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BLUMENFELD & COHEN
SUMNER SQUARE
1615 M STREET, N.W. SUITE 700
WASHINGTON, D. C. 20036

202 955-6300

FACSIMILE 202 955-6460

<http://www.technologylaw.com>

4 EMBARCADERO CENTER
SUITE 1170
SAN FRANCISCO, CA 94111

415 394-7500

FACSIMILE 415 394-7505

May 5, 1999

VIA MESSENGER

Magalie Roman Salas, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

RECEIVED

MAY 5 1999

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Re CC Dockets No. 94-102

Dear Ms. Salas:

On Tuesday, May 4, 1999, Ellen Kirk, Ruth Milkman, and the undersigned, on behalf of SnapTrack, Inc. met with Tom Sugrue, Jim Schlichting, Dan Grosh, Martin Liebman and Julie Buchanan to address the issues raised in the captioned proceedings. The attached materials were distributed and summarize the issues discussed.

Pursuant to Section 1.1206 of the Commission's Rules, two copies of this letter are enclosed for filing. Please contact me should you have any questions in regard to this matter.

Sincerely,



Christy C. Kunin

CCK:hs

cc: Ellen Kirk
Ruth Milkman

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041

Wireless

April 26, 1999

WEEK

www.wirelessweek.com

Phase II Not Ready?

Carrier May Pull Out Of E911 Test

By Edward Warner

WASHINGTON—Houston Cellular, one of two carriers participating in a closely watched Texas test of enhanced 911 technology, may bow out by mid-May. That could jeopardize the test and indicate phase II service may not be ready for prime time.

Although technical issues are the apparent reason for Houston Cellular's possible withdrawal, under the surface is a power struggle. Wireless carriers and public-safety dispatch agencies are at odds over who makes the technology choice for each deployment of phase II, which locates callers within 125 meters. In addition, FCC-sanctioned cost recovery mechanisms may prove insufficient to cover equipment expenses so carriers are looking to fee-based location services to compensate, making technology selection key. Further, the FCC didn't address how costs could be shared between carriers and dispatch agencies, which are controlled by various local and state entities.

*The system has
"a major problem ... on
the edges of cell sites."*

Last month, Houston Cellular sent a confidential letter to TruePosition Inc., warning the

continued on page 6

WIRE

Phase II from page 1

vendor not to publicly call the phase II system it installed in the Greater Harris County 911 Emergency Network a commercial product. One source close to the trial indicated technical problems are the reason.

Claiming no links to TruePosition competitors, the source said the system has "a major problem with [callers who are] on the edges of cell sites." Because the callers are only near one or two cells, their location can't be determined by triangulation—measuring distance

from three cells—the method used by TruePosition and other vendors.

Houston Cellular spokeswoman Julie DiCarlo: 911 network information services manager John Melcher; and TruePosition all said the test was producing good results, though they

wouldn't quantify data. The FCC's mandate only requires accurate location determination 65 percent of the time.

Houston Cellular simply wants to try other vendors' products, said DiCarlo, who characterized the test as a "limited trial."

The cellular company had an-

other reason for pulling out, said Tom Bass, board chairman of the 911 network, which covers Houston and surrounding areas. Houston Cellular "knows phase II costs money," and under FCC rules, it can postpone deployment for two years, he said.

According to industry estimates, TruePosition-type systems require carriers to buy special radios costing \$30,000 to upgrade each cell site, though a TruePosition spokesman said general cost projections are unreliable since many variables can affect system expense.

Bass, pointing out his years in Texas state politics, threatened to politically embarrass Houston Cellular. Melcher said his organization's lawyers see grounds for a breach-of-contract lawsuit. Houston Cellular disagreed.

Legally, there's uncertainty over whether a dispatch agency can seek phase II service before 2001 or tell a carrier, which serves provider to use, even though in this case the Harris County network—not the carrier—is paying TruePosition. Another potential problem: TruePosition's parent, The Associated Group, told the Securities and Exchange Commission in a March 31 filing that the TruePosition test system "began locating live wireless E911 callers in March 1999" though Melcher said the trial involves testers dialing *211, not citizens dialing 911.

Representatives of the carrier's parent, BellSouth Mobility Inc., will meet with county officials this week.

Melcher's network initially intended to serve Houston Cellular's analog customers and begin testing digital phones in June. He planned to offer full service by the end of the year, making Harris County the first U.S. dispatch agency to do so and beat the FCC's deadline by a year.

Come 2001, carriers will probably pay directly for their E911 system and seek reimbursement from local or state agencies or by raising rates. Only 27 states allow carriers to put E911-related surcharges on bills. Although Texas is one of these states, its surcharge is a paltry 50 cents per month. Surcharge revenue must cover E911's first phase, plus the more costly second phase and the networking upgrades needed by public-safety agencies.

Melcher said one of the purposes of the Houston test was to determine actual costs of providing E911 service. ■

SnapTrack

Meeting with

Tom Sugrue

Chief, FCC Wireless Telecommunications Bureau

May 4, 1999

PHASE II IN JEOPARDY

- *Wireless Week* article confirms what is stated in the record: network solutions are not ready, and may be cost-prohibitive
- Guidelines for waivers will spur handset solutions, and in turn, may accelerate resolution of issues for network solutions.

RECORD SUPPORTS WAIVER GUIDELINES

- Acceleration
- Competition
- Performance

Turnover and the Embedded Base

- At present turnover rates, ALI-capable handsets could exceed the penetration required by the FCC's rules and ultimately be virtually ubiquitous

Turnover and the Embedded Base

- For customers with non-ALI enabled phones, marketing and public service announcements can expedite the turnover

NETWORK COVERAGE GAPS

- Digital services
- Rural areas
- Small systems
- Performance is static: Time will not improve the coverage deficiencies of network-based solutions

ROAMING

		Carrier Using	
		Handset Solution	Network Solution
Handset	Non-ALI	Standards (by air interface) Diminishing w/time	No problem where network has coverage
	ALI	Standards (by air interface)	No problem where network has coverage

MEMORANDUM

TO: Tom Sugrue, Chief, Wireless Telecommunications Bureau
Nancy Bookner, Wireless Telecommunications Bureau

From: Ruth Milkman
Glenn B. Manishin
Christy C. Kunin

Date: May 4, 1999

Re: *Wireless E911 Phase II Requirements, Docket 94-102*

This memorandum reviews the record developed by the Wireless Telecommunications Bureau regarding waiver or revision of the Commission's Wireless E911 location rules (97 C.F.R. § 20.18(e)), including the issues of coverage, performance, penetration and roaming for handset-based E911 ALI technologies.

The record before the Commission strongly supports issuance of waiver guidelines that would enable carriers to implement a handset-based solution for compliance with the wireless E911 Phase II implementation requirements. The record unambiguously demonstrates that handset-based solutions provide substantial benefits, including considerably more accurate location information, will ultimately be available in nearly all phones, and are substantially less expensive to deploy than network based solutions. Moreover, the record shows that a handset-based solution may be the *only* viable solution for digital networks *and* many rural or small networks.

With respect to many of the Bureau's Public Notice questions regarding handset-based solutions, the record reveals difficulties with network-based alternatives. The network-based solutions are incomplete and extremely costly, and the record corroborates the concerns raised in a recent *Wireless Week* article (appended as Attachment 1) as to whether network-based solutions can meet the Phase II deadlines at all.

Analysis of the record also indicates that the principal criticisms of handset-based ALI approaches—the impact on embedded base of wireless phones and on roaming subscribers—are easily resolvable on both a technical and policy level. Specifically, with respect to turnover of the embedded base, it is clear that at present turnover rates carriers will exceed the penetration required by the Commission's rules and be virtually ubiquitous shortly thereafter. In addition, for those customers with non-ALI enabled phones, the record is clear that marketing and public service announcement can expedite this turnover rate. In contrast, once deployed a network-based solution will not achieve any greater coverage over time.

With respect to location of roamers, with a handset-based solution, most roamers will be covered because they will either have an ALI-equipped phone in an handset-based territory, or

will be located via a network-based alternative. Until ALI-based handsets have reached full penetration, however, there may be an ever decreasing number of roamers with non-ALI enabled handsets in a handset based territory. As all phones become ALI-capable, handset turnover will eliminate this gap. In contrast, the coverage gaps of network-based solutions will persist. Rural and small markets and digital phones will never be reached under a network system, and thus the only hope of locating such customers is through deployment of handset-based ALI solutions.

In sum, there is clearly a strong public interest basis for the Commission to ensure that handset-based ALI technologies are deployed as quickly as possible. Despite the fact that many manufacturers are now in the process of developing ALI-capable handsets, carriers will be reluctant to rely on this technology to meet their wireless E911 obligations without guidance from the Commission regarding the availability of waivers. Whether this guidance takes the form of waivers, waiver guidelines or interim rules is far less important than that it occur promptly, or else a principal public benefit associated with the deployment of handset-based solutions will be lost.

Procedural Background

On December 24, 1998, the FCC's Wireless Telecommunications Bureau released a Public Notice that (1) invited applications for waivers of the Commission's rules and requirements relating to Phase II Implementation of E911 standards and (2) sought comments regarding guidelines for such waivers.¹ In its Public Notice, the Bureau acknowledged that its current rule was the product of an incorrect assumption: that ALI implementation would proceed solely through modifications/upgrades to network equipment. *See* Public Notice, Wireless E911 Phase II Requirements at 2, CC Docket No. 94-102 (rel. Dec. 24, 1999). The Commission expressed a willingness to consider waivers to facilitate implementation via new handset-based technologies, taking into account particularities related to this form of technology and its distribution. *Id.* The Bureau suggested that it would consider phased-in implementation standards, "especially to the extent a proposal helps achieve further improvements in ALI capabilities."² *Id.*

The Public Notice stated that it would judge waiver applications designed to accommodate handset-based solutions based upon certain factors that indicate the ability of the proposed solutions to facilitate improvements in ALI capabilities: (1) the accuracy and reliability of handset-based ALI solutions; (2) the speed with which handset-based ALI will be

¹ *See WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969) (waiver is appropriate where "special circumstances" support a deviation from the general rule and "such deviation will serve the public interest.") A waiver is generally warranted under Sections 1.3 and 24.819 of the Rules if "the underlying purpose of the rule(s) would not be served or would be frustrated and a waiver would serve the public interest; the application of the rule would be inequitable, unduly burdensome, or contrary to the public interest; or good cause for waiving the rule can be demonstrated." 47 C.F.R. §§ 1.3, 24.819.

² The Commission does not intend "that the implementation deadline, the accuracy standard, or other rules should hamper the development and deployment of the best and most efficient ALI technologies and systems." Memorandum Opinion and Order at ¶ 124.

offered to consumers; (3) the extent to which handset-based solutions will leave gaps in universal ALI coverage; and (4) the relative cost effectiveness of handset-based solutions. These issues were addressed in-depth in the comments, which are reviewed below.

1 Accuracy and Reliability

a Field Tests

- Numerous field tests submitted for the record have confirmed that handset-based solutions provide ALI with greater accuracy and reliability than required by the Commission's current rules. *See* Cambridge Positioning Systems Ltd. Ex Parte, ITS World (April 14, 1997); Tendler Cellular, Inc. Ex Parte Presentation at 3 (Oct. 15, 1997); Tendler Cellular, Inc. Reply Comments, CC Docket No. 94-102, at 2 (Aug. 19, 1996); Ex Parte Presentation of SnapTrack, Inc., CC Docket No. 94-102 (Oct. 30, 1998); Integrated Data Communications, Ex Parte Presentation, at 3-4 (Dec. 30, 1998); "SnapTrack Enhanced GPS Technology: Field Test Results Using Prototype GPS Handset Antenna, Including the Impact of User Head Blockage," (Aug. 17, 1998), Exhibit A to SnapTrack Comments.
- A number of products with chips that offer location capabilities are already being introduced. Comments of Zoltar Satellite Alarm Systems, Inc. at 11-12 & Exhibits 2-8, *citing* products of Garmin and Protection One; IDC; Hughes Network Systems; SiRF Technology; Boeing; Tendler Cellular; and SnapTrack.
- The tests conducted by Integrated Data Communications in cooperation with a local exchange carrier, three wireless carriers and the King County E-911 Program Office, determined that through handset-based technologies, calls could be tracked within 125 feet 100% of the time, within 40 feet 80% of the time, and within 20-22 feet 70% of the time. Integrated Data Communications, Ex Parte Presentation, at 3-4 (Dec. 30, 1998).
- Tests demonstrate that it is possible to locate a 911 caller within 10 meters using GPS technology. *See* Tendler Cellular, Inc. Ex Parte Presentation at 3 (Oct. 15, 1997).
- Tests indicate that handset ALI solutions will work even in difficult settings. SnapTrack Ex Parte (Denver tests show results in indoor and urban canyon environments).
- The tests conducted by SnapTrack, Inc. in San Francisco in the Fall of 1997, Tokyo and Kyoto, Japan in late 1997, Denver, Colorado in early 1998 and Washington, D.C. in late 1998, proved so successful that NTT DoCoMo, Japan's largest wireless communications provider, opted to purchase a handset-based location determination system that is going into effect this year. SnapTrack Press Release (August 17, 1998), Attachment 3 to AirTouch Communications, Inc. Comments (Feb. 4, 1999).

b Comparable Performance Of Handset And Network-Based Solutions

i. Greater Accuracy

- Commenters stressed the superior accuracy and reliability of handset-based ALI solutions as a primary reason for their desire to explore and potentially use such alternatives to network-based solutions. *See, e.g.*, Ameritech Request for Waiver at 4-5 (Feb. 4, 1999); PrimeCo Personal Communications L.P. Petition for Waiver at 5-6 (Feb. 4, 1999); US WEST Petition for Waiver at 5-8 (Feb. 4, 1999).
- GPS handset-based solutions are “widely recognized to be capable of delivering greater radio location accuracy,” at least in certain circumstances. *See, e.g.*, Public Safety Associations’ Comments at 3 (Feb. 4, 1999).
- The difference in capabilities between handset-based solutions and network-based solutions can have a large practical effect. A standard of 125 meters – the current FCC standard that the network solutions are striving to meet – is a huge radius within the context of an urban environment and may be virtually useless to an urban rescue team (especially when the two dimensional nature of network solutions, discussed below, is considered). Powertel, Inc. Petition for a Waiver at 4 (Feb. 4, 1999).

ii Vertical Location Capability

- Network solutions are, by their nature, terrestrial, and therefore are incapable of providing a caller’s altitude. GPS based handset solutions, on the other hand, do offer vertical location capability. Sprint Spectrum L.P. Waiver Request at 3 (Feb. 4, 1999).
- “In particular, [network] systems show limited potential for accuracy improvements with time, never offering any hope of providing z-axis information or approaching the accuracy discussed in the E911 First Report and Order.” Sprint Spectrum Waiver Request at 3.

2 Pace Of Deployment

a Commercial Availability Of ALI-Equipped Handsets

- QUALCOMM has announced that its next generation of ASIC will allow for handset-based ALI and will be available in test quantities later this year. QUALCOMM Press Release, Attachment B to SnapTrack Comments.
- NTT Mobile Communications in Japan is deploying handset-based location technology this year. Texas Instruments Comments at 2 (Mar. 24, 1999).
- If not delayed by regulatory uncertainty, location-enabled handsets could be available in commercial quantities in this country by the end of 2000. Texas Instruments Comments at 2 (Mar. 24, 1999).

- TIA projects that handsets should be commercially available by October 1, 2000. Letter from Phil Brown, Chair, Working Group I, TR-45.5 Subcommittee, to Kim Chang, Vice Chair Working Group II, TR-45.5 Subcommittee at 1 (November 18, 1998).
- “US WEST has been informed by three vendors that ALI-capable handsets should be commercially available in advance of the Phase II implementation deadline – possibly as early as the fourth quarter of 2000.” US WEST Petition for Waiver at 8.
- AirTouch has been informed by one handset manufacturer that it expects to have ALI-capable handsets commercially available in 2000. AirTouch Comments at 11.
- An ALI vendor has indicated that multiple manufacturers are also currently proceeding with prototypes that integrate GPS into handsets for the provision of ALI information. SnapTrack Press Release at 1 (Sept. 23, 1998).

b Handset Turnover And “Embedded Base”

i Projected Turnover Rates

- “Handset users are projected to replace their handsets at extremely high rates in the next few years, ensuring that new location-enabled handsets quickly could be in the hands of consumers.” Texas Instruments Comments at 2 (Mar. 24, 1999).
- 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. Ex Parte Presentation of SnapTrack, Inc., CC Docket No. 94-102 (Oct. 30, 1998).
- “Using average cellular and PCS industry churn rates, Aerial estimates that at the compliance date the percentage of non-ALI capable handsets in use in [its] PCS network will be about fifty percent. Within three years from the compliance date, the percentage of non-ALI capable handset in use in Aerial’s PCS network will be less than ten percent.” Aerial Communications, Inc. Petition for Waiver at 6.
- Internal AirTouch forecasts indicate that consumers replace handsets approximately every three years. AirTouch Comments at 11. Other sources estimate that between 15 and 22 percent of existing handsets will be replaced this year, with the rate growing to more than 27 percent in the year 2001. *See* BT Alex. Brown, *Handsets! Rapid Growth, Explosive Innovation, Intense Competition* (July 29, 1998); *see also* *Mobile Family Segment To Churn \$4 Billion, Study Says*, Newsbytes (August 21, 1998) (citing 22 percent replacement rate); *Briefs*, Mobile Phone News (Aug. 19, 1997) (citing 17 percent replacement rate).
- Based upon current replacement rates, it is projected that over 95 percent of wireless subscribers could own ALI-enabled phones by the end of 2004. AirTouch Comments at 12; SnapTrack Ex Parte (October 30, 1998).

- The handset approach will eventually reach virtually all consumers. AirTouch Communications Petition at 11-12; PowerTel, Inc. Petition at 6-7; PrimeCo Personal Communications, L.P. Petition at 7. US WEST Wireless, LLC Petition at 9-10; SnapTrack Ex Parte (October 30, 1998).
- According to North Carolina RSA 1, their subscribers replace their cellular phones on average once every 26 months. North Carolina RSA 1 Partnership Petition for Waiver at 2.
- “PrimeCo’s experience is that the average digital handset life is two-three years – thus ensuring that large numbers of customers will have ALI-capable handsets proximate to the Phase II deadline. Further, handset replacement rates are likely to remain high if handset features are desirable to customers, as expected. In this regard, consumers have demonstrated demand for location technologies, and demand for ALI-capable phones is thus expected to be great.” PrimeCo Petition for Waiver at 7.

ii Methods Of Increasing Handset Turnover

- Studies show that consumers desire both emergency and non-emergency location information, meaning consumers educated by marketing campaigns can be expected to trade in phones to obtain the ALI capability, just as they are doing for other desirable features. AirTouch Comments at 12, *citing* Tendler Cellular, Inc. Ex Parte at 3-4 (Oct. 14, 1997); Cambridge Positioning Systems Ex Parte at 3; TruePosition Ex Parte, Wireless E911 Survey at 3 (Sept. 16, 1997).
- With marketing, the turnover rate – and the above projections – may be accelerated. In a recent survey, 56% of wireless phone users cited emergency situations as their main reason for purchasing a mobile phone, giving wireless carriers “every incentive—social and economic—to deploy Phase II technology in an expeditious manner.” Personal Communications Industry Association Comments at 5 (Feb. 16, 1999), *citing* PCIA’s 1998 Wireless Market Monitor (Oct. 1998).
- Ameritech estimates a turnover rate of 700,000 to 800,000 handsets a year, and hopes to increase the turnover rate through active educational and promotional campaigns. Ameritech Request for Waiver at 7 (“Ameritech would aid the natural operation of the market by actively educating the public and promoting the safety benefits of location-enabled handsets”).
- CenturyTel intends to “undertake an active program to promote awareness of the availability and public safety benefits of ALI-capable handsets.” Its anticipated program will involve “advertisements in local newspapers and periodicals, billing inserts, and incorporation of such information in customer presentations by the company’s sales personnel” and “could be in conjunction with the local PSAP or public safety entities.” CenturyTel Wireless, Inc. Request for Waiver at 6-7 (Feb. 4, 1999).

c Projections For Handset And Network Deployment Compared

- Neither form of technology is sufficiently advanced to permit immediate initiation of commercial deployment of technology to meet the Commission's ALI goals. Both network and handset proponents must, to some extent, use projections as the basis for their discussion of capabilities. *See, e.g.,* US WEST Reply Comments at 2.
- There is no certainty that any technology will enable carriers to meet current Phase II requirements. At this time, carriers generally have not committed and cannot commit to either a network or handset-based Phase II ALI solution. AirTouch Petition at 9-10; AT&T Petition at 3-6; Sprint Spectrum Petition at 3-5; US WEST Wireless Petition at 2; Aerial Communications Petition at 2-3.
- The requests for waivers to accommodate handset-based technologies are contingent upon satisfaction of deadlines. Sprint Spectrum Reply at 2.
- The claims of systems manufacturers that handset technology will not progress to meet implementation timetable projections are besides the point; if the projections are not met, carriers that rely solely upon handset technology will not be in compliance with FCC rules. This is no different from the situation that will occur if network based technology does not progress quickly enough to meet the projected timetables for implementation of network solutions. The Commission, in setting waiver guidelines, is only stating a set of circumstances that is acceptable if achieved. SnapTrack Comments at 16-17.
- If the Commission rejects a waiver to accommodate the development of handset solutions based on the fact that the technology behind handset solutions is still developing, it will not only be acting inconsistently, but it will arbitrarily be placing all hopes for achievement of its ALI goals on one unproven technology rather than facilitating the growth of competing technologies and hoping that at least one will permit accomplishment of its public interest goals. US WEST Reply at 1 ("absent the requested waivers (or rule modification), US WEST and other CMRS providers may be forced to purchase network products without regard to technical, cost, or other shortcomings simply because handset solutions cannot be fully deployed prior to October 1, 2001.")

3 Coverage

a General

- "Handset solutions permit universal coverage the day the handset is purchased." Sprint Spectrum Reply Comments at 4.

b Coverage Before October 1, 2001

- In order to satisfy the conditions of the waivers that have been requested, carriers must begin to distribute ALI-enabled handsets prior to October 1, 2001. *See, e.g.,* SnapTrack Comments

at 4; Air Touch Comments at 6. This will ensure that some consumers receive the benefits of Phase II ALI coverage prior to the date mandated in the Commission's rule and, almost certainly, prior to the date, if any, that they would receive these benefits through network systems. Thus, for the time period from present to October 1, 2001, a waiver would lead to *increased* provision of Phase II ALI coverage. *Id.*

- If, as projected, handset turnover occurs at a rate of approximately one-third of all handsets per year, and, as projected, ALI-equipped handsets are distributed beginning by the end of the year 2000, then as many as one third of existing handsets will be exchanged for ALI-enabled handsets by October 1, 2001. AirTouch Comments, Attachment 1; SnapTrack Comments at 14-15. In addition, new purchasers of mobile phones will receive ALI-enabled handsets once they become available, making the percentage of Phase II enabled handsets among all handsets in operation potentially higher still.

c Coverage Triggered By Handset Requests

- Even if network vendors overcome the substantial hurdles facing their own preparedness to offer service to many consumers, as Sprint PCS points out “network vendors studiously avoid the fact that implementation of Phase II will not automatically occur on October 1, 2001. There must also be a request from a PSAP and a willingness to pay associated costs. If Phase I implementation is any indication, it will be many years before network solutions will be capable of universal coverage.” Sprint Spectrum Reply Comments at 4 (Feb. 22, 1999).
- AT&T notes that “[c]arriers are not required to provide Phase II service unless the relevant PSAP has requested the service and is capable of receiving and utilizing the data elements associated with the service, and a cost recovery mechanism is in place. 47 U.S.C. sec. 20.18(e). Even though AT&T was ready to implement Phase I service as of the April 1, 1998 deadline, most PSAPs were not.” AT&T Reply Comments at 3-4, *citing* AT&T Ex Parte Filing (October 2, 1998) (despite the fact that AT&T was ready to implement Phase I on April 1, 1998, less than four percent of AT&T's wireless customers were receiving Phase I service as of September 30, 1998). *See also* Clement Driscoll, *Locating Wireless 911 Callers*, RCR News at 57 (Phase I services are operational “on only about 2 percent of wireless networks” and the requirements of Phase II are considerably more challenging than Phase I.”)

d Gaps In Coverage

i Handset Gaps

- Handset-based solutions produce a gap in ALI coverage with respect to consumers with non-location enabled handsets who roam to the service areas of carriers that employ handset-based location solutions. All other roamers will be covered: (1) those with ALI equipped handsets will be covered wherever they roam as standardized location technologies are adopted and (2) those without ALI-enabled handsets who roam into territories covered by

network solutions will be served by those network solutions. Ameritech Request for Waiver at 5-6. Thus, “[r]oamer’ problems will exist only in limited circumstances.” *Id.*

- Natural progression of handset turnover will lead to universal ALI coverage; based on current turnover rates, it is estimated that 95% of consumers will have Phase II ALI capabilities through handsets by the end of 2004. *See* AirTouch, Attachment 1.
- Cell-Loc “agrees with many petitioners” that the gaps in coverage due to non ALI-equipped handsets and roamers whose home carrier adopts a network based solution will disappear “at some time in the future” once only GPS-enabled handsets are sold. Cell-Loc Comments at 2 (Feb. 16, 1999).
- Industry standards are already developed for interoperability of handset-based ALI technologies for CDMA systems and are underway for GSM and TDMA systems. These industry standards will ensure that all subscribers, will be located to the same degree of accuracy while roaming as in their “home” systems. SnapTrack Comments at 11, note 15, Attachment A; AirTouch Comments, Attachment 2.
- Although conventional GPS systems may have difficulties providing ALI in indoor and urban canyon environments, enhanced GPS handset tests have proven effective in these environments. SnapTrack Ex Parte (Oct. 30, 1998) (Denver tests show results in indoor and urban canyon environments where a conventional GPS receiver cannot work). *See also* US WEST Petition for Waiver at 5-6 (tests indicate that handset solutions work in wide variety of terrains); Texas Instruments Comments at 4 (same).

ii Network Gaps

a) Availability

- No network based solutions are available for *any* digital technology. Reply of AirTouch Communications at 15.
- There simply is no network-based ALI solution for TDMA that is procurement-ready today. AT&T Wireless Services Inc. Comments at 3-5. Waiver Request of Sprint Spectrum at 3; Comments of Wireless Services, Inc. at 2-3. Despite the claims of certain network-based technology vendors that their solutions will work for wireless networks using TDMA, these solutions are still in the testing phase. AT&T Reply Comments at 4. Compare TruePosition Response at 5 with Attachment 3, Press Release, “TruePosition Releases TDMA Modules for Wireless Location System,” released Feb. 1, 1999 (announcing that TruePosition has “*commenced production*” of AMPS/TDMA modules for the series 2 TruePosition Wireless Location System” and has “successfully completed laboratory testing and *begun field trials.*” (emphasis added). AT&T notes that it will have to conduct its own integration tests to ensure that any potential solution will not negatively impact digital performance. It notes that it hopes the TruePosition solution is available within a year, but that “this outcome is far from certain.” AT&T Wireless Services Inc. Reply Comments at 4.

- Tritel, Inc. notes that “despite the claims of some equipment manufacturers to the contrary, there is currently no network-based solution available for carriers using TDMA technology in their wireless networks. Tritel, Inc. Comments at 2.
- Ariel Communications, a GSM-based carrier, states that it is not aware of any “wide scale field trials” demonstrating the feasibility of a network solution for GSM systems.
- US WEST points out that it is unaware of any comprehensive field tests establishing that network solutions have solved the problems posed by rural areas. US WEST Reply Comments at 5 & n.11.
- Network systems have not yet been deployed, or even developed, in systems using GSM or CDMA air interfaces. Comments of AT&T Wireless Services, Inc. at 2-3. Because almost every PCS system uses one of these technologies, there is apparently no assurance that a network based solution is even feasible for these systems. *Id.*

b) Multipath

- Network solutions may be incapable of providing Phase II ALI in certain areas where geometry and multipath issues pose problems. US WEST Reply at 4.

c) Small And Rural Markets

- Network solutions do not work in rural areas: because they rely upon triangulation to locate a caller, network solutions require three overlapping cell sites to operate. Most of the locations in the US where wireless service is available are covered by fewer than three cell towers. The cost of building additional towers to make a network solution available is exorbitant. Handset solutions, by contrast, require only one cell site to locate a caller. *See also* US WEST Reply Comments at 5 (the record demonstrates that network solutions require a minimum of two or three cell sites within a specified geographic area in order to meet Phase II requirements).
- Rural areas may pose particular difficulty for network systems. Moreover, even if it becomes technically possible for network solutions to provide Phase II ALI in all environments, it may be cost prohibitive to do so. US WEST Reply at 4.
- A handset-based solution may provide the only practicable, cost-effective solution for small markets. Reply Comments of Inland Cellular Telephone at 3 (Feb. 22, 1999).
- A large number of carriers large and small serve rural areas, including US WEST, Sprint, AirTouch, AT&T, Western Wireless, and a number of other large CMRS providers provide service in many rural markets. US WEST Reply at 6. As a result, these carriers will not be able to develop a network-only solution if they are to provide coverage to their existing customer bases.

- The equipment necessary to obtain a network-based solution for ALI is far too expensive for a small, rural telecommunications carrier to contemplate. North Alabama Cellular, LLC Petition for Limited Waiver at 1 (February 22, 1999) (at a cost of approximately \$75,000 per cell site, “it will be simply impossible to generate sufficient revenue, either from customers or from direct subsidies from the state’s 911 fund, to cover the cost of the equipment over a remotely reasonable timeframe”). A handset-based solution is the “only one economically feasible in markets like rural Alabama.” *Id.* At 2; *see also* Upstate Cellular Network Reply Comments at 3 (Feb. 24, 1999) (“[q]uite simply, a handset-based solution may prove to be the only solution for small markets.”)
- Many carriers believe that they will not be able to afford a network-based solution. *See* New Mexico RSA 6-III Partnership at 2 (estimating \$6 million cost of network solution build-out); Texas RSA 7B3, Inc. Request for Waiver at 2 (estimating \$1.2 million cost of building additional cell sites for network solution); Advantage Cellular Systems, Inc. Request for Waiver at 2 (estimating \$7.5 million cost of building additional cell sites for network solution).

4 Costs

- The economic feasibility of network solutions has not been determined. Costs affect not only carriers, but also PSAPs and customers. Cost estimates for a network solution range from \$500 million to \$5 billion to implement. AirTouch Reply Comments at 17.
- One carrier estimated that the costs to the wireless industry of implementing a network-based system could be as high as \$2 billion. Sprint Spectrum L.P. Waiver Request (Feb. 4, 1999).
- Many carriers believe that they will not be able to afford a network based solution. *See* New Mexico RSA 6-III Partnership at 2 (estimating \$6 million cost of network solution build-out); Texas RSA 7B3, Inc. Request for Waiver at 2 (estimating \$1.2 million cost of building additional cell sites for network solution); Advantage Cellular Systems, Inc. Request for Waiver at 2 (estimating \$7.5 million cost of building additional cell sites for network solution).
- Deployment of these sites necessary to make network solutions operable in rural areas would cost between \$350 and \$6,600 per subscriber depending upon the size and population of the market. *See* Advantage Request at 2 (\$1,160 per subscriber); New Mexico Request at 2 (\$635 per subscriber); South #5 Request at 2 (\$350 per subscriber); Texas 7 Request at 2 (\$6,600 per subscriber).
- Given the cost of network solutions, “it may be cost prohibitive to use network solutions.” US WEST Reply Comments at 7. The cost of network solutions has been estimated at \$10,000 to \$50,000 per cell site. In turn, it has been estimated that the total cost to the wireless industry for merely retrofitting cell sites will be \$6.25 billion. PCIA Ex Parte, Phase II Implementation Cost (March 24, 1997).

- Preliminary estimates are that handset-based solutions are less costly. Advantage Cellular Systems, Inc., Request for Waiver, at 2 (Feb. 4, 1999) (\$540 v. \$1160 per customer); Aerial Petition at 2-3 (\$5 million v. \$41 million); *see also* Brazos Cellular Petition at 2; New Mexico RSA 6-III Partnership Petition at 2; Peoples Cellular Petition at 2; Sprint Petition at 3; Tritel Petition at 4; AirTouch Reply Comments at 17.

5 Effect Of Current Rule On Handset Option

- Application of the existing flash-cut rule will effectively preclude the use of handset-based solutions. AirTouch Reply Comments at 3 & n.5. Aerial Petition at 2-3; Brazos Cellular, Petition for Waiver at 2 (Feb. 4, 1999); Sprint Petition at 3.
- If the Bureau refuses to grant waivers or make a rule changing and forces carriers utilizing handset solutions to change out all handsets immediately to meet the existing rule, “the additional cost to carriers and PSAPs (to the extent that PSAPs reimburse carriers) would likely be so great as to practically eliminate any handset-based alternative from consideration. For example, Ameritech estimates that providing location-enabled handsets for only 20 percent of US wireless customers would cost in excess of \$3 billion, some of which may be underwritten by the public safety community itself.” Ameritech Request for Waiver at 7.
- AirTouch estimates that the provision of replacement phones to only 20 percent of the wireless population would cost in excess of \$3 billion. AirTouch Comments at 13.
- To impose the current rule upon handset solutions would kill them—it would cost 3.5 billion to replace all “legacy” handsets—\$540 per subscriber. Advantage Waiver Petition at 2.
- Carriers cannot force subscribers to purchase new ALI compliant handsets, nor can they force them to retrofit their current handsets. Arctic Slope Telecommunications and Cellular, Inc. Request for Waiver at 3 (Feb. 4, 1999). Thus, they only hope to comply with the existing rule by offering to change out non-enabled handsets at no charge to customers. *Id.* The cost of doing so would be enormous, and probably would make handset solutions cost prohibitive. *Id.* Moreover, the cost of forcing carriers to comply with the existing rule would be unnecessary, since consumers on average trade in their handsets rapidly anyway (see section 2 above), unwise, since it would mandate the technology available at a given point in time while technology continues to improve, and very possibly wasted, since no offering by carriers can ensure that consumers would trade in their handsets earlier than they otherwise would in the absence of the offering. *See* Sprint Spectrum Reply at 3.
- The uncertainty caused by lack of a safe harbor standard for handset solutions has already retarded their growth; without such uncertainty, handset technology has moved to commercialization more quickly overseas. Texas Instruments Comments at 3.

CONCLUSION

The record in this proceeding clearly supports swift action by the Bureau to grant waivers, establish waiver guidelines or interim rules to ensure that handset-based solutions can be deployed by carriers in compliance with Commission regulations.



MOTOROLA

FOR IMMEDIATE RELEASE:

April 26, 1999

**Motorola Partners with SnapTrack to Bring Personalized
Location Services to Mobile Consumers Worldwide**

*Chip-Level Integration Cost-Effectively Adds
GPS Feature To Mobile Devices*

AUSTIN, TX. -- April 26, 1999 -- Motorola's Semiconductor Products Sector (SPS) announced today that it has entered into a strategic relationship with SnapTrack to offer personal location services as an integral part of its wireless chip-sets for mobile consumers. Motorola will license SnapTrack's personal location technology to complement its DigitalDNA™ solutions for wireless platforms.

Under the terms of the agreement, SnapTrack will provide Motorola Semiconductor with its wireless-assisted Global Positioning System (GPS) technologies for mobile devices. In addition to the broad licensing agreement, Motorola has made an equity investment in SnapTrack. Financial terms of the transaction were not disclosed.

Once these services are deployed, mobile users will be able to take advantage of enhanced wireless 911, 411 and roadside assistance services. In the future, consumers will have the ability to receive new wireless services, such as location-specific traffic information -- including maps and detailed directions -- directly to their personal mobile devices. Other possible benefits to wireless customers include personalized access to wireless yellow page information on local restaurants, concierge services, weather updates, or location-specific electronic coupons while shopping.

The Federal Communications Commission (FCC) has mandated that wireless carriers have the ability to locate wireless callers to 9-1-1 to within 125 meters by October 1, 2001; in multiple trials, SnapTrack technology has exceeded this requirement.

(more)

Motorola/SnapTrack 2

"We are impressed with SnapTrack's concept and recent CDMA tests in Tampa, Florida have provided real data that demonstrates the capability of the technology," said Mario Rivas, corporate vice president and general manager, Motorola Wireless Subscriber

Systems Group. "By integrating high-performance GPS functionality in the chip-sets we sell for mobile communications, Motorola has the ability to offer value added services to our customers. All this becomes possible through a creative combination of Motorola and SnapTrack technologies."

Besides meeting the FCC mandate for locating wireless customers, carriers can benefit from new revenue streams based on location-sensitive billing and location-sensitive information delivery. Location services also offer opportunities for carriers to optimize their networks for maximum performance.

"In the near future, wireless systems built around Motorola semiconductors will enable information delivery that is specific to your location, instantaneously. This opens up a whole world of safety and productivity-enhancing services for mobile users, and provides a new means for consumers to connect with the network operators and service providers that they rely on everyday," said Steve Poizner, president of SnapTrack.

SnapTrack's wireless-assisted GPS improves upon conventional GPS performance in part by sharing processing tasks between patented software algorithms inside a wireless device and sophisticated server software running in the wireless network. Motorola's Semiconductor Products Sector can now embed SnapTrack in their digital signal processor-based (DSP) baseband processors for wireless devices. The result will be extremely rapid, highly accurate location determination in a wide variety of environments, including difficult signal environments such as inside cars, houses, and office buildings.

(more)

Motorola/SnapTrack 3

As the world's #1 producer of embedded processors, Motorola's Semiconductor Products Sector offers multiple DigitalDNA(tm) solutions which enable its customers to create new business opportunities in the consumer, networking and computing, transportation, and wireless communications markets. Motorola's worldwide semiconductor sales were \$7.3 billion (USD) in 1998.

<http://www.motorola.com/sps>

Motorola is a global leader in providing integrated communications solutions and embedded electronic solutions. Sales in 1998 were \$29.4 (USD) billion.

<http://www.motorola.com>

Headquartered in San Jose, Calif., SnapTrack is focused on integrating GPS and

two-way wireless technologies.

<http://www.snaptrack.com>

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Reader Contact:

Tony Bugg
Motorola
6501 William Cannon Dr.
Austin, TX 78735
(512) 895-6103

Editorial Contact:

James Florez
M/C/C
8131 LBJ Freeway, Suite 275
Dallas, TX 75251
(972) 480-8383
james_florez@mccom.com

Ellen Kirk
SnapTrack, Inc.
4040 Moorpark Ave., Suite 250
San Jose, CA 95117
(408) 556-0461
Fax (408) 556-0404
ekirk@snaptrack.com

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