

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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

**REPLY COMMENTS OF
NCTA – THE INTERNET & TELEVISION ASSOCIATION**

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INTRODUCTION AND SUMMARY

The ability of first responders to quickly and accurately locate 911 callers is critically important, and the cable industry is committed to helping to ensure the reliability of the nation’s 911 communications system.¹ NCTA – The Internet & Television Association (NCTA)² and its members look forward to continuing to work with the Commission and the wireless industry to improve the accuracy of wireless 911 call locations. NCTA supports the development of new technologies that will improve location accuracy and has been engaged in long-running discussions with the wireless industry related to cable operators’ participation in the National

¹ See *Wireless E911 Location Accuracy Requirements*, Fourth Further Notice Of Proposed Rulemaking, PS Docket No. 07-114, FCC 19-20, ¶ 1 (rel. Mar. 18, 2019) (*Fourth FNPRM*) (“[T]he capability to locate wireless 911 callers quickly and accurately is of critical importance regardless of where the call originates.”); see also Letter from Neal M. Goldberg, General Counsel, NCTA – The Internet & Television Association, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 07-114 (May 13, 2019).

² NCTA is the principal trade association of the cable television industry in the United States, which is a leading provider of residential broadband service to U.S. households. Its members include owners and operators of cable television systems serving nearly 80 percent of the nation’s cable television customers, as well as more than 200 cable program networks. Cable service providers have invested more than \$290 billion over the last two decades to deploy and continually upgrade networks and other infrastructure—including building some of the nation’s largest Wi-Fi networks.

Emergency Address Database (NEAD). However, comments in response to the *Fourth FNPRM* amplify NCTA members' significant concerns about: (1) the NEAD's effectiveness generally and as compared to more recent promising technologies; (2) the cable industry's ability to populate the NEAD with meaningful data; and (3) the potential unintended negative effects on NCTA members' customers. These concerns, which have contributed to NCTA members' challenges in working with CTIA to engage in testing of the NEAD, were also heightened by the results presented in the recent *ATIS Report*.³

Multiple commenters discuss alternative solutions that they assert are already capable of delivering reliable vertical location information, without the implementation challenges associated with the NEAD.⁴ Because the NEAD serves as only one of two options that wireless carriers can select to meet the Commission's technology-neutral 911 vertical location obligations,⁵ the record suggests that resources may be better spent on alternative solutions that can be proven to better improve location accuracy for 911 callers. As the Commission considers measures to improve location accuracy for wireless E911 calls originating indoors, including a

³ Letter from Matthew Gerst, Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 07-114 (Apr. 26, 2019) (CTIA ex parte), Attachment B, E911 Location Test Bed Dispatchable Location Summary Report (*ATIS Report*).

⁴ See NextNav LLC Comments at 1-2 (discussing NextNav's metropolitan beacon service (MBS) technology); Google Comments at 1-4 (discussing Google's Android Emergency Location Service (ELS) technology); Boulder Emergency Telephone Service Authority (BRETSA) Comments at 5 (stating that "[t]he Stage Z vertical location tests demonstrate the accuracy of vertical location technologies developed by Polaris and NextNav"). Unless otherwise noted, all comment citations are to comments filed in PS Docket No. 07-114 on or around May 20, 2019.

⁵ See 47 C.F.R. § 20.18(i)(2)(ii)(C) (permitting nationwide CMRS providers to "deploy either dispatchable location, or z-axis technology in compliance with any z-axis accuracy metric that has been approved by the Commission"). CMRS providers using dispatchable location "must ensure that the NEAD is populated with a sufficient number of total dispatchable location reference points to equal 25 percent of the CMA population," while those deploying z-axis technology must cover 80 percent of the CMA population. *Id.* § 20.18(i)(2)(ii)(C)(1)-(2).

z-axis metric,⁶ NCTA offers these reply comments to provide additional information about inherent challenges related to the NEAD-based Dispatchable Location (DL) option.

I. THE ATIS REPORT AND RELATED COMMENTS COMPOUND CONCERNS THAT THE NEAD MAY NEVER DEVELOP SUFFICIENTLY TO BECOME AN EFFECTIVE LONG-TERM SOLUTION.

As many commenters attest, the recently-submitted *ATIS Report* calls into question whether the NEAD and NEAD-based systems will ever develop adequately to become an effective long-term solution to the location accuracy problem. The *ATIS Report* finds that NEAD testing results to date “reflect the capabilities of an emerging technology, rather than the capabilities of a complete, ready-to-deploy system.”⁷ The report further suggests that the ultimate utility of the NEAD is conditioned on multiple assumptions that are likely unrealistic, including, but not limited to, assumptions about handset support.⁸

Several commenters suggest that the NEAD could be improved through the addition of more wireless access points.⁹ Yet the *ATIS Report* notes that the scenarios that have been tested already “tend to skew towards an optimistic assessment of database completeness,”¹⁰ suggesting that, even with additional reference points, NEAD-based systems will not provide a reliable location in a significant percentage of cases. Extrapolating from test data, the *ATIS Report* predicts that “an acceptable Provisioning Density could be somewhere in the 50% to 75% range

⁶ See *Fourth FNPRM* ¶ 3.

⁷ *ATIS Report* at 3.

⁸ See *id.* at 4 (stating that subsequent testing and implementation may be appropriate “[i]f support for Dispatchable Location is added to iOS devices (which is unlikely), and when substantial[ly] more Reference Point data is added to the NEAD,” and further noting that DL processing logic must still be “refined” before use in operational 911 settings) (emphasis added).

⁹ See Qualcomm Comments at 5; Verizon Comments at 2.

¹⁰ *ATIS Report* at 3.

for medium and large commercial and residential structures,”¹¹ significantly higher than any configuration tested to date. Indeed, the *ATIS Report* suggests that the bar the NEAD must meet for reliable public safety use may be impossible to reach: “[s]ingle-family and other small stand-alone structures ... may need 100% Provisioning Density, to avoid reporting neighboring buildings or reporting no address at all.”¹²

In light of these limitations, NENA: The 9-1-1 Association urges the Commission “to reconsider the use of NEAD as a means to comply with its rules,” adding that “functional and sustainability issues with NEAD . . . leave us concerned that it is not a viable program.”¹³ Other public safety groups observe that “[t]he test bed results did not identify a high level of accuracy for the NEAD solution.”¹⁴ Technology vendors likewise assert that the NEAD “remains highly inaccurate and may never be sufficiently accurate to provide a reliable tool for public safety,”¹⁵ and that there are “significant impediments to achieving a successful and sustainable NEAD solution.”¹⁶ Even CTIA and its members acknowledge “several implementation challenges that

¹¹ *Id.* at 19. The *ATIS Report* defines “provisioning density” as “the fraction of units (apartments, suites, separate rooms or partitions) in a building in which one or more reference points are provisioned in the NEAD.” *See id.*

¹² *Id.*

¹³ NENA Comments at 1-2.

¹⁴ International Association of Fire Chiefs, National Association of State EMS Officials, and National Sheriffs’ Association Comments at 5 (IAFC et al. Comments); *see also* International Association of Fire Fighters Comments at 3 (“It is not sufficient to provide . . . the location address of Wi-Fi access points somewhere in the vicinity of a wireless caller [because] [i]n an emergency situation, individuals often move within a building attempting to escape a fire, hide from an assailant, or respond to other emergencies”). While APCO urges the Commission to “forgo adoption of a [z-axis] metric and thereby require carriers to rely on dispatchable location solutions to comply with the vertical location rules,” APCO does not advocate reliance on the NEAD specifically and suggests that other dispatchable location technologies may be more effective. *See* APCO Comments at 1, 6.

¹⁵ NextNav LLC Comments at ii.

¹⁶ Precision Broadband LLC Comments at 14.

NEAD-based DL solutions face, including handset support and reference point provisioning.”¹⁷

It is not clear how those challenges will be overcome, or if it is even possible to fully overcome the performance obstacles.

Test results from the NEAD in its current form underscore that significant challenges and uncertainty remain before it can be determined whether this technology is reliable enough for public safety purposes. As the *ATIS Report* explains, Dispatchable Location Level 1 (DL1) indicates that a caller’s position “is known to the quadrant or zone of the building on the correct floor or on the floor immediately above or below the correct floor,” while Dispatchable Location Level 2 (DL2) indicates that the reported location “is known to the specific unit number.”¹⁸ Public safety commenters maintain that DL2 is the preferred standard for dispatchable location and have expressed concerns that DL1 data is insufficiently precise to direct first responders to the right floor and unit of a multi-story building – or even to the right building in some circumstances.¹⁹ However, only 38.7 percent of valid test calls produced an accurate DL1 *or* DL2 result satisfying relevant ATIS standards; well over half of the test calls failed to produce even DL1 information.²⁰ As IAFC et al. observe, an accurate floor and apartment or suite number can make “the difference between saving a life and finding a caller too late,” but fewer

¹⁷ CTIA ex parte at 2; *see also* Verizon Comments at 4 (stating that “Verizon’s device specifications already request the LPP/LPPE interface and NEAD support, but virtually no handset manufacturers have implemented or activated these basic capabilities”).

¹⁸ *ATIS Report* at 7-8.

¹⁹ *See* IAFC et al. Comments at 4-5 (arguing that only DL2 information should be deemed to satisfy the Commission’s dispatchable location requirement); National Public Safety Telecommunications Council (NPSTC) Comments, PS Docket No. 07-114 at 8 (Oct. 1, 2018) (stating that “DL Level 1 is less accurate [than DL2] . . . and is unacceptable from a public safety standpoint”).

²⁰ *See ATIS Report* at 10 (finding that only “38.7% of valid calls produced successful DL2 or DL1 civic addresses”).

than 10 percent of test calls successfully identified a DL2 dispatchable location and correctly reported meeting this DL2 requirement.²¹

Furthermore, according to the *ATIS Report*, only 74 percent of valid test calls produced even the correct street address, meaning that more than one quarter of all test calls produced either the wrong civic address or no address at all.²² Moreover, the *ATIS Report* found that “[o]f the 28,583 valid test calls, 2,456, or 8.6%, [incorrectly] reported the address of a neighboring or nearby building” instead of the address where the call actually originated.²³ For most buildings, the NEAD “returned at least some neighboring building addresses, thus this effect is widespread, it is not limited to only a few problem areas, and it occurs in all morphologies and building types.”²⁴

Finally, the *ATIS Report* notes that “[o]nly five Google Android mobile device models were tested, as only these devices so far support the necessary reporting and signaling needed to enable Dispatchable Location,” and that “Apple iOS devices do not support the necessary functionality, and thus could not be used in this testing.”²⁵ The *ATIS Report* further posits that adding “support for Dispatchable Location” to iOS devices is “unlikely.”²⁶ CTIA also indicates that “Apple’s iPhone does not support the signaling necessary to report wireless access points for

²¹ IAFB et al. Comments at 5; *see also ATIS Report* at 10 (stating that “the percentage of valid calls where the reported [class of service (CoS)] was DL2 and the true CoS was DL2 [was] 9.6%”).

²² *ATIS Report* at 9-10.

²³ *Id.* at 14.

²⁴ *Id.* at 15.

²⁵ *Id.* at 3; *see also* Precision Broadband Comments at 14 (noting that “only Android mobile devices support the functionality required by the NEAD, not the Apple iPhone (half of smartphones in the U.S.)”).

²⁶ *ATIS Report* at 4.

NEAD-based DL solutions.”²⁷ It has been reported that Apple devices comprise approximately 45 percent of the smartphone market, significantly exacerbating the shortcomings noted in the *ATIS Report*.²⁸

Overall, the record reflects broad consensus that the NEAD is not ready – or even close to ready – for operational use in public safety situations. Even with additional development and testing, many commenters agree that the NEAD may never be an optimal solution to improving 911 location accuracy. As NENA observes, “[w]hile additional funding and continued work may indeed make NEAD more effective, we . . . doubt that the NEAD will continue to keep pace with commercially available location services.”²⁹

II. FOCUS ON THE NEAD MAY DIVERT RESOURCES FROM THE DEVELOPMENT OF MORE EFFECTIVE SOLUTIONS, INCLUDING, BUT NOT LIMITED TO, SOLUTIONS IDENTIFIED BY COMMENTERS.

NCTA does not endorse any particular 911 location accuracy solution; nevertheless, the range of options in the record underscores that the NEAD is almost certainly not the only way – much less the best way – to achieve the Commission’s 911 location goals. In fact, the record reflects that significant additional investment in the NEAD may be counter-productive and divert resources from the widespread implementation and improvement of alternative 911 location solutions that were developed after the NEAD framework was proposed.³⁰ As the Texas 911

²⁷ CTIA ex parte at 4.

²⁸ *US Smartphone Users, by OS, 2018-2021 (millions, % change and % of total)*, eMarketer (Mar. 12, 2019), <https://www.emarketer.com/Chart/US-Smartphone-Users-by-OS-2018-2021-millions-change-of-total/226788>.

²⁹ NENA Comments at 1; *see also id.* at 23 (“While the NEAD’s initial hurdles may eventually be overcome with significant effort, continued improvement and maintenance of the database has little additional economic incentive for participants.”).

³⁰ As noted above, the NEAD serves as only one of two options that wireless carriers can select to meet the Commission’s technology-neutral 911 vertical location obligations. *See supra* note 5.

Entities observe, 911 location solutions are evolving rapidly, and while “it may have been contemplated . . . that z-axis might be mostly a fallback where dispatchable location was not available via the NEAD . . . [m]ore recent filings with the Commission appear to indicate that approach may no longer be a reasonable 9-1-1 system and PSAP planning assumption.”³¹ APCO notes that “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.”³² Other commenters describe a range of 911 location technologies that they contend are already capable of meeting or exceeding the performance of the NEAD, with fewer implementation challenges.³³

The wireless industry has also acknowledged that the NEAD is not the only solution to location accuracy. For instance, CTIA previously indicated that the nationwide wireless carriers would begin offering support for device-based hybrid location technology solutions in some fashion by the end of 2018.³⁴ A recent CTIA ex parte also acknowledges that “9-1-1 location solutions are more closely aligning with evolving and innovative commercial location solutions,” and that the wireless industry is involved in “ongoing evaluation of nascent commercial location

³¹ Texas 911 Entities Comments at 6.

³² APCO Comments at 6 (citing William Falcon & Henning Schulzrinne, *Predicting Floor Level for 911 Calls with Neural Networks and Smartphone Sensor Data* (2018), <https://arxiv.org/pdf/1710.11122.pdf>).

³³ See NextNav LLC Comments at 2 (asserting that its MBS technology “achieves accuracy of within 3 meter[s] (and more recently within 2 meter[s]) in multiple independently-conducted tests”); Google Comments at 1-2 (stating that its ELS technology “currently delivers more precise user latitude and longitude coordinates than traditional technologies,” and that “Google is committed to offering high-quality z-axis information through ELS as well”); BRETSA Comments at 5 (stating that “[t]he Stage Z vertical location tests demonstrate the accuracy of vertical location technologies developed by Polaris and NextNav”).

³⁴ Press Release, CTIA, Wireless Industry Announces Development in Improving 9-1-1 Location Accuracy (Sept. 5, 2018), <https://www.ctia.org/news/wireless-industry-announces-development-in-improving-9-1-1-location-accuracy>.

technologies that can meet the Commission’s vertical location requirements.”³⁵ CTIA further “expressed support for a shared goal among the Commission and the public safety community to enhance 9-1-1 location accuracy, particularly indoors, using the most advanced commercial technologies available,” highlighting the launch of its next phase of testing for vertical location solutions, Stage Za, and asserting that “these additional test bed efforts have the potential to provide valuable insights to the state of device-based vertical location solutions, just as testing demonstrated the value of device-based horizontal location solutions.”³⁶

Public safety entities are also publicly testing alternative technologies that may ultimately prove more efficient and more effective than the NEAD. For example, the state of California is piloting a cloud-based mapping and analytics solution that it believes “will improve location accuracy faster than the [Commission] mandate.”³⁷ California plans to complete statewide deployment in the Fall of 2019 under a contract awarded to AT&T as a reseller for RapidDeploy.³⁸ The Commission should continue to monitor these developments and assess realistically whether the NEAD remains an optimal solution for improving 911 location accuracy.

³⁵ CTIA *ex parte* at 2.

³⁶ *Id.* at 2, 5.

³⁷ See Press Release, Governor’s Office of Emergency Services (Cal OES), RapidDeploy Location Accuracy <https://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/002-RapidDeploy.pdf> (last visited June 17, 2019).

³⁸ RapidDeploy describes itself as “the market leader in Cloud Aided Dispatch (CAD) and 9-1-1 analytics software.” See <https://www.rapiddeploy.com/about> (last visited June 17, 2019).

III. COMMENTERS SHARE NCTA’S CONCERNS ABOUT SIGNIFICANT PRACTICAL AND CONSUMER CONCERNS RELATED TO THE NEAD.

The initial comments also echo NCTA members’ significant practical concerns related to the feasibility of the NEAD, as well as concerns about potential negative consequences to their customers. First, while cable operators obtain *wireline* location information from their voice customers that conforms to 911 formatting and accuracy standards, they do not maintain Wi-Fi “reference point” data of the type envisioned for use in the NEAD.³⁹ In addition, cable operators do not have mechanisms to control the location of non-public access points once they are in a customer’s possession. Likewise, cable operators may not be aware or be informed about third-party access point systems purchased and deployed by customers. Therefore, short of requiring that customers periodically self-certify their access point location information, cable operators do not have the capability to certify accurate access point locations. And even assuming that location information could be validated and placed in the NEAD, given the unknown challenges discussed below – that information would likely quickly go stale, resulting in a higher probability of worst-case overconfidence errors in DLs.⁴⁰ Any system that provides incorrect

³⁹ See *ATIS Report* at 3 (describing the NEAD as a “‘Reference Point’ database that associates WiFi Access Point and Bluetooth Beacon identities with validated civic address information”); APCO International, *Overarching Wireless Location Information*, Presentation to the Michigan SNC Emerging Technology Forum at 14 (Apr. 10-11, 2018), https://www.michigan.gov/documents/msp/Overarching_Wireless_Location_Information_620677_7.pdf (*APCO Presentation*) (describing the NEAD as “a database of the street address and additional location information of Wi-Fi and Bluetooth . . . access points, referred to as Reference Points in the database”).

⁴⁰ See *NENA Comments* at 23-24 (explaining that “in commercial location services WiFi access points are registered automatically with no human interaction,” whereas “[a] program like NEAD will always struggle to keep up because it does not have hundreds of millions of potential probes (i.e. consumer phones that passively collect data) constantly estimating access point location”).

location information in a significant number of cases presents a serious risk to both 911 callers and consumers who are behind the incorrect door.

Also, due to the nature of Wi-Fi service, which is inherently different than wireline voice service for purposes of location determination, cable operators do not have insight into the scope of the technical, operational, and administrative efforts that would be required to provide and validate such reference point information in a form that would be reliable for public safety purposes.⁴¹ As NENA observes, the NEAD “faces considerable sustainability issues,” and even the limited test bed results were “achieved through a significant amount of effort and human maintenance.”⁴² Cable operators must better understand how participating wireless carriers managed these technical and formatting complications for access point information – material omitted from the *ATIS Report* – before considering sharing any such information themselves.⁴³

NCTA members had been reluctant to commit the significant resources required to attempt to collect, format, verify, and transmit Wi-Fi access point information that might be suitable for use in the NEAD in the absence of any test results prior to the release of the recent *ATIS Report*. The lack of any prior test results and the limited insights into challenges faced by CTIA members in collecting and verifying their own access point data limited NCTA members’ ability to assess cable’s potential participation in the NEAD. After reviewing the *ATIS Report* and initial comments in this proceeding, NCTA members have even less confidence that the

⁴¹ See *APCO Presentation* at 14 (noting that “[b]efore any reference point data is added to the NEAD, the data is first verified against the Master Street Address Guide (MSAG)”).

⁴² NENA Comments at 23.

⁴³ NCTA’s members generally need additional information about the risks and resources required to participate in the NEAD. Learning more about the resources that may be required to format data for the NEAD is one such example.

NEAD is a viable option for vertical location accuracy and question whether further testing with cable Wi-Fi access points will positively affect the test results.

In addition, protecting customer privacy is of paramount concern to NCTA's members, and commenters broadly acknowledge that the NEAD would require access to sensitive information from 911 callers, in addition to many others whose wireless devices may serve as reference points.⁴⁴ Cable operators have obligations to their customers to protect their privacy, and since the NEAD's inception, cable operators have been concerned about how such a database would collect, manage, and disclose customers' private location data. But as Public Knowledge comments, "[w]ithout adequate safeguards to protect 'dispatchable location transactions end-to-end,' cable operators face a choice between risking liability or withholding subscriber address information."⁴⁵ In addition, customer Wi-Fi access point data is commercially sensitive information, and NCTA's members are troubled by the potential for disclosure or other misuse of their customers' Wi-Fi access point information for competitive purposes.

⁴⁴ See Public Knowledge Comments at 1-2 ("[A] government mandate for enhanced geolocation information, including dispatchable address information for 911 response, raises significant concerns around consumer privacy."); CTIA Comments at 10 (supporting the requirement that "wireless providers may only use NEAD-associated information for 9-1-1 purposes"); NextNav LLC Comments at 12 (arguing that such privacy and security protections were necessary "not because the NEAD would be used by carriers to help identify the locations of wireless callers to E911, but because the NEAD would contain very personal information about individuals, *including individuals who may never place a call to E911 emergency services*") (emphasis added).

⁴⁵ Public Knowledge Comments at 4; see also Letter from Lindsay Stern, Policy Fellow, Public Knowledge, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 07-114 at 1-2 (May 21, 2019) (urging the FCC to investigate wireless carrier sale of subscriber geolocation information regardless of whether it was technically stored in the NEAD, because "the government and the Commission did not intend to create a 'no man's land' for certain information to sit in limbo between that of CPNI and NEAD").

Finally, NCTA's members are concerned that cable operators would lack control over how customers' Wi-Fi access point information would be used to determine DLs,⁴⁶ and that transmission of misleading location information to public safety could result in damage to customers' premises or possible harm to customers. As noted above, the *ATIS Report* found that 8.6 percent of valid test calls produced an incorrect street address, such as the address of a neighboring building.⁴⁷ Such errors are particularly worrisome for NCTA's members to the extent they indicate that providing Wi-Fi access point data to the NEAD could inadvertently result in authorities responding to the wrong address.

CONCLUSION

NCTA members share the Commission's goal of providing first responders with accurate location data and are committed to helping ensure the reliability of the nation's 911 communications system. However, NCTA members continue to be concerned about the substantial risks related to sharing information and participating in the NEAD, including potentially compromising customers' privacy, which is of paramount importance, as well as practical challenges related to data provisioning. Given the availability and market-driven development of alternative location solutions, which appear likely to result in more accurate and reliable location information for more calls, a continued focus on a NEAD-based system could detract from the widespread implementation of innovative and likely more effective location technologies.

⁴⁶ See NENA Comments at 15 n.23 (noting that the "NEAD's public-facing website provides barely a paragraph describing how it works or how it interfaces with external systems").

⁴⁷ *ATIS Report* at 4.

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