Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of		
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	)	
Wireless E911 Location Accuracy Requirements	)	PS Docket No. 07-114
	)	
	)	
E911 Requirements for IP-Enabled Service Providers	)	WC Docket No. 05-196
	)	

COMMENTS OF COMMLABS, INC.

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SUMMARY

The Commission has taken important steps in the concurrently released E911 Second Report and Order to advance the goal of ensuring that public safety entities are able to locate citizens in distress as accurately as possible wherever they are. The industry has also moved toward handset-based solutions that, combined with the growing availability of GPS-capable handsets, has contributed greatly to this effort. In the Further Notice of Proposed Rulemaking and Notice of Inquiry, however, the Commission recognizes that there remain weaknesses in the E911 location system, such as locating wireless devices indoors, in urban canyons and in buildings (especially high-rises).

Even when the wireless carriers comply fully with the requirements of the Second Report and Order, emergency personnel will too often not be able to, for example, locate a person in distress making an emergency call downtown in a major city or from inside a building where the GPS signal or other satellite based signals designed for location do not reach. They won't be able to track that person as he or she moves from floor to floor in a high rise building in a downtown area to escape a fire or an assailant. Further, users of nomadic VoIP devices may not have any E911 location capability whatsoever if the user failed to register the location of a device that has been moved.

Commlabs, Inc. has developed a terrestrial-based multilateration position location service called Wide Area Positioning System ("WAPS"). WAPS is a highly synchronized network that uses Multilateration Location and Monitoring Service ("M-LMS") spectrum and, if deployed, can be made available at low cost in major cities within two years. Transmitter beacons are strategically placed to surround a GPS challenged location (such as a metropolitan area) using existing structures and WAPS-enabled handsets calculate their location using signals from

multiple beacons. WAPS technology could be added to GPS chipsets for future generations of wireless handsets in many cases as a software or firmware upgrade.

WAPS technology, as tested pursuant to an experimental license, established a location result 95 percent of the time, and located target devices within 20 meters for 67 percent of calls and within 40 meters for 90 percent of calls made both indoors and outdoors in urban and suburban conditions. Therefore, WAPS can help wireless carriers to exceed the Commission's revised E911 location accuracy requirements.

In addition, due to WAPS' ability to surround an urban area with beacons and the enhanced receiver sensitivity of cellular devices toward the WAPS signal, WAPS can locate emergency callers indoors and in urban canyons. Further, using an inexpensive micro pressure sensor that is remotely calibrated by WAPS, devices can be located and tracked based on their elevation. Although WAPS uses existing cellular antennas on wireless devices, VoIP devices can also be equipped for WAPS location with the addition of a low cost WAPS receiver.

Therefore, WAPS, paired with GPS, would allow emergency responders to locate precisely victims using wireless or VoIP devices throughout the vast majority of the United States, including inside buildings, downtown in major cities and by elevation. The public interest benefits resulting from the widespread availability of Commlabs' WAPS technology would be substantial.

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Commlabs, Inc. ("Commlabs"), by its attorneys and in accordance with Section 1.415 of the Commission's rules, 47 C.F.R. §1.415, hereby submits its comments in response to the Further Notice of Proposed Rulemaking ("FNPRM") and Notice of Inquiry ("NOI") in the above-referenced proceeding.[1] In its companion Second Report and Order, the Commission established a PSAP or county level geographic area for E911 compliance, adjusted the E911 deadlines and deferred addressing emergency calls made from indoors.[2]

Commlabs has developed a terrestrial-based multilateration position location service that can help to strengthen the location accuracy capabilities of wireless carriers. The service, called Wide Area Positioning System ("WAPS"), can exceed the Commission's revised E911 location accuracy requirements and locate devices indoors, in urban canyons and by elevation. WAPS will use Multilateration Location and Monitoring Service ("M-LMS") spectrum currently

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[1] *See Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, *E911 Requirements for IP-Enabled Service Providers*, WC Docket No. 05-196, Further Notice of Proposed Rulemaking and Notice of Inquiry, FCC 10-177 (Sept. 23, 2010) ("FNPRM and NOI").

[2] *See Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Second Report and Order, FCC 10-176 (Sept. 23, 2010) ("Second R&O").

allocated for position location. It is low-cost, can be added to Global Positioning System ("GPS") chip sets in many cases as a software or firmware upgrade, is compatible with Voice over Internet Protocol ("VoIP") devices, and, if deployed, can be made available in major cities within two years.

I. INTRODUCTION

Commlabs developed WAPS to allow wireless carriers to meet, and exceed, the Commission's recently revised E911 location accuracy requirements.[3] Commlabs' ultimate goal, shared by the Commission, is to ensure that public safety entities are able to locate citizens in distress as accurately as possible wherever they are. The Commission has taken important steps in the concurrently released Second Report and Order to advance these goals, and the expansion of GPS-capable handsets has contributed greatly to this effort. There are, however, still far too many situations in which first responders will not be able to locate citizens making emergency calls from wireless devices using GPS or network-based technologies.

Even when the wireless carriers comply fully with the requirements of the Second R&O, emergency personnel will too often not be able to, for example, locate a person in distress making an emergency call downtown in a major city or from inside a building where the GPS signal does not reach. They won't be able to track that person as he or she moves from floor to floor in a high rise building in a downtown area to escape a fire or an assailant.

If carriers incorporate WAPS technology into their GPS chipsets, however, first responders would be able to locate emergency callers virtually anywhere. GPS-based location is adequate in open spaces, but WAPS would allow emergency personnel to locate citizens in cities

[3] We refer herein to "wireless devices," "wireless carriers" or "carriers" since they are currently subject to the E911 location accuracy requirements. We address, however, the potential expansion of the requirements to VoIP providers in Section VI. below.

and indoors, including by floor in multi-story buildings. The public benefits resulting from achieving this goal would be tremendous.

II. COMMLABS AND THE WIDE AREA POSITIONING SYSTEM

Commlabs is a Silicon Valley-based company led by an experienced team of wireless technology entrepreneurs and innovators formerly with top universities and leading communications technology companies who bring together skills in radio product design and testing, RF planning and network operations. The Commlabs team is focused on developing and bringing to market innovative next generation location technologies for hand-held wireless devices, vehicles and other mobile assets. Commlabs has spent the last three and a half years developing the WAPS service, and began working in cooperation with Progeny LMS, LLC ("Progeny"), an M-LMS licensee, in 2009.

WAPS is a highly synchronized network that locates enabled wireless devices and other assets using multilateration. Transmitter beacons are strategically placed to surround a GPS challenged location (such as a metropolitan area) using existing building structures and towers. To fix a location in the absence of GPS, a WAPS-enabled device optimally should receive signals from at least three WAPS beacons. The device then computes its own location based on the reception of the beacon signals and, in the case of a wireless device, may then transmit its location using the devices' home network (*e.g.*, cellular signal). Figure 1 shows the principal elements of a WAPS network.

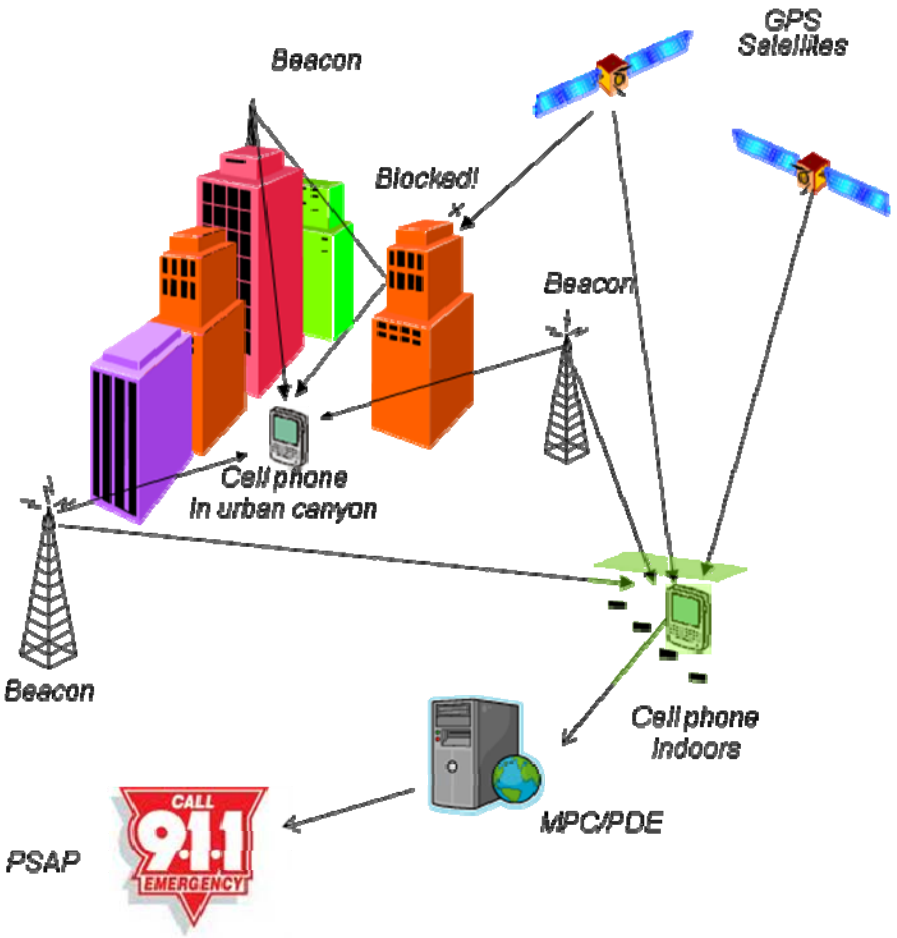

Figure 1. Overview of WAPS Operation

In a typical deployment, WAPS would require a relatively small number of transmitters compared to a standard cellular deployment because WAPS is a broadcast system, does not have spectrum capacity issues, and cellular handset receivers enabled with WAPS technology have more enhanced sensitivity toward the low bit rate WAPS signal than toward standard cellular transmissions. Future generations of wireless devices with a GPS chipset in many cases could require only a software or firmware upgrade to operate WAPS. Due to the terrestrial nature of the signals and the receiver algorithms that can take advantage of the terrestrial signals, WAPS technology uses only one-tenth of the device power of standard GPS operations. In addition,

WAPS technology enables a very fast Time to First Fix ("TTFF") (*i.e.*, less than five seconds) even under cold start conditions, which can be determinative in emergency situations.

Pursuant to experimental authority, Commlabs has been conducting field tests of its WAPS technology for several years. Commlabs' most recent field tests were initiated in Santa Clara County, California in January 2010 and expanded to San Mateo and San Francisco Counties in August. As discussed in more detail below, WAPS was able to greatly exceed the revised location accuracy requirements established by the Commission in the Second R&O. Further, WAPS can provide enhanced capabilities, such as indoor location and an elevation component.

III. THE COMMISSION'S REVISED E911 LOCATION ACCURACY REQUIREMENTS

In the Second R&O, the Commission revised the E911 location accuracy requirements contained in Section 20.18(h) of its rules in several important respects. The revised rules: 1) make adjustments to both the network-based and handset-based location accuracy deadlines and requirements; 2) set the PSAP or county as the geographic area for compliance; and 3) confirm that the accuracy measurements are for outdoor calls only.[4]

A. The Second Report and Order Adjusted the E911 Location Accuracy Requirements and the Timeframe for Compliance

The location accuracy rules adopted in the 2007 First Report and Order required full compliance from handset-based and network-based carriers by 2012 for 95 percent of E911 calls.[5] Specifically, network-based carriers were required to locate emergency callers within 100

[4] *See* Second R&O, ¶ 25.

[5] *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Report and Order, FCC 07-166, Appendix B (2007) ("First R&O").

meters for 67 percent of calls and within 300 meters for 95 percent of calls.[6] Handset-based carriers were required to locate emergency callers within 50 meters for 67 percent of calls and within 150 meters for 95 percent of calls.[7]

Based on compromises between the public safety community and wireless carriers, the Commission altered these requirements in its Second R&O. Ultimately (*i.e.*, within eight years), carriers using network-based technologies will be required to locate emergency callers within 100 meters for 67 percent of calls and within 300 meters for 90 percent of calls.[8] Carriers using handset-based technologies (such as GPS) will be required to locate emergency callers within 50 meters for 67 percent of calls and within 150 meters for 90 percent of calls.[9] Within two years, however, handset-based location technologies must be able to locate emergency callers within 150 meters for only 80 percent of calls.[10]

The Commission concluded that its Second R&O "effectively relaxed"[11] its location accuracy requirements, adjusting them by approximately six years and five percent of emergency calls. As discussed in further detail below, WAPS would allow carriers to improve significantly both their E911 location accuracy and compliance timeframe.

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[6] *Id*.

[7] *Id*.

[8] *See id*., ¶¶ 31, 36-37 and revised Section 20.18(h)(1).

[9] *See* Second R&O, ¶ 19 and revised Section 20.18(h)(2).

[10] *Id*.

[11] *Id.*, ¶ 25.

B. The Commission Established a PSAP or County-Level Geographic Area for Location Accuracy Compliance

In the Second R&O, the Commission resolved any ambiguity regarding the geographic area over which wireless carriers must establish compliance with the location accuracy requirements.[12] Some had argued in favor of a state, regional or even larger geographic area for compliance.[13] The Commission concluded that such an approach would have resulted in failure to meet the accuracy requirements in substantial segments of each carrier's service area.[14] Those segments could have included rural areas without a dense cellular tower infrastructure, but they could have also included urban canyons, leading to inadequate E911 coverage for thousands or millions of city dwellers.

The primary concern raised, as referenced in the First R&O, was that "carriers may achieve acceptable levels of location accuracy in urban areas of a given state, yet provide location information of limited or no use to first responders in rural areas."[15] Although this would likely be true for network-based technologies, for which density of cellular towers is the primary concern, handset-based carriers using GPS are more likely to be concerned about locating E911 callers in urban canyons.

The Commission implicitly addressed this concern. Motorola argued that rather than excluding from compliance fifteen percent of counties due to heavy forestation, the Commission should have favored the overall 85 percent compliance standard so that handset-based carriers

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[12] *See id.*, ¶ 16.

[13] *See Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Notice of Proposed Rulemaking, FCC 07-108, ¶ 6 (2007) ("NPRM") and First R&O, ¶ 9.

[14] *See* NPRM, ¶ 5 and Second R&O, ¶ 12.

[15] First R&O, ¶ 11.

could take into account factors such as urban canyons.[16] The Commission rejected this proposal, stating, "we agree with [the National Emergency Number Association ("NENA")] and [Association of Public-Safety Communications Officials ("APCO")] that any expansion of this exclusion, whether to an increased percentage or based on factors in addition to forestation, would excuse compliance to an unacceptable level of risk to public safety."[17] The "factors in addition to forestation" would certainly include location difficulties in urban canyons. Therefore, the Commission appears to have concluded that a lack of E911 coverage in urban centers would impose a substantial risk to public safety. As described in detail below, urban canyons are an area in which WAPS can be most effective to supplement a carrier's E911 network.

C. The Commission Clarified That Its Revised Rules Apply Only to Outdoor Measurements

The Second R&O identifies a significant gap in the national E911 system. One of the most difficult locations for wireless carriers to trace emergency callers is indoors. This is especially true for handset-based carriers using GPS technology, but even network-based carriers are relying more and more on GPS as a supplement to their network-based technologies to meet the Commission's requirements.[18] For that reason, public safety and the major handset-based and network-based carriers announced that they will participate in an industry group or a technical advisory group to evaluate technologies for locating citizens in distress calling from

[16] *See* Second R&O, ¶ 24. In the revised rules, handset-based carriers are allowed exclude from compliance up to fifteen percent of counties or PSAPs due to heavy forestation. Network-based carriers, on the other hand, are only required to comply with the location accuracy requirements in 85 percent of counties or PSAPs at their final benchmark. Therefore, network-based carriers have more options to exclude counties based on various considerations other than heavy forestation, such as building obstructions.

[17] Second R&O, ¶ 27.

[18] *See infra* Section IV.D.

indoors.[19] The Commission clarified in the Second R&O that its revised location accuracy requirements apply only to outdoor measurements, giving as its reasons the inherent technological challenges and the cooperative efforts being undertaken by the public safety and industry communities.[20]

Unfortunately from a public safety perspective, given the ever growing number of wireless emergency calls, including wireless calls made from indoors, a solution to this problem must be found quickly. As discussed further below, WAPS technology would provide carriers with the ability not only to locate emergency callers indoors, but also to track them as they travel from floor to floor.

IV. WAPS TECHNOLOGY CAN GREATLY IMPROVE E911 LOCATION ACCURACY AND PUBLIC SAFETY

WAPS is a handset-based E911 location solution that materially exceeds the Commission's revised handset-based location accuracy requirements and would allow first responders to more accurately locate emergency callers a greater proportion of the time. Further, WAPS would allow carriers to locate emergency callers in particularly challenging environments, is not affected by roaming concerns and can be rolled out in all major cities within two years.

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[19] *See* Letter from Willis Carter, President, APCO, and Ronald Bonneau, President, NENA, to Derek Poarch, Chief, Public Safety and Homeland Security Bureau, FCC, filed July 14, 2008 at 2; Letter from Brian Fontes, CEO, NENA, Robert M. Gurss, Director, Legal & Gov't Affairs, APCO, and John T. Scott, III, VP & Deputy General Counsel, Verizon Wireless, to Kevin J. Martin, Chairman, FCC, filed Aug. 20, 2008, at 2; and Letter from Brian Fontes, CEO, NENA, Robert M. Gurss, Director, Legal & Gov't Affairs, APCO, and Robert W. Quinn, Jr., SVP – Federal Regulatory, AT&T, filed Aug. 25, 2008 at 3 ("APCO/NENA/AT&T Aug. 25 Ex Parte").

[20] *See* Second R&O, ¶ 29.

A. WAPS Can Materially Exceed the Commission's Handset-Based Location Accuracy Requirements

WAPS offers the capability for wireless carriers to exceed the eight-year location accuracy standards within two years where it is available. WAPS technology, as tested pursuant to an experimental license, established a location result 95 percent of the time, and located target devices within 20 meters for 67 percent of calls and within 40 meters for 90 percent of calls made both indoors and outdoors in urban and suburban conditions. Therefore, assuming WAPS is deployed, WAPS-equipped handsets could exceed within two years the strictest location accuracy requirement (*i.e.*, for handset-based technologies) by 30 meters. At eight years out, WAPS-equipped handsets could exceed the strictest requirement by 110 meters. Such differences could be the difference between life and death in an emergency.

B. WAPS Can Locate Emergency Callers Indoors and in Urban Canyons

The Commission's wireless E911 location accuracy requirements have positively impacted the rollout of GPS chips in wireless devices. In most areas of the United States, GPS is adequate to locate wireless devices making emergency communications. GPS is particularly effective outdoors and in rural areas. As the Commission recognized in the FNPRM, however, GPS is not effective in what the Commission calls "challenging environments" – including indoor settings, urban canyons and buildings (especially high-rises).[21] Because of these challenges, the Commission determined that the revised location accuracy requirements apply only to outdoor measurements.[22]

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[21] *See* FNPRM and NOI, ¶ 22.

[22] *See* Second R&O, ¶ 29.

In the FNPRM and NOI, the Commission requests comment on the trends reflecting "the growing number of indoor 911 calls."[23] Given the growing use of wireless devices to initiate E911 calls, it stands to reason that the number of emergency calls made from wireless devices located indoors is also increasing. Therefore, it is important that E911 location accuracy technology solutions allow a carrier to locate emergency callers indoors. Due to WAPS' ability to surround an urban area with beacons and the enhanced sensitivity of cellular device receivers toward the low bit rate WAPS signal, WAPS can penetrate indoors and in urban canyons to locate emergency callers. Indeed, WAPS can locate emergency callers indoors and in urban canyons at much better location accuracy standards than are achieved with other solutions, as indicated in the figure below. WAPS, paired with GPS, could allow emergency responders to precisely locate victims throughout the vast majority of the United States, including inside buildings and downtown in major cities.

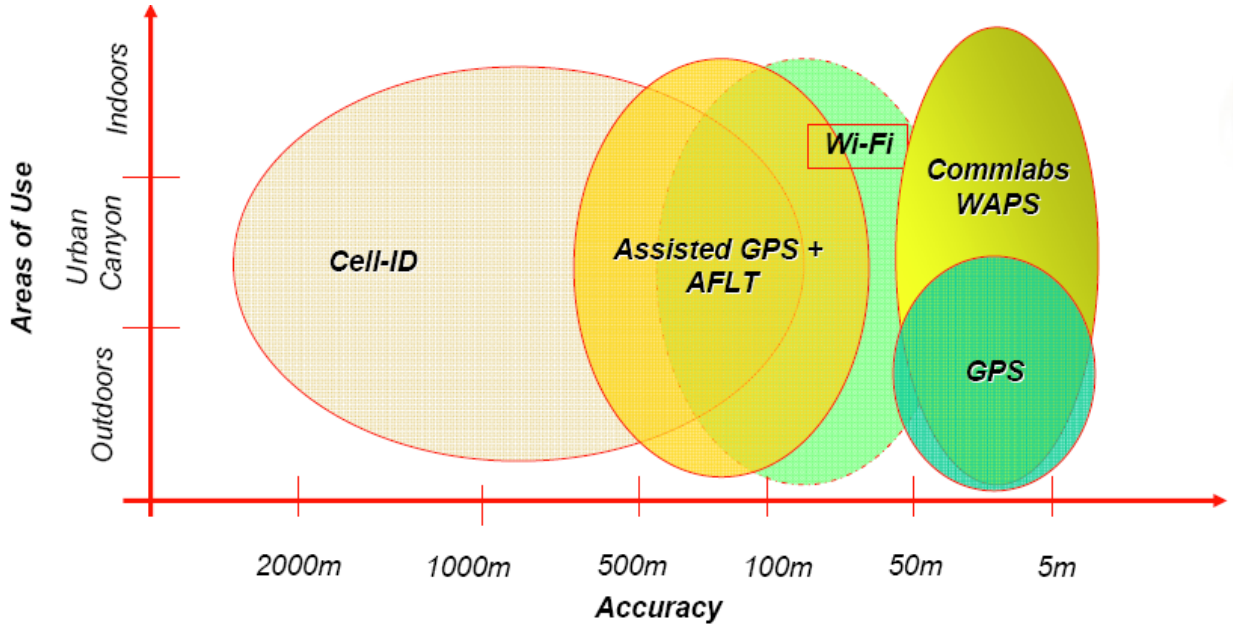

Figure 2. Position Location Comparison

[23] *See* FNPRM and NOI, ¶ 20.

To the extent the Commission determines that it should require compliance testing for location accuracy, WAPS would allow wireless carriers to include indoor measurements. Several parties have argued that the Commission should require E911 compliance testing to include measurements in indoor environments.[24] Network-based technologies have some ability to reach callers indoors, but GPS generally does not. Once a solution, such as WAPS, that allows the tracking of emergency calls indoors is in place, compliance testing can also include indoor test calls. The same is true for other challenging environments, such as dense urban environments.

C. WAPS Can Establish An Emergency Caller's Elevation

Emergency responders need to be able to locate emergency callers located indoors, but if the building is a high-rise, they also need to be able to identify the floor from which the call originates.[25] Fire fighters simply are not able to locate an emergency caller located on the 35th floor of a high-rise, who may have passed out from smoke inhalation after making an E911 call, by checking the building floor-by-floor. They need the E911 system to pinpoint the caller's floor for them in order to reach the victim in time. Neither GPS nor traditional network-based technologies can provide this "z-axis" component. WAPS, however, has been successfully tested to provide floor level information and, as shown in Figure 3, has actually tracked a test caller as he moved from one floor to another, including inside an elevator.

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[24] *Id.*, ¶ 19.

[25] *Id.*, ¶ 23.

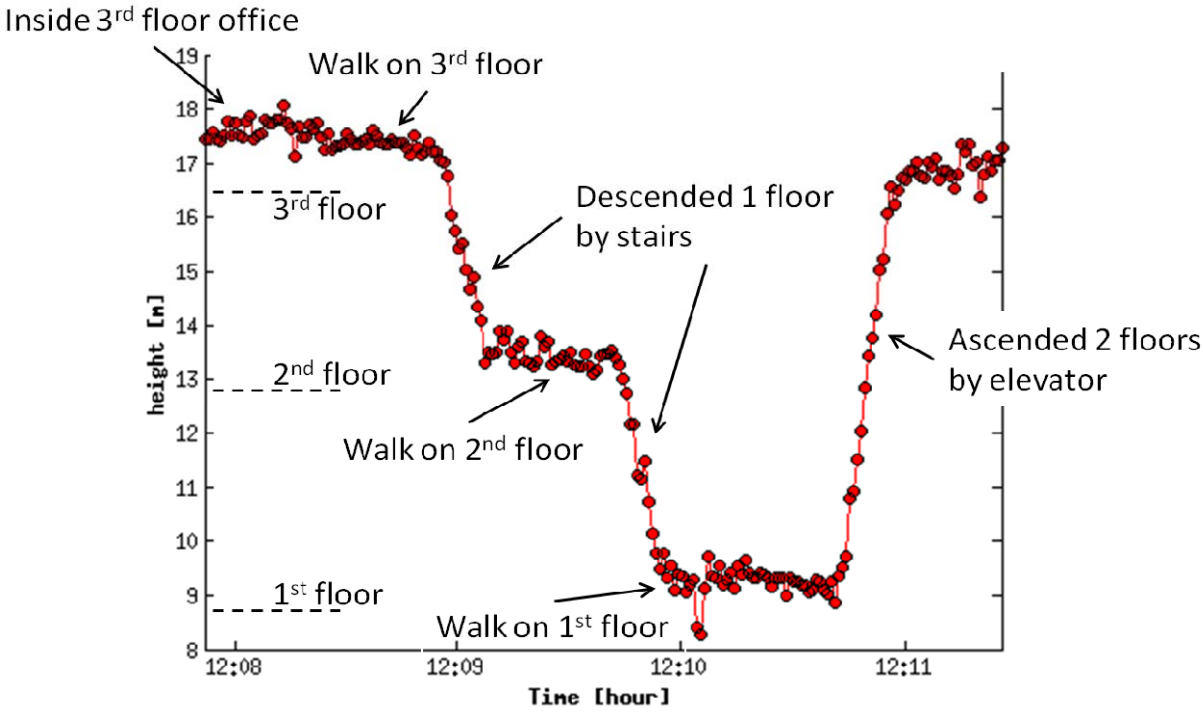

Figure 3. Floor Level Accuracy Test Results

In order to provide floor level information, handsets using the WAPS technology must be equipped with a micro pressure sensor, which is neither a complex nor expensive addition.[26] Such pressure sensors, however, provide accurate elevation information only if they are frequently corrected for barometric pressure and other local conditions. Commlabs makes these measurements on the network level and continuously transmits in the beacon signal real-time calibration information to the handsets in order to ensure the accuracy of the elevation information that they report.

[26] A micro pressure sensor utilizes micro-electromechanical (MEMS) technology and is comparable in size and cost to other sensors (e.g., accelerometer, gyroscope, compass) found in smart phones today. One such example is the Bosch BMP085 which is 5mm x 5mm x 1.2mm. Another is the Intersema MS5607, which is 5mm x 3mm x 1mm.

D. WAPS' Location Capability is Not Affected by Roaming

The Commission's FNPRM seeks comment on location accuracy while roaming.[27] WAPS can allow carriers to meet the tighter location accuracy standards discussed above whether the emergency caller is on the carrier's home network or roaming on another network. Because WAPS is an overlay network of location beacons, handsets using WAPS do not depend on cellular networks to identify their location. Therefore, just like with GPS, as long as the WAPS network is available, the system is independent of the carrier's network in establishing position location.

WAPS is a handset-based location technology consistent with the needs of the public safety community. NENA, APCO and AT&T (a network-based technology carrier) stated in their joint proposal that handset-based approaches are preferable to network-based approaches because:

> [a]s network-based providers will be unable to meet the new proposed county-level accuracy standards in all areas relying solely upon current network-based technology solutions, carriers who employ network-based location solutions may be expected to deploy handset-based solutions as an overlay to existing network-based solutions in order to meet the more stringent county-level requirements…[28]

The parties proposed to employ a "blended" approach that would include "aGPS" handsets for many customers.[29] The Second R&O permits this "blended" approach, which will likely result in further rollout of wireless handsets with GPS capabilities.[30]

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[27] *See* FNPRM and NOI, ¶24.

[28] APCO/NENA/AT&T Aug. 25 Ex Parte at 1.

[29] *See* Second R&O, ¶ 33.

[30] *Id.*, ¶ 47.

Although roaming is a potential concern for handsets relying on network-based location technologies, any handset outfitted with a GPS chip containing WAPS technology should be able to use WAPS to locate itself regardless of whether it is roaming on another network.

E. WAPS Can Be Rolled Out in Major Cities Within Two Years and Extended to Full Coverage Within Four Years

In the FNPRM, the Commission requests information regarding location accuracy requirements, challenging environments, z-axis location, roaming, testing and other issues. A persistent question, however, is when each capability can be made available.[31] WAPS will allow wireless carriers to significantly improve E911 location accuracy, and expand location coverage to indoors, urban canyons and high-rises, on a much shorter schedule than required by the Commission in the Second R&O. The WAPS service, including all the capabilities described above, if deployed, can achieve substantial coverage in major cities in 2012 and coverage in remaining markets in 2014.

V. WAPS CAPABILITIES CAN BE PROVIDED AT LOW COST

Another matter of concern to the Commission and to carriers (and potentially interconnected VoIP providers) subject to the E911 location accuracy requirements, is, of course, cost. It is worth noting that, other technologies such as GPS and network-based technologies cannot economically provide the same capabilities as WAPS, such as providing accurate location information in urban canyons, indoors and based on elevation. For several key reasons, however, WAPS can be made available to carriers at a remarkably reasonable cost.

First, WAPS is a shared network that, once operating in a given geographical area, can be used by an unlimited number of carriers and other service providers. As a result, the operating

[31] *See e.g.*, FNPRM and NOI, ¶ 19-24.

costs can be incrementally shared by many entities. Second, the WAPS network infrastructure is relatively inexpensive, consisting of low-cost beacons that can be located on existing tower and building sites surrounding metropolitan areas. The overall density of WAPS transmitters can be much lower than in a cellular network because WAPS is a broadcast system and cellular handset receivers enabled with WAPS technology have more enhanced sensitivity toward the low bit rate WAPS signal than toward standard cellular transmissions. Third, a WAPS network used to provide position location services for wireless handsets does not require a backhaul, thereby reducing operating costs. Fourth, because of the proximity of M-LMS spectrum to the cellular bands, many GPS chipsets could be outfitted with WAPS using a simple software or firmware upgrade for future generations of handsets. WAPS can also use the handset's existing cellular antenna for reception of the WAPS signals.

For these reasons, WAPS is a viable and economical solution to the current E911 limitations outlined in the FNPRM and NOI. Commlabs has been meeting with the major wireless carriers and chip set manufacturers, as well as the Commission and NENA, to discuss the WAPS capabilities and costs. The results of these meetings have been very promising.

VI. WAPS IS ALSO AVAILABLE FOR PORTABLE OR NOMADIC VOIP HANDSETS

WAPS will also be available for VoIP handsets with the addition of an inexpensive WAPS receiver. The Commission has concluded that the existing method for establishing the location of an interconnected VoIP device (*i.e.*, the registered location requirement) is inadequate.[32] The Commission therefore tentatively concluded that it should require that

[32] *See id.*, ¶ 27 (*citing* NPRM, ¶ 18).

portable or nomadic VoIP services employ an automatic location technology.[33] The registered location method leaves to the consumer the responsibility to keep his registered location up to date every time the VoIP device is moved. The requirement makes the unlikely assumption that a VoIP phone user is going to remember to register his interconnected VoIP phone at a relative's address when he visits for the holidays. Such location information scores very low on the confidence scale and very high on the uncertainty scale. The registered location requirement was simply the best that could reasonably be done at the time. That is no longer the case.

Fundamentally, WAPS technology requires a GPS chipset and an antenna to give a handset the ability to locate itself to within 20 to 40 meters, indoors, in urban canyons and by elevation. Because current VoIP enabled devices may not have a GPS chipset and associated antenna like wireless phones, such handsets would require the addition of a low cost WAPS receiver. This solution would allow the Commission to avoid the difficult decision regarding whether and how to regulate various potentially small local providers of broadband Internet connections to customers such as coffee shops, hotels, airports and municipalities.[34] Rather, the location capability would be built into the VoIP device. Commlabs takes no position on whether the Commission should extend E911 location accuracy requirements to interconnected VoIP providers, or other VoIP providers. Any VoIP device, however, can be outfitted with WAPS technology and would therefore be able to exceed the Commission's E911 location accuracy requirements.

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[33] *See id.*

[34] *See id.*, ¶ 28.

VII. CONCLUSION

As discussed herein, Commlabs has developed a new E911 location technology called WAPS that can exceed the Commission's location accuracy requirements and locate emergency callers indoors, in urban canyons and by elevation. WAPS is not impacted by customer roaming, could be available at low cost in many cases with a simple software or firmware upgrade to the GPS chipsets of future handsets and could be used to locate equipped VoIP devices. WAPS, if deployed, can be deployed to achieve substantial coverage of major cities within two years and coverage to remaining markets within four years.

Commlabs believes that its WAPS service can be an important part of the solution that advances the E911 goals established by the Commission in the FNPRM and NOI.

Respectfully submitted,

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