

September 11, 2008

VIA ECFS

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: ***Notice of Ex Parte Presentation; Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114; Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102.***

Dear Ms. Dortch:

On September 10, 2008, Robert Anderson and Michael Amarosa of TruePosition, Inc. and I met with members of the FCC staff to discuss technical issues related to location of wireless E911 calls. Ron Repasi, Deputy Chief of the Office of Engineering and Technology, presided on behalf of the Commission staff.

The attached presentation sets forth the substance of the discussion.

Copies of this letter and the attachment are being filed electronically in the above-referenced dockets.

Sincerely,

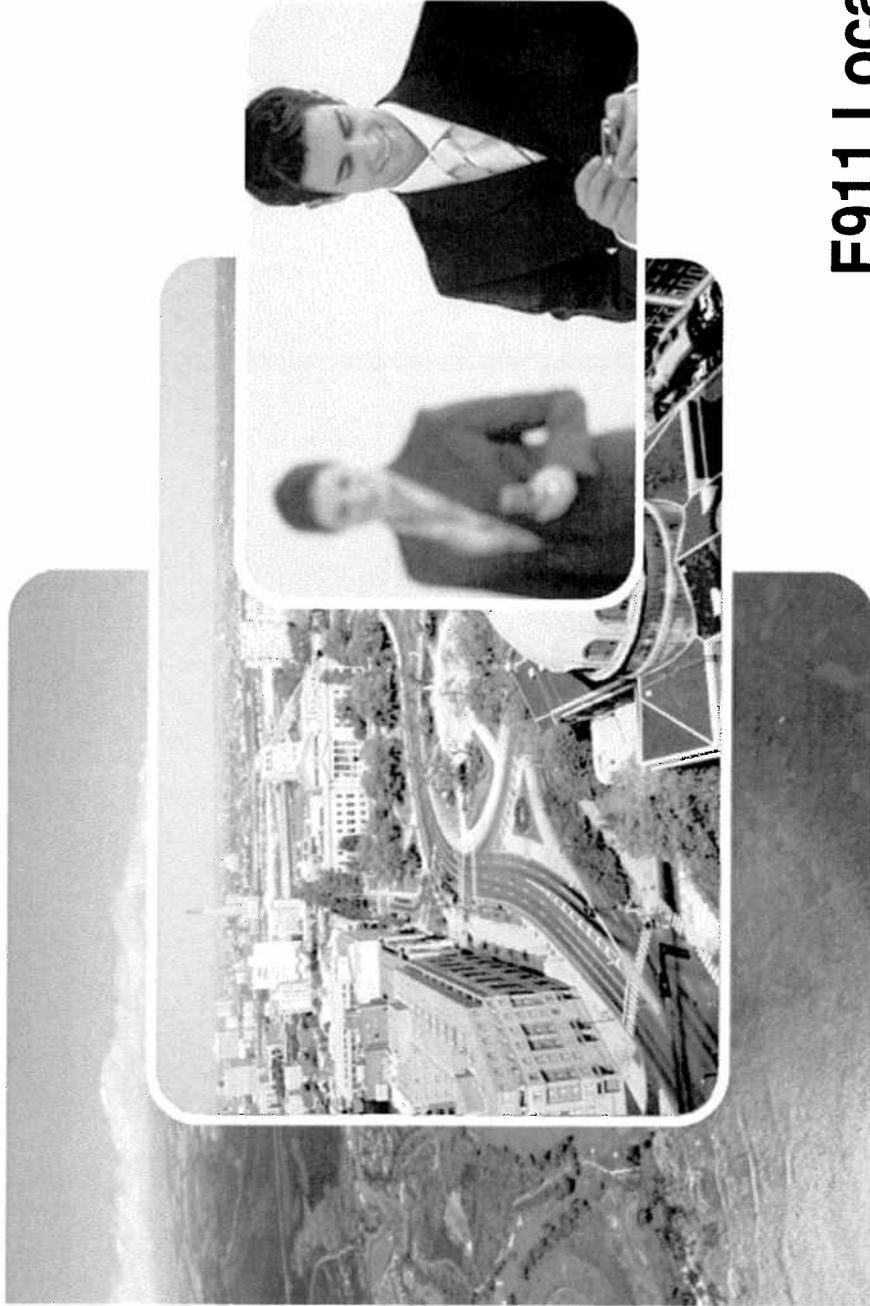
Philip L. Verveer

Attachment

cc: Julius Knapp
Ron Repasi
James Miller
Chip Fleming

Marlene Dortch
September 11, 2008
Page 2

Nicholas Oros
Paul Marrangoni
Ziad Sleem
Salomon Satche
Ahmed Lahjouji



TruePosition

E911 Location Technology

September 10, 2008

Proprietary

Global Wireless Location Solutions. Technology. Applications. End-to-End LBS.

TruePosition E911 Success



- **TruePosition Customers**
 - AT&T Mobility (formerly Cingular)
 - T-Mobile
 - Several Tier II and Tier III carriers
- **TruePosition U-TDOA Coverage:**
 - Over 75,000 Base Stations deployed
 - More than 270 million POPs covered in the US
- **TruePosition has delivered products and services supporting customers in meeting all FCC consent decree milestones on time**
- **TruePosition customers are compliant with current E911 accuracy requirements where TruePosition systems are deployed**
- **TruePosition rapidly completed massive LMU rollouts shipping over 60,000 LMUs over 3 years**

General Comments on UTDOA Performance

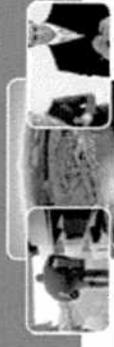


- **Most TruePosition customers deployed UTDOA cell site equipment, (LMUs) on more than 90% of cell sites**
 - Achieve excellent performance indoors
 - Minimal difficulty in operating the system
- **Some customers have deployed LMUs on a significantly smaller fraction of sites**
 - Sparsely deployed networks fully compliant with the national level accuracy requirements
 - Fewer sites tend to be deployed in urban areas, where most indoor calls are made
 - Because LMUs are not densely deployed, the in-building performance of the UTDOA network is degraded, relative to a more fully deployed network
 - Deploying UTDOA on a smaller fraction of cell sites makes the network more sensitive to equipment and configuration issues, making the system more challenging to operate



- **T-Mobile Position: “ TDOA is not a good complement to AGPS; need is for a technology that provides significant improvements in environments where AGPS is weak, particularly but not limited to indoors.”**
- **TruePosition response:**
 - TruePosition has favorable TDOA test data with large operators in many environments including dense urban environments, both indoor and outdoor; these data include both CDMA and GSM
 - TruePosition also has AGPS and AGPS + AFLT test data in those same environments
 - AGPS and AGPS + AFLT perform poorly in dense urban environments
 - AGPS + AFLT fails to perform inside high loss buildings made of concrete, steel, and glass
 - TDOA performs far better in urban and indoor environments than AGPS and is therefore an excellent complement to AGPS

Performance comparison of UTDOA vs. AGPS



Metric	Metric Definition	AGPS + AFLT Performance			UTDOA Performance		
		Dense Urban Outdoor	Indoor low loss	Indoor High loss	Dense Urban Outdoor	Indoor low loss	Indoor High loss
Accuracy 67 percent (m)	67 th percentile error in meters	368	48	a	65	77	90
Accuracy 95 percent (m)	95 th percentile error in meters	1989	980	b	180	210	270

a -- indicates that the technology failed to produce a location more than 33 percent of the time, preventing a 67th percentile accuracy from being computed.

b -- indicates that the technology failed to produce a location more than 5 percent of the time, preventing a 95th percentile accuracy from being computed.

- UTDOA performs well in places where AGPS is weak
- UTDOA is an excellent complement to AGPS



- **T-Mobile Position: “there are many significant logistical/practical issues associated with empirically measuring indoor performance”**
- **TruePosition Response:**
 - TruePosition has performed indoor testing in most cities
 - Typically 5% of test calls placed indoors
 - Indoor calls make up much larger fraction E911 calls (possibly 40%-60%)
 - Placing 40%-60% of test calls indoors in wide variety of locations in every county not necessary to assess indoor performance
 - A lower percentage of indoor calls (i.e. 10%) can be used with a higher weighting in the final statistics (i.e. 40% - 60%)
 - Additionally, a representative set of environments can be thoroughly evaluated and those results applied across similar environments
 - TruePosition has used both methods to determine location accuracy

Indoor Testing is not an Obstacle in Achieving Indoor Performance



- **T-Mobile Position: TruePosition has made inaccurate/misleading performance claims of “under 50 meters 75% of the time”**
- **TruePosition response:**
 - **TruePosition did not make the statement and believes it is not accurate**
 - Based on test results, TruePosition believes that a UTDOA network would meet the network accuracy requirements in 75% - 80% of PSAPS (2007 filing)
 - With new Generally Available software TruePosition estimates that a UTDOA network will be compliant in 80-85% of PSAPS (2007 filing)
 - TruePosition believes that a hybrid UTDOA + AGPS can meet the handset based accuracy requirements 50m 67%, 150m 95% in the majority of PSAPS.
 - TruePosition believes that accuracy of 50m 75% in all environments would be very challenging



- **U-TDOA provides high accuracy and yield in many areas**
- **In certain areas, accuracy and yield are not as high**
 - Rural areas with few cell sites
 - Areas with poor cell site geometry (along rural highways)
 - Areas with significant terrain features causing signal blockage
- **A-GPS performs well in areas with a clear view of the sky (Outdoor rural, suburban, and some urban)**
 - In certain areas, accuracy, and particularly yield, is degraded to unacceptable levels
 - In-building for certain building types
 - Urban canyon with significant shadowing/blockage

Performance of UTDOA and A-GPS are complementary

Hybrid Location Technology – Definition



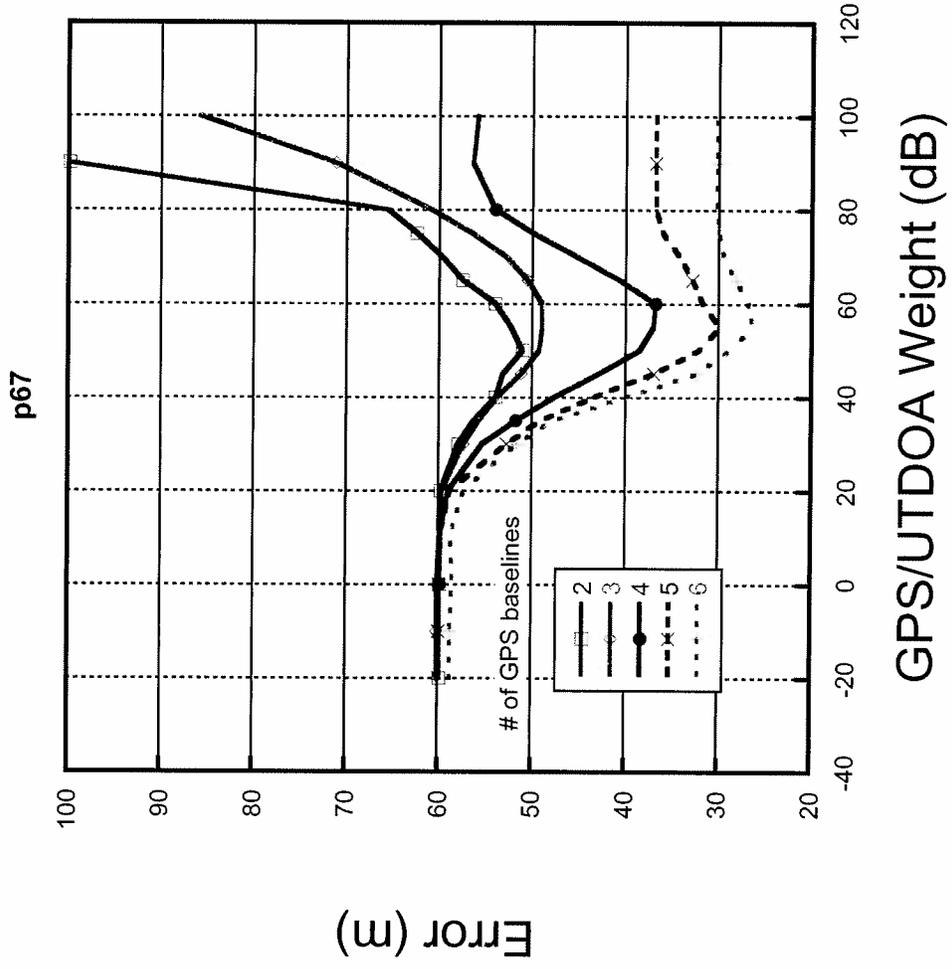
- **Several definitions of “Hybrid” location**
 - Perform one approach and fall back to another if first fails
 - Perform multiple approaches and select best among them
 - Perform multiple approaches and combine to produce single solution
- **Approach of combining differing measurements into a single solution allows maximum benefit from orthogonal measurements**

Hybrid Development

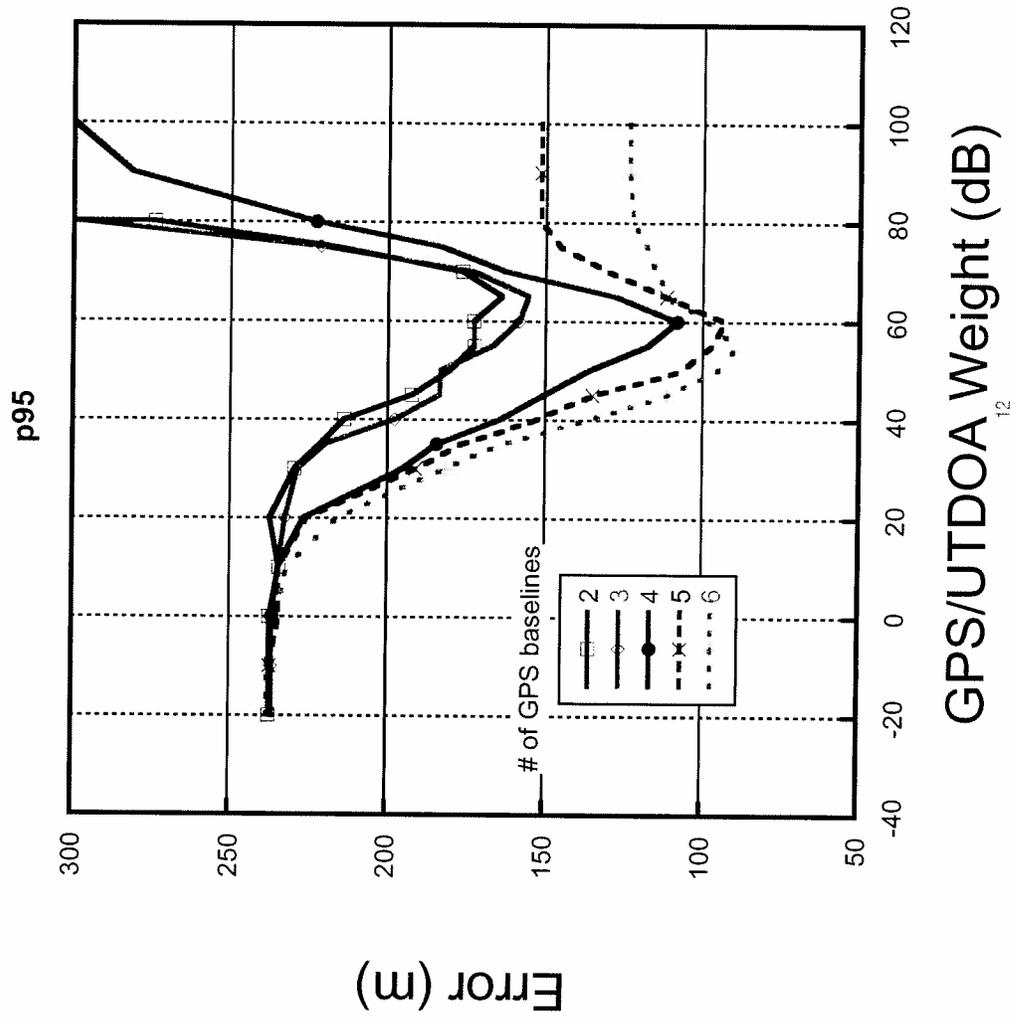


- Algorithms have been developed and tested with real & simulated data
 - Used CDMA A-GPS pseudo-ranges and UTDOA measurements collected by 3rd party
 - Used measurements to calculate hybrid location and compared it to ground truth, A-GPS, and UTDOA
 - Results indicate that combination hybrid produces results more accurate than either UTDOA or A-GPS
- Effort underway with major CDMA and GSM operators to collect additional real-world measurements to assess and fine tune algorithms
 - Place calls on GSM network and collect TDOA measurements
 - Place calls on CDMA Network from same test point and collect satellite pseudo-range measurements – provides A-GPS with Fine Timing Assistance
 - Place calls on GSM network from same test point and collect satellite Pseudo-range measurements
 - Combine measurements and feed into location algorithm
 - Will assess fallback, selection, and combining approaches to Hybrid location to measure relative benefit of each approach

Combined Hybrid Performance Expectation @ 67%



Combined Hybrid Performance Expectation @ 95%



Proprietary



Summary



- **TruePosition has successfully deployed massive networks to meet all customer E911 requirements**
- **Tests involving multiple operators prove UTDOA performs indoors and in dense urban environments**
- **UTDOA is an excellent complement to AGPS**
- **TruePosition working with multiple wireless operators to measure hybrid performance this year**