NENA Non-Mobile Wireless Service Interaction Information Document

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NENA-INF-018.1-2017

DSC Approval: 11/15/2016
PRC Approval: 02/01/2017
NENA Executive Board Approval: 02/16/2017
Next Scheduled Review Date: 02/16/2018

Prepared by:
National Emergency Number Association (NENA) Interconnection & Security Committee, NG9-1-1 Architecture Evolution Subcommittee, Non-Mobile Wireless and Broadband Connectivity 9-1-1 Working Group

Published by NENA
Printed in USA

NENA
INFORMATION DOCUMENT
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ACKNOWLEDGEMENTS

The National Emergency Number Association (NENA) National Emergency Number Association (NENA) Interconnection & Security Committee, NG9-1-1 Architecture Evolution Subcommittee, Non-Mobile Wireless and Broadband Connectivity 9-1-1 Working Group developed this document.

NENA recognizes the following industry experts and their employers for their contributions in development of this document.

Executive Board Approval Date 02/16/2017

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Special Acknowledgements:

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1 Executive Overview

The evolving and ongoing transition of wireless connectivity continues to increase the current number of non-mobile wireless type 9-1-1 calling scenarios that may be more commonly presented as 9-1-1 emergency calls to Public Safety Answering Points (PSAPs). How 9-1-1 calls are presented on the Automatic Location Identification (ALI) screen may potentially impact how telecommunicators, Geographical Information Systems (GIS) mapping functions, Computer-Aided Dispatch (CAD) systems, dispatch, and downstream emergency response may be able to successfully interpret and use the information, including the location information, and to determine the appropriate or optimal emergency response given the presented information.

Some aspects of these non-mobile 9-1-1 calling scenarios can be somewhat different from prior traditional Wireless Phase I (WPH1) and Wireless Phase II (WPH2) deployments. Traditional wireless 9-1-1 call WPH1 and WPH2 deployments generally involved wireless 9-1-1 calls scenarios from mobile handsets working off large macrocell coverage areas and scenarios where providing the wireless 9-1-1 caller civic location was either not feasible or was not being provided to the PSAPs. Examples of non-mobile 9-1-1 calling type scenarios include Wireless Home Phone (WHP) adapter devices, consumer femtocells, voice calling from Wi-Fi access point (Wi-Fi calling) and the increased wireless carrier deployment of small cells and Distributed Antenna System (DAS) systems. These non-mobile wireless-type 9-1-1 calling scenarios may present the registered caller civic location instead of latitude and longitude coordinates associated with traditional wireless 9-1-1 call WPH2 deployments, or in the case of small cells or DAS systems may present materially smaller cell coverage areas than the macrocells associated with WPH1 deployments.

This document seeks to provide basic background information on these increasingly more common non-mobile 9-1-1 calling-type scenarios and point out near-term considerations that may appropriately fit for these scenarios. With regard to non-mobile 9-1-1 calling for WHPs, femtocells, and Wi-Fi calling offerings, considerations generally include the following:

- When a non-mobile 9-1-1 calling device or handset is at its registered caller civic location and would provide a caller civic location to the PSAP, the issue of which Class of Service (CoS) to display should be considered, including perhaps whether and how using an existing wireless class of service of WRLS, WPH1, or WPH2 in conjunction with a caller civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems and whether to use a separate CoS.
- When a non-mobile 9-1-1 calling device or handset is nomadic and enables the customer or the wireless carrier to register the "caller civic location," the issue of whether to have a location sanity check mechanism that switches to mobile WPH1 and WPH2 mode if the customer is not at the registered caller civic location should be considered.
- When a non-mobile 9-1-1 calling device or handset is at its registered caller civic location, the issue of what to include in the "Customer Name Field" should be considered, including whether it should be additional identifying information to assist the CoS as used currently sometimes in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING) or whether it should display the customer name associated with that account.

- Where and when technically feasible, when non-mobile 9-1-1 calling device or handset is at its registered caller civic location, if in the geographic area wireline English Language Translations (ELTS) are currently being used for Voice over Internet Protocol (VoIP) i2 VoIP Positioning Center (VPC) 9-1-1 calls instead of ELTS of "Verify, Verify, Verify," the issue of whether to use wireline ELTS should be considered.
- Where and when technically feasible, when non-mobile 9-1-1 calling device or handset is at its registered "caller civic location," the issue of whether to route the wireless 9-1-1 call based on the caller civic location instead of the cell or cell sector information should be considered.
- Issues associated with what would generally be expected to happen during a live 9-1-1 call if, as applicable respectively, the device, mobile handset, or service moves out of range of the registered caller civic location should be considered, including with respect to whether the 9-1-1 call would generally drop and what would generally be expected to happen to the caller civic location information, if anything, being displayed to a PSAP.

With regard to small cell and DAS system deployments, near-term cell site address location considerations generally include:

- Before a wireless carrier considers deploying a small cell for 9-1-1 purposes, the issue of whether and how to populate the NENA Test Validation Worksheet (TVW) information differently than or the same as the deployment of a macrocell should be considered by the wireless carrier.
- Before 9-1-1 Authority or PSAP considers how to respond to the TVW from the wireless carrier, the issue of whether and how to populate the TVW information differently than or the same as the deployment of a macrocell should be considered by the 9-1-1 Authority and/or the PSAP.
- Specific items that could potentially be considered differently between a small cell deployment compared to a macrocell deployment by wireless carriers, 9-1-1 Authorities, and/or PSAPs include: (1) how to populate the "location address information" in the TVW; (2) what to display in the Customer Name Field (such as displaying "SMALL CELL ADDRESS" or "DAS SMALL CELL ADDRESS" in the Customer Name Field); (3) whether to use a new CoS (such as WFXD or some other new CoS beginning with "W") associated with the existing FIXD position source; and (4) regardless of CoS used having the rebid function available should be considered a potentially critical to the PSAP call-takers for small cells.

With regard to ongoing work associated with indoor wireless location accuracy and derived Civic Address Location information within 50 meters,[1] the following near-term issues should be considerations:

- When a wireless mobile handset presents a "Civic Address Location" to a PSAP, the issue of which CoS to display should be considered, including perhaps whether and how using an existing wireless class of service of WRLS, WPH1, or WPH2 in conjunction with a caller

[1] Civic Address information of the caller that is believed to be within 50 meters, but that is not the Registered Caller Civic Location.

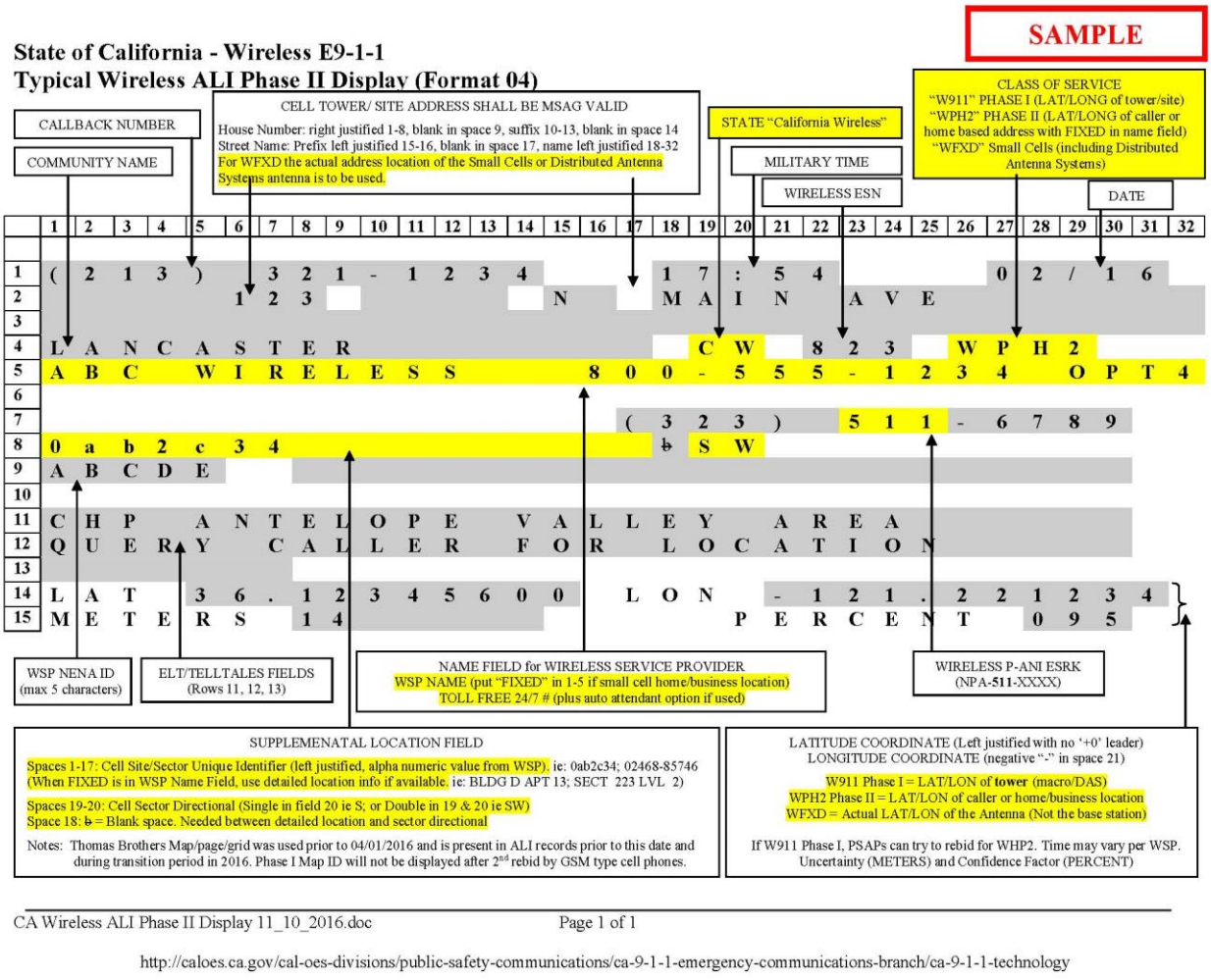
civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems and whether to use a separate CoS.

- When a wireless mobile handset presents a "Civic Address Location," the issue of what to include in the "Customer Name Field" should be considered, including whether it should be additional identifying information to assist the CoS as used currently sometimes in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING), whether it should state "CIVIC DISPATCHABLE" and "CIVIC APPROXIMATE," and/or whether it to display the customer name associated with that account.

2 Introduction

The evolving and ongoing transition of wireless connectivity continues to increase the current number of non-mobile wireless type 9-1-1 calling scenarios that may be more commonly presented as 9-1-1 emergency calls to PSAPs. How 9-1-1 calls are presented on the ALI screen may potentially impact how telecommunicators, PSAP GIS mapping functions, CAD systems, dispatch, and downstream emergency response interpret and use the information, including the location information, and to determine the appropriate or optimal emergency response given the presented information. (For example, CoS may impact whether the GIS mapping or the CAD system would display a Civic Address Location or the latitude/longitude, x/y coordinates as the primary ALI.) This may be especially important to consider given that not all areas have implemented all aspects of what could be presented on the ALI screen – with examples being not having enabled VoIP classes of service, confidence and uncertainty, supplemental field – and given that PSAP GIS mapping and CAD systems may be dependent on or interrelated with specific aspects of the ALI screen presentation. Figures 1 and 2 below, respectively, presents an example of one state's ALI format for Wireless 9-1-1 and VoIP 9-1-1, and Figure 3 below for another different area presents a side-by-side example of how a mobile wireless 9-1-1 call is typically presented compared to how a non-mobile 9-1-1 call from Wi-Fi calling may be presented when the caller is at their primary registered civic location.

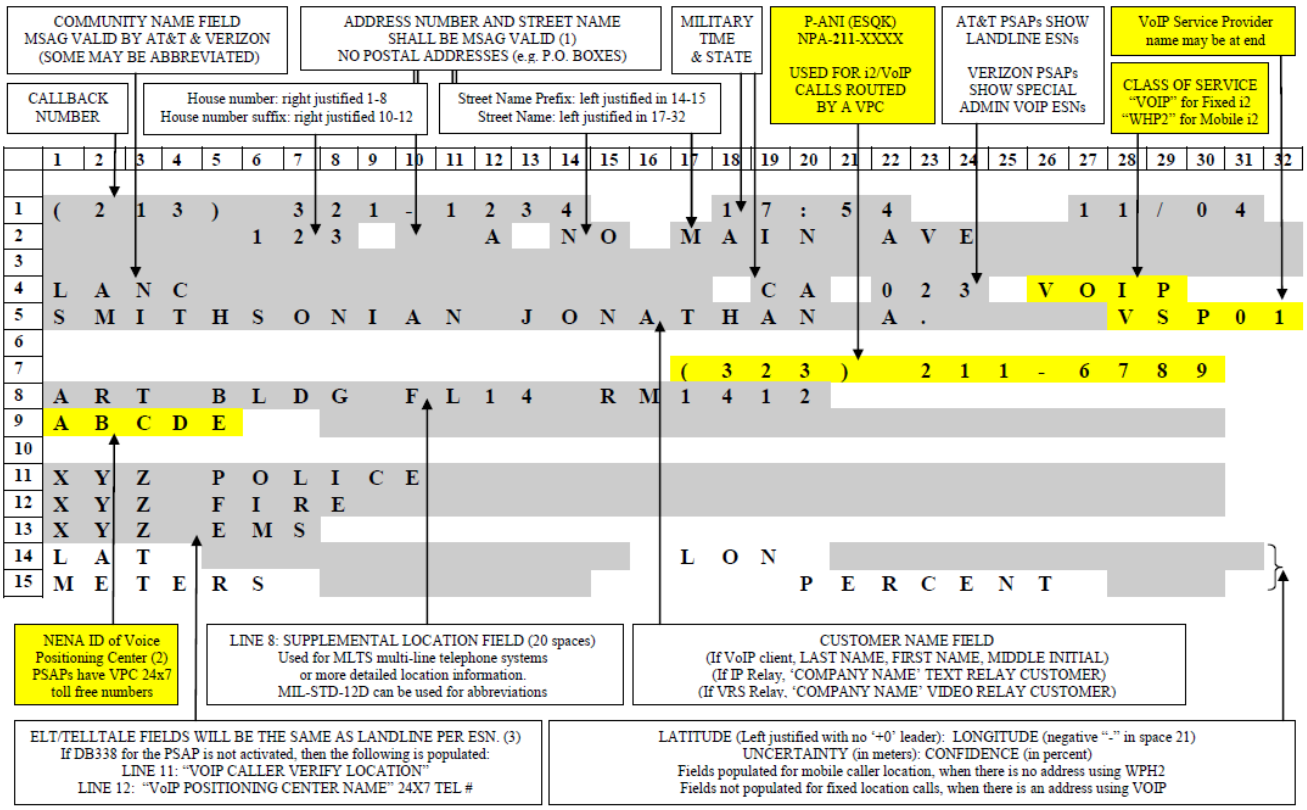
Figure 1[2]



[2] As indicated in Figures 1 and 2, this information is publicly available on the State of California 9-1-1 website.

Figure 2

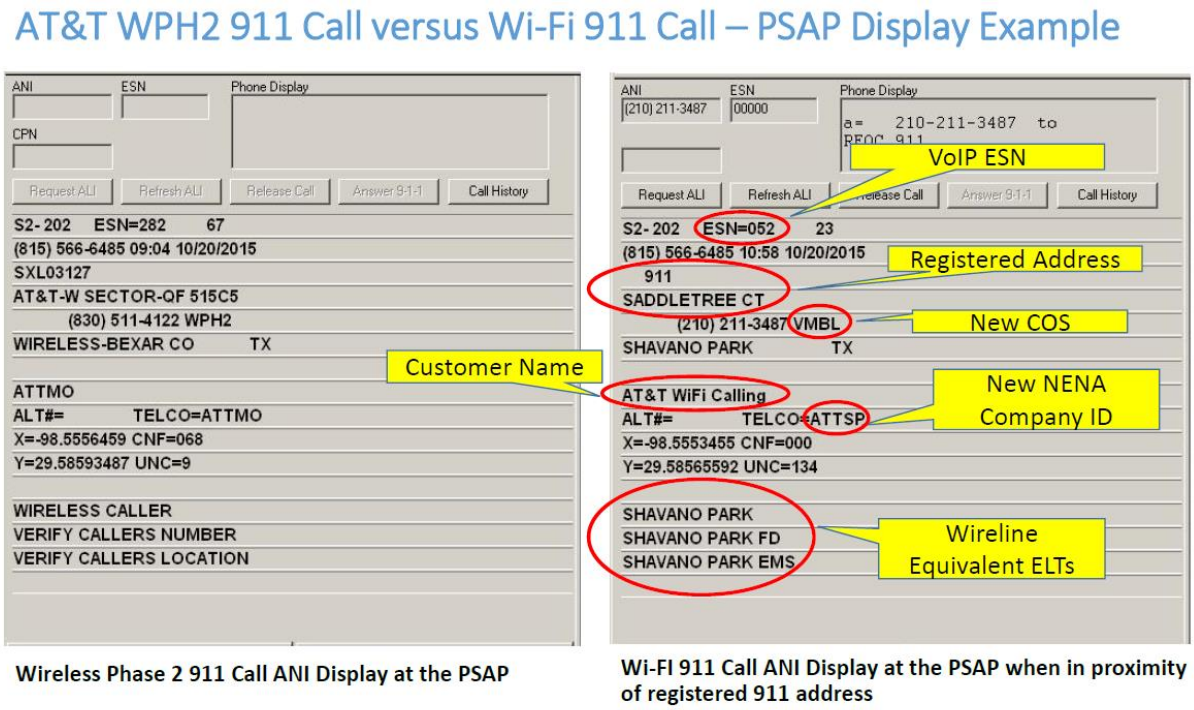
State of California – NENA i2/VoIP E9-1-1 Deployment
Typical i2 VoIP ALI Display (E-PAM from Format 04)



CA VoIP E9-1-1 i2ALI Display 7-21-2014.doc Page 1 of 1 www.caloes.ca.gov/PSC/Pages/Services/911/VoIP.aspx

(1) Non-MSAG Valid addresses go to VPC Call Center for 10-digit routing and correction.
(2) NENA ID field will show VPC responsible for routing (TCS, TRDO/HBF, VIXXI/DASH/BAND, or TMOB)
(3) As of 2nd Q 2007, DB338 upgrade was made available to PSAPs by AT&T and VZN ALI providers to show telltales.

Figure 3[3]



Wireless Phase 2 911 Call ANI Display at the PSAP

Wi-FI 911 Call ANI Display at the PSAP when in proximity of registered 911 address

Some aspects of these non-mobile 9-1-1 calling scenarios can be somewhat different from prior traditional WPH1 and WPH2 deployments. Traditional wireless 9-1-1, called WPH1 and WPH2 deployments, generally involved wireless 9-1-1 call scenarios from mobile handsets working off large macrocell coverage areas where providing the wireless 9-1-1 caller civic location was either not feasible or was not being provided to the PSAPs. However, non-mobile wireless type 9-1-1 calling scenarios may present the registered caller civic location instead of latitude and longitude coordinates associated with traditional wireless 9-1-1 call WPH2 deployments, or in the case of small cells or DAS systems may present materially smaller cell coverage areas than the macrocells associated with WPH1 deployments.

This document seeks to provide basic background information on these increasingly more common non-mobile 9-1-1 calling type scenarios and point out near-term considerations that may appropriately fit for these scenarios. High level examples of the increased non-mobile 9-1-1 calling type scenarios include, but are not limited to:

1. Generally, non-mobile home or business phones being converted from wired to wireless service provider connectivity, such as via the use of various types of static or

[3] This Wi-Fi calling testing screen shot (which happened to be with AT&T Wi-Fi calling) is used for training purposes by the Bexar Metro 9-1-1 Network District, and is public information.

nomadic wireless connectivity home adapter devices and mini-cells to improve wireless accessibility in homes or businesses;
2. Smartphone wireless mobile handsets that may be able to make VoIP type Wi-Fi 9-1-1 calls from registered Wi-Fi access points or, in at least some cases also from other Wi-Fi access points; and
3. Increased additional deployment and use of wireless small cells that have a geographically smaller cell coverage area than would otherwise be the case with traditional macrocells.

Reasons why the basic background information and pointing out near-term deployment considerations are timely and important include, but are not limited to:

1. Some of these non-mobile 9-1-1 calling type scenarios are currently in their initial or early deployment or 9-1-1 deployment rollouts;
2. Some of these non-mobile 9-1-1 calling type scenarios are being deployed in greater numbers in at least some areas (e.g., small cells in metropolitan areas), and increased awareness on how small cells may be being deployed currently in some areas may lessen the likelihood that either wireless carriers, 9-1-1 Authorities, or PSAPs may later seek to redo the ongoing small cell deployments in a different manner, if the small cells were instead deployed to look exactly the same as macrocells deployments;
3. Certain specific non-mobile 9-1-1 calling type scenarios may be considered for residential and business consumer landline replacement service, including perhaps as one option as part of a legacy landline Public Switched Telephone Network (PSTN) sunset (e.g., static and nomadic Wireless Home Phones [WHP] that do not require a separate broadband connection); and
4. Other NENA Working Groups and industry technical bodies are considering issues that may be similar or have some overlaps with the potential deployment considerations that are also associated with the increased non-mobile 9-1-1 calling type scenarios. Examples of such include to meeting the new FCC indoor wireless location accuracy requirements and issues associated with CoS and the Customer Name Field.

2.1 Operations Impacts Summary

This NENA Non-Mobile Wireless Service Interaction Information Document is intended to provide guidelines for wireless carriers, third-party service providers, 9-1-1 authorities, PSAPS, and, as applicable, state and federal regulators on two near-term scenarios that can enhance traditional E9-1-1 wireless call processing:

- Non-mobile home or business phones being converted from wired to wireless service provider connectivity, such as via the use of various types of home adapter devices and mini-cells to improve wireless accessibility in homes, businesses, etc.
- The growing use of wireless small cells that have a geographically smaller cell coverage area

It is anticipated that the suggested considerations presented herein will provide the basic background information and point out near-term deployment considerations.

2.2 Technical Impacts Summary

This is an informational document. As such the recommendations made throughout this document may be considered as a guideline for use when designing and deploying non-mobile wireless services in these two current near-term specific scenarios. When implemented, some of the recommendations within this document may have significant technical impacts.

2.3 Security Impacts Summary

It is not anticipated that this NENA Information Document will have any new particular Security aspects on the 9-1-1 industry or on Next-Generation 9-1-1.

2.4 Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Document Number	Approval Date	Reason For Changes
NENA-INF-018.1-2017	02/16/2017	Initial Document

2.5 Recommendation for Additional Development Work

For ongoing work associated with indoor wireless location accuracy and derived Civic Address Location information within 50 meters, the following issues should be considerations:

1. When a wireless mobile handset presents a "Civic Address Location" to a PSAP, the issue of which CoS to display should be considered, including perhaps whether and how using an existing wireless class of service of WRLS, WPH1, or WPH2 with a caller civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems and whether to use a separate CoS.
2. When a wireless mobile handset presents a "Civic Address Location," the issue of what to include in the "Customer Name Field" should be considered, including whether it should be additional identifying information to assist the CoS as used currently in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING), whether it should state "CIVIC DISPATCHABLE" and/or "CIVIC APPROXIMATE," and/or whether to display the customer name associated with that account.

2.6 Anticipated Timeline

This document contains several potential systemic improvement recommendations. Depending upon which (if any) recommendations are implemented, varying timelines will be applicable. Given the solutions suggested herein as fitting well for these Non-Mobile offering are either similar to some existing Wi-Fi calling and femtocells 9-1-1 solutions currently deployed or use the existing TVW processes with straightforward clarification, it is believed that the solutions suggested are easily achievable within a 12 to 18 month time period without much effort.

2.7 Cost Factors

The cost of implementing the protocols recommended herein would be borne by each entity adopting them.

2.8 Cost Recovery Considerations

Normal business practices shall be assumed to be the cost recovery mechanism.

2.9 Additional Impacts (non-cost related)

The information or requirements contained in this NENA document are, if adopted by the industry, expected to have the following impacts, based on the analysis of the authoring group: The primary impacts are expected to be near-term enhancements in the quality of existing traditional E9-1-1 wireless call processing in these two non-mobile wireless scenarios.

2.10 Intellectual Property Rights (IPR) Policy

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2.11 Abbreviations, Terms and Definitions

See NENA-ADM-000, NENA Master Glossary of 9-1-1 Terminology, located on the NENA web site for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

Term or Abbreviation (Expansion)	Definition / Description	**New (N) / Update (U)
Civic Address	Any city-style address that includes a house number and a street name is considered a Civic Address. Civic Addresses include a community name that may or may not be recognized by the USPS.	
CoS (Class of Service)	A designation of the type of telephone service, e.g. residential, business, Centrex, coin, PBX, wireless. (Ref: NENA 02-010; NENA 02-011).	

Customer Name Field	The portion of traditional Automatic Location Information format where the Customer Name or other pre-populated identifying information is displayed to the 9-1-1 Telecommunicator.	N
DAS (Distributed Antenna System)	A DAS network is used to distribute RF signals from a central hub to a specific area with poor coverage or inadequate capacity. A DAS network consists of (i) a number of remote communications nodes deployed throughout the desired coverage area, each including at least one antenna for the transmission and reception of a wireless service provider's RF signals, (ii) a high capacity signal transport medium (typically fiber optic cable) connecting each node to a central communications hub site, and (iii) radio transceivers located at the hub site (rather than at each individual node as is the case for small cells) to process or control the communications signals transmitted and received through the antennas. DAS deployments may cover entire neighborhoods and involve hundreds of nodes connected to a single hub. Further, whereas small cells are usually operator-managed and support use by a single wireless service provider, DAS networks can often accommodate multiple wireless providers using different frequencies and/or wireless air interfaces. Economics as well as coverage and capacity needs may dictate different solutions in different scenarios, so use of DAS continues to evolve. In addition, other wireless technologies are also being developed and deployed that are similarly capable of being placed indoors or on top of short structures like utility poles.	N
Civic Address Location	Civic Address information of the caller that is believed to be within 50 meters, but that is not the Registered Caller Civic Location.	N
Femtocell	A residential or business customer small cell that generally has a radius range of approximately 10 meters (or approximately 33 feet), that generally requires the customer to have a wired broadband connection in order for the wireless carrier to activate and register the small cell for use and connect the call to the mobile switching center, and that enables the customer to move the small cell and re-register the small cell.	N
Location Sanity Check Mechanism	An automatic verification process that once a non-wireless handset device is connected to AC power source for use enables the wireless network to verify whether the customer is at the Registered Caller Civic Location.	N

Macrocell	A wireless carrier installed and activated cell that may have a radius range of approximately at least one kilometer but up to 20 kilometers (or approximately one-half mile to 12 miles) and provide access to all wireless handsets and access devices	N
Metrocell	A type of small cell that is generally wireless carrier installed and activated small cells and that generally may have a cell radius range of approximately 150 to 300 meters (or approximately 500 to 1000 feet).	U
Microcell	A type of small cell that is generally wireless carrier installed and activated and that generally may have a cell radius range of approximately 2 kilometers (or approximately 1 mile).	N
Picocell	A type of small cell that is generally wireless carrier installed and activated and that generally may have a cell radius range of approximately 200 meters (or approximately 650 feet)	N
Position Source	A parameter in the E2 protocol standard that actually indicates the *method* used for determining the latitude and longitude values, but that is also frequently used as an indication of wireless Phase 1 or Phase 2 in the ALI response to the PSAP.	N
Registered Caller Civic Location	The civic address of the caller that is the result of registration by the customer or provisioning by the carrier.	N

Small Cells	These are wireless carrier installed and activated cells that generally have a "cell" radius range of 500 meters or less. Because individual small cells cover small areas, however, it is necessary to deploy a number of such cells to achieve the seamless coverage that would be provided by a single macrocell. They are "small" compared to a wireless macrocell which macrocell may have a radius range of at least one kilometer. Small cells are low-powered wireless base stations that function like cells in a mobile wireless network and are intended to cover targeted indoor or localized outdoor areas ranging in size from homes and offices to stadiums, shopping malls, hospitals, and metropolitan outdoor spaces. Typically, they are used by wireless service providers to provide wireless connectivity to their subscribers in areas that present capacity and coverage challenges to traditional wide-area macrocell networks. Small cells can also be used to help fill in coverage gaps created by buildings, tower siting difficulties, and/or challenging terrain. While the industry has not always been consistent in the terms it uses for different types of small cell technology, generally speaking, femtocells, picocells, metrocells, and microcells refer to types of small cell technologies with coverage areas of increasing size.	N
Wi-Fi Calling	A service offering being used by some wireless carriers, cable companies, other companies, and some enterprise customers that seek to deliver voice calls over Wi-Fi. In the context of 9-1-1 calling at least from major wireless carriers, there is a general first preference for the mobile handset to send 9-1-1 calls over the CMRS or VoLTE networks where available and Wi-Fi calling may only be used when such does not occur within a period of several seconds. Where the 9-1-1 calling is done via Wi-Fi calling, the connectivity from the Wi-Fi access point to the 9-1-1 system is comparable to connectivity from a wired broadband connection for VoIP to the 9-1-1 system.	

(WHP) Wireless Home Phone	A residential or business Digital Enhanced Cordless Telephone (DECT) phone adapter device that generally provides home phone calling through wireless Commercial Mobile Radio Service connected services; generally requires an AC power source; is generally not used in a mobile context (as is a wireless handset); and is designed for use at a fixed location. This device may support nomadic as well as static use cases. It is also technically possible for this device to be used in a mobile manner where a mobile AC power source is also available, such as in a motor home.	N

3 Evolving and Ongoing Transition of Wireless Connectivity and Non-Mobile Service Characteristics and Suggested Considerations

3.1 Wireless Home Phones

Basic Background:

A WHP is a residential or business phone adapter device that generally provides home phone calling through wireless commercial mobile radio service (CMRS) connected services, generally requires an AC power source; is generally not used in a mobile context (as is a wireless handset); and is generally designed for use at a fixed location. This device may support nomadic as well as the static use case.

Near-Term Caller Civic Location Deployment Considerations:

1. When a WHP is at its registered caller civic location and would provide a caller civic location to the PSAP, the issue of which CoS to display should be considered, including perhaps whether and how using an existing wireless class of service of WRLS, WPH1, or WPH2 with a caller civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems and whether to use a separate CoS and the RESD position source. (It is our understanding that another NENA Working Group is considering WDSP and/or WCVC as one or more new separate CoS to represent wireless Civic Address Location.)
2. When a nomadic WHP enables the customer or the wireless carrier to register the "caller civic location," the issue of whether to have a location sanity check mechanism that switches to mobile WPH1 and WPH2 mode if the customer is not at the registered caller civic location should be considered.
3. When a WHP is at its registered caller civic location, the issue of what to include in the "Customer Name Field" should be considered, including whether it should be additional identifying information to assist the CoS as used currently sometimes in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING) and/or whether it should display the customer name associated with that account.
4. Where and when technically feasible, when a WHP is at its registered caller civic location, if in the geographic area wireline ELTS are currently being used for VoIP i2 VPC 9-1-1 calls instead of ELTS of "Verify, Verify, Verify," the issue of whether to use wireline ELTS should be considered.

5. Where and when technically feasible, when a WHP is at its registered "caller civic location," the issue of whether to route the wireless 9-1-1 call based on the caller civic location instead of the cell or cell sector information should be considered.

3.2 Femtocells

Basic Background:

A femtocell is a residential or business customer small cell that generally has a radius range of 10 meters and that generally requires the customer to have a wired broadband connection in order for the wireless carrier to activate and register the device for use.

Near-Term Caller Civic Location Deployment Considerations:

1. When a femtocell is at its registered caller civic location, and would provide a caller civic location to the PSAP, the issue of which CoS to display should be considered, including perhaps whether and how using an existing wireless class of service of WRLS, WPH1, or WPH2 with a caller civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems and whether to use a separate CoS and the RESD position source. (It is our understanding that another NENA Working Group is considering WDSP and/or WCVC as one or more new separate CoS to represent wireless Civic Address Location.)
2. When a femtocell that enables the customer or the wireless carrier to register the "caller civic location," the issue of whether to have a location sanity check that switches to mobile WPH1 and WPH2 mode if the customer moves the femtocell and has not re-registered a caller civic location should be considered.
3. For any customer installed femtocell that requires a customer broadband connection (which to our current knowledge is all of them), the issue of what to include in the Customer Name Field should be considered, including whether it should be additional identifying information to assist the CoS as used currently sometimes in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING) or whether to display the customer name associated with that account.
4. Where and when technically feasible, when a femtocell is at its registered caller civic location, if in the geographic area wireline ELTS are currently being used for VoIP i2 VPC 9-1-1 calls instead of ELTS of "Verify, Verify, Verify," the issue of whether to use wireline ELTS should be considered.
5. Where and where technically feasible, when a femtocell is at its registered "caller civic location," the issue of whether to route the wireless 9-1-1 call based on the caller civic location instead of the cell or cell sector information should be considered.
6. Issues associated with what would generally be expected to happen during a live 9-1-1 call if the mobile handset moves out of range of the femtocell should be considered, including with respect to whether the 9-1-1 call would generally drop and what would generally be expected to happen to the caller civic location information, if anything, being displayed to a PSAP.

3.3 Wi-Fi Calling

Basic Background:

A Wi-Fi calling service offering is an approach being used by some wireless carriers, cable companies, other companies, and some enterprise customers that seek to deliver voice calls over

Wi-Fi. In the context of 9-1-1 calling, at least from major wireless carriers, the service is more newly deployed than either WHP or femtocells and there is a general first preference for the mobile handset to send 9-1-1 calls over the existing CMRS or VoLTE networks where available; Wi-Fi calling may only be used when such does not occur within a period of several seconds.

But perhaps because Wi-Fi calling for 9-1-1 calls is so new, the three or four major wireless carriers that support it appear to do so differently. For example, even though three different major wireless carriers state "WIFI" in the Customer Name Field with Wi-Fi calling for 9-1-1 calls, at least one of the wireless carriers limits Wi-Fi calling for 9-1-1 calls via its terms and conditions to the registered location. In addition, at least one of the wireless carriers uses the CoS for Voice Mobile (VMBL) while another uses the general default VoIP CoS. With the four major wireless carriers, at the present time it appears uncertain whether Wi-Fi calling to CMRS handover for 9-1-1 calls is supported by some major wireless carriers, or by no major wireless carriers. With regard to Wi-Fi calling for 9-1-1 calls from Enterprise solutions, at this any Enterprise specific issues, if any exist, have not been reviewed or compared to the differing major carrier approaches to Wi-Fi calling for 9-1-1 calls. (It is our understanding that another NENA Working Group is considering whether VMBL should be used to signify Wi-Fi calling for 9-1-1 calls where x, y coordinates best represent the caller's location and whether VNOM should be used to signify Wi-Fi calling for 9-1-1 calls where civic location best represents the caller's location.)

Near-Term Caller Civic Location Deployment Considerations:

1. When a Wi-Fi calling mobile handset is at its registered caller civic location, and would provide a caller civic location to the PSAP, the issue of which CoS to display should be considered, including perhaps whether and how using an existing wireless classes of service of VMBL, VoIP, or WPH2 with a caller civic location may potentially impact PSAP GIS mapping, CAD, and other downstream systems – and what if anything may be different than how any other wireless or VoIP 9-1-1 calls are being presented.
2. When a Wi-Fi calling mobile handset enables the customer or the wireless carrier to register the caller civic location, the issue of whether to have a location sanity check that switches to mobile WPH1 and WPH2 mode if the customer moves the Wi-Fi calling and has not re-registered a caller civic location should be considered.
3. When a Wi-Fi calling mobile handset is at its registered caller civic location, the issue of what to include in the "Customer Name Field" should be considered, including whether it should be additional identifying information to assist the CoS as used currently sometimes in the Customer Name Field (e.g., FEMTOCELL, WIFI CALLING) or whether to display the customer name associated with that account.
4. Where and when technically feasible, when a Wi-Fi calling mobile handset is at its registered "caller civic location", if in the geographic area wireline ELTS are currently being used for VoIP i2 VPC 9-1-1 calls instead of ELTS of "Verify, Verify, Verify," the issue of whether to use wireline ELTS should be considered. (In places such as statewide in Texas where ESQKs have been pre-provisioned in this manner, this may occur automatically if ESQKs are used for the solution deployment.)
5. Where and when technically feasible, when a Wi-Fi calling mobile handset is at its registered caller civic location, the issue of how to best route the Wi-Fi calling 9-1-1 call should be considered.

6. Issues associated with what would generally be expected to happen during a live 9-1-1 call if the mobile handset moves out of range of the Wi-Fi calling access point should be considered, including with respect to whether the 9-1-1 call would generally drop and what would generally be expected to happen to the caller civic location information, if anything, being displayed to a PSAP.

3.4 Small Cells (including Distributed Antenna Systems)

Basic Background:

A small cell is "small" compared to a wireless macrocell that may have a radius range of at least one kilometer and provide access to all wireless handsets and access devices. Examples of small cells include picocells with a radius coverage range of about 70 meters and metrocell/microcells with a radius coverage range of about 500 meters. Because individual small cells cover small areas, however, it is necessary to deploy a number of small cells to achieve the seamless coverage that would be provided by a single macrocell. A DAS is another alternative to the use of macrocells mounted on tall antenna structures.

Near-Term Small Cell Site Address Location Deployment Considerations:

1. Before a wireless carrier considers deploying a small cell for 9-1-1 purposes, the issue of whether and how to populate the NENA TVW information differently than or the same as the deployment of a macrocell should be considered by the wireless carrier.

2. Before a 9-1-1 Authority or PSAP considers how to respond to the TVW from the wireless carrier, the issue of whether and how to populate the TVW information differently than or the same as the deployment of a macrocell should be considered by the 9-1-1 Authority and/or the PSAP.

3. Specific items that could potentially be considered differently between a small cell deployment compared to a macrocell deployment by wireless carriers, 9-1-1 Authorities, and/or PSAPs include:
   - How to populate the “location address information” in the TVW;
   - What to display in the Customer Name Field (such as displaying “SMALL CELL ADDRESS” or “DAS SMALL CELL ADDRESS” in the Customer Name Field);
   - Whether to use a new CoS (such as WFXD or some other new CoS of service beginning with “W”) associated with the existing FIXD position source;
   - Regardless of CoS used, having the rebid function available should be considered a potentially critical to the PSAP call-takers for small cells. (This is especially important given that while picocell may have a range of approximately 70 meters, metrocells may have ranges of up to 500 meters, which is an area larger than the x, y location accuracy that may available upon rebid.);
   - Whether some method or methods should be considered to distinguish a small cell radius range of within approximately 10 meters, within approximately 50 meters, within approximately 100 meters, and/or within approximately 500 meters; and/or whether confidence and uncertainty or other small cell coverage display and PSAP GIS mapping

approaches should be considered. (For example, the State of California might consider using the Thomas Brothers area to include supplemental information.)

4 Recommended Reading and References

None.

5 Previous Acknowledgments

None. This is the initial document.