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FEDERAL COMMUNICATIONS COMMISSION
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EX PARTE

BY HAND DELIVERY

Ms. Magalie Roman Salas
Secretary, Federal Communications Commission
Portals II, 445 Twelfth Street, S.W.
Washington, D.C. 20554

EX PARTE OR LATE FILED

Re: **Revision of the Commission's Rules to Ensure
Compatibility with Enhanced 911 Emergency Calling Systems
CC Docket No. 94-102 - Written Ex Parte Presentation**

TruePosition, Inc. ("TruePosition") hereby submits these written ex parte comments in response to the late-filed Enhanced 911 ("E911") comments and ex parte presentations of SnapTrack, Inc. ("SnapTrack"), Texas Instruments Incorporated ("TI"), Zoltar Satellite Alarm Systems, Inc. ("Zoltar"), and Integrated Data Communications ("IDC") filed in the above-captioned proceeding. These latest comments, each filed after the close of the pleading cycle in this proceeding, simply confirm that there is no basis for the Wireless Telecommunications Bureau ("Bureau") to waive or change the E911 Phase II rules based on the current promises of handset-based technology proponents. To begin with, these commenters erroneously cling to the notion that because no workable handset-based solution yet exists, the Phase II rules must not be technology neutral. More significantly, the commenters offer nothing but speculation to support their contention that handset-based ALI technologies will be available in the near future and will be able to match, or improve upon, the location accuracy already offered by network-based ALI technologies. The commenters merely reiterate the same flawed contentions and assumptions made by the original waiver proponents without addressing the still-unrefuted criticisms of TruePosition and others.

Whereas TruePosition is ready to compete with other E911 technologies on an equal playing field, the grant of the requested waivers would change the

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rules of the game to extend deadlines or modify rules so that potential competitors who have failed over the last five years to produce workable ALI solutions can continue to experiment at the expense of public safety. Meanwhile, working network-based solutions would go unused while carriers hold their collective breaths hoping for workable handset-based solutions as the October 2001 deadline comes and goes. Such action by the Bureau would indefinitely and substantially prolong delivery of E911 protection to consumers. In short, the record remains devoid of facts or policy justifications to support the instant waiver requests.

I. The E911 Rules Already are Technology Neutral

SnapTrack, Zoltar and TI reiterate the contention that the October 2001 deadline for locating all subscribers is not technology neutral because carriers cannot comply using any and every technology – namely certain GPS-based technologies. They even falsely contend that the Commission and the Bureau Chief have agreed that the Phase II rules are not technology neutral.¹ This is not the case. The Bureau Chief has simply reiterated the Commission's policy of technology neutrality, recently testifying that the Bureau would "ensure that the Commission's Phase II rules are applied in a competitively and technologically neutral way that encourages the use of the best automatic location methods."² Such a statement is far from an endorsement for changing the existing Phase II rules. Moreover, the Commission, although noting the objections of SnapTrack and others, has emphatically reaffirmed that its current E911 rules *are* technology neutral because they reflect "general performance criteria, rather than extensive technical standards" and are based on the

¹ SnapTrack Comments at 2; Zoltar Comments at 3; TI Comments at 1-2.

² Testimony of Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, before the Subcommittee on Telecommunications, Trade, and Consumer Protection, Committee on Commerce, U.S. House of Representatives (Feb. 3, 1999).

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Commission's public safety goal of "rapid, efficient, and effective deployment of ALI."³

The Commission's well-deliberated public interest determination is that by October 2001 *all* CMRS users should be located when dialing 911 (or its equivalent) and that the Phase II rules are designed to accomplish this objective without regard to particular technologies. These rules do not give network-based technologies, as opposed to handset solutions, a "federally created monopoly" as SnapTrack contends. Indeed, in 1996 the Commission established a five-year deadline and provided all CMRS carriers and manufacturers the opportunity to develop solutions that would locate people in emergencies. Whether the Commission anticipated that ALI would be provided by a particular technology is irrelevant because its rules did not specify, nor show a preference for, a particular Phase II solution. To the contrary, the only requirements were that the ALI technology meet minimum location standards (125 meters RMS) by a particular date (October 2001). The Commission mandated enhanced location features for CMRS to further the public interest as the Commission concluded that ALI will save lives when deployed in increasingly important wireless communications. Nonetheless, arguments in support of the waiver requests attempt to confuse the Commission's public policy agenda with the technological failings experienced by those who elected to invest their efforts in a GPS solution. The rules do not, nor have they ever, impeded a carrier's ability to select any technology that would satisfy the Commission's public policy objectives.⁴

³ E911 MO&O at ¶ 123.

⁴ In the universal service proceeding, the Commission addressed the importance of technology neutral rules while at the same time establishing the primary public policy objectives for universal service. Although it specifically adopted technological neutrality as a principle of universal service, the Commission did not alter its public policy objectives to embrace a particular technology. As the Commission noted, "the concept of technological neutral-
(continued...)

For example, among ALI vendors whose technology would not necessitate waivers is IDC, a GPS-based ALI proponent. IDC submits that "compliance with the FCC's E911 Phase II requirements by the current deadline is possible for all handsets."⁵ Although it is unclear whether IDC has successfully incorporated its technology into a handset, IDC contends that its technology can satisfy the Phase II requirements as written. Indeed, contrary to most other GPS-based ALI vendors, IDC recognized the Commission's finding that all CMRS users must be located and is designing its technology accordingly.

The phased-in implementation that waiver proponents seek, on the other hand, is designed to placate the obvious shortcomings of their own technologies. These vendors support waivers because their technologies are too late in coming, still unproven or, even if deliverable, too expensive to apply to the entire CMRS customer base. Unlike IDC's version, other GPS-based solutions concededly will not be able to afford ALI protection to the estimated 100 million CMRS users that will comprise the CMRS marketplace in 2001. Nor do SnapTrack, Zoltar or TI offer any evidence to support the "offers" of 90-meter ALI accuracy, which notably

⁴ (...continued)
ity does not guarantee the success of any technology supported through universal service support mechanisms, but merely provides that universal service support should not be biased toward any particular technologies." Federal-State Joint Board on Universal Service, Report and Order, 12 FCC Rcd 8776, ¶ 49 (1997). In particular, the Commission refused to waive the requirement that a service provider offer voice grade access to the public switched network in order to allow paging companies to qualify for universal service recovery. Federal-State Joint Board on Universal Service, Fourth Order on Recon., 13 FCC Rcd 5318, ¶¶ 264, 265 (1997). Here, too, the Commission must not alter its E911 policy goals because certain technologies cannot comply with the rules at this time.

⁵ IDC Ex Parte, attachment 1, page 2 (March 22, 1999).

is lesser accuracy than TruePosition is already achieving. Instead, they ask the Commission to modify the rules or to set waiver "conditions that make a handset-based solution feasible."⁶ Zoltar advocates that the Commission grant waivers "liberally" because its "technology is in its infancy."⁷

If waivers are in the public interest at all, the standards for granting them must be based upon demonstrable advances in public safety, not pure speculation and technology favoritism. If waivers, rule changes, or delays are designed solely to boost a particular technology vis-a-vis others, then such changes are, by definition, *not* technology neutral. Indeed, such waivers or rule changes would not stem from "general performance criteria" but instead would be based on "technical standards" inherent in certain handset-based technologies. Because the rules further a necessary public safety objective without specifying how the "general performance criteria" must be fulfilled, they are already technology neutral.

II. The Latest Comments Fail to Address GPS Shortcomings

Rather than build a factual record that might support E911 waivers, SnapTrack, Zoltar, TI and IDC simply reiterate unsubstantiated claims and theories about their technologies and the CMRS marketplace without even addressing – let alone refuting – the points advanced by TruePosition and others opposing the waiver requests. By failing to address these issues, the commenters effectively concede that the handset-based ALI proposals are still in the design stage and/or simply cannot locate all CMRS users within a reasonable period of time or at a reasonable cost. Moreover, by ignoring the failings of GPS-based solutions in the CMRS environment, these parties have also failed to address the questions raised by the Bureau's December 24, 1998 Public Notice.

⁶ SnapTrack Comments at 17.

⁷ Zoltar Comments at 2.

In its comments TruePosition identified several unproven promises and flawed assumptions regarding handset-based technologies and the waiver requests.⁸ The late-filed comments ignore these issues, apparently hoping the Bureau will do the same. The Commission, however, has twice concluded that the public interest, and specifically public safety, requires that by 2001 *all* CMRS users be located when making emergency calls. Thus, the Bureau cannot blindly accept the unsubstantiated predictions and aspirations of those touting unproven technologies to the detriment of the public safety that the Commission has already taken great strides to protect.

A. Predictions that GPS-Equipped Handsets Will Work are Still Speculative

The record does not reflect testing of any GPS-equipped CMRS phones. Zoltar has not even described its test equipment. IDC, which does not promote waivers but suggests its technology could complement carrier efforts to facilitate phone churn, describes its ideas for integrating its technology into a handset but has not produced a working prototype. SnapTrack simply regurgitates its Denver and other test results that used a pure GPS receiver designed merely to look like a CMRS handset, or what SnapTrack has referred to as a "handset mockup."⁹ In fact, SnapTrack's phone-shaped GPS receiver contains an external "patch" antenna visible on the outside of the receiver and is attached by a wire to an actual CMRS phone.¹⁰ SnapTrack has failed to demonstrate that this comparatively large unit can be incorporated into today's miniature, light-weight digital CMRS phones in a technically feasible or consumer acceptable manner. In fact, even SnapTrack recognizes

⁸ See, e.g., TruePosition Comments at 20-21.

⁹ See Reply of US West Wireless, L.L.C., Attachment B at 1.

¹⁰ See Exhibit 1, excerpt from SnapTrack Comments at 13.

that "[d]esign of GPS antennas for cellular handsets is a challenging issue."¹¹ Indeed, tests using internal GPS antennas unequivocally demonstrate that such an integration will lead to significant performance degradation.¹² The commenters simply ignore these deficiencies and uncertainties in predicting GPS handset production. This underscores the uncertainty about whether GPS-based ALI solutions will work at all, let alone whether they will be able to work as well as network solutions.

Nor do SnapTrack's recent Tampa trials demonstrate significant advances in the company's technology. While specific data about its tests apparently have not yet been filed with the Commission, it is clear that the phones tested still are not fully GPS-integrated. SnapTrack's own website release claims that the tested antennas were simply "capable of integration into wireless handsets," without any demonstration or explanation how that could be achieved without materially degrading the GPS signal.¹³ Moreover, at an April 13 IEEE conference, SnapTrack's vice president of product marketing, Thomas Wrappe, publicly conceded that SnapTrack had tested its technology only with CDMA wireless systems because TDMA, GSM and AMPS system base stations lack the timing function necessary for its system to work. SnapTrack offered no solution for its TDMA, GSM and AMPS deficiency. In response to questions, SnapTrack also refused to reveal the extensive costs to CMRS networks for the changes that its hybrid technology would require. Such costs, in addition to the approximate \$7 licensing fee and \$7 to \$10 in parts to increase the phones' RF components and memory (plus any vendor mark-up), can represent significantly more costs than SnapTrack has previously disclosed.

¹¹ See Reply of US West Wireless, filed February 22, 1999, Attachment B at 5.

¹² See TruePosition Presentation to FCC, February 24, 1999 (diagram showing a 100-fold (or 20 db) loss).

¹³ See Exhibit 2, SnapTrack Test Facts (visited Apr. 29, 1999) <<http://www.snaptrack.com>>.

In contrast, TruePosition's time-difference-of-arrival system is already working in several cities locating actual registered analog and digital CMRS phones within the Phase II parameters. Analog and TDMA systems are deliverable now, and CDMA systems will be deliverable later this year. Lest there be any doubt that TruePosition's system can be deployed now and more than meets the Phase II requirements, carriers and the Commission are welcome at any of TruePosition's three demonstration markets any time. And particularly with respect to CDMA, TruePosition invites carriers to participate in its demonstrations rather than speculate from afar.

B. Assertions of ALI Handset Availability Do Not Realistically Address the Considerable Delays Inherent in Placing a New Product on the Market

Waiver proponents cannot meaningfully demonstrate that ALI-capable handsets will be available – let alone available in sufficient quantities – before the October 2001 deadline. None of the handset-oriented technology companies cited by the waiver proponents even make phones or the CMRS network equipment necessary to fully integrate their GPS-based location systems. Thus, their deployment and volume commitments are worthless. Only manufacturers of CMRS handsets and network equipment can commit to or promise the design, manufacture, and shipment of phones and network equipment. Without such phones and equipment, companies developing handset-based technologies cannot demonstrate the viability of their technologies in the real world. In contrast, network-based proponents like TruePosition manufacture their own equipment and own their intellectual property and therefore can control the deployment of their systems.

For example, Zoltar asserts that workable technology is already available and parades several proposed versions of GPS-based products that it claims "confirm the accuracy and reliability of the GPS solution."¹⁴ On the contrary, these GPS-based applications face all of the technical problems associated with GPS: the

¹⁴ Zoltar Comments at 13.

products do not work in signal-blocked areas, the GPS equipment does not fit into a normal-sized cellular phone, and the antenna problems remain unresolved. TI avoids this issue by contending that the "critical question" is when *carriers*, not customers, can buy ALI-capable handsets.¹⁵ These watered-down claims of availability are based on nothing more than hopes that "test quantities" of a working prototype, which has yet to be designed, will be produced.¹⁶ The commenters completely disregard the long process required to take a product from a working prototype to the public, which includes the several stages of the standardization process,¹⁷ research, design, production, manufacture and distribution. Delays will occur as retail outlets deplete their inventories before offering the new product.

Finally, once the new product is made available to consumers, the waiver proponents' expectations for how quickly phased-in implementation would occur are greatly exaggerated. IDC presents a highly exaggerated churn estimate based on service churn rather than handset churn. Even the most favorable industry analysis does not support churn as high as 40% per year, as IDC posits.¹⁸ SnapTrack claims that "at expected rates of handset turnover a handset-based ALI solution will, within three years of initial deployment, achieve a higher rate of successful locations than is currently required by the Commission's regulations."¹⁹ Interestingly, SnapTrack previously claimed that it would take at least four years after initial deployment for handset-based technologies to capture even a *majority* of the market,

¹⁵ TI Comments at 2.

¹⁶ SnapTrack Comments at 14.

¹⁷ SnapTrack readily concedes that, in order to deploy handsets as it predicts, vendors cannot wait for standardization. See SnapTrack Comments at 14.

¹⁸ IDC Ex Parte, page 6 (December 29, 1998).

¹⁹ SnapTrack Comments at 8.

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not to mention 67% thereof.²⁰ Nonetheless, as TruePosition explained in its earlier comments, handset turnover likely will not continue at the current rates associated with migration to new light-weight digital handsets and digital PCS systems with rate plans that are lower than pure analog cellular systems. It is simply not plausible that 100 million users will trade in their phones so quickly after having already upgraded to lighter digital handsets with much greater service features. In fact, to achieve such high turnover within three years more than 90,000 pre-existing users would have to trade in their phones *every day*. Again the latest commenters ignore each of these points.

Even if the Commission's mandate – that all 911 callers be located – were achievable within a reasonable time after the 2001 deadline using handset-based approaches, to require consumers to purchase a new phone in order to have ALI protection is inconsistent with the Commission's public interest determinations. The Commission has made clear that when it comes to public safety, it will not create a world of haves and have-nots. In its E911 Memorandum Opinion and Order, the Commission determined that carriers had to forward all calls, even those made by non-subscribers, to the PSAP.²¹ In other words, the Commission determined that consumers do not even have to subscribe to CMRS to have full ALI protection. It should not now require that consumers buy new phones to have ALI protection. Indeed, most non-subscribers are likely to have older, analog phones and therefore be less likely to purchase replacement phones.

C. Handset-Based ALI Systems Would Not Comply with Phase II Even If 67% of the Phones in Circulation were GPS Compatible.

SnapTrack mischaracterizes the accuracy standard and the degree of market penetration necessary to exceed it. Even if the turnover rate proffered by SnapTrack were achieved, to meet the 125-meter accuracy standard using RMS

²⁰ See SnapTrack Presentation to the FCC, October 1998.

²¹ E911 MO&O ¶34

methodology, more than 99% – not just 67% – of all CMRS phones would have to have GPS-installed chips and antennas.²² Again, SnapTrack and Zoltar mischaracterize this calculation to artificially inflate the accuracy of their promoted products.

D. Handset-Based Technology Proponents Offer No Solution to the Roamer Problem.

TruePosition explained in its comments that handset-oriented technology companies and waiver proponents have not offered any meaningful way to provide ALI protection to roamers. Today the record is replete with misplaced assumptions and implausible predictions but remains devoid of real plans to solve the roamer problem associated with handset-based proposals.

TI stays silent on this question. IDC does not even claim that its technology will provide full ALI protection to roamers. If a caller does not purchase an equipped handset, IDC admits, "the call will default to providing location information based upon cell site and sector location information (the Phase I requirement)."²³

SnapTrack presumes that the roamer problem will "disappear over time" as consumers replace their handsets with GPS-equipped handsets and as network-based solutions are implemented as failsafes. SnapTrack also ignores the fact that CMRS subscribers using phones equipped with its ALI technology could not be located by any CMRS system relying on another handset-based technology since such a CMRS system would not have installed the network equipment necessary to make SnapTrack's solution work. Thus, even with standardization, an IDC system could not locate a SnapTrack-equipped phone. Moreover, while SnapTrack argues that standardization will ensure interoperability, it disregards the normal

²² See TruePosition Comments at 22.

²³ See IDC Ex Parte at 3 (March 24, 1999).

standardization process, which has always been long and complicated and in this case would unreasonably delay availability of E911 to all wireless customers.²⁴ Finally, although SnapTrack supports waivers to relieve carriers from timely implementing one of the available network-based technologies, it presumes that network-based solutions will nonetheless be ubiquitously available to solve the roamer problem inherent in its own proposed solution. Only through this daisy chain of improbabilities can SnapTrack conclude that the roamer problem will solve itself "in due course."²⁵

III. Conclusion

Waivers are intended for exceptional circumstances, not to favor particular technologies and not for widespread applications that would amount to a de facto modification of the underlying rules. SnapTrack, Zoltar and TI, like the initial waiver requests, do not even try to substantiate their claims with specific evidence or to refute the clear and convincing problems inherent in relying on handset-based solutions. No handset-based ALI solutions have been achieved and no fully integrated GPS handsets have been produced, thus handset-based ALI technologies have no inevitability of success. Even if GPS-equipped handsets were technically feasible within a reasonable time, the only proffered remedy for such technologies to meet the 125-meter RMS standard and to extend ALI protection to the 100 million pre-existing CMRS phones is the waiver proponents' speculation about exaggerated deployment schedules and churn scenarios, which even in the best case would take several years after 2001 to run its course. The latest commenters merely reiterate rosy predictions, apparently expecting that through such repetition the Bureau would be inclined to disregard a record that is so barren of any facts to support their cause.

²⁴ See TruePosition Comments at 15-17.

²⁵ See SnapTrack Comments at 10.

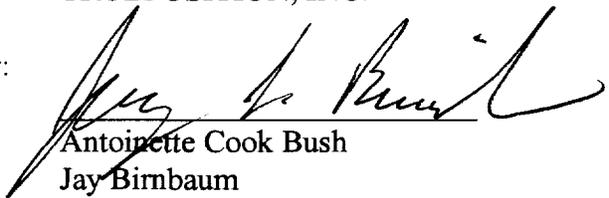
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Without such a factual record, however, the Bureau must deny the pending waiver requests.

Respectfully submitted,

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Figure 4. Test Configuration – Inside Building Test With Head Blockage



SnapTrack Test Facts

Spring 1999 -- Tampa, Fla.

- **Calling Environments** -- Data was gathered for 17 calling environments where people commonly carry wireless telephones. SnapTrack was tested outdoors, indoors, in automobiles and under dense foliage. The tests highlighted the sensitivity of SnapTrack's GPS Indoors system.
- **Field Testing** -- To date, SnapTrack's alpha test has involved prototypes produced by Motorola and Samsung. Each phone looks similar to one of the company's production models.
- **Call Volumes** -- Each prototype was tested between 100 and 200 times at each location. Each test involved establishing a location fix from a cold start, without the use of data from prior tests. In all, more than 8,000 calls were made.
- **Antennae** -- A variety of miniature GPS antennae capable of integration into wireless handsets were tested with the prototype phones. Antennae designs included patch, quadrifiler helix and microstrip.
- **Accuracy** -- In areas with open-sky conditions, SnapTrack's enhanced GPS (EGPS) located test calls within eight meters; outside calls from suburban areas were located within 12 meters; calls from inside a wood-frame building registered 28-meter accuracy. In more severely blocked environments, including inside a shopping mall and from the third floor of a five-story office building, SnapTrack EGPS recorded 35-meter accuracy. Calls from the fourth level of a six-floor parking garage were located within 25 meters. No other location solution even approaches this level of precision across such a wide range of environments.

The walls of structures reduce the strength of GPS satellite signals reaching a receiver. Conventional GPS cannot make use of weak signals, while SnapTrack EGPS actually uses signal reflections to improve calculated location. Under every condition, EGPS far exceeded the FCC's 125-meter accuracy requirements.

- **On The Go** -- SnapTrack also performed superbly in tests inside automobiles. Calls made inside a stationary car yielded 17-meter accuracy. EGPS accurately tracked calls within moving cars, even when the mobile phone was held to the driver's right ear, maximizing signal blockage from the driver's head. With the speed of the automobile exceeding 50 mph, EGPS not only located the vehicle, but was able to pinpoint which side of the road the vehicle was on and the direction of travel.
- **Multipath** -- Inside a car parked in a narrow alley between multi-story brick buildings, SnapTrack registered 67-meter accuracy. Calls from a downtown urban canyon between multi-story skyscrapers resulted in 72-meter accuracy, still far more precise than the FCC's 125-meter requirement. Multipath errors occur when a radio signal, such as from a satellite or cell phone, reaches a receiver from more than one direction. This is a common problem for all location determination systems in urban areas where signals bounce off of buildings.

- **Speed** -- In open-sky conditions, EGPS provided a first fix in less than a second. In worst case environments, the system provided a first fix in just a few seconds. Traditional GPS receivers take at least 30 seconds and up to a few minutes to acquire a first fix.

About SnapTrack

Headquartered in San Jose, Calif., SnapTrack is focused on integrating GPS and two-way wireless technologies. For more information on the activities of or possible participation in SnapTrack testing.

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