TCS TeleCommunication Systems

Enabling Convergent Technologies®

Wireless E9-1-1 Standard Operating Procedures for PSAPs

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The xypoint location platform
from **TCS**

Document History

Version	Date	Description
1.0	07/01/1999	Initial Release
2.0	11/27/2000	Updated trouble reporting, expanded change control, updated terminology and organization to correspond with Operations Manual.
3.0	02/07/2001	Updated impairment reporting, change control, and terminology.
4.0	02/19/2001	Updated pager numbers in contact list, updated details in escalation timeline.
5.0	08/17/2001	Incorporated document into new TCS template. Updated phone numbers, company name, and Tier support information. (Originally known as version 4.1)
6.0	03/13/2002	Updated contacts, updated language to include wireless carrier information. (Originally known as version 4.2.)
7.0	08/21/2003	Updated document.
8.0	04/15/2004	Restructured document, removed tier support. Added Post deployment change section. Added class of service table.
9.0	11/9/2004	Revised sections 1, 2, 3, 4, and Appendix C. Added section 2.4.
10.0	12/16/2004	Added in the NOC fax number to every instance that contacting the NOC is mentioned.
10.1	05 April 2005	Revised email addresses throughout; also performed minor edits to the following sections: 2.2.3, 3.1, 3.2, 3.3, D.2, & front cover.
11.0	26 August 2005	Revised wording in section 2.3 and Table B-1.
12.0	26 June 2006	Revised section 2.3.1 with content regarding enhanced MCLU logic

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1. Introduction

TeleCommunications Systems, Inc., represents wireless carriers that use the TCS Enhanced 9-1-1 (E9-1-1) solution. TCS works both with wireless carriers and with qualified public safety answering points (PSAPs) to deploy and maintain E9-1-1 service. A PSAP that does not have E9-1-1 service must contact a wireless carrier to initiate the service.

1.1.   Your Relationship with TCS

TCS works with you and with the wireless carrier during and after deployment to provide continuous E9-1-1 call processing 24 hours a day, seven days a week, 365 days a year.

TCS Deployment Contact

During deployment of Phase I and II E9-1-1 service, your primary contact is a TCS deployment manager.

TCS Post Deployment Contacts

Once service is deployed, your primary contact is the TCS Network Operations Center (NOC).

Additionally, the TCS PSAP Services Group assists you with PSAP-related needs. PSAP Services may contact you regarding:

- Updates in contact information (ours or yours).
- Changes to the wireless carrier's network.
- Other network changes requiring your involvement.

If you have any special requests, the TCS NOC logs your request and connects you with PSAP Services or another appropriate group within TCS.

Note	To insure that TCS can continue to provide uninterrupted E9-1-1 service, it is essential that you maintain communication with TCS. Table 3.2 in section 3.3 details a number of PSAP changes that are especially important for you to communicate with TCS.

1.2.   About this Document

This document explains the standard operating procedures for PSAPs currently served by wireless carriers that use the TCS E9-1-1 solution. The audience for this document includes PSAP managers and dispatchers.

Note	To insure that TCS can continue to provide uninterrupted E9-1-1 service, it is essential that you maintain communication with TCS. Table 3.2 in section 3.3 details a number of PSAP changes that are especially important for you to communicate with TCS.

2. E9-1-1 Call Processing

This section describes the difference between Phase 0, Phase I, and Phase II information, where to find information on the ALI screen, how to determine whether Phase I or Phase II information is available, and how to rebid for Phase II information.

2.1. Phase I and Phase II Location Information

The FCC mandated that E9-1-1 technology be delivered in two phases.

Phase I provides a PSAP with the address of the cell site tower handling the call and the callback number (CBN) of the mobile handset. It does not provide the wireless caller's location.

Phase II provides the caller's location, although the accuracy of that location information varies from call to call. Phase II technology did not replace Phase I, which continues to play a central role in E9-1-1 location tracing.

Table 2.1 summarizes the phases of E9-1-1 service implementation.

Table 2.1: Phases of Enhanced 9-1-1 Services Implementation

Phase	Call Routing	Location Information	Notes
Phase 0	Wireless E9-1-1 calls are routed to a PSAP.	None.	
Phase I	Wireless E9-1-1 calls are routed to the PSAP.	Location information includes the callback number of a wireless E9-1-1 caller and the cell site tower — or cell site sector (CSS) — from which the call is received.	The FCC mandated that Phase I wireless service be implemented by April 1, 1998, or within six months of a valid PSAP request for service, whichever is later.
Phase II	Wireless E9-1-1 calls are routed to the PSAP.	The PSAP receives more precise location information (latitude and longitude) about the caller based upon the technology used. Specific requirements differ for network-based and handset-based solutions.	The FCC requires the carrier to provide E9-1-1 service within six months of a valid PSAP request.

Some PSAPs are equipped to receive Phase I data only. Even if your PSAP receives Phase II data, some E9-1-1 calls arrive with only Phase I data.

The availability of Phase II location data depends on a number of factors, including:

- The capabilities of the wireless carrier's network and the wireless caller's phone (handset-based or network-based).

- The wireless caller's environment.

- The transient conditions in the E9-1-1 network.

To determine whether Phase I or Phase II data is available for a call, see Section 2.2.1, "Class of Service," and Section 2.2.3, "Phase II Location Data."

2.2. ALI Screen Display

The type of information displayed on an ALI screen varies depending on the wireless carrier and also on the screen software used by your PSAP.

For both Phase I and Phase II calls, most ALI screens display the following data:

- Wireless caller's phone number, also known as callback number (CBN).

- Class of service (See Section 2.2.1.)

- Cell site address.

- pANI/ESRK.

- Wireless carrier's name or NENA ID.

2.2.1. Class of Service

The class of service code indicates whether Phase 0, Phase I, or Phase II location information is available for the call. You can also determine from this code whether or not to rebid (also known as requery, retransmit, or reALI). (For information about rebids, see Section 2.2.4.)

Typically, your local exchange carrier (LEC) determines which class of service codes are available and what each code means. For a list of commonly used codes and their meanings, see Appendix B.

2.2.2. Phase I Position Data

Phase I provides a PSAP with the wireless caller's CBN and address of the cell tower handling the call. Depending upon your equipment, you may also receive the latitude and longitude (lat/lon) of the cell tower.

Typical Phase I data is shown in Table 2.2. Your screen might display a different set of data or terms. This depends upon your LEC or your CPE.

Table 2.2: Phase I Screen Data and Definitions

Term	Definition
CBN	The wireless caller's call back number.
CSS	The cell site sector address of the cell tower handling the call.
Latitude	The y coordinate.
Longitude	The x coordinate.

| Note | Phase I cell tower lat/lon is often confused with Phase II wireless caller lat/lon. Check the class of service code to see what phase is displayed on your ALI screen. |

| ⚠ Caution | For Phase I calls, PSAP operators must ask the caller for detailed location information. |

2.2.3. Phase II Location Data

Phase II provides a PSAP with Phase I information and the lat/lon of the wireless caller. If the E9-1-1 system is able to calculate the Phase II data and if your PSAP is equipped to receive Phase II data, the information shown in Table 2.3 can appear on your screen. Your screen might display a different set of data or terms than those shown below. This depends upon your LEC and your CPE.

Table 2.3: Phase II Screen Data and Definitions

Term	Definition
Latitude	The y coordinate.
Longitude	The x coordinate.
Uncertainty	The caller's potential distance from the displayed latitude and longitude, from 1 meter to 1800 km.
Confidence	The degree of certainty that the calling party lies within the confidence area. (The value is expressed as a percentage.)
Altitude	The caller's location measured in a vertical distance above or below the point of origin (WGS-84 ellipsoid surface).

| Note | Phase II wireless caller lat/lon is often confused with Phase I cell tower lat/lon. Check the class of service code to see what phase is displayed on your ALI screen. |

| ⚠ Caution | For Phase II calls, PSAP operators must ask the caller for detailed location information. |

2.2.4. pANIs/ESRKs

The first number that populates your data display is the pANI or pseudo automatic number identification. This is a 10-digit number that appears most commonly in the ANI field. Depending on the LEC in your area, it may also appear in the location field or ALT number field.

TCS refers to the pANI as the emergency services routing key (ESRK). This is the number used by the wireless E9-1-1 network to route the call to the appropriate PSAP. The ESRK is also used to retrieve the location record from the ALI database. A TCS technician may ask you for the ESRK when troubleshooting problems.

The pANI/ESRK is a non-dialable number.

2.3.   Rebids

A rebid (also called a retransmit or a requery) requests updated Phase II position information from the E9-1-1 system. A rebid is possible only while a call is live.

There are two reasons to rebid:

* The class of service indicates Phase II position information may be available. You must rebid to receive the Phase II information.

* The caller is in motion and you want updated Phase II position information as time passes.

Note	Midcall updates are not available are not available for all calls. See Section 2.3.1.

Your class of service code indicates whether a call is Phase II. To rebid for updated Phase II position information, you press a key on your keyboard or click a button on your display. The specific key or button differs from PSAP to PSAP depending upon your equipment.

Before you rebid, wait at least 30 seconds after the initial call. This rebid frequency conforms to the recommended industry standard. Contact your CPE vendor for more information.

Note	Phase II data may not be available upon rebid because the ability to deliver Phase II data depends on the handset. The wireless carrier's technology solution may require handset upgrades to deliver Phase II information.

2.3.1.   Rebids for Midcall Location Update Requests

A midcall location update (MCLU) request, also known as a moving update request, occurs when a PSAP makes repeated updated-position requests for a given call. MCLUs allow a PSAP to get updated positions for an in-progress E9-1-1 call. MCLUs may help the PSAP operator to determine if the E9-1-1 caller has moved substantially during the call. Per recommended standards, the TCS system had relied upon receiving position requests of type = "updated" in order to provide these MCLUs. A PSAP's ability to send "updated" position requests depends on a number of factors including PSAP equipment, ALI capability, and even the trunk configuration between the PSAP and ALI. These last two factors have proven to be a limitation for many PSAPs with PAM and (legacy) NENA ALI databases. The result is that MCLUs are likely unavailable to these PSAPs.

As of June 2006, in the interest of allowing more PSAPs to receive MCLUs, TCS system logic has been enhanced to account for this limitation. The new logic allows for MCLUs to be triggered in two scenarios:

- When TCS receives a valid "updated" position request.

- Or, when TCS receives successive ALI queries (of any type) within a short time frame.

2.4.   Subscriber Information

If you need a caller's billing name and address, it may be possible to retrieve that information by calling the wireless carrier's emergency contact number. Refer to the NENA Company Identifier List at http://www.nena.org for contact information.

Every wireless carrier has a different policy about releasing private subscriber information. Because of privacy issues, and depending upon the level of the emergency, you might be required to provide a subpoena or other official documentation when requesting this information.

The Emergency Services Interconnect Forum (ESIF) at http://www.atis.org/esif/docs.asp provides a standard form for submitting requests for confidential subscriber information.

3. Post Deployment Changes

Wireless carriers, LECs, PSAPs, and TCS often make network changes after deployment. These changes can affect E9-1-1 service. This section describes common network changes, PSAP impacts, and notification procedures prior to changes.

3.1. Wireless Carrier and TCS Network Changes

Table 3.1 details common changes and how these changes affect your PSAP. The PSAP Impact column describes notification procedures and further action that is required from you.

Table 3.1: Postdeployment Changes, PSAP Impacts, and TCS Communication

Entity	Type of Change	PSAP Impact
Wireless Carrier	Adds and/or changes a cell site.	TCS sends you a traffic plan for the new cell site. You review and approve the routing and addressing displayed on the traffic plan with TCS. Depending upon the number of cell site changes, TCS or the wireless carrier may coordinate drive testing with you.
	Decommissions cell sites.	No action is necessary from you.
	Conducts general maintenance.	Your wireless carrier may or may not contact you. TCS is not involved.
TCS	Conducts general maintenance.	No action is necessary from you.

3.2. Wireless Carrier Cell Site Additions and Routing Approval

During Phase I deployment, the TCS deployment manager works with the PSAP to determine address formatting preferences and to obtain cell site routing approval.

After deployment, a wireless carrier may add or change cell sites in their network. If new cell site coverage is within the boundaries TCS has mapped for your PSAP, TCS notifies you by email, mail, or fax, depending upon your preference, and includes a new wireless traffic plan and a map for your review.

We request that you review the new wireless traffic plan and map and respond within three business days to ensure continuity of E9-1-1

service. If you need more time, contact the TCS representative who sent you the wireless traffic plan and let them know the number of additional days you need to review the information. Please acknowledge your approval even if you do not have changes or comments. If you ever need changes to addressing or routing after this initial approval, you can contact the TCS NOC who will help to process your request.

A sample wireless traffic plan is included in Appendix C.

Note	If you have not previously requested additional time for review and TCS does not hear from you within 3 business days, the wireless carrier receives the TCS-recommended cell site routing plan. TCS let's the wireless carrier know at a sector level whether you have approved the routing or not.

3.3.   PSAP-Controlled Network Changes

You are responsible for notifying TCS of the changes listed in Table 3.2. Failure to do so impairs the ability of TCS to provide continuous service.

Please notify the TCS Network Operations Center (NOC) at NOC@telecomsys.com at least two weeks in advance of any changes listed in Table 3.2. The NOC will acknowledge your email. You can also call the NOC directly at 1-800-959-3749. If you need to send a fax to the NOC, the number is 1-206-792-3192.

Note	TCS and the wireless carriers we represent in your area request that you contact TCS for post deployment issues. TCS has wireless carrier contact information for all markets and will involve the wireless carriers if needed to ensure your issues are resolved.

Table 3.2: PSAP Changes That Require Communication with TCS

Type	Description
ALI	Changes to hardware or software. Circuit moves between the PSAP, ALI, or LEC. Changes to the ALI display format. **Note:** For more information about ALI changes, see Section 3.3.3.
CPE	Changes to hardware or software. Changes to your ALI screen display. Planned outages due to upgrades.
LEC	Changes or upgrades to wireless voice trunks (such as new trunk lines into the PSAP). Changes to circuits.
PSAP	Changes to contact information. Changes to 24 X 7 alternative route emergency line. Changes to PSAP jurisdiction. Consolidation or split. **Note:** For continuation of service, notify TCS even if you handle a consolidation or split independently with your LEC.

3.3.1.   ALI Data Changes

If your ALI data — for example, cell site address — is incorrect:

1. Contact the TCS NOC at NOC@telecomsys.com or call
    1-800-959-3749. If you need to send a fax to the NOC, the number is
    1-206-792-3192.

2. Describe the problem and specify the data that you would like to
    have changed.

After receiving your email request, TCS opens a trouble ticket, assigns a
tracking number, and works with you to implement the changes.

3.3.2.   ALI Display Changes

Although your ALI display or address formatting is usually controlled by
your LEC, in some cases TCS can assist you with formatting options.
Contact the TCS NOC at NOC@telecomsys.com or call
1-800-959-3749 for more information. If you need to send a fax to the
NOC, the number is 1-206-792-3192.

3.3.3.   Standalone ALI Changes

If you operate a standalone ALI (SALI) database and you intend to make
formatting changes or install new equipment, you must report all
changes, including formatting, to TCS. Otherwise, data delivery and/or
display problems may occur.

If you intend to make formatting changes, report planned alterations to
the TCS NOC two weeks in advance. Email the TCS NOC at
NOC@telecomsys.com or call 1-800-959-3749. If you need to send a fax
to the NOC, the number is 1-206-792-3192.

If you install new equipment and require changes to circuit configuration,
notify the TCS NOC six weeks in advance. During this time, TCS makes
configuration changes to accept your new equipment. Email the TCS

NOC at NOC@telecomsys.com or call 1-800-959-3749. If you need to send a fax to the NOC, the number is 1-206-792-3192.

The TCS SALI integration engineer will schedule a conference bridge with you, your CPE vendor, and TCS engineers to discuss the ALI modifications and to answer the following questions:

- Does the change involve planned or unplanned maintenance?

- Does the change involve maintenance or upgrades to software or hardware?

- Will data formatting be altered?

- What type of equipment is involved?

- What other third-party vendors, if any, are involved in the planned service?

- Who is the individual performing the maintenance work and what is their contact information?

During the change process, TCS works with you and pertinent third-party vendors as follows:

- The TCS standalone ALI integration engineer assists you during the equipment swap.

- The TCS wireline services engineer ensures your ALI display format is accurate.

- TCS engineers test the ALI links with you, the LEC, and your CPE vendor.

4. Service Impairments

TCS works with you and the wireless carrier to provide continuous E9-1-1 call processing 24 hours a day, seven days a week, 365 days a year. Although TCS monitors E9-1-1 call processing at all times, you are responsible for contacting the TCS NOC to report symptoms of trouble as soon as they become apparent.

4.1.   Overview

An impairment that affects wireless E9-1-1 PSAP service can result from a failure at any of several points. The failure can occur in equipment owned by TCS, by the local exchange carrier (for example, a selective router or ALI), by the wireless carrier (for example, a wireless switch), or by the PSAP (for example, the hardware for a standalone ALI).

During a service impairment, the TCS NOC follows established procedures to resolve the difficulty. The NOC's responsibilities include creating and updating a trouble ticket, managing escalation, and keeping stakeholders informed of progress.

TCS notifies you by email or fax. All TCS-generated communications include the associated TCS trouble ticket number.

4.2.   Types of Impairments

The most common kinds of impairments that PSAPs experience are:

- "No Record Found" is displayed on your screen.

- Calls are misrouted or default routed to the wrong PSAP.

- Phase I information is missing or inaccurate.

- Phase II information is missing or inaccurate.

- ALI display is incorrectly formatted.

- E9-1-1 calls arrive on a non-emergency line.

Although TCS is sometimes able to resolve these impairments internally, the cause may originate from a third-party facility. In such cases, TCS reports the issue to the third party and keeps you advised until resolution.

4.3.   How to Report an Impairment to TCS

If you experience the service impairments in Section 4.2 or if E9-1-1 service is not working properly, call the TCS NOC at 1-800-959-3749 and then press 1, or send an email to NOC@telecomsys.com. If you need to send a fax to the NOC, the number is 1-206-792-3192. Please report all issues as soon as possible (same day). Be prepared to supply as much of the following information as possible:

- Name of your PSAP.
- Street address of your PSAP.
- PSAP phone number.
- PSAP email address.
- Contact person at your PSAP.
- Phone number of the contact person.
- Description of the impairment.
- Date and time of the impaired call.
- Name of the wireless carrier affected.
- Does the impairment apply to all carriers?
- Wireless caller's CBN.
- Mobile identification number (MIN).
- pANI/ESRK numbers.
- Selective router, ALI provider CPE vendor if known.
- Class of service; for example, Phase II-capable.
- Frequency of reoccurrence.
- Is a screen print of the issue available?
- What is the error message, if any?
- Does the lat/lon change when you rebid?

After you supply this basic information, TCS asks you questions specific to the impairment and works with you to resolve the issue.

Appendix A. TCS Contact Information

Recipient	Intent	Contact Information
TCS Network Operations Center (NOC)	Service impairments. PSAP-controlled network changes.	NOC@telecomsys.com and/or 1-800-959-3749. If you need to send a fax to the NOC, the number is 1-206-792-3192.

Appendix B. Class of Service Tables

Table B.1 provides information about the four most common classes of service displayed on the ALI screen. The information displayed may vary depending upon local exchange carrier or PSAP preference.

Table B.1: Classes of Service

Class of Service	Phase Type	Should the dispatcher rebid?
MOBL	Phase I	No.
WRLS	Phase I	Yes, Phase II data may be available.
WPH1	Phase I	Yes, Phase II data may be available.
WPH2	Phase II	Yes, as needed (see Section 2.3.1, Rebids for Midcall Location Update Requests for details and limitations).

Appendix C. Sample Post Deployment Wireless Traffic Plan

Appendix D. PAM 02 Midcall Location Update Configuration

TCS supports midcall location updates using PAM 02 queries. NENA trunk 97 configuration is required at the PSAP CPE and at the ALI database.

D.1.   PSAP CPE Configuration

Configure the CPE to rebid with a trunk 97 identifier in the NENA query.

D.2.   LEC ALI Database Configuration

When reformatting a NENA query to PAM, the LEC needs to configure the ALI to translate a NENA trunk 97 query into a PAM 02 query.

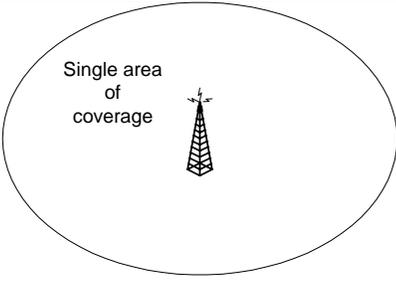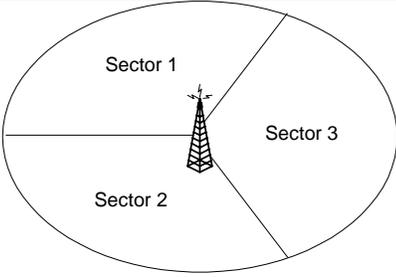# Appendix E. Cellular Communication and the E9-1-1 System

This appendix briefly explains cellular communication in the context of the E9-1-1 system. The following sections describe cells, cell towers, coverage areas, call routing, Phase II technology, and voice and data paths.

E.1.   Cells

A cell is the area covered by a cell tower. The tower receives and sends signals to and from the mobile handsets in its coverage area, linking the handsets to the landline communications network, including the E9-1-1 system. As a mobile caller moves away from the tower, communication between tower and handset grows weaker. At the cell boundary, the call is automatically handed off to the next site.

As shown in Figure E.1, there are two types of cells: omnidirectional and sectored.

Figure E.1: Omnidirectional and Sectored Cells

Single area of coverage	**Omni Cell** • Tower has one antenna. • Antenna covers 360 degrees around the site. • Coverage can extend for miles in all directions. • Typically used in rural areas.
Sector 1 Sector 3 Sector 2	**Sectored Cell** • Tower has multiple antennas. • Coverage area is divided into sectors. Each sector area is covered by one antenna. • Sectors within the cell are numbered consecutively, for example, 1, 2, and 3. • Typically used in and around urban environments.

E.2.   Coverage Areas

Landscape features, antenna power, and other factors influence a cell's coverage area. The wireless carrier can change the coverage area by adjusting the height, power, or orientation of the antenna. Coverage within the area can fluctuate due to weather and other transient conditions.

Figure E.2 shows an omnidirectional cell and a sectored cell, plus the related PSAP territories.

Figure E.2: Coverage Areas

ONMI and Sectored
Cell Sites

Demonstration map
illustrating the difference
between OMNI and Sectored
sites.

Map does not contain real
data.

LEGEND
▲ Cell Sites (Towers)
▢ PSAP Boundaries

Radio Frequency (RF) Best Server:
(site name).(sector#)
● Lovington.0
● Gelding.1
● Gelding.2
● Gelding.3
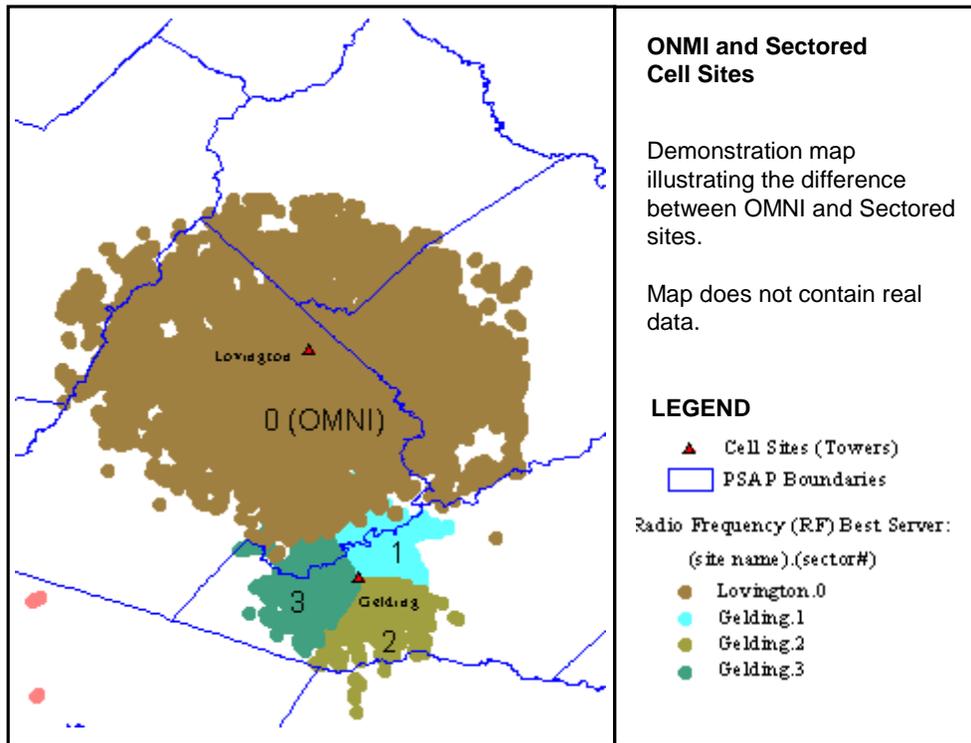
As shown in Figure E.2, there is no correlation between cell coverage areas and PSAP territories. One cell can cover parts of several PSAP territories, and one PSAP can be served by several cells. With Phase I technology, all the E9-1-1 calls handled by an entire cell (for omni cells) or by an entire sector (for sectored cells) are routed to a single PSAP. This PSAP transfers calls to other PSAPs based on the location information provided by callers. Phase I technology is characterized as "routing by cell site."

When a PSAP is deployed — that is, first integrated into the E9-1-1 system — TCS creates a traffic plan to determine which cells or cell site sectors should route Phase I calls to that PSAP. TCS sends the traffic plan to the PSAP for approval.

E.3. Phase II Technologies

There are two Phase II solutions: network based and handset based. Each wireless carrier determines which type it will use.

Network-based solutions depend on equipment at each cell tower. In network-based solutions, most calculations are performed outside the handset by elements of the E9-1-1 system. The system calculates location based on the time differential of signals traveling between the handset and the towers that are within range to detect the handset signals.

Handset-based solutions depend on data coming from the Global Positioning Satellite (GPS) system and received by the handset. The handset communicates the satellite information to elements of the E9-1-1 system, which calculates the handset's location based on which satellites are visible to the handset and how long it takes for signals from each

satellite to reach the handset. In general, handset-based solutions are more accurate than network-based solutions.

The FCC adopted the following accuracy and reliability requirements for Phase II solutions:

- Network-based: 100 meters for 67 percent of calls, 300 meters for 95 percent of calls.

- Handset-based: 50 meters for 67 percent of calls, 150 meters for 95 percent of calls.

E.4.   E9-1-1 Call Flow

When a mobile caller places an E9-1-1 call, two call paths are initiated: the voice path and the data path. The voice path carries vocal communication between the caller and the PSAP. The data path carries a complex series of data exchanges between the mobile handset, the wireless carrier's network, TCS facilities, the ALI, and equipment at the PSAP.

The basic voice path of a wireless E9-1-1 call is shown in Figure E.3 and explained in the text that follows.

Figure E.3: Basic Voice Path of a Wireless Call from Handset to PSAP
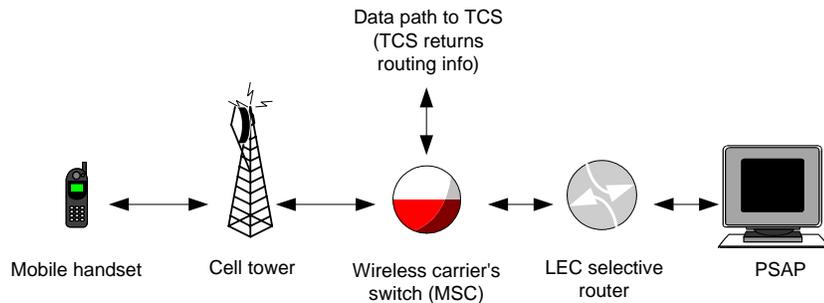
When a wireless caller dials E9-1-1, the following chronology of events occurs:

1. The signal from the caller's mobile handset is picked up by the nearest cell tower belonging to the E9-1-1 wireless carrier.

2. The cell tower sends the signal to a switch owned by the wireless carrier.

3. The switch sends a data request to TCS.

4. The TCS system determines the PSAP to which the call should be routed, and sends this routing information to the switch.

5. The switch sends the voice signal to the selective router that serves the PSAP. This selective router is owned by the LEC.

6. The selective router sends the call to the PSAP.

Along the data path, the TCS system sends the routing instructions for the voice portion of a call. The TCS system also helps calculate the caller's location and prepares that information for display on the PSAP's ALI screen.

The role of the TCS system in calculating location varies depending on type of location technology used by the wireless carrier and whether Phase I or Phase II is involved. In some cases, TCS plays a primary role in determining location. In the other cases, the carrier supplies location information.

Data communications occur behind the scenes. They are invisible to the mobile caller and the PSAP dispatcher. Additional data path details are beyond the scope of this document.