

Mr. Jeff Pulver  
President and Chief Executive Officer  
pulver.com  
115 Broadhollow Road, Suite 225  
Melville, NY 11747  
October 30, 2002

Ms. Magalie Roman Salas, Secretary  
Federal Communications Commission  
Office of the Secretary  
445 - 12th Street, S.W. - Room TW-A325  
Washington, D.C. 20554

**RE: CC Docket No. 94-102**

**pulver.com comments on the Hatfield E911 Report**

Dear Ms. Salas:

The October 16, 2002 Wireless Telecommunications Bureau (WTB) Notice requested comments on a report prepared by Dale N. Hatfield titled "Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 911 Services". This filing comments on some aspects of the Hatfield Report. This filing is closely related to the pulver.com September 20, 2001 filing<sup>1</sup> on locating E911 callers in building interiors.

The Hatfield Report notes, "As wireless phones have become ever more widespread, the percentage of wireless-originated calls to PSAPs has risen dramatically. Some estimates put the current figure at well over one third of all emergency calls. With the dropping cost and increased convenience of wireless service, many users have replaced – or are contemplating replacing -- their wireline service entirely". This statement is consistent with the observation that currently most mobile 911 calls come from callers on the road in open environments. However, given the shift from wireline to wireless devices, it is expected that in the future increasing number of wireless emergency calls will originate from indoors environments rather than from the roadside.

Unlike open environments, where high location accuracy can be achieved, indoors settings pose a special challenge for location technologies. Furthermore, the Hatfield Report notes that even some outdoor areas may hamper GPS positioning, "...the presence of dense foliage or 'urban canyons' may prevent a satellite-based (i.e., GPS) system from achieving its full performance".

Moreover, locations such as large commercial and residential buildings, subways and malls may be difficult or even impossible to cover with traditional wide area location technologies such as AGPS (Assisted GPS) and TDOA (Time Difference of Arrival). Even if these technologies may provide location fixes in some indoor environments, they do not address 3-dimensional positioning, which is required for pinpointing location in multi-story buildings. The accurate determination of only longitude and latitude coordinates of an individual in a

---

<sup>1</sup> Petition for E911 Phase III directive to enable effective coverage of buildings interiors

multi-story building would be insufficient because an emergency team may have to waste critical time searching every floor.

The pulver.com September 2001 filing<sup>1</sup> proposed a hybrid solution that combines wide area solutions with local positioning technologies<sup>2</sup> where local positioning provides the coverage for the indoor environment. Local positioning usually requires extensive deployment of fixed access points throughout a building's interior. The 2001 filing suggested future Bluetooth<sup>3</sup> deployment as a possible solution for indoors positioning. Yet, since the 2001 filing, 802.11 WLAN (Wireless Local Area Network), known also as WiFi, has begun to take root in residential homes as well as in many public and commercial areas. Today, one can find WiFi Internet access points ('Hot Spots') in hotels, airports and restaurants. As 802.11 access points become more ubiquitous, they could provide the infrastructure for indoors positioning.

The Hatfield report expresses concern on locating 911 calls originated from WLAN and Ethernet Voice of IP (VoIP) access points stating, "The issues become even more tightly intertwined with the rapidly growing popularity of wireless LANs (e.g., WiFi/802.11b)...While the range of these systems is typically much less than the range of a single cellular base station, they do add additional uncertainty as to the exact physical location of the end user making an emergency call." There is no doubt that voice calls over wireless LANs could complicate the task of locating emergency callers. Nonetheless, if properly addressed, 802.11b and/or similar technologies could be a solution rather than a roadblock for locating 911 callers in indoors settings.

The pulver.com Fall 2002 Location Based Services Summit, which took place in Atlanta October 7-9, 2002, dedicated several sessions to the problem of indoors/outdoors positioning<sup>4</sup>. Presenters at these sessions proposed that WLANs could provide high accuracy for indoors positioning and that hybrid indoors/outdoors solutions could augment existing location determination capabilities in these difficult environments.

pulver.com supports the Hatfield Report recommendation that, at this stage of the E911 rollout, additional requirements should not be instituted since these would further complicate the difficult task of the current deployment. The development of indoors positioning within the context of 911 services should be an evolutionary process that should not at this time be subject to strict deadlines. A reasonable approach would be to let the emergency services follow the deployment of wireless access points instead of mandating a rollout of a costly indoors-positioning infrastructure.

While this filing proposes that it would currently be premature to mandate accurate indoors positioning for E911 services (E911 Phase III), it recommends that the Commission explore issues that could facilitate the deployment of such services in the future. Examples of such initiatives could include but are not limited to (a) the evaluation of local positioning technologies and algorithms that could be used for E911 deployment, (b) the creation of databases to relate access point identifiers with geographical position and (c) the translations of space coordinates to floor and office and apartment numbers.

The investigation of options for indoors E911 positioning could be undertaken by an advisory organization as recommended by the Hatfield Report. According to the Report, one of the

---

<sup>2</sup> More information on local positioning is available in the pulver.com September 2001 Location Based Services Report at URL: <http://pulver.com/lbsreport/bissues.html>

<sup>3</sup> Information on Bluetooth is available at <http://www.bluetooth.com>

<sup>4</sup> <http://www.pulver.com/lbs/schedule.html>

tasks of the proposed advisory committee would be to address the technical framework for the further development and evolution of E911 systems and services.

Respectfully Submitted,

Jeff Pulver

President and Chief Executive Officer, [pulver.com](http://pulver.com)

Cc: Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, (Rm. #3-C252)  
Kris Monteith, Chief, Policy Division, WTB (Rm. #3-C124)  
Thomas Stanley, WTB (Rm. #3-C460)  
Daniel Grosh, WTB (Rm. #3-A221)  
Patrick Forster, WTB (Rm. #3-A104)  
Dr. William Lane, WTB (Rm. #3-C304)