

January 21, 2015

VIA ELECTRONIC FILING

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

Re: Wireless E9-1-1 Location Accuracy Requirements, PS Docket No. 07-114

Dear Ms. Dortch,

Throughout the negotiations leading to the Roadmap, APCO, NENA, AT&T Mobility, Sprint, T-Mobile, and Verizon worked to ensure that this landmark framework would deliver meaningful, FCC-enforceable carrier commitments for improved wireless 9-1-1 indoor location accuracy. Chairman Wheeler recently commended the Roadmap as “a big step forward” and called on the Commission to make certain that new rules “provid[e] confidence-building measures and backstop thresholds that set clear targets and deadlines for improving indoor location and hold parties accountable for results.”¹ Since the signing of the Roadmap, and the comments in response to the Commission’s Public Notice, we have continued working side-by-side with public safety to consider issues raised and the concerns of FCC staff. Today, we propose to modify the Roadmap to deliver even further on “confidence-building measures and backstop thresholds.” The amended Roadmap contains the following new commitments:

- (1) Adopts new, quantifiable indoor-specific metrics to assure widespread wireless 9-1-1 indoor positioning fixes, including vertical location fixes;
- (2) Expands the Roadmap’s performance metrics to apply to all 9-1-1 calls, not just 9-1-1 calls that use Voice-over-LTE (VoLTE) technology; and
- (3) Commits to a National Emergency Address Database Privacy and Security Plan to be developed and transmitted to the FCC.

Importantly, the new metrics will achieve meaningful and quantifiable improvements for indoor wireless 9-1-1 location fixes that build on the Roadmap with achievable and verifiable performance metrics superior to those in the draft Order on circulation. For this reason, we offer the amended Roadmap metrics to replace, *not supplement*, those in the draft Order.

The amended Roadmap commits carriers to widespread implementation of solutions that either provide a dispatchable location or a z-axis component, or both, to assure the availability of accurate horizontal and vertical location information for indoor calls. With these commitments, there can be no doubt the Roadmap provides clear targets and accountability for indoor location

¹ FCC Chairman Tom Wheeler, “Back to Basics: Promoting Public Safety and Protecting Consumers,” Blog Post (Jan. 8, 2015) *available at* <http://www.fcc.gov/blog/back-basics-promoting-public-safety-and-protecting-consumers>.

through aggressive performance metrics verified by live call data and an open and transparent test bed. In contrast, the draft Order’s performance metrics on circulation, while well-intentioned, risk undermining a dispatchable location approach and will not result in demonstrable progress: (1) the draft x/y metric is not a reasoned “indoor-only” proxy in that it excludes satellite-assisted location technologies which provide accurate fixes for many indoor calls, largely relies upon a single proprietary technology from NextNav, and excludes hybrid solutions such as Polaris, TruePosition and others that rely on GPS; and (2) the draft z-axis metric applies to all calls, including outdoor calls that have no need for a vertical fix, thereby imposing unnecessary and excessive z-axis requirements. We believe the Roadmap’s performance metrics as amended provide assurances for improved indoor wireless 9-1-1 location accuracy and should replace the draft performance metrics proposed on circulation.

Indoor, Vertical Location Commitments. Some concerns have been raised that, although the signatory carriers committed to develop dispatchable location, the Roadmap did not contain sufficient benchmarks to assure that dispatchable locations would be widely available to improve indoor 9-1-1 wireless call location fixes, including vertical location. We address that here by amending the Roadmap to require a substantial implementation of dispatchable location solutions *and* to commit carriers to the deployment of Z-axis solutions where that requirement is not met. In addition, as already included in the original Roadmap, if the three year assessment determines that dispatchable location solutions are not on track, the timeline for Z-axis deployment is accelerated, while retaining dispatchable location as a fallback option where it can be achieved. These revised commitments provide quantifiable metrics to assure that indoor location technologies and vertical location solutions will be deployed, deriving positioning fixes for wireless 9-1-1 indoor calls as verified by live call data.

The carriers commit to implement either a dispatchable location or z-axis location solution in the 50 most populous Cellular Market Areas (“CMAs”), on a CMA by CMA basis, according to an aggressive but achievable schedule. As many stakeholders recognize, CMAs with dense urban and urban morphologies are the areas with the most challenging indoor location environments.² The revised commitments target these areas where consumers and First Responders would derive the most benefit, covering approximately 153 million people. CMA by CMA compliance assures meaningful and balanced distribution of reference points across the 50 most populous areas, or Z-axis deployment in a CMA in the event the dispatchable location metric is not achieved.

² See e.g., Letter from Russell E. Sanders, Executive Secretary, Metropolitan Fire Chiefs Association, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 07-144 at 2 (dated July 14, 2014) (“While location accuracy and speed of response is important in all geographies, the urgency of the problem is particularly crucial in large urban environments, both because of the density and complexity of structures as well as the criticality of vertical location in multi-level high-rise buildings.”); see also *id.* at 3 (noting that vertical location information is particularly important for high-rise fires, which “traditionally have been some of the riskiest and most complicated fires to fight”); Reply Comments of Consumers Union, PS Docket No. 07-114 at 1 (dated July 14, 2014) (“[M]ore needs to be done to improve the ability of emergency first responders to locate emergency calls made indoors, especially in dense urban areas and in buildings with many floors...”).

Dispatchable Location Metric. The dispatchable location commitment establishes a measurable metric to ensure a minimum number of reference points to cover the total population of a CMA. This metric is based on population coverage, taking into account that each individual reference point will most often serve multiple users, particularly in urban and multi-unit structures:

A carrier will be deemed to have implemented a dispatchable location solution in a CMA if the total number of dispatchable location reference points (e.g., WiFi access point or Bluetooth LE beacon) in that CMA meets or exceeds the population of the CMA divided by a concentration factor of 4 within six years, based on 2010 U.S. Census Data.

The concentration factor accounts for the fact that reference points serve multiple users, and compliance based on a factor of 4 is conservative.³

To further assure these metrics will be met, the revised commitment requires signatory carriers to populate the National Emergency Address Database with the MAC address or Bluetooth reference data for dispatchable location reference points that are under their direct control. Of course, reference points will be incorporated into the NEAD in CMAs all over the country, not just within the most populous CMAs.

Z-Axis Metric. The revised deployment commitments also assure a quantifiable Z-axis backstop if a carrier has not met the dispatchable location benchmark by year 6 in any of the most populous 50 CMAs:

A carrier will be deemed to have implemented a Z-axis location solution in that CMA if its Z-axis solution provides coverage for at least 80% of the population of the CMA within 8 years. In addition at least 50% of all new handset model offerings everywhere must be z-capable by year 7, and 100% of all new handset models by year 8.

This metric ensures that Z-axis is a hard backstop if dispatchable location is not achieved in the areas that will benefit most from indoor location technology. Moreover, carrier signatories remain committed to dispatchable location solutions and 9-1-1 callers in any Z-axis market will still benefit from dispatchable location reference points in those markets.

³ The concentration factor of 4 is based on the following. The average population per household in the 50 most populous CMAs is 2.7, which means that a reference point serving a residential unit would typically provide dispatchable location with population coverage of 2.7 persons. Enterprise and public WiFi reference points generally serve more users than a residential access point – we believe a “twice as many” factor is conservative based on typical WiFi usage scenarios. Thus a WiFi reference point serving an enterprise or public location would conservatively serve 5.4 persons. We reasonably assume that people are at home 50 percent of the time and elsewhere 50 percent of the time, and thus derive the following concentration factor: $(2.7 \times 0.5) + (5.4 \times 0.5) = 4.05$.

A Better Solution. As noted above, the amended Roadmap provides clearer targets to measure dispatchable location and/or Z-axis progress, a far better proxy for indoor location improvements than the under-inclusive (no GPS) x-/y-axis or over-inclusive (outdoor) z-axis metrics. Moreover, the technology neutral test bed will assure a firm understanding of varying solutions' indoor capabilities and live 9-1-1 call data reporting will enable stakeholders to track and quantify the performance. Further, the Roadmap retains the commitments to study Z-axis and advance Z-axis standards on aggressive timelines; thus ensuring that Z-axis solutions are supported, whether they be deployed as the preferred location solution or as a backstop where dispatchable location is not available. It also retains the Roadmap's original 36-month assessment of dispatchable location – if development is not on track, a carrier remains committed to deploy Z-axis or dispatchable location to the 25 most populous CMAs within 6 years and the 50 most populous CMAs within 8 years. With the amended commitments, the Roadmap takes further steps to deliver meaningful, quantifiable improvement on indoor location accuracy, including vertical fixes.

Performance Metrics for All 9-1-1 Calls, not Just VoLTE Calls, in Later Year Commitments. Concerns were also raised that the Roadmap's live 911 call metrics in years 2 and 3 would apply to all wireless 9-1-1 calls, but the metrics in years 5 and 6 would only apply to VoLTE 9-1-1 calls. That difference recognized that that the new technologies necessary for dispatchable location or sub-50 meter location fixes for indoor calls would be deployed in new handsets, and it is expected that most carriers will have transitioned most of their customers to VoLTE by the later year benchmarks. Nevertheless, to address concerns about such limitations, the signatory carriers have agreed to remove the VoLTE distinction in later year benchmarks. Given the significant challenges associated with turn-over of consumer handsets, the revised "all calls" metrics are modified slightly. Carriers commit to satisfy the metric for 60% of all calls (rather than 75% of VoLTE calls) by year 5 and 80% of all calls by year 7 (instead of year 6).

NEAD Privacy and Security. Some concerns were also raised about the privacy and security of information contained in National Emergency Address Database (NEAD) used to validate reference points, including information specific to particular consumers or consumer-owned devices. As part of the on-going effort to establish the NEAD, the signatory carriers have committed to engage with various industry experts on privacy and security to ensure that best practices are followed in the development and operation of the database. An additional commitment is made here to require the vendor(s) selected for the NEAD administration to develop a Privacy and Security Plan in advance of going live and transmit it to the FCC.

Respectfully Submitted,

/s/ Joan Marsh

AT&T Services, Inc.

/s/ Kathleen O'Brien Ham

T-Mobile USA

/s/ Ray Rothermel

Sprint

/s/ Kathleen Grillo

Verizon

Attachment

ATTACHMENT

6) 36 Month Assessment of Dispatchable Location

- a) Signatories agree to determine, within 36 months after the execution of this Agreement, whether dispatchable location solutions are on track, consistent with the timeframes described in Section 2, to provide improved location estimates.
- b) If the dispatchable location solutions are on track, as specified in 6(a) above, carrier signatories agree to the following commitments:
 - i) Carriers will implement either a dispatchable location or z-axis location solution that satisfies the z-axis metric, as determined in the Test Bed (Sec. 5) and in accordance with Section 6(d), in the 50 most populous CMAs, on a CMA by CMA basis, as specified in subsections (1) and (2) below.
 - (1) A carrier will be deemed to have implemented a dispatchable location solution in a CMA if the total number of dispatchable location reference points (e.g., WiFi access point or Bluetooth LE beacon) in that CMA meets or exceeds the population of the CMA divided by a concentration factor of 4 within six years, based on 2010 U.S. Census Data. Carrier signatories commit to populating the NEAD with the MAC address or Bluetooth reference data for dispatchable location reference points that are under their direct control.
 - (2) A carrier will be deemed to have implemented a Z-axis location solution in a CMA if its Z-axis solution provides coverage for at least 80% of the population of the CMA within eight years.
 - ii) Should carriers implement the Z-axis solution, carriers agree to introduce new handsets that are capable of delivering Z-axis location information that satisfies the z-axis metric in accordance with the following benchmarks:
 - (1) 50% of all new VoLTE handset models offered by carriers will have the capability to deliver Z-axis location information for 9-1-1 calls made on VoLTE within seven years.
 - (2) 100% of all new VoLTE handset models offered by carriers will have the capability to deliver Z-axis location information for 9-1-1 calls made on VoLTE within eight years.
 - iii) Implementation timelines must recognize the interdependence of different activities, e.g., development of industry standards, handset availability, phased-in deployment over covered POPs, PSAP readiness, etc.
- c) If the dispatchable location solutions are not on track, as specified in 6(a) above, the dispatchable location provisions contained in this document will be supplanted with provisions designed to promote the implementation of alternative location solutions, in accordance with this section. Carrier signatories may, however, continue to implement dispatchable location solutions and such implementations may be used to demonstrate compliance with location commitments.

- i) Carrier signatories agree to the following commitments regarding provision of Z-axis solutions:
 - (1) Carriers will implement either a dispatchable location or z-axis location solution that satisfies the z-axis metric, as determined in the Test Bed (Sec. 5) and in accordance with Section 6(d), in the 25 most populous CMAs within six years and within the 50 most populous CMAs within eight years, on a CMA by CMA basis, as specified in subsections (2) and (3) below.
 - (2) A carrier will be deemed to have implemented a dispatchable location solution in a CMA if the total number of dispatchable location reference points (e.g., WiFi access point or Bluetooth LE beacon) in that CMA meets or exceeds the population of the CMA divided by a concentration factor of 4, based on 2010 U.S. Census Data. Carrier signatories commit to populating the NEAD with the MAC address or Bluetooth reference data for dispatchable location reference points that are under their direct control.
 - (3) A carrier will be deemed to have implemented a Z-axis location solution in a CMA if its Z-axis solution provides coverage for at least 80% of the population of the CMA.
 - (4) Should carriers implement the Z-axis solution, carriers agree to introduce new handsets that are capable of delivering z-axis location information that satisfies the z-axis metric in accordance with the following benchmarks:
 - (a) 25% of all new VoLTE handset models offered by carriers will have the capability to deliver Z-axis location information for 9-1-1 calls made on VoLTE within 36 months of the assessment in Section 6(a).
 - (b) 50% of all new VoLTE handset models offered by carriers will have the capability to deliver Z-axis location information for 9-1-1 calls made on VoLTE within 48 months of the assessment in Section 6(a).
 - (c) 100% of all new VoLTE handset models offered by carriers will have the capability to deliver Z-axis location information for 9-1-1 calls made on VoLTE within 60 months of the assessment in Section 6(a).
 - ii) Implementation timelines must recognize the interdependence of different activities, e.g., development of industry standards, handset availability, phased-in deployment over covered POPs, PSAP readiness, etc.
- d) Any z-axis solution implemented to satisfy the provisions of section 6(b) or 6(c) must be technically feasible, and fit within network plans and architectures, and must satisfy the following conditions:
- i) Solutions must be standardized, scalable and commercially available across carrier networks from multiple sources;
 - ii) Solutions may require consumers to purchase equipment and/or to incur additional costs but would not include additional 9-1-1 service fees. For example, to the extent that new handset hardware is needed or existing handset software cannot be updated over-the-air or manually, a consumer may need to purchase a new handset

and, depending on the service provider and the customer's existing plan, a modified service plan;

- iii) Solutions must demonstrate through the test bed the ability to provide a meaningful, substantial improvement in indoor location accuracy and reliability over currently implemented location solutions or those location solutions in deployment (including OTDOA and A-GNSS) in all test bed environments.