

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

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In the Matter of)
)
Revision of the Commission's rules) CC Docket No. 94-102
to ensure compatibility with) RM - 8143
enhanced 911 emergency calling systems)

To: The Commission

**COMMENTS OF THE
COUNTY OF LOS ANGELES**

Respectfully submitted,

COUNTY OF LOS ANGELES
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INTRODUCTION

The County of Los Angeles ("County") hereby submits the following comments in response to the Commission's Notice of Proposed Rulemaking ("NPRM"), FCC 94-102 (released October 19, 1994), in the above-captioned proceeding regarding the Revision of the Commission's rules ensuring the compatibility of wireless and private branch exchange enhanced 9-1-1 emergency calling systems.

Los Angeles County has well over eleven million citizens spread over an area of more than 4,000 square miles. The reliable, accurate and rapid response of emergency services to the County's citizens centers around a robust 9-1-1 emergency response network.

The County's 9-1-1 Public Safety Answering Point ("PSAP") configuration includes 45 independent cities and 18 Sheriff's primary PSAP's, along with 29 Fire Department's secondary PSAP's.

The County of Los Angeles commends the Commission for the issuance of this progressive and extremely well thought out NPRM. The following specific and general comments focus on the NPRM's main areas of concern: compatibility of wireless services with enhanced 9-1-1 (E 9-1-1), and compatibility of PBX equipment with enhanced 9-1-1 systems. The County wholeheartedly supports the joint filing of the Association of Public Safety Communications Officials-International, Inc., the National Emergency Number Association and the National Association of State Nine-One-One Administrators. Their filing covers all the very technical issues with which we are in complete agreement, and thus we will not repeat their specific findings.

COMPATIBILITY OF WIRELESS SERVICES WITH ENHANCED 9-1-1

The County's government agencies have over two thousand cellular telephones. A total of approximately 1.3 million cellular phones are currently activated within the County. The concentration and utilization of cellular telephones by the public in Los Angeles County is one of the highest in the Country. Citizens have begun to rely on their cellular telephones for first rate emergency response when calling 9-1-1. In reality, 9-1-1 wireless response

is not all that it can be. Every California wireless 9-1-1 call is routed to the California Highway Patrol ("CHP"). Approximately 453,000 cellular 9-1-1 telephone calls were received by the CHP in Los Angeles County alone in 1994. A significant number of these callers indicated that they did not know their location! Clearly, location identification is a necessity.

An originating 9-1-1 call should have priority over other non-emergency service calls. This priority must, at minimum, extend to placing the 9-1-1 call at the beginning of a queue for calls waiting to be placed, if no radio or network resources are available. A point of discussion should include the merits of "bumping" a call in progress, similar to the preemption techniques used in emergency public safety trunked radio systems. The County further suggests a second level of priority, which includes specific public safety cellular telephone subscriber units obtaining dial tone in the event of an emergency, such as a Sheriff hostage negotiation or a Fire Battalion Chief call to the owner of commercial fire location with hazardous materials.

Nationwide, all users of current and future wireless technology should have the ability to reach emergency services from any wireless handset in a home service area or roaming area by dialing the three digit number 9-1-1. No additional digit sequence should be required to reach emergency services. Dialing 9-1-1 must be able to override any lockout feature programmed into a subscriber

unit. Every public wireless unit that is service initialized on a wireless network must be allowed to make a 9-1-1 call, without a requirement for user validation. An analogous situation in the wireline industry refers to the fact that, in California, all pay telephones permit the call completion of a 9-1-1 call with no money deposited.

End-to-end grade of service objectives for wireless E 9-1-1 may involve several systems. An overall grade of service objective, from the 9-1-1 caller to the call taker, should be one busy per 100 9-1-1 call attempts. Also, a minimum of two trunks from each point of presence to the 9-1-1 network, for provision of network transport redundancy, is required.

One of the key issues in the quest for wireless enhanced 9-1-1, is the ability to accurately and precisely determine the location of the 9-1-1 calling party. One of the main benefits of this is to provide aid when the caller is unable to give his or her location. Also, this allows the routing of the call to the most likely appropriate PSAP. This reduces the amount of time it will take to get the call to the right PSAP, thus improving emergency response time, which is so important in a large geographical area such as Los Angeles County.

The two Los Angeles facility based cellular carriers claim that location technology is not available at this time. This is

inaccurate as evidenced in the Joint Experts Meeting Report¹ and the C.J. Driscoll & Associates document.² There are location technologies available today that some jurisdictions are using. Further documentation is noted in the attachments.

In Attachment One, a NENA NEWS article describes the use of cell sector Automatic Number Identification (ANI) in Kane County, Illinois.³

In Attachment Two, the APCO BULLETIN contains a report on the lack of satisfactory 9-1-1 service from cellular telephones. ESMR and PCS will exacerbate the problem.⁴

Attachment Three, from RADIO COMMUNICATIONS REPORT, describes wireless location technologies which can help enhance all forms of wireless 9-1-1 access.⁵

¹ Wireless Support of 9-1-1 and Enhanced 9-1-1 Emergency Services, Joint Experts Meeting Report, 94.11.02, 1994, TIA, APCO, NASNA, NENA, PCIA, T1P1.

² Survey of Location Systems to Support Wireless 9-1-1, Edition 2.0, C.J.Driscoll & Associates, 1994.

³ "Enhanced" Cellular 9-1-1 Program in Operation, Nena News, August 1994, page 26.

⁴ Wireless Services' Deployment, Development Cannot Be Left Only to Market Demand, APCO Bulletin, January 1994, pages 14, 15 & 16.

⁵ Locating Wireless 911 Callers Is Goal of Industry Associations, Radio Communications Report, September 1994, Pages 11, 12 & 13.

COMPATIBILITY OF PBX EQUIPMENT WITH 911 SYSTEMS

The County of Los Angeles government has approximately one hundred PBX's with 32,000 lines. An additional 50,000 lines are Centrex type lines. For these comments the County will use the term PBX to include all the above wireline services.

At present, a 9-1-1 caller using a PBX system usually must dial extra digits to connect with the 9-1-1 network. The majority of the public is not familiar with the differences of telephone system operation, especially during an emergency. The Commission should balance the ideal of having all PBX equipment configured to access 9-1-1 simply by dialing the digits "9-1-1" (without any access code), and the economic costs of such an implementation. Therefore, if a telephone instrument can not directly dial 9-1-1, the Commission should order a label to be placed on the telephone detailing exactly how to call 9-1-1.

Automatic Location Information (ALI) database maintenance is a critical issue. The ALI database provides geographic information as to where a particular telephone station is located. Because the actual matching of location to telephone number is typically done outside the telephone switch, the Commission should provide uniform nationwide standards that follow the NENA standard format. Each local government should be permitted to adopt local regulations, as

done with building codes, governing which PBX installations must have fully enhanced 9-1-1 features.

The Commission should require that any new or developing service or technology consider 9-1-1 access as a fundamental part of the service offering. The County believes this should be a requirement for obtaining an FCC license for the service or system.

The County of Los Angeles suggests an implementation timeline of 3 years for all wireless enhancements including three-dimensional information. This timeline should apply to existing systems as well as new systems. The Commission should also require the Local Exchange Carriers (LEC's) and other 9-1-1 service providers to ensure enhanced capability in their networks, within this timeframe.

CONCLUSION

The Information Superhighway is here. We need to construct an emergency lane on the Information Superhighway! The County of Los Angeles supports the Federal Communications Commission's initiative in CC Docket No. 94-102 and urges that the resulting regulations provide part of this superhighway emergency lane.

Respectfully submitted,

COUNTY OF LOS ANGELES



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January 9, 1995



“Enhanced” Cellular 9-1-1 Program in Operation

Robert Langguth, Chief of Communications Services for the Kane County (IL) Sheriff Dept. sent information about an “Enhanced” Cellular 9-1-1 Program in Kane and Kendall Counties.

County officials worked with the area’s two cellular carriers, Cellular One and Ameritech Cellular Services, to establish this cellular 9-1-1 service in the Chicagoland metropolitan area. Cellular customers traveling in Kane and Kendall counties can dial 9-1-1 on their cellular phones to reach emergency assistance directly from the Kane or Kendall county 9-1-1 dispatch centers. The airtime is free for these calls, and roaming charges will not be charged to out of town travelers. Previously, callers dialed *999 to reach help, where calls were routed to the appropriate emergency response agency.

Cellular 9-1-1 also comes with a feature similar to enhanced land-based systems that can identify the address from which a call is made. If the cellular caller is unable to identify his or her location, the service can pinpoint the general area from which the call was made to within a distance of about 8 square miles. This is done by identifying the closest relay tower to the call and the direction from which the call was received.

“Eight square miles may not sound like much help when searching for someone,” Langguth said. “But without knowing even that much, you have the whole county or even the whole metropolitan area to search.”

This program has been fully operational since March 1994. Several other northern Illinois counties and municipalities will be introducing “Enhanced” Cellular 9-1-1 this summer.

Langguth notes an interesting sidelight: the State Department of Transportation will not allow the posting of signs.

If you would like additional information regarding the “Enhanced” Cellular program in Kane County, Langguth can be reached at 708-208-2052. His normal office hours are 0730 to 1530 Monday through Friday.

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APCO BULLETIN

...9-1-1...

Wireless Services' Deployment, Development Can Not Be Left Only to Market Demand

By Jim Beutelspacher • APCO 9-1-1 Committee

THE present and future wireless communications market presents a particular concern for the 9-1-1 community. There is economic-driven pressure to let the market determine the nature and features of wireless communications systems. However, if the deployment and development of wireless communications services is left only to market demand, vital public policy issues could be brushed aside in the rush to gain market share, and a quality of service opportunity could be missed.

The Federal Communications Commission has recognized this issue, responding to APCO Project 31 and other petitioners with a Notice of Proposed Rulemaking to deal with wireless and PBX (private branch exchange) issues

The lack of satisfactory 9-1-1 service from cellular telephones helps illustrate the network concern. It is the first step down the slippery slope of overlapping service areas.

affecting 9-1-1. The Commission's rules will deal with equipment and interface capabilities. There will be a good deal of information regarding the provision of call-back number and location capabilities in this and other publications, and they are important issues. Remember, however, that *if* the technology, politics and finance issues all go our way, en-

couraging wireless and PBX providers to cooperate with public-safety providers, there are still some important local public-policy concerns. Foremost in my mind is the network implication of multiple, overlapping telephone serving areas.

The lack of satisfactory 9-1-1 service from cellular telephones helps illustrate the network concern. It is the first step down the slippery slope of overlapping service areas.

Most wired-world 9-1-1 systems are designed for P.01 grade of service (the caller has one chance out of 100 attempts of getting a busy signal on the first call attempt during a busy hour). When designing 9-1-1 systems, we usually think of that criterion in dollars and



cents terms: paying enough to permit a normal volume of calls to get through. There is also an operational benefit, however, because the design alleviates overloading of the answering point by simultaneous calls from the same vicinity.

A barn fire on the top of a hill in a small community, for example, could trigger hundreds of simultaneous call attempts. Because there are only two dedicated lines from the telephone exchange, **blocking** occurs, allowing persons in other exchanges a reasonable chance to complete *their* 9-1-1 calls. Notice that the blocking occurs before the call gets into the 9-1-1 network.

Adding an ACD (automatic call distributor) at the PSAP (public safety answering point) would not solve the problem because the network would already be overloaded by the time calls got to the PSAP. Operationally, adding a recording would not help either because it is simultaneous attempts which cause the problem. We want multiple, subsequent reports in some cases because subsequent reports may contain *more or updated information*, for example, on an accident.

Various methods of getting cellular 9-1-1 calls into a 9-1-1 network are in use, but we haven't seen any that completely address the problem which is caused when multiple, simultaneous call attempts from the same location defeat the choking effect which is needed to effectively manage them. Remember that a PBX "solution" involving dedicated trunks to a 9-1-1 tandem can further erode choking, too.

Part of the cellular problem we are trying to deal with in Minnesota is caused by the fact that we do not have a blocking network. The State Patrol answers most of the 10,000 monthly cellular 9-1-1 calls in Minnesota. In Minnesota, the Patrol generally has jurisdiction on all federal and state highways, even when they pass through a city, and 80% of all cellular 9-1-1 callers are reporting highway incidents.

Because each mobile telephone switching office (MTSO) translates 9-1-1 to the seven-digit number of the appropriate State Patrol PSAP, a rudimentary form of selective

routing is provided, but blocking, if it occurs, takes place at the answering point. That means multiple, simultaneous calls to report the same stalled car, for example, could prevent other calls from getting through.

Limiting the number of simultaneous 9-1-1 calls from each cell site would be only a partial solution because that particu-

lar cellular provider might have many cell sites covering the same busy freeway area, and there is yet another cellular provider with likewise multiple cell coverage. Obviously, when six different PCN (personal communications network) providers also cover the same area, there would be still more multiple paths for redundant calls, unless multiple, simultaneous calls



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from all providers can be limited by common network blocking.

Providing call-back numbers or location information will help on those calls which can be answered, but will not solve the fundamental network issue.

There are just not enough facilities or trained telecommunicators to answer all of the potential redundant 9-1-1 calls when PCN becomes available and wireless telephones become small enough and cheap enough so that everyone, including school children, will be carrying them. Network-blocking will be needed, and in order to **limit** calls to P.01 grade of service, the PCN and cellular providers will have to send 9-1-1 calls to the PSAP through a common 9-1-1 network or under the control of a network-blocking device.

Today, Minnesota has statewide 9-1-1 service, and more than 75% of our population is served by enhanced 9-1-1 systems. In all of the land-line 9-1-1 systems in Minnesota, calls are managed in a blocked system, and, in the enhanced systems, a 9-1-1 caller's call-back number and location are automatically forwarded to the 9-1-1 call-taker. Cellular telephone networks have yet to deliver that level of service. Wireless systems should be designed and installed so that the same functional benefits are available, and past evidence shows that legislative or regulatory action, rather than market demand, is needed to accomplish that.

The following regulatory language is offered for consideration:

Access to the appropriate Public Safety Answering Point must be through the three-digit number 9-1-1 with no additional digit sequence. All 9-1-1 calls originated on a cellular or Personal Communications Network system must be routed so that access contention caused by multiple, simultaneous calls from callers served by all carriers in a given area will be limited to a manageable number either through use of a private or virtual private network. When 9-1-1 calls are originated in an enhanced 9-1-1 area, a dialable call-back number and the location of caller must be delivered to the appropriate Public Safety Answering Point.

If you have figured out an answer to this issue, or if you would like to comment, please call me at (612) 296-7104. I would love to hear from you.

About the Author

Jim Beutelspacher, a long-time member of the Minnesota Chapter of APCO, is 9-1-1 product manager with the Minnesota Department of Administration. He is treasurer of the Minnesota Chapter and a member of the APCO 9-1-1 Committee. ■

Locating wireless 911 callers is goal of industry associations

By Clement J. Driscoll

According to the Cellular Telecommunications Industry Association, approximately a half million 911 calls are placed over U.S. cellular networks each month. With the cellular subscribers growing at an annual rate of 48 percent, the number of cellular 911 calls is increasing, creating a serious problem for public-safety response organizations.

In most metropolitan areas around the country, Enhanced 911 (E911) systems are in place that automatically provide the Public Safety Answering Point (PSAP) dispatcher with the phone number and location of 911 callers using wireline phones. Billions of dollars have been invested nationwide in E911 systems. These systems make it possible for emergency calls to be immediately routed to the appropriate PSAP and for assistance to be dispatched to the proper location whether or not the caller is able to communicate his location. Automatic Location Information (ALI) also speeds up the interrogation and dispatching process.

Cellular networks today can not support E911, as there is no way to accurately locate the caller. By some estimates, up to 25 percent of cellular 911 callers are unable to identify their location. With the number of U.S. cellular, PCS and enhanced specialized mobile radio subscribers projected to grow to 55 million or 60 million by the year 2000, public-safety organizations are concerned the substantial investment in E911 systems will become obsolete and the level of emergency service will be degraded.

Looking for answers

In response to this growing problem, a number of public-safety organizations, telecommunications standards bodies and trade associations are seeking to find ways to support E911 service over wireless networks.

In late 1992, the National Emergency Number Association Inc. and the Association of Public-Safety Communications Officials International Inc. submitted comments to the Federal Communications Commission on the proposed rulemaking for personal communications services. These comments emphasized the need for PCS to provide Automatic Location Information.

NENA's comments proposed the use of cell or cell segment identification in the near term for approximating the caller's location and a more precise approach in the future.

As a result of NENA and APCO's comments, the FCC, in its September 1993 Second Report and Order amending PCS rules, stated the following: "The industry and standards-setting bodies should direct particular attention to offering an emergency 911 capability that would work with enhanced 911 systems (E911) and, to the extent feasible, permit locating a caller in situations where the caller is unable to state his location. We are particularly concerned that unless an E911 capability is designed into PCS systems, dialing 911 from a PCS telephone will not be equivalent to dialing 911 from a traditional wired telephone."

The FCC further stated, "Accordingly, we contemplate initiating a proceeding in the future to address E911 and related issues with regard to PCS, cellular, and any other relevant mobile services. While we are not in a position at this time formally to require E911 capability for PCS on the basis of the record before us, this is a matter of serious concern and we will closely monitor developments in standards-setting bodies and elsewhere regarding PCS and E911."

In December 1993, a Petition of Reconsideration was submitted to the FCC by the Texas attorney general's office on behalf of the Texas Advisory Commission on Emergency Communications and supported by 911 program authorities in several other states. Among the items in this petition was a request that the FCC

amend its rules on PCS to require transmission of 911 caller location or, alternatively, initiate a proceeding to address the need for all wireless services to provide 911 calling party number and location.

In June 1994, the State of California Telecommunications Division and APCO commissioned C.J. Driscoll & Associates to conduct a study of location systems and technologies that could be used to locate wireless 911 callers.

The purpose of the study was to establish whether it is viable for the

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FCC to require that wireless networks provide 911 caller location. The study was also intended to contribute to the efforts of the standard-setting bodies in establishing real-

istic standards for wireless 911 emergency services.

The study, entitled "Survey of Location Technologies to Support Mobile 911" covers location systems and technologies developed by some 20

companies. These include network-based location systems, which consist of an overlay to an existing wireless network, and systems which are based on external radiolocation systems, such as the Global Positioning System (GPS). The study includes a description of each system along with the status of system development, accuracy estimates, performance in dense urban environments and indoors, and projected deployment cost, where available.

Systems developed by Associated Communications Corp., Engineering Research Associates (E-Systems) and Terrapin Corp. are among those covered in the study. An expanded version of the initial study is available from C.J. Driscoll & Associates, Rancho Palos Verdes, Calif.

Based, in part, on the above location system study, the TR45 Committee of the Telecommunications Industry Association, responsible for establishing U.S. cellular communications standards, concluded it is reasonable to establish a near-term goal of 400-foot accuracy for 911 cellular caller location and a long-term goal of 40-foot accuracy. Altitude information is desirable for indoor calls in order to identify the floor from which the call was placed.

The Personal Communications Industry Association and the National Association of State Nine-One-One Administrators (NASNA), along with NENA and APCO, have issued an Emergency Access Position Paper.

This paper recommends a migration path for 911 caller location, to begin with a requirement that the location of the base station to which the wireless handset was communicating be identified and progress toward the ability to locate an individual wireless handset in a three-dimensional environment, as location technology and the cost of implementing such a technology become attainable.

Continued on next page

The paper suggests the standards organizations determine if a minimum geographic location accuracy of 400 feet can be achieved both technically and economically. A much higher level of location accuracy should be considered in urban environments where it will be necessary to determine the precise location of a caller within a multi-story structure.

A Joint Experts Meeting on Wireless Support of 911 and E911 Emergency Services will be held Oct. 11-14 in Reston, Va. Among the purposes of the meeting are to define PSAP requirements, identify current and developing technologies that can support PSAP service and identify the need for standards.

The FCC plans to issue a proceeding on wireless E911 in the September-October time frame. It is anticipated this will be a Notice of Proposed Rule Making covering cellular, PCS and other relevant mobile services.

The TR45 Joint Experts Meeting report and the PCIA/ NASNA/ NENA/APCO Emergency Access Position Paper have been submitted to the FCC to represent the positions of these organizations for consideration in the forthcoming proceeding. It is anticipated the proceeding will address the issue of wireless 911 caller location along with other wireless 911 issues.

System applications

Deploying location systems to support wireless 911 will not occur immediately as wireless network standards may be impacted and standards for incorporating caller location, number and other information into the PSAP will have to be developed by public-safety organizations such as NENA.

However, if these location systems are deployed over the next few years, they will be applied to a wide range of services, in addition to 911. These services include deterring fraudulent use of wireless phones, stolen vehicle recovery, roadside assistance, routing travelers to their destinations and fleet vehicle location.

The accuracy requirements of these services vary. Accuracy of 400 feet, for example, will not be adequate for real-time routing requirements in which the driver needs to be advised that he is approaching an intersection at which he must turn. However, location systems that can achieve accuracies of 100 feet or better would meet the requirements for most intelligent vehicle highway system (IVHS) related services and other applications which require identifying the location of mobile users.

Therefore, it is anticipated that deploying wireless location systems will not only enhance public-safety, but will generate revenue from a wide range of services, which will help defray the cost of these systems.

Clement Driscoll is principal of C.J. Driscoll & Associates of Rancho Palos Verdes, Calif., which provides consulting on automatic vehicle location (AVL) and mobile communications to corporate and government clients. He has written numerous articles for industry publications.