



November 5, 2019

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: *Ex Parte Presentation, Wireless 9-1-1 Location Accuracy, PS Docket No. 07-114*

Dear Ms. Dortch,

On November 1, 2019, CTIA and nationwide wireless provider member company representatives (participants) met with Public Safety and Homeland Security Bureau (Bureau) Deputy Chief David Furth and Bureau staff (see Attachment for a list of meeting attendees) to discuss the Commission's draft *Fifth Report and Order and Fifth Further Notice of Proposed Rulemaking* (Draft Fifth R&O and Draft Fifth FNPRM, respectively).¹

During the meeting, CTIA and the nationwide wireless providers reiterated their ongoing commitment to delivering accurate vertical location information with wireless 9-1-1 calls and recounted their substantial investment in and evaluation of new solutions. Specifically, the participants highlighted the success of device-based location solutions, such as Apple's Hybridized Emergency Location (HELO) and Google's Android Emergency Location Service (ELS), that wireless providers have successfully harnessed to achieve more granular horizontal (X,Y) location for wireless 9-1-1 calls, particularly indoors. They noted that the success of these solutions in 9-1-1 was preceded by years of development and use in commercial applications, such as navigation, ride sharing, and retail. The participants expressed a similar optimism that device-based location solutions will help deliver accurate vertical location for wireless 9-1-1 calls, but reminded the Commission that unlike horizontal solutions in 2015, vertical solutions are nascent and evolving.

With this background, CTIA expressed support for the Commission establishing a ± 3 meter metric for Z-axis information as a goal and did not seek any changes to the rule. The participants cautioned though that further testing is currently underway and planned during 2020 to better determine the extent to which ± 3 meters for 80% of wireless calls as measured in the 9-1-1 Location

¹ Wireless E911 Location Accuracy Requirements, Draft *Fifth Report and Order and Fifth Further Notice of Proposed Rulemaking*, PS Docket No. 07-114 (rel. Oct. 29, 2019), <https://docs.fcc.gov/public/attachments/DOC-360516A1.pdf> (Draft Fifth R&O and Draft Fifth FNPRM, respectively).



Accuracy Test Bed (Test Bed) is achievable by April 2021. The Draft Fifth R&O presumes that technologies studied in the earlier test campaigns, including CSRIC III (2013) and the Test Bed's Stage Z (2018), are technically feasible and commercially available to meet the Commission's April 2021 benchmark because firmware or software upgrades could load these technologies onto existing wireless handsets. However, given their recent experience with current marketplace dynamics, the participants expressed concern that the Draft Fifth R&O overstates the extent to which these solutions are scalable and deployable by April 2021. The participants noted that it is critical for the Commission, public safety professionals, first responders, and the public to have reasonable expectations about the availability and utility of Z-axis information.

For these reasons and as explained in further detail below, the participants urged the Commission to make targeted modifications to the Draft Fifth R&O:

- In Paragraph 24, revise the definition of a “z-axis capable device” to include “any device capable of measuring *and reporting* vertical location with a wireless 9-1-1 call without a hardware upgrade,” to ensure that a “capable” device is one that can actually provide Z-axis information as part of a wireless 9-1-1 call.
- In Paragraph 29, replace or supplement the conclusion that wireless providers can mandate that a third party vertical location solution be incorporated on a wireless handset with a recognition of the collaboration required among wireless service providers, handset and operating system (OS) providers, and solutions providers to support wireless 9-1-1 calling capabilities, including vertical location; and
- In Paragraph 16, more accurately describe the cautionary views of CTIA, the nationwide wireless providers, handset and OS providers and public safety organizations that were expressed in the record that ± 3 meters is an important goal, but that further testing, development and collaboration is necessary to validate that Z-axis solutions can meet this metric by April 2021.

The participants also expressed support for the Draft Fifth FNPRM and encouraged the Commission to further expand the FNPRM to seek comment on the Commission's vertical 9-1-1 location accuracy regime. For example, the Commission appropriately seeks comment on a technology neutral approach for dispatchable location. In the z-axis context, the Commission should consider the prospects for an achievable benchmark under a compliance framework that focuses on a nationwide solution (rather than the top 25 and then top 50 CMAs) and delivery of vertical location data (not only coverage). By taking a holistic approach, the Commission can advance delivery of accurate information that can help public safety professionals respond quickly and safely to emergencies.



A Z-Axis Metric of ± 3 Meter is the Right Goal, But Further Testing and Deployment is Necessary to Meet the Commission's Z-Axis Benchmarks

In the meeting, the participants reiterated their support for the ± 3 meter metric as an important goal for z-axis solutions that will aid in advancing the development of vertical location technologies. But as the participants have noted, a range of stakeholders play critical roles in the delivery of accurate vertical location information, and further testing would serve to validate technology solutions' ability to meet the ± 3 meter metric and achieve the scalability necessary to meet the Commission's deployment benchmarks. The viewpoints described below, and in the record, reflect the complexity involved in meeting the ± 3 meter z-axis metric.

Paragraph 16 asserts that wireless providers "are on record as supporting adoption of the 3-meter metric without further testing,"² without acknowledging their caution that technical and marketplace realities will make that a difficult goal to achieve, particularly in light of the April 2021 benchmark. For example, AT&T stated that the metric would provide certainty, while also noting that z-axis solutions "will require that handset operating system providers and OEMs work diligently to incorporate the new technology into the handsets to reach these benchmarks."³ Verizon similarly supported the metric, while adding that ± 3 meters "is more aggressive than what vendors were able to demonstrate in the [Stage Z] Test Bed, but is a good target for 9-1-1 calls from devices with the necessary capability."⁴ CTIA agreed that the Fourth FNPRM offered a reasoned approach but was clear that "further technology development and testing remain necessary to validate the ability of vertical location technology solutions to meet the proposed ± 3 meter metric, as well as the scalability necessary to meet the Commission's deployment benchmarks."⁵ The participants encouraged the Commission to revise the Paragraph 16 discussion to better reflect the rulemaking record regarding the critical context regarding participants' support of ± 3 meters.

Handset manufacturers and OS providers in the record, such as Google and Apple, also express cautionary views about a ± 3 -meter metric. For example, Google noted that "clear benchmarks and timelines" will serve to "help companies focus their testing, development, and implementation on concrete objectives," but it cautioned that an overly aggressive metric "may discourage work on technologies that hold long-term promise but require substantial development to achieve that promise."⁶ Apple similarly noted concern that "the z-axis estimation

² Draft Fifth R&O ¶ 16.

³ Comments of AT&T, PS Docket No. 07-114, at 2 (filed May 20, 2019).

⁴ Comments of Verizon, PS Docket No. 07-114, at 2-3 (filed May 20, 2019).

⁵ Comments of CTIA, PS Docket No. 07-114, at 4 (filed May 20, 2019).

⁶ Comments of Google, PS Docket No. 07-114, at 4-6 (filed May 20, 2019) (Google Comments).



approaches under consideration . . . do not necessarily mean that a ± 3 meter accuracy metric is achievable by April 2021 in real-world circumstances.”⁷

The record also reflects varied viewpoints among the public safety community on how the Commission should move forward on 9-1-1 vertical location policy. For example, APCO previously encouraged the Commission to refrain from adopting a z-axis metric unless it includes floor-level information.⁸ It recently expressed concern that the Commission is “on a path that will not lead to meaningful improvements in 9-1-1 location information” even with the adoption of “the most stringent z-axis metric.”⁹ Other commenters, such as the Federal Way Police Department and other public safety officials, encouraged the Commission to require the provision of a floor number estimate.¹⁰ The International Association of Fire Fighters strongly supported a ± 3 -meter metric, stating that such a metric “significantly improves emergency response” and provides the information necessary to “locate wireless callers in distress and ensure the safety of those dispatched to aide them.”¹¹ The International Association of Fire Chiefs, the National Association of State EMS Officials, and the National Sheriffs’ Association encouraged the Commission to adopt the ± 3 -meter metric, observing that a more targeted metric would unnecessarily delay implementation.¹² NENA, however, urged the Commission to consider requiring service providers to deliver geodetic Location Object information including x, y, and z coordinates and more, and explains that the premature use of floor level information may result in the introduction of avoidable errors.¹³

⁷ See Letter from Paul Margie, Counsel for Apple Inc., to Marlene H. Dortch, FCC, PS Docket No. 07-114, at 3 (filed Oct. 29, 2019) (Apple Letter).

⁸ Comments of the Association of Public-Safety Communications Officials-International, Inc., PS Docket No. 07-114, at 5-7 (filed May 20, 2019).

⁹ Letter from Jeffrey S. Cohen and Mark S. Reddish, APCO International, to Marlene H. Dortch, FCC, PS Docket No. 07-114, at 1 (filed Oct. 25, 2019) (APCO Letter).

¹⁰ See, e.g., Letter from Andy H. Hwang, Federal Way Policy Department, to Marlene H. Dortch, FCC, PS Docket No. 07-114 (filed Oct. 21, 2019); Letter from Christopher L. Freeman, Marshall County 911, to Marlene H. Dortch, FCC, PS Docket No. 07-114 (filed Oct. 21, 2019); Letter from Robert Oglesby, Jenkins County Sheriff Office, to Marlene H. Dortch, FCC, PS Docket No. 07-114 (filed Oct. 18, 2019).

¹¹ Comments of the International Association of Fire Fighters, PS Docket No. 07-114, at 3-4 (filed May 20, 2019).

¹² Comments of International Association of Fire Chiefs, National Association of State EMS Officials, and National Sheriffs’ Association, PS Docket No. 07-114, at 2-3 (filed May 20, 2019)

¹³ Comments of NENA: The 9-1-1 Association, PS Docket No. 07-114, at 5 (filed May 20, 2019); see *also* Letter from Daniel Henry, NENA, to Marlene H. Dortch, FCC, PS Docket No. 07-114 (filed Oct. 21, 2019).



In light of these issues, CTIA and the nationwide wireless providers encouraged the Commission to more accurately describe the cautionary views of CTIA, the nationwide wireless providers, and many others – namely, that ± 3 meters is an important goal, but that further testing, development and collaboration is necessary to validate whether z-axis solutions can meet this metric by April 2021.

**Z-Axis Location Technologies are Evolving Solutions that Require Ecosystem Support
to Meet the Commission’s Deployment Benchmarks**

The participants expressed some concern that the Commission overstates the extent to which a z-axis metric of ± 3 meters “is technically feasible in the near term” based on the test data from the two vendors that participated in the Stage Z test bed, NextNav and Polaris Wireless.¹⁴ In fact, as the Report on Stage Z observed, “[n]either of the two vendors that did participate in the Test Bed have integrated their Z-Axis estimation systems into off-the-shelf commercial mobile devices,”¹⁵ making it “challenging to identify a Z-axis metric that can be consistently replicated in a live 9-1-1 calling environment.”¹⁶

Handset manufacturers and OS providers have expanded on this concern in the record. Apple, for example, observed that the Stage Z test bed results showing ± 3 meters were “obtained only under conditions that deviate significantly from realistic user patterns and constraints.”¹⁷ It concluded that the Stage Z results did not necessarily mean that a ± 3 meter accuracy metric “is *achievable by April 2021 in real-world circumstances*.”¹⁸ Apple proposed that any evaluation of vertical location accuracy performance should assess whether solutions “[can] be implemented at large scale, subject to real-world operational considerations, and for their impact on consumer privacy.”¹⁹ Google also noted that the “Stage Z testbed . . . demonstrated the technical feasibility of measuring achievement of a z-axis metric *in some circumstances*” but that “calls were not placed to produce z-axis fixes, and standardized 911 signaling was not used.”²⁰ As CTIA has explained, the

¹⁴ See, e.g., Draft Fifth R&O ¶ 10; see also *id.* ¶ 11.

¹⁵ See Letter from Scott K. Bergmann, Senior Vice President, Regulatory Affairs, CTIA *et al.*, to Marlene H. Dortch, FCC, PS Docket No. 07-114 (filed Aug. 3, 2018) (CTIA Z-Axis Letter) and Attachment, 911 Location Test Bed, LLC, Report on Stage Z, at 121 (Report).

¹⁶ Report at 123.

¹⁷ See Apple Letter at 3.

¹⁸ *Id.* (emphasis added).

¹⁹ *Id.* at 1-2.

²⁰ Google Comments at 12-13.



Stage Z test bed demonstrated that “significant questions remain about performance and scalability in live wireless 9-1-1 calling environments.”²¹

With regard to barometric sensor-based vertical location solutions, the participants encouraged the Commission to consider all data relevant to the availability of barometric sensors in handsets to support compliant z-axis location data. According to the International Data Corporation’s *Worldwide Quarterly Mobile Phone Tracker*[®], 51% of the more than 514 million smartphones sold in the U.S. from 2016 to 2018 contained a barometric pressure sensor, including 100% of iPhones and 24% of Android smartphones (in contrast to data referenced in Paragraph 25).²² Further, none of the more than 36 million feature phones sold during that period contained a barometric pressure sensor.²³

However, the presence of a barometric pressure sensor in a handset does not ensure that a handset can measure, process, and deliver z-axis information that can meet the Commission’s metric as part of a wireless 9-1-1 call. As the Stage Z Report makes clear, active calibration is necessary to overcome the handset bias of a barometric pressure sensor-based z-axis solution.²⁴ As discussed in the section below, although active calibration is generally part of a barometric sensor-based z-axis vendor’s proprietary solution, handset or OS provider support for the z-axis solution is necessary to incorporate z-axis information as part of a wireless 9-1-1 call flow.²⁵

Given these issues, the participants expressed concern that the Draft Fifth R&O seems to presume that wireless providers can compel third party suppliers, such as handset manufacturers and OS providers, to actively participate in the processing and delivery of z-axis data as part of a wireless 9-1-1 call. As drafted, Paragraph 29 states, “the wireless carriers are fully capable of setting requirements for such third parties and establishing contractual timelines that will enable timely deployment of z-axis solutions in time to meet the deadlines in the rules.”²⁶ This perception misconstrues marketplace realities and the critical role that collaboration among wireless providers, handset manufacturers, OS providers, and solutions providers plays in supporting wireless 9-1-1 calls. The Commission should delete the Paragraph 29 statement above and provide

²¹ See generally CTIA Z-Axis Letter and Report.

²² See International Data Corporation USA, *Worldwide Quarterly Mobile Phone Tracker*, available at https://www.idc.com/tracker/showproductinfo.jsp?prod_id=37.

²³ *Id.*

²⁴ See Report at 4, 59-60.

²⁵ Further, lack of ongoing handset manufacturer or OS provider support for a z-axis solution in existing mobile wireless devices may also become an issue as devices age in the marketplace. CTIA Z-Axis Letter at 4.

²⁶ Draft Fifth R&O ¶ 29.



(or supplement it with) a more nuanced view that recognizes the interdependencies and encourages collaboration among all necessary entities to support wireless 9-1-1 calling capabilities, including vertical location.²⁷

A “Z-Axis Capable Device” Should Account for Technological and Marketplace Realities

The participants welcomed the Draft Fifth R&O’s statement affirming that, “as the basis for validation of any z-axis technology, we require wireless carriers to demonstrate in the test bed that the technology achieves 3-meter accuracy for 80% of wireless E911 calls.”²⁸ In other words, the Commission will require wireless providers to validate the 9-1-1 z-axis location benchmark – ± 3 meters for 80% of wireless calls – in the test bed. Use of the test bed for these purposes is consistent with the 9-1-1 horizontal accuracy compliance framework the Commission has adopted and the participants support.²⁹ However, the Draft Fifth R&O’s definition of “z-axis capable device” introduces ambiguity that the Commission should clarify to align the z-axis obligations—and public safety and consumer expectations—with technological and marketplace realities.

The Draft Fifth R&O finds that the ± 3 meter metric should apply to “z-axis capable devices” – meaning “all handsets that have the capability to support vertical location” or all “devices that can be modified to support vertical location by means of a firmware or software upgrade.”³⁰ As an example, the Draft Fifth R&O finds that the two solutions tested in Stage Z, NextNav and Polaris Wireless, can be implemented by the April 2021 benchmark because “software modifications are readily achievable” without hardware changes.³¹ The Draft Fifth R&O cites Polaris’ statements that

²⁷ *Id.* The Commission has imposed rules on licensees in other contexts that recognize compliance requires cooperation among multiple stakeholders in addition to the licensee. See, e.g., *Review of the Emergency Alert System*, Sixth Report and Order, 30 FCC Rcd 6520, 6540-41 ¶ 43 (2015) (stating “[w]e acknowledge that the creation and delivery of an accessible visual message is not solely within the control of any one entity, and often requires coordination and execution among many connected parties and equipment in the EAS alert distribution chain.”); *Closed Captioning of Video Programming et al.*, 29 FCC Rcd 2221, 2254 ¶ 52 (2014) (quoting *Closed Captioning and Video Description of Video Programming Implementation of Section 305 of the Telecommunications Act of 1996 Video Programming Accessibility*, Report and Order, 13 FCC Rcd 3272, 3364 ¶ 199 (1997)) (reiterating that “closed captioning is most likely to be done at the production stage or prior to distribution where it is most economically and technically efficient” and expressing agreement that “the creation and delivery of good quality captions is not solely within the control of any one entity and often requires coordination and execution among many connected parties in the video delivery chain”).

²⁸ Draft Fifth R&O ¶ 23.

²⁹ See *id.* ¶ 43 (“the existing rules already clearly identify the test bed as the basis for certifying compliance of all indoor location technologies, horizontal and vertical”).

³⁰ *Id.* ¶ 24.

³¹ *Id.* ¶ 26.



both firmware upgrade and software upgrade options are achievable “through cooperation among carriers, device manufacturers, and chipmakers” or “through cooperation among carriers, location vendors, and device Operating System providers,” respectively.³²

The Draft Fifth R&O simply presumes such cooperation, but the record shows that just because a device *can technically* be modified to support vertical location via firmware or software, it does not mean that such a device can support a z-axis solution that is compliant with the Commission’s rules. APCO, for example, has stated that the Commission “cannot assume that OEM or OS providers will cooperate with carriers and z-axis technology vendors to replicate test bed conditions.”³³ In addition, Apple recently cautioned against the presumption that certain vertical location solutions will be allowed on its devices as they “create unacceptable incursions into personal privacy by requiring a user’s device to repeatedly connect to proprietary third-party servers and disclose sensitive location information even when the user has not initiated a 911 call.”³⁴

For these reasons, “z-axis capable device” should mean “any device capable of measuring *and reporting* vertical location with a wireless 9-1-1 call without a hardware upgrade” – not any device that can simply be modified to measure vertical location by firmware or software upgrade, but cannot report such information as part of a wireless 9-1-1 call.³⁵ Doing so will better reflect technological realities and today’s marketplace, as well as the universe of devices that public safety professionals should expect to deliver z-axis information with wireless 9-1-1 calls. Accordingly, the Commission should modify the definition in Paragraph 24.

The Commission Should Take a Holistic View of the 9-1-1 Vertical Location Framework to Foster Delivery of Accurate Information for Public Safety

The participants also expressed support for the scope of the Draft Fifth FNPRM and encouraged the Commission to further expand it to seek comment on the Commission’s vertical 9-1-1 location accuracy regime. For example, while the Commission appropriately seeks comment on a technology neutral approach for dispatchable location, the Commission should more broadly seek comment on the prospects for a vertical location compliance framework offering a nationwide solution (rather than the top 25 and then top 50 CMAs) and a focus on delivery of vertical location data (not only coverage). NENA shares the view the Fifth FNPRM provides a good

³² *Id.*

³³ See APCO Letter at 3; Apple Letter at 3.

³⁴ Apple Letter at 3.

³⁵ Further, older devices pose particular issues – for example, handset manufacturers and OS providers may no longer produce maintenance releases for certain handsets, making those handsets incapable of supporting a Z-axis solution.



opportunity for more discussion regarding implementation and compliance.³⁶ The participants also reiterated that, despite the challenges of the National Emergency Address Database (NEAD), dispatchable location remains an important objective, and look forward to working with all stakeholders on this endeavor.

By taking a holistic approach, the Commission can ensure that its rules and requirements will advance work towards delivering accurate vertical location information with wireless 9-1-1 calls that can help public safety professionals respond quickly and safely to emergencies.

Pursuant to Section 1.1206 of the Commission's rules, a copy of this letter is being filed in ECFS and provided to the Commission meeting attendees. Please do not hesitate to contact the undersigned with any questions.

Sincerely,

/s/ Matthew Gerst

Matthew Gerst
Vice President, Regulatory Affairs

Attachment

³⁶ See Chris Nussman, *NENA Comments on Z-Axis Report & Order and Further Notice of Proposed Rulemaking*, Press Release (Oct. 31, 2019), <https://www.nena.org/news/476299/NENA-Comments-on-Z-Axis-Report--Order-and-Further-Notice-of-Proposed-Rulemaking.htm>.



ATTACHMENT

November 1, 2019 Meeting Attendees

CTIA

Matthew Gerst

Adam Krinsky, Wilkinson Barker Knauer, LLP

Danielle Thumann, Wilkinson Barker Knauer, LLP

AT&T

Joe Marx

Sprint

Ray Rothermel*

T-Mobile

Steve Sharkey*

Eric Hagerson*

Verizon

Robert Morse

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David Furth, PSHSB*

Kenneth Carlberg, PSHSB

Alex Espinoza, PSHSB*

John Evanoff, PSHSB

Nellie Foosaner, PSHSB*

Erika Olsen, PSHSB*

*Participated via conference bridge