6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 9

[PS Docket No. 07-114; FCC 19-124; FRS 16359]

Wireless E911 Location Accuracy Requirements

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Federal Communications Commission (the FCC or Commission) proposes rules to improve E911 wireless location accuracy. The Fifth Further Notice of Proposed Rulemaking (FNPRM) seeks comment on adopting a timeline narrowing the z-axis (vertical) location accuracy metric, and requiring Commercial Mobile Radio Service (CMRS) Providers to deliver floor level information to Public Safety Answering Points (PSAPs) in conjunction with a wireless indoor 911 call. The FNPRM also seeks comment on alternative methods for carriers to demonstrate z-axis technology deployment, and comment on expanding dispatchable location solutions. The intended effect of this FNPRM is to address long term public safety requirements in the Commission's indoor location framework, while balancing technological neutrality and flexibility.

DATES: Comments are due on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, and reply comments are due on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: You may submit comments, identified by PS Docket No. 07-114, by any of the following methods:

- Federal Communications Commission's Web Site: http://apps.fcc.gov/ecfs/. Follow the instructions for submitting comments.
- Mail: Parties who choose to file by paper must file an original and one copy 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. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes 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 9050 Junction Drive, Annapolis Junction, MD 20701. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.
- People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

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SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Fifth Further Notice of Proposed Rulemaking (FNPRM) in PS Docket No. 07-114, adopted November 22, 2019, and released November 25, 2019. The full text of this document is available for public inspection during regular business hours in the FCC Reference Information Center, Portals II, 445 12th Street, SW, Room CY-A257, Washington, DC 20554.

Initial Paperwork Reduction Act of 1995 Analysis

This document does not contain proposed information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, therefore, it does not contain any proposed information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 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 the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998), http://www.fcc.gov/Bureaus/OGC/Orders/1998/fcc98056.pdf.

The proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's ex parte rules. Persons making ex parte presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within 2 business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral ex parte presentations are reminded that memoranda summarizing the

presentation must (1) list all persons attending or otherwise participating in the meeting at which the ex parte presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during ex parte meetings are deemed to be written ex parte presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral ex parte presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's ex parte rules.

SYNOPSIS:

1. Given the likelihood that vertical location technology will continue to improve, we seek comment on whether to establish a long-term timeline for migrating to a more stringent z-axis metric than 3 meters, and ultimately whether to require CMRS providers carriers to deliver floor level information in conjunction with wireless indoor 911 calls. We also propose to amend the rules to expand on the current options for demonstrating deployment of z-axis or dispatchable location capability.

Continuing to Improve the Z-Axis Metric

2. We seek comment on what additional steps we can take to facilitate our long-term location accuracy objectives. Public safety commenters that support the 3-meter standard in the short term also support taking additional steps to achieve floor level accuracy over the longer term. For example, the International Association of Fire Chiefs recommends narrowing the 3-meter metric over a five-year timeline. Commenters note that vertical location technology solutions will continue to improve, thus making application of a narrower metric more feasible over time.

3. We seek comment on the feasibility of phasing in more granular z-axis requirements over time, consistent with the approach that has worked well to date for horizontal location accuracy and allowed valuable vertical location technologies to evolve. We seek comment on whether it would be technologically feasible to achieve a 2 meter metric and if so, over what time frame. For example, should we adopt a phased five-year timeline for migrating from the 3-meter metric towards a 2-meter metric? As part of that phased-in approach should we require nationwide CMRS providers to meet a 2-meter metric within four years and non-nationwide CMRS providers to comply in the fifth year? Is a 1-meter metric feasible over the longer term?

4. Are there other alternatives we should consider for a narrower vertical location accuracy metric? Should we maintain the same requirements as in the current rules for applying future metrics to handsets (80% of wireless E911 calls from z-axis capable handsets) and for providing C/U data (based on a 90% confidence threshold)? Commenters advocating other alternatives and/or a mix of the options described here should explain the technical feasibility, benefits, and costs of their preferred approach(es).

5. To continue to improve the z-axis metric, we seek comment on whether

enhancements are needed to the vertical location accuracy testing process. For example, APCO states that "[t]he Commission should require carriers to take additional steps to verify that real-world performance is consistent with test bed evaluation of z-axis technology," and asserts that the Commission should require more comprehensive testing of devices and testing unique public safety use cases. Should we require testing to include specific first responder scenarios? How does z-axis technology work during power outages? We also seek comment on the impact of power outages on horizontal location accuracy and address-based dispatchable location technologies, such as the NEAD. Should power outage scenarios be included in a z-axis technology test bed? APCO also raises concerns about first responders trying to "match" a 911 caller's altitude when the first responders are using one technology vendor and the caller's device uses another. Should we require testing protocols to ensure that the "use of different solutions does not produce additional error that exceeds the +/- 3 accuracy baseline"? We seek comments on APCO's proposals and other improvements to vertical location accuracy testing.

6. Some representatives of public safety officials argue that they would benefit from actual floor level information. Given the lack of current mechanisms that are consistently and reliably capable of converting z-axis information to a floor level, we seek additional information on efforts to convert z-axis data to precise floor level. What resources are available today for public safety entities and CMRS providers to convert z-axis information into floor-level information? Are there any local or regional tools currently available that could be scaled nationally? What tools and resources are being developed, and on what time horizon? Is there an appropriate timeline for converting z-axis information (as required to be reported above) to floor level information, taking into account the time needed to achieve technical feasibility and the relative costs of doing so? What are some of the technological challenges to delivering floor

level and how can we overcome these challenges? BRETSA states that floor heights are not standard and other commenters note that an authoritative database for the mapping of floors in multi-story buildings does not exist. Are there initiatives under way to develop resources for mapping building heights and floor numbers? What are the costs to carriers and public safety to develop database solutions that can be used to convert altitude measurements to an actual floor-level?

7. One possible technological solution to providing floor or unit number data uses Wi-Fi, Bluetooth, and other wireless signals to query privately-maintained databases linking those signals to the location data. Our record indicates that significant technical and implementation challenges remain with this approach. For example, there may be lower densities of Wi-Fi and Bluetooth access points in lower-income communities. Privately-maintained reference point databases also do not provide outdoor coverage (such as in national parks), may be moved or discarded, and may not work at all during power outages. We seek to maintain technological neutrality in our z-axis requirements, and we do not want to inhibit the development of technological solutions that will provide the most accurate location data and, ultimately, save lives. At the same time, we encourage commenters to assess the reliability of their proposed technological solutions in foreseeable emergency circumstances and how that should affect any future changes to our location data requirements.

8. Google proposes that the Commission include an option that allows carriers to provide floor level estimates instead of HAE-based 3-meter z-axis measurements. We seek comment on Google's proposal to allow provision of floor level information without provision of HAE. What are the drawbacks of delivering vertical location information without HAE?

9. Some public safety commenters encourage us to require CMRS providers to

report floor-level, rather than simply z-axis information, or dispatchable location and z-axis information. If we were to do so, would a 5, 7, or 10-year timeline be sufficient to achieve floor level accuracy? What interim deadlines should the Commission impose and what other actions should the Commission take in order to ensure that CMRS providers can provide floor level information and/or multiple data points? If CMRS providers meet such a timeline, will PSAPs be ready within the same timeframe to accept floor level information? What should the testing and development process look like?

10. We seek comment on whether to require provision of confidence and uncertainty data with floor level information. We also seek comment on the costs and benefits associated with a requirement to provide floor level in comparison to the costs and benefits of providing z-axis information. In the Fifth Report and Order we determine that our location accuracy rules, including the 3-meter z-axis metric, would improve emergency response times, which, in turn, would improve patient outcomes and save lives. Expected benefits far exceed that temporary cost amount which lasts only for a few years. The benefit floor from enhanced horizontal and vertical accuracy for wireless phones adopted in the Fifth Report and Order is expected to account for a large part of $97 billion. Are there alternatives beyond a five-year timeline that we should consider for implementing a floor-level accuracy metric? Commenters advocating a different approach should explain the technical feasibility, benefits, and costs of their preferred approach(es).

Alternative Options for Z-Axis Deployment

11. In each CMA where CMRS providers use z-axis technology to comply with vertical location requirements, the current rules require that CMRS providers deploy z-axis technology to cover 80% of the CMA population. We seek comment on whether expanding

options beyond the population-based CMA coverage requirement would serve the public interest.

12. Urban and Dense Urban Morphologies. Verizon states that deploying the network-level components of z-axis solutions should focus on urban and dense urban areas where multi-story buildings are concentrated. Verizon reasons that "[t]he Commission's public safety objectives would not be served if deployment of the capability in a suburban area helps achieve the 80 percent coverage benchmark, but the result is that Z-axis coverage is provided for single-story residential dwellings, rather than the multi-story buildings where those residents work (but do not live)." NextNav argues that focusing deployment on buildings above three stories would reduce costs and increase benefits because such deployment rules "would permit location service providers to focus deployment of their weather calibration reference points where they are most needed to achieve the mission (and correspondingly, to avoid deployment in areas where they do not add significant value)." Precision Broadband proposes mandating the provision of both dispatchable location and a z-axis location metric for 911 calls originating from "multi-story" buildings.

13. Some commenters recommend refining the per-CMA requirement in the rules to measure deployment based on coverage of 80% of the buildings that exceed three stories in each of the top 50 CMAs, rather than based on covering 80% of the population. If afforded the option to focus z-axis deployment in dense and dense urban morphologies and buildings above three stories, how would CMRS providers document their deployment? Should the information be provided to the PSAPs so they know which areas and buildings are covered? Should the same information be provided to the public? Would NextNav and Verizon's proposal reduce compliance costs while preserving or increasing the benefits of the z-axis backstop? Would deployment criteria focused on urban and dense urban morphologies as opposed to population

coverage promote deployment of handset-based solutions? Should the Commission mandate the provision of both dispatchable location and vertical location data for 911 calls originating from multi-story buildings?

14. Handset Deployment. The two z-axis solutions that have already been tested in the test bed (NextNav and Polaris) are handset-based, i.e., the location determination is calculated in the handset, rather than at an external point within a network. Google also supports focusing on handset-based solutions because such solutions have the advantage that they can be deployed on a nationwide basis so that all wireless users have access to them. Accordingly, we seek comment on establishing an option for CMRS providers to deploy z-axis capable handsets nationwide as a means of complying with our z-axis deployment requirements. What are the benefits and costs associated with handset-based z-axis deployment? Would a handset deployment option facilitate more rapid and widespread availability of nationwide z-axis solutions deployment than other options? Is a handset-based approach more-cost effective than a network-based approach? How do the costs change between deploying in the top 50 CMAs and nationwide? Can deployment nationwide be handled approaches that would require additions or modifications to network at the handset level rather than incurring infrastructure costs? We additionally seek comment on the costs and benefits of both deploying z-axis capable handsets in the top 50 CMAs and deploying them nationwide. We seek data on how likely consumers carrying z-axis capable handsets may travel in and out of one of the top 50 CMAs. What do carriers or other industry actors estimate the cost per handset is? Will a nationwide implementation of the instant rules reduce costs per handset? Can deployment nationwide be handled at the handset level rather than incurring infrastructure costs? We seek comment on how a nationwide deployment would impact compliance costs.

15. We also recognize that ensuring meaningful deployment of handset-based solutions requires z-axis capable devices to be widely available to consumers. How should we measure such deployment? Would it be sufficient for CMRS providers to show that they have made a certain percentage of the handset models that they market to customers z-axis capable? If so, what should that percentage be, and should we specify additional criteria to ensure that providers offer a reasonable selection of low-end handset models as well as higher-end models that have z-axis capability? What steps could we take to increase the number of older devices and lifeline phones that are z-axis capable? Alternatively, should we require CMRS providers to demonstrate actual market penetration of z-axis capable handsets, and if so, what penetration level would be sufficient? Should we take handset churn rates into account in setting penetration thresholds, or should we require providers to achieve specified penetration levels regardless of churn, as we did in implementing our Phase II rules?

16. Google suggests adopting an approach analogous to that in the European Electronics Communication Code (EECC). Google states that "[b]y December 2020, all European Union member states will be required to use handset-derived location in addition to network-based information for response to emergency calls." By March 17, 2022, "the EECC will require that all smartphones sold in the European Single Market be able to provide handset-based location data." We seek comment on Google's suggestion that we adopt an approach similar to the EECC. Should we consider this or other international initiatives as we seek to encourage the development and deployment of improved z-axis solutions in the U.S.? What are the costs and benefits of such an approach?

17. Non-Nationwide CMRS Providers. As we consider future z-axis requirements for E911 location accuracy nationwide, CCA urges the Commission "to implement a glide path for

non-nationwide carriers to comply with any adopted timeframes, particularly if these carriers operate outside of the FNPRM's proposed benchmark of the top 50 markets." APCO notes that "existing benchmarks in 2022 and 2024 for non-nationwide carriers could be adjusted consistent with [its] suggested revisions for 2021 and 2023." We seek comment on an appropriate timeline for affording new z-axis deployment options to non-nationwide CMRS providers. Non-nationwide CMRS providers already have an additional year to comply with CMA-based deployment metrics under our current rules. If we adopt other deployment options based on building type or nationwide deployment of handset-based z-axis solutions, would the extra year already afforded to non-nationwide providers be sufficient to enable them to take advantage of these options?

18. We also seek comment on costs and benefits associated with top 50 CMA and a possible nationwide deployment of z-axis technology, which would effectively result in a nationwide x, y and z location accuracy standard. How do the costs or benefits change between deploying in the top 50 CMAs and nationwide? Does a phased implementation approach change these costs and benefits? In order to reduce the infrastructure costs associated with vertical location, NextNav suggests that the Commission "consider revising its existing requirements regarding the geographic locations where z-axis services must be provided." NextNav argues that "[i]t is unclear . . . whether accurate vertical location information is urgently needed in every portion of the top CMAs, particularly in suburban and rural areas with a large preponderance of one and two story residences," and as such, one way to reduce cost would be to require compliance based on "coverage of 80 percent of the buildings that exceed three stories in each of the top 50 CMAs, rather than based on the residential locations of 80 percent of the population." Would such a proposal, for example, minimize carrier compliance costs while directing z-axis

coverage to the areas that need it most? We seek comment on this proposal and solicit comments on any other methods to reduce costs while increasing benefits, especially if the Commission opts to implement these rules nationwide.

Dispatchable Location and Alternatives to the NEAD

19. In each CMA where dispatchable location is used, our rules require nationwide CMRS providers to "ensure that the NEAD is populated with a sufficient number of total dispatchable location reference points to equal 25 percent of the CMA population." This requirement precludes carriers from implementing dispatchable location solutions that rely on data sources other than the NEAD, even where such solutions might be more viable and cost-effective. Accordingly, we propose to allow CMRS providers to demonstrate dispatchable location deployment by means other than NEAD reference points. We seek comment on this proposal. As NextNav suggests, we also seek comment on "any procedures that would quantify and verify these improvements, such as requiring the use of address-based (DL) accuracy testing and reporting requirements (including confidence and uncertainty reporting) to ensure that any changes to the NEAD or other address-based DL technologies actually succeed in improving wireless location accuracy to support public safety." How do we account for uncertainty in dispatchable location data? Should we extend C/U requirements to alternative methods of delivery dispatchable location? If, so what should be the required C/U percentage?

20. We recognize the importance to public safety of obtaining dispatchable location information regarding which "door to kick in." However, the record indicates that the NEAD faces challenges that could slow down implementation of dispatchable location. Meanwhile, alternatives to the NEAD are emerging that could support dispatchable location. As APCO puts it, "dispatchable location can be provided without the NEAD" and use of the NEAD to provide a

caller's location does not necessarily mean a "dispatchable location has been provided." The Texas 9-1-1 Entities point to location solutions such as Apple's HELO, Google's Android ELS, and West Public Safety's proximity check. Texas 9-1-1 Entities state that "[t]o the extent additional issues regarding the NEAD or alternative dispatchable location solutions can be further clarified early in the development process, any such clarifications may enhance the development process." Precision Broadband explains that it will soon propose a fixed broadband alternative dispatchable location solution—independent of the NEAD— which relies on internet service provider interfaces to provide dispatchable location.

21. Our proposal to expand the range of possible dispatchable location solutions for CMRS providers is also consistent with the approach to dispatchable location that we recently adopted for non-CMRS providers in the Kari's Law and RAY BAUM's Act proceeding. In that proceeding, we sought comment on whether database location solutions, including the NEAD, could potentially assist non-CMRS providers in determining the "dispatchable location of MLTS end users." Commenters in that proceeding generally expressed skepticism that the NEAD has any near-term utility for MLTS location, but commenters suggested that dispatchable location may be achievable if carriers can leverage other data sources, such as third-party databases or crowd-sourced location data. To address concerns about relying on database location solutions, the Commission adopted a more flexible approach to providing dispatchable location for non-CMRS providers. In this proceeding, we expect CMRS providers to continue pursuing dispatchable location alternatives, even if they choose not to pursue the NEAD.

22. Because the Commission has applied specific privacy and security safeguards to the NEAD, we propose that any dispatchable location alternative used by CMRS providers should include equivalent safeguards. We seek comment on this tentative conclusion. What are

the costs and benefits of employing alternative information sources, either to supplement or replace the NEAD? How reliable are third-party and crowd-sourced location data alternatives? Are there other alternative information sources that we should consider? Should, for example, the Commission consider fixed broadband location data as a NEAD information source? What are the relative costs and benefits of applying NEAD-type security and privacy protections to alternative information sources? How would such sources meet the validation criteria in the definition of dispatchable location applicable to CMRS providers?

23. We also seek comment on the possible costs and benefits associated with dispatchable location alternatives to the NEAD. For example, what are the costs and benefits associated with Precision Broadband's multi-faceted proposal to require the reporting of both (1) dispatchable location and (2) z-axis information in the top 50 Cellular Market Areas. What are the associated costs and benefits of relying on alternative data sources for dispatchable location. What are the costs and benefits of alternative methods for delivering dispatchable location?

I. INITIAL REGULATORY FLEXIBILITY ANALYSIS

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

Need for, and Objectives of, the Proposed Rules

2. In the Fifth Further Notice, we propose changes to, and seek comment on, our E911 location accuracy rules to expand options for z-axis deployment and provisioning of dispatchable location, in order to address long term public safety requirements in the Commission's indoor location framework, while balancing technological neutrality and flexibility. More specifically, we seek comment on a timeline for narrowing the z-axis metric and requiring carriers to deliver floor level information to Public Safety Answering Points (PSAPs) in conjunction with a wireless indoor 911 call. We inquire whether a five-year timeline is sufficient to achieve floor level accuracy, and, if so, what actions should the Commission take in order to ensure that CMRS providers can provide floor level information. For z-axis deployment, we seek comment on providing alternative ways for carriers to demonstrate that they have deployed z-axis technology, such as deploying z-axis capable handsets nationwide. With respect to dispatchable location, the Commission seeks comment on expanding dispatchable location solutions, provided that any new sources of dispatchable locations would be subject to privacy and security protection equivalent to those in effect for the National Emergency Address Database (NEAD).

Legal Basis

3. The proposed action is authorized under sections 1, 2, 4(i), 7, 10, 201, 214, 222, 251(e), 301, 302, 303, 307, 309, 316, and 332, of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152(a), 154(i), 157, 160, 201, 214, 222, 251(e), 301, 302, 303, 307, 309, 316, 332; the Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, 47 U.S.C. 615 note, 615, 615a, 615b; and Section 106 of the Twenty-First Century Communications and Video Accessibility Act of 2010, Pub. L. No. 111-260, 47 U.S.C. 615c.

Description and Estimate of the Number of Small Entities To Which the Proposed Rules Will Apply

4. 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, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. 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 SBA.

5. Small Businesses, Small Organizations, Small Governmental Jurisdictions. Our actions, over time, may affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three broad groups of small entities that could be directly affected herein. First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the SBA's Office of Advocacy, in general a small business is an independent business having fewer than 500 employees. These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.

6. Next, the type of small entity described as a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field." Nationwide, as of August 2016, there were approximately 356,494 small organizations based on registration and tax data filed by nonprofits with the Internal Revenue Service (IRS).

7. Finally, the small entity described as a "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand." U.S. Census Bureau data from the 2012 Census of Governments indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number there were 37,132 General purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts and special districts) with populations of less than 50,000. The 2012 U.S. Census Bureau data for most types of governments in the local government category show that the majority of these governments have populations of less than 50,000. Based on this data we estimate that at least 49,316 local government jurisdictions fall in the category of "small governmental jurisdictions."

1. Telecommunications Service Providers

a. Wireless Telecommunications Providers

8. Pursuant to 47 CFR 9.10(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."

9. 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.

10. All Other Telecommunications. The "All Other Telecommunications" category is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry. The SBA has developed a small business size standard for All Other Telecommunications, which consists of all such firms with annual receipts of $32.5 million or less. For this category, U.S. Census Bureau data for 2012 shows that there were 1,442 firms that operated for the entire year. Of those firms, a total of 1,400 had annual receipts less than $25 million and 42 firms had annual receipts of $25 million to $49,999,999. Thus, the Commission estimates that the majority of "All Other Telecommunications" firms potentially affected by our action can be considered small.

11. AWS Services (1710–1755 MHz and 2110–2155 MHz bands (AWS-1); 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz bands (AWS-2); 2155–2175 MHz band (AWS-3)). For the AWS-1 bands, the Commission has defined a "small business" as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a "very small business" as an entity with average annual gross

revenues for the preceding three years not exceeding $15 million. For AWS-2 and AWS-3, although we do not know for certain which entities are likely to apply for these frequencies, we note that the AWS-1 bands are comparable to those used for cellular service and personal communications service. The Commission has not yet adopted size standards for the AWS-2 or AWS-3 bands but proposes to treat both AWS-2 and AWS-3 similarly to broadband PCS service and AWS-1 service due to the comparable capital requirements and other factors, such as issues involved in relocating incumbents and developing markets, technologies, and services.

12. Competitive Local Exchange Carriers (Competitive LECs). Competitive Access Providers (CAPs), Shared-Tenant Service Providers, and Other Local Service Providers. Neither the Commission nor the SBA has developed a small business size standard specifically for these service providers. The appropriate NAICS Code category is Wired Telecommunications Carriers and under that size standard, such a business is small if it has 1,500 or fewer employees. U.S. Census Bureau data for 2012 indicate that 3,117 firms operated during that year. Of that number, 3,083 operated with fewer than 1,000 employees. Based on these data, the Commission concludes that the majority of Competitive LECS, CAPs, Shared-Tenant Service Providers, and Other Local Service Providers, are small entities. According to Commission data, 1,442 carriers reported that they were engaged in the provision of either competitive local exchange services or competitive access provider services. Of these 1,442 carriers, an estimated 1,256 have 1,500 or fewer employees. In addition, 17 carriers have reported that they are Shared-Tenant Service Providers, and all 17 are estimated to have 1,500 or fewer employees. Also, 72 carriers have reported that they are Other Local Service Providers. Of this total, 70 have 1,500 or fewer employees. Consequently, based on internally researched FCC data, the Commission estimates that most providers of competitive local exchange service, competitive access providers, Shared-

Tenant Service Providers, and Other Local Service Providers are small entities.

13. Incumbent Local Exchange Carriers (LECs). Neither the Commission nor the SBA has developed a small business size standard specifically for incumbent local exchange services. The closest applicable NAICS Code category is Wired Telecommunications Carriers. Under the applicable SBA size standard, such a business is small if it has 1,500 or fewer employees. U.S. Census Bureau data for 2012 indicate that 3,117 firms operated the entire year. Of this total, 3,083 operated with fewer than 1,000 employees. Consequently, the Commission estimates that most providers of incumbent local exchange service are small businesses that may be affected by our actions. According to Commission data, one thousand three hundred and seven (1,307) Incumbent Local Exchange Carriers reported that they were incumbent local exchange service providers. Of this total, an estimated 1,006 have 1,500 or fewer employees. Thus using the SBA's size standard the majority of incumbent LECs can be considered small entities.

14. Narrowband Personal Communications Services. Two auctions of narrowband personal communications services (PCS) licenses have been conducted. 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. Through these auctions, the Commission has awarded a total of 41 licenses, out of which 11 were obtained by small businesses. 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.

15. Offshore Radiotelephone Service. This service operates on several UHF television broadcast channels that are not used for television broadcasting in the coastal areas of states bordering the Gulf of Mexico. The closest applicable SBA size standard is for Wireless Telecommunications Carriers (except Satellite), which is an entity employing no more than 1,500 persons. U.S. Census Bureau data in this industry for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more. Thus, under this SBA category and the associated small business size standard, the majority of Offshore Radiotelephone Service firms can be considered small. There are presently approximately 55 licensees in this service. However, the Commission is unable to estimate at this time the number of licensees that would qualify as small under the SBA's small business size standard for the category of Wireless Telecommunications Carriers (except Satellite).

16. Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment. The SBA has established a small business size standard for this industry of 1,250 employees or less. U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, we conclude that a majority of manufacturers in this industry are

small.

17. Rural Radiotelephone Service. The Commission has not adopted a size standard for small businesses specific to the Rural Radiotelephone Service. A significant subset of the Rural Radiotelephone Service is the Basic Exchange Telephone Radio System (BETRS). The closest applicable SBA size standard is for Wireless Telecommunications Carriers (except Satellite), which is an entity employing no more than 1,500 persons. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more. Thus under this category and the associated size standard, the Commission estimates that the majority of Rural Radiotelephone Services firm are small entities. There are approximately 1,000 licensees in the Rural Radiotelephone Service, and the Commission estimates that there are 1,000 or fewer small entity licensees in the Rural Radiotelephone Service that may be affected by the rules and policies proposed herein.

18. Wireless Communications Services. This service can be used for fixed, mobile, radiolocation, and digital audio broadcasting satellite uses. The Commission defined "small business" for the wireless communications services (WCS) auction as an entity with average gross revenues of $40 million for each of the three preceding years, and a "very small business" as an entity with average gross revenues of $15 million for each of the three preceding years. The SBA has approved these small business size standards. In the Commission's auction for geographic area licenses in the WCS there were seven winning bidders that qualified as "very small business" entities, and one that qualified as a "small business" entity.

19. Wireless Telecommunications Carriers (except Satellite). This industry comprises establishments engaged in operating and maintaining switching and transmission

facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services. The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1000 employees or more. Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

20. Wireless Telephony. Wireless telephony includes cellular, personal communications services, and specialized mobile radio telephony carriers. The closest applicable SBA category is Wireless Telecommunications Carriers (except Satellite). Under the SBA small business size standard, a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had fewer than 1,000 employees and 12 firms had 1000 employees or more. Thus under this category and the associated size standard, the Commission estimates that a majority of these entities can be considered small. According to Commission data, 413 carriers reported that they were engaged in wireless telephony. Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees. Therefore, more than half of these entities can be considered small.

21. 700 MHz Guard Band Licensees. In 2000, in the 700 MHz Guard Band Order, the Commission adopted size standards for "small businesses" and "very small businesses" for purposes of determining their eligibility for special provisions such as bidding credits and

installment payments. A small business in this service is an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding $40 million for the preceding three years. Additionally, a very small business is an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than $15 million for the preceding three years. SBA approval of these definitions is not required. An auction of 52 Major Economic Area licenses commenced on September 6, 2000, and closed on September 21, 2000. Of the 104 licenses auctioned, 96 licenses were sold to nine bidders. Five of these bidders were small businesses that won a total of 26 licenses. A second auction of 700 MHz Guard Band licenses commenced on February 13, 2001 and closed on February 21, 2001. All eight of the licenses auctioned were sold to three bidders. One of these bidders was a small business that won a total of two licenses.

22. Lower 700 MHz Band Licenses. The Commission previously adopted criteria for defining three groups of small businesses for purposes of determining their eligibility for special provisions such as bidding credits. The Commission defined a "small business" as an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding $40 million for the preceding three years. A "very small business" is defined as an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than $15 million for the preceding three years. Additionally, the lower 700 MHz Service had a third category of small business status for Metropolitan/Rural Service Area (MSA/RSA) licenses—"entrepreneur"—which is defined as an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than $3 million for the preceding three years. The SBA approved these small size standards. An auction of 740 licenses (one license in each of the 734 MSAs/RSAs and one license in each of the six Economic Area

Groupings (EAGs)) commenced on August 27, 2002, and closed on September 18, 2002. Of the 740 licenses available for auction, 484 licenses were won by 102 winning bidders. Seventy-two of the winning bidders claimed small business, very small business or entrepreneur status and won a total of 329 licenses. A second auction commenced on May 28, 2003, closed on June 13, 2003, and included 256 licenses: 5 EAG licenses and 476 Cellular Market Area licenses. Seventeen winning bidders claimed small or very small business status and won 60 licenses, and nine winning bidders claimed entrepreneur status and won 154 licenses. On July 26, 2005, the Commission completed an auction of 5 licenses in the Lower 700 MHz band (Auction No. 60). There were three winning bidders for five licenses. All three winning bidders claimed small business status.

23. In 2007, the Commission reexamined its rules governing the 700 MHz band in the 700 MHz Second Report and Order. An auction of 700 MHz licenses commenced January 24, 2008, and closed on March 18, 2008, which included: 176 Economic Area licenses in the A-Block, 734 Cellular Market Area licenses in the B-Block, and 176 EA licenses in the E-Block. Twenty winning bidders, claiming small business status (those with attributable average annual gross revenues that exceed $15 million and do not exceed $40 million for the preceding three years) won 49 licenses. Thirty-three winning bidders claiming very small business status (those with attributable average annual gross revenues that do not exceed $15 million for the preceding three years) won 325 licenses.

24. Upper 700 MHz Band Licenses. In the 700 MHz Second Report and Order, the Commission revised its rules regarding Upper 700 MHz licenses. On January 24, 2008, the Commission commenced Auction 73 in which several licenses in the Upper 700 MHz band were available for licensing: 12 Regional Economic Area Grouping licenses in the C Block, and one

nationwide license in the D Block. The auction concluded on March 18, 2008, with 3 winning bidders claiming very small business status (those with attributable average annual gross revenues that do not exceed $15 million for the preceding three years) and winning five licenses.

25. Wireless Resellers. The SBA has not developed a small business size standard specifically for Wireless Resellers. The SBA category of Telecommunications Resellers is the closest NAICS code category for wireless resellers. The Telecommunications Resellers industry comprises establishments engaged in purchasing access and network capacity from owners and operators of telecommunications networks and reselling wired and wireless telecommunications services (except satellite) to businesses and households. Establishments in this industry resell telecommunications; they do not operate transmission facilities and infrastructure. Mobile virtual network operators (MVNOs) are included in this industry. Under the SBA's size standard, such a business is small if it has 1,500 or fewer employees. U.S. Census Bureau data for 2012 show that 1,341 firms provided resale services for the entire year. Of that number, all operated with fewer than 1,000 employees. Thus, under this category and the associated small business size standard, the majority of these resellers can be considered small entities. According to Commission data, 213 carriers have reported that they are engaged in the provision of local resale services. Of these, an estimated 211 have 1,500 or fewer employees. Consequently, the Commission estimates that the majority of Wireless Resellers are small entities.

b. Equipment Manufacturers

26. Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products

made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment. The SBA has established a small business size standard for this industry of 1,250 employees or less. U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, we conclude that a majority of manufacturers in this industry can be considered small.

27. Semiconductor and Related Device Manufacturing. This industry comprises establishments primarily engaged in manufacturing semiconductors and related solid state devices. Examples of products made by these establishments are integrated circuits, memory chips, microprocessors, diodes, transistors, solar cells and other optoelectronic devices. The SBA has developed a small business size standard for Semiconductor and Related Device Manufacturing, which consists of all such companies having 1,250 or fewer employees. U.S. Census Bureau data for 2012 show that there were 862 establishments that operated that year. Of this total, 843 operated with fewer than 1,000 employees. Thus, under this size standard, the majority of firms in this industry can be considered small.

Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

28. The Fifth Further Notice proposes and seeks comment on E911 location accuracy rule changes that may affect reporting, recordkeeping, and other compliance requirements for small entities. In particular, the Fifth Further Notice seeks comment on: (1) timelines for

requiring carriers to provide floor-level emergency caller information (whether 5 years or an alternative number) to Public Safety Access Points (PSAP); (2) focusing z-axis technology deployment on building size vs. population coverage, and; (3) use of alternative information—third party and crowd sourced information—to provide dispatchable location.

29. The proposed rules in the Fifth Further Notice if adopted may require small entities to hire engineers, consultants, or other professionals for compliance. The Commission cannot however, quantify the cost of compliance with the potential rule changes and obligations that may result in this proceeding. In our discussion of the proposals in the Fifth Further Notice we have sought comments from the parties in the proceeding, including cost and benefit analyses, and expect the information we received in the comments to help the Commission identify and evaluate relevant matters for small entities, including any compliance costs and burdens that may result from the matters raised in the Fifth Further Notice.

Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

30. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for such small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.

31. The Commission determined in the Fifth Report and Order that benefit floor from

the enhanced horizontal and vertical location accuracy requirements adopted for wireless phones is expected to be $97 billion and far exceeds its costs. In the Fifth Further Notice the Commission continues to refine its indoor location accuracy framework to meet long term public safety objectives and seeks comment on a variety of proposals to best implement its objectives, while ensuring information privacy and security. While doing so, the Commission is mindful that small entities and other CMRS providers will incur costs should the proposals we make, and the alternatives upon which we seek comment in the Fifth Further Notice, be adopted. We believe however that the economic costs of compliance for small entities will be reduced by some of the steps we have taken in the Fifth Further Notice such as our proposals, (1) to expand options for the z-axis deployment, (2) to expand options for the dispatchable location portion of our rules, provided that any new sources of dispatchable locations would be subject to privacy and security protection equivalent to those in currently in effect.

32. To assist in the Commission's evaluation of the economic impact on small entities and other CMRS providers, the Commission seeks comment on the costs and benefits of various proposals and alternatives in the Fifth Further Notice and specifically on how to reduce compliance costs and increase benefits.

33. In particular, the Commission seeks comment on the costs and benefits of narrowing the z-axis metric from 3 meters to 1 meter and information on the costs to carriers and public safety to develop database solutions that can be used to convert altitude measurements to an actual floor-level. The Commission also seeks comment on the costs and benefits as applied to a nationwide deployment of the z-axis metric, resulting in a nationwide x, y and z location accuracy standard and associated with a phased-in, nationwide deployment of the z-axis metric; and on how a nationwide deployment would impact compliance costs. Further, the Commission

seeks comment on alternatives to the NEAD including the costs and benefits of requiring the reporting of both (1) dispatchable location and (2) z-axis information in the top 50 Cellular Market Areas, and the associated costs and benefits of relying on alternative data sources for dispatchable location.

34. Aside from the costs and benefits information in the Fifth Further Notice, the Commission seeks comment on the appropriate timeline for requiring carriers to provide floor level information—or more granular requirements—and considers a five-year timeline for doing so. In the alternative, the Commission seeks comment on whether other timelines would better account for the time needed to achieve technical feasibility and the associated costs for the provision of floor level information rather than meeting the 3-meter vertical location accuracy standard. To help secure E911 location information, the Fifth Further Notice also seeks comment on whether alternative sources of caller location information would best help provide timely and accurate dispatchable location information, and queries whether such information can be secured by applying security and privacy requirements similar to those of the NEAD.

35. The Commission expects to consider more fully the economic impact on small entities following its review of comments filed in response to the Fifth Further Notice, including costs and benefits analyses. The Commission's evaluation of the comments filed in this proceeding will shape the final alternatives it considers, the final conclusions it reaches, and any final actions it ultimately takes in this proceeding to minimize any significant economic impact that may occur on small entities.

Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

36. None.

II. ORDERING CLAUSES

37. Accordingly, IT IS ORDERED, pursuant to sections 1, 2, 4(i), 7, 10, 201, 214, 222, 251(e), 301, 302, 303, 307, 309, 316, and 332, of the Communications Act of 1934, 47 U.S.C. 151, 152(a), 154(i), 157, 160, 201, 214, 222, 251(e), 301, 302, 303, 307, 309, 316, 332; the Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, 47 U.S.C. 615 note, 615, 615a, 615b; and section 106 of the Twenty-First Century Communications and Video Accessibility Act of 2010, Pub. L. No. 111-260, 47 U.S.C. 615c, that this Fifth Report and Order and Further Notice of Proposed Rulemaking, is hereby ADOPTED.

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

List of Subjects in 47 CFR Part 9

Communications common carriers, Communications equipment, Radio, Federal Communications Commission.

Cecilia Sigmund,
Federal Register Liaison Officer,
Office of the Secretary.

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 9 as follows:

PART 9 – 911 REQUIREMENTS

1. The authority citation for part 9 continues to read as follows:

Authority: 47 U.S.C. 151 through 154, 152(a), 155(c), 157, 160, 201, 202, 208, 210, 214, 218, 219, 222, 225, 251(e), 255, 301, 302, 303, 307, 308, 309, 310, 316, 319, 332, 403, 405, 605, 610, 615, 615 note, 615a, 615b, 615c, 615a-1, 616, 620, 621, 623, 623 note, 721, and 1471, unless otherwise noted.

2. Section 9.10 is amended by revising paragraphs (i)(2)(ii)(C)(*1*) and (*2*) and (i)(2)(ii)(D)(*1*) and (*2*) to read as follows:

§ 9.10 911 Service Requirements.

* * * * *

(i) * * *

(2) * * *

(ii) * * *

(C) * * *

(*1*) In each CMA where dispatchable location is used: nationwide CMRS providers ensure that the NEAD is populated with a sufficient number of total dispatchable location reference points to equal 25 percent of the CMA population. CMRS providers may demonstrate dispatchable location deployment by means other than the NEAD reference points, provided that any dispatchable location option that does not rely on the NEAD includes equivalent privacy and security safeguards; or

(*2*) In each CMA where z-axis technology is used:

(*i*) Nationwide CMRS providers must deploy z-axis technology to cover 80 percent of the CMA population; or

(*ii*) CMRS providers may also demonstrate z-axis deployment to cover 80 percent of the buildings that exceed three stories in the CMA; or

(*iii*) CMRS providers may also demonstrate z-axis deployment by deploying z-axis capable handsets nationwide. By 2021, CMRS providers choosing nationwide deployment shall ensure that 80 percent of handsets on the network are z-axis capable.

(D) * * *

(*1*) In each CMA where dispatchable location is used: nationwide CMRS providers ensure that the NEAD is populated with a sufficient number of total dispatchable location reference points to equal 25 percent of the CMA population. CMRS providers may demonstrate dispatchable location deployment by means other than the NEAD reference points, provided that any dispatchable location option that does not rely on the NEAD includes equivalent privacy and security safeguards; or

(*2*) In each CMA where z-axis technology is used:

(*i*) Nationwide CMRS providers must deploy z-axis technology to cover 80 percent of the CMA population; or.

(*ii*) CMRS providers may also demonstrate z-axis deployment to cover 80 percent of the buildings that exceed three stories in the CMA; or

(*iii*) CMRS providers may also demonstrate z-axis deployment by deploying z-axis capable handsets nationwide. By 2023, CMRS providers choosing

nationwide deployment shall ensure that 100 percent of handsets on the network are z-axis capable.

* * * * *

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