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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

DATE: August 10, 2000

REPLY TO ATTN OF: Wireless Telecommunications Bureau Policy Division

SUBJECT: Summary of FCC E911 Phase II Reconsideration Proceeding Multi-Party Meeting July 6, 2000

TO: Magalie Roman Salas, Secretary, FCC

The Wireless Telecommunications Bureau Policy Division hereby submits an *ex parte* summary of the FCC E911 Phase II Reconsideration Proceeding Multi-Party Meeting, held July 6, 2000, in CC Docket 94-102, as well as the list of questions that was distributed to meeting participants prior to this meeting.

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List A B C D E

Minutes from FCC E911 Multi-Party Meeting
July 6, 2000

Tom Sugrue, Chief, Wireless Telecommunications Bureau (WTB), welcomed participants and stated that the intent of this meeting was to discuss potential E911 Automatic Location Identification (ALI) technologies. E911 ALI is an important issue for the Commission, the Chairman, and the Wireless Telecommunications Bureau, and lately there have been several conflicting reports about the effectiveness of the different proposed ALI technologies. Because E911 ALI is a multi-faceted process, the WTB thought it would be useful to gather information from wireless carriers, manufacturers, and public safety entities about the status of the various proposed ALI technologies for input into the Commission's reconsideration process concerning E911 ALI requirements.

Questions for Carriers

What air interface(s) do(es) the company use? What location solutions are available, network, handset, and hybrid, for the various interfaces, AMPS, CDMA, TDMA, and GSM? What testing has been completed and what were the results? Have test results been verified? What are potential deployment time frames?

AT&T Wireless

AT&T Wireless uses TDMA for its digital networks. AT&T has been reviewing every location technology that is available and has field-tested several network solutions. Early on, AT&T determined that handset manufacturers would not be able to meet the deadlines, so it has not pursued a handset solution. AT&T reviewed 13 technologies in the lab, relying on test results provided by the vendors, and deployed two network-based technologies in six cell sites for real-world testing. Initial results from AT&T's field tests did not meet the mandated accuracy. AT&T's experience with Enhanced Observed Time Difference (E-OTD) shows that, due to the TDMA channelization, it will be difficult for this technology to meet the FCC's accuracy and timing requirements for AT&T's network.

BellSouth Cellular

BellSouth Cellular uses AMPS, TDMA, and about 15 percent GSM for its networks. BellSouth is pessimistic about the test results it has obtained so far. When implementing an ALI location technology, BellSouth said that availability of equipment must be considered, i.e., prototypes are needed for testing in the first phase of an implementation, and a volume of equipment is needed for installation and further testing in later phases. BellSouth said there is a variety of network-based equipment for AMPS and TDMA that is available for testing, and soon there will be equipment available for GSM. Also, for a handset solution, there are prototype handsets available for TDMA, GSM, and AMPS, but there would not be enough handsets produced in time to meet the deadlines.

BellSouth also believes that there will not be enough network equipment available for a large scale deployment by the October 1, 2001, deadline because of the time that manufacturers need to produce equipment, as BellSouth experienced when obtaining equipment for testing. There are many other considerations when installing a network solution, even if network equipment is available, including RF planning, tower leases, building leases, zoning issues, scheduling tower climbers, DS-0 installation, testing, calibration, training, maintenance, and installing the PSAP interface. BellSouth has field-tested Angle of Arrival (AOA), Time Difference of Arrival (TDOA) (with two different vendors), E-OTD network equipment, and GPS handset technology, and has seen demonstrations of other vendors' equipment. Even though some technologies are better than others, depending on the environment, BellSouth concluded that no technology would meet the accuracy requirements with 100 percent certainty. None of them would be available for deployment by the deadlines.

NEXTEL

NEXTEL uses the iDEN air interface (with a GSM-based switch) and is considering a network overlay solution. NEXTEL considers availability a subjective term because even if network vendors say that equipment is available, carriers must consider many factors, such as RF interfaces with existing infrastructure, and PSAP interfaces using GMLC and SMLC devices. Beginning in 1999, NEXTEL tested 15 vendors' solutions and has narrowed their choice down to five possibilities. To compare technologies, NEXTEL tested network overlay, assisted GPS, and E-OTD solutions in the D.C. metropolitan area, collecting more than 2000 data points over a four-day period. Consultants are now analyzing and validating the data; results will be available soon. After consulting with the single manufacturer that supplies its handsets, NEXTEL concluded that handsets would not be produced by the deadlines. NEXTEL is concerned about its ability to support a network solution and expressed its preference to implement Phase II on a nationwide basis, rather than on an individual PSAP-request basis. NEXTEL also expressed concerns about methods to recover costs.

SBC Wireless

SBC Wireless, which has AMPS, TDMA, and GSM networks, has had experiences similar to those described by other carriers. SBC has no handset experience, but it has performed a number of tests on paper and some live network testing on technology that determines the X, Y coordinates of location and expressed the view that converting this data to a format that can be used by PSAPs is problematic. Two tests have been completed and a third is in progress. SBC has the same concerns about equipment availability, in the allowed time frame, that other carriers have mentioned.

U.S. Cellular

U.S. Cellular uses TDMA, AMPS, and some CDMA air interfaces. Two U.S. Cellular engineers observed TDOA and AOA lab testing, and TDOA appears to work well in an ideal lab environment. Due to the predominantly rural nature of its systems, U.S. Cellular feels that it will have to deploy multiple location technologies. U.S. Cellular cited numerous problems with deploying a network solution. For example, TDOA requires that cell sites be appropriately located and, in rural environments needs three towers for an accurate location determination. AOA may work with fewer than 3 towers, and may work adequately in a typical rural string of pearls configuration along the highway. U.S. Cellular has tested an AMPS GPS solution (the Tendler phone) and this appears to be the ideal solution for its rural service areas. Based on conversations with handset manufacturers, no product will be available by the due date.

Questions for Handset Manufacturers

What is the availability of handset solutions? What is the deployment time frame? What is the time frame for production of handsets?

Nokia

Nokia is not the sole supplier to any carrier, and no carrier has given it an order. Nokia supplies a "tier" of handset models—good, better, best. There have been several requests for information (RFIs) from carriers about potential impacts on size, cost, battery, and memory for a handset solution, which Nokia has answered. Technology availability varies, depending on the air interface, and the earliest availability for a U.S./Canada GSM deployment could be near the end of 2002. Nokia also expressed the view that production capacity for all handset-based solutions, across air interfaces, will occur sometime in 2002. There is a tremendous amount of risk and no firm decisions have been made. Complicating matters is the different strategy for value-added services. A cell phone with GPS is very much different than simply a box with a GPS locator inside. In addition, there are no rules for the evolution of technology in the U.S., and there are different technical innovations occurring simultaneously, especially between 2001 and the end of 2003. Nokia has asked customers for prioritization but nothing has been forthcoming. While E911 ALI implementation is an important issue, industry only has so much capacity to deploy technologies. Nothing definite has been decided and technologies to implement E911 ALI could take a number of different directions.

Nokia believes it would take two years from an order date to get to 50% activation of ALI-capable handsets for a single carrier. One year would be needed to get a handset in working shape and another year to complete compliance and reliability testing. Also, Nokia believes that the only way to achieve the 50% new activation requirement is to put GPS into the lowest end handset models because high cost models sell the least. In addition, there are complications because of the need to involve specialists for the

different air interfaces and the cooperation and coordination required for deployment. Because there are no standards, there is a question whether software will work between carriers. Currently, Nokia's task is to build a product based on a standard platform, and then customize it to fit a carrier's requests. E-OTD equipment for GSM will be available close to the mandated dates (end of 2001-beginning of 2002). E-OTD for TDMA will not meet the accuracy requirements.

Motorola

Motorola agrees with the points that Nokia raised. To meet different interface and market requirements, Motorola needs to develop a variety of products. Firm commitments from carriers for specific products and air interfaces would be helpful, but Motorola does not have enough resources to deliver for all of the air interfaces. Prioritization will be necessary, based on customer input. While Motorola can sometimes anticipate the direction of solutions, RFIs and RFQs do not drive its allocation of resources. Motorola can attempt to be prepared, developing specific solutions, but based on conversations with customers, there is no clear picture of the best way to proceed. There are many uncertainties about how to capture a customer's business, making it difficult to determine how to structure products and creating substantial risk.

Assisted GPS stands the best chance of meeting the timing and accuracy requirements. Motorola does not believe that AFLT or E-OTD will meet the current accuracy requirements. There is also a dilemma about how to handle a costly add-on function. In the volume needed for the market, Motorola may not be able to hide the cost of this location solution, and cannot offer it to operators or consumers without additional costs; making end user purchasing decisions difficult to predict. To deploy a cost effective solution in a given form factor, the GPS solution must be highly integrated, which will require different chip sets for different manufacturers, especially in the low-end market.

In June of this year, Motorola finally received a license to use SnapTrack's GPS technology. Motorola could not use this technology before due to an incomplete agreement, which was delayed by Qualcomm's acquisition of SnapTrack and SnapTrack's confidentiality constraints. Work on a cost-effective solution (chip development then product development) can now begin. Motorola needs one year for chip development and one year after that to integrate the chips into the product platform. Then, time would be needed to test the technology and integrate it with carrier systems. Motorola will not be in a position to ship 50% of GPS units until a few months beyond the two-year development period. Motorola does not believe that E-OTD will meet the accuracy requirements for iDEN and GSM. A benign environment was needed to meet the 50-meters/67% requirement and anything less than optimum degraded the results two to three times.

Questions for Location Technology Vendors

What technology is being developed? What trials have been performed? Where have they been conducted? What accuracy levels were achieved? Have test results been independently verified? What is the deployment time frame? Is the technology scalable? Can numerous large orders be handled?

Cell-Loc

Cell-Loc is a service provider that builds networks to provide x-y location information. Working for the last 11 years to perfect its technology, Cell-Loc has spent the last four years testing its technology in the same network, with 18 months of testing in downtown Toronto. Cell-Loc will launch its first commercial service in Calgary on July 7, 2000. Initially, Cell-Loc will only provide 411 (information) services and fleet management. There is no 911 requirement in Canada; 911 services will be a non-revenue-generating by-product of Cell-Loc's system that it can make available to carriers. This is possible because Cell-Loc can use the same hardware to provide service for all the standards. The same "card" can provide x-y information for AMPS, CDMA, TDMA, GSM, and other standards. Cell-Loc plans to deploy its technology, including 911 service, in Austin, Texas September 1, and then move to Dallas soon after. Cell-Loc hopes to double the number of cities deployed every quarter.

Cell-Loc plans to offer its 911 service to carriers free of charge. Revenue streams will come from other services. Cell-Loc uses a combination TDOA/voice positioning technology and the accuracy improves with longer conversations, the same as for assisted-GPS. Cell-Loc indicated that with AMPS, it has achieved test results of 31-92 meters, 67% of the time and 21-148 meters, 95% of the time. Cell-Loc plans to focus on wireless-internet and portal services, as well as other location-oriented services (e.g., locators in dog collars and children's clothing, location-specific advertising). Cell-Loc has, so far, declined to trial with any U.S. carrier. Although it has not done any testing in the U.S., Cell-Loc is confident its technology can meet the accuracy requirements.

IDC

IDC's technology is a type of in-band modem that can move location data through networks. It is comprised of special software in the handset and in LEC, CMRS, PSAP, and commercial call-center servers. IDC typically works with location technology providers and provides an accessory to GPS technology. Since September 1999, IDC has been focussing on commercial applications for its technology, rather than 911 applications, but development has not yet progressed to the point of a commercial order. While anecdotal demonstration data (from demonstrations for handset manufacturers and car companies) has been collected, IDC has no additional 911-test data available. IDC has outstanding requests to demonstrate its technology and to perform form-factor testing to determine if time frames can be met. IDC has also announced commercial product

tests with wireless carriers. Although IDC has not received orders for its device, which is still under development, it is hoping to receive commercial orders in the next several months.

IDC's King County testing with Sirf chips demonstrated a high level of accuracy for a handset-based solution, but there has not been any testing beyond this. IDC's technology can work with a variety of air interfaces and for the assisted-GPS solution, but will require additional work and testing to improve the accuracy. IDC expects to have a product in the market in 2001.

TruePosition

TruePosition has developed a network-based TDOA solution for E911 ALI and currently has a product that can handle AMPS, CDMA, TDMA air interfaces, while GSM is in production and is expected early next year. TruePosition's AOA product will be available for commercial deployment by the end of 2000. TruePosition has done several live field deployments and has met the Phase II accuracy requirements in many areas. While with larger-scale deployments TruePosition has met the accuracy standards, it is more difficult to meet the standards with small-scale installations in rural areas. In some areas, like "string of pearls" rural configurations, the required accuracy can only be met at great cost, due to needed system additions (e.g., additional antennas and stand-alone sites). TDOA needs at least three sites to obtain a location reading but very often, because of multi-path and geometry constraints, four to twelve sites are needed, depending on a particular location. Only two sites may be needed if TDOA and AOA are used together.

TruePosition indicates that it will be expensive to achieve uniform accuracy standards across diverse rural coverage areas. TruePosition expects that its equipment suppliers will be able to produce 2000 signal collection units a month to meet deployment deadlines, but recognizes that carriers may be constrained in their ability to support deployment. TruePosition estimates that it will take 2-4 months for deployment, with 2 months for RF planning design, and 1 month for installing equipment and testing. Because TruePosition's TDOA system uses existing antennas, it is less expensive than AOA, which usually requires independent antennas with a time-consuming and expensive installation. Also, TDOA installations do not require negotiating modifications to tower agreements or obtaining zoning authorization. If a mobile unit transmits, TruePosition's equipment will yield location data for that mobile unit. Also, accuracy improves with multiple fixes. Accuracy is degraded, however, when carriers, in optimizing their operations, employ handset power controls in their networks, making it difficult to make TDOA and AOA measurements.

U.S. Wireless

U.S. Wireless' RadioCamera (location fingerprinting) technology will work with AMPS. CDMA, and TDMA, and iDEN interfaces. Test results vary slightly for each air interface, with CDMA being slightly better. There will be no testing with GSM before the end of 2000. U.S. Wireless has completed trials for all of these interfaces (Oakland, CA, DC Metropolitan area, and Billings, MT), with the idea of gaining experience and shaping company strategy. The RadioCamera system will be deployed primarily as a standalone shared network location capability system, so that it will not be dependent on, or constrained by, carriers' sites. In this way, U.S. Wireless will have more control over the performance of equipment – its location, integration, and optimization. This is U.S. Wireless' method of promoting and facilitating the launch of the industry, especially since it is primarily interested in the U.S. E911 market.

U.S. Wireless contends that because there are no standard procedures for measuring location performance, the outcomes can be driven to look any way that is desired, and this may account for the contention between carriers and location technology vendors. Therefore, an industry standard is needed on how to test to achieve accuracy standards. The audit methodology developed for U.S. Wireless' Montana trial could be helpful, especially since the trial was performed with a team of nine companies, including a Phase I company, a LEC, a display entity, and a wireless carrier. The weaknesses identified were with reaching the 95% reliability level. U.S. Wireless performed audits similar to the Montana audits of deployments in four other markets, some of which had considerable traffic.

Availability of equipment is also a challenge, particularly for small providers. U.S. Wireless has enlisted two large manufacturers to supply enough equipment for a nationwide rollout. Phase I of its rollout will involve 100 markets with 11,000 tower installations. The integration aspects of this first rollout are especially challenging, especially relating to tower site leasing. U.S. Wireless is partnered with American Towers, and has negotiated a master leasing agreement. Financing is also a concern and if the mandate were to weaken, U.S. Wireless might not be able to obtain financing for the rollout. U.S. Wireless' plans are, after an order is placed, to install its RadioCamera equipment and arrange for back-haul transmissions and connections. After that, U.S. Wireless is dependent on cooperative switch interfaces with carriers. U.S. Wireless will perform all calibration, maintenance, mapping, etc., so the carrier will get location information without any other involvement.

RadioCamera works on the voice channel. The carrier notifies U.S. Wireless that there is a 911 call and U.S. Wireless provides the location information through a Phase I pipeline to the PSAP. RadioCamera is less sensitive in rural environments, and while it can provide a location determination with one cell site, more sites give better results. Power control that is coming because of network optimization will affect everyone. Special attention must be paid to the CDMA deployment footprint to achieve acceptable results. RadioCamera uses the same hardware for all systems, but some need a few additional components. RadioCamera is primarily a pc frame, with a few additional plug-ins. The

greatest costs are in setting up a tower and the related integration equipment (e.g., cabling, shelter, etc.). The RadioCamera equipment costs are relatively small in comparison.

Question for Public Safety Representatives

What is the status of Phase II preparation for PSAPs?

NENA

The ability for PSAPs to accept Phase II data is dependent on their Phase I capability. Many communities have shown an increase in PSAP requests for Phase I, especially after the Commission's action on cost recovery. With Phase I implementation, many PSAPs can receive third party data. Phase II, however, poses additional challenges and a need for mapping or some other means for latitude and longitude data to be converted into plain English so that the PSAP operator can dispatch emergency personnel based on the data. Mapping, however, is a better method of displaying Phase II data. Even though there was limited interest in location technology early on, and public safety was late in describing the problem to the FCC, wireless carriers should now realize that 30-50% of 911 calls are from wireless callers. With 98% accuracy to the PSAP for wireline calls, the average call length was shaved by 32 seconds.

The PSAP community has been proactive with the wireless community in developing standards for Phase II to ensure that Phase II data will be transferred to PSAPs in a standardized format, regardless of the location technology used. Many carriers have been proactive and, although data is still being collected, there recently appears to be a 66% percent increase in Phase I activity. Some states have even forced a decision on E911 by the PSAPs in that state. A PSAP Phase II readiness date, however is not clear yet. Phase II may be slowed by suspending the target implementation date indefinitely. Would handset manufacturers deliver if an order for one million units were placed? Public safety entities are wondering whether they should commit resources without a set implementation date. There will be many requests from PSAPs when Phase II is available. But PSAPs are now being told with respect to Phase I that if they are not absolutely ready to receive Phase I data, then their request letter does not count.

NENA has heard conflicting stories about network-based solutions. Carriers have reported some good and some dismal results. NENA believes the dismal results came from tests in parking lot basements and elevator shafts. NENA also believes that carriers are reluctant to trial potential solutions and are obstructing the implementation of Phase II E911. NENA predicts that the request process for Phase II will go faster than Phase I, as many PSAPs think Phase II is a better answer than Phase I. Phase II will help PSAPs by reducing the workload. Phase II is sorely needed because wireless 911 calls are increasing and PSAP operators do not know where the callers are located. More time to process calls is a big concern.

Question for Carriers and Manufacturers

How serious are you about implementing Phase II E911?

AT&T

E911 is the most important issue on AT&T's list of regulatory mandates, but there is a disconnect between the mandate and the state of the technology. AT&T has been in the forefront on Phase I issues and has devoted a lot of time towards developing standards. AT&T is concerned about what will happen in October 2000 and October 2001.

BellSouth

BellSouth takes both Phase I and Phase II very seriously and it has a dozen people working on these issues. BellSouth is aware of the seriousness of this issue, especially because emergency use is the primary reason for a cell phone purchase. It is clear, however, that the accuracy requirements cannot be met in all cases, and it will be difficult to meet the deadlines with a network solution and almost impossible with a handset solution. To maximize accuracy, the rules should require that a PSAP request apply to all the carriers in an area. An extension of time is needed because the current deadlines cannot be met. In addition, the accuracy requirements should be relaxed or testing that omits indoor areas should be mandated. Vendors should understand that carriers could not order products sight-unseen and that they need prototypes for testing. Vendors are the ones setting the schedule.

Motorola

Even if a carrier were to give Motorola an order, with a check, for a million handsets, Motorola would have to decline, because it does not have the ability to deliver with assisted GPS in the allowed time frame. Industry was discussing this 18 months ago when it was an infant technology and although it has moved from a concept to something more concrete, Motorola does not develop anything unless there is a market for it. In reply to Qualcomm's representation that it is ready to ship chipsets and its contention that resultant handsets could be produced in six months, Motorola contends that this is only for CDMA and that Qualcomm is making confusing representations. Qualcomm's MSM3300 baseband chip does not support 1X and does not meet all the needs of CDMA operators and their customers (e.g., hands free dialing, etc.). Although it does support a form of assisted-GPS, Qualcomm's GPS1 chip is different than the technology used in the Tampa trial.

How can Qualcomm have GPS handsets manufactured within six months in Asia?

Nokia

Nokia expressed the view that it should not be required to use Qualcomm's chip sets. There are alternatives available and Nokia has not just been waiting for an order. Instead, it has been working to develop proper technology. Pragmatically, it will take multiple steps to make this technology a success. Integrating GPS with the cell phone is the best option, because it will be the most efficient and least-cost solution, and will support other desired features. But Nokia will not be ready to deploy a solution 16-17 months from now. It is unrealistic to think that it can.

To meet the 50% mandate, the technology will have to be installed in an entry-level product at first, because of that product's price constraints. Nokia does not believe that can provide a fully integrated GPS handset within the current timeframe, and believes that leaving the deadlines in place will amount to a mandate for sub-optimal, less-integrated solutions. Nokia does not know if Qualcomm's chip set will actually work because it has not yet seen it deployed. Nokia is also concerned about who will perform the server assist portion for the assisted-GPS solution. Realistically, October 1, 2001 is not going to happen with handset approaches to E911. Starting today, Nokia would need 18-24 months to produce a sellable product.

Motorola

Motorola has questioned the viability of GPS as a commercial offering. Assisted GPS could be an investment with no payback in the 911 arena. Several operators were not sure about handsets and have been leaning towards a network solution. It is very possible that all of Motorola's customers could be forced to choose a network solution. Motorola does not want to rush to market with a solution that no one will use. Also, which non-compliant solution does a carrier choose and Motorola support?

NENA

Manufacturers do not want to risk any money without an order for handsets. The FCC's order holds the carriers responsible. In this case, the free market is at work, if one player cannot deliver, another will. Others will have to play catch-up. If it takes two years to deploy handsets, we should only be six months away because the mandate was modified 18 months ago. Internet phones were mentioned after this order and now someone can purchase such a phone at BestBuy – without a mandate. So, it seems it is just dollars and business cases. In the end, NENA does not mind what system is used and parties should provide safety without any more excuses. Those who can deliver should survive, and those who cannot, shouldn't survive.

NENA thinks it is unfair to be characterized as emotional zealots when they present statistical information and attempt to be team players with carriers. All NENA has done is point out the lack of progress. Wireless telephones have been widely successful and NENA, while it understands economic cases, feels that result comes with a moral obligation to help fix this problem.

FCC

Tom Sugrue reminded participants that a year ago, it was said that handset solutions would be a diversion because network-based solutions were available and able to meet the accuracy requirements. Since then, we seem to have made negative progress and carriers are saying the network solutions will not work. What is the real story?

Cell-Loc

Cell-Loc's solution will cost carriers nothing because Cell-Loc is committed to delivering the location coordinates at no cost.

BellSouth

We cannot accept the business model of putting control with a third party because carriers have the regulatory burden.

Nextel

Nextel is evaluating changes to the network that are needed for a network-based solution versus those needed for a handset-based solution. Standards for the PSAP interface are also needed and will not be available until early next year. Nextel will not be able to deploy in the October time frame with either a network or handset solution.

TruePosition

TruePosition's solution was tested in field tests and it will meet the accuracy requirements the majority of the time. Some areas, however, will require additional antennas for TruePosition's technology to work adequately, *i.e.*, within the FCC accuracy standards. TruePosition usually uses the cellular network antennas, but can do stand alone installations. TruePosition's equipment is easy to install; the constraints are carrier resources and the DS-0 back-haul links.

Cell-Loc

Cell-Loc is not dependent on antennas at existing cell sites. Cell-Loc's separate network with "super sites" (as in Calgary) can actually reduce the number of towers needed. As far as 50% coverage, Cell-Loc plans to double the number of cities every quarter and will have 45 cities at 50% coverage by 10/1/2001, which is the best they can do.

Concluding Statements

U.S. Wireless

None of the network vendors have waited for an order and instead started developing technology. But these vendors will not be able to sustain this activity single-handedly for long, and will be looking for orders soon. This is like the meeting of two cultures – mature, powerful service providers, who are working hard to improve the quality of service, and a new, emerging industry. Measuring performance is difficult because location technology today is like cellular service in the 1960s. U.S. Wireless has an elegant solution that has some holes it is working to eliminate. How will accuracy be measured in sparse coverage areas? Do PSAPs need the mandated accuracy in these areas or is a possible answer to relax the accuracy standards in rural areas?

U.S. Cellular

U.S. Cellular filed a request for a six-month extension for rural carriers facing deadlines. A network-based solution does not work in rural areas. The mandate is clear but rural carriers do not have the resources to participate in the standard setting process to the extent that non-rural carriers can. The fact that U.S. Cellular does not have the pull with manufacturers, which large carriers have, needs to be addressed.

TruePosition

TruePosition's system works and TDOA can locate wireless callers, but it is still a question of range, which is a function of cost versus performance. We really need to look at the distribution of the location of 911 calls.

SBC Wireless

It is clearly in the public's interest to move forward. The Commission should carefully review the carriers' responses in October 2000, and possibly consider extending the deployment dates and whether the accuracy requirements are realistic.

Nokia

Nokia provided an accurate set of statistics that show there are a growing number of wireless 911 calls. GPS has been headed for commercial development, even though the accuracy and timing of that deployment were not entirely clear. Nokia believes the mandate is very clear and began working on a handset in September 1999. The FCC needs to clarify the implementation because Nokia cannot meet the timing or accuracy. Nokia does not believe Qualcomm's claims that its chipsets can be turned into handsets within 6 months of commercial availability. Nokia is not waiting and doing nothing, but to integrate GPS into a handset, Nokia needs product specifications from customers.

Nextel

Nextel is taking this obligation seriously and has already spent more than $250,000 on Phase II. Phase II, and other wireless mandates (CALEA, LNP, and TTY) will affect carriers' operations. Also, hands-free dialing, voice recognition, and other safety features create memory and power concerns. Today, there is no prototype iDEN handset incorporating GPS that can be used to test the effect on the rest of the network. Without good information, Nextel cannot act responsibly for its shareholders. The situation today is making it difficult to make a rational decision. Nextel needs changes in the deadline and possibly the accuracy as well.

NENA

The FCC should stick to its order and let the marketplace weed out those who cannot produce in time. The waiver process exists for those technologies that cannot meet the deadlines so the FCC should entertain exceptions to its requirements on a case-by-case basis. Carriers should not lose sight of public safety, and the process should move forward so the public can be protected. Systems have been built that can locate. Now data is needed to determine if the accuracy requirements are appropriate. The network-based solution appears to work, so do not let perfection be the enemy of the good.

Motorola

Motorola is committed to supporting the interests of public safety and has actively participated in standard setting. Motorola has come to the hard conclusion that the current requirements for handsets cannot be met. Motorola has not been silent its views—it came to the FCC prior to the Third Report and Order and indicated that the handset requirements would not be achievable. Motorola has concluded that assisted GPS stands a reasonable chance of meeting the requirements, depending on the tests. If we look at the pattern of where most 911 calls are made and design a reasonable test, then assisted GPS stands a reasonable chance of meeting the accuracy requirements. There are problems with in-building coverage for assisted GPS. We cannot ignore the time that

it takes to integrate complicated systems into today's networks. A network is not just a box with an antenna. We have to be careful with how we introduce this technology and don't cause problems. Each network is unique.

Cell-Loc

Cell-Loc started developed a system 11 years ago, long before the FCC's E911 ALI order. Cell-Loc's system meets the mandate and will be demonstrated in Calgary over the next several weeks. An Austin rollout will follow shortly, with Dallas rolled out in September. Cell-Loc would be happy to talk with carriers.

BellSouth

E911 is at the top of BellSouth's priorities. BellSouth has looked at every potential solution, but does not believe that the October 2001 timeframe can be met by either network or handset technologies. BellSouth is concerned that no technology can meet the required accuracy levels. BellSouth cannot report in October 2000 because it does not have a plan or solution.

AT&T

This Phase II E911 is the single most important regulatory mandate we face. Right now, AT&T does not see a way that it can meet the FCC's requirements. If AT&T cannot make it, it will do the best it can and seek a waiver.

FCC E911 Multi-Party Meeting
July 6, 2000

Name:	**Company/Organization:**
Doug Brandon	AT&T Wireless
Lori M. Buerger	AT&T Wireless
Ben Almond	Bell South
Andrew W. Clegg	Bell South
Linda Lancaster	Bell South
Michel Fattouche	CELL-LOC
John Jimison	CELL-LOC
Sean Krakiwsky	CELL-LOC
Bob Eckert	FCC-OET
Dale Hatfield	FCC-OET
Alexander Dobrev	FCC-WTB
Patrick Forster	FCC-WTB
Dan Grosh	FCC-WTB
Gil Hopenstand	FCC-WTB
Jennifer Kolen	FCC-WTB
Bill Lane	FCC-WTB
Marty Liebman	FCC-WTB
Ron Netro	FCC-WTB
Kelly Quinn	FCC-WTB
Jim Schlichting	FCC-WTB
Blaise Scinto	FCC-WTB
Tom Sugrue	FCC-WTB
Andy Rimkus	IDC
Mary Brooner	Motorola
Paul De Clerck	Motorola
Audrey Longhurst	Motorola
Duane Rabe	Motorola
Sharon Counterman	NENA
Norman H. Forshee	NENA
Jim Hobson	NENA
John R. Melcher	NENA
Bob Ewald	NEXTEL
Larry Krevor	NEXTEL

FCC E911 Multi-Party Meeting
July 6, 2000

Name:	**Company/Organization:**
Leo Fitzsimon	Nokia
Adam Gould	Nokia
Larry Paulson	Nokia
Russ Jackson	SBC Wireless
Bob Tyler	SBC Wireless
Michael Amarosa	True Position
Joe Sheehan	True Position
Phil Verveer	Willkie Farr & Gallagher for True Position
James Quinlan	U.S. Cellular
Tom Van Wazer	U.S. Cellular
Eliot Greenwald	Swidler Berlin for U.S. Wireless
Oliver Hilsenrath	U.S. Wireless
Tom Dombrowsky	Wiley, Rein & Fielding

July 5, 2000

Format/Questions for E911 Phase II Multi-Party Meetings

Ground rules:

- Two to three representatives per company, maximum.
- No presentations. We are interested in obtaining responses to questions. Any presentations may be submitted separately in writing.
- Commission staff will prepare a summary of the meeting for ex parte notification purposes.

Proposed Order for addressing issues, with accompanying questions:

I. Accuracy standards (suggested timeframe: 30 minutes)

1.a. Are there network-based technologies that meet our current accuracy standards for each of the five air interfaces (GSM, CDMA, TDMA, iDEN, and AMPS)?
1.b. What level of accuracy can network-based technologies provide for these air interfaces?
1.c. Is there reliable test data to support this conclusion? Can such data be made available to the Commission (if necessary, on a confidential basis, but preferably on the public record)?
1.d. Has this test data been independently verified by carriers or by other independent parties?
1.e. If not, how should such data be obtained? Can it be obtained in time for carriers to make informed decisions?

2.a. Are there handset-based technologies that meet our current accuracy standards for each of the five air interfaces (GSM, CDMA, TDMA, iDEN and AMPS)?
2.b. What level of accuracy can handset-based technologies provide for these air interfaces?
2.c. Is there reliable test data to support this conclusion? Can such data be made available to the Commission (if necessary, on a confidential basis, but preferably on the public record)?
2.d. Has this test data been independently verified by carriers or by other independent parties?
2.e. If not, how should such data be obtained? Can it be obtained in time for carriers to make informed decisions?
2.f. Have only prototype handsets thus far been tested? Have ALI tests been conducted while a handset is in normal operation? If actual production models will differ in structure (e.g., incorporation of GPS antenna and other hardware into handset) how can we be assured of the accuracy of handset test data, and the ability of the handset to achieve required accuracy and maintain normal operation (given the possible effect of GPS hardware/software on battery drain, memory, interference, etc.)?

3.a. Of the various "hybrid" technologies (e.g., Advanced Forward Lateral Triangulation (AFLT) and Enhanced Observed Time Difference (E-OTD)), what accuracy levels can these technologies currently achieve? What accuracy levels are expected in the future?

3.b. Is there reliable test data to support this conclusion? Can this data be made available to the Commission (if necessary, on a confidential basis, but preferably on the public record)?
3.c. Has this test data been independently verified by carriers or by other independent parties?
3.d. If not, how should such data be obtained? Can it be obtained in time for carriers to make informed decisions?
3.e. Are these technologies applicable only to certain air interfaces?

II. Availability of Solutions (30 minutes)

4.a. Are there network-based solutions available for all of the air interfaces (AMPS, CDMA, TDMA, GSM, iDEN)? Are they at similar stages of development and testing, or have certain air interfaces lagged further behind?
4.b. Are there handset-based solutions available for all of the air interfaces (AMPS, CDMA, TDMA, GSM, iDEN)? Are they at similar stages of development and testing, or have certain air interfaces lagged further behind?
4.c. What is the status of GPS standards for each of the air interfaces? How will the standard-setting schedule affect deployment of handsets for each air interface?
4.d. Are any of the air interfaces technically incompatible with either network or handset-based solutions?
4.e. Are there other aspects of a particular air interface that would make a network-based or handset-based solutions cost-prohibitive?
4.f. If so, what is the magnitude of the cost differential?
4.g. How soon will handset manufacturers be able to bring GPS-capable handsets to market – for each air interface? How soon will handset manufacturers be able to bring E-OTD or AFLT-capable handsets to market – for each air interface?
4.h. One issue with handset-based solutions has been that they do not provide coverage for roamers and older handsets. How do proponents of handset-based technologies intend to address this issue?

III. Timing/Implementation Deadlines (20 minutes)

5.a. Will carriers be able to meet the specified implementation deadlines?
5.b. What are the major impediments or risks associated with meeting the deadlines? Regulatory? Technical? Economic? Other?
5.c. What progress is being made by PSAPs? When will they be ready to receive and utilize Phase II information?
5.d. Is there a possibility that there may be a widespread lack of readiness to implement Phase II on the PSAP side, similar to the experience with Phase I?
5.e. Are there actions the FCC could take to facilitate PSAP implementation of Phase II?

IV. Carrier Commitments/Incentives (20 minutes)

6.a. What assurances do carriers need in order to make place firm orders with handset or network infrastructure manufacturers?
6.b. How specifically can we enhance the incentive for carriers, manufacturers, and other stakeholders, to move quickly to get E911 Phase II capability deployed?
6.c. Alternatively, what penalties for non-compliance should the FCC consider, if some carriers fail to meet the implementation deadlines?
6.e. Some parties have proposed that carriers be deemed in compliance with our handset deployment requirements if they place firm orders for sufficient quantities of compliant handsets, early enough. This proposal seems to lack enforceability and could potentially result in multi-year delays in implementation. Are there other ways to break the apparent chicken-egg impasse between carriers and handset manufacturers?

V. Wrap Up (15 minutes)
Each participant will be given three minutes to respond to points or arguments raised that they may not have gotten a chance to fully address.