A Report on Technical and Operational Issues Impacting The Provision of Wireless Enhanced 911 Services

Prepared for the

Federal Communications Commission

By

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Executive Summary

The purpose of this report is to convey the results of an independent inquiry into the technical and operational issues affecting the deployment of wireless Enhanced 911 ("E911") services in the United States. The inquiry was carried out by the author on behalf of the Federal Communications Commission ("Commission") over a six month period beginning on April 15, 2002.

Before turning to my principal findings and recommendations, I would like to offer three preliminary comments:

First, the importance of 911 as the Nation's universal emergency assistance number has long been recognized. That importance was acknowledged with the passage of the Wireless Communications and Public Safety Act of 1999. Subsequent developments, e.g., the tragic events of September 11, 2001 and growing dependence on wireless networks, serve to further emphasize the importance of E911 in general, and wireless E911 in particular, to the safety of life and property and homeland security. The automatic provision of location information with wireline and wireless 911 calls – i.e., E911" – is critical to those emergency services.

Second, over the past several years, the center of attention of the industry has clearly shifted from discovering, developing, evaluating and selecting the ways of locating mobile units in wireless systems to integrating the location information into the existing E911 system. I regard this as very good news as it indicates that there is no longer any real disagreement regarding the technical feasibility of providing wireless E911 to the approximately 130 million wireless subscribers in the United States. The challenge now is to successfully complete the implementation of wireless E911, a process that has really just begun.

Third, one over-arching issue that immediately emerged in my inquiry is that the existing wireline E911 infrastructure, while generally reliable, is seriously antiquated. Indeed, it turns out that the existing wireline E911 infrastructure is built upon not only an outdated technology, but one that was originally designed for an entirely different purpose. It is an analog technology in an overwhelmingly digital world. Yet it is a critical building block in the implementation of wireless E911.

From a national policy perspective, this latter observation is troubling for a number of reasons. It is troubling because it means that the additional network elements and functionalities necessary to handle the increasing volume of wireless E911 calls are being built upon a platform or foundation that has serious limitations in terms of speed, scalability, and adaptability. Additionally, it is troubling because these limitations not only burden the development of wireless E911 services, but they will also constrain our ability to extend E911 access to a rapidly growing number of non-traditional devices (e.g., PDAs), systems (e.g., telematics) and networks (e.g., voice networks that employ Voice-over-the-Internet Protocol -- VoIP). Finally, it is troubling because of uncertainty surrounding the willingness and ability of Public Safety Answering Points ("PSAPs") to

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pay for wireless E911, let alone the other, long term upgrades to the local exchange carriers' networks and their own customer premises equipment necessary to provide E911 access to these emerging devices, systems, and networks.

With respect to the specific technical and operational issues relating to the implementation of wireless E911 services, I have reached six principal findings or conclusions.

- *First*, I find that there is a strong Federal interest in the implementation of wireless E911 and that that interest has increased as a result of the tragic events of September 11, 2001. I further conclude that existing Federal programs to encourage the implementation are fragmented and that the most visible program, while very commendable, does not totally reflect the broader implications of wireless E911 for the safety of life and property and homeland security. My concern about this issue is compounded by the fact that a number of states have failed to establish a state-wide coordination body and/or appropriate cost recovery mechanisms.

- *Second*, I find that the deployment of wireless E911 in the U.S. is an extremely complex undertaking and that a variety of critical technical and operational choices – including critical decisions relating to network architectures – must be made to ensure the reliable and seamless E911 system contemplated by Congress when it passed the 911 Act. Because of the total number of stakeholders involved, the complexity of the inter-relationships among the stakeholders, and the incentives and constraints on those stakeholders, I conclude that an unusually high degree of coordination and cooperation among public and private entities will be required if that vision is to be realized.

- *Third*, in light of my second finding, I conclude that for the efficient, timely, and cost-effective deployment of wireless E911, there is a need for increased coordination among stakeholder groups in three areas: overall systems engineering, implementation/project management and the development and adoption of standards.

- *Fourth*, unless corrective steps are taken, I find that the rollout of wireless E911 services will continue to be constrained by what I refer to in shorthand as PSAP "fatigue," the lack of cost recovery and other funding mechanisms, and the lack of a "champion" within the Federal government. I also conclude that, even when good faith efforts are made on all sides, PSAP awareness and readiness remains a potential detriment to the rapid and efficient rollout of wireless E911 services.

- *Fifth*, I find that the incumbent local exchange carriers ("ILECs") play a critical role in the deployment of wireless E911 service in the reliable and seamless manner contemplated by Congress when it passed 911 Act. I also find that, in the past, the ILECs were not fully included in the development of wireless E911 and that their responsibilities for supporting wireless E911 deployment were not well defined. I further conclude that the prices charged by the ILECs for the cost of upgrading their existing wireline E911 system to support wireless E911 may impede the rollout of the

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emergency service, especially in those states that do not have a cost recovery mechanism in place.

- *Sixth*, I find that (a) the lack of well-accepted, standardized tests for determining whether the various position location systems selected by the wireless carriers comply with the accuracy requirements set forth in the Commission's rules, (b) uncertainty over the interaction between delay and accuracy in obtaining position location information, and (c) uncertainty as to the area over which the test results can be averaged may cause delay in the deployment, acceptance and certification of wireless E911 systems.

In order to resolve some of the issues and concerns raised during the course of my inquiry, I have included a number of recommendations. These recommendations include suggestions that:

- The Commission should work more closely with other Federal agencies to ensure that accurate location information for emergency calls is gathered, delivered, accepted and made available for use in the dispatching of first responders. I further recommend that the Commission suggest to the Administration that a "National 911 Program Office" be established within the proposed Department of Homeland Security to coordinate with, and be a resource for, local and state public safety first responders and other stakeholders.

- Because of the importance of E911 to the safety of life and property and to homeland security and the critical nature of the network architecture and industry structure choices being made, and because of the overall complexity of the situation, I recommend that the Commission maintain or even increase its oversight of the rollout of wireless E911 services in the U.S. over the next several years.

- In order to respond to the need for increased coordination in the rollout of wireless E911 and the evolution of E911 more generally, I recommend that the Commission (a) establish, or cause to have established, an advisory committee that would address the technical framework for the further development and evolution of E911 systems and services, (b) continue to urge the creation of organizations at the state, regional and local levels of government that can act as a coordinating body in the rollout of wireless E911 services, (c) encourage the creation of a national level clearinghouse to the collect, store, and disseminate status information on the rollout of wireless E911, and (d) charge the advisory committee recommended above with conducting an overall review of the standards situation as related to wireless E911 while continuing to encourage industry-based voluntary standards activities.

- Because PSAPs are on the frontlines in the Nation's defense against the threat of terrorism as well as in responding to more conventional emergencies, I recommend that the Commission actively coordinate with and support the U.S. Department of Transportation's Wireless E911 Initiative and other formal and informal efforts at all levels of government to educate state and local governments and PSAPs on the

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benefits and importance of wireless E911 services. On a longer term basis, I would recommend that the National E911 Program Office (whose creation I urged above) take on the role of educating and advocating for PSAPs at the Federal level of government. I also recommend that the Commission continue to support the efforts of the Emergency Services Interconnection Forum (jointly sponsored by the National Emergency Number Association and the Alliance for Telecommunications Industry Solutions) to address the issue of PSAP readiness. In the text of the full report, I also suggest the possibility of some form of an independent third party process for certifying PSAP readiness.

- During the period of my inquiry, the Commission requested that the largest ILECs provide certain critical information regarding their readiness to carry out their role in wireless E911 deployment and committed itself to monitoring the situation to see whether additional obligations are necessary. This action is consistent with my recommendation concerning the creation of national clearinghouse of such information. I further recommend that the Commission work closely with individual state regulatory commissions and their association, the National Association of Regulatory Utility Commissioners, in resolving issues relating to ILEC cost recovery and pricing.

- The Commission should urge the stakeholders to cooperatively develop industry-wide procedures for testing and certification (and recertification) of wireless E911 to ensure that they meet (and continue to meet) the accuracy requirements specified in the Commission's rules.

Certain other issues were raised during the course of my inquiry. These other issues included concerns about the need for end-to-end testing of wireless E911 systems, conveying confidence/uncertainty information associated with position determination and routing choices, accommodating new requirements and requirement "creep," the impact of future technological developments, consumer expectations, the implications of commercial location based services, and the need for a more adaptable regulatory approach. Recommendations concerning these issues and more details regarding the recommendations recorded above are contained in the main body of the report.

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