge mechanism.

Planning and Funding for Next Gen 911

In 2010, CTA published a comprehensive roadmap outlining necessary steps to implement Next Gen 911 statewide, and in 2011 conducted public meetings to get stakeholder input from across the state. In addition, several pilot projects are underway, including a project funded with a federal grant that is centered out of Butte County and involves 37 PSAPs in 13 counties with

Verizon as the vendor. So far, these pilots involve all-IP Next Gen 911 platforms with voice calls, but not texting, data, photos, or video.

Implementing Next Gen 911 will require substantial funding for PSAP upgrades to the IP-based platform that is the foundation of Next Gen 911. The exact costs are uncertain, however, as technologies continue to evolve. A CTA contractor developed a “Rough Order Magnitude Cost Estimate” of \$885 million for total hardware and software costs to deploy conceptual Next Gen 911 design while also running the existing 9-1-1 system. CTA states that this is an estimated \$375 million additional investment over five years on top of the \$510 million to operate the existing system over that same five years. CTA notes, however, that the variance margin of error for the estimate is plus or minus 50 percent. CTA expects to have refined cost estimates at the completion of the pilot projects in mid-2015.

Texting to 911

On December 6, 2012, the four major wireless carriers – AT&T, Verizon, Sprint, and T-Mobile – made a voluntary commitment with the FCC to offer their subscribers the ability to text to 911 no later than May 15, 2014. This service can be offered through currently available Short Message Service (SMS) texting technology. The carriers point out that SMS texting is a “best efforts” technology not designed to provide any time-sensitive, mission-critical service, which means a SMS text is not 100 percent guaranteed to transmit. Nonetheless, it provides an interim solution prior to full deployment of IP-based Next Gen 911 infrastructure and offers near-term opportunities to text to 911, which is especially significant for individuals who are deaf, hard of hearing or speech-impaired.

The carriers, along with the FCC and public safety and 911 dispatch organizations, agreed to develop an outreach effort regarding the availability and limitations of text to 911 service and the benefits of using voice calls to 911 whenever possible. In addition, in order to manage customer expectations that texting to 911 may already be available, the carriers agreed to implement, no later than June 30, 2013, a “bounce-back” auto-reply message to alert subscribers who attempt to text to 911 where the service is not available that they text did not reach 911 and should place a voice call instead.

The carrier commitment does not guarantee availability of texting to 911 by May 15, 2014, however. PSAPs must be “technically ready” and be authorized by “the appropriate local or State 9-1-1 service governing authority” to receive 911 text messages. The PSAPs will need equipment (and perhaps additional staff) to receive texts, which requires funding approval from the CTA. The governing authority authorization specified in the voluntary commitment presumably would also be from the CTA. To date, the CTA has not specified plans to authorize PSAP upgrades to receive texts. In fact, it has recently proposed to change PSAP equipment replacement schedules from five years to seven years, which PSAPs view as going in the opposite direction of being “technically ready” to make texting to 911 available any time in 2014. Carriers have expressed concern that lack of PSAP readiness may confuse customers. The FCC has proposed rules, based on the voluntary commitment, to require all wireless carriers to enable their customers to send text messages to 911 in areas where 911 PSAPs are prepared to

receive texts. The FCC also is seeking comment on whether the requirement should apply to providers of certain Internet-based applications that send text messages to phone numbers.

Reverse 911 Local Emergency Alert Systems

Many local public safety agencies are using the database of telephone numbers and addresses in their 911 system to communicate with residents during emergencies. These “reverse 911” systems use autodialers to send recorded messages to each resident whose telephone number is in the database or to residents in a defined geographic area for localized emergencies. Because 911 databases contain only landline numbers and addresses, and increasing numbers of people are migrating off landline service, agencies are actively encouraging residents to self-register on agency web sites the numbers for their wireless and VoIP service. An associated address for wireless and VoIP customers also is required so that agencies can “geo-target” alerts to geographic areas impacted by an emergency. Reverse 911 systems have been used for evacuation orders, fire and weather alerts, tsunami warnings, and in connection with crimes. San Diego and Contra Costa counties have robust reverse 911 systems as an element of local emergency warning systems, which officials say have been especially effective in connection with fires in recent years.

Commercial Mobile Alert System

Pursuant to the Warning, Alert, and Response Network (WARN) Act of 2006, the FCC, along with FEMA and the wireless industry, has established the CMAS for sending alerts to wireless telephones effective April 2012. CMAS is part of a larger government alert architecture that has evolved from the EBS to inform the public of impending or ongoing emergencies and how to stay safe.

CMAS allows customers with an enabled mobile device to receive nationwide presidential alerts, along with emergency alerts generated by state, local, and other non-federal authorities. The alerts appear like text messages, but the CMAS technology protects the alerts from delay and traffic congestion that may affect standard SMS texting services. Although carrier participation is voluntary, nearly all carriers participate, which means all their customers will get the alerts unless they have an older device that is not CMAS-enabled. Software upgrades are available for older phones. There is no charge to receive alerts. Customers may opt out of receiving state and local alerts, but all customers of participating carriers receive presidential alerts.

FirstNet National Public Safety Broadband Network

The Middle Class Tax Relief and Job Creation Act of 2012 (Act) authorizes and provides funding for a new nationwide wireless broadband network for public safety communications with direction that the network eventually be integrated with local agency 911 PSAPs. The Act establishes the First Responder Network Authority (FirstNet), within the National Telecommunications and Information Administration (NTIA) in the Commerce Department and gives FirstNet broad authority to ensure that the nationwide public safety broadband network is built, maintained, and kept current as technology evolves. Up to \$7 billion in funding is authorized through 2022 for FirstNet and related public safety programs with revenue expected

from FCC spectrum auctions. In expectation that public-private partnerships to build the new network will reduce costs to the public sector, the Act includes requirements and guidelines for shared use of existing infrastructure.

States can opt out of the nationwide network, and instead apply to NTIA for grants to build their own radio access network links to the FirstNet core infrastructure. On February 6, 2013, NTIA announced the availability of \$121.5 million in grants to states, in collaboration with regional, tribal, and local jurisdictions, to support planning, consultation, education and outreach activities and for collecting data on infrastructure and equipment that could be used by FirstNet to build the network. A grant is not to exceed 80 percent of project costs, but NTIA can waive the 20 percent match requirement. A comprehensive state plan for public safety uses of the network are among grant eligibility requirements. Applications are due March 19, 2013. The CTA is the lead coordinator of California's participation in FirstNet, with support from CalEMA and other public safety agencies.

California's Regional Public Safety Broadband Networks

The Los Angeles Regional Interoperable Communications System Authority (LA-RICS), formally launched in 2009, is a joint effort of the Los Angeles region's public safety agencies to plan and deploy a regional, interoperable broadband network intended to enable first responders to communicate with each other during routine and emergency operations. LA-RICS involves more than 80 public safety agencies and about 34,000 first responders serving more than 4,000 square miles and about 10 million people. The network would enable computer-enabled dispatch, rapid law enforcement queries, real-time video streaming, medical telemetry and patient tracking, geographic information systems services and other applications intended to enhance public safety.

The LA-RICS network will consist of two separate, but complementary, radio systems – a Land Mobile Radio (LMR) system for critical voice communications and a Long Term Evolution (LTE) mobile broadband network. It is estimated that the total cost to build and maintain the LMR system over 15 years will approach \$600 million. About \$80 million in federal Homeland Security grants already are earmarked for LMR construction. To help fund the LTE project, LA-RICS was awarded a grant of \$154.6 million from American Recovery and Reinvestment Act of 2009 (ARRA) under the broadband infrastructure program administered by NTIA. To help LA-RICS meet ARRA expenditure deadlines, AB 1486 (Lara, 2012) was enacted to exempt certain LA-RICS structures from some requirements under the California Environmental Quality Act. Contracts to begin construction of the LTE network were delayed in order to ensure that LA-RICS complies with guidance for system architecture of FirstNet.

The San Francisco Bay Area has a similar public safety broadband network in the works called the Wireless Enhanced Broadband (BayWEB) program under a 13-member Bay Area Regional Interoperable Communications System Authority (BayRICS) established in August 2011. BayRICS is charged with authorizing funding, setting policy, and contracting with vendors to construct the BayWEB project and other regional public safety communications projects. Members of the BayRICS Authority include State of California, City and County of San

Francisco, City of Oakland, City of San Jose, Counties of Alameda, Contra Costa, Marin, San Mateo, Santa Clara, Sonoma, and “hub” city groups from the East Bay and South Bay.

BayWEB will allow first responders throughout the Bay Area to communicate seamlessly during a disaster and for day-to-day operations. It incorporates 4G LTE technology to deliver wireless broadband data, allowing first responders to share text, graphics, real-time video and other mobile “apps” designed specifically for public safety. The BayWEB project received a \$50.6 million ARRA broadband grant to help with the estimated total project costs of about \$72 million. Like LA-RICS, the BayWEB project is on hold pending guidance to conform with FirstNet architecture standards.

ARRA – American Recovery and Reinvestment Act of 2009
BayRICS – Bay Area Regional Interoperable Communications System Authority
BayWEB – Bay Area Wireless Enhanced Broadband
CalNENA – California Emergency Number Association
CMAS – Commercial Mobile Alert System
CTA – California Technology Agency
EBS – Emergency Broadcast System
FCC – Federal Communications Commission
FEMA – Federal Emergency Management Agency
FirstNet – First Responder Network Authority
IP – Internet Protocol
LMR – Land Mobile Radio
LTE – Long Term Evolution
LA-RICS – Los Angeles Regional Interoperable Communications System Authority
NTIA – National Telecommunications and Information Administration
Next Gen 911 – Next Generation 911
PSAPs – Public Safety Answering Points
SETNA – State Emergency Telephone Number Account
SMS – Short Message Service
VoIP – Voice over Internet Protocol
WARN – Warning, Alert, and Response Network Act

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