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APCO Emerging Technologies Forum

TRENDS IN WIRELESS LOCATION ACCURACY TECHNOLOGY: A CARRIER PERSPECTIVE

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Agenda

- Current Location Information Provisioning
- Location Technology Trade-Offs
- Radio Access Network Limitations and Opportunities
- Location Technology Improvements
- Principles for Further Evaluation

Current Location Information Provisioning

- Wireless Providers cannot 'push' location information to the PSAP
  - PSAP must request ('pull') location from the ALI Service Provider
  - ALI Service Provider then 'pulls' location from Wireless Provider (GMLC/MPC)
- Normal Location Process
  - Initial ALI Bid upon call reception at PSAP (often automated) – typically results in Phase I (Cell ID) location
  - Re-bid approximately 30 seconds into call (can be manual or automated) – typically results in Phase II location estimate
    - Re-bid can be timed from call reception or from previous ALI bid result – whichever is most convenient for the PSAP/CPE vendor
    - Repeat re-bid process ("mid-call location update") as needed

Location Technology Trade-Offs

All location technologies have limitations and involve trade-offs between accuracy, yield, and latency – as a matter of physics

- No location technology delivers high accuracy, high yield, and zero latency
- Stakeholders have indicated that high accuracy is top priority – even if it takes longer to obtain
- As agreed with public safety from the inception of wireless E911 – no other location technology is as timely and reliable as Cell ID for immediately routing 911 calls to the designated PSAP – don't want to delay 911 call routing, even for a few seconds

Radio Access Network Limitations & Opportunities

Legacy radio access networks (pre-LTE) are limited with respect to location performance

LTE opens up new capabilities for improved location:

- Simultaneous positioning methods (crucial for optimal accuracy/yield within fixed latency limit)
- OTDOA integrated into physical layer – synchronized/coordinated positioning reference signals for improved 'hearability'
- Wider bandwidth downlink for high-accuracy TOA measurements
- Carriers are converging on common LTE access technology

Location Technology Improvements

Carriers are independently moving forward with both continuing improvements to existing location technologies and implementation of new location technologies

- AGPS continues to be the “gold standard” for location – accuracy and yield are consistently improving over time
- Several carriers have committed to support GLONASS satellite functionality (in addition to AGPS) over LTE
  - Higher likelihood for sufficient quantity of satellite measurements (increased yield) and better geometry (increased accuracy)
- Many carriers have indicated they will support OTDOA over LTE which holds promise of improved accuracy and yield in many environments and appears to be a good complement to AGPS

Principles For Further Evaluation

- Must be fact-driven based on technical and economic realities (utilize CSRIC Test Bed to sort fact from fiction)
- Must be forward-looking and take into account the unique location capabilities inherent within LTE networks (avoid stranded investments in legacy networks)
- Must ensure technologies capable of meeting FCC requirements are available from multiple sources – to foster a healthy eco-system, long-term support, and continued innovation

Principles For Further Evaluation

- Any new technologies must be commercially available, fully standardized, and cost effective to deploy, operate, and maintain
- Must not favor one particular technology or vendor over another
- Must recognize that new technologies take considerable time to implement – especially if handset modifications are required
- Collaborative effort amongst all stakeholders will yield best result

➢ **Everyone's goal must be for real improvements – that are both technically and economically feasible**

Q & A

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