Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Wireless E911 Location Accuracy Requirements	)	PS Docket No. 07-114

COMMENTS OF APCO INTERNATIONAL

The Association of Public-Safety Communications Officials-International, Inc. (APCO)[1] submits the following comments in response to the Public Safety and Homeland Security Bureau's Public Notice in the above-captioned proceeding.[2] The Bureau seeks comment on the vertical accuracy (z-axis) test bed report ("Report"), submitted by CTIA on behalf of the nationwide wireless carriers (AT&T Mobility, Sprint, T-Mobile USA, and Verizon), and on the carriers' proposal for a z-axis accuracy metric submitted with the Report.[3]

The nation's largest carriers, through CTIA, proposed a z-axis metric of +/- 5 meters for 80% of fixes from mobile devices capable of delivering barometric pressure sensor-based altitude estimates.[4] That translates to a range of up to two floors below, or up to two floors above, the actual floor where a 9-1-1 caller may be located, and some lesser degree of accuracy for one in five calls to 9-1-1. The carriers' proposal thus fails the American public and the dedicated public safety professionals who need actionable, accurate location information to find

[1] Founded in 1935, APCO is the nation's oldest and largest organization of public safety communications professionals. APCO is a non-profit association with over 31,000 members, primarily consisting of state and local government employees who manage and operate public safety communications systems – including 9-1-1 Emergency Communications Centers (ECCs), emergency operations centers, radio networks, and information technology – for law enforcement, fire, emergency medical, and other public safety agencies.
[2] Public Safety and Homeland Security Bureau Seeks Comment on Vertical (Z-Axis) Accuracy Metric Proposed by the Nationwide Wireless Carriers, PS Docket No. 07-114, *Public Notice*, DA 18-928 (Public Safety and Homeland Security Bur. rel. Sept. 10, 2018) ("Notice").
[3] *Id.* at 1.
[4] *Id.* at 2.

9-1-1 callers during emergencies. Consistent with the goals of the 2015 Fourth Report and Order[5] and in order to carry out the Commission's statutory mission to "promote the safety of life and property,"[6] the Commission must reject the carriers' proposal.

In its Order, the Commission adopted new rules that required carriers to ensure that wireless 9-1-1 callers could be located indoors with a vertical location component by providing 1) dispatchable location – the gold standard for public safety – or 2) z-axis information.[7] As the Commission explained, "by providing a z-axis metric as a backstop to dispatchable location for identifying floor level of 911 calls from multi-story buildings, we ensure that vertical location accuracy is achieved."[8] In establishing these alternative paths and a longer compliance timeline than originally proposed in 2014, the Commission gave the carriers an opportunity to make good on their commitment to public safety to pursue aggressive improvements to location accuracy.

As explained below, the carriers' z-axis metric proposal is disconnected from what's technically feasible and what's actionable for an emergency response. Thankfully, the Commission anticipated this situation, explaining in its Order that appropriate incentives were in place for the carriers to improve location accuracy promptly and effectively, and that "[i]n the absence of an approved z-axis metric alternative, CMRS providers will be obligated to rely on dispatchable location."[9] Accordingly, the Bureau should recommend to the Commission that it should reject the proposed z-axis metric and thereby obligate the carriers to provide dispatchable location.

[5] Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114, *Fourth Report and Order*, 30 FCC Rcd 1259 (2015) ("Order").
[6] 47 U.S.C. § 151.
[7] Order at para. 117.
[8] *Id.* at para. 162.
[9] *Id.* at para. 45.

I. The Carriers' Proposal is Unjustified and Shows a Lack of Good Faith

CTIA failed to explain how it arrived at +/- 5 meters. The participating technology providers indicated support for a more accurate, but readily-achievable metric.[10] The test bed results indicate that +/- 1.8 meters is achievable today, and technologies will no doubt improve between now and the vertical accuracy benchmark in 2021. Accordingly, the carriers should have provided much more detailed justification rather than offering generalized statements as to how they arrived at 5 meters.

Further, even if a range of +/- 5 meters could have been justified by the test bed results, the carriers had a good faith obligation to consider other options for producing a more useful metric. Nothing in the rules prohibited the carriers from considering information outside of the test bed when developing the proposed metric. Indeed, CTIA acknowledged that "other approaches to Z-axis location estimates are emerging."[11] Considering all available information when developing the metric would have been entirely appropriate, especially if the intent is to ensure that public safety is provided with an actionable location fix for indoor callers.

Entities outside the test bed have reported on technologies that demonstrate that a much higher degree of vertical location accuracy – presented as a floor level – is achievable.[12] Further,

[10] Ex Parte Letter of NextNav, LLC, PS Docket No. 07-114, at 7 (filed Aug. 16, 2018) ("the results of the recently concluded z-axis test bed, combined with the results of multiple other test beds conducted by CTIA, CSRIC and other independent and expert administrators, clearly demonstrate that technologies are available today (and others are being developed) that can provide floor level vertical accuracy of within 3 meters for at least 80 percent of wireless calls."); Ex Parte Letter of Polaris Wireless, Inc., PS Docket No. 07-114, at 4 (filed Sept. 10, 2018) ("Polaris Wireless recommends that the FCC proceed with in establishing a vertical location benchmark metric of 3 meters on 80% of fixes for E9-1-1.").

[11] Z-Axis Metric Proposal of CTIA, PS Docket No. 07-114, at 5 (filed Aug. 3, 2018) ("CTIA Proposal").

[12] For example, an academic paper described a system capable of predicting the correct floor level with 100% accuracy that does not require the use of beacons, prior knowledge of the building infrastructure, or knowledge of user behavior. *See* William Falcon & Henning Schulzrinne, "Predicting Floor Level for 911 Calls with Neural Networks and Smartphone Sensor Data" (2018) available at https://arxiv.org/pdf/1710.11122.pdf; *See also* Carbyne, Indoor Positioning, https://carbyne911.com/indoor-positioning/ (describing Carbyne's indoor positioning technology "that is capable of pinpointing a user's location to within a one-meter radius, including indoor and elevation.").

the carriers were uniquely positioned to evaluate vertical location solutions that leverage their own carrier-provisioned WiFi access points, small cell deployments, and 5G network technologies.[13] While CTIA points out that Section 20.18 of the Commission's rules requires that the proposed metric be "validated" by the test bed,[14] this requirement was not intended to justify an excessively conservative metric in light of what was shown to be achievable by all test bed participants, other technology providers, and the means that carriers have at their own disposal.

If the carriers were committed to producing meaningful improvements, they would have at least proposed multiple z-axis metrics, consistent with Section 20.18 (i)(2)(ii)(B), to establish a conservative baseline along with a more accurate metric that would be useful to public safety. Because the carriers proposed an unjustified metric that ignores substantial support for a more accurate and actionable metric, APCO questions their commitment to 9-1-1 location accuracy. The carriers should not be permitted to take advantage of the limitations of the test bed they established to urge the adoption of an unnecessarily lax z-axis metric.

II. Accepting the Z-Axis Proposal Would Be a Bad Outcome for Public Safety

Accepting the carrier's proposal would mean that 9-1-1 location accuracy is worse than it otherwise would have been under the Commission's 2014 proposal. Had the 2014 proposal been adopted, carriers would have been required to provide vertical location estimates within 3 meters for 80% of calls in 2020.[15] Under the carriers' proposed z-axis metric, vertical location

[13] News reports indicate that carriers are planning in-home 5G services, which could provide a dispatchable location or a floor level indication at a minimum. *See* Mike Dano, "New T-Mobile's plans for in-home, fixed wireless internet services begin to take shape," Fierce Wireless (Sept. 21, 2018) https://www.fiercewireless.com/5g/new-t-mobile-s-plans-for-home-fixed-wireless-internet-services-begin-to-take-shape; 5G is Here, Verizon, (Sept. 11, 2018) https://www.verizon.com/about/news/5g-here.

[14] CTIA Proposal at 4.

[15] Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114, *Third Further Notice of Proposed Rulemaking*, 29 FCC Rcd 2374, at para. 38 (2014).

information would be far less accurate and provided to Emergency Communications Centers at a later date. This would betray the intent of the Commission, the carriers' promises, and the needs of the public safety community and the citizens they serve. Moreover, the proposed metric fails to respond to the requirement to identify the floor level and would undermine incentives to provide dispatchable location.

A. The Proposed Metric Fails to Meet the Commission's Call for Identifying the Floor Level

The carriers' proposal, even if revised to a more accurate metric than +/- 5 meters, would not be effective for public safety. The Commission's rules were aimed at "identifying floor level" of 9-1-1 callers.[16] Ignoring this, the carriers proposed that the vertical location information would be delivered as a height above mean sea level. Vertical location information provided as a value relative to mean sea level is not actionable for public safety. If a z-axis metric is adopted, it should include floor level information, consistent with the Commission's direction.

B. The Proposed Metric Would Likely Derail Efforts to Provide Dispatchable Location

Adopting the carriers' proposal would likely result in the abandonment of dispatchable location solutions. Because carriers have the option to pursue dispatchable location or z-axis technologies, they would have every incentive to take the easiest path. A z-axis metric that's more conservative than what's readily achievable today gives the carriers little reason to invest in dispatchable location. Although CTIA requests additional time for testing, public safety is left with no guarantee that the industry will propose a more acceptable metric. The carriers were

[16] Order at para. 162 ("by providing a z-axis metric as a backstop to dispatchable location *for identifying floor level* of 911 calls from multi-story buildings, we ensure that vertical location accuracy is achieved.") (emphasis added).

already given three years, and the Commission should not depart from the carefully crafted deadlines in the Order.

Public safety needs to know which door to kick down. A dispatchable location is much-preferred over x/y/z position estimates.[17] Even with floor level vertical information, first responders would be left to search an area up to one hundred meters across - the size of a city block. That's why, with assurances that the carriers were committed to aggressively pursuing dispatchable location solutions, APCO negotiated with the carriers and agreed to an alternative approach to the Commission's 2014 proposal. With the carriers' commitment now in doubt, and the potential for a z-axis metric that undermines dispatchable location, APCO has significant concern for the future of 9-1-1 location accuracy.

III. The Commission Should Immediately Rule that the Carriers Must Provide a Dispatchable Location

As noted above, the Commission declared in the Order that "[i]n the absence of an approved z-axis metric alternative, CMRS providers will be obligated to rely on dispatchable location."[18] Given the carriers' failure to propose a z-axis metric that meets at least a floor-level accuracy, and the upcoming deployment deadlines, the carriers should not be afforded time for additional testing to determine the metric. The Commission should make clear that the carriers must comply with its vertical location accuracy requirements by providing dispatchable location. That is the only way to ensure that public safety remains on track to receive actionable indoor wireless 9-1-1 locations to carry out their life-saving missions.

[17] In addition to widespread agreement in the public safety community for a dispatchable location, since the adoption of the 2015 Order, Congress has directed the Commission to explore requiring dispatchable location for 9-1-1 calls regardless of the technology platform used to make the call. *See* RAY BAUM'S Act of 2018 § 506.
[18] Order at para. 45.

IV. Conclusion

In proposing a z-axis metric of +/- 5 meters, CTIA and the carriers have failed to demonstrate that they are committed to meeting the expectations of public safety and the Commission. The Commission must reject this proposal and thereby require the carriers to comply with the 2015 Order by providing dispatchable location.

Respectfully submitted,

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