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VIA ELECTRONIC FILING

September 25, 2013

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street NW, Room TW-A325
Washington, DC 20554

Re: Workshop on Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114

Dear Ms. Dortch:

With this filing, TruePosition, Inc., through its attorneys, respectfully submits answers to the Federal Communications Commission's (FCC) questions posed in its September 9, 2013 Public Notice announcing the FCC E911 Phase II Location Accuracy Workshop on October 2, 2013. Should there be any questions, please contact TruePosition's undersigned counsel.

Sincerely,

/s/ James Arden Barnett, Jr.
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FCC E911 PHASE II LOCATION ACCURACY WORKSHOP QUESTIONS

TRUE POSITION ANSWERS

- Wireless usage has expanded significantly over the past few years. Americans are not only using wireless phones for a greater percentage of calls, they are increasingly using wireless phones for all calls, including calls to 911 from indoor environments.[1] How have wireless providers and PSAPs been affected by the increase in the volume of wireless calls to 911, and how have they modified their practices to account for such changes? In addition, we seek the submission of specific data that quantifies the increase in wireless calls to 911, particularly the increase in wireless 911 calls from indoor environments.

Answer: A survey has been initiated by the *Find Me 911 Coalition* (of which True Position is a member) with a number of PSAPs throughout the United States. Their answers to these questions and others will be assembled, summarized and submitted to the FCC, as soon as possible. That said, the best data regarding the scope of the problem relating to 911 calls originating indoors resides with the carriers. Specifically, the problem is the number and percentage of location requests where AGPS fails to provide a location and the carrier is forced to rely instead on its fall-back technology. Although this will not precisely quantify the number of indoor calls, as some indoor calls can be located by AGPS and some outdoor calls (e.g., urban canyons, dense forest) cannot be located by AGPS, it will quantify the number of calls where public safety is not getting a Phase II compliant location.

- How has the increase in wireless calls to 911, particularly from indoor environments, affected the ability of wireless providers to deliver Phase II location information?

Answer: All things being equal, wireless call volume itself should not adversely impact the ability of wireless carriers to deliver Phase II location information, assuming that a carrier has put in place a technology that can quickly and accurately deliver Phase II location information from any location. The currently deployed handset and network based technologies have far more throughput than is required for E911, so the quantity of location requests is not an issue.

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[1] J.D. Power's *2011 Wireless Call Quality Study – Volume 1*, conducted during the second half of 2010, showed that an average of 56 percent of wireless calls were made from indoors, up from 40 percent in 2003. *See* J.D. Power and Associates, 2011 U.S. Wireless Call Quality Performance Study, Volume 1, *available at* http://www.jdpower.com/content/press-release/Kp2D0Ys/wireless-call-quality-performance-study.htm (last visited Sept. 9, 2013) (*J.D. Power 2011 Wireless Call Quality Study – Vol. 1*). Also in 2011, *Consumer Reports* stated that 60 percent of 911 calls were placed through wireless phones. *See For 911, is a Cell Phone as Safe as a Landline?*, CONSUMER REPORTS MAGAZINE, (Jan. 2011), *available at* http://www.consumerreports.org/cro/magazine-archive/2011/january/electronics/best-cell-phones/911-from-cell-phone/index.htm (last visited Sept. 9, 2013). More recently, a letter from the San Francisco Department of Emergency Management indicated that 70 percent of all wireless 911 calls originate indoors. *See* Letter from Lisa Hoffman, Deputy Director, Division of Emergency Communications, San Francisco Department of Emergency Management, to Julius Genachowski, Chairman, FCC, WT Docket No. 11-49 (filed Mar. 25, 2013).

- What factors affect whether individual 911 calls include or do not include delivery of Phase II location information to the PSAP? For example:

    - What is the impact of 911 call duration on the ability of different technologies to provide Phase II location information to the PSAP?

    - To what degree is the delivery of Phase II information to the PSAP with each call a function of automated versus manual processes?

    - What is the role of rebid procedures when Phase II information is not delivered to the PSAP with the initial 911 call?

    - Are there other network or operational issues that can affect a carrier's ability to deliver Phase II information with each call and/or the PSAP's ability to receive the information?

Answer: The most significant factor affecting whether a given 911 call includes Phase II location information is the E911 location technology employed by the carrier. Some technologies, such as the "fall-back" technologies used by many carriers when AGPS fails to provide a location, are unlikely to deliver Phase II compliant locations no matter how many times a PSAP "rebids" and no matter how much time a PSAP allows for the location data to be sent to them or "captured" by them. "Round Trip Time" (RTT) technology, for instance, is notoriously inaccurate and will never deliver anything more than Phase I-type information. Advanced Forward Link Trilateration (AFLT) is another fall-back technology that, in a hybrid application with AGPS, has been determined by the CSRIC Working Group III to not be in compliance with the FCC's Phase II requirements indoors.

In most cases, an AGPS location will not be delivered to the PSAP when the 911 call connects. However, when AGPS is capable of calculating a location (i.e., when the satellite signals to the handset are not blocked) and given enough time prior to the rebid, AGPS can provide accurate Phase II information.

The problem for the PSAP is that 911 operators may be provided a location labeled as Phase II, but are not told whether what they are seeing on their screen is an accurate AGPS Phase II location, or an inaccurate fall-back technology location.

- What measures do PSAPs and wireless providers undertake, in terms of ongoing monitoring of Phase II performance, both on an individual call basis and an aggregated basis? What types of metrics are monitored and how are they measured?

Answer: Not applicable to True Position.

- In what percentage of wireless 911 calls is Phase II location information successfully delivered to the PSAP? How does current Phase II yield (percentage of wireless 911 calls that include Phase II location information) compare to Phase II yield in the past few years?

Answer: Based on the carriers' responses to the CalNENA data, the carriers do not "deliver" Phase II data to the PSAPs, but make such data available to the PSAPs through the rebid process approximately 30 seconds after the call connects. But even if we assume that this degree of latency is acceptable and that the PSAP is in a position to rebid at the appropriate time, the question remains as to whether the location being delivered to the PSAP upon rebid and labeled as "Phase II" is in fact Phase II compliant. Specifically, if the call originates indoors or in other environments where AGPS does not function, then the delivered location will be generated by a technology that is not Phase II compliant.

It is notable, however, that during the period of time that AT&T and T-Mobile relied on a network based solution (UTDOA) to provide E911 locations, they were able to deliver Phase II compliant locations roughly 90% of the time. It was only after the transition to a handset based solution (AGPS) that latency and rebid protocols became an issue, with Phase II compliance as reported by CalNENA falling well below 50%. By contrast, UTDOA can provide a location in 3-5 seconds and typically is delivered to the PSAP when the 911 call connects.

- Is there a correlation between trends in Phase II yield and an increase in the number of wireless calls originating from indoors?[2]

Answer: If the reference in the question is to Phase II *compliant* locations, then the answer is likely yes. As the number of wireless calls from indoors increases, the number of calls where AGPS fails will increase. Given that the fallback technologies relied on to generate a location in those cases are not Phase II compliant, the yield would go down.

- Is Phase II yield affected by wireless providers' migration to new network technologies, *e.g.*, from 2G to 3G/4G networks?

Answer: There is no direct relationship between a carrier's transition from 2G to 3G or 4G network technology and changes in the E911 location accuracy that the same carrier can deliver. The variable is the location technology that the carrier chooses to employ, regardless of the radio spectrum or the speed of their network. The decision by certain carriers to move from UTDOA for GSM to AGPS for UMTS precipitated the fall-off associated with increased latency and indoor inaccuracy described above.

- Is Phase II yield affected by the wireless provider's choice of location technology (*e.g.*, network versus handset-based location solution) or changes in the location technology used (*e.g.*, migration to A-GPS)?

[2] According to J.D. Power, "Typically, wireless calls placed indoors result in slightly more problems, on average, than calls placed outdoors." *J.D. Power 2011 Wireless Call Quality Study – Vol. 1.*

Answer: Technology choice by the carrier is the most important factor in Phase II location yield. That conclusion was reached by CSRIC studies and it has been proven time and again in the field. As indicated above, changes in PSAP practices will have no bearing on increasing the percentage of Phase II compliant locations if the underlying technology used by the carrier is incapable of providing accurate locations.

- Are there variations in the delivery of Phase II location information based on the type of environment (*e.g.*, urban versus rural environments, indoor versus outdoor environments)?

Answer: Yes. The AGPS technology currently relied on by the carriers to deliver Phase II locations does not function in many indoor and urban environments; and the fallback technologies relied on when AGPS fails are not Phase II compliant.

- According to the CalNENA filing, of the 1,589,580 wireless 911 calls received statewide in March 2013, less than half of those calls included Phase II location information.[3] Does the data in the record support CalNENA's contention that there has been a decline in the delivery of accurate Phase II location information in the past few years?

Answer: Yes. The high, 90% Phase II compliance levels shown by certain carriers four to five years ago are consistent with their use of network-based (UTDOA) location technology for their 2G GSM networks. The subsequent fall-offs in the delivery of Phase II locations are consistent with a switch by those carriers to handset based (AGPS) location technology. However, as noted above, even if the delivery of Phase II compliant AGPS locations is increased by the modification of PSAP rebid practices, the location of calls placed from indoors and other environments where AGPS fails will be generated by a noncompliant location technology. The number of calls originating from these AGPS challenged environments is estimated to be in the range of 20-50%, depending on morphology, and is predicted to continue to increase as more users rely on wireless devices as their sole or primary means of contacting 911.

- In 911 calls where Phase II location information is delivered to the PSAP, has the overall quality and accuracy of the information improved, declined, or remained unchanged in comparison to the past few years? To what extent, if any, has the overall quality and accuracy of Phase II location information been affected by:
    - The increase in wireless calls originating from indoors?
    - Wireless providers' migration to new network technologies?
    - Changes in the location technology used by carriers?

[3] CALNENA *ex parte* at 2.

- Type of environment (*e.g.*, urban versus rural environments, indoor versus outdoor environments)?

Answer: Given that the technologies relied on by the carriers to generate locations in indoor and other environments where AGPS fails have been determined to be noncompliant with Phase II requirements, it is reasonable to assume that the increase in calls from these environments results in a decline in accuracy. Moreover, given that UTDOA has been determined to be Phase II compliant indoors, the migration of the GSM carriers away from UTDOA to AGPS is the direct cause of the decline in accuracy in these environments. The use of a combination of AGPS and UTDOA for E911 location will ensure Phase II compliance in all indoor and outdoor environments and, because UTDOA can calculate a location in 3-5 seconds, enable both x-y routing and the delivery of a Phase II location when an emergency call connects.

- How is the ability of PSAPs to respond to 911 calls affected by the availability or unavailability of Phase II location information, the time required to obtain a Phase II fix (including rebids), and the quality of the Phase II information when it is provided?

Answer: The correlation between the time in which assistance is delivered for medical emergencies and the likelihood of survival has been studied and confirmed over time by many different medical experts. For instance, the likelihood of surviving a cardiac arrest decreases by 7 to 10% for each minute that passes without emergency assistance. http://circ.ahajournals.org/content/122/18_suppl_3/S706.full. Consequently, there is a direct causal connection between delays experienced by PSAPs in receiving accurate E911 location information and the ability of public safety employees to save lives.

- What efforts are stakeholders making (or can they make in the future) to improve Phase II yield and the accuracy of Phase II information?

  - What solutions are available to improve the delivery of Phase II information, including improving location accuracy both outdoors and indoors, and what are the costs of such solutions?

Answer: A combination of handset (AGPS) and network based location technology (such as UTDOA) provides prompt and Phase II accurate location information both indoors and outdoors. Network costs could be shared by wireless carriers; there is no need for each carrier to build its own network-based E911 location system.

- What additional measures, including regulatory action, could help improve the delivery of Phase II E911 location information in the near term? In light of the expanding role of wireless technology in communicating with emergency services, are there regulatory gaps in the Commission's E911 rules? Are there public safety requirements for location accuracy that are not being met by the rules?

Answer: The FCC should more regularly require wireless carriers to verify and confirm that the technologies they are employing are delivering Phase II compliant location information. The FCC should inform wireless carriers that even though the FCC's E911 testing regulations only apply outdoors, carriers have an obligation to provide Phase II compliant E911 services from all locations, indoors and outdoors, where a PSAP has informed them that they are prepared to accept Phase II information, unless the carrier has a specific Phase II geographic exclusion. The next regulatory step would be to require testing of indoor E911 location accuracy. The CSRIC III Working Group shows that this can be accomplished with accurate results at reasonable costs.

- Is currently available location technology able to deliver more precise location information than the Commission's current E911 rules require?
    - What is the potential for current technology to provide vertical location (z-axis) as well as horizontal location (x- and y-axis)?
    - What is the potential for future location technology to improve accuracy performance, particularly as providers deploy 4G networks and increase the use of small cells and other advanced infrastructure?

Answer: Current technologies do not yet support the Z-axis. New pressure sensors are available for installation in wireless phones which can be used to determine the altitude, or Z-axis. These pressure sensors have absolute and relative errors which must be calibrated in order to provide an accurate altitude. Experimental calibration schemes have shown promise on prototype systems; however, they have yet to be proven in commercial systems, and on a large scale.

When UTDOA is combined with AGPS, both of which are technologies deployed in nationwide networks, high accuracy can be delivered indoors, better than the network technology requirement of 100m/300m. Improvements in existing technologies, as well as deployment of new technologies, will provide indoor accuracy to better than 50m/150m. These improvements have yet to be demonstrated on commercial ready platforms, but tests have shown much promise.

TruePosition