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December 3, 2001

VIA HAND DELIVERY
Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, S.W.
Washington, D.C. 20054

REDACTED – FOR PUBLIC INSPECTION

RE: ***Request for Confidential Treatment of ACS Wireless' Petition for Limited Waiver – CC Docket No. 94-102***

Dear Secretary Salas:

On November 30, 2001, we filed on behalf of ACS Wireless, Inc. ("ACSW") in CC Docket No. 94-102 the following: (1) a (Confidential – Not For Public Inspection) Petition for Limited Waiver; and (2) a Redacted version of this Petition for public inspection.

Due to a clerical error on one page, the Redacted version of this Petition (for public inspection) contains confidential information. Therefore, we are enclosing a corrected Redacted version and request that it be filed as of November 30, 2001. I apologize for any inconvenience this may have caused.

If you have any questions or concerns, please do not hesitate to contact the undersigned at 202-659-5800.

Sincerely,

Elisabeth H. Ross

Elisabeth H. Ross

Enclosure
cc: Patrick Forster, Policy Division, Wireless Telecommunications Bureau
Qualex International (w/ disk)

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
	)	
Revision of the Commission's Rules	)	CC Docket No. 94-102
To Ensure Compatibility with Enhanced 911	)	
Emergency Calling Systems	)	
	)	
	)	

ACS WIRELESS' PETITION FOR LIMITED WAIVER (REDACTED VERSION)

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EXECUTIVE SUMMARY

ACS Wireless, Inc. ("ACSW") requests a limited Waiver of the E911 Phase II Location Technology Implementation Rules of the Federal Communications Commission ("Commission") set forth in 47 C.F.R. § 20.18(e)-(h) ("Phase II rules"). ACSW is a small regional wireless carrier that serves Alaska. ACSW operates over a Time Division Multiple Access ("TDMA") and Advanced Mobile Phone Service ("AMPS") network that has been designed and constructed to address Alaska's overall demographic, climatic, and geographic obstacles.

In particular, Alaska's population is generally very spread out across large distances in the state. In many cases, cell sites are deployed in an atypical network design (largely non-matrix). For example, towers are aligned along highways, like pearls on a string, or are located on mountaintops or in other extremely rural and remote locations. Consequently, [REDACTED]. It has been extraordinarly difficult for ACSW to identify a technically feasible, network-wide reliable and proven location solution. In fact, no single location solution available to date will provide ACSW subscribers with location services in line with the Commission's accuracy standards.

ACSW is the owner of three PCS licenses and plans to complete its initial build-out of this network by April 28, 2002, as required by the Commission's build-out rules. ACSW has [REDACTED] this technology has significant advantages for ACSW subscribers. Among these advantages are [REDACTED] and accurate location services. ACSW can meet the Commission's accuracy standards using [REDACTED] technology on its soon to be deployed [REDACTED] network. Based on ACSW's investigation of

the available alternatives, [REDACTED] is the most accurate and feasible location solution for its Alaska network.

In light of the fact that ACSW's CDMS network will not be initially deployed until April 28, 2002, ACSW proposes a compliance plan as follows:

- Provide TDMA and AMPS customers Phase I location services within 6 months of a PSAP request;
- As of April 28, 2002, [REDACTED];
- By April 1, 2003 [REDACTED];
- By December 31, 2003, [REDACTED];
- By April 1, 2004 [REDACTED];
- By December 31, 2005, [REDACTED]; and
- By December 31, 2007, [REDACTED].

The foregoing plan will ensure that ACSW customers receive the benefit of Phase II E911 location accuracy over a time frame that permits the most appropriate deployment of that service over ACSW's Alaska network. ACSW has conferred with the largest PSAPs in the State of Alaska, including the Anchorage (the APCO Project 38 Model City) PSAP, regarding its plan. The PSAPs concur with ACSW's plan. Accordingly, special circumstances exist to justify a limited waiver of the Phase II rules for ACSW and such waiver is in the public interest.

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ACS WIRELESS PETITION FOR LIMITED WAIVER (REDACTED VERSION)

ACS Wireless, Inc. ("ACSW"), pursuant to 47 C.F.R § 1.3 and § 1.925 hereby requests a limited Waiver of the E911 Phase II Location Technology Implementation Rules of the Federal Communications Commission ("Commission") set forth in 47 C.F.R. § 20.18(e)-(h) ("Phase II rules"). ACSW is a small regional wireless carrier serving Alaska and currently provides wireless telecommunications over a Time Division Multiple Access ("TDMA") and Advanced Mobile Phone Service ("AMPS") network. ACSW has diligently investigated different location solutions for this network. However, the extreme rural and remote locations of a significant portion of its cell sites make developing a reliable and proven location solution network-wide for the TDMA and AMPS networks extraordinarily difficult. The available solutions are not usable network-wide in a technically feasible manner because of Alaska's overall demographic, climatic, and geographic obstacles.

ACSW can meet the Commission's accuracy standards using [REDACTED] on its soon to be deployed [REDACTED] network. A new [REDACTED] network has significant advantages for consumers. Among these advantages are [REDACTED] as well as accurate Phase II location services.

Based on ACSW's investigation, an [REDACTED] solution for this [REDACTED] network is the best and most feasible alternative for its Alaska network. ACSW seeks permission to deploy the Phase II location services through its new [REDACTED] network and to phase in this solution over a slightly longer period of time than originally mandated. ACSW will use reasonable efforts to transition as many TDMA-AMPS customers as possible to this network, and plans to [REDACTED] on this

network with [REDACTED] by December 31, 2003. [REDACTED]. ACSW provides herein its blueprint for implementing Phase II service as closely as possible to the Commission's rules, as well as a compliance plan.

ACSW has conferred with the largest PSAPs in the State of Alaska, including the Anchorage (the APCO Project 38 Model City) PSAP, regarding its plan. The PSAPs concur with ACSW's plan.[1] For the reasons set forth below, the Commission should grant ACSW a limited waiver of its Phase II rules.

I. STANDARD FOR GRANTING WAIVER

Under the Communications Act, the Commission must promote the safety of life and property through the use of wire and radio communications.[2] This mandate has been enhanced by the enactment of the Wireless Communications and Public Safety Act of 1999.[3] The purpose of the 911 Act is to enhance public safety by encouraging and facilitating the prompt deployment of a nationwide, seamless communications infrastructure for emergency services that includes wireless communications.[4] In furtherance of this mandate, the Commission promulgated rules for the phase-in of E911 location technologies as well as standards for the accuracy and reliability of such technologies.[5]

The Commission has recognized that, in certain circumstances, for instance where technology-related issues or other exceptional circumstances arise, the Commission may

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[1] No PSAP has made a request for Phase I or Phase II accuracy in Alaska at this time.
[2] *See* Section 1 of the Communications Act, 47 U.S.C. § 151.
[3] Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, enacted Oct. 26, 1999 ("911 Act").
[4] *Id.*
[5] *See* 47 C.F.R. § 20.18 *et seq.*

waive its rules.[6] Generally, the Commission's rules may be waived for good cause shown.[7] Further, waiver is appropriate if special circumstances warrant a deviation from the rules, and such a deviation will serve the public interest.[8] Special circumstances include unusual factual circumstances that make application of the rule(s) inequitable or unduly burdensome, or when an applicant for waiver has no reasonable alternative to enable compliance with the rule(s).[9]

In the context of the E911 initiative, the Commission has implicitly recognized that rural or smaller carriers may have difficulty deploying location technologies.[10] The Commission noted that the cost of upgrades, combined with the relatively low number and density of customers in rural areas, could impose high per customer costs in rural areas.[11] Further, in selecting a location solution, accuracy is only one of several important means by which location technologies contribute to the public safety.[12] The rate and extent of deployment, reliability, encouragement of further improvements, and cost are other relevant factors to consider.[13]

All of these considerations support granting ACSW a limited waiver of the Phase II rules. ACSW establishes herein that special circumstances exist to justify a limited waiver of the location accuracy requirements to allow ACSW to delay deployment of a Phase II location solution until it can offer an [REDACTED] solution on its planned

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[6] *See Fourth Memorandum Opinion and Order*, ¶ 43.
[7] *Id; see also* 47 C.F.R. § 1.3.
[8] *Id.*
[9] *See* 47 C.F.R. § 1.925(b)(3)(ii).
[10] *See generally* TRO ¶ 23.
[11] TRO ¶ 23.
[12] *See Fourth Memorandum Opinion and Order*, ¶ 40.
[13] *Id.*

[REDACTED] network. Moreover, ACSW establishes that this waiver is in the public interest.[14]

II. ACSW'S NETWORK

ACSW is a small regional carrier that provides wireless service over a TDMA and AMPS network. Operating across Alaska, ACSW currently serves 78,574 cellular subscribers out of a total state population of approximately 622,000, achieving a penetration rate of 17%. It offers a vast in-state service calling area with coverage in Alaska's few most densely populated cities and numerous smaller communities. ACSW's network extends from Ketchikan in the Southeast to Barrow and Deadhorse on the North Slope and to Homer in Southcentral, an area of approximately 325,000 square miles.[15] Thus, the ACSW network spans an enormous area encompassing coastal areas, mountain ranges, rainforest, glaciers, and tundra, all with different climates, geography and demographics. Further, the state is very sparsely settled with small villages and communities spread often many hundreds of miles apart, which are, in many cases, inaccessible by road.

ACSW has three principal service areas in Alaska centered around its three switches. These markets are Anchorage (Southcentral), Fairbanks (North), and Juneau (Southeast). The network configuration in each of these three markets differs

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[14] *See generally* AT&T Petition for Waiver and *In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, CC Docket No. 94-102, *Fourth Memorandum Opinion and Order*, 15 FCC Rcd. 17442 (2000) ¶ 43 (citing Northeast Cellular Telephone Co. v. FCC, 897 F.2d 1164, 1166 (D.C. Cir. 1990)) (other citations omitted).

[15] ACSW's service is not continuously available throughout this entire area.

significantly. Each presents unique challenges, which complicate deployment of a fully compliant, accurate location solution within the Phase II rules' time frames.

Anchorage (Southcentral)[16]

The Anchorage market includes Anchorage, Alaska's only "large" city with a population of 260,283,[17] and other smaller communities, including Homer (pop. 3946), Glenallen (pop. 554),[18] Whittier (pop. 182), Soldotna (pop. 3759), and Clam Gulch (pop. 173). There are 54 sites in this area, which cover a population of 309,974 and serve 56,709 subscribers. The 20 sites in Anchorage proper mirror the typical matrix or star-type network configuration found in urban areas in the Lower 48. However, Anchorage is ACSW's only location in this service area (and the state) in which this optimum configuration is found.

Due to the distance and terrain of this market, most of the 54 sites do not hand off to other sites. As a rule, only one highway runs in and out of the communities in Alaska and the cell sites are located along that one road like "pearls on a string." For example, on the Kenai Peninsula south of Anchorage, 20 cell sites cover 173 miles of road and are configured in a linear fashion. Even in the Anchorage area, 4 cell sites are located in a linear configuration along the highway going north out of the city, covering 27 miles of road.

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[16] *See* Exhibit A, Map of Anchorage Metro Area Cellular Sites and Map of Kenai Peninsula (Anchorage Market) Cellular Sites.
[17] All population statistics contained in this pleading are derived from the 2000 Census.
[18] Glenallen is considered a "suburb" of Anchorage, although it is located 134 miles from that city.

Fairbanks (North)[19]

The Fairbanks market includes Fairbanks (pop. 30,224), as well as outlying areas such as North Pole (pop. 1570), Nenana (pop. 402), Delta Junction (pop. 840), Harding Lake (pop. 216), McKinley (pop. 142), Barrow (pop. 4581), and Tok (pop. 1393), among others.[20] The market stretches to extremely isolated areas, like Deadhorse, which is over 489 miles from the center of Fairbanks and above the Arctic Circle on Prudhoe Bay. This area of Alaska experiences some of the most extreme weather conditions in the state. Generally, winter begins in late August and lasts until late May. Frozen tundra, mountain ranges, and vast roadless expanses characterize this Northern region.

There are 22 sites in this market that serve 17,138 subscribers out of a market-wide population of 90,225. Only in Fairbanks proper will a subscriber's handset be able to see three cell sites. Twenty cell sites cover 440 miles of road, configured in a linear fashion. Only six of the total twenty-two sites in this market are capable of handing signals off to other cell sites.

Juneau (Southeast)[21]

The Juneau market includes Juneau, the third largest city in Alaska (pop. 30,711), Sitka (pop. 8835), Ketchikan (pop. 7922), and many small villages, including Klawock (pop. 854), Thorne Bay (pop. 557), Craig (pop. 1397), and Manley (pop. 72). There are 22 sites in this market, which cover a population of 53,616 and serve 5,492 subscribers.

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[19] *See* Exhibit B, Map of Fairbanks Market Outlying Cellular Sites and Map of North Slope (Fairbanks Market) Cellular Sites.

[20] ACSW's one analog cell site is located in Barrow. Approximately 30% of ACSW's users have analog handsets, however, even though ACSW provides digital service in all other locations.

[21] *See* Exhibit C, Map of Southeast Alaska (Juneau) Market Outlying Cellular Sites.

Southeast Alaska is a northern temperate rainforest. Steep mountains rising straight from the sea, plentiful rain and humidity many months of the year, fjords, and dense forests characterize this region of the state.

In Juneau, which is located narrowly between several heavily forested mountains, there is no place where a subscriber's handset can see more than two cell sites. In Ketchikan, only two cell sites hand off to one another. All of the 18 other sites in this market are on mountaintops and do not hand off to other cell sites.

In sum, of the foregoing 98 cell sites in ACSW's TDMA network, *only 54 cell sites can hand off to two or more cell sites.* Therefore, only 54 cell sites are situated appropriately for most, if not all, network based location technologies to work properly.[22] *The remaining 44 sites, or over 45% of ACSW's network,* are extremely problematic for network-based location technologies. Eight of the 44 cell sites are on highways and while a handset is able to see two other cell sites when using these cell sites, it can only see them in a straight line. So, because they cannot triangulate, a subscriber's handset sees, in effect, only one cell site. For sixteen of the 44 cell sites, a subscriber's handset can see only a single other cell site.[23] Lastly, twenty of the 44 sites are stand-alone sites and cannot hand off to any other cell sites.[24]

To further complicate matters, ACSW owns less than one-half of its cell towers. ACSW leases most of its towers from another telecommunications carrier. Due to the

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[22] Most of ACSW's mobile traffic is in these 54 sites.
[23] Of these 16 sites, some are used for fixed dial tone.
[24] These sites include, but are not limited to, Bedami, Barrow, Seward, Ratz Mountain, Tern Lake, Whittier, Moose Pass, Nenana, Healy and McKinley. Some of the 20 stand-alone sites are used for fixed wireless to provide basic dial tone to rural customers. In these instances, local PSAPs are aware of the mobile unit's address because the unit is not truly mobile.

expense of constructing and maintaining towers in remote areas of Alaska, a single tower is often used to support long-distance, microwave and cellular services. Consequently, a substantial number of these towers are already overloaded. To date, ACSW has had to wait more than one year to get access to certain towers to install additional antennae and other equipment. Therefore, ACSW has no right to install additional equipment on a large number of its cell towers, and, even if it did, its ability to access towers in a timely or cost effective manner is diminished.

The foregoing describes the unique configuration of ACSW's TDMA network. In addition, ACSW holds three PCS licenses. Each of these licenses covers a basic trading area, which, when combined, cover the entire state of Alaska. ACSW's five-year build out date for these three licenses is April 28, 2002. ACSW is planning to deploy a [REDACTED]-based network in its licensed frequencies in order to provide Alaskan consumers improved advanced wireless services, particularly mobile data services. ACSW intends to use reasonable efforts to migrate its existing TDMA customers to this advanced system by 2007.[25]

III. THE COMMISSION'S PHASE II RULES

The Commission's Phase II rules set forth different standards for accuracy based on the type of location technology used. For network-based location technologies, a carrier must: 1) provide E911 service to at least 50 percent of the coverage area or 50 percent of the population beginning October 1, 2001 or within six months of a PSAP

[25] In some areas, ACSW may, depending on future determinations of cost, need, or feasibility, retain some TDMA and/or analog service for its subscribers. ACSW will maintain analog service to the extent required by the Commission's rules and its subscribers needs.

request (whichever is later); and 2) provide E911 service to 100 percent of the coverage area or 100 percent of the population within 18 months of such a request or by October 1, 2002 (whichever is later).[26] Carriers must provide location information within 100 meters for 67% of calls and within 300 meters for 95% of calls.[27]

The Phase II rules for handset-based location technologies are more stringent. Carriers employing handset technologies must: 1) begin selling and activating location-capable handsets no later than March 1, 2001; and 2) ensure that at least 50 percent of all new digital handsets activated are location-capable no later than October 1, 2002 regardless of whether a PSAP request has been made.[28] Once a PSAP request is made, within six months of the request or by October 1, 2001 (whichever is later), a carrier must: 1) ensure that 100 percent of all new handsets activated are location-capable; 2) install any hardware and/or software in the CMRS network and/or other fixed infrastructure, as needed, to enable the provision of E911 service; and 3) begin delivering E911 service to the PSAP. Within two years of the PSAP request or by December 31, 2004 (whichever is later), the carrier must undertake reasonable efforts to achieve 100 percent penetration of location-capable handsets among its subscribers.[29] Carriers must also provide location information within 50 meters for 67% of calls and within 150 meters for 95% of calls.[30] In light of these standards, ACSW investigated both network-based and hand-set based location solutions.

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[26] 47 C.F.R. § 20.18(f).
[27] For the remaining 5% of calls, location attempts must be made and a location estimate must be provided to the PSAP. 47 C.F.R. § 20.18(h)(3).
[28] 47 C.F.R. § 20.18(g)(4).
[29] 47 C.F.R. § 20.18(g)(2).
[30] As with network-based solutions, for the remaining 5% of calls, location attempts must be made and a location estimate must be provided to the PSAP. 47 C.F.R. § 20.18(h)(3).

IV. ACSW INVESTIGATED MULTIPLE NETWORK-BASED LOCATION SOLUTIONS FOR ITS TDMA NETWORK AND NO ONE SOLUTION MEETS THE PHASE II ACCURACY STANDARD

ACSW's options for an accurate network-based location technology are limited by the fact that it operates a largely TDMA-based network in a rural area. It is widely accepted that, for TDMA networks, the most accurate available network-based location solutions are Time Difference of Arrival ("TDOA"), Angle of Arrival ("AOA"), and Mobile-Assisted Network Locations System using a mobile-assisted hand off technique (generally referred to as "MNLS") or other similar solution, which relies on triangulation and/or interpretation of signal strength measurements.[31] However, industry tests have revealed that none of these network solutions can strictly meet the Commission's accuracy requirements, particularly for TDMA networks.[32] ACSW's own analysis supports this conclusion.

Moreover, because of the unique characteristics of ACSW's network, no *single* location solution will provide location accuracy levels that comply with the Commission's mandate. To meet the Commission's accuracy standards, ACSW would have to deploy combinations of technologies across its network in ways that are unproven and with unknown reliability. For example, ACSW would have to construct a parallel subnetwork for all sites that can see only one other site, designed solely to allow these

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[31] TDOA, AOA and Sensors all rely on triangulation in order to determine the location of a mobile unit. MNLS uses an existing mechanism of the handset combined with a technique known as mobile-assisted handoff (MAHO) to make and transmit measurements that are compared against a database of signal measurements to determine the location of a mobile unit.

[32] *See* Cingular Waiver Petition at 23, 32-33, wherein Cingular discusses the analyses and findings of various industry representatives including VoiceStream, AT&T, Motorola, Ericsson and Nokia.

location solutions to function as designed. Deploying even one of these technologies, let alone several, in Alaska, is prohibitively expensive for ACSW and its small customer base. Bottom line, it does not make sense to invest such large sums of money to create extraordinary solutions when it is not even clear that the solutions will reliably achieve Phase II accuracy levels. ACSW's investigations of various technologies revealed the following:

TDOA (54 sites)

The problems with TDOA are threefold. First, TDOA alone is an option for only 54 of the 98 sites in ACSW's network. These 54 sites are not in the same market, rather the 54 sites are found in the most "urban" markets of the state like Anchorage, Fairbanks and Juneau, proper. Therefore, ACSW is faced with deploying this technology across three distinct areas, with full function only in those areas with the most concentrated cell deployment where signal triangulation is possible.

Second, field trials reveal that TDOA technology is not particularly accurate. AT&T's trials revealed that TruePosition's TDOA technology could only provide accuracy within 318-371 meters for 67% of calls and within 965-1226 meters for 95% of all drive-test calls.[33] Similarly, Grayson's TDOA technology provided substandard accuracy results or within 245-855 meters for 67% of calls and within 474-1624 meters for 95% of all drive-test calls.[34] Thus, data from field tests conducted in much more ideal circumstances than those present in Alaska (*i.e.* in a clustered network) reveals that TDOA alone is not compliant with the Commission's Phase II rules.

[33] *See* AT&T Waiver Petition at 8.
[34] *Id.* at. 9.

Third, this technology is very expensive to deploy in Alaska, particularly in light of the fact that TDOA is only a partial solution for ACSW's network (only 54 sites), as discussed more fully below. Its vendor has advised ACSW that the approximate cost of the basic equipment necessary to run this solution is $25,000-30,000 per cell site, and this is just the beginning.[35] This cost does not include installation expenses (discussed in detail below), or the inherent administrative and computer costs of backhauling location information from the tower to one of ACSW's three switches. All location information from the responding cell site must be backhauled to the switch, where a processor compares the information to determine location. Transporting the information back to the switch, or backhauling, can be a costly endeavor because many cell sites are a great distance from any one of ACSW's three switches.

Based on these additional and unavoidable expenses, the cost to ACSW for TDOA is likely to greatly exceed the estimated raw equipment cost of $25,000-30,000 for each site. And, this cost calculation only applies to 54 sites. For the remaining 44 sites in ACSW's network, ACSW would have to deploy additional location solutions.

TDOA + AOA (24 sites)

Because TDOA alone is not fully compliant with the Commission's Phase II rules and is only functional in little more than one-half of ACSW's network, ACSW explored using TDOA in combination with other technologies. Specifically, ACSW investigated using AOA in conjunction with TDOA. Although this combination provides broader location coverage across ACSW's network, even a combination of the two technologies will not provide Phase II levels of accuracy. As AT&T found in its trials, TDOA and

[35] ACSW received an equipment quote from Grayson Wireless.

AOA together only provide accuracy levels of within 250-400 meters for 67% and 420-750 meters for 95% of all drive-test calls.[36] Moreover, even TDOA and AOA combined would only provide improved accuracy for an additional 24 cell sites and not for all of ACSW's network.

Further, like TDOA, AOA requires new equipment. Generally, AOA requires an array of antennae deployed on a single tower to ensure proper signal direction can be determined. Identifying and securing tower space for this equipment is essential. But, in some instances, due to existing tower over capacity, new towers would have to be constructed. The construction of even one new tower is a significant undertaking. Generally, a single tower can cost in excess of $100,000.

With installation costs factored in, the cost of a new tower can exceed $150,000. This is because installation costs in Alaska can be extraordinarily high and are often unpredictable.[37] Extreme weather conditions in many areas of the State mean that network construction may only be completed within a small window of time. For example, on the North Slope, construction can only occur 2 or 3 months of the year. In Southcentral Alaska, the construction season is slightly longer (generally May to September) though appreciably shorter than is typical in the lower 48 states. Deployment must be scheduled during limited construction periods along with all of ACSW's other construction and maintenance priorities. Therefore, rapid deployment of any technology is hindered by factors outside of ACSW's control.

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[36] AT&T Waiver at 9.

[37] These costs apply to any construction endeavor in Alaska, not just towers.

Further, there are a number of complex engineering issues to consider. Certain precautions and special steps often need to be taken in areas that experience extreme temperature fluctuations or varying levels of rain or snowfall.[38] For example, equipment refinements or the addition of special casings often need to be added to "weatherize" equipment to ensure signal strength, connector quality, and service reliability. Similarly, the changing weight loads that equipment and towers can withstand factor into nearly every modification to towers in Alaska, more so than in other climates. Ice and wind conditions can dramatically affect the stability of a tower. For example, in areas of heavy icing, the build up of ice on equipment in the winter must be addressed because ice changes the weight as well as the surface area of equipment, which alters its relationship to the tower (*e.g.*, weight as well as wind resistance). Therefore, evaluating and remedying these engineering considerations becomes critical in Alaska.

Lastly, due to the remoteness of numerous towers (one-fourth of ACSW's sites are not located on a road), ACSW must use other transportation means to access these sites. In most cases, ACSW must hire a helicopter to access these towers, which is an expense in excess of $1,200/per hour for flight time and two technicians. Barrow, for example, as well as other sites are three or more hours away by helicopter. All of these

[38] Extreme seasonal temperature differences of –78 degrees in the winter to 98 degrees in the summer have been recorded for Northern areas such as Fairbanks, North Pole and Nenana. The climate of Barrow is arctic, where the daily minimum temperature is below freezing 324 days of the year. In Southcentral Alaska, the temperatures range from –10 degrees in the winter to 70 degrees in the summer for areas such as Anchorage, Homer, Whittier and Clam Gulch. In Glenallen, temperature ranges from as low as –74 to as high as 96 have been recorded. Southeast Alaska is noted for its heavy precipitation. In areas such as Juneau, Sitka, Ketchikan, Craig and Thorne Bay, precipitation ranges from 92 to 162 inches, including snowfall amounts of as much as 101 inches annually. Alaska Department of Community and Economic Development.

unique and unusual circumstances greatly increase the expense of deploying already expensive location technologies.

TDOA + AOA + Sensor (20 sites)

To address a location solution for the remaining 20 cell sites in its network, ACSW explored deploying TDOA and AOA with a stand alone, intermediate Sensor. A Sensor is necessary to assist in transporting a signal from the transmitting cell site to the nearest switch. While this approach would provide location coverage to ACSW's entire network, its accuracy would always be limited by the inherent inaccuracy of TDOA and AOA. In addition, accuracy is compromised by an inability to maintain the integrity of Sensor equipment in remote areas.

As with TDOA and AOA, there are significant equipment costs with Sensors. More importantly, however, Sensors will likely require their own towers. Again, ACSW would have to construct a subnetwork of towers around each remote base station. Each tower would hold the Sensor and microwave equipment capable of transmitting the time difference of arrival information back to the switch.

In addition, the maintenance costs of Sensors, in particular, are likely to be unsustainable. Each Sensor will need an independent power source to function properly. There are no electric utility or other power sources in the remote areas where Sensors are necessary. Accordingly, each Sensor would need to be deployed with two generators. The existence of generators creates significant operational problems, which include the difficulty of ensuring a constant supply of fuel, and the inability to provide year round monitoring and maintenance of the Sensor. Further, at each site, ACSW would have to

install batteries, a solar panel array, and potentially a wind turbine, all surrounded by an electric fence to keep bears and moose from damaging the equipment.

These issues substantially magnify the cost of this solution, particularly since stand-alone remote site may serve only 50-100 people. Further, they fatally compromise the functioning and reliability of the equipment. All told, ACSW will not be able to ensure the accuracy of the location solution, because the accuracy quality is only as good as the equipment needed to sustain it.

MNLS[39]

Another alternative that ACSW explored is MNLS. While MNLS is the only network-based solution that could be deployed throughout ACSW's network on its own, MNLS is not a viable option either. MNLS will not function properly or provide Phase II accuracy levels across ACSW's network.

Only in the 54 cell sites, in which three signal measurements can be obtained, will MNLS provide Phase II location information. That location information, however, will not be in line with the Commission's accuracy mandate. As AT&T's trials revealed, MNLS only provides location accuracy levels of within 250 meters 67% of the time and within 750 meters 95% of the time and only in *urban* settings.[40] The comparatively highly urban networks tested do not have parallel configurations to ACSW's largely more

[39] Here, MNLS refers to a Mobile Assisted Network Locations System using a Mobile Assisted Handoff Technique.

[40] *See* AT&T Petition for Waiver, filed April 4,2001 at 13; Cingular Petition for Limited Waiver, filed July 6, 2001 at 21. AT&T's testing was conducted in a highly urban settings like Stockholm, Sweden, Kirkland and Redmond, Washington, at least when compared to the urban areas in Alaska.

rural network configuration. Therefore, for the 54 cell sites noted above, the accuracy levels achieved in AT&T's trials will likely be difficult to replicate.

Moreover, with MNLS, close to one-half of ACSW's network will not realize Phase II location information. For 44 cell sites, MNLS will only give Phase I location accuracy, *i.e.* the phone number of the mobile unit and from which site the call originates.[41] For these cell sites, MNLS cannot provide any estimate of how far the mobile unit is from the tower or its specific direction.[42] Thus, MNLS is of very limited use for nearly half of ACSW's network. As with other solutions, to provide Phase II service to its full network, ACSW would have to supplement this technology.

Further, like the other network-based technologies analyzed, the costs of MNLS are prohibitive. Although there are no external equipment upgrades needed for MNLS (*i.e.* no antennae or tower modifications are needed), the software for MNLS is very expensive. ACSW has received a quote from its vendor for MNLS in the range of $2.5 million. As with the cost of TDOA, AOA and Sensors, the cost of MNLS represents a large portion of ACSW's network-wide annual capital budget.

The foregoing analyses demonstrate that, in order to provide location coverage across its network (although still not compliant), ACSW would have to deploy multiple, different location technologies at the same time. ACSW cannot segment the deployment of these technologies by market. For example, ACSW could not elect TDOA for Southcentral and AOA for the Northern market. Rather, elements of each of these technologies would be needed in each market. Because of construction and/or operation

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[41] *See* 47 C.F.R. § 20.18(d)(1).

[42] In the few instances where multidirectional antennas are deployed, MNLS would transmit sector information to the PSAP.

limitations, ACSW could not deploy any of these solutions within the Commission's time frames. Thus, the deployment costs and logistical/administrative considerations of these technologies are highly complex. In addition, none of the network-based location solutions discussed above is a cost-effective solution for ACSW or its small subscriber base, technically feasible, or proven reliable in real-world deployment. [REDACTED].

V. ACSW'S INVESTIGATION [REDACTED] DEMONSTRATED THAT DEPLOYING [REDACTED] IN ITS [REDACTED] NETWORK IS THE BEST OPTION FOR ITS ALASKA NETWORK

[REDACTED]. ACS owns three PCS licenses, and has plans to deploy [REDACTED] by April 2002, in accordance with its five-year license built out requirements.[43] ACSW has determined that [REDACTED] a viable location technology option for this network. Tests of [REDACTED] reveal that [REDACTED] will meet the Commission's Phase II accuracy standards.[44] Therefore, ACSW seeks to deploy [REDACTED] from the outset.

[REDACTED].[45]

[REDACTED].[46]

Since ACSW intends to transition its TDMA customers to the more advanced PCS network, it makes more sense to focus deployment efforts on this newer, more advanced system.[47] This is true from both an economic perspective, which impacts ACSW *and* its customer base, as well as from a wide range of technical considerations.

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[43] *See* 47 CFR § 24.229.
[44] *See* [REDACTED].
[45] [REDACTED].
[46] [REDACTED].
[47] As noted *supra*, to the extent necessary, ACSW may maintain a portion of its TDMA and AMPS network in order to meet the needs of its most rural and analog users.

Consequently, ACSW proposes to deploy [REDACTED] in its planned [REDACTED] network only. [REDACTED] solution, deployed over its new [REDACTED] network, will provide Alaskans the best overall location solution – it will allow ACSW to offer Alaskans Phase II accuracy in its network, albeit over a slightly longer time from than the Commission's rules contemplate.[48]

VI. ACSW'S BLUEPRINT FOR DEPLOYMENT ACHIEVES PHASE II LOCATION ACCURACY AS CLOSELY AS POSSIBLE TO THE COMMISSION'S RULES

ACSW proposes the following compliance plan for Phase II location accuracy standards:

- Provide TDMA and AMPS customers Phase I location services within 6 months of a PSAP request;
- As of April 28, 2002, [REDACTED];[49]
- By April 1, 2003 [REDACTED];
- By December 31, 2003, [REDACTED];
- By April 1, 2004 [REDACTED];
- By December 31, 2005, [REDACTED]; and
- By December 31, 2007, [REDACTED].[50]

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[48] Like Sprint, ACSW does not seek relief from the Commission's accuracy requirements. Rather, ACSW seeks to delay the deployment schedule somewhat. On October 12, 2001, the Commission granted Sprint's request for a delayed deployment schedule. *In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, Request for Waiver by Sprint Spectrum L.P. d/b/a Sprint PCS*, CC Docket No. 94-102, *Order*, FCC 01-297 (rel. October 12, 2001).

[49] [REDACTED].

[50] [REDACTED].

This plan is specific and focused and sets forth a detailed path to compliance as closely as possible with the Commission's rules. In addition, it has clear advantages for Alaskan consumers. [REDACTED].

Accuracy

ACSW's plan will comply with the Commission's accuracy standards in its [REDACTED] network and as many customers as possible will be transitioned to this network to achieve the widest compliance network-wide. [REDACTED], ACSW will be able to comply with the Commission's Phase II rules. [REDACTED].[51] [52] [53] [54]

Reliability

[REDACTED] offers a much more reliable solution than the other location solutions investigated by ACSW. As noted above, [REDACTED]. Moreover, because [REDACTED].[55]

In addition, [REDACTED].[56]

Cost

Cost is a more major consideration for smaller carriers with smaller customer bases, than it is for the larger, nationwide carriers. Since larger carriers have higher revenues and greater financial resources, they are more able to handle the costs of expensive network or service modifications. In granting Sprint a waiver of its Phase II rules, the Commission expressly noted that Sprint had invested thousands of hours and

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[51] [REDACTED].
[52] [REDACTED].
[53] [REDACTED].
[54] [REDACTED].
[55] [REDACTED].
[56] [REDACTED].

tens of millions of dollars over the past year toward developing and installing a compliant Phase II technology.[57] ACSW does not have similar resources. For smaller carriers like ACSW, every capital outlay requires a high degree of strategic planning in order to minimize the impact of the outlay on the financial ability of the company and on the affordability of services for its subscribers. In the ultimate cost of a technology to subscribers, even a few dollars can make a difference to countless consumers.

While still expensive, [REDACTED] is the most affordable technology for Alaskan consumers. [REDACTED]. Many Alaskans, particularly those living in smaller and native communities, have relatively low incomes and some still rely on subsistence activities. As a result, the amount of discretionary income available for wireless services is more limited. [REDACTED].

[REDACTED].

ACSW proposes a longer [REDACTED] schedule in order to attempt to minimize the cost of [REDACTED] to its consumers. By extending the migration date of [REDACTED] until 2007, the Commission would allow ACSW to phase-in the [REDACTED]. [REDACTED].

[REDACTED]. For many Alaskans, including Native Americans, who may rely on wireless service for basic phone service, it is in the public interest to select the most cost efficient location solution and deployment schedule of the solutions available. ACSW's plan imposes reasonable cost controls while still ensuring Alaska consumers realize the benefit of location services.

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[57] Sprint Waiver.

Advantages to Consumers

In addition to accuracy and cost concerns, service considerations demonstrate that ACSW's implementation plan is in the public interest. At the point of initial deployment, ACSW's schedule provides that [REDACTED]. The [REDACTED] network upgrade will also bring Alaskan consumers real advantages in the form of the increased availability of advanced wireless services. [REDACTED].

[REDACTED].[58]

[REDACTED].

Not only will ACSW's upgrade to a [REDACTED] network allow [REDACTED] but also it will bring other advanced wireless services. These services include [REDACTED]. As a result, a [REDACTED] network, on which [REDACTED] will be deployed, is in the interest of Alaskan consumers because it will facilitate the more rapid availability of improved and advanced services.

VII. ALASKA'S LARGEST PSAPS ARE ENGAGED IN ACSW'S PLAN

ACSW has conferred with the largest PSAPs in the State of Alaska, including Anchorage (the APCO Project 38 Model City), Juneau, Fairbanks, Kenai, and Sitka. Together, ACSW and these PSAPs discussed the various location technologies options for Alaska and ACSW's network. ACSW fully advised each of these PSAPs of its planned build-out of and transition to a [REDACTED] network and the difficulties associated with simultaneously deploying an accurate location solution in this system as well as in its TDMA system. ACSW discussed its specific [REDACTED] deployment schedule with each of the PSAPs.

[58] [REDACTED].

Each PSAP has provided a letter reflecting their position on ACSW's plan.[59] Their respective positions are as follows:

[REDACTED]

Thus, each of these PSAPs is aware of ACSW's plans and is supportive of ACSW's efforts.

VIII. ACSW'S SPECIFIC REQUEST FOR RELIEF

Based on the foregoing, ACSW presents special circumstances justifying a waiver. There is good cause shown to grant ACSW a waiver of the Commission's Phase II rules so that ACSW can deploy [REDACTED] in its planned [REDACTED] network and use reasonable efforts to transition as many TDMA/AMPS customers as possible to that network. ACSW can deploy [REDACTED] as quickly as and more fully than any other location solution in light of its [REDACTED] network build-out efforts scheduled for April 2002.[60]

This is a reasonable blueprint for action considering ASCW's unique circumstance. Deploying a network-based solution in ACSW's TDMA network is unreliable and technically infeasible because of its atypical network configuration and the unusual circumstances of Alaska's environment.[61] The only reasonable alternative for ACSW, which serves the public interest, is to deploy [REDACTED] over its new [REDACTED] network and use reasonable efforts to transition other users to that platform.[62] Accordingly, ACSW respectfully requests a limited waiver of the

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[59] *See* Exhibit D, [REDACTED].
[60] *Fourth Memorandum Opinion and Order* at ¶ 40.
[61] 47 CFR § 1.925(b)(3)(ii).
[62] 47 CFR § 1.925(b)(3)(ii).

Commission's Phase II rules for its TDMA/AMPS network and proposes the following compliance plan:

1. Provide TDMA and AMPS customers Phase I location services within 6 months of a PSAP request;
2. As of April 28, 2002, [REDACTED];[63]
3. By April 1, 2003 [REDACTED];
4. By December 31, 2003, [REDACTED];
5. By April 1, 2004, [REDACTED];
6. By December 31, 2005 [REDACTED]; and
7. By December 31, 2007, [REDACTED].

The foregoing waiver will ensure that ACSW customers receive the benefit of Phase II E911 location accuracy over a time frame that permits the most appropriate deployment of that service over its Alaska network. ACSW's compliance plan conforms as closely as possible to the Commission's rules. For these reasons ASCW respectfully requests that the Commission grant it a limited waiver of its Phase II rules.

Respectfully submitted on this 30th day of November, 2001.

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[63] [REDACTED].

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