

Before the
U.S. Senate, Committee on Commerce, Science and Transportation
Subcommittee on Communications, Technology and the Internet

Hearing on “Locating Wireless Callers in a Wireless World”

Statement of
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Qualcomm is a licensor of highly innovative wireless technology and manufacturer of cutting edge chips for wireless devices. Qualcomm was one of the primary inventors of Assisted-GPS and the first to implement Assisted-GPS. For more than 10 years Assisted-GPS has located millions of emergency callers and saved lives.

With an increasing number of indoor 911 calls the need to accurately locate wireless users indoors is increasingly important. As a result, Qualcomm and its partners are actively researching and developing next-generation technologies to improve both outdoor and indoor wireless location accuracy in the absence of any new federal mandate.

Based on the CALNENA report to the FCC, and the recent FCC Workshop, there is some confusion about when and how an accurate location estimate of an emergency caller is made available to the 911 call center. I would like to clarify this.

Currently, each 911 call from a mobile device is routed to the call center that is closest to the device's serving cell. The call center then uses a separate communication channel to "bid", often referred to as "rebid", for a more accurate location estimate; in other words, the call center has to "ask" the network to provide it with the caller's location. This two-step process has not changed since E911 was first implemented in response to the FCC's E911 mandate established over a decade ago.

Qualcomm participated in the last FCC Communications Security, Reliability and Interoperability Council (CSRIC), which issued its report in 2013. We provided support to both Verizon Wireless and Sprint in demonstrating their E-911 hybrid location technology, which utilizes both Assisted GPS and Advanced Forward Link Trilateration (AFLT). AFLT is a 3G technology based on measurements of signals from cellular base stations.

The work of the last CSRIC was critically important as it enabled the industry to learn the state of technologies available to improve indoor location accuracy. CSRIC invited all industry participants to present location technologies for independent third-party testing, and CSRIC reported the results from three technologies. One of those was A-GPS/AFLT, which is an open standard with products available from multiple vendors.

There are several key points to note about the CSRIC results. *First*, the results were obtained on unmodified Verizon Wireless and Sprint networks. *Second*, this is the first publication of performance results for A-GPS / AFLT. *Third*, although this technology has worked well for over 10 years, until recently the focus has not been on indoor performance. The performance reported by CSRIC ranged from 10s to 100s of meters for indoor sites spanning rural to dense urban environments. The CSRIC results confirm that this 3G technology works reasonably well indoors.

But as I will explain, Qualcomm and its partners are working on 4G-based technology that will perform better. Specifically Observed Time Difference Of Arrival (OTDOA). OTDOA, like

AFLT, is handset based and relies on measurements from cellular base stations. But 4G OTDOA technology has been designed to perform even better than 3G AFLT, including through use of signals that are dedicated to positioning. Qualcomm believes, and test data support, that OTDOA will be a very useful indoor positioning technology for locating emergency callers. Initial field trials of the technology show that OTDOA is able to provide accuracies within a few or tens of meters. Even better results are expected in the future, through a robust roadmap of improvements for future generations of the standard. All major US carriers have plans to deploy OTDOA.

Qualcomm believes in leveraging the 4G LTE cellular network for indoor location for many reasons, including that cellular, by its nature, provides coverage wherever the call is made - including indoors. OTDOA positioning is based on the trusted and accurate information of the cell locations. OTDOA uses the LTE handsets being deployed for voice over LTE services; once deployed, any LTE-capable phone, from any vendor, will support OTDOA; no special handset hardware is needed.

CSRIC has reconvened and is proceeding with planning the next round of testing. Qualcomm strongly supports this process and CSRIC's recommendation to the FCC to consider including OTDOA in a future test bed. This allows the industry and regulators to make informed decisions.

Qualcomm also believes that information about Wi-Fi access points may be used to supplement indoor positioning that uses Assisted-GPS and AFLT or OTDOA. Standards exist allowing for Wi-Fi information, including the positions used by existing consumer location services, to be provided as supplemental information to E911 location servers. However, Wi-Fi solutions face challenges because there is no assurance that Wi-Fi databases are accurate. Clarification of liability for an inherently unreliable source might be a first step.

In summary, currently deployed A-GPS plus AFLT based technologies work well when callers are outdoors and reasonably well indoors. With an increasing number of indoor 911 calls, it is important that additional technologies be implemented in order to improve performance and the ability to quickly and accurately locate emergency callers, wherever they are located. This process is well underway, and is occurring in the absence of any new Federal mandate. For example, the major US carriers are actively expanding their 4G LTE networks to enable OTDOA. Qualcomm recommends a measured approach by the FCC in gathering data and considering how to support the industry's ongoing efforts. Qualcomm believes the industry, along with valuable participation from CSRIC, is moving in the right direction in a reasonable time frame.