Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of:	)	
	)	
Public Safety and Homeland Security Bureau	)	PS Docket No. 07-114
Seeks Comment on Vertical (Z-Axis)	)	
Accuracy Metric Proposed by the Nationwide	)	
Wireless Carriers	)	

COMMENTS OF
THE NATIONAL PUBLIC SAFETY TELECOMMUNICATIONS COUNCIL

The National Public Safety Telecommunications Council (NPSTC) submits these comments in response to the Public Notice in the above captioned proceeding.[1] The Public Notice seeks comment on a proposed z-axis metric for 9-1-1 location accuracy submitted by CTIA for the nationwide wireless carriers. As addressed in these comments the proposal for a +/- 5 meter vertical accuracy metric fails to offer the level needed to protect the public in emergency situations. Instead, a vertical z-axis metric providing floor level accuracy is needed and can be accomplished with available technology, especially within the generous implementation timeframe established in the rules adopted in 2015.

[1] *Public Notice*, DA-18-928, released September 10, 2018.

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The National Public Safety Telecommunications Council

The National Public Safety Telecommunications Council is a federation of public safety organizations whose mission is to improve public safety communications and interoperability through collaborative leadership. NPSTC pursues the role of being a resource and providing advocacy for public safety organizations in the United States on matters relating to public safety telecommunications. NPSTC has promoted implementation of the Public Safety Wireless Advisory Committee (PSWAC) and the 700 MHz Public Safety National Coordination Committee (NCC) recommendations. NPSTC explores technologies and public policy involving public safety telecommunications, analyzes the ramifications of particular issues and submits comments to governmental bodies with the objective of furthering public safety telecommunications worldwide. NPSTC serves as a standing forum for the exchange of ideas and information for effective public safety telecommunications.

The following 16 organizations serve on NPSTC's Governing Board:[2]

American Association of State Highway and Transportation Officials
American Radio Relay League
Association of Fish and Wildlife Agencies
Association of Public-Safety Communications Officials-International
Forestry Conservation Communications Association
International Association of Chiefs of Police
International Association of Emergency Managers
International Association of Fire Chiefs
International Municipal Signal Association
National Association of State Chief Information Officers
National Association of State Emergency Medical Services Officials
National Association of State Foresters
National Association of State Technology Directors
National Council of Statewide Interoperability Coordinators
National Emergency Number Association
National Sheriffs' Association

[2] These comments represent the views of the NPSTC Governing Board member organizations.

Several federal agencies are liaison members of NPSTC. These include the Department of Homeland Security (the Federal Emergency Management Agency, the Office of Emergency Communications, the Office for Interoperability and Compatibility, and the SAFECOM Program); Department of Commerce (National Telecommunications and Information Administration); Department of the Interior; and the Department of Justice (National Institute of Justice, Communications Technology Program). Also, Public Safety Europe is a liaison member. NPSTC has relationships with associate members: The Canadian Interoperability Technology Interest Group (CITIG) and the Utilities Technology Council (UTC), and affiliate members: The Alliance for Telecommunications Industry Solutions (ATIS), Open Mobile Alliance (OMA), Telecommunications Industry Association (TIA), TETRA Critical Communications Association (TCCA), and Project 25 Technology Interest Group (PTIG).

NPSTC Comments

The Public Notice seeks comment on a proposed z-axis metric for 9-1-1 location accuracy submitted by CTIA for the nationwide wireless carriers. Imagine the following scenarios:

> You and your spouse have saved all year for a well-deserved vacation to take your three young children to your favorite city. You have a great day with your children and marvel at how they enjoy life. Your family retires for the night on the 10th floor of a high rise hotel. You are awakened suddenly to the smell of smoke and check the door of your room to see if it is safe to open. The door is very hot so fire must be present in the hallway, preventing exit. You quickly dial 9-1-1, and tell the call-taker of your emergency. Fortunately, the vertical location information from your cellphone is available to the PSAP. Unfortunately, that information incorrectly places you and your family on the 11th floor instead of the 10th floor. Precious minutes are lost in the firefighter search for your rescue, and the results are tragic. Memorial services for you, your spouse and your three children are held the following week.

> Your neighbor's daughter has worked very hard in high school, attaining the grades, test scores and extracurricular activities needed to gain entry into her favorite college. She settles well into her 4th floor dorm room with new friends. During her freshman year, an active shooter enters the dorm and begins randomly firing. The daughter calls 9-1-1 for help. Sadly, while the accuracy information from her phone meets the federal requirements, it locates her on the wrong floor, so the information provided to law enforcement responding to the incident does not help save her life.

The above scenarios and countless others that are similar could be the result of the +/- 5 meter z-axis metric recommended by the nationwide carriers, on which the Commission requests comments. A +/- 5 meter level of accuracy equates to a total potential error span of 10 meters, i.e., approximately 33 feet or 3 floors. In contrast, with floor level accuracy, firefighters, law enforcement officers and paramedics responding to an emergency can save precious minutes—minutes that could help save a life.

The Commission's 2015 Fourth Report and Order established the following vertical location requirements, considering the effective date of the rules adopted:[3]

> By April 3, 2021:
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> Nationwide providers must provide either (1) dispatchable location, or (2) vertical (z-axis) location information in compliance with the FCC-approved metric, in each of the top 25 Cellular Market Areas (CMAs). If dispatchable location is used, there must be a density of reference points distributed throughout the CMA equivalent to 25 percent of the population in that CMA. If vertical location technology is used, it must be deployed to cover 80 percent of the CMA population.[4]
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> By April 3, 2023:
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> Nationwide providers must provide either (1) dispatchable location, or (2) vertical (z-axis) location information in compliance with the FCC-approved metric, in each of the top 50 CMAs. If dispatchable location is used, there must be a density of reference points distributed throughout the CMA equivalent to 25 percent of the population in that CMA. If vertical

[3] *Fourth Report and Order*, PS Docket No. 07-114, released February 3, 2015.
[4] 47 C.F.R. § 20.18(i)(2)(ii)(C)

location technology is used, it must be deployed to cover 80 percent of the CMA population.[5]

Public safety has expressed support for dispatchable location information that would provide first responders greater certainty in responding to members of the public in need. However, the rules provide an option for vertical location (z-axis) parameters to supplement horizontal x/y location information. Therefore, the challenge now is to determine the vertical (z-axis) level metric to be inserted into the above requirements. Accordingly, the Public Notice requests comment on the z-axis recommendation submitted by CTIA on behalf of the nationwide carriers.[6]

NPSTC views the z-axis recommendation CTIA submitted on behalf of the nationwide carriers as unacceptable, especially considering test results also submitted by developers of vertical location technology, resources the nationwide carriers have at hand and the generous timeframe the Commission has provided for vertical location implementation. As follow-up to the CTIA report, NextNav submitted its own report that states the following:

> The z-axis test bed reaffirmed the significant accuracy of NextNav's Metropolitan Beacon System ("MBS") technology, documenting vertical location accuracy of 1.8 meters or better for 80 percent of fixes and 3 meter or better accuracy for 94 percent of fixes, *i.e.*, "floor level" accuracy.[7]

Polaris Wireless reports a 2.8 meter accuracy with limited active compensation applied to the test measurements.[8] NPSTC expects that technology improvements going forward can provide even

[5] (47 C.F.R. § 20.18(i)(2)(ii)(D))
[6] Wireless E-9-1-1 Location Accuracy Requirements (PS Docket No. 07-114) Submission of Z-axis Metric and Report, August 3, 2018.
[7] *Ex Parte* Notice submitted by NextNav, LLC, PS Docket. No. 07-114, August 16, 2018.
[8] *Ex Parte* Notice submitted by Polaris Wireless, PS Docket No. 07-114, September 10, 2018.

greater accuracy. Polaris appears to agree and addresses current standards for barometric sensor compensation as follows:

> Standards will continue to adjust to technological improvements, but there is no need to wait. The standards support setting a benchmark now and it is incumbent upon carriers and device manufacturers to implement these standards.[9]

NPSTC concurs. The three years the Commission provided for testing to develop a z-axis recommendation by nationwide carriers should be more than sufficient. NPSTC believes it is time to move to implementation. Once carriers have actually implemented either dispatchable location or the option of z-axis vertical location, NPSTC does recommend that carriers and PSAPs provide some final "live" testing before the automatic 9-1-1 location capability is marketed to the public. NPSTC also recommends that carriers plan implementation so this testing fits within the current timelines in the Commission's rules. There should be no need to extend these generous timelines further.

In addition to the technology availability, NPSTC believes the four nationwide carriers have adequate resources to deploy floor level vertical accuracy. The 2017 AT&T Annual Report shows operating revenues of $160.54 Billion and a net income of $29.45 Billion.[10] The 2017 Verizon Annual Report shows $126.0 Billion in consolidated revenues and $30.1 Billion in net income. [11] The T-Mobile Annual Report shows total revenues of $40.6 Billion with a net income of $4.536 Billion.[12] For 2017, Sprint reported $24.323 Billion in total net operating revenues with a net income of $7.32 Billion.[13]

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[9] Polaris *Ex Parte*.
[10] https://investors.att.com/~/media/Files/A/ATT-IR/financial-reports/annual-reports/2017/complete-financial-review.pdf
[11] https://www.verizon.com/about/sites/default/files/2017VerizonAnnualReport.pdf
[12] http://investor.t-mobile.com/Cache/1500109984.PDF?O=PDF&T=&Y=&D=&FID=1500109984&iid=4091145
[13] http://s21.q4cdn.com/487940486/files/doc_financials/quarterly/2017/q3/01_Fiscal-3Q17-Earnings-Release-FINAL.pdf

NPSTC realizes these companies face significant expenses in building out and maintaining their respective networks. However, in view of the above financial reporting, it is hard to believe that resources could not be made available to deploy floor level location accuracy that meets public safety requirements and provides increased safety to the public. Furthermore, the revenue and net income numbers cited above are for one year. The Commission has provided the nationwide carriers a very generous multi-year timeline for vertical location under the rules. Starting from the Commission's decision in 2015, the nationwide carriers had three years to recommend a z-axis metric, six years for implementation in only the top 25 markets, and nine years to reach implementation in the top 50 markets. Such a generous schedule should provide even more options to deploy greater vertical accuracy than that proposed in the CTIA filing.

NPSTC believes it is also important for the z-axis information to be actionable from a public safety perspective. Ideally, PSAPs and first responders need to have information showing the building floor or level number. If vertical information cannot be reported in those terms, reporting the height above ground level would be a preferable approach to a height above mean sea level (AMSL). Further discussions may be needed on this aspect of vertical location, however, that does not mean the Commission's already generous timelines should be extended.

Several of NPSTC's member organizations also are members of the CTIA 911 Location Accuracy Advisory Group and have reported that carriers appear to be attempting to dilute the definition of dispatchable location. In its 2015 Fourth Report and Order, the Commission amended the rules to show the following definition of dispatchable location:

> A location delivered to the PSAP by the CMRS provider with a 911 call that consists of the street address of the calling party, plus additional information such as suite, apartment or similar information necessary to adequately identify the location of the calling party. The street address of the calling party must be validated and, to the extent possible, corroborated against other location information prior to delivery of dispatchable location information by the CMRS provider to the PSAP.[14]

Our member organizations report that the carriers, working with the Alliance for Telecommunications Industry Solutions (ATIS), have produced a standard on location accuracy for emergency calls that includes two different definitions or "levels" of dispatchable location. The ATIS standard includes a "DL Level 1" and a "DL Level 2." DL Level 2 is described as location information that is enough to locate a wireless caller on the correct floor and in the correct suite and therefore, closely resembles the Commission's definition.

However, DL Level 1 is less accurate and could report a location that is a floor above or a floor below that of the caller, or even a building adjacent to, or across the street from, the building in which the caller is located. Therefore, DL Level 1 is not consistent with the definition in the Commission's rules and is unacceptable from a public safety standpoint. Furthermore, having these two definitions is likely to create confusion. NPSTC therefore urges the Commission to maintain its current definition of dispatchable location, regardless of any apparent attempts by carriers to dilute that definition.

[14] 47 C.F.R. § 20.18(i)(1).

Conclusion

NPSTC appreciates the opportunity to provide recommendations on the +/- 5 meter z-axis metric recommended by the nationwide carriers. As addressed in these comments, members of the public in distress in multi-story buildings would not be adequately served by this +/- 5 meter vertical metric because it would not provide an accurate floor level. Public safety needs floor-level accuracy for the z-axis metric and therefore, NPSTC views that z-axis recommendation from the nationwide carriers to be unacceptable. This conclusion also considers 1) test results submitted by providers of vertical location technology that show a 1.8 meter accuracy level is possible; 2) the vast resources nationwide carriers have at hand, as affirmed in their respective 2017 annual reports; and 3) the very generous timeline for vertical location implementation the Commission has provided. ***Given the technology and resources available to provide floor-level accuracy, we should NOT plan for mere mediocrity in setting the vertical z-axis metric. Floor-level accuracy is what is needed and should be required. Also, the Commission's definition of dispatchable location in the rules should not be diluted.***

Ralph A. Haller, Chairman

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