

September 5, 2013

**Via Electronic Filing**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Re: *Wireless E911 Location Accuracy Requirements* PS Docket No. 07-114

Dear Ms. Dortch:

On Wednesday, September 04, 2013, Ryan Jensen, Kathleen Ham, Steve Sharkey, and Eric Hagerson of T-Mobile USA, Inc. (“T-Mobile”), along with John Nakahata, Wiltshire & Grannis, LLP, on behalf of T-Mobile, met with the following:

- David Turetsky, Chief, Public Safety and Homeland Security Bureau (“PSHSB”);
- Henning Schulzrinne, Chief Technologist, Office of Strategic Planning and Policy Analysis;
- David Furth, Deputy Bureau Chief, PSHSB;
- Erika Olsen, Senior Counsel, PSHSB;
- John Healy, Associate Division Chief, Cybersecurity and Communications Reliability Division, PSHSB;
- Nicole McGinnis, Policy and Licensing Division, PSHSB;
- Dana Zelman, Policy and Licensing Division, PSHSB;
- Eric Ehrenreich, Policy and Licensing Division, PSHSB; and
- Timothy May, Policy and Licensing Division, PSHSB.

We discussed the ex parte letter filed by the California Chapter of the National Emergency Number Association (CalNENA) on August 12, 2013, and provided the FCC attendees with the attached presentation. T-Mobile takes very seriously its obligations to provide E911, and to make available accurate location information that meets or exceeds the Commission’s requirements. T-Mobile is very concerned that CalNENA’s ex parte presents a distorted picture as to the availability of 911 Phase II location information.

Contrary to what CalNENA presented, there is no crisis in the availability of wireless Phase II location information to the 5 PSAPs studied: the low number of calls with wireless Phase II information delivered to the PSAP by call end stems overwhelmingly from the fact that these PSAPs never actually requested updated Phase II locations for the vast majority of 911 calls. When T-Mobile analyzed its data for actual 911 calls placed to the 5 California PSAPs from January to July 2013, it found:

- **There is no problem with the *availability* of Wireless Phase II location data.** For the 5 California PSAPs, Wireless Phase II data is available for 90% of calls over 30 seconds long (30 seconds is specified by the FCC Office of Engineering and Technology's Bulletin OET-71 and NENA's own guidelines), and 86% of calls over 5 seconds long.
- **These 5 PSAPs are not requesting the location information they say they need.** Standard implementation of Wireless Phase II – including both NENA and APCO best practices – specifies a PSAP should re-bid (re-query) when updated location information is desired. The 5 California PSAPs do not re-bid for location on 79% of the 911 calls routed by T-Mobile. San Francisco does not rebid on 93%.
- **The PSAPs already have the tools to solve the “problem.”** PSAPs can design their systems automatically to re-bid for location after an appropriate amount of time, e.g., 30 seconds, if they want to “pull” the updated location more consistently or without calltaker intervention. These 5 PSAPs apparently did not do so, which would have ensured that the most up-to-date location information was on their calltakers' screens by call end.
- **Short calls should have been excluded.** These are unlikely to be emergencies. PSAPs frequently complain about the level of fraudulent, abusive and non-emergency calls they receive. 21% of calls to these 5 PSAPs are under 5 seconds, 32% are under 15 seconds, and 44% are under 30 seconds. The average T-Mobile 911 call to these 5 PSAPs is 95 seconds long, illustrating that genuine emergencies are much more likely to be longer calls.

It is important to recognize that the re-bid process is essential to the PSAP obtaining the most accurate available information for a given call. The initial location estimate that a PSAP receives is usually requested approximately 4-5 seconds after the start of the call. At that time in the call, it is rare that a high accuracy Phase II location estimate will have been generated. For example, A-GPS, which is by far the most accurate of all currently deployed location technologies, usually takes 25-30 seconds to generate a location estimate, and thus this high accuracy location estimate is generally not going to be available near the start of the call. Accordingly, in 2003, NENA Operational Information Document 57-501 specified that when a wireless carrier delivered a Phase I location estimate, “the PSAP will then need to re-bid or re-request the ALI approximately 15 to 30 seconds after they receive the initial ALI bid to obtain the 9-1-1 caller's accurate latitude and longitude.” In 2007, APCO Project Locate underscored the importance of re-bids when the caller cannot provide location by adopting the following Effective Practice: “The [PSAP] should rebid all wireless calls when the wireless caller is not able to provide a location, even if the call is initially presented to the calltaker as a WPH2.” (APCO Project Locate Effective Practice 380743). It appears that these 5 California PSAPs either (1) did not need wireless Phase II location information for the 79% of calls they did not re-bid, or (2) failed to follow APCO Project Locate's Effective Practice.

With respect to indoor accuracy, T-Mobile made the point that the CSRIC Working Group 3 test-bed was developed specifically because it is infeasible to test indoor location performance in the same manner as outdoor performance. There is no operationally feasible way for a provider to obtain access to hundreds of indoor test sites in each county. The only operationally feasible way to assess indoor technologies is through testing in representative

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environments. The Working Group 3 test bed also allowed, for the first time, apples-to-apples evaluation and empirical verification of rival vendors' claims. The most important step the Commission can take in the near-term with respect to the continued development of a workable indoor solution to complement A-GPS would be to encourage and support further test-bed testing of additional candidate technologies by CSRIC. In that way, all stakeholders can make data-driven judgments about how to address indoor location accuracy. Ultimately, this could lead to a type-acceptance process for certifying indoor performance for E911 location technologies.

Please contact me if you have further questions.

Sincerely,



John T. Nakahata  
*Counsel to T-Mobile USA, Inc.*

Attachment

cc (without attachment):

David Turetsky  
Henning Schulzrinne  
David Furth  
Erika Olsen  
John Healy  
Eric Ehrenreich  
Nicole McGinnis  
Timothy May  
Dana Zelman

# CaINENA E911 Phase II Location Complaint

## T-Mobile Analysis and Response

# Summary

- **There is no problem with the availability of Wireless Phase II location data.** For the 5 California PSAPs, Wireless Phase II data is available for 90% of calls over 30 seconds long (30 seconds is specified by OET-71), and 86% of calls over 5 seconds long.
- **These PSAPs are not requesting the information they say they need.** Standard implementation of Wireless Phase II specifies a PSAP should re-bid (re-query) when updated location information is desired. The 5 California PSAPs do not re-bid for location on 79% of the 911 calls routed by T-Mobile. San Francisco does not rebid on 93%.
- **The PSAPs already have the tools to solve the “problem.”** PSAPs can design their systems automatically to rebid for location after an appropriate amount of time, e.g., 30 seconds, if they want to “pull” the updated location more consistently or without calltaker intervention.
- **Short calls should have been excluded.** These are unlikely to be emergencies. 21% of calls to these 5 PSAPs are under 5 seconds, 32% are under 15 seconds, and 44% are under 30 seconds.

# Background on CalNENA Analysis

- Data analyzed by CalNENA/PSN for wireless 911 calls routed to five PSAPs in California between January 2008 - December 2012.
- Specifically considered percentage of wireless 911 calls with Phase II location information at the PSAP at call termination – collectively for all calls, by carrier, and by PSAP.
  1. Bakersfield PD (Kern County)
  2. Pasadena PD (Los Angeles County)
  3. San Francisco CEC (San Francisco County)
  4. San Jose PD/FD (Santa Clara County)
  5. Ventura County SO
- Two primary concerns noted:
  1. Low percentage of Phase II location information at call termination across all carriers.
  2. Phase II percentage has generally decreased over time beginning in 2009.
- These PSAPs never raised these as significant concerns or attempted to resolve these concerns with T-Mobile before publishing this report.

# Re-bids are Required to Maximize Ph. II Delivery

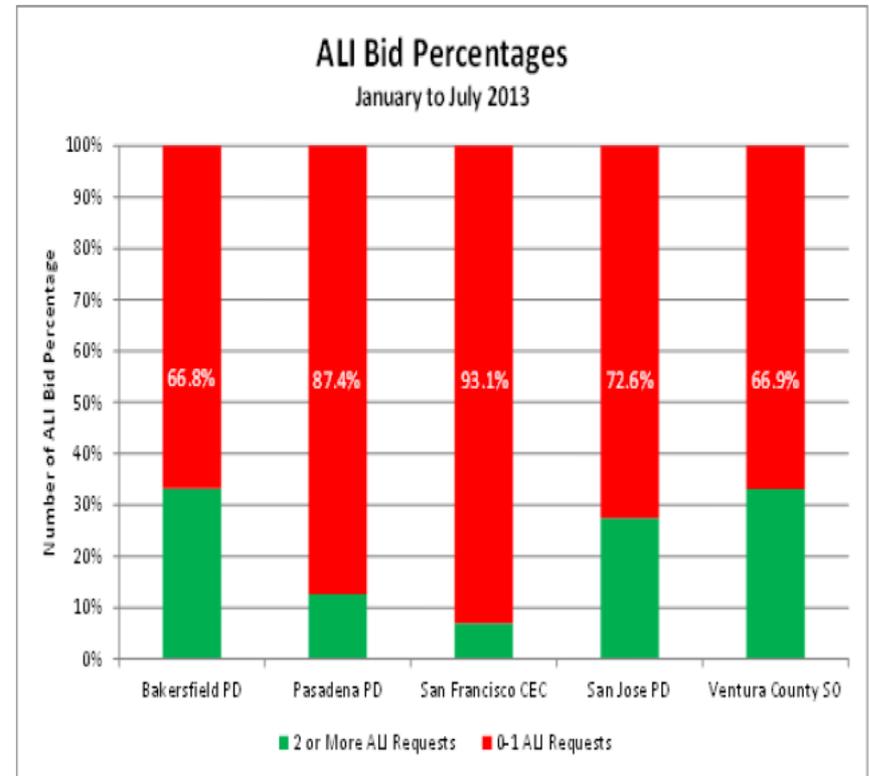
- Current FCC guidelines and NENA Best Practices recognize that location solutions require time to provide high accuracy estimates.
- The FCC's OET-71 and NENA Best Practices specify a two-stage process, one in which a call is routed quickly based on initial location information (such as cell ID), followed by re-bids.
- OET-71 and NENA permit 30 seconds to develop accurate location estimates.
- A-GPS is the most accurate technology, and the only one capable of adequately handling rural areas, such as along highways, but it takes time to develop a position.
- No matter the location technology, PSAPs must re-query ("re-bid") for an updated location.
- APCO Project Locate advised PSAPs to re-bid whenever the caller could not provide location, but that a re-bid should not be made prior to 30 seconds after call presentation.

# OET-71 and NENA Specify Re-bids

- OET-71 specifically contemplated re-bids after initial routing:
  - § III – **Timing:** Location information must be delivered to PSAPs within a reasonable time to permit its effective use by emergency response teams. This presents at least two separate issues. First, location information should be available as soon as possible, with little or no delay in normal call delivery, to assist in routing the call to the correct PSAP and to provide rapid location information to the dispatcher. Second, location information is needed by emergency response teams responding to the call, who will benefit from more accurate location information. To accommodate both of these objectives, available location information should be delivered with call completion, but verification of the accuracy of the information may take place shortly after call completion.... **An acceptable time limit for such testing is 30 seconds after the call is sent.**
- NENA’s Operational Information Document (OID) “Wireless Phase I & II Features & Functions” (Document 57-501, 20 Jan 2003) which defines how E911 Phase II should work:
  - 3.2.8 - “Once queried by the MPC, **the PDE is allowed up to 30 seconds to provide a valid Phase II location.** In most cases, with current technology, the PDE will not have responded with final Phase II location information to the MPC by the time the call is answered by the PSAP and initial ALI query to the MPC is performed. **This makes it necessary for the PSAP to be able to re-bid or re-request their ALI to receive the caller’s location information or to receive updated location information. This is currently necessary, because 9-1-1 calls are generally routed in 5 seconds or less and once the call is routed, it usually takes no more than 1 second for the initial ALI bid to be made.** If an accurate latitude and longitude cannot be calculated in the 6 or less seconds it takes to route the call and make the initial ALI bid, then the wireless carrier will deliver Phase I type location data. In those cases, **the PSAP will then need to re-bid or re-request the ALI approximately 15 to 30 seconds after they receive the initial ALI bid to obtain the 9-1-1 caller’s accurate latitude and longitude.**”

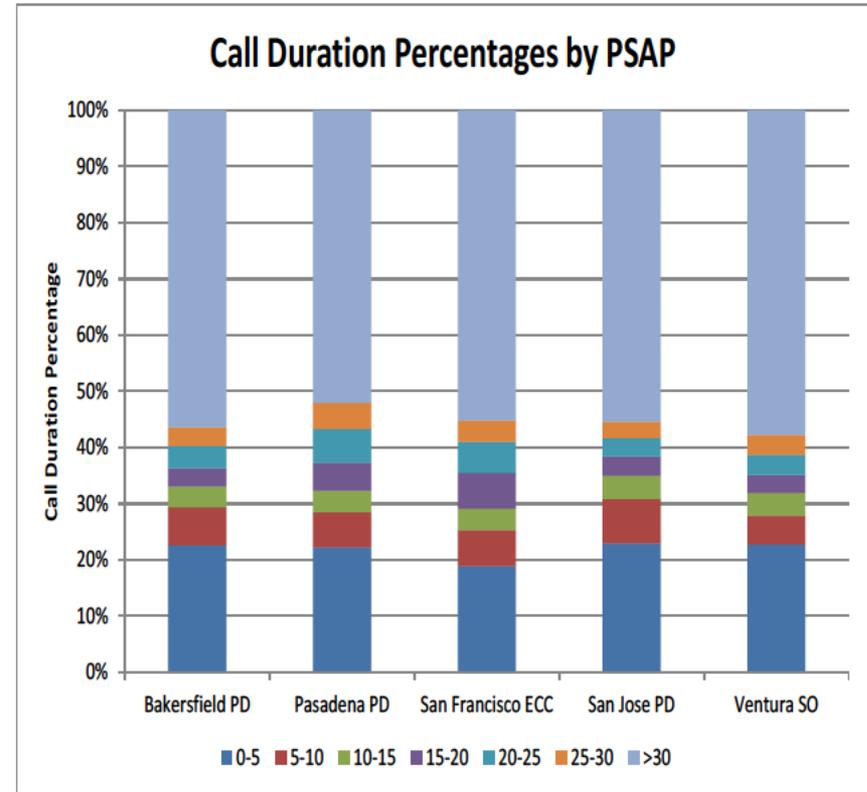
# The 5 CA PSAPs Didn't Rebid for Most Calls

- T-Mobile analyzed 911 call data for the 5 CA PSAPs for all calls between Jan. 2013 and July 2013.
- A re-bid request was made for only 21% of calls, i.e., 79% had no re-bid.
  - 10% of the 911 calls had no ALI bid at all.
  - 69% of the 911 calls had only the initial ALI query (no re-bid).
  - One PSAP (San Francisco CEC) issued no re-bid request for 93% of calls.



# Short, Non-Emergency Calls Also Skew Results

- Average 911 call to the 5 CA PSAPs is 95 seconds long.
- Short calls are most likely to be misdials, pranks or multiple reports of the same incident.
- 44% of all 911 calls routed to the 5 CA PSAPs were less than 30 seconds long.
- 32% of all 911 calls to these PSAPs were less than 15 seconds long.
- 21% of all 911 calls to these PSAPs were less than 5 seconds long.



# How Often is Wireless Phase II Actually Available?

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- For the 5 California PSAPs, Wireless Phase II location was available (from the initial location attempt), if re-bid, for:
  - 86% of all calls greater than 5 seconds long.
  - 88% of all calls greater than 15 seconds long.
  - 90% of calls greater than 30 seconds long.

# PSAPs Can Configure Automatic Re-bids

- If they want to ensure automatic location updates, PSAPs could configure their systems for automatic re-bids. Doing so would automatically ensure delivery of updated locations, if available, at intervals chosen by the PSAP.
- BUT –
- NENA 57-501 – “It is best practice to allow PSAPs to make manual mid-call location updates. This paper does not support the use of automatic re-bids.” (emphasis in original)
- APCO Project Locate –
  - Effective Practice 380741: “The AHJ [Authority Having Jurisdiction] should not rebid (automatically or manually) less than 30 seconds after the call is first presented to the calltaker. Any subsequent rebids should be at 30-second intervals. If automatic rebid is used, only the first rebid should be automatic.”
  - Effective Practice 380743: “The AHJ should rebid all wireless calls when the wireless caller is not able to provide a location, even if the call is initially presented to the calltaker as a WPH2.”

# Conclusions

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- The T-Mobile network has the Phase II location information available within 30 seconds of the 911 call initiation, but often does not receive a request from the PSAP to provide it (no re-bid).
  - The lack of ALI queries initiated by the PSAP and the high percentage of short 911 calls explains the low percentage of Phase II location information present at the PSAP by call termination.
- The perceived issue raised by CalNENA is not a failure of the underlying E911 location technology currently in use: if the information is needed, NENA and APCO Project Locate Best Practices suggest requesting updated location information.

# Background Info

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# Overview of the E911 Auto Location Process

1. There is no location information delivered with the routing of the 911 call (only an ESRK). Calls are routed using Cell ID (Ph I) location.
2. The PSAP generates an initial ALI query (or 'bid') to request location information.
3. The timing of the initial ALI query can vary from call-to-call and PSAP-to-PSAP. Many PSAPs automate this initial ALI query process.
  - The initial ALI query is happening on average 4.3 seconds after call initiation for the aggregate of all 911 calls routed to the 5 CA PSAPs – when it occurs.
4. Some calls never generate an initial ALI query (may be short in duration or the PSAP has no auto ALI query system in place).
  - 10% of the 911 calls routed to the 5 CA PSAPs had no ALI query at all.
5. All carriers deliver the best location information available at the time of the initial ALI query. The vast majority of the time – only Cell ID (Ph I) location information will be provided in response to the initial ALI query – especially for high-accuracy location methods like AGPS, since the query usually occurs only a few seconds after call initiation.
  - In some instances – a high accuracy Phase II location is available in response to the initial ALI query – but this is the exception, not the rule.

# Overview of the E911 Auto Location Process (cont'd)

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6. T-Mobile's network immediately kicks off a location request upon initiation of the emergency call.
7. This location request can take up to 30 seconds to complete, depending on the underlying location technology used and environmental factors affecting RF propagation.
8. The expectation is that the PSAP will follow the initial ALI query with a second ALI query or "re-bid" – ideally about 30 seconds into the 911 call – which will ideally result in the return of an updated, improved, Phase II location estimate.
9. In practice, the timing of the re-bid can vary from call-to-call, PSAP-to-PSAP, and call taker-to-call taker.
10. Many 911 calls do not result in any ALI re-bid request. This may be because of short call duration, no need for ALI information (the caller may be able to adequately describe their own location), or the lack of an automatic ALI re-bid process and/or proper call handling procedures in place at the PSAP. In this case – the cellular network may have a Phase II location ready – but never receive a request to provide it to the PSAP.