Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
King County: Phase I E911 Implementation	)	
Issues	)	DA 00-1975
	)	
Enhanced 911 Emergency Calling Systems	)	CC Docket No. 94-102
	)	

SPRINT PCS COMMENTS

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September 18, 2000

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Summary of Comments

The issue in this case is *not* about cost recovery, as King County suggests. Over the past five years, King County has recovered millions of dollars from wireless and their customers, fees it has used to support its E911 operations. The issue in this case is rather the point of demarcation separating the wireless carrier's responsibilities and the responsibilities of the Public Safety Answering Point ("PSAP").

King County wants the demarcation point to be located at the E911 selective router, so that a wireless carrier would be responsible for those parts of the E911 network between the router and the wireless carrier network. This position, however, is inconsistent with prevailing E911 arrangements, state law, and the Commission's prior E911 orders. This authority makes clear that the demarcation point for E911 service is at the wireless carrier switch and that the PSAP is therefore responsible for the E911 network — a network designed for and used exclusively by PSAPs.

King County's position is also discriminatory. King County agrees that for E911 calls originated on the network of an incumbent local exchange carrier ("ILEC"), the point of demarcation is appropriately located at the ILEC's end offices. If the switch serving E911 callers is the proper demarcation point for landline E911 calls, then the switch serving E911 callers is the proper demarcation point for mobile E911 calls. Carriers cannot compete meaningfully in the market if one class of carriers (mobile) incurs regulatory costs not incurred by other carriers (fixed). Thus, if a PSAP pays 100% of the E911 network costs for LEC E911 calls, it must pay 100% of the E911 network costs for wireless E911 calls.

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SPRINT PCS COMMENTS

Sprint Spectrum L.P., d/b/a/ Sprint PCS ("Sprint PCS"), below responds to the Commission's request for comments addressing a matter raised by the King County, Washington E911 Program Office ("King County").[1]

The issue in this proceeding is *not* about cost recovery, as King County suggests.[2] Over the past five years King County has recovered millions of dollars from wireless carriers and their customers to support its E911 services.[3] Rather, as the Commission cor-

[1] *See Public Notice*, "Wireless Telecommunications Bureau Seeks Comment on Phase I E911 Implementation Issues," CC Docket No. 94-102, DA 00-1875 (Aug. 16, 2000). *See also* Letter from Marlys Davis, E-911 Program Manager, King County E-911 Program Office, to Thomas J. Sugrue, Chief, Wireless Bureau (May 25, 2000)("King County Request").

[2] King County Request at 1 ("[W]ireless carriers have responded to [King County's] Phase I service orders by offering to implement service only if the counties provides [*sic*] cost recovery for certain components of the Phase I service.").

[3] King County has recovered from wireless carriers $1,011,903 in 1996, $1,228,631 in 1997 and presumably higher annual sums in the last three years (because of higher wireless subscribership). *See* Washington State Department of Revenue, *Enhanced 911 Funding Study for Wireless Telecommunications in the State of Washington*, Chapter 6, Table 6B (Dec. 31, 1998). Sprint PCS does not have access to more recent data. If the Commission deems more recent information pertinent, King County could provide the E911 sums it has received from the CMRS industry since 1997 and these amounts could be placed in the record.

rectly recognized in its *Public Notice*, the issue is the point of demarcation separating the responsibilities of carriers and PSAPs.

King County wants the demarcation point to be located at the E911 selective router, so that a wireless carrier is responsible for that portion of the E911 network connecting its network with the selective router. This position, however, is inconsistent with prevailing E911 arrangements, state law, and the Commission's prior E911 orders. This authority makes clear that the demarcation point for E911 service is at the wireless carrier switch and that the PSAP is therefore responsible for the E911 network — a network designed for and used exclusively by PSAPs.

King County's position would also lead to discriminatory results. King County agrees that for E911 calls originated an ILEC's network, the point of demarcation is appropriately located at the ILEC's end offices. If the switch serving E911 callers is the proper demarcation point for landline E911 calls, the switch serving E911 callers is the proper demarcation point for mobile E911 calls. Carriers cannot compete meaningfully in the market if one class of carriers (mobile) incur regulatory costs not incurred by other carriers (fixed). Thus, if a PSAP pays 100% of the E911 network costs for LEC E911 calls, it must pay 100% of the E911 network costs for wireless E911 calls.

I. BACKGROUND FACTS

Sprint PCS supports King County's plans to convert from basic 911 service to Phase I enhanced 911 service for wireless customers. Phase I E911 service differs from basic 911 service in that a wireless carrier must modify its network to provide to the PSAP two sets of data with the 911 call: (1) the telephone number of the 911 caller, and

(2) the identity of the base station serving the wireless caller.[4] Each of these data elements requires 10 digits, for a total of a 20-digit data stream.

One way to deploy Phase E911 service is known as Call Associated Signaling ("CAS"). As illustrated in Diagram 1, with CAS the PSAP receives the 20 digit Phase I data elements. CAS often requires the PSAP to upgrade its customer premise equipment ("CPE") in order to utilize the 20 digits of information (because landline E911 calls have historically required only an eight-digit data stream). In addition, if the PSAP chooses to have the ILEC deliver to it all of its E911 calls, the ILEC's network and connecting facilities must also be capable of transmitting all 20 digits (that is, the ILEC cannot use antiquated CAMA trunks).

Some PSAPs choose not to upgrade their CPE, or in the case of King County, have used the services of the ILEC that had not upgraded its network to accommodate the 20 digits needed for wireless Phase I E911 service. In this situation, the PSAP must use what is known as the Non-Call Associated Signaling method ("NCAS"). NCAS basically converts the 20 digits of wireless data into eight digits, a format that is compatible with older ILEC CAMA trunks and older PSAP CPE. PSAPs choosing this NCAS method have two options. First, they can use the services of vendors such as SCC Communications and XYPoint Corporation that use a Service Control Point to convert the 20 digits into eight digits. *See* Diagram 2. Alternatively, PSAPs can choose to use the services of the ILEC, which uses a Wireless Integration Device ("WID") or other protocol converter to convert the 20 digits into eight digits. *See* Diagram 3. As discussed be-

[4] *See* 47 C.F.R. § 20.18(d).

low, the ILEC serving King County, Qwest, offers such a service, known as CELL-TRACE, to PSAPs in the State of Washington.

There are three main components to the provision of wireless Phase I E911 service:

1. Carrier Network. A carrier must modify its own network in order to deliver with 911 calls certain data elements such as calling number (ANI) and customer location (whether cell site or more precise longitude/latitude data);

2. PSAP CPE. A PSAP must obtain CPE to respond to E911 calls and to receive and utilize the data elements that carriers transmit; and

3. The E911 Network. The E911 network, as the Commission notes, includes "all the facilities and equipment beyond the wireless carrier's switch necessary to transmit wireless 911 calls to PSAPs."[5] The principal function of the E911 network is to transport the E911 call and associated data elements to the PSAP from the carrier switch serving the E911 caller — whether a landline central office or a mobile switching center ("MSC"). In addition, the PSAP may decide to perform functions such as storage of caller location in the E911 network (*e.g.*, ALI databases) rather than in its CPE (*e.g.*, its own computers).

It is important to remember that the E911 network is built specifically for, and used exclusively by, PSAPs.

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[5] *Public Notice* at n.3.

Because the existing E911 network in King County is not capable of transporting twenty digits, King County has chosen to use the NCAS method for wireless Phase I E911 service. However, it does not want to pay the necessary costs to compensate for the network shortcomings. Rather, it wants wireless carriers to fund a portion of the E911 network, including funding the costs of performing the CAS-to-NCAS conversion. Sprint PCS demonstrates below that the King County's position is contrary to all precedent. In addition, adoption of King County's position would enable King County to discriminate among carriers based solely on the technology they use in providing their services.

II. PRECEDENT ESTABLISHES THE DEMARCATION POINT AT THE WIRELESS CARRIER SWITCH, NOT AT THE SELECTIVE ROUTER

King County wants the Commission to rule that the demarcation point for Phase I E911 service is at the ILEC E911 selective router.[6] This position is contrary to all precedent, including the Commission's prior orders, prevailing E911 arrangements, and state law. As Sprint PCS demonstrates below, all available precedent establishes that the point of demarcation for E911 service is at the wireless carrier's switch — the mobile switching center ("MSC").

A. The Commission Has Already Ruled that PSAPs Have the Obligation to Upgrade Their E911 Network

King County has installed a E911 network capable of receiving and processing landline E911 calls. It now understandably wants to use this same network to support wireless E911 calls. However, in contending that the demarcation point should be lo-

[6] *See* King County Comments at 1 (Sept. 13, 2000)("It is King County's viewpoint that the E911 selective router is the demarcation point between carrier and PSAP responsibilities.").

cated at the selective router, King County is taking the position that wireless carriers are responsible for upgrading the existing E911 network to accommodate wireless E911 calls. This position, however, is inconsistent with the Commission's orders, which squarely place this network upgrade obligation on the PSAP.

FCC Rule 20.18(j) makes clear that a wireless carrier is responsible for providing Phase I E911 service only if the PSAP "is capable of receiving and utilizing the data elements associated with the service:[7] The Commission has further stated that the PSAPs will often be required to incur costs (either to upgrade their E911 network or to obtain additional services from third parties) in order to receive and utilize the Phase 1 data elements:

> Without adequate funding, PSAPs may not be able to finance expenditures required to upgrade their hardware or software capabilities to receive and use Phase I and Phase II information, as well as to finance recurring costs that may be associated with *additional network services*. . . . [T]he Commission [has] recognized that implementation will require [PSAP] investment in *facility* and equipment upgrades.[8]

The Commission has thus recognized that there are additional E911 network costs associated with wireless E911 and that these E911 network costs, which are separate from the costs wireless carriers incur in upgrading their own network, are the PSAP's responsibility.

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[7] 47 C.F.R. § 20.18(j).

[8] *Second E911 Reconsideration Order,* 14 FCC Rcd 20850,20878 ¶ 66 (Dec. 8, 1999)(emphasis added).

King County claims that its existing network is capable of receiving and utilizing the data elements associated with Phase I E911 service.[9] Sprint PCS must respectfully disagree. King County's existing network is not capable of receiving the twenty digit data stream that Phase I requires unless those digits are converted to eight digits. As discussed below, the incumbent LEC has a product capable of such a twenty-to-eight digits conversion (and it can use the services of other firms as well), but King County does not want to purchase these services. King County has incorrectly portrayed the NCAS solution using the ILEC protocol converter (the "special equipment") as a CAS method. It is precisely because the network is limited that requires the use of the protocol converter.

The Commission has determined that disputes between CMRS carriers and PSAPs on the choice of transmission means and related technologies should be resolved through negotiations between the parties.[10] A PSAP must be responsible for the upgrades to its E911 network or there is no effective choice because the PSAP could dictate that a wireless carrier employ an NCAS solution rather than the PSAP upgrade its existing network. Sprint PCS has not attempted to force any PSAP to choose either a CAS or NCAS solution; however, if PSAP prefers an NCAS solution, it is the PSAP's obligations to pay for the additional services necessary to compensate for the deficiencies in its existing E911 network.

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[9] *See* King County Request at 1 ("The PSAPs in King County . . . are capable of receiving the Phase I information over the *existing* E911 network, and displaying the information on the *existing* E911 equipment.")(emphasis added).

[10] *See Second E911 Reconsideration Order* at ¶ 7. As discussed below, in the State of Washington, ILECs have the right to make the technology choice and PSAPs are obligated to obtain CPE that is consistent with the ILEC's decision. Competitive parity dictates that wireless carriers should have the same right.

It is important to note that wireless consumers pay (and have paid for five years) a 911 surcharge in the State of Washington. Every month, Sprint PCS collects $0.25 from its Washington customers and remits this surcharge to PSAPs such as King County. In 1996 and 1997 alone, King County collected over $2.2 million from the wireless E911 surcharge.[11] Despite the collection of this surcharge, King County does not pay any of the costs Sprint PCS and other wireless carriers incur in upgrading their networks to support and provide Phase I E911 service.[12]

Sprint PCS is paying its internal E911 implementation costs each month. King County, however, is unwilling to pay its costs to either upgrade its network to receive the data elements associated with wireless E911 or to make the necessary arrangements to provide the additional services necessary to compensate for the limitation of its existing network.

B. Prevailing E911 Arrangements Confirm That the Demarcation Point Is At the Wireless Switch

PSAPs in other jurisdictions have acknowledged that the demarcation point is at the wireless carrier switch. For example, the contract prepared by the Iowa Emergency

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[11] Washington State Dept. of Revenue, Enhanced 911 Funding Study for Wireless Telecommunications in Washington State, Appendix H-1.

[12] To meet its obligations, the wireless carrier must be capable of generating and transmitting from its switch the data elements associated with the service (20 digits of information) to PSAPs that are capable of receiving and utilizing the E911 information. This obligation requires significant costs on the part of the wireless carrier to prepare the required information and to upgrade its own network to transmit the information. The wireless carrier must develop and implement facilities and software changes to allow its switch to translate a 911 call into the required 20 digits of information. It must assign and administer P-ANIs to correspond to cell site locations and populate the ALI database used by the PSAP with the P-ANI and location information. It must perform mapping to determine the appropriate PSAP to receive the call. It must continually update its information every time it deploys a new cell site. It must employ administrative personnel to perform these duties. All of these functions are necessary for a wireless carrier to meet its obligations to provide Phase I information.

Management Division specifies that PSAPs have the obligation to fund the trunks connecting to the mobile switching center and any database service components used in their E911 network:

> Wireless Carriers have the option to obtain DS1 Transport, CellLink (CellTrace) and SCP Services (CellTrace Plus) at no cost under the terms of this agreement. All associated costs for these services will be paid for by the State of Iowa Emergency Management Division.[13]

Similar contracts are in place in other jurisdictions.

C. King County's Position Is Inconsistent With State Law

The State of Washington provides a good example of how state law has established the responsibility in the provision of E911 services. Washington Administrative Code ("WAC") § 118-65-030(1) defines the E911 network similar to the way in which the Commission's definition.

> "9-1-1 voice network" means all switches and circuits which provide the connection between the caller's central office and the public safety answering point.[14]

Similarly, WAC § 118-65-050 defines an E911 network to include ANI provisioning; selective routing (hardware, software, database); 9-1-1 voice network; switch upgrades; and ALI data links.[15]

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[13] Proposed contract for the State of Iowa Emergency Management Division.

[14] *Compare Public Notice* at n.3 ("[W]e consider the E911 network to include all facilities and equipment beyond the wireless carrier's switch necessary to transmit wireless 911 calls to PSAPs.").

[15] WAC § 118-65-050(1). Other components that the regulations specify as part of a PSAP's responsibility include ALI databases, CPE, operational expenses and "additional equipment." *Id.* at § 118-65-050(2)-(5).

This straightforward rule — PSAP is responsible for designing and funding its own E911 network — has also been applied by the Washington Utilities and Transportation Commission. According to tariffs filed by Qwest and other ILECs that the Washington Commission has approved, if a PSAP decides to use carrier facilities or equipment in its E911 network, the PSAP is responsible for compensating the carrier. For example, Qwest's Washington tariff provides that the PSAP "will be required to purchase exchange lines from the Originating End Office to the PSAP and when necessary, applicable mileage rates from the Originating End Office to the Serving End Office, to allow the direct routing of end office calls over those lines."[16] While PSAPs are free to deploy their own E911 selective routers and location database functions, Qwest charges extra if PSAPs choose to use its routers and databases.[17] Moreover, Qwest's tariffs make clear that it is the PSAP's "responsibility to ensure that the CPE is compatible with the service furnished by the Company."[18]

In fact, the Washington Commission has squarely addressed the precise issue that King County now raises with this Commission — namely, which party, PSAP or wireless carrier, is responsible for making the necessary arrangements to convert the twenty digits of Phase I location information generated by a wireless carrier. In 1997 U S WEST proposed a new service for PSAPs, called "CELLTRACE." U S WEST described its proposed service as follows:

> CELLTRACE is a service which provides the E911 customer the capability of receiving the ANI from a wireless handset for delivery to a PSAP.

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[16] U S WEST Communications, WN-31 Exchange and Network Services Tariff, Section 9, Original Sheet 20, § 9.2.1.A.3 (effective Aug. 11, 1994).

[17] *See, e.g., id.* at Section 9, Original Sheet 45, § 9.2.1B.4.

[18] *Id.* at Section 9, Original Sheet 37, § 9.2.1.B.3(q)(3).

> A call to 911 from a wireless handset is passed from the Wireless Switching Center (WSC) to the Company's selective routing switch on dedicated facilities. Upon completing the call to the PSAP, the cell site location and number of the originating call are displayed on the PSAP's ALI display device.[19]

In approving this tariff, the Washington Commission necessarily determined that PSAPs — and not wireless carriers — should pay the costs of the entire E911 network when used in connection with E911 calls made by mobile customers.[20]

King County's position represents poor public policy. PSAPs are demanding increased capabilities, especially from wireless carriers. A PSAP can purchase CPE and network upgrades to utilize these capabilities. However, according to King County, PSAPs can defer modernizing their networks and CPE by requiring the wireless carrier to perform any conversion functions necessary to use its existing 911 network. In effect, PSAPs want to impose two sets of costs on wireless carriers: (1) the costs of modernizing their own networks to provide additional E911 capabilities, and (2) the costs of converting the additional data elements that become available by the carrier's upgrade into a format that the PSAP's network and CPE can accommodate.

The irrationality of King County's position is demonstrated by the facts in this case. King County has decided, as is its right, to rely extensively on the E911 network that the ILEC has constructed. This Qwest network is not capable of receiving and utilizing the data provided by the wireless carriers: the routers had limited capabilities and

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[19] U S WEST Communications, WN-31 Exchange and Network Services Tariff, Section 9, Original Sheet 53.1, § 9.2.1.C.3 (effective April 11, 1997).

[20] Sprint PCS is not suggesting that PSAPs like King County should be required to use Qwest's CELLTRACE service. Qwest's CELLTRACE service is an optional feature; PSAPs should have the flexibility to use E911 network components provided by other carriers or vendors, or which PSAPs provision directly.

the trunks connecting the routers with the PSAPs were CAMA trunks, meaning they were capable of transmitting only eight digits of data. To overcome these network deficiencies, King County expected wireless carriers to pay for the costs its contractor, Qwest, incurred in converting the wireless data into eight digits (even though Qwest's approved tariffs placed this cost burden on the PSAP).

As part of a recent Washington Commission settlement involving Qwest's acquisition of U S WEST, Qwest has agreed to spend $5.3 million in upgrading the E911 network, including $1.7 million for upgrading PSAP CPE.[21] Among other things, Qwest will be installing state-of-the-art selective routers and will be adding SS7 signaling to the trunks connecting the routers with the PSAPs. In short, these improvements should enable Qwest to transport all twenty E911 data digits that CMRS providers need to pass to PSAPs.[22]

PSAPs want to control the design of their E911 networks. This is understandable; each PSAP wants a network that meets its unique needs. But if PSAPs want control, they must also assume responsibility for upgrading the E911 network so that it is capable of utilizing wireless E911 information. Washington law is clear on this point: it is the PSAP and not carriers, that is responsible for funding the E911 network.

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[21] *See* WUTC News, "Consumers to Receive $26 million in Telecommunications Improvements as a Result of Settlement Among WUTC, Qwest, and Consumer Advocates," <www.wutc.wa.gov.>

[22] The Washington Commission staff encourages the PSAPs to spend wisely, and not spend on "redundant facilities" rather than modifying their CPE "to accommodate changes being implemented in the public switched network," including "more advanced signaling protocols." *See* WTUC Staff Report, *Petition for the Continuance of the State E911 Excise Tax for the Year 2000,"* Docket UT-991449 (Oct. 27, 1999).

II. KING COUNTY'S PROPOSAL IS UNLAWFULLY DISCRIMINATORY

King County wants the right to treat wireless carriers differently than landline carriers. As noted, for landline E911 calls, the demarcation point is located at the ILEC switch serving the E911 caller and the PSAP is responsible for the entire E911 network from the end office switch to its CPE. As King County acknowledges:

> In Washington State, the PSAPs pay for the selective routing, network, and data base components of the E911 service from the LEC end offices to the PSAPs.[23]

With respect to E911 calls made by wireless customers, however, King County wants to pay the costs for only a portion of its E911 network— the E911 selective router and the trunks connecting the router to PSAP CPE.[24] King County contends that it is not responsible for funding other portions of the E911 network, including the trunks connecting the MSCs to the selective routers; the "special equipment" used to convert a wireless provider's twenty digit stream of information into eight digits (the CAMA conversion); any ALI database used to store base station (or cell site) location information; and the links connecting the router and databases with each other and the PSAP's CPE.[25] King County takes this position even though its pays LECs when they perform these same functions on behalf of King County.

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[23] King County Comments at 3. *See also* King County Request at 1 (E911 network has "traditionally . . . been considered to be elements of the E911 service that is ordered by PSAPs from telecommunications companies.").

[24] *See* King County *Ex Parte* (Aug. 15, 2000), Diagram 1, labeled, "Call Associated Signaling." This diagram actually shows a hybrid of the NCAS method, whereby the CMRS provider uses CAS signaling, but the PSAP uses NCAS signaling with the ILEC converting the CAS signals into NCAS signals.

[25] *See id.*

The only justification King County offers for this proposed discrimination is that ILEC services are regulated and wireless services are not regulated:

> Technically, the implementation of wireline and wireless E911 service is similar . . . However, the funding mechanism used to support wireline and wireless E911 service is not comparable. . . . [W]ireless carriers are unregulated, competitive carriers. The ILECs are regulated carriers who have tariffed rates for E911 service.[26]

Whether the prices a carrier charges are regulated or not has no bearing on this issue before the Commission: the appropriate demarcation point of each party's obligations. King County is correct that if it wants Sprint PCS to provide portions of the E911 network, the prices Sprint PCS charges for providing these additional capabilities will not be regulated. But King County has other options for its E911 network. It can use the services of such vendors as SCC Communications or XYPoint Corporation. Or, if paying regulated prices is important, King County can use the regulated services offered by Qwest (*e.g.*, CELLTRACE).

King County's position unfairly discriminates against wireless carriers. King County proposes that wireless carriers pay for certain functions in the E911 network (*e.g.*, MSC-to-router trunks, protocol conversion, location storage) when it pays ILECs to perform these same functions. Last year Congress enacted the Wireless Communications and Public Safety Act of 1999 in large part to remove discrimination between landline and wireless carriers in the provision of their 911 and other services. For example, Section 4 provides that a "wireless carrier . . . shall have immunity . . . that is not less than the scope and extent of immunity or other protection from liability that any local ex-

[26] King County Comments at 2-3.

change company . . . .have under Federal and State law."[27] As stated in the Senate Report accompanying this legislation:

> The Committee's intent is to establish liability parity between wireline and wireless carriers. To ensure the existence of a truly competitive market, the Committee believes the same liability should apply to both wireline and wireless carriers. . . . [S]tates are still free to establish and determine liability. They must simply do so on a technology-neutral basis.[28]

This statute makes clear that for purposes of E911 services, Congress intended that all carriers be treated equally, regardless of whether their services are regulated or not.

Conclusion

The appropriate demarcation point in the provision of wireless Phase I services is at the wireless carrier's switch. Beyond the wireless carrier's switch it is the obligation of the PSAP to ensure that the E911 network is capable of receiving and utilizing the elements associated with wireless Phase I service. This result is dictated by prior Commission orders, prevailing 911 arrangements, and state law. Moreover, this is the only demarcation point that is not discriminatory.

For all the foregoing reasons, Sprint PCS respectfully requests that the Commission reaffirm that a PSAP remains responsible for all components of the E911 network — whether the network is used to transport/process fixed, landline calls or mobile, wireless calls.

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[27] 47 U.S.C. § 615(a).

Respectfully submitted

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[28] S. Rep. No. 106-138, 106th Cong., 1st Sess., at 6-7 (Aug. 4, 1999).

CERTIFICATE OF SERVICE

I, Anthony Traini, hereby certify on that on this 19th day of September 2000, I served a copy of the foregoing Sprint PCS Comments by U.S. first-class mail, delivery as indicated with an *, to the following persons:

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DIAGRAM SECTION

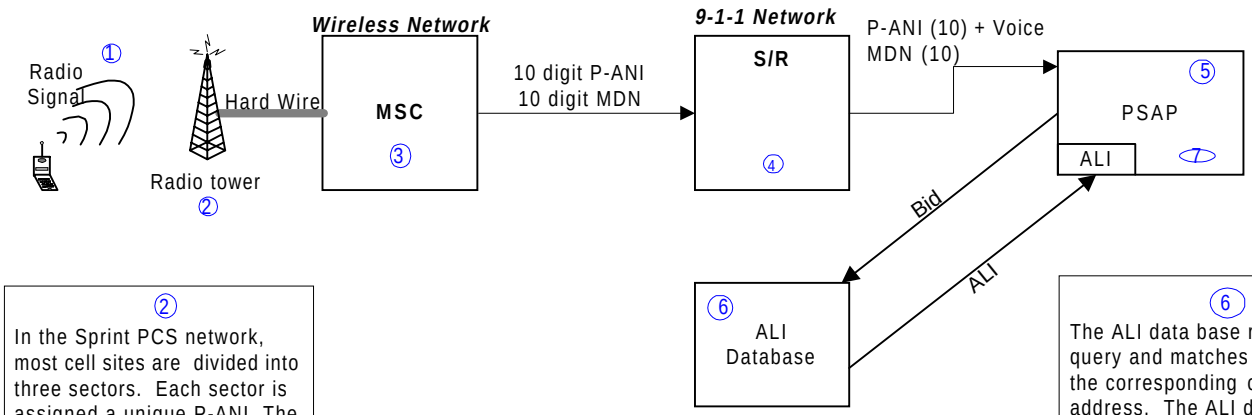
CAS Solution - SS7 or Feature Group D

① The wireless caller places a 9-1-1 call. The call is transmitted via radio signal to a radio tower, referred to as a cell site. The cell site, operated by the Wireless Service Provider (WSP), covers a geographic area called a cell. Once the call is received, it is passed to the Mobile Switching Center or MSC.

③ The MSC is the part of the wireless network, which links the wireless network to the wireline network. The MSC recognizes the call as a 9-1-1 call and retrieves the P-ANI assigned to the originating cell l site.

The MSC transmits to the Selective Router (S/R), the 10 digit P-ANI, and the 10 digit MDN along with the voice call. The 20 digits of information are transmitted using either the SS7 network or Feature Group D signalling. Normal wireline CAMA trunking is incapable of handling more than eight digits.

⑤ The PSAP receives the voice call, the MDN and the P-ANI. Using the P-ANI, the PSAP sends a query to the ALI database.



② In the Sprint PCS network, most cell sites are divided into three sectors. Each sector is assigned a unique P-ANI. The P-ANI is loaded into the ALI database along wth the corresponding address of the cell site. The WSP provides the operator of the ALI database with the P-ANI and the corresponding cell site location.

④ The S/R is part of the 9-1-1 network. The S/R routes the call to the PSAP using a database that links the P-ANI to a specific PSAP. Along with the call, the S/R forwards the P-ANI and the MDN to the PSAP.

⑥ The ALI data base receives the query and matches the PANI to the corresponding cell site address. The ALI database responds to the PSAP with the cell site address

⑦ The PASP receives the cell site address, and the address and the MDN are displayed on the PSAP's equipment.

Diagram # 1

NCAS Solution - SS7 / SCP

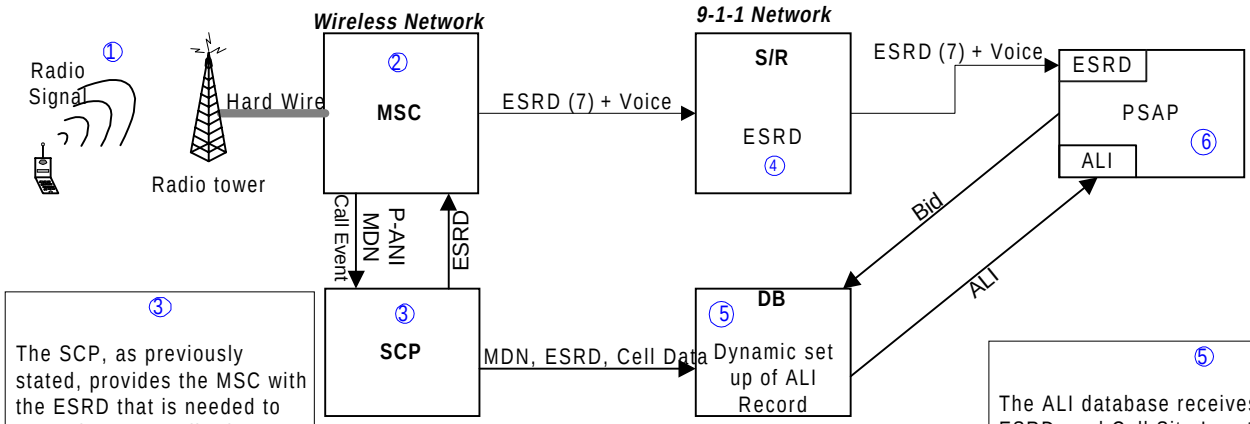
① The wirelessr phone user places a 9-1-1 call. The call is transmitted via radio signal to a radio tower, referred to as a cell site. The cell site, operated by the Wireless Service Provider (WSP), covers a geographic area called a cell. Once the call is received, it is passed to the Mobile Switching Center or MSC.

② The MSC is the part of the wireless network, which links the wireless network to the wireline network. The information received by the MSC from the cell site is the cell site number, and the Mobile Directory Number or MDN.

The MSC processes the call by querying the Signal Control Point (SCP) through the Signaling System 7 (SS7) network. Within the SCP resides a database that contains a number of Emergency Service Routing Digits (ESRD) used by the MSC to route 9-1-1 calls. These numbers are similar to the ANI numbers associated with Wireline calls except that they are used exclusively for routing wireless 9-1-1 calls.

The MSC provides the SCP with the P-ANI and the MDN, and the SCP in return provides the corresponding ESRD to route the call. The MSC then passes the 7-digit ESRD along with the voice data (the call) to the Selective Router (S/R) that resides in the 9-1-1 Wireline network.

6 When the 9-1-1 call is received, the PSAP computer queries the ALI database using the ESRD number received with the call. The ALI database retrieves the ALI record associated with the ESRD number and sends the ALI record back to the PSAP.



Sample ALI

ESRD
PSAP
Carrier
MD
N (10)
Cell Site Data
⑦

③ The SCP, as previously stated, provides the MSC with the ESRD that is needed to route the 9-1-1 call. The SCP uses the P-ANI to retrieve the cellsite location from the data stored in the SCP database. The SCP also tags the MDN and the site location with the ESRD it assigned, and passes it to the Automatic Location Information (ALI) database through the SS7 network, where it is held for processing by the PSAP.

④ The database that is used by the Selective Router (S/R) to route 9-1-1 calls contains both ESRD information and the corresponding PSAP information. When the S/R receives the call from the MSC, it compares the ESRD it received to its database and determines which PSAP should receive the call. The S/R then routes the call, which includes both the voice data and the 7-digit ESRD.

⑤ The ALI database receives the MDN, ESRD, and Cell Site Location from the SCP. An ALI record is then updated to include the Cell Site location and the MDN. The ALI database contains certain informational elements that pertain to each ALI record that are static, including the wireless carrier name. The ALI record is retained in the database using the ESRD number as the file name.

⑦ The ALI record typically contains the information shown in the drawing. The 10 digit MDN is the call back number of the cellular phone. The MDN and the Cell Site location are updated dynamically as part of the ALI record when the 9-1-1 call is made.

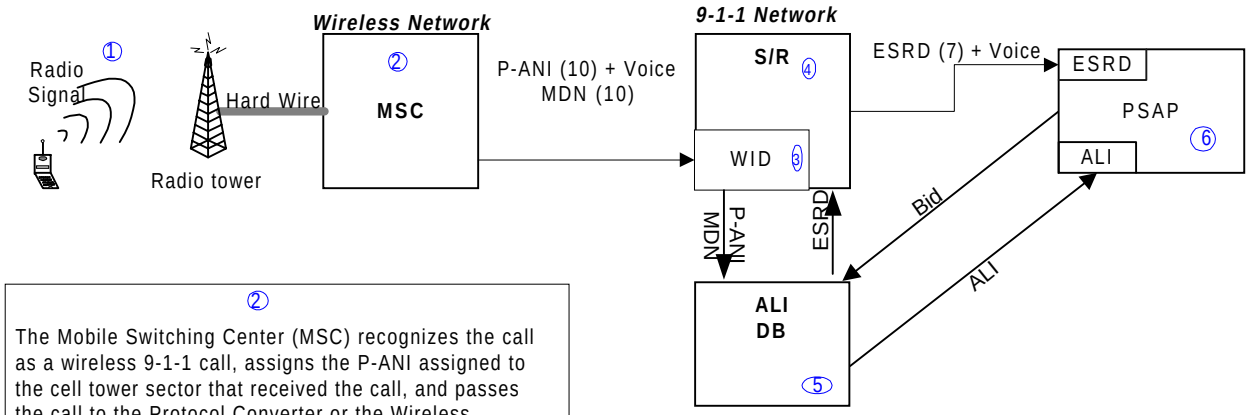
Diagram # 2

NCAS Solution - Protocol Converter or Wireless Integration Device

① The wireless user places a 9-1-1 call. The call is transmitted via radio signal to a radio tower, referred to as a cell site. The cell site, operated by the Wireless Service Provider (WSP), covers a geographic area called a cell. Once the call is received, it is passed to the Mobile Switching Center or MSC.

③ The WID routs the P-Ani and MDN to ALI database without altering content, i.e. they are both still 10 digits. The ALI database has been previously loaded with the P-ANI and the corresponding cell site locations. The WID also converts to the P-ANI from digital to Multi-Frequency, that is to say it converts the 10 digit Signaling System 7 (SS-7) P-ANI to a CAMA 7 digit ESRD that is passed along to the Selective Router. The conversion is done by means of a P-ANI database that is integral to the WID.

④ The Selective Router (S/R) receives the ESRD from the WID. The database that is used by the S/R to route 9-1-1 call contains both ESRD information and the corresponding PSAP information. When the S/R receives the call from the WID, it determines which PSAP should receive the call based on the ESRD. The ERSD and the voice call are then routed to the correct PSAP.



② The Mobile Switching Center (MSC) recognizes the call as a wireless 9-1-1 call, assigns the P-ANI assigned to the cell tower sector that received the call, and passes the call to the Protocol Converter or the Wireless Integration Device (WID) located at the Selective Router (S/R). The information that is passed to the WID is the 10 digit Mobile Directory Number (MDN), the 10 digit P-ANI assigned to the cell site sector that received the wireless call, and the voice call. The MSC database contains one P-ANI for each cell site sector it controls.

⑤ When the 9-1-1 call is received, the PSAP receives the ESRD. The PSAP computer queries the ALI database using the ESRD received with the call. The ALI database transmits the ALI record to the PSAP, matching the ESRD to the assigned MDN and cell site locations.

Sample ALI

ESRD ESN
PSAP Carrier
MDN (10)
Cell Site Data

⑥ In this scenario, the only data that is dynamically updated is the 10 digit MDN. The remaining information is static data that resides in the MSC, the Selective Router and ALI databases.

Diagram # 3