6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 20

[PS Docket No. 07-114; FCC 19-20]

Wireless E911 Location Accuracy Requirements

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) proposes to revise its rules to require Commercial Mobile Radio Service providers to deliver accurate vertical location information to Public Safety Answering points consistent with a metric of plus or minus three meters for wireless 911 calls placed from indoors. The Commission seeks comment on this proposal as well as on alternatives to improve vertical location accuracy for wireless 911 calls made from multi-story buildings.

DATES: Comments are due on or before [**INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and reply comments are due on or before [**INSERT DATE 75 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 Website: http://www.fcc.gov/ecfs/. Follow the instructions for submitting comments.
- Mail: 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 the Commission continues 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.

- People with Disabilities: Contact the Commission to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by email: FCC504@fcc.gov or phone: 202-418-0530 or TTY: 202-418-0432.

For detailed instructions for submitting comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Brenda Boykin, Policy and Licensing Division, Public Safety and Homeland Security Bureau, (202) 418-2062 or via email at Brenda.Boykin@fcc.gov; Nellie Foosaner, Policy and Licensing Division, Public Safety and Homeland Security Bureau, (202) 418-2925 or via e-mail at Nellie.Foosaner@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commissions Fourth Further Notice of Proposed Rulemaking in PS Docket No. 07-114, released on March 18, 2019. The full text of this document is available for public inspection during regular business hours in the FCC Reference Center, Room CY-A257, 445 12th Street, SW, Washington, D.C. 20554, or online at www.fcc.gov.

PAPERWORK REDUCTION ACT

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 sections 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).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://apps.fcc.gov/ecfs/.
- Paper Filers: 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 e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

The proceeding this Notice initiates 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 two 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.

I. INTRODUCTION

1. Since the Commission first adopted its wireless Enhanced 911 (E911) location accuracy rules in 1996, the wireless landscape has undergone major changes. In 2018 the number of Americans with smartphones rose to 77%, up from just 35% in Pew Research Center's first survey of smartphone ownership conducted in 2011. As the adoption of cellphones and smartphones has skyrocketed, they have become an indispensable tool to protect consumers' health, property, and wellbeing, and many Americans are now relying on mobile phones as their only phones. Consumers make 240 million calls to 911 each year, and in many areas 80% or more of these calls are from wireless phones. For both first responders and consumers, the capability to locate wireless 911 callers quickly and accurately is of critical importance regardless of where the call originates.

2. To ensure that first responders and Public Safety Answering Points (PSAPs) can find 911 callers quickly and accurately when a consumer calls from a multi-story building, we propose a vertical, or z-axis, location accuracy metric of plus or minus 3 meters relative to the handset for each of the benchmarks and geographic requirements previously established in the Commission's E911 wireless location accuracy rules. This proposed metric will more accurately identify the floor level for most 911 calls, reduce emergency response times, and save lives.

II. BACKGROUND

3. In the 2014 Third Further Notice of Proposed Rulemaking in this proceeding, the Commission proposed measures and timeframes to improve location accuracy for wireless E911 calls originating indoors, including, among others, a 3-meter z-axis metric for 80% of such calls.

In the 2015 Fourth Report and Order in this proceeding, the Commission established benchmarks and timetables for the deployment of z-axis technology or dispatchable location (which includes a vertical location component) in the top 50 Cellular Market Areas, but deferred a decision on a specific z-axis metric until it received additional testing data. Specifically, the Commission required the four nationwide Commercial Mobile Radio Service (CMRS) providers to establish a test bed to develop a proposed z-axis accuracy metric and to submit the proposed metric to the Commission for approval within 3 years (i.e., by August 3, 2018). The Commission stated that the proposal would be placed out for public comment.

4. On August 3, 2018, CTIA submitted the "Stage Z Test Report" (Report or Stage Z Test Report) on behalf of the four nationwide CMRS providers. According to the Report, Stage Z testing sought to assess the accuracy of solutions that use barometric pressure sensors in the handset for determining altitude in support of E911. Two vendors, NextNav LLC (NextNav) and Polaris Wireless, Inc. (Polaris), participated in Stage Z. The test results showed that in 80% of NextNav test calls, vertical location was identified to a range of 1.8 meters or less, while 80% of Polaris test calls yielded a vertical accuracy range of 4.8 meters or less. The Report noted that Polaris' performance "could likely be significantly improved should a more robust handset barometric sensor calibration approach [than that used in the test bed] be applied."

5. In its August 3, 2018, cover letter submitting the Report, CTIA stated that the test results provided "helpful insight" into the state of z-axis technologies, but that "significant questions remain about performance and scalability in live wireless 9-1-1 calling environments." On behalf of the four nationwide wireless providers, CTIA therefore proposed a z-axis metric of "+/- 5 meters for 80% of fixes from mobile devices capable of delivering barometric pressure

sensor-based altitude estimates." CTIA also stated that further testing of vertical location technologies could yield results to validate adoption of a more accurate z-axis metric.

6. On September 10, 2018, the Public Safety and Homeland Security Bureau (Bureau) released a Public Notice seeking comment on the Report and the carriers' proposed z-axis metric. The Public Notice sought to gather information that would inform the Bureau's recommendations to the Commission concerning next steps in the development of the z-axis accuracy metric contemplated by the Fourth Report & Order. Fourteen entities filed comments and reply comments.

7. Public safety organizations unanimously opposed CTIA's proposed 5-meter metric as too imprecise to identify a caller's floor level. Some public safety organizations expressed support for a 3-meter metric, while others encouraged the Commission to adopt a 2-meter metric. NextNav and Polaris asserted that they could meet a 3-meter metric for 80% of wireless indoor calls within the prescribed timeframes.

8. In their initial comments, CTIA and some nationwide CMRS providers argued that the Commission should defer setting a more aggressive z-axis metric than 5 meters pending further testing. In a December 2018 ex parte filing, however, CTIA and all four nationwide CMRS providers revised their recommendation. These parties recognized "that public safety representatives have encouraged the Commission to adopt a more aggressive Z-Axis metric of ± 3 meters in the near term." While continuing to stress the importance of further testing, CTIA and the four providers stated that "certainty as to the Z-Axis metric in the near term, whether via an Order or expeditiously seeking public comment, may help advance the development process necessary to meet the 2021 and 2023 vertical location accuracy benchmarks in the Fourth Report & Order."

9. Herein, we take steps to build on the Commission's adoption of the Fourth Report and Order by proposing a metric for the z-axis compliance standard for wireless 911 calls that is available to those providers that do not choose the dispatchable location compliance standard for vertical location accuracy.

III. DISCUSSION

10. Given the current state of the record, we believe it is appropriate to propose a z-axis metric based on a 3-meter standard. This will provide the final element of the Commission's existing indoor location accuracy regime, which already includes a timetable for CMRS providers to deliver vertical location information by deploying either dispatchable location or z-axis technology in specific geographic areas. Our proposed z-axis metric will provide certainty to all parties and establish a focal point for further testing, development, and implementation of evolving z-axis location technologies. To ensure a complete and comprehensive record on this issue, we seek comment on our proposal as discussed below.

A. Floor Level Accuracy

11. We propose a z-axis metric of 3 meters relative to the handset for 80% of wireless E911 calls for each of the benchmarks and geographic requirements previously established in the Commission's E911 wireless location accuracy rules. To certify compliance with this proposed requirement, the caller's handset should be located within 3 meters above or below the vertical location provided by the phone for 80% of indoor wireless calls to 911, as demonstrated in the test bed. Under our proposal, we would amend Section 20.18 of the Commission's rules to require that by April 3, 2021, nationwide CMRS providers must deploy in each of the top 25 Cellular Market Areas either dispatchable location or z-axis technology in compliance with the 3-meter metric. In Cellular Market Areas where z-axis technology is used, nationwide CMRS

providers must deploy z-axis technology to cover 80% of the Cellular Market Area population. By April 3, 2023, these requirements would be expanded to cover each of the top 50 Cellular Market Areas. Non-nationwide CMRS providers that serve any of the top 25 or 50 Cellular Market Areas would continue to have an additional year to meet each of these benchmarks in the relevant Cellular Market Area.

12. We seek comment on our proposed 3-meter metric. We tentatively agree with commenters responding to the Stage Z Test Report who assert that 3 meters will provide sufficient accuracy to identify the caller's floor level in most cases. For example, IAFF comments that the Commission should require vertical location information that provides true floor level accuracy, "i.e., no more than 3 meters." NENA states that "[c]itizens and public safety require, in the absence of a dispatchable location solution, a z-axis accuracy benchmark of +/-3 meters." The Texas 911 Entities assert that a metric greater than 3 meters for 80% of calls "would not satisfy the critical requirements of public safety." We acknowledge that a 3-meter metric is not always certain to yield floor level accuracy. If the indoor wireless caller's handset is located at the vertical center of a floor with an average height of 3.1 to 3.9 meters, the margins of a 3-meter metric allow for a variance of up to six meters, which would extend the search range to one floor above and one floor below the location of the handset. Nevertheless, we believe this search range will significantly narrow the scope of the search and can provide a reasonable basis for identifying the correct floor in most cases. We seek comment on this tentative conclusion. Do commenters agree that the metric should be set at 3 meters? If not, what vertical location metric should the Commission adopt, and why?

13. We also tentatively conclude that a 5-meter metric should not be adopted because the record indicates it would not yield the floor level accuracy that first responder commenters

consider necessary. APCO states that a 5-meter metric "translates to a range of up to two floors below, or up to two floors above, the actual floor where a 911 caller may be located, and some lesser degree of accuracy for one in five calls to 911." APCO and NENA also assert that adopting a metric of 5 meters would undermine incentives for CMRS providers to invest in the development of more accurate z-axis solutions. We seek comment on our tentative conclusion.

14. We also seek comment on other elements of the proposed metric. Should the metric apply to 80% of wireless calls? If not, what percentage of calls is appropriate? CTIA's proposed metric would apply only to "mobile devices capable of delivering barometric pressure sensor-based altitude estimates." Should the z-axis metric apply only to calls from such devices, only devices manufactured after a date certain, or should it apply to wireless calls from all mobile devices, as we propose? Additionally, NPSTC asserts that reporting vertical location information as height above ground level (AGL) would be preferable to height above mean sea level (MSL) which is how carriers' data would otherwise be provided by default. Should the Commission specify that CMRS providers must report z-axis information as AGL, as NPSTC suggests, or are there advantages to keying height estimates to MSL? Should the Commission require CMRS providers to identify the floor level when reporting z-axis information, as suggested by APCO? What would be the technical and/or operational issues in requiring CMRS providers to provide either AGL height or floor level information? Should the Commission require all CMRS providers to provide the same type of z-axis information (e.g., MSL, AGL, or floor level) to avoid potential confusion at the PSAP? Alternatively, should we decline to specify this level of detail so that entities developing z-axis solutions have more flexibility?

B. Technical Feasibility

15. We tentatively conclude that our proposed 3-meter z-axis metric is technically

feasible under the timeframes established in the Fourth Report and Order.

16. The test bed results show that in 80% of NextNav test calls, vertical location was identified to a range of 1.8 meters or less. NextNav achieved a vertical accuracy within 2 meters for 67% of test calls and within 3 meters for 90% of test calls in the dense urban, urban, and suburban morphologies. NextNav also achieved a vertical accuracy within 2 meters for 80% of test calls for every handset tested. According to NextNav, these results "were consistent across age of handsets, with the oldest devices (2016 models) performing identically to the newest (2018)." NextNav asserts that the results demonstrate reasonable consistency between handsets, weather, building types, environments, and time of day and that they demonstrate "the efficacy of the overall altitude determination system (< 1m @ 80%)."

17. In addition, Polaris states that it was able to achieve aggregate accuracy performance of 2.8 meters for 80% of test calls by using additional available location data to recalibrate and refine its Stage Z data. This also supports our tentative conclusion in favor of a 3-meter metric. Polaris also indicates that in a real-world deployment its solution would use an active compensation correction model that operates in an application running continuously in the background of the device. As stated by Dr. R. Michael Buehrer of Virginia Tech, we also expect that this calibration process would be at least as accurate as the limited (once per month) calibration process Polaris used in reprocessing its Stage Z data. Accordingly, we tentatively conclude that Polaris' reprocessing of the data presents a reasonably accurate picture of the capabilities of its solution. We seek comment on this view.

18. Additionally, we are encouraged that entities outside the test bed have reported on technologies that may be able to achieve an equivalent degree of vertical location accuracy, and in this respect, we note that our rules do not require the use of a particular technology to achieve

the necessary metric. For instance, on September 18, 2018, Google announced the launch of its Emergency Location Service in the United States. According to Google, Emergency Location Service is "a supplemental service that sends enhanced location directly from Android handsets to emergency services when an emergency call is placed." Emergency Location Service works on "99 percent of Android devices (version 4.0 and above)." Emergency Location Service is part of the Android operating system and does not require any special hardware or updates. Regarding vertical location accuracy, Google states that it is working to provide accurate altitude and floor location and "improve [Emergency Location Service] location quality, especially for challenging locations, such as urban canyons and indoors."

19. We recognize that some public safety commenters urge us to adopt a 2-meter metric, which would increase the likelihood of providing floor-level accuracy. However, we believe it is not yet established that such a metric is technically achievable on a consistent basis, although it may become achievable in the long term as technology continues to evolve. While NextNav's test bed results demonstrate that its solution can achieve an accuracy of 1.8 meters or less for 80% of test calls overall, it could only achieve an accuracy of 2.5 meters or less for 80% of test calls in the dense urban morphology, where calls from multi-story buildings are most likely to occur. Similarly, even after reprocessing its data, Polaris' solution yielded only 2.8 meters or less for 80% of test calls. Because the existing record does not indicate that 2-meter accuracy is currently achievable by either vendor in the dense urban morphology, we tentatively conclude that it would be premature to adopt a 2-meter metric. We believe, however, that our proposed 3-meter metric will encourage CMRS providers to work with NextNav, Polaris, and emerging location and device vendors to achieve more precise vertical location accuracy solutions. We seek comment on this view.

C. Testing

20. We propose to adopt a 3-meter z-axis metric instead of deferring the matter for further testing. Although CTIA initially maintained that additional testing was needed before a metric could be adopted, it has since taken the opposite view. Additionally, vendors' comments suggest that the 3-meter metric is technically feasible, and public safety commenters acknowledge that such a metric, while not as precise as they might like, would nevertheless be a worthwhile step to take. Although we tentatively conclude that the benefits of further testing are insufficient to warrant any more delay in the progress of this proceeding, to the extent that the proponents of additional testing conduct tests or studies that yield more accurate and efficient vertical location solutions, we encourage these stakeholders to file them in this docket. We observe that CTIA recently announced that in July 2019, the test bed will begin the next round of z-axis testing, which CTIA has designated as "Stage Za." We encourage all technology vendors that are developing potential z-axis solutions to participate in Stage Za. We note, however, that in the interest of providing certainty in the near term to all parties, the Commission envisions proceeding on this rulemaking while additional testing occurs.

21. We also tentatively conclude based on our own assessment of the Report that the limitations on testing described therein do not preclude us from adopting a 3-meter metric without requiring additional testing. We seek comment on this tentative conclusion.

22. For example, in Stage Z, Chicago was added as a test region to provide a more extreme cold-weather environment for evaluating z-axis technologies, but NextNav was unable to test there. NextNav also did not test its solution in rural morphologies. We do not believe that the lack of NextNav test data in either environment is a sufficient reason to delay consideration of a z-axis metric.

23. In particular, with respect to extreme cold-weather testing, the Report states that very cold weather was not available during testing and that this is likely because the test campaign started in late February. Accordingly, the test results would not have been conclusive even if NextNav had participated. In addition, if we were to require additional cold-weather testing, it could not be scheduled before next winter, which would entail at least a year's delay in adopting a metric.

24. Similarly, we do not believe that the absence of NextNav test data in rural morphologies warrants a delay in our consideration of a z-axis metric. The Report notes that the rural morphology is "the sparsest environment overall" and is mostly residential, with most structures between 1 and 2 stories high. Moreover, the Commission's vertical location accuracy requirements apply only to the top 50 Cellular Market Areas, which are most likely to feature the urban and dense urban morphologies. In these morphologies, the test bed shows that NextNav's solution would meet a 3-meter metric. Additionally, NextNav's technology was tested for vertical accuracy in rural areas during the original CSRIC Test Bed conducted in 2012, and NextNav's results from that testing fell within 3 meters for 80% of all calls.

25. We also do not believe that testing of additional devices, such as older and lower-end devices, is needed prior to adoption of a z-axis metric. NextNav and Polaris each tested six handsets, for a total of twelve handsets, in Stage Z. The Report states that handsets were selected "to ensure variety between sensor manufacturers, the age of handsets (within limits) and their overall use characteristics," and that the handsets used in testing were "the same production-ready handsets sold by wireless carriers and available to the general public" and did not contain any hardware modification that would favor these handsets over any commercially available handsets. NextNav points out that the Stage Z results showed a high level of consistency

between different models of handsets and that these results were consistent with the results of prior independent tests conducted on its technology. Although we encourage additional testing on a greater variety of devices, we believe that a sufficient variety of devices have been tested to support moving forward with our proposed 3-meter metric at this time. We seek comment on this assessment. We seek comment on whether the proposed 3-meter z-axis metric will provide adequate vertical location accuracy protection for consumers who participate in the Commission's Lifeline program. We seek comment on the extent to which mobile phones provided to consumers as part of the Lifeline program have the capability, through barometric pressure sensors or other means, to be located within a 3-meter z-axis metric. We also seek comment on how to ensure that vertical location protections extend to and include users of the Lifeline program. We also seek comment on the potential turnover rates for wireless handsets and the features of devices likely to be available and in use by the compliance dates established in our rules. Those data points would influence the extent to which difficulties in achieving the metric over older and lower-end devices may pose an impediment to meeting the proposed requirements.

D. Deployment

26. We believe our proposed 3-meter z-axis metric will support the development of scalable vertical location solutions that can be deployed in time to meet the carriers' 2021 and 2023 deadlines. To the extent that CMRS providers elect to use solutions that rely on barometric pressure readings, nearly all smartphones on the market appear to be equipped with barometric pressure sensors. In addition, both NextNav and Polaris state that calibration of the barometric sensors in their z-axis solutions would be software-based and thus would scale readily for widespread use. Polaris and NextNav also state that industry standards necessary to implement

the barometric sensor-based solutions tested in Stage Z are already adopted and that implementation of these standards is in the hands of carriers and device manufacturers. Based on these comments, we believe barometric sensor-based solutions are likely to be scalable and can be made readily available to wireless consumers within the timeframes required by the rules. We seek comment on this assessment and its underlying factual assumptions.

27. We also seek comment on the potential for development and deployment of other new or emerging vertical location solutions that could be used to meet the proposed z-axis metric. The Commission has previously recognized that no single technological approach will solve the challenge of indoor location, and it adopted requirements applicable to CMRS providers that are technically feasible and technologically neutral "so that providers can choose the most effective solutions from a range of options." We continue to believe that this approach should guide the adoption of any metric in this proceeding. CTIA states that other vertical location technologies and vendors will likely be ready for testing in 2019. We seek comment on the potential for widespread deployment and adoption of these or other alternatives within the timeframes required by the rules, as well as their likely performance in real-world conditions. Are there issues associated with implementing these solutions into wireless network systems and production mobile devices, or scaling them for widespread use?

28. We also seek comment on whether we should consider accelerating or otherwise altering the deployment timelines within the rules. Is a 3-meter metric achievable more quickly than the current 2021 and 2023 deadlines? If so, when should these deadlines be set? These deadlines also pertain to the carriers' option of using dispatchable location for vertical location accuracy. Must the timetables be adjusted for both options? Can CMRS providers achieve dispatchable location and complete work on the NEAD on an accelerated timeframe? If not,

should the Commission decouple the choice of deploying z-axis technology from dispatchable location, and how would bifurcating CMRS providers' technology choice impact CMRS providers' incentives to deploy dispatchable location and complete work on the NEAD? If the Commission adopts a more stringent metric such as floor level or a +/- 2-meter vertical location standard, is it achievable within the current timeframes or would it take longer than the current timetable in the rules? Is it feasible to adopt both a more precise metric and to shorten compliance timetables? How should the Commission address the timeframes applicable to non-nationwide CMRS providers? How would changing the existing timeframes impact the compliance regime for vertical location accuracy?

E. Z-Axis Data Privacy and Security

29. We seek comment on the appropriate data privacy and security framework for z-axis data. In 2015 the Commission established rules governing CMRS provider usage of the National Emergency Address Database (NEAD). In doing so, the Commission stated that "certain explicit requirements on individual CMRS providers are necessary to ensure the privacy and security of NEAD data and any other information involved in the determination and delivery of dispatchable location." In the same Order the Commission required that, "as a condition of using the NEAD or any information contained therein to meet our 911 location requirements, and prior to use of the NEAD, CMRS providers must certify that they will not use the NEAD or associated data for any purpose other than for the purpose of responding to 911 calls, except as required by law." We seek comment on whether use of z-axis data should be limited to 911 calls except as otherwise required by law and if such a limitation should be implemented and codified in a manner similar to the limitations applicable to the NEAD described above.

F. Comparison of Benefits and Costs

30. We now seek comment on which z-axis metric would allow us to achieve the anticipated level of benefits in the most cost-effective manner. Specifically, because the alternative metrics have an effect on both costs and benefits, we seek comment on how the benefits and costs of the proposed z-axis metric of 3 meters for 80% of calls compares to the benefits and costs of alternative metrics. We seek comment on the expected number of lives saved by adopting a 3-meter metric, versus a 2-meter or 5-meter metric. We also seek comment on the expected number of lives that would be saved if we required CMRS providers to identify floor level when reporting z-axis information. In the Fourth Report and Order, the Commission concluded that the location accuracy rules, including the z-axis accuracy metric, would improve emergency response times, which, in turn, would improve patient outcomes and save lives. The Commission found that the location accuracy improvements that it adopted had the potential to save approximately 10,120 lives annually at a value of $9.1 million per statistical life, for an annual benefit of approximately $92 billion or $291 per wireless subscriber. The Commission characterized this $92 billion as an annual benefit floor value because it also expected substantial, unquantifiable benefits from the reduction of human suffering and loss of property. The Commission further found that the costs of implementing the available solutions to achieve the indoor wireless location accuracy standards were far less than the $92 billion benefit floor, with the costs further declining as demand grew.

31. We now seek comment on how the benefits and costs of the proposed z-axis metric of 3 meters for 80% of calls compares to the benefits and costs of alternative metrics. We tentatively conclude that a z-axis metric of 3 meters for 80% of calls strikes the best balance between benefits and costs. As noted above, some public safety commenters identify a 3-meter

metric as providing sufficient accuracy to identify the caller's floor level in most cases. Accordingly, a 3-meter metric would manifest the benefits of location accuracy described in the Fourth Report and Order. The record contains evidence that supports a finding that the costs of implementing a 3-meter metric are themselves low, at least on a per-handset basis. NextNav asserts that its z-axis solution, which requires only software changes to be made to each handset, could be made available for a nominal cost that amounts to significantly less than a penny per month per handset and would impose no incremental cost burdens on new handsets. Polaris states that its z-axis solution is "objectively affordable" because it is software-based, does not require hardware in networks or markets, and "does not require anything special in devices beyond implementation of adopted 3GPP and OMA standards." Polaris' solution also is "instantly available and deployable throughout a carrier's nationwide network." As the Commission noted in the Fourth Report and Order, we continue to expect that these costs will decline as demand grows.

32. We tentatively conclude that the value of a 3-meter metric exceeds that of a 5-meter standard because a 5-meter metric would result in a significant reduction in the benefits described above. As commenters have indicated, a 5-meter metric could indicate a location up to 2 floors below, or up to 2 floors above, the actual floor where a 911 caller may be located. This large search range would make it far more likely that first responders would need to search 2 or more additional floors, significantly increasing average emergency response times and consequently degrading patient outcomes. Due to the likely degradation of patient outcomes with a 5-meter metric, we tentatively conclude that a 3-meter metric provides greater value. We seek comment on this tentative conclusion, including on the marginal benefits and costs of a 3-meter metric versus a 5-meter metric.

33. We also tentatively conclude that, at this time, the value of a 3-meter metric exceeds that of a 2-meter metric. We acknowledge that a 2-meter metric would further improve the accuracy of 911 calls by increasing the likelihood that the caller's floor level could be identified with certainty, which would further improve emergency response times and patient outcomes. In other words, while the margins of both the 2-meter and 3-meter search ranges could extend one level above and below a caller's floor level, a greater portion of the 2-meter search range is likely to be concentrated at the correct floor level. However, because we tentatively conclude that existing solutions are unlikely to achieve 2-meter accuracy for 80% of E911 calls prior to the deadlines established by our rules, we expect that adopting a 2-meter metric would likely cause developers of z-axis solutions to incur substantial development, testing, and implementation costs, without any guarantee of achieving the 2-meter metric before the deadline. Rather than force these expenditures in pursuit of additional benefits that may not materialize on-schedule, we tentatively conclude that there is greater value in adopting the certain benefits of the achievable 3-meter metric. In addition, we observe that any delay in deployment of z-axis solutions necessitated by a 2-meter metric would also delay realization of the benefits of improved location accuracy—i.e., improved emergency response times, better patient outcomes, and lives saved. We seek comment on this tentative conclusion, including on the marginal benefits and costs of a 2-meter metric versus a 3-meter or 5-meter metric. We also seek comment on how the benefits and costs of requiring CMRS providers to identify floor level when reporting z-axis information would compare to the benefits and costs of providing z-axis information as AGL or MSL height. Are these costs and benefits any different for non-nationwide providers as opposed to nationwide providers?

34. We seek comment on our analysis and tentative conclusions as to the comparative value of these z-axis metrics. Are there ways to more precisely quantify the differences in patient outcomes that would arise from the adoption of 2-, 3-, and 5-meter metrics? For example, under each of these metrics, in what percentage of calls would the floor reported to first responders be the correct one? How much additional time is necessary for first responders to search additional floors of a building if the 911 caller is not on the first floor that they search? How much more time would be required for a first responder to find a 911 caller if a 5-meter metric were adopted, as compared to adoption of a 3-meter metric? How much less time would be required for a first responder to find a 911 caller if a 2-meter metric were adopted? What costs would arise from implementing z-axis solutions to meet a 3-meter metric that would not exist when implementing a 5-meter metric? What is the projected amount of those costs? Are there z-axis solutions for which the cost of satisfying a 3-meter metric is the same or negligible when compared to the costs of implementing a 5-meter metric? Are there any alternative z-axis metrics that have not been addressed that we should consider?

IV. INITIAL REGULATORY FLEXIBILITY ANALYSIS

35. 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 Fourth Further Notice of Proposed Rule Making (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 Notice. The Commission will send a copy of the Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA). In addition, the Notice and IRFA (or summaries thereof) will be published in the Federal Register.

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

36. The Notice advances the Commission's goal of ensuring "that all Americans using mobile phones – whether they are calling from urban or rural areas, from indoors or outdoors – have technology that is functionally capable of providing accurate location information so that they receive the support they need in times of an emergency." In the Notice, the Commission proposes to adopt a metric to more precisely identify the location of a 911 wireless caller located in a multi-story building. More specifically, we propose to require the provisioning of vertical location (z-axis) information that would enable first responders to identify the caller's floor level for most wireless calls to 911 from multi-story buildings, which represents a critical element to achieving the Commission's indoor location accuracy objectives. Consistent with the regulatory framework established in the last major revision of the Commission's wireless location accuracy rules in 2015 and the information developed in the associated docket, this Notice proposes a z-axis location accuracy metric of 3 meters above or below a handset for 80 percent of wireless Enhanced 911 (E911) indoor calls. As alternatives, we seek comment on different metrics of two or five meters, as well as potentially revised time frames depending on the precision of the metric adopted. Our proposed metric, if adopted, could augment the ability of Public Safety Answering Points (PSAPs) and first responders to more accurately identify the floor level for most 911 calls made from multi-story buildings, reduce emergency response times, and, ultimately, save lives. It also implements the final element of the Commission's existing indoor location accuracy regime, which already includes a timetable for Commercial Mobile Radio Service (CMRS) providers to deliver vertical location information by deploying either dispatchable location or z-axis technology in specific geographic areas. Our proposed z-axis metric will provide certainty to all parties and establish a focal point for further

testing, development, and implementation of evolving z-axis location technologies.

B. Legal Basis

37. 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, 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.

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

38. 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.

39. 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.

40. 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).

41. 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

42. Pursuant to 47 CFR § 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."

43. 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.

44. 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.

45. 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.

46. 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.

47. 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.

48. 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.

49. 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).

50. 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.

51. 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.

52. 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.

53. 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.

54. 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) and the appropriate size standard for this category under the 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 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.

55. 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.

56. 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.

57. 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.

58. 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.

59. 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

60. 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 size standard for this industry of 1,250 employees or less. U.S. Census 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.

61. 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.

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

62. The Notice proposes and seeks comment on a z-axis (vertical) location accuracy metric that will, if adopted, affect the reporting, recordkeeping and/or other compliance requirements of nationwide and non-nationwide CMRS providers, including small businesses. Under the current rules, by 2021, nationwide CMRS providers must deploy either (1) dispatchable location, or (2) z-axis technology that achieves the Commission-approved z-axis metric, which metric is yet to be adopted, in each of the top 25 Cellular Market Areas. CMRS providers must deploy z-axis technology to cover 80 percent of the Cellular Market Areas population if z-axis technology is used. By 2021, nationwide CMRS providers must deploy dispatchable location or z-axis technology pursuant to the metric that will be adopted by the Commission in each of the top 50 Cellular Market Areas. Non-nationwide carriers, including resellers, that serve any of the top 25 or 50 CMAs will have an additional year to meet the two benchmarks (i.e., until 2022 for the top 25 Cellular Market Areas and 2024 for the top 50 Cellular Market Areas). Thus, under the Commission's proposal, CMRS nationwide and non-nationwide CMRS providers that deploy z-axis technology will be required to provide vertical location information within 3 meters under the Commission's existing timelines. As alternatives, we seek comment on different metrics of two or five meters, as well as potentially revised time frames depending on the precision of the metric adopted.

63. We have tentatively concluded, based on the z-axis solution test results and other comments, that a metric of 3 meters for 80% of indoor calls is technically achievable and that z-

axis solutions capable of meeting this metric can be deployed within the timeframes established in the rules. As described further below, we also have tentatively concluded that the cost of compliance with the 3-meter metric is relatively low. Small entities may incur costs associated with software and/or hardware changes and may need to employ engineers or other experts in order to comply with the proposal in the Notice. However, the technology solution a small entity chooses to implement the requirement will determine the nature of the costs it incurs.

64. We anticipate that small entities would have a choice of vendors with z-axis technology solutions, which will lessen their costs to comply with the proposed rule, if adopted. One of the vendors that participated in Stage Z testing, NextNav, asserts that its z-axis solution requires only software changes to be made to each handset could be made available for a nominal cost that amounts to significantly less than a penny per month per handset. Another test vendor, Polaris, asserts that its solution is instantly available and deployable throughout a carrier's nationwide network. Polaris also asserts that its solution is "objectively affordable" because it is software-based, does not require hardware in networks or markets, and "does not require anything special in devices beyond implementation of adopted 3GPP and OMA standards." Further, with the addition of vertical location technologies and vendors into the market, small entities will have more implementation options, which could further reduce their cost of compliance. As noted above, Google has announced that it has developed and is deploying its Emergency Location System (ELS) in the U.S. for Android devices. Google states that ELS is "a supplemental service that sends enhanced location directly from Android handsets to emergency services when an emergency call is placed." Google also states that ELS is part of the Android operating system and does not require any special hardware or updates. Moreover, as the Commission noted in the Fourth Report and Order, we continue to expect that these

technology costs will decline as demand grows.

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

65. The RFA requires an agency to describe any significant 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 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 small entities.

66. Based on a comparison of the benefits and costs to alternatives metrics, the Commission believes that the 3-meter metric that it proposes to adopt is the most cost-effective option for achieving the Commission's objectives in this proceeding while avoiding undue burdens on all entities. The metric should benefit all entities by giving certainty in selecting an option for complying with the Commission's rules. While the rule proposed in the Notice would apply to all nationwide and non-nationwide CMRS in the same manner, the Commission has already taken steps to accommodate smaller non-nationwide CMRS providers by supplying additional time to comply with any vertical location accuracy benchmarks ultimately adopted by the Commission. The rules also already establish that nationwide and non-nationwide CMRS providers may choose to provide dispatchable location or deploy z-axis technology; and they give non-nationwide CMRS providers an additional year to comply with the Commission's z-axis benchmarks. In addition, the proposed rule gives small entities the freedom to choose a solution that best fits their financial situation, rather than imposing a specific z-axis technology

solution, which should minimize the economic impact on these entities. The Commission does not believe that the costs and/or administrative burdens associated with the proposed rule would unduly burden small entities and expects to more fully consider the economic impact and alternatives for small entities following the review of comments filed in response to the Notice. The metric the Commission proposes to adopt should benefit all entities by giving certainty in selecting an option for complying with the Commission's rules. Many CMRS providers likely would be able to avoid unnecessary costs by knowing that the Commission has chosen an accuracy metric of 3 meters, which means they don't have to make an expensive attempt to satisfy a 2-meter metric by the implementation date specified in the rules. All CMRS providers, including small entities, should benefit from the scale economies provided to phone manufacturers who would be able to provision all phones to the same 3-meter standard adopted by the Commission. As alternatives, we seek comment on different metrics of two or five meters, as well as potentially revised time frames depending on the precision of the metric adopted.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

67. None.

V. ORDERING CLAUSES

68. 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 Fourth Further Notice of Proposed Rulemaking, is hereby ADOPTED.

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

List of Subjects

47 CFR Part 20

Communications common carriers, Communications equipment, Radio

FEDERAL COMMUNICATIONS COMMISSION

Katura Jackon,
Federal Register Liaison Officer
Office of the Secretary.

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 20 as follows:

PART 20 – COMMERCIAL MOBILE SERVICES

1. The authority citation for part 20 continues to read as follows:

Authority: 47 U.S.C. 151, 152(a) 154(i), 157, 160, 201, 214, 222, 251(e), 301, 302, 303, 303(b), 303(r), 307, 307(a), 309, 309(j)(3), 316, 316(a), 332, 610, 615, 615a, 615b, 615c, unless otherwise noted.

2. Section 20.18 is amended by revising paragraph (i)(2)(ii)(C) introductory text and paragraph (i)(2)(ii)(D) to read as follows:

§ 20.18 911 Service.

* * * * *

(i) * * *

(2) * * *

(ii) * * *

(C) By April 3, 2021: In each of the top 25 CMAs, nationwide CMRS providers shall deploy either dispatchable location, or z-axis technology in compliance with the following z-axis accuracy metric: within 3 meters above or below (plus or minus 3 meters) the handset for 80% of wireless E911 calls.

* * * * *

(D) By April 3, 2023: In each of the top 50 CMAs, nationwide CMRS providers shall deploy either dispatchable location, or z-axis technology in compliance with the following z-axis accuracy metric: within 3 meters above or below (plus or minus 3 meters) the handset for 80% of wireless E911 calls.

* * * * *

[FR Doc. 2019-06012 Filed: 4/3/2019 8:45 am; Publication Date: 4/4/2019]