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Before the
Federal Communications Commission
Washington, D.C. 20554

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FCC Mail Room

In the Matter of)
Wireless E911 Location Accuracy Requirements) PS Docket No. 07-114
)
E911 Requirements for IP-Enabled Service) WC Docket No. 05-196
Providers)

FURTHER NOTICE OF PROPOSED RULEMAKING
AND NOTICE OF INQUIRY

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By the Commission: By the Commission: Chairman Genachowski and Commissioners Copps, McDowell,
Clyburn, and Baker issuing separate statements.

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I. INTRODUCTION

1. As mobile communications technology evolves, one of the great potential benefits it
provides is to enhance the public’s ability to contact emergency services personnel during times of crisis.
To ensure this benefit is realized, such technology must enable public safety personnel to obtain accurate
information regarding the location of the caller. The Commission’s existing Enhanced 911 (E911) rules
require wireless carriers to meet standards for provision of location information when emergency calls are
made via mobile telephone networks. In the companion Second Report and Order adopted today, we

strengthen these standards by requiring wireless carriers to provide more specific automatic location information to 911 call centers in areas where they have not done so in the past. In this Further Notice of Proposed Rulemaking (FNPRM) and Notice of Inquiry (NOI), as recommended in the National Broadband Plan,¹ we explore how to further improve the location capability of 911 and E911 services for existing and new voice communications technologies, including new broadband technologies associated with deployment of Next Generation 911 (NG911) networks. Our aim is to ensure that the Commission is doing everything within its power, in conjunction with the public safety community and service providers, to ensure that Americans have access to the most forward-thinking technologically advanced emergency response systems in the world.

2. Today we take additional steps to improve wireless E911 location accuracy and reliability by examining the next stage of potential regulations that would be commensurate with the surge in wireless usage, encompassing additional voice over Internet Protocol (VoIP) and wireless services, devices, and applications. In this FNPRM and NOI, we seek comment on several issues with regard to amending the Commission's wireless 911 and E911 requirements and extending 911 and E911 requirements to additional VoIP and wireless services. In our continuing endeavor to ensure that wireless E911 service meets the needs of the American people and public safety, we request comment on the ongoing evolution in the use of wireless devices and the development of location technologies. As recommended in the National Broadband Plan,² the issues we examine also address the impact of NG911 deployment on 911 and E911 location accuracy requirements. NG911 will integrate the core functions and capabilities of E911 while adding new 911 capabilities in multiple formats, such as texting, photos, video and e-mail. This will vastly improve the quality and speed of response, and provide a more interoperable and integrated emergency response capability for PSAPs, first responders, hospitals and other emergency response professionals.³

3. First, in the FNPRM, we seek comment on proposals to improve wireless location accuracy. In this regard, the FNPRM builds upon the second part of the preceding Notice of Proposed Rulemaking that the Commission released on June 1, 2007.⁴ We seek comment on a number of issues initially raised in the *Location Accuracy NPRM*, including: whether we should consider more stringent location parameters in Section 20.18(h) of the Commission's rules, which specifies the standards for wireless E911 Phase II location accuracy and reliability; what methodology carriers should employ to verify compliance, both initially and during ongoing testing; the format in which accuracy data should be automatically provided to PSAPs; how to address location accuracy while roaming; how location information and accuracy can be improved in more challenging environments; and whether location accuracy standards should include an elevation (Z-axis) component.

4. In the NOI, we request comment on whether we should require interconnected VoIP service providers to automatically identify the geographic location of a customer without the customer's active cooperation. We also seek comment on what E911 obligations, if any, should apply to VoIP services that are not fully interconnected to the public switched telephone network (PSTN). Additionally, we seek comment on the impact of NG911 developments on location accuracy and automatic location identification (ALI). Finally, we request comment on the applicability of 911 and E911 requirements to

¹ Federal Communications Commission, National Broadband Plan: Connecting America; Recommendation 16.15, at 326 (rel. Mar. 16, 2010) (National Broadband Plan).

² *Id.*

³ *See id.* at 323.

⁴ Wireless E911 Location Accuracy Requirements; Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems for IP-Enabled Service Providers, PS Docket No. 07-114, CC Docket No. 94-102, WC Docket No. 05-196, *Notice of Proposed Rulemaking*, 22 FCC Rcd 10609, 10613-16 ¶¶ 8-19 (2007) (*Location Accuracy NPRM*).

additional wireless communications services, devices and applications.

II. BACKGROUND

5. In this section, we review the prior Commission actions leading up to the present rules and proposals concerning 911 and E911 requirements for wireless and VoIP services. The Commission has adopted rules requiring commercial wireless carriers to provide both basic 911 service, which connects the caller to a PSAP, and E911 service, which provides call-back and location information. The E911 information requirements consist of two parts: Phase I – which requires wireless carriers to deliver to a PSAP the telephone number of the wireless 911 caller and the location of the cell site or base station that received the call, and Phase II – which requires wireless carriers to provide the location (latitude and longitude) of the caller within particular accuracy parameters, depending on the location technology that the carriers have chosen.⁵ In its initial *E911 Report and Order*, released on July 26, 1996, the Commission adopted Section 20.18(h), which specifies the accuracy requirements for the provision of E911 by wireless carriers.⁶ As amended by today's Second Report and Order, Section 20.18(h) requires licensees subject to the wireless E911 requirements, to ultimately comply with the following Phase II location accuracy and reliability standards at the county or PSAP service area level, based on certain benchmarks, limitations, and exclusions: for network-based technologies: 100 meters for 67 percent of calls, 300 meters for 90 percent of calls; for handset-based technologies: 50 meters for 67 percent of calls, 150 meters for 90 percent of calls.⁷

6. In April 2000, the Commission's Office of Engineering and Technology (OET) issued Bulletin No. 71 to provide assistance in determining whether wireless licensees comply with the accuracy standards set by the Commission.⁸ The OET Bulletin did not establish mandatory procedures; rather, it stated that compliance with the OET guidelines would establish “a strong presumption that appropriate means have been applied to ensure that an ALI system complies with the Commission's Rules.”⁹ The OET Bulletin sets forth the Commission's expectations regarding location accuracy measurement and testing.

7. In June 2005, the Commission released a First Report and Order and Notice of Proposed Rulemaking (*VoIP 911 Order and VoIP 911 NPRM*) adopting rules requiring providers of interconnected VoIP service to supply E911 capabilities to their customers as a standard feature from wherever the customer is using the service.¹⁰ The rules adopted by the *VoIP 911 Order* apply only to providers of interconnected VoIP services, which are services that (1) enable real-time, two-way voice communications; (2) require a broadband connection from the user's location; (3) require Internet protocol-compatible customer premises equipment (CPE); and (4) permit users generally to receive calls

⁵ See 47 C.F.R. § 20.18(d) (concerning the “Phase I enhanced 911 services” requirements); 47 C.F.R. § 20.18(e) (concerning the “Phase II enhanced 911 services” requirements).

⁶ Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-10, *Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 18676, 18712 (1996) (*E911 Report and Order*).

⁷ 47 C.F.R. § 20.18(h); see also *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, *Second Report and Order*, FCC 10-XXX (2010) (*Location Accuracy Second Report and Order*).

⁸ See OET Bulletin No. 71, *Guidelines for Testing and Verifying the Accuracy of Wireless E911 Location Systems* (Apr. 12, 2000) at 2, available at http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet71/oet71.pdf.

⁹ *Id.*

¹⁰ In the Matters of IP-Enabled Services; E911 requirements for IP-Enabled Service Providers, WC Docket No. 04-36, WC Docket No. 05-196, *First Report and Order and Notice of Proposed Rulemaking*, 20 FCC Rcd 10245, 10246 (2005) (*VoIP 911 Order and VoIP 911 NPRM*).

that originate on the PSTN and to terminate calls to the PSTN.¹¹ Interconnected VoIP service providers generally must provide consumers with E911 service and transmit all 911 calls, including Automatic Number Identification (ANI) and the caller's Registered Location for each call, to the PSAP, designated statewide default answering point, or appropriate local emergency authority.¹²

8. In the *VoIP 911 Order*, the Commission stated its intent to adopt a future order containing an advanced E911 solution for portable interconnected VoIP service, which would include a method for determining a user's location without assistance from the user as well as a firm implementation deadline.¹³ To that end, the *VoIP 911 NPRM* sought comment on what additional steps should be taken to determine whether there may be ways to automatically identify the location of a user of a portable interconnected VoIP service, whether to extend the requirements to other VoIP services, such as services that are not fully interconnected to the PSTN but may permit users to make calls to or receive calls from landline and mobile phones, whether providers of wireless interconnected VoIP service would be more appropriately subject to the existing commercial mobile radio service (CMRS) 911/E911 rules (contained in Part 20), and whether there are any steps the Commission should take to ensure that people with disabilities who desire to use interconnected VoIP service can obtain access to E911 services.¹⁴

9. In June 2007, the Commission released the *Location Accuracy NPRM* seeking comment on several issues relating to wireless E911 location accuracy and reliability requirements, in addition to the issue that we address in the companion Second Report and Order, i.e. the geographic level at which wireless licensees have to meet the location accuracy requirements under Section 20.18(h).¹⁵ The Commission requested comment on these additional issues to ensure that wireless E911 service meets the needs of public safety and the American people, while taking into account the evolution in the use of wireless devices and the further development of location technologies.¹⁶ Specifically, the Commission sought comment on the capabilities and limitations of existing and new location technologies, the advantages of combining handset-based and network-based location technologies (a hybrid solution),¹⁷ the prospect of adopting more stringent location accuracy requirements,¹⁸ and compliance testing methodologies in regard to different environments, such as indoor versus outdoor use and rural areas.¹⁹ Also, the Commission invited comment on how to address location accuracy issues for 911 calls placed when roaming, particularly between carriers employing different location technologies.²⁰ Further, the Commission requested comment on a number of tentative conclusions and proposals, including establishing a single location accuracy standard rather than the separate accuracy requirements for network and handset-based technologies,²¹ adopting a mandatory schedule for accuracy testing,²² and

¹¹ 47 C.F.R. § 9.3.

¹² 47 C.F.R. § 9.5(b). The Registered Location is "[t]he most recent information obtained by an interconnected VoIP service provider that identifies the physical location of an end user." 47 C.F.R. § 9.3.

¹³ See *VoIP 911 Order*, 20 FCC Rcd at 10266 ¶36.

¹⁴ See *VoIP 911 NPRM* at 10276-77, 10279 ¶¶ 56-59, 63.

¹⁵ See *Location Accuracy NPRM*, 22 FCC Rcd at 10613-16 ¶¶ 8-19.

¹⁶ See *id.*

¹⁷ See *id.* at 10613-14 ¶ 11.

¹⁸ See *id.* at 10614 ¶ 12.

¹⁹ See *id.* at 10614 ¶ 14 (also requesting comment on whether the OET Bulletin No. 71 guideline should be made mandatory).

²⁰ See *id.* at 10615 ¶ 17.

²¹ See *id.* at 10613 ¶¶ 9-10.

applying the same location accuracy standards that apply to circuit-switched CMRS services to interconnected VoIP services used in more than one location.²³

10. In response to the *Location Accuracy NPRM*, a number of parties filed comments, including public safety organizations, commercial carriers, and location technology vendors. Comments regarding the prospect of adopting of a single location accuracy requirement varied,²⁴ with some supporting an open forum to gather more information.²⁵ In regard to the impact of advances in location technologies and the use of hybrid technologies on location accuracy, commenters noted the benefits and drawbacks of the underlying technologies for handset-based and network-based solutions.²⁶ Commenters provided a variety of specific suggestions regarding whether more stringent accuracy requirements should be adopted.²⁷ Also, commenters addressed whether the Commission should adopt different standards based on topographical environments.²⁸ Some commenters supported the inclusion of elevation standards²⁹ and others believed that there must be more research and development conducted before the Commission adopts standards for indoor settings, particularly in regard to high-rise buildings.³⁰

11. In October 2008, the Commission released a Report and Order (*NET 911 Improvement Act Report and Order*) adopting rules providing “interconnected VoIP providers rights of access to any and all capabilities necessary to provide 911 and E911 service from entities that own or control those capabilities.”³¹ In the *NET 911 Improvement Act Report and Order*, the Commission declined to “issue highly detailed rules listing capabilities or entities with ownership or control of these capabilities” because the nation’s 911 system varies depending on the locality and “overly specific rules would fail to

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²² See *id.* at 10614-15 ¶ 15.

²³ See *id.* at 10615-16 ¶ 18.

²⁴ Commenters generally supporting a single location accuracy requirement include the following: APCO Comments at 3; AT&T Comments at 8 (a single standard “may be achievable” but “adoption of [one] may be premature”); Intrado Inc. (Intrado) Comments at 4; NENA at 4 (supports a “unitary standard” with qualifications); Nsighttel Wireless, LLC Comments at 2-3; Rural Telecommunications Group (RTG) Comments at 6-7. Opposing commenters include the following: Rural Cellular Association (RCA) Comments at 5-6; Telecommunications Industry Association (TIA) Comments at 4; T-Mobile USA, Inc. (T-Mobile) Comments at 8, 10.

²⁵ See generally Alliance for Telecommunications Industry Solutions on behalf of the Emergency Services Interconnection Forum (ATIS) Comments at 4; CTIA – The Wireless Association (CTIA) Comments at 2-4; Motorola Comments at 3; Nokia Inc. and Nokia Siemens Networks at 2-3; Sprint Nextel Comments at 3, 7-8; Comments of the Texas 911 Alliance and the Texas Commission on Emergency Communications (Texas 9-1-1 Agencies) at 9.

²⁶ See generally Polaris Wireless, Inc. (Polaris) Comments at 6-10 (addressing benefits of hybrid technologies); TruePosition, Inc. (TruePosition) Comments at 3-4 (concerning benefits); Qualcomm Incorporated at 3-4 (noting drawbacks); Sprint Nextel Comments at 11 (noting drawbacks).

²⁷ See generally Sprint Nextel Comments at 12; Texas 9-1-1 Agencies at 8; TIA Comments at 5-7.

²⁸ See generally AT&T Comments at 9; RCA Comments at 4; T-Mobile Comments at 10.

²⁹ See APCO Comments 4; Intrado Comments at 6.

³⁰ See APCO Comments at 4; AT&T Comments at 9-10; ATIS Comments at 5; Texas 9-1-1 Agencies Comments at 8.

³¹ Implementation of the NET 911 Improvement Act of 2008, WC Docket No. 08-171, *Report and Order*, 23 FCC Rcd 15884, 15885 (2008) (*NET 911 Improvement Act Report and Order*).

reflect these local variations.”³² The Commission also declined “to expand the applicability of the rights granted in the NET 911 Act to entities beyond those encompassed within that statute.”³³

12. In April 2009, we released a *Public Notice* seeking nominations for membership on the Communications Security, Reliability, and Interoperability Council (CSRIC).³⁴ CSRIC is a Federal Advisory Committee that provides guidance and expertise on the nation’s communications infrastructure and public safety communications.³⁵ The committee’s duties include recommending best practices and actions the Commission can take to ensure the security, reliability, operability and interoperability of public safety communications systems, and improve reliability and resiliency of communications infrastructure.³⁶ One of the Working Groups within CSRIC, Group 4C - Technical Options for E911 Location Accuracy, is responsible for examining E911 and public safety location technologies in use today, identifying current performance and limitations for use in next generation public safety applications, examining emerging E911 public safety location technologies, and recommending options to CSRIC for the improvement of E911 location accuracy timelines.

13. On March 16, 2010, the Commission delivered to Congress the National Broadband Plan in which it stated that the Commission should examine approaches for leveraging broadband technologies to enhance emergency communications with the public by moving towards NG911,³⁷ because NG911 will provide a “more interoperable and integrated emergency response capability for PSAPs, first responders, hospitals and other emergency response professionals.”³⁸ Further, the National Broadband Plan notes that the Commission is “considering changes to its location accuracy requirements and the possible extension of...ALI...requirements to interconnected VoIP services,” and recommends that the Commission “expand [the *Location Accuracy NPRM*] proceeding to explore how NG911 may affect location accuracy and ALI.”³⁹

III. FURTHER NOTICE OF PROPOSED RULEMAKING

14. As noted at the outset, today we adopted the *Location Accuracy Second Report and Order* that established an eight-year timeframe, consisting of interim benchmarks, requiring handset-based and network-based carriers to meet amended wireless location accuracy requirements at the county or PSAP-based level.⁴⁰ The rule changes we adopted in this companion order complete one of our proceedings and will lead to significant improvements in wireless location accuracy, thereby saving lives and property and improving emergency response. At the same time, we have more work to do to update and complete the remaining inquiries initiated by the Commission in 2007 to improve wireless E911 service, particularly as wireless communications continue to proliferate as the primary or sole means for many Americans to reach 911. Accordingly, consistent with our devotion to continually improving

³² *NET 911 Improvement Act Report and Order*, 23 FCC Rcd at 15893 ¶ 22.

³³ *NET 911 Improvement Act Report and Order*, 23 FCC Rcd at 15894 n.66.

³⁴ FCC Seeks Nominations by May 11, 2009 for Membership on the Communications Security, Reliability, and Interoperability Council (CSRIC), DA 09-816, *Public Notice* (PSHSB April 10, 2009).

³⁵ *Id.* at 2.

³⁶ *Id.*

³⁷ *Id.*, Chapter 16, “Public Safety,” Section 16.3, “Leveraging Broadband Technologies to Enhance Communications with the Public,” at 313.

³⁸ *Id.*

³⁹ *Id.* at 326, Recommendation 16.15.

⁴⁰ See *Location Accuracy Second Report and Order*, at Appendix C (amending Section 20.18(h)(1) (for carriers using network-based location technologies) and Section 20.18(h)(2) (for carriers using handset-based location technologies)).

public safety and homeland security, this FNPRM expands upon the *Location Accuracy NPRM*, in order to ensure that wireless E911 service meets the needs of public safety and the American people, while taking into account the evolution in the use of wireless devices and the further development of location technologies. The following discussion includes proposals for improving wireless 911 location accuracy requirements.

15. *Existing and Prospective Location Technologies.* We begin by seeking current information on the state of wireless location technologies, particularly since the Commission explored these issues in 2007, as well as in light of market trends resulting in increasing consumer adoption of location-based services. We seek to develop a full understanding of the capabilities and limitations of existing location technologies, as well as any new technologies that may provide improvements in location accuracy. In response to the *Location Accuracy NPRM*, a few location technology vendors noted that improvements in location accuracy were possible with some modifications or additional investment.⁴¹ While the existing location accuracy requirements, particularly when complied with at the county or PSAP service area level, often provide PSAPs with good indications of the location of a 911 caller, the limitations of existing location determining technologies in use by carriers can lead to variations of up to 300 meters, or more. How can location determination be improved upon? Are there existing location technologies available today that carriers can immediately adopt? If so, what are the relative quantitative advantages versus costs of deployment? What new or prospective location technologies might be utilized to improve accuracy? What would be the feasibility of incorporating newer technologies into wireless networks? What market incentives, such as for location-based services, might drive the need for improved accuracy technologies, and thus for application to 911? Commenters, particularly location technology vendors, should provide quantitative data that provides a basis for understanding the relative performance capabilities and commercial feasibility of the available and prospective location technologies. We also seek information concerning whether certain technologies are better suited or targeted to perform best in certain environments. As noted above, the CSRIC is exploring issues related to wireless location technologies. In this regard, we look forward to receiving the recommendations of this committee. We also want to ensure that our E911 policies properly consider the interests of people living with disabilities. Should we make any changes to our rules to better accommodate persons with disabilities who use E911 wireless services? Are there technologies that can help ensure that E911 services address the interests of those living with disabilities?

16. In today's *Location Accuracy Second Report and Order*, we also adopted confidence and uncertainty requirements sought by the PSAP community, which should permit improved expectations concerning the location information delivered with wireless 911 calls. How does the availability of this information impact the need for changes or improvements to location accuracy information?

17. *Potential Modifications to Accuracy Standard.* We seek comment on whether we should consider changing the current location accuracy requirements of Section 20.18(h). Should we modify the current location accuracy standard for network-based and handset-based providers? Should we adopt a single location accuracy standard, rather than maintaining the network/handset distinction? Would a single standard provide more consistency for PSAPs? The Commission previously sought comment on these issues in the *Location Accuracy NPRM*. In response, APCO noted that it "agrees with the Commission's inclination to require a 'uniform accuracy standard at least as stringent as that currently in

⁴¹ See TruePosition Comments at 2-3; Polaris Comments at 5-6. See also Intrado Comments at 4-5 (asserting that "certain mobile technologies may not currently have the ability to discern whether an end user's device is located indoors, but with a phased development approach and the use of alternative addressing schemes, the desired end state is achievable."); S5Wireless, Inc. Reply Comments at 1-2; YMax Corporation Reply Comments at 2-4; Letter from Eliot J. Greenwald, Bingham McCutchen LLP, counsel for Andrew Solutions, a CommScope Company, to Marlene Dortch, Secretary, FCC, filed July 29, 2010, Attached Presentation at 8 (stating that (1) "Hybrid and Backup Technologies Can Improve Overall Performance [and] Increase Yield with Objective Accuracy" and (2) "4G Networks Permit Additional Enhancement of Location Methods[.]").

place for handset-based technologies” and supported “the Commission’s desire for even greater accuracy.”⁴² Sprint Nextel argued that, “while a single standard is an admirable goal, the reality is that wireless voice service is provided over numerous, ever-increasing varieties of networks and technologies.”⁴³ T-Mobile stated that, “[u]nifying the CMRS accuracy requirements by requiring the network-based providers to meet handset-based standards would be grossly inequitable, ignoring the substantial benefits of network-based technologies.”⁴⁴ We now seek to expand and update the record, particularly as the CMRS marketplace has evolved over the past few years with the deployment of advanced networks and devices.

18. We also seek comment on whether carriers can employ a combination of handset-based and network-based location technologies (a hybrid solution), rather than employing one or the other, to achieve improved location accuracies. As the Texas 9-1-1 Agencies noted, “handset solutions generally work better outdoors and in rural areas, while network solutions generally work better indoors and may have issues in rural areas.”⁴⁵ TruePosition commented that “a hybrid network-GPS technology consisting of U-TDOA and A-GPS is well within the realm of technical feasibility and it would produce enhanced location accuracy.”⁴⁶ Another technology vendor, Polaris, argued that “a hybrid system is the best long-term approach to improve location accuracy and consistency.”⁴⁷ Polaris considers the ideal hybrid solution to be “the pairing of a network-based and a handset-based technology,” which “leverages the strengths of two highly complementary technologies.”⁴⁸ In addition to the use of both handset-based and network-based technologies in a single solution, what other technical features provide an appropriate basis for a definition of hybrid solutions? Are hybrid solutions better defined as location determination systems that can use multiple position location technologies either individually, or in combination, to achieve better performance, accuracy, or reliability? Would hybrid technologies provide greater location accuracy than either network-based or handset-based solutions alone? How can hybrid solutions improve location performance aspects other than accuracy, such as increased percentage yield of success of location determinations? Has the existence of different accuracy requirements for handset-based and network-based systems influenced the focus and direction of research and development in location based services and 911 technology solutions? How does the implementation of 3G and 4G networks, services, and devices impact wireless E911 requirements? For example, as indicated in today’s *Location Accuracy Second Report and Order*, the roll-out of 3G networks incorporates A-GPS handsets, which will improve accuracy over time as they are blended into each carrier’s subscriber base. How else might 3G, and 4G, technologies lead to improved means or methods of location accuracy? Are there any specific ways that burgeoning 4G networks, or subsequent technology releases, can be implemented that would achieve location benefits? What are 4G industry standards setting bodies considering for location identification, and how might such activities impact the Commission’s flexibility in determining the best solution or solutions? Are there ways to provide incentives for wireless carriers to exceed the Commission’s baseline location accuracy requirements? How should the Commission implement a changed location accuracy requirement? Should the Commission continue to define a particular minimum accuracy requirement, rather than specifying a particular solution?

19. *Compliance Testing.* We seek to refresh the record on what methodology carriers should

⁴² APCO Comments at 4.

⁴³ Sprint Nextel Comments at 7.

⁴⁴ T-Mobile Comments at 16.

⁴⁵ Texas 9-1-1 Agencies at 7.

⁴⁶ *Id.* at 5.

⁴⁷ Polaris Comments at 5.

⁴⁸ *Id.*

employ to verify compliance, both initially and during ongoing testing. In response to the *Location Accuracy NPRM*, APCO and the Texas 9-1-1 Agencies argued that OET Bulletin No. 71 should be revised to increase the number of indoor test calls to at least 30 percent.⁴⁹ According to TruePosition, “[w]ith consumers increasingly substituting wireless devices for wireline service, approximately 40%-60% of E911 calls are now made indoors.”⁵⁰ As a result, TruePosition argues that “the Commission’s rules should require carrier E911 compliance testing to include measurements in indoor environments; a carrier’s indoor test results for E911 location accuracy should be weighted in accordance with its estimated percentage of indoor E911 calls.”⁵¹ Qualcomm, however, argued that the Commission should neither convert OET Bulletin No. 71 guidelines into requirements, nor impose a specified level of indoor testing.⁵² According to Qualcomm, “the mandate has always covered 67% and 95% of the calls to 911, period. The proportion of mobile phone calls to 911 placed from indoors varies from PSAP to PSAP, from town to town, from county to county, and from state to state. Accordingly, it would be the height of arbitrary decision making for the Commission to pick a particular level of indoor testing and to simply impose it, now, over a decade after it adopted the original mandate.”⁵³ We seek comment on these views.

20. If we were to require compliance testing, should we use OET Bulletin No. 71 as the basis, which provides guidelines for testing and verifying the accuracy of wireless E911 location systems to verify compliance? Should we make OET Bulletin No. 71 mandatory? Should we establish a measurement procedure in our rules for testing and verifying the accuracy of wireless E911 location systems? If so, what measurement procedure would be appropriate? For example, should our rules specify a certain level of indoor versus outdoor testing in order to reflect the proportion of indoor versus outdoor use? Should the Commission update OET Bulletin No. 71 to include measurements in indoor environments? What percentage of wireless 911 calls is made indoors? What trends reflect the growing number of indoor 911 calls? How about testing in other challenging environments, such as dense urban settings, or heavily forested or mountainous terrain? Further, what mix of equipment (i.e., carrier-provided handsets, base stations, or other facilities) should be employed for accuracy testing? How many test points should we require within a PSAP service area and how should the test points be distributed? What special considerations, if any, should we establish for tests in rural areas? Should we impose other testing parameters to accurately assess a consumer’s experience when using a carrier’s E911 service?⁵⁴ As an alternative, would it be beneficial to enable consumers to test wireless 911 and E911 capabilities, such as by making test calls and seeing the identified location data, as well as the PSAP that would receive the call?

21. *Schedule for Testing.* In the *Location Accuracy NPRM*, the Commission tentatively concluded that it would establish a mandatory schedule for accuracy testing, and sought comment on the appropriate schedule for such testing. Corr Wireless disagreed with the tentative conclusion and argued that, “[t]here is no need for periodic testing of E-911 compliance. Once accuracy levels are attained, the level of accuracy typically only gets better, not worse.”⁵⁵ Is there any data to support this conclusion? We seek to refresh the record on the appropriate schedule for accuracy testing and the appropriate

⁴⁹ See APCO Comments at 4; Joint Initial Comments of the Texas 9-1-1 Agencies at 7.

⁵⁰ TruePosition Comments at 6.

⁵¹ *Id.*

⁵² See Qualcomm Comments at 5.

⁵³ *Id.* at 5.

⁵⁴ See, e.g., Association of Public Safety Communications Officials-International, *An Assessment of the Value of Location Data Delivered to PSAPs with Enhanced Wireless 911 Calls (Project LOCATE)*, Final Report, April 2007, CC Docket No. 94-102 (filed Apr. 10, 2007).

⁵⁵ Corr Wireless Comments at 6.

statistical methodology for determining compliance. Should we require testing every two years, as APCO suggested,⁵⁶ or should we adopt a different schedule? As Phase II service is extended into new areas, at what point should carriers be required to conduct compliance testing? Should carriers be required to file compliance and maintenance testing data with the Commission, one or more national public safety organizations (such as NENA, APCO, and NASNA), local PSAPs, or some combination of these entities? Should test results be made available to the public? Should we treat this information in a confidential manner? Should carriers be required to provide consolidated performance statistics to illustrate accuracy levels for various topologies or for other reasons? Consistent with the *Location Accuracy NPRM*, we tentatively conclude that we should establish a mandatory schedule for accuracy testing.

22. *Challenging Environments.* We also seek to refresh the record on how location information and accuracy can be improved in more challenging environments, including indoor settings, urban canyons, buildings including high-rises, rural environments characteristic of heavy forestation, mountainous terrain, or sparsely located wireless towers. Do accuracy needs differ for indoor, outdoor, rural, and urban location determinations? Would it be appropriate to establish different threshold criteria depending on the environment? For example, whether a caller is located deep within a large building, or near a window, might have a significant impact on whether it is possible to achieve a location fix. How should trends in usage (such as increasing use of wireless inside buildings) impact accuracy requirements? What expectations do consumers hold in terms of the ability for PSAPs to locate them in various environments? Do some technologies perform better under certain challenging circumstances? What factors influence how well a particular accuracy solution performs? How best can the Commission spur innovation in location accuracy in both the short term and the future in challenging environments? What is a reasonable timeframe for carriers to significantly improve location accuracy in challenging environments? Would service providers be sufficiently motivated to achieve such improvements absent a regulatory deadline? How can technologies combine information from diverse sources, such as Wi-Fi access points or other ubiquitous sources, to improve location accuracy or other performance characteristics?⁵⁷ If a service provider provisions Wi-Fi access points for which it knows the address, should it use this information in lieu of end user-supplied location information?⁵⁸ We ask parties to comment on any other potential revisions to our current location accuracy requirements that could help carriers improve location accuracy in challenging environments.

23. *Vertical Location Information.* There has never been a requirement for service providers subject to the CMRS 911 rules to include vertical or z-axis information with location data. Of course, a third dimension of location information could greatly enhance accuracy, and have particular benefit in buildings in terms of identifying the floor where the 911 caller is located. We seek comment on how location information can include an accurate Z-axis component. In response to the *Location Accuracy NPRM*, APCO argued that, “the increased use of wireless phones in multiple-story buildings also requires potential inclusion of elevation information if technologically feasible.”⁵⁹ ATIS stated that, “[c]urrently no industry criterion exists for elevation and . . . before such information could be included in the location standard, greater research and development must occur.”⁶⁰ The Texas 9-1-1 Agencies noted that,

⁵⁶ APCO Supplement at 4.

⁵⁷ See Paul Boutin, *How to Use Facebook's New Location Feature*, THE NEW YORK TIMES – GADGETWISE, Aug. 19, 2010, <http://gadgetwise.blogs.nytimes.com/2010/08/19/how-to-use-facebooks-new-location-feature/?emc=eta1> (“Apple has built impressive location detection into its newer iPhones. They have GPS, plus they sniff the air for local Wi-Fi network names and compare them to a map of known network locations.”)

⁵⁸ See *IP-Enabled Services; E911 Requirements for IP-Enabled Service Providers*, Petition of T-Mobile USA, Inc. for Clarification, WC Docket 04-36, WC Docket 05-196 (filed July 29, 2005) (T-Mobile Petition) at 4-5.

⁵⁹ APCO Comments at 4.

⁶⁰ ATIS Comments at 5.

“realizing the conceptual potential value of elevation, we would like to see more information on how ‘elevation’ would specifically be proposed for use in practice at the PSAP before it would be considered further to become a requirement.”⁶¹ What technologies incorporate the use of Z-axis components for location awareness? What levels of accuracy do these technologies support? Would an accuracy requirement for a vertical component need to be stringent enough to distinguish building floors? What is the state of industry standardization of Z-axis components in geolocation? How should evolving standards and consumer expectations guide future rules? If handsets employ a vertical sensor, such as an altimeter, how could such information be incorporated into location data sent to a PSAP? If delivering vertical information were possible, are PSAPs capable of using such information and, if not, what would be necessary to enable receipt of vertical information? What is a reasonable timeframe for carriers to include an accurate z-axis component with location data? Would service providers be sufficiently motivated to implement a vertical location component absent a regulatory deadline?

24. *Location Accuracy While Roaming.* We next seek to refresh the record with regard to location accuracy while roaming. As the Commission noted in the *Location Accuracy NPRM*, we are concerned that a wireless caller whose carrier employs one type of location technology may not be provided Phase II service at all when roaming on the network of another carrier that relies on a different technology, or when there is no roaming agreement between carriers using compatible technologies.⁶² In response to the *Location Accuracy NPRM*, APCO stated that the Commission “should require that wireless carriers develop a viable technical solution to this [roaming] problem by a specific deadline.”⁶³ NENA stated that, “[a]s a general matter, NENA believes the obligation to deliver 9-1-1 calls should be met for roamers as well as native subscribers, no matter what the differences in technologies.”⁶⁴ Motorola, however, argued that full, seamless E911 roaming is not achievable in near term for carriers deploying disparate technologies.⁶⁵ Corr Wireless meanwhile argued that while different location technologies might not serve the needs of roamers, “adoption of a proposal to mandate AGPS technology... would effectively eliminate this issue;” however, it also noted that, “so long as there are incompatible technologies, it would plainly be irrational to expect or require carriers to provide a solution to roamers that their network is incapable of providing to their own customers.”⁶⁶ How can these issues be addressed? Should we require carriers to ensure delivery of location information to PSAPs for every call handled on their networks, including calls made by customers of another carrier (“roaming calls”) that has deployed a different technology in its own network or with whom the carrier handling the call has no automatic roaming relationship?

IV. NOTICE OF INQUIRY

25. In this NOI, we launch a broader inquiry into how we can ensure that providers of VoIP services can offer improved or expanded 911 service. We begin by focusing on whether we should require providers of interconnected VoIP services to provide location information to PSAPs without the

⁶¹ Texas 9-1-1 Agencies Comments at 8.

⁶² See *Location Accuracy NPRM*, 22 FCC Rcd at 10615 ¶ 17. We note that nothing in this item should be construed as addressing issues related to whether a provider has an obligation to enter into roaming arrangements with another provider and whether such obligation should be extended to non-interconnected services. These issues are addressed in a separate proceeding. See Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, WT Docket No. 05-265, *Order on Reconsideration and Second Further Notice of Proposed Rulemaking*, 25 FCC Rcd 4181 (2010).

⁶³ APCO Comments at 5.

⁶⁴ NENA Comments at 11.

⁶⁵ See Motorola Comments at 13.

⁶⁶ Corr Wireless Comments at 6.

customer's active cooperation. We also explore whether the Commission's 911 and E911 rules should apply to non-interconnected VoIP service providers. We next explore how location accuracy and ALI requirements will be impacted by the deployment of NG911 systems. Finally, we will seek comment on the applicability of 911 and E911 requirements to additional wireless communications services, devices, and applications.

A. 911 and E911 Requirements for VoIP Services

26. The Commission's E911 rules presently apply to interconnected VoIP services, specifically services that (1) enable real-time, two-way voice communications; (2) require a broadband connection from the user's location; (3) require Internet protocol-compatible customer premises equipment (CPE); and (4) permit users generally to receive calls that originate on the PSTN and to terminate calls to the PSTN.⁶⁷ In this section, we explore whether to impose additional requirements upon one subset of interconnected VoIP services – those that are portable, or “nomadic,” meaning they can be used from any available broadband Internet access service connection.⁶⁸

27. *Automatic Location Identification.* The Commission's rules currently do not require providers of portable interconnected VoIP service to automatically provide location information to PSAPs without the customer's active cooperation. In the *VoIP 911 NPRM*, the Commission requested comment on whether there may be ways for portable interconnected VoIP service providers to automatically identify the geographic location of a customer without the customer's active cooperation.⁶⁹ In the *Location Accuracy NPRM*, the Commission tentatively concluded that “to the extent that an interconnected VoIP service may be used in more than one location, providers must employ an automatic location technology that meets the same accuracy standards that apply to those CMRS services.”⁷⁰

28. Several commenters generally concurred with the Commission's tentative conclusion. For example, APCO stated that “where [an] interconnected VoIP service connects to a PSAP through a wireless network, then the location information should be delivered in the same form as required of other wireless service providers.”⁷¹ RCA noted that it “supports the position that standards for [VoIP] service should remain equivalent to those for CMRS [and it] is both reasonable and appropriate that these interconnected services be treated in the same manner as competing services.”⁷² However, a number of commenters opposed the tentative conclusion.⁷³ For example, TIA argued that “if the FCC decides to impose similar location accuracy standards on interconnected VoIP providers that are applicable to CMRS services, the Commission would be forced to regulate the entity providing the broadband Internet connection (i.e. restaurants, coffee shops, hotels, municipalities, etc.).”⁷⁴ Nokia stated that interconnected VoIP services “should not be subject to the Commission's CMRS E911 location requirements without ensuring that time is taken to study location technologies that can be used when a wireless 911 call is made using VoIP, standards are developed for delivering location technology over the Internet when a wireless VoIP 911 call is made, and technologies to be utilized for location are tested and finally

⁶⁷ 47 C.F.R. § 9.3.

⁶⁸ See *VoIP 911 Order*, 20 FCC Rcd at 10259-60 ¶ 25 & n.80 (contrasting “fixed” VoIP services, which can be used at only one location, with “portable” VoIP services, which can be used from any broadband connection).

⁶⁹ *VoIP 911 NPRM*, 20 FCC Rcd at 10276-77 ¶ 57.

⁷⁰ *Location Accuracy NPRM*, 22 FCC Rcd at 10615-16 ¶ 18.

⁷¹ APCO Comments at 5-6.

⁷² RCA Comments at 7.

⁷³ See, e.g., Comments of AT&T at 13-14; Sprint Nextel at 18-19; TIA at 7-9; Verizon at 1; VON at 2; Vonage at 7-11; NENA at 11; TCS at 2.

⁷⁴ TIA Comments at 8.

deployed.”⁷⁵ WCA argued that the Commission “fails to appreciate the enormous technical, operational and economic challenges wireless broadband network operators and their equipment suppliers will face if [the Commission] prematurely imposes ALI and location accuracy requirements on interconnected VoIP service without further study.”⁷⁶ A number of commenters recommended that the Commission form an advisory committee comprised of Commission staff, representatives of the VoIP industry, equipment vendors, state and local public safety officials, and consumer groups to study the technical, operational and economic issues related to the provision of ALI for interconnected VoIP services.⁷⁷

29. In light of the passage of time, we seek to refresh the record and revisit the tentative conclusion from the *Location Accuracy NPRM*. Specifically, what advanced technologies, if any, permit portable interconnected VoIP service providers to provide ALI? Have portable interconnected VoIP service providers implemented any practices or methods to provide ALI? If not, what can the Commission do to facilitate the development of techniques for automatically identifying the geographic location of users of this service? Should interconnected VoIP service providers incorporate an ability to automatically detect a user’s Internet connectivity, identify a user’s location, and prompt a user to confirm his/her location, prior to enabling calling features? What technologies exist that could locate a VoIP user using a standard broadband Internet connection? Should we require the automatic detection of a subscriber’s location prior to enabling calling features for a VoIP service, application, or device? Should the Commission clarify that CMRS operators providing interconnected VoIP services may deliver location information to a PSAP in the same manner as for CMRS, specifically, delivering longitude and latitude coordinates to the PSAP in lieu of a street address?⁷⁸

30. What have PSAPs experienced when VoIP users move to a different location and do not update their address? Is this scenario common? When it does occur, does the PSAP receive incorrect location information? Would requiring interconnected VoIP service providers to provide ALI minimize the reporting of erroneous location information, whether mistakenly or intentionally? What is the experience of PSAPs in receiving incorrect registered location information? How frequently do PSAPs receive fraudulent or malicious calls from users of interconnected VoIP services that appear to intentionally report false registered location information? Do industry standards and commercial trends indicate that ALI technologies exist for interconnected VoIP services that would be technically feasible and commercially viable? What privacy concerns are posed by requiring the automatic detection of VoIP users’ movement on Internet networks? Should we require that all terminal adapters or other equipment used in the provision of portable interconnected VoIP service sold as of a certain date be capable of providing location information automatically, whether embedded in other equipment or sold to customers at a separate price? Under what authority could the Commission take such actions? If the Commission were to develop an automatic location identification requirement for portable interconnected VoIP service providers, should it also establish a deadline for compliance and, if so, what should that deadline be?

31. *Additional VoIP Services*. Thus far, the Commission’s VoIP 911 rules have been limited to providers of interconnected VoIP services. Since these rules were adopted, however, there has been a significant increase in the availability and use of portable VoIP services and applications that do not meet one or more prongs of the interconnected VoIP definition. In light of the increase in use of these services,

⁷⁵ Nokia Comments at 6.

⁷⁶ WCA Comments at 4.

⁷⁷ See, e.g., Comments of WCA at 5; AT&T at 4, 13; CTIA at 9; Nokia Inc. and Nokia Siemens Networks at 6; TIA at 9; ATIS at 10; Center for Democracy and Technology/EFF Reply Comments at 2; T-Mobile Reply Comments at 8. See also Verizon at 4-5 (“Verizon has been part of an active industry effort through the Emergency Service Interconnection Forum (ESIF), a committee of the Alliance for Telecommunications Industry Solutions (ATIS), to develop a series of standards related to the provision of location information to PSAPs”).

⁷⁸ T-Mobile Petition at 10.

we seek comment on whether we should extend 911 and E911 obligations to providers of VoIP services that are not currently covered by the rules. For instance, what 911/E911 obligations, if any, should apply to VoIP services that are not fully interconnected to the PSTN? Specifically, should 911/E911 obligations apply to VoIP services that enable users to terminate calls to the PSTN, but do not permit users to receive calls that originate on the PSTN? Should 911/E911 obligations apply to VoIP services that enable users to receive calls from the PSTN, but do not permit the user to make calls terminating to the PSTN? Should 911/E911 obligations apply to VoIP services that enable users to receive calls from the PSTN and terminate calls to the PSTN but as separately elective services? Even though such VoIP services do not fully meet the definition of “interconnected VoIP,” should such service providers assume the same public safety responsibilities? Does it continue to make sense that because a VoIP service permits, for example, only out-bound calls to the PSTN, that there should be no 911 obligations? Is there a need to modify the definition of “interconnected VoIP” or create a new definition to cover the range of VoIP services that should be subject to 911/E911 requirements? How do consumer expectations, and the needs of PSAPs and emergency responders, factor into whether we should extend 911 and E911 obligations to additional VoIP services not meeting the interconnected definition? Would adopting additional 911 and E911 requirements for VoIP services help to further ensure that people with disabilities who desire to use interconnected VoIP service can obtain access to 911/E911 services? Would it be necessary to extend to non-interconnected VoIP providers rights of access to any and all capabilities necessary to provide 911 and E911 service from entities that own or control those capabilities? Would such extension of capabilities impact requirements for mobile handsets, terminal adapters or other equipment that may be outside the control of the non-interconnected VoIP service provider? What is a reasonable timeframe for providers of VoIP services and applications that do not meet the interconnected VoIP definition to comply with the Commission’s 911 rules?

32. *Authority.* The *VoIP 911 Order* rested on ancillary jurisdiction principles in adopting 911 requirements for interconnected VoIP services.⁷⁹ Subsequently, the NET 911 Act required interconnected VoIP providers to comply with the rules the Commission adopted in 2005 “as such requirements may be modified by the Commission from time to time.”⁸⁰ Accordingly, we seek comment on the FCC’s jurisdiction to extend 911 requirements to VoIP services that would not meet the “interconnected VoIP” definition. Under what authority should the Commission adopt any such rules?

B. Impact of NG911 Deployments on Location Accuracy and ALI

33. The National Broadband Plan recommends that the Commission consider how NG911 deployments may affect location accuracy and ALI requirements.⁸¹ We seek to examine how we may need to revise our location accuracy and ALI requirements to account for the deployment of NG911 systems. Although deployments of NG911 systems have been limited to date, we seek to build a record on the expected impact of NG911 deployments on the existing wireless location accuracy and ALI requirements. What has been the nature to date of NG911 deployments, and what currently might be in the planning or deployment stages? How will the identification and delivery of location information be incorporated by NG911 PSAPs? What technological or operational changes might service providers, applications developers, and device manufacturers implement that would complement NG911 capabilities? As the regulatory framework for wireless and VoIP E911 evolves, what specific considerations should the Commission heed as NG911 systems are deployed throughout the nation? Are there a minimum set of network, software and/or device criteria that would afford flexibility in providing location accuracy, but also meet consumers’ expectations and facilitate the deployment of NG911?

⁷⁹ See *VoIP 911 Order*, 20 FCC Rcd at 10261-66 ¶¶ 26-35.

⁸⁰ New and Emerging Technologies 911 Improvement Act of 2008, Pub. L. No. 110-283, 122 Stat. 2620 (2008) (NET 911 Act) (amending Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, 113 Stat. 1286 (1999)).

⁸¹ National Broadband Plan at 326.

C. Applicability of 911 and E911 Requirements to Additional Wireless Communications Services, Devices and Applications

34. *IP-Based Voice Communications Services, Devices, and Applications.* The wireless 911 and E911 requirements currently apply only to CMRS carriers meeting the criteria of Section 20.18(a). However, many new forms of IP-based voice communications are being offered to consumers via a variety of wireless services, devices and applications⁸² for use on a wide range of new devices.⁸³ These IP-based communications are being carried over CMRS circuit-switched and data networks, unlicensed Wi-Fi networks, or some combination of both.⁸⁴

35. In its recent survey of “the current state of the [broadband] ecosystem,” the National Broadband Plan found that “[d]evices continue to grow in number and variety as more computers, phones and other machines connect to the Internet. New devices have repeatedly revolutionized the personal computer (PC) market in the past three decades [and] about 80% of U.S. households have some sort of personal computer [and] although desktops initially dominated the market, 74% of all new personal computers sold today are laptops [and] over the next 5 years, growth in the netbook and tablet markets will far outpace growth in the traditional PC market.”⁸⁵ Similarly, the National Broadband Plan reported that the “mobile phone market has also seen robust innovation. There were more than 850 different certified mobile products in the United States in 2009. In that same year, approximately 172 million mobile phones were sold in the United States. Of these, 27% were Internet-capable smartphones manufactured by a wide variety of firms, including Apple, HTC, LG, Motorola, Nokia, Palm, RIM, Samsung and Sony-Ericsson.”⁸⁶ The distinguishing features of a smartphone are “an HTML browser that allows easy access to the full, open Internet; an operating system that provides a standardized interface and platform for application developers; and a larger screen size than a traditional handset.”⁸⁷ Many smartphones also have touch screens and/or a QWERTY keypad, and “run an operating system that offers a standard platform for application developers to create and sell device software through an application store.”⁸⁸ In contrast to traditional handsets with applications that include voice and messaging, smartphones have more user-friendly interfaces that facilitate access to the Internet and software applications.

36. The widespread and increasing availability and use of smartphones, mobile computing devices (*e.g.*, laptops, netbooks), and applications are leading to many new voice calling capabilities.⁸⁹

⁸² Examples of mobile VoIP services and smartphone-based applications are Google Voice Mobile, Skype Mobile, Truphone, iSkoot, and Fring.

⁸³ Examples of these include wireless smartphones; small personal computers, such as netbooks and the Apple iPad; other Wi-Fi-enabled but non-phone devices such as the Apple iPod touch; and computer peripherals, such as wireless air cards.

⁸⁴ Other wireless technology standards exist, although perhaps without as strong a nexus to voice communications, such as Bluetooth and near field communication.

⁸⁵ National Broadband Plan at 18.

⁸⁶ National Broadband Plan at 18 (footnotes omitted).

⁸⁷ Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No.09-66, *Fourteenth Report*, FCC 10-81 (rel. May 20, 2010) at ¶ 136 (14th Mobile Wireless Competition Report).

⁸⁸ *Id.*

⁸⁹ According to one study, mobile VoIP services will develop significantly faster in developed markets due to the direct correlation between 3G network deployments and the adoption of mobile VoIP by subscribers to those networks, although a high percentage of mobile VoIP carried over applications will be on Wi-Fi networks, (continued....)

We seek comment on what wireless devices, services and applications provide the equivalent of mobile telephony⁹⁰ or interconnected VoIP,⁹¹ whether using CMRS, Wi-Fi or other combination of wireless connectivity, yet are not subject to the interconnected VoIP or CMRS 911 and E911 rules. For such voice-based services and applications, what are the expectations of consumers using such technologies in terms of being able to dial 911, and having the PSAP know where they are located? Would adopting 911 and E911 requirements for additional IP-based devices, services and applications help to further ensure that people with disabilities who desire to use such technologies can obtain access to E911 services? Which if any such devices, services and applications should be made subject to 911 and E911 requirements? What is a reasonable timeframe for providers of these services, devices, and applications to comply with the Commission's 911 rules? What would be the source of the Commission's jurisdiction to impose any such requirements?

37. If we were to apply 911 and E911 requirements to these additional broadband-enabled voice technologies, or to amend the rules that currently apply to interconnected VoIP services, what approach should we take? What technical and economic factors should we consider? For any new devices, services, and applications that would become subject to 911 and E911 requirements, would we need to extend rights of access to any and all capabilities necessary to provide 911 and E911 service from entities that own or control those capabilities? Should we distinguish the applicability of 911 and E911 requirements based on the device used, and if so, should any distinction be drawn between devices authorized for use under Parts 22, 24, 27 or 90 of the Commission's rules, which generally place the responsibility for compliance on the licensee, from devices authorized under Part 15, which places responsibility for compliance on manufacturers? Since a number of VoIP services and applications are offered by third party software developers, should we extend 911 and E911 requirements to such entities? We seek comment on whether the Commission has the jurisdiction to impose 911 and E911 requirements particularly upon software application developers. If we adopt new rules for these services, devices, and applications, should we impose these requirements after a date certain? How do consumer usage patterns, marketing practices, consumer expectations, and the needs of the public safety community, including PSAPs and first responders, impact whether these additional communication services should be required to provide access to emergency services? As an alternative to adopting regulatory requirements, should the Commission encourage industry solutions?⁹² Would an industry-developed "model 911 voice app" be helpful? Could mobile voice applications be programmed to recognize a 911 attempt, and automatically engage the CMRS component of the device (if available)?

38. What particular capabilities or limitations might be presented by extending the wireless 911 and E911 requirements to additional voice communications methods? Would there always be a call-back number? Would it be necessary or helpful to distinguish those services, devices, and applications that utilize the macro CMRS network, as opposed to a Wi-Fi connection? If a Wi-Fi connection is utilized, does it further make a difference if the Wi-Fi connection is in-home, as opposed to a public hotspot, such as at a coffee shop, airport, bookstore, municipal park, etc.? Should devices supporting voice-based applications, including those that access the macro cellular network, Wi-Fi, or both, incorporate the capability to become location aware or require subscriber self-reporting of location? Should the Commission clarify that CMRS operators providing interconnected VoIP services may deliver location information to a PSAP in the same manner as for CMRS, specifically, delivering longitude and

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bypassing operators' networks altogether. See VoIP.biz-news.com, *Juniper Research: Mobile VoIP Users to Exceed 100 Million by 2012*, June 11, 2010.

⁹⁰ See Section 20.15(b)(1) (defining "mobile telephony").

⁹¹ See Section 9.3 (defining "interconnected VoIP service").

⁹² See Tom Lookabaugh & Douglas C. Sicker, *Self-Regulation of E911 for VoIP: Lessons for the Cable Industry from Environmental Voluntary Agreements*, Address before 2005 Magness Institute Academic Seminar, 2005 National Cable Television Association Show (Apr. 2, 2005).

latitude coordinates to the PSAP in lieu of a street address.⁹³ Would incorporating A-GPS chips or passive CMRS wireless receivers be effective in triangulating position? What would be the costs of doing so?

39. *Consumer Disclosures.* Some IP-based voice services offered via an Internet connection, and/or as a smartphone application, contain various forms of disclosures indicating that such services do not provide access to emergency services.⁹⁴ For those voice-based communications services, devices, and applications that do not support 911, what disclosures are currently being provided to the public and PSAPs about the lack of 911 capability? What do consumers expect concerning 911 and E911 for voice-calling services and applications? Are such voice-based services and applications the sole means for certain consumers to place voice calls, and thus to access 911? Should we adopt disclosure requirements for certain types of communications services, devices, and applications if they do not support 911 access? If so, what type of disclosure requirements should we adopt? Is there a basis for distinguishing certain VoIP services, such as those offered over a standard broadband Internet connection, or those that are used with mobile smartphones, or other devices such as netbooks, etc.? What would be the Commission's best source of authority for adopting such consumer disclosure requirements?

40. *Emerging Network Devices.* In connection with the provision of existing CMRS offerings, wireless carriers are incorporating a variety of network components that enhance coverage, capacity, and spectrum efficiency. Examples include femtocells, picocells, microcells, and distributed antenna systems. A femtocell is a miniature base station that transmits in a wireless carrier's licensed spectrum and provides improved coverage within a subscriber's home. Femtocells typically use a subscriber's home broadband connection for backhaul.⁹⁵ A picocell offers a wider range of connectivity than a femtocell, but still has a limited range of connectivity and is often employed to provide coverage over an area such as a single floor of a building, a train station platform, or an airport terminal. A microcell offers a larger deployment footprint than a picocell, such as a residential neighborhood, an office complex, or an entire airport. A distributed antenna system is a network of spatially separated antenna sites called "nodes" connected to a common source that provides wireless service within a geographic area or structures.

41. Since carriers are deploying these network components, it may be very helpful to consider the prospect of leveraging these devices to enhance location accuracy. Therefore, we seek to understand the capabilities and limitations of imposing location accuracy requirements that utilize these types of network components. In what ways can these devices and technologies be used to improve location accuracy? For example, a femtocell could be viewed as typically installed in a semi-permanent manner at a particular home or office, that could thus be programmed with an exact address, or even have an embedded A-GPS chip. If that address could be transported with a 911 call, that would lead to significant improvement in location accuracy, akin to the location quality of wireline networks. Similarly, the location of a picocell alone could provide greater location accuracy for 911 calls handled by a picocell. Are there opportunities for these network elements to provide a means to transmit more accurate location information? If so, how can we best incorporate these capabilities into the location information transmitted with a wireless 911 call?

⁹³ T-Mobile Petition at 10.

⁹⁴ See, e.g., Skype, *Product Features* (visited August 10, 2010) <<http://www.skype.com/intl/en-us/features/>>; Truphone, *Truphone Service Standard Terms and Conditions* (visited August 23, 2010) <http://www.truphone.com/about_us/legal.html>.

⁹⁵ Several major wireless operators are offering their subscribers femtocells for home use. See 14th Mobile Wireless Competition Report, at ¶ 350.

V. PROCEDURAL MATTERS

A. *Ex Parte* Rules – Permit-But-Disclose

42. This is a permit-but-disclose notice and comment rulemaking proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed pursuant to the Commission's rules.⁹⁶

B. Comment Period and Procedures

43. Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using: (1) the Commission's Electronic Comment Filing System (ECFS), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies. See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

44. *Electronic Filers:* Comments may be filed electronically using the Internet by accessing the ECFS: <http://www.fcc.gov/cgb/ecfs/> or the Federal eRulemaking Portal: <http://www.regulations.gov>. Filers should follow the instructions provided on the website for submitting comments. All comments shall be filed in PS Docket No. 07-114 and WC Docket No. 05-196. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions, filers should send an e-mail to ecfs@fcc.gov, and include the following words in the body of the message, "get form." A sample form and directions will be sent in response.

45. *Paper Filers:* Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. The Commission's contractor will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE, Suite 110, Washington, DC 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

46. *People with Disabilities:* To request materials in accessible formats for people with disabilities (Braille), large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

47. The public may view the documents filed in this proceeding during regular business hours in the FCC Reference Information Center, Federal Communications Commission, 445 12th Street, S.W., Room CY-A257, Washington, D. C. 20554, and on the Commission's Internet Home Page: <http://www.fcc.gov>. Copies of comments and reply comments are also available through the Commission's duplicating contractor: Best Copy and Printing, Inc., 445 12th Street, SW, Room CY-B402, Washington, DC, 20554, 1-800-378-3160.

⁹⁶ See generally 47 C.F.R. §§ 1.1202, 1.1203, 1.1206.

C. Initial Regulatory Flexibility Analysis

48. As required by the Regulatory Flexibility Act of 1980 (RFA),⁹⁷ the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in the *NPRM* portion of this document. The analysis is found in the Appendix. We request written public comment on the analysis. Comments must be filed by the same dates as listed in the first page of this document, and must have a separate and distinct heading designating them as responses to the IRFA. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this *NPRM*, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

D. Initial Paperwork Reduction Analysis

49. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified "information collection burden for small business concerns with fewer than 25 employees," pursuant to the Small Business Paperwork Relief Act of 2002.⁹⁸

E. Further Information

50. For further information concerning this rulemaking proceeding, contact Patrick Donovan, Public Safety and Homeland Security Bureau, at (202) 418-2413, Federal Communications Commission, 445 12th Street, S.W., Washington, D.C. 20554; or via the Internet to Patrick.Donovan@fcc.gov.

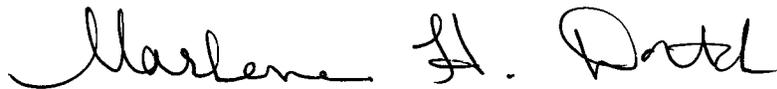
VI. ORDERING CLAUSES

51. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 7, 10, 201, 214, 251(e), 301, 302, 303, 307, 308, 309, 310, 319, 324, 332 and 333 of the Communications Act of 1934, 47 U.S.C. §§ 151, 152, 154(i), 157, 160, 201, 214, 251(e), 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, 333, that this Notice of Proposed Rulemaking and Notice of Inquiry is hereby ADOPTED.

52. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Further Notice of Proposed Rulemaking and Notice of Inquiry, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

53. IT IS FURTHER ORDERED that pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments on this Further Notice of Proposed Rulemaking and Notice of Inquiry on or before 60 days after publication in the Federal Register, and reply comments on or before 90 days after publication in the Federal Register.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

⁹⁷ 5 U.S.C. § 603.

⁹⁸ Public Law 107- 198; see 44 U.S.C. § 3506(c)(4).

APPENDIX

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁹⁹ the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact of the proposal described in the attached Further Notice of Proposed Rulemaking and Notice of Inquiry on small entities. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments in the Further Notice of Proposed Rulemaking and Notice of Inquiry. The Commission will send a copy of the Further Notice of Proposed Rulemaking and Notice of Inquiry, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).¹⁰⁰ In addition, the Further Notice of Proposed Rulemaking and Notice of Inquiry and IRFA (or summaries thereof) will be published in the Federal Register.¹⁰¹

A. Need for, and Objectives of, the Proposed Rules

2. The Further Notice of Proposed Rulemaking and Notice of Inquiry seek comments on how to ensure that wireless E911 service meets the needs of public safety and the American people, while taking into account the evolution in the use of wireless devices and the further development of location technologies. The Further Notice of Proposed Rulemaking part of this item seeks comment on the impact of technological changes in the use of wireless devices and the further development in the capabilities of location technologies on the standards for E911 Phase II location accuracy and reliability under Section 20.18(h) of the Commission's rules. As amended by the companion Second Report and Order, Section 20.18(h) requires licensees subject to the Commission's E911 requirements to meet those standards at the county or PSAP-based level.

3. The Further Notice of Proposed Rulemaking expands upon the second part of the preceding Notice of Proposed Rulemaking that the Commission released on June 1, 2007 (*Location Accuracy NPRM*) and seeks to update the other inquiries and tentative conclusions that the Commission initiated and reached, respectively. Specifically, the Further Notice of Proposed Rulemaking seeks comment on a number of issues raised in the *Location Accuracy NPRM*, including the following tentative conclusions by the Commission.

4. The Further Notice of Proposed Rulemaking tentatively concludes that the Commission should establish a mandatory testing and compliance regime and invites comment on the format in which accuracy data should be automatically provided to PSAPs.

5. The Further Notice of Proposed Rulemaking also tentatively concludes that "to the extent that an interconnected VoIP service may be used in more than one location, providers must employ an automatic location technology that meets the same accuracy standards that apply to those CMRS services," and asks for updated comment on whether the Commission should require carriers to ensure delivery of location information to PSAPs for every call handled on their networks, including calls made by customers of another carrier ("roaming calls") that has deployed a different technology in its own network or with whom the carrier handling the call has no automatic roaming relationship. The Commission seeks comment on the foregoing tentative conclusions.

6. Additionally, the Commission seeks comment on the other issues related to E911 location

⁹⁹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 – 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

¹⁰⁰ See 5 U.S.C. § 603(a).

¹⁰¹ See 5 U.S.C. § 603(a).

accuracy on which it previously sought comment in the *Location Accuracy NPRM*.

B. Legal Basis

7. The legal basis for any action that may be taken pursuant to this Further Notice of Proposed Rulemaking and Notice of Inquiry is contained in Sections 4(i) and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 332.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Would Apply

8. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules.¹⁰² The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”¹⁰³ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.¹⁰⁴ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).¹⁰⁵

9. Nationwide, there are a total of approximately 22.4 million small businesses, according to SBA data.¹⁰⁶ A “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹⁰⁷ Nationwide, as of 2002, there were approximately 1.6 million small organizations.¹⁰⁸ The term “small governmental jurisdiction” is defined generally as “governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹⁰⁹ Census Bureau data for 2002 indicate that there were 87,525 local governmental jurisdictions in the United States.¹¹⁰ We estimate that, of this total, 84,377 entities were “small governmental jurisdictions.”¹¹¹ Thus, we estimate that most governmental jurisdictions are small.

¹⁰² 5 U.S.C. §§ 603(b)(3), 604(a)(3).

¹⁰³ 5 U.S.C. § 601(6).

¹⁰⁴ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such terms which are appropriate to the activities of the agency and publishes such definitions(s) in the Federal Register.”

¹⁰⁵ 15 U.S.C. § 632.

¹⁰⁶ See SBA, Programs and Services, SBA Pamphlet No. CO-0028, at page 40 (July 2002).

¹⁰⁷ 5 U.S.C. § 601(4).

¹⁰⁸ Independent Sector, *The New Nonprofit Almanac & Desk Reference* (2002).

¹⁰⁹ 5 U.S.C. § 601(5).

¹¹⁰ U.S. Census Bureau, *Statistical Abstract of the United States: 2006*, Section 8, page 272, Table 415.

¹¹¹ We assume that the villages, school districts, and special districts are small, and total 48,558. See U.S. Census Bureau, *Statistical Abstract of the United States: 2006*, section 8, page 273, Table 417. For 2002, Census Bureau data indicate that the total number of county, municipal, and township governments nationwide was 38,967, of which 35,819 were small. *Id.*

1. Telecommunications Service Entities

a. Wireless Telecommunications Service Providers

10. Pursuant to 47 C.F.R. § 20.18(a), the Commission's 911 Service requirements are only applicable to Commercial Mobile Radio Service (CMRS) "[providers], excluding mobile satellite service operators, to the extent that they: (1) Offer real-time, two way switched voice service that is interconnected with the public switched network; and (2) Utilize an in-network switching facility that enables the provider to reuse frequencies and accomplish seamless hand-offs of subscriber calls. These requirements are applicable to entities that offer voice service to consumers by purchasing airtime or capacity at wholesale rates from CMRS licensees."

11. Below, for those services subject to auctions, we note that, as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Also, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated.

12. *Wireless Telecommunications Carriers (except Satellite)*. Since 2007, the Census Bureau has placed wireless firms within this new, broad, economic census category. Prior to that time, such firms were within the now-superseded categories of "Paging" and "Cellular and Other Wireless Telecommunications." Under the present and prior categories, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees. Because Census Bureau data are not yet available for the new category, we will estimate small business prevalence using the prior categories and associated data. For the category of Paging, data for 2002 show that there were 807 firms that operated for the entire year. Of this total, 804 firms had employment of 999 or fewer employees, and three firms had employment of 1,000 employees or more. For the category of Cellular and Other Wireless Telecommunications, data for 2002 show that there were 1,397 firms that operated for the entire year.

13. *Broadband Personal Communications Service*. The broadband Personal Communications Service (PCS) spectrum is divided into six frequency blocks designated A through F, and the Commission has held auctions for each block. The Commission defined "small entity" for Blocks C and F as an entity that has average gross revenues of \$40 million or less in the three previous calendar years.¹¹² For Block F, an additional classification for "very small business" was added and is defined as an entity that, together with its affiliates, has average gross revenues of not more than \$15 million for the preceding three calendar years.¹¹³ These standards defining "small entity" in the context of broadband PCS auctions have been approved by the SBA.¹¹⁴ No small businesses, within the SBA-approved small business size standards bid successfully for licenses in Blocks A and B. There were 90 winning bidders that qualified as small entities in the Block C auctions. A total of 93 small and very small business bidders won approximately 40 percent of the 1,479 licenses for Blocks D, E, and F.¹¹⁵ On March 23, 1999, the Commission re-auctioned 347 C, D, E, and F Block licenses. There were 48 small business

¹¹² See *Amendment of Parts 20 and 24 of the Commission's Rules – Broadband PCS Competitive Bidding and the Commercial Mobile Radio Service Spectrum Cap*, WT Docket No. 96-59, Report and Order, 11 FCC Rcd 7824, 61 FR 33859 (July 1, 1996) (*PCS Order*); see also 47 C.F.R. § 24.720(b).

¹¹³ See *PCS Order*, 11 FCC Rcd 7824.

¹¹⁴ See, e.g., *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Fifth Report and Order, 9 FCC Rcd 5332, 59 FR 37566 (July 22, 1994).

¹¹⁵ FCC News, *Broadband PCS, D, E and F Block Auction Closes*, No. 71744 (rel. Jan. 14, 1997); see also *Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licenses*, WT Docket No. 97-82, Second Report and Order, 12 FCC Rcd 16436, 62 FR 55348 (Oct. 24, 1997).

winning bidders. On January 26, 2001, the Commission completed the auction of 422 C and F Broadband PCS licenses in Auction No. 35. Of the 35 winning bidders in this auction, 29 qualified as “small” or “very small” businesses. Subsequent events, concerning Auction 35, including judicial and agency determinations, resulted in a total of 163 C and F Block licenses being available for grant.

14. *Narrowband Personal Communications Services.* To date, two auctions of narrowband personal communications services (PCS) licenses have been conducted. For purposes of the two auctions that have already been held, “small businesses” were entities with average gross revenues for the prior three calendar years of \$40 million or less. Through these auctions, the Commission has awarded a total of 41 licenses, out of which 11 were obtained by small businesses. To ensure meaningful participation of small business entities in future auctions, the Commission has adopted a two-tiered small business size standard in the *Narrowband PCS Second Report and Order*.¹¹⁶ A “small business” is an entity that, together with affiliates and controlling interests, has average gross revenues for the three preceding years of not more than \$40 million. A “very small business” is an entity that, together with affiliates and controlling interests, has average gross revenues for the three preceding years of not more than \$15 million. The SBA has approved these small business size standards.¹¹⁷ In the future, the Commission will auction 459 licenses to serve Metropolitan Trading Areas (MTAs) and 408 response channel licenses. There is also one megahertz of narrowband PCS spectrum that has been held in reserve and that the Commission has not yet decided to release for licensing. The Commission cannot predict accurately the number of licenses that will be awarded to small entities in future auctions. However, four of the 16 winning bidders in the two previous narrowband PCS auctions were small businesses, as that term was defined. The Commission assumes, for purposes of this analysis, that a large portion of the remaining narrowband PCS licenses will be awarded to small entities. The Commission also assumes that at least some small businesses will acquire narrowband PCS licenses by means of the Commission’s partitioning and disaggregation rules.

15. *Specialized Mobile Radio.* The Commission awards “small entity” bidding credits in auctions for Specialized Mobile Radio (SMR) geographic area licenses in the 800 MHz and 900 MHz bands to firms that had revenues of no more than \$15 million in each of the three previous calendar years.¹¹⁸ The Commission awards “very small entity” bidding credits to firms that had revenues of no more than \$3 million in each of the three previous calendar years.¹¹⁹ The SBA has approved these small business size standards for the 900 MHz Service.¹²⁰ The Commission has held auctions for geographic area licenses in the 800 MHz and 900 MHz bands. The 900 MHz SMR auction was completed in 1996. Sixty bidders claiming that they qualified as small businesses under the \$15 million size standard won 263 geographic area licenses in the 900 MHz SMR band. The 800 MHz SMR auction for the upper 200 channels was conducted in 1997. Ten bidders claiming that they qualified as small businesses under the \$15 million size standard won 38 geographic area licenses for the upper 200 channels in the 800 MHz

¹¹⁶ *Amendment of the Commission’s Rules to Establish New Personal Communications Services, Narrowband PCS*, Docket No. ET 92-100, Docket No. PP 93-253, Second Report and Order and Second Further Notice of Proposed Rulemaking, 15 FCC Rcd 10456, 65 FR 35875 (June 6, 2000).

¹¹⁷ See SBA Dec. 2, 1998 Letter.

¹¹⁸ 47 C.F.R. § 90.814(b)(1).

¹¹⁹ *Id.*

¹²⁰ See Letter to Thomas Sugrue, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, from Aida Alvarez, Administrator, Small Business Administration, dated August 10, 1999. We note that, although a request was also sent to the SBA requesting approval for the small business size standard for 800 MHz, approval is still pending.

SMR band.¹²¹ A second auction for the 800 MHz band was conducted in 2002 and included 23 BEA licenses. One bidder claiming small business status won five licenses.¹²²

16. The auction of the 1,050 800 MHz SMR geographic area licenses for the General Category channels began was conducted in 2000. Eleven bidders won 108 geographic area licenses for the General Category channels in the 800 MHz SMR band qualified as small businesses under the \$15 million size standard.¹²³ In an auction completed in 2000, a total of 2,800 Economic Area licenses in the lower 80 channels of the 800 MHz SMR service were awarded.¹²⁴ Of the 22 winning bidders, 19 claimed "small business" status and won 129 licenses. Thus, combining all three auctions, 40 winning bidders for geographic licenses in the 800 MHz SMR band claimed status as small business.

17. In addition, there are numerous incumbent site-by-site SMR licensees and licensees with extended implementation authorizations in the 800 and 900 MHz bands. We do not know how many firms provide 800 MHz or 900 MHz geographic area SMR pursuant to extended implementation authorizations, nor how many of these providers have annual revenues of no more than \$15 million. One firm has over \$15 million in revenues. In addition, we do not know how many of these firms have 1500 or fewer employees.¹²⁵ We assume, for purposes of this analysis, that all of the remaining existing extended implementation authorizations are held by small entities, as that small business size standard is approved by the SBA.

18. *Mobile Satellite Service Carriers.* Neither the Commission nor the U.S. Small Business Administration has developed a small business size standard specifically for mobile satellite service licensees. The appropriate size standard is therefore the SBA standard for Satellite Telecommunications, which provides that such entities are small if they have \$13.5 million or less in annual revenues.¹²⁶ Currently, the Commission's records show that there are 31 entities authorized to provide voice and data MSS in the United States. The Commission does not have sufficient information to determine which, if any, of these parties are small entities. The Commission notes that small businesses are not likely to have the financial ability to become MSS system operators because of high implementation costs, including construction of satellite space stations and rocket launch, associated with satellite systems and services.

19. *220 MHz Radio Service – Phase I Licensees.* The 220 MHz service has both Phase I and Phase II licenses. Phase I licensing was conducted by lotteries in 1992 and 1993. There are approximately 1,515 such non-nationwide licensees and four nationwide licensees currently authorized to operate in the 220 MHz Band. The Commission has not developed a definition of small entities specifically applicable to such incumbent 220 MHz Phase I licensees. To estimate the number of such licensees that are small businesses, we apply the small business size standard under the SBA rules applicable to Wireless Telecommunications Carriers (except Satellite).¹²⁷ This category provides that a small business is a wireless company employing no more than 1,500 persons.¹²⁸ The Commission

¹²¹ See "Correction to Public Notice DA 96-586 'FCC Announces Winning Bidders in the Auction of 1020 Licenses to Provide 900 MHz SMR in Major Trading Areas,'" *Public Notice*, 18 FCC Rcd 18367 (WTB 1996).

¹²² See "Multi-Radio Service Auction Closes," *Public Notice*, 17 FCC Rcd 1446 (WTB 2002).

¹²³ See "800 MHz Specialized Mobile Radio (SMR) Service General Category (851-854 MHz) and Upper Band (861-865 MHz) Auction Closes; Winning Bidders Announced," *Public Notice*, 15 FCC Rcd 17162 (2000).

¹²⁴ See, "800 MHz SMR Service Lower 80 Channels Auction Closes; Winning Bidders Announced," *Public Notice*, 16 FCC Rcd 1736 (2000).

¹²⁵ See generally 13 C.F.R. § 121.201, NAICS code 517210.

¹²⁶ 13 C.F.R. § 121.201, North American Industry Classification System ("NAICS") code 517410.

¹²⁷ *Id.*

¹²⁸ *Id.*

estimates that most such licensees are small businesses under the SBA's small business standard.

20. *220 MHz Radio Service – Phase II Licensees.* The 220 MHz service has both Phase I and Phase II licenses. The Phase II 220 MHz service is a new service, and is subject to spectrum auctions. In the *220 MHz Third Report and Order*, the Commission adopted a small business size standard for defining “small” and “very small” businesses for purposes of determining their eligibility for special provisions such as bidding credits and installment payments.¹²⁹ This small business standard indicates that a “small business” is an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding \$15 million for the preceding three years.¹³⁰ A “very small business” is defined as an entity that, together with its affiliates and controlling principals, has average gross revenues that do not exceed \$3 million for the preceding three years.¹³¹ The SBA has approved these small size standards.¹³² Auctions of Phase II licenses commenced on and closed in 1998.¹³³ In the first auction, 908 licenses were auctioned in three different-sized geographic areas: three nationwide licenses, 30 Regional Economic Area Group (EAG) Licenses, and 875 Economic Area (EA) Licenses. Of the 908 licenses auctioned, 693 were sold.¹³⁴ Thirty-nine small businesses won 373 licenses in the first 220 MHz auction. A second auction included 225 licenses: 216 EA licenses and 9 EAG licenses. Fourteen companies claiming small business status won 158 licenses.¹³⁵ A third auction included four licenses: 2 BEA licenses and 2 EAG licenses in the 220 MHz Service. No small or very small business won any of these licenses.¹³⁶ In 2007, the Commission conducted a fourth auction of the 220 MHz licenses.¹³⁷ Bidding credits were offered to small businesses. A bidder with attributed average annual gross revenues that exceeded \$3 million and did not exceed \$15 million for the preceding three years (“small business”) received a 25 percent discount on its winning bid. A bidder with attributed average annual gross revenues that did not exceed \$3 million for the preceding three years received a 35 percent discount on its winning bid (“very small business”). Auction 72, which offered 94 Phase II 220 MHz Service licenses, concluded in 2007.¹³⁸ In this auction, five winning bidders won a total of 76 licenses. Two winning bidders identified themselves as very small businesses won 56 of the 76 licenses. One of the winning bidders that identified themselves as a small business won 5 of the 76 licenses won.

21. *Wireless Telephony.* Wireless telephony includes cellular, personal communications services (PCS), and specialized mobile radio (SMR) telephony carriers. As noted, the SBA has developed

¹²⁹ Amendment of Part 90 of the Commission's Rules to Provide For the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service, *Third Report and Order*, 12 FCC Rcd 10943, 11068-70 ¶¶ 291-295 (1997).

¹³⁰ *Id.* at 11068 ¶ 291.

¹³¹ *Id.*

¹³² See Letter to Daniel Phythyon, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, from Aida Alvarez, Administrator, Small Business Administration, dated January 6, 1998.

¹³³ See generally “220 MHz Service Auction Closes,” *Public Notice*, 14 FCC Rcd 605 (WTB 1998).

¹³⁴ See “FCC Announces It is Prepared to Grant 654 Phase II 220 MHz Licenses After Final Payment is Made,” *Public Notice*, 14 FCC Rcd 1085 (WTB 1999).

¹³⁵ See “Phase II 220 MHz Service Spectrum Auction Closes,” *Public Notice*, 14 FCC Rcd 11218 (WTB 1999).

¹³⁶ See “Multi-Radio Service Auction Closes,” *Public Notice*, 17 FCC Rcd 1446 (WTB 2002).

¹³⁷ See “Auction of Phase II 220 MHz Service Spectrum Scheduled for June 20, 2007, Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction 72,” *Public Notice*, 22 FCC Rcd 3404 (2007).

¹³⁸ See “Auction of Phase II 220 MHz Service Spectrum Licenses Closes, Winning Bidders Announced for Auction 72, Down Payments due July 18, 2007, FCC Forms 601 and 602 due July 18, 2007, Final Payments due August 1, 2007, Ten-Day Petition to Deny Period,” *Public Notice*, 22 FCC Rcd 11573 (2007).