

Section One: Test Bed

Any test bed for evaluating location accuracy technologies should encompass the following guidelines:

- a) The test bed should be managed by a non-governmental entity (e.g., Alliance for Telecommunications Industry Solutions (ATIS)) and operated in an open, transparent, and competitively neutral manner, as to technologies, carriers and location solution vendors.
- b) The test bed should be utilized both to demonstrate vendor performance of E911 location solutions and to characterize performance of E911 location technologies, including Observed Time Difference of Arrival (OTDOA)/Assisted Global Navigation Satellite System (A-GNSS). While the test bed will be available to and can be used by vendors to assess the performance of solutions not yet standardized or commercially available, only testing of solutions based on industry standards will be relied on to verify performance expectations to an E911 location benchmark.
- c) The test bed should be consistent with the elements recommended by the Communications Security, Reliability and Interoperability Council (CSRIC) III Working Group 3, CSRIC IV Working Group 1, and with the work undertaken by the Emergency Services Interconnection Forum (ESIF) established by ATIS.
- d) Non-nationwide carriers will be permitted to use test results derived from the test bed for purposes of demonstrating performance of a particular E911 technology, as well as the performance of said technology as offered by a particular vendor.
- e) While carriers and affected E911 location vendors are logical sources of funding for the test bed, the portion of funding paid by carriers, in the aggregate, should be the sum of amounts reflective of the proportion to each carrier's voice-capable subscriber base, or in a similarly equitable manner.

Section Two: Dispatchable Address Location Information

- a) Dispatchable location definition: the civic address of the calling party plus additional information such as floor, suite, apartment or similar information that may be needed to adequately identify the location of the calling party. The civic address of the calling party number will be validated. In addition, the civic address will be corroborated against other location information prior to delivery of the address with the 9-1-1 call to the PSAP to the extent possible.
- b) Some dispatchable location solutions will require a National Emergency Address Database (NEAD), which is described in Section 2(c), while other solutions can be implemented without the use of the NEAD. Prior to the completion of the NEAD, competitive carriers will take steps to make such non-NEAD dispatchable location information available for delivery to PSAPs (through a variety of carrier-provisioned and third party sources), and further commit to the following:
 - i) To the extent that a non-nationwide carrier plans to offer for sale new wireless consumer home products, such carrier agrees to integrate into such products dispatchable location technology within 24-30 months of the date of this Agreement.

(1) “Wireless consumer home products” as used herein are limited to products or devices whose primary purpose is to allow users to connect to an available CMRS network through either a direct connection or the access of a local WiFi network. Specifically excluded from this definition are all machine-to-machine devices, including, but not limited to, wearable computing devices, health monitoring devices, and “smart” consumer electronics such as smart meters and appliances.

(2) Wireless consumer home products not installed by non-nationwide carrier representatives may require the customer to input dispatchable location data (e.g., apartment number) into the product or device. Non-nationwide carriers agree to encourage customers to input this data into the product or device, but will not be held liable for any failure by customers to do so. Furthermore, non-nationwide carriers will not be liable for any inaccurate location information provided by a beacon not installed at its current location by the carrier, whether due to entry error, the device being relocated, or for any other reason.

(3) Non-nationwide carriers will work with public safety to study and consider further steps to providing wireline equivalent routing for wireless consumer home products that provide a dispatchable location.

c) The NEAD is the database that is envisioned to provide the correlation between unique identifiers such as (but not limited to) media access control (MAC) address or Bluetooth universally unique identifiers (UUIDs), and dispatchable location. There are several design and implementation issues surrounding the NEAD that need to be resolved, such as identifying parties that will create the database, security and privacy issues and management of the database. ATIS has formed an Emergency Location Task Force (ELOC) to focus on standards for implementing indoor location solutions, where these issues could be decided. As a prerequisite to any of the deadlines or commitments involving the NEAD being applied to non-nationwide carriers, however, at least two such providers must be provided the opportunity to take part in any working group or standards body (e.g., the ELOC) vested with decision-making authority regarding the NEAD.

i) Carriers, APCO and NENA will work together to develop the design, operations, and maintenance requirements for the NEAD within 12 months from the date of this framework, including measures to protect the security and privacy of information contained in the NEAD.

ii) Carriers, APCO and NENA will launch the initial database within 12-24 months **after** the development of the design requirements described in Section 2(c)(i) above.

iii) Carriers, APCO and NENA will work together at the federal, state, and local level to develop an outreach program that will promote a broader integration of a variety of dispatchable location sources into the NEAD, and enlist the support of other organizations (e.g., hotel associations) to achieve this goal.

d) Handset Design and Development

- i) 25% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support delivery of beacon information, e.g., Bluetooth LE and WiFi, to the network in conjunction with a 9-1-1 call made on VoLTE within 30-36 months after the completion of standards.
- ii) 50% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support delivery of beacon information, e.g., Bluetooth LE and WiFi, to the network in conjunction with a 9-1-1 call made on VoLTE within 36-42 months after completion of standards.
- iii) 100% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support delivery of beacon information, e.g., Bluetooth LE and WiFi, to the network in conjunction with a 9-1-1 call made on VoLTE within 42-48 months after completion of standards.
- iv) Carriers, APCO and NENA will jointly work with original equipment manufacturers, operating system providers, the Federal Communications Commission, and other stakeholders as necessary to address issues that may arise concerning the NEAD's and carriers' access to Bluetooth LE, WiFi beacon, and other handset-related information necessary for the NEAD and other dispatchable location methods to function effectively.

e) Network Design and Development

- i) Non-nationwide carriers will enable their VoLTE networks to deliver beacon information from the handsets to the Location Server within 36 months after completion of standards or 12 months of their respective VoLTE networks becoming operational, whichever is later.

f) Initial End-to-End Functionality

- i) Non-nationwide carriers agree to provide initial end-to-end dispatchable location functionality on their respective VoLTE networks no later than 60 months from the date of this framework or within 12 months of their respective VoLTE networks becoming operational—whichever is later—after completion of the steps identified in Sections 2(b) and (c) herein.

g) 36 Month Assessment of Dispatchable Location

- i) Participants in the working group or standards body vested with decision-making authority regarding the NEAD agree to jointly conduct a formal assessment of the progress made in developing and implementing dispatchable location solutions, in accordance with the Dispatchable Location Performance Assessment section of this Agreement, 36 months from the date of this framework.

Section Three: Latitude/Longitude (Horizontal; x,y-axis) Location Information

To facilitate delivery of enhanced horizontal location information for calls originating from indoors, non-nationwide carriers propose the following:

a) Non-nationwide carriers agree to conduct testing of OTDOA and A-GNSS for both outdoor and indoor accuracy on each of their respective VoLTE platforms. Since OTDOA for use with 9-1-1 calls requires VoLTE, any operational testing of OTDOA in conjunction with 9-1-1 calls will necessarily hinge on VoLTE implementation, which will vary by carrier and by market.

i) Non-nationwide carriers that have an operational VoLTE platform as of the date of this Agreement will conduct testing of OTDOA and A-GNSS within 6-12 months from the date of the Agreement, contingent upon receiving necessary cooperation from any third-party vendor(s)/supplier(s).

ii) Non-nationwide carriers that do not have an operational VoLTE platform as of the date of this Agreement will conduct testing of OTDOA and A-GNSS within 6 months of such a platform becoming operational, contingent upon receiving necessary cooperation from any third-party vendor(s)/supplier(s).

b) Non-nationwide carriers agree to deploy OTDOA in their networks in association with VoLTE, during implementation (including related testing) in each market as they transition 9-1-1 calls to VoLTE. OTDOA will be used in conjunction with A-GNSS as the primary location solution, and will operate on a standalone basis only when A-GNSS is not available. Until such time as OTDOA implementation is complete, each competitive carrier will provide APCO and NENA with a report, subject to appropriate confidentiality protections, on the progress of its OTDOA implementation for use with 9-1-1 calls on a semi-annual basis.

c) Non-nationwide carriers agree to introduce new devices with A-GNSS 9-1-1 capabilities in accordance with the following benchmarks, if the carrier offers more than four VoLTE-capable handset models as of the dates set forth below:

i) 50% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support A-GNSS for 9-1-1 calls made on VoLTE within 36 months of the date of the Agreement.

ii) 75% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support A-GNSS for 9-1-1 calls made on VoLTE within 48 months of the date of the Agreement.

iii) 100% of all new VoLTE handset models offered by each non-nationwide carrier will have the capability to support A-GNSS for 9-1-1 calls made on VoLTE within 54 months of the date of the Agreement.

If a non-nationwide carrier offers four or less VoLTE-capable handset models during any of the benchmark dates set forth above, then a minimum of one such handset will have the capability to support A-GNSS for 9-1-1 calls made on VoLTE.

Section Four: Vertical (z-axis) Location Information

Because delivery of vertical (z-axis) location information is more probative in urban areas, the following standards are proposed for providing this information:

a) Non-nationwide carriers whose service footprints include any county or county equivalent with a population density of 20.0 people per square mile or more ([as determined by the 2010 United States Census Results](#)) agree to deliver uncompensated barometric pressure data to PSAPs from any voice-capable handset that supports such a capability within four (4) years of this Agreement, subject to the following conditions:

- i) A determination has been made that there is sufficient benefit to PSAPs associated with the delivery of uncompensated barometric pressure data;
- ii) Standards for delivery of this data to PSAPs have been developed and approved; and
- iii) At least two commercial vendors are offering this technology to non-nationwide carriers.

The z-axis metric shall be expressed in terms of a vertical component for a specific percentage of VoLTE 9-1-1 calls from z-axis capable handsets, established pursuant to standards necessary for industry and PSAP utilization, with at least two proven candidate technologies being commercially available to non-nationwide carriers.

b) Non-nationwide carriers whose service footprints fall within a county or county equivalent (or a group of counties/county equivalents), each of which has a population density of 19.9 people per square mile or less ([as determined by the 2010 United States Census Results](#)) will be exempt from providing any uncompensated barometric pressure data to PSAPs.

Section Five: Enhanced Location Accuracy Performance Assessment

All parties have an interest in assessing the development of enhanced location accuracy technologies: The following proposals are made to assist in evaluating the progress of standards:

a) Non-nationwide carriers agree to collect data for live wireless 9-1-1 calls that would show the percentage of time that each “positioning source method” is used to deliver a wireless 911 call, consistent with the following:

- i) “Positioning source method” would include dispatchable location methods as well as positioning based on latitude/longitude (e.g., A-GPS, A-GNSS, OTDOA, AFLT, RTT, Cell ID or a hybrid of any of the listed or future technologies);
- ii) For non-nationwide carriers that operate in one of the six geographic areas that correspond to the six geographic test regions recommended by ATIS ESIF, data will be collected in and reported for that region. If a non-nationwide carrier operates in more than one of the six geographic areas that correspond to the six geographic test regions recommended by ATIS ESIF, data will be collected in and reported for one half of the total number of regions where the non-nationwide carrier operates, with the reporting areas selected by each such carrier. Once the region or regions are selected, however, the carrier

must consistently report data from the selected region(s) for the remainder of the benchmarks.

iii) For non-nationwide carriers that do not operate in any of the six geographic areas that correspond to the six geographic test regions recommended by ATIS ESIF, data will be collected in and reported for the largest county by population within the carrier's footprint. To the extent the carrier's footprint encompasses more than one of the four morphologies found in the ATIS ESIF test regions (dense urban, urban, suburban, and rural), the carrier will collect data from a sufficient number of counties so as to provide data covering each of the morphologies found in the carrier's footprint.

b) Non-nationwide carriers commit to obtain a location fix using "heightened location accuracy technologies" for the following percentage of wireless 9-1-1 calls from the date of this Agreement consistent with Section 5(a) (call data):

- i) 40% of all wireless 9-1-1 calls within two (2) years;
- ii) 50% of all wireless 9-1-1 calls within three (3) years;
- iii) 70% of all wireless 9-1-1 calls (including VoLTE calls) within the later of five (5) years from the date of this Agreement or six months of having an operational VoLTE platform in their network; and
- iv) 80% of all wireless 9-1-1 calls (including VoLTE calls) within the later of six (6) years from the date of this Agreement or one year of having an operational VoLTE platform in their network.

Wireless 9-1-1 calls that originate from "heightened location accuracy technologies" are calls with fixes for (1) A-GNSS (e.g., GPS and GLONASS); (2) dispatchable location; and (3) the proportion of calls from any other technology or hybrid of technologies capable of location accuracy performance of 50m using a blended composite of indoor and outdoor based on available data from a test bed and/or drive test performance. For example, if OTDOA is shown through testing to deliver 50m accuracy in 60% of calls, then 60% of OTDOA calls can be used to support the metrics above.

c) Non-nationwide carriers would provide reports to APCO and NENA sixty (60) days following each of the performance benchmarks set out above, subject to appropriate confidentiality protections. Non-nationwide carriers, APCO and NENA will use the data from these reports to assess the trend in positioning performance over time.

d) Each non-nationwide carrier will ensure that its location technology deployment is consistent between the geographic areas designated for reporting and coverage areas outside these areas.

Section Six: Dispatchable Location Performance Assessment

All parties have an interest in assessing the development of dispatchable location technologies: The following proposals are made to assist in evaluating the progress of standards:

a) Participants in the working group or standards body vested with decision-making authority regarding the NEAD will determine within 36 months from the date of this framework whether dispatchable location solutions are on track, consistent with the timeframes described in Section 2.

b) If the dispatchable location solutions are not on track, the dispatchable location provisions contained in this document would be supplanted with provisions designed to promote the implementation of alternative location solutions by non-nationwide carriers in the most populous 25 Cellular Market Areas (CMAs), in accordance with this section. Competitive carriers may, however, continue to implement dispatchable location solutions and such implementations may be used to demonstrate compliance with location commitments.

i) Any solutions implemented as an alternative to dispatchable location must be technically feasible, and fit within network plans and architectures, and must satisfy the following conditions:

(1) Solutions must be standardized, scalable and commercially available across non-nationwide carriers' networks from multiple sources;

(2) Solutions may require consumers to purchase equipment and/or to incur additional costs. 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;

(3) Solutions must demonstrate 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.