April 26, 2019

Via ECFS
Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Wireless E-9-1-1 Location Accuracy Requirements (PS Docket No. 07-114), Dispatchable Location Test Bed Report

Dear Ms. Dortch:

On April 24, 2019, representatives from CTIA and its nationwide wireless provider member companies met with staff from the Public Safety and Homeland Security Bureau and Office of Economics and Analytics (see Attachment A for a list of meeting participants). CTIA and its member companies reiterated that they are committed to enhancing the location accuracy of wireless 9-1-1 calls, particularly indoors, for Public Safety Answering Points (PSAPs). Since 2015, wireless providers have met every location accuracy benchmark and requirement set forth in the *Fourth Report & Order*.[1] CTIA submits here the Dispatchable Location Summary Report (Report) that describes the initial evaluation of National Emergency Address Database (NEAD)-based dispatchable location solutions.[2]

The wireless industry remains committed to enhancing indoor 9-1-1 location accuracy through innovative solutions. To date, the nationwide wireless providers have tested and implemented solutions, such as device-based hybrid (DBH) to meet the Commission's increasing benchmarks for horizontal location accuracy, stood up the NEAD and attained Commission approval for its privacy and security plan, and proposed a vertical metric for z-axis information.[3]

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[1] *Wireless E911 Location Accuracy Requirements*, Fourth Report and Order, 30 FCC Rcd 1259 (2015) (*Fourth Report & Order*).

[2] *See* Attachment B, E911 Location Test Bed Dispatchable Location Summary Report (Report).

[3] *See, e.g.,* 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 (announcing nationwide wireless providers' adoption of device-based

The Report reflects that NEAD-based DL solutions have achieved the functional capabilities the Commission described in the *Fourth Report and Order*. However, the Report also reflects several implementation challenges that NEAD-based DL solutions face, including handset support and reference point provisioning.

At the meeting, the participants separately discussed the wireless industry's ongoing evaluation of nascent commercial location technologies that can meet the Commission's vertical location requirements. As envisioned by the Commission in the *Fourth Report and Order*, 9-1-1 location solutions are more closely aligning with evolving and innovative commercial location solutions.[4] CTIA and its member companies 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.

The NEAD and the Test Bed

On behalf of the nationwide wireless providers, CTIA established the NEAD, a database of the validated street address and additional location information associated with Wi-Fi access points provisioned into the database (reference points). Since 2015, CTIA and the nationwide wireless providers have invested millions of dollars working diligently to meet the commitments to develop, design and operationalize the NEAD, as the Commission described in the *Fourth Report and Order*.[5] To date, the NEAD has provisioned and validated approximately 25 million reference points, made up entirely from wireless access points of nationwide wireless providers. Over the last two years, CTIA and wireless providers have also conducted outreach and held discussions with major owners and operators of wireless access points, such as cable and

hybrid location technology solutions)(CTIA 9-1-1 DBH Location Announcement); Press Release, CTIA, Wireless Industry Announces Latest Step Toward Enhancing Mobile 911 Location Services, Oct. 4, 2016, https://www.ctia.org/news/wireless-industry-announces-latest-step-toward-enhancing-mobile-911-location-services (announcing selection of West's Safety Services to develop and operate the NEAD platform); *Wireless E911 Location Accuracy Requirements*, Memorandum Opinion and Order, PS Docket No. 07-114, FCC 17-150 (rel. Nov. 14, 2017) (approving NEAD Privacy and Security Plan); Public Safety and Homeland Security Bureau Seeks Comment on Vertical (Z-Axis) Accuracy Metric Proposed by the Nationwide Wireless Carriers, Public Notice, DA 18-928 (rel. Sept. 10, 2018); Letter from Scott K. Bergmann, Senior Vice President, Regulatory Affairs, CTIA, *et al.*, Submission of Z-axis Metric and Report, PS Docket No. 07-114 (filed Aug. 3, 2018).

[4] *See, e.g., Fourth Report & Order* ¶ 62.

[5] *Fourth Report & Order* ¶ 55.

enterprise stakeholders, to incorporate additional access points into the NEAD. These efforts to bring in additional access point holders have proven challenging.

On behalf of the nationwide wireless providers, CTIA also established the 9-1-1 Location Technologies Test Bed, LLC (Test Bed LLC), pursuant to the *Fourth Report & Order's* requirement of an independently administered and transparent 9-1-1 location accuracy test bed process for certain technologies and benchmarks.[6] Although the *Fourth Report & Order* did not require a DL test, the nationwide wireless providers executed this DL test to assess the status of NEAD-based DL solutions. CTIA submits the Report to provide the Commission with a status update on the NEAD and nationwide wireless providers' DL solutions.

At the direction of CTIA and the nationwide wireless providers and consistent with previous testing, the Test Bed LLC contracted with the Alliance for Telecommunications Industry Solutions (ATIS) as the independent Program Manager and Further Enterprise Solutions (FES) as the independent testing vendor to execute on the ATIS Emergency Services Interconnection Forum (ESIF) test methodology for DL testing.

Testing Results for NEAD-Based DL Solutions

As described further in the Report, the Test Bed LLC conducted 30,090 test calls in the two test regions of Atlanta and San Francisco. The test calls were placed from 230 test points in 12 buildings in the Atlanta area and 13 buildings in the San Francisco Bay area, during September-November 2018. Buildings were located in dense urban, urban, suburban, and rural morphologies.[7]

Overall, the testing confirmed that NEAD-based DL solutions have achieved the functional capabilities the Commission described in the *Fourth Report and Order*:

> [T]he NEAD will contain media access control (MAC) address information of fixed indoor access points, which a device would "see" upon initiating a wireless 911 call. When the device "sees" the MAC address of this particular device, the CMRS network would cross-reference this MAC address with a dispatchable address, which would be made available to the PSAP.[8]

[6] 47 C.F.R. § 20.18(i)(3)(i).

[7] Report at 5.

[8] *Fourth Report & Order* ¶ 55.

Specifically, the testing demonstrated the following with regard to the performance of NEAD-based DL solutions:

- 74.0% of valid test calls produced the correct civic address (street address); the remaining valid test calls produced either an incorrect street address, namely, an address of a neighboring building, or no civic address.

- 38.7% of valid test calls produced accurate location information beyond the correct civic address, either DL2 or DL1 class of service, as defined by ATIS standards.[9]

Testing was subject to certain limitations relevant to current NEAD-based DL solutions. First, the DL testing only involved specific handsets utilizing Google's Android operating system; Apple's iPhone does not support the signaling necessary to report wireless access points for NEAD-based DL solutions. Second, specific buildings were intentionally chosen because they satisfied a minimum level of NEAD coverage for test purposes.[10] Accordingly, the results reflect a higher reference point density than may exist in a general live-call environment.

From the test results, we expect that the distribution of reference points within a building is an important factor of DL performance. For example, if most NEAD-provisioned reference points are on the lower floors of a building and none are on higher floors, 9-1-1 calls from higher floors would have less accurate DL results. Further analysis of the Report also suggests that DL yield and accuracy in a commercial environment will differ from a residential environment, as commercial buildings typically have a higher population density and more individuals per unit/suite than residential buildings and individual apartments/condominiums.

[9] Report at 9. In addition to civic address, ATIS standards identify two other location classes of service: DL2 and DL1. DL2 identifies civic address and room/suite that the 9-1-1 call was made from, including floor. DL1 identifies civic address, building zone/quadrant, and floor that the 9-1-1 call was made from (plus or minus one floor). *See* ATIS Emergency Services Interconnection Forum, *Guidelines for Testing Dispatchable Location*, ATIS 0500035, § 9.2 (July 2017).

[10] Report at 3, 5.

Testing Commercial Vertical Location Solutions

At the meeting the participants also discussed CTIA's parallel effort to leverage commercial location solutions to enhance 9-1-1 location accuracy.[11] CTIA has announced the launch of the next test of vertical location solutions, Stage Za, and in the recent *Fourth Further Notice* proposing a z-axis metric, the Commission "encourage[d] all technology vendors that are developing potential z-axis solutions to participate in Stage Za."[12] With robust participation from providers of vertical location solutions 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.[13]

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CTIA and its member companies share the goals of the Commission and the public safety community to enhance 9-1-1 location accuracy, particularly indoors, using the most technologically feasible and effective approach.

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

[11] *See, e.g., Fourth Report & Order* ¶ 62 ("Given the commercial benefits of deploying technologies that would support improved indoor location accuracy, we anticipate that commercial location systems will continue to proliferate, providing additional resources that could be leveraged for E911 use.").

[12] *Wireless E911 Location Accuracy Requirements*, Fourth Further Notice of Proposed Rulemaking, FCC 19-20, PS Docket No. 07-114 (2019).

13 *See*, Press Release of CTIA, CTIA's 9-1-1 Location Accuracy Technologies Test Bed Opens for Additional Testing (Feb. 26, 2019) https://www.ctia.org/news/ctias-9-1-1-location-accuracy-technologies-test-bed-opens-for-additional-testing; *see also,* CTIA 9-1-1 DBH Location Announcement, *supra*, n.3.

CC:

William Beckwith
Eric Burger
Ken Carlberg
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Attachments

ATTACHMENT A

April 24, 2019 Meeting Attendees

CTIA
Thomas Sawanobori
John Marinho
Matthew Gerst
Adam Krinsky, Wilkinson Barker Knauer, LLP

AT&T
Joe Marx
Mike Tan*

Sprint
Ray Rothermel
Jenna Green*
Tony Wageman*

T-Mobile
Eric Hagerson
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Robert Morse
Don Brittingham*
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*Participated via conference bridge