PS Docket № 07-114

# Before the Federal Communications Commission

*In re*

Wireless E911 Location Accuracy Requirements

*on third further notice of proposed rulemaking*
*and notice of proposed rulemaking*

## REPLY COMMENTS OF THE NATIONAL EMERGENCY NUMBER ASSOCIATION


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# Before the Federal Communications Commission

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*ON THIRD FURTHER NOTICE OF PROPOSED RULEMAKING*
*AND NOTICE OF PROPOSED RULEMAKING*

## REPLY COMMENTS OF THE NATIONAL EMERGENCY NUMBER ASSOCIATION

NENA: The 9-1-1 Association respectfully submits the following reply to Comments filed in response to the *Third Further Notice of Proposed Rulemaking* adopted by the Commission on February 20th, 2014, in the above-captioned proceeding.

## REPLY

The contents of this docket, and its evolution, make three things clear: First, the arguments against improving wireless location accuracy have not changed in over 15 years, despite the tremendous success of technologies and approaches that undermine them at every turn. Second, technologies can be deployed on a reasonable timeframe to satisfy the requirements proposed by the Commission in this docket. Third, the Commission must exercise particular care in crafting updated location accuracy rules to ensure that they are clear and unambiguous.

## I. *«Plus ça change, plus c'est la même chose.»*[1]

Experience has shown that implementing new location determination solutions is not without its pitfalls. Promising technologies fail to live up to expectations; industry standards wax and wane; PSAP budgets go from flush to meager; and some regulations are maintained with greater regularity than others. Despite all these challenges, however, one overwhelming point emerges: Dedicated efforts on the part of the public and private sectors, driven, indeed, by prescriptive regulations, at times, can make a meaningful difference in the lives of ordinary, unsuspecting consumers. Thus, notwithstanding the familiar cries of protest, the Commission should press on, resolute in its conviction that, despite its inability to accomplish the perfect, it can do good.

Despite extraordinary developments in positioning navigation and timing (PNT) technologies, the record in this proceeding is rife with industry objections to the Commission's reasonable proposals that remain wholly unchanged since they were leveled against the Commission's first wireless E9-1-1 location proposals nearly 20 years ago. First, carriers insist now is not the time to require *any* location accuracy improvements because the technology does not exist to meet the proposed requirements.[2] Second, they insist that even if the technology exists, it has not yet been studied, tested, or standardized.[3] And, third, they warn that any attempt to require location accuracy improvements is doomed to fail be-

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[1] Karr, Jean-Baptiste Alphonse, *Le Guêpes* (Jan. 1849) (Literally, "the more it changes, the more it is the same thing.").

[2] *Compare* Sprint, *Comments* at 6 (PS Docket No. 07-114) (May 12, 2014) *with* AT&T, *Comments* at 19 (CC Docket No. 94-102) (Jan. 9, 1995).

[3] *Compare* CTIA: The Wireless Association, *Comments* at 13 & 20 (PS Docket No. 07-114) (May 12, 2014) *with* Nextel, Inc., *Comments* at 5 (CC Docket No. 94-102) (Jan. 9, 1995).

cause PSAPs will be unable to reap the benefits of those improvements.[4]

### A. Now has never been the time.

In 1995, AT&T stated that the then-newly-proposed Wireless E9-1-1 location requirements were "premature and counter-productive."[5] Only seven years after the implementation of the original rules, however, one study found that "following E911 [sic] adoption, the ambulance arrives (and thus medical intervention begins) at a point where the probability of mortality is 11% lower" in cardiac patients.[6] Despite this evidence that the Commission's rules were both timely and productive, however, Ericsson offers almost the same argument against new location improvements.[7] In 2011, Verizon admitted that a separate indoor accuracy standard is needed,[8] yet to date neither Verizon nor any other carrier has supported any measurable indoor location standard. This begs the question: when will the time *ever* be right for the Commission to require improved wireless E9-1-1 location performance? NENA maintains that it is now. Never before have so many consumers had so much access to such advanced handset and network technology. And, never before have the PNT technolo-

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[4] *Compare* Verizon and Verizon Wireless, *Comments* at 26 (PS Docket No. 07-114) (May 12, 2014) *and* CTIA: The Wireless Association, *Comments* at 20 (PS Docket No. 07-114) (May 12, 2014), *with* AT&T, *Comments* at 22 (PS Docket 94-102) (March 17, 1995).

[5] AT&T, *Comments* at 16 (CC Docket No. 94-102) (Jan. 9, 1995).

[6] Susan Athey & Scott Stern, *The Impact of Information Technology on Emergency Health Care Outcomes*, 33 RAND J. OF ECON. 399 (2002).

[7] Ericsson, *Comments* at 1 (PS Docket No. 07-114) (May 12, 2014).

[8] Verizon and Verizon Wireless, *Comments* at 8 (PS Docket No. 07-114) (Jan. 19, 2011).

gies incorporated into those networks and handsets experienced such a dramatic and accelerating rate of improvement.

### B. More study and more tests and more standardization have always been needed.

When the FCC first proposed to implement wireless E9-1-1 location rules, Nextel suggested that the Commission facilitate a coordinated effort among all segments of the industry to determine the most appropriate means of fulfilling the 9-1-1 objectives,[9] and AT&T agreed that the best approach to location accuracy would be to establish an advisory committee.[10] Now, as commenters again debate the improvement of wireless location capabilities, nearly the same argument is advanced again.

In this new docket, T-Mobile asserts that the FCC should focus on "establishing an indoor test bed that will allow for investigation of new technologies…"[11] Similarly, Verizon and AT&T suggest that there should be an open-ended test bed to find a technology can meet the proposed standards, and a timeline for implementation should await the discovery of such a single technology.[12] As before, each such suggestion is tied to a multi-stakeholder advisory committee, now known as the Communications Security, Reliability, and Interoperability Council ("CSRIC").

This argument continues to ignore the chicken-or-egg paradox to which it necessarily subjects the market

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[9] Nextel Communications Inc., *Comments* at 2 (CC Docket No. 94-102) (Jan. 09, 1995).

[10] AT&T, Inc., *Comments* at 7 (PS Docket No. 07-114) (July 5, 2007).

[11] T-Mobile, *Comments* at 8 (PS Docket No. 07-114) (May 12, 2014).

[12] AT&T, *Comments* at 29 (PS Docket No. 07-114) (May 12, 2014); Verizon and Verizon Wireless, *Comments* at 22 (PS Docket No. 07-114) (May 12, 2014).

for PNT technology: Device, chip, and network equipment manufacturers cannot as rapidly develop, or deploy at scale, systems that can meet a Commission-mandated performance standard until such a standard is adopted, because to do otherwise would risk building to the wrong requirement, either under- or over-investing as the case may be. Thus if the Commission indefinitely delays adopting a performance standard, it may well find itself waiting indefinitely for one to prove achievable. In the present docket, this problem manifests itself particularly in the industry's narrow focus on the capabilities of each individual technology that has been proposed or tested so far.

It is true that no *single* technology evaluated during the 2012 CSRIC test bed process met the Commission's proposed requirement for circa 2016 compliance by itself. It is also true, however, that CSRIC never evaluated any hybridization techniques that could have extended the capabilities of technologies which *did* yield large, if still non-compliant, fractions of 50m indoor fixes. In practice, carriers often deploy more than one location technology both to improve E9-1-1 location performance and to improve the value of commercial location-based services for consumers, app developers, and marketers. For example, Verizon currently uses a hybrid AGPS/AFLT approach.[13] NENA is convinced that even if some level of hybridization is required, carriers will be able to meet the Commission's proposed indoor performance requirements in the near future.

### C. PSAPs have never been ready.

Each time the Commission has proposed to implement or improve wireless location accuracy standards, industry has objected that such improvements will not benefit public safety because PSAPs and field responders will

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[13] Verizon, *Comments* at 3 (PS Docket 07-114) (September 25, 2013).

be unable to utilize their fruits.[14] It is true that the public sector often moves more slowly than the private. The Phase II implementation experience made clear that while PSAP directors and personnel overwhelmingly support updating their capabilities to conform to the latest technology, PSAPs cannot always obtain the funding necessary unless the carriers act first. Just as AT&T now proposes that the Commission delay implementation of a z-axis standards for the carriers until PSAPs are equipped with z-axis-capable GIS systems,[15] T-Mobile argued in 2007 that any improvement in horizontal location accuracy would have little benefit because 25 percent of PSAPs were not yet equipped to use the improved location data.[16] Despite carrier concerns, the Commission was right to issue its original wireless location accuracy order: Today, 97.8% of PSAPs reaching 98.3% of the population are Phase II equipped, with the majority of the remaining PSAPs located in areas where carriers are exempted from county level compliance.[17]

## II. The proposed horizontal and vertical indoor accuracy standards can be met using a combination of technologies.

Some commenters contend that the Commission failed to adopt realistic timeframes in the implementation of Phase II, and that it is poised to repeat that mistake. In

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[14] *E.g.*, CTIA: The Wireless Association, *Comments* at 20 (PS Docket No. 07-114) (May 12, 2014); Information Technology Industry Council, *Comments* at 3 (GN Docket No. 11-117) (Oct. 3, 2011); AT&T, *Comments* at 22 (PS Docket 94-102) (March 17, 1995).

[15] AT&T, *Comments* at 17 (PS Docket 07-114) (May 12, 2014).

[16] T-Mobile, *Comments* at 14 (PS Docket 07-114) (July 5, 2007).

[17] NENA: The 9-1-1 Association, "9-1-1 Statistics" *available at* https://www.nena.org/?page=911Statistics (last accessed July 14, 2014).

particular, CTIA points to the Commission's September 2000 Order extending the penetration timeframe for GPS-capable handsets from five years to six as evidence that a solution for indoor location cannot reach 80% of calls within the proposed 5-year deadline.[18] Today's handset market, and the Commission's proposed approach to location performance, however, are markedly different from the market and approach that existed in 2000. The currently-proposed benchmarks for horizontal and vertical accuracy are to be met in 80% of *test calls* within five years not 95% of *devices*. Unlike 2000, handsets today can *already* leverage existing capabilities for horizontal and, in some cases, vertical location determination. This means that carriers need only close the gap between already-deployed capabilities and the Commission's proposed requirement, rather than starting from scratch.

### A. Hybrid A-GNSS / Network technology can already yield a significant fraction of compliant fixes.

The CSRIC San Francisco Test Bed Report shows that AGPS/AFLT, as deployed by Qualcomm, can obtain indoor fixes within 50 meters for 48% of calls in rural morphologies.[19] The CSRIC III Report also noted that "outstanding GPS performance, almost as good as indoors, can be achieved inside single story homes," which

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[18] *See* CTIA: The Wireless Association, *Comments* at 11-12 (PS Docket No. 07-114) (May 12, 2004) (citing *Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Fourth Memorandum Opinion and Order (CC Docket No. 94-102) 15 FCC Rcd 17442 (2000)).

[19] *See CSRIC Indoor Location Test Bed Report* at 34 (Figure 7.3-8, "Accuracy Percentiles in the Rural Environment") (*available at*: http://transition.fcc.gov/bureaus/pshs/advisory/csric3/CSRIC_III_WG3_Report_March_%202013_ILTestBedReport.pdf).

will result in a high number of compliant fixes in suburban and rural environments from AGPS-equipped handsets.[20] Similar results have been reported under similar conditions in follow-on testing by at least one other vendor.[21] While carriers will not be able to meet the proposed standards with existing AGPS chipsets alone, their additional burden to achieve the 67% initial and 80% final compliance fractions is greatly enhanced from the beginning by the wide-scale deployment of this existing technology. For the initial deadline, the marginal improvement required is likely less than 20% for a majority of the counties and PSAPs in the United States. Given at least some carriers' stated commitments to the deployment of more advanced multi-constellation A-GNSS capabilities in the near term,[22] even this estimate is likely high.

NENA must concede that the situation for A-GNSS/Network hybrids looks less rosy in urban morphologies.[23] But the growing number of satellite constellations in operation, along with enhancements to those constellations through both space- and ground-based augmentation systems, improved clock and orbit tracking, and ever-growing receiver capabilities mean that even here, the problem of supplementing the fraction of calls for which a compliant fix can be obtained is tractable.

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[20] *Id.* at 31.

[21] *TruePosition*, *Indoor Test Report Wilmington, DE* at 51 (March 22, 2013). *But see* AT&T

[22] Verizon and Verizon Wireless, *Comments* passim (PS Docket No. 07-114) (May 12, 2014).

[23] *See CSRIC Indoor Location Test Bed Report* at 27-30 (*available at*: http://transition.fcc.gov/bureaus/pshs/advisory/csric3/CSRIC_III_WG3_Report_March_%202013_ILTestBedReport.pdf).

### *1. Indoor positioning technologies are more advanced today than were outdoor technologies before the 1999 Order.*

As noted by NextNav there is "substantial technical and standards groundwork already in place" today to support indoor location determination. Specifically, NextNav reports that it is working with the Open Mobile Alliance, the Alliance for Industry Solutions, and the Third Generation Partnership Project to standardize metro beacon technology,[24] and with two of the leading wireless chipset manufacturers, Broadcom and Qualcomm, on chipset integration.[25] Similarly, nearly every smartphone on the market already supports some combination of standards-based RF technologies such as Wi-Fi, Bluetooth, and Near-Field Communication (NFC), any one (or more) of which could be leveraged to improve indoor wireless E9-1-1 performance by leveraging existing assets deployed to enable commercial location-based services. As CTIA points out,[26] this was not the case in the late '90s, when the introduction of the Commission's wireless E9-1-1 rules required the development of wholly-new miniaturization technologies for A-GPS deployments.

## B. Barometry is valuable and can be used by public safety agencies in the short term.

In 1995, AT&T commented that GPS was an "entirely unsuitable" solution because it "[did] not work inside buildings and in urban environments" and it "[caused] excessive errors."[27] AT&T also warned that "extremely expensive" handset upgrades would result in a "nation-

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[24] NextNav, *Comments* at 13 (PS Docket 04-117) (May 12, 2014).

[25] *Id.*

[26] CTIA: The Wireless Association, *Comments* at 11 and fns.42-45 (PS Docket No. 07-114) (May 12, 2014).

[27] AT&T, *Comments* at 23 (PS Docket No. 94-102) (Mar. 17, 1995).

wide cost of $20 billion" and would "make handsets less portable."[28] In the intervening years, however, the true market impact of a Commission mandate has been made clear. A-GNSS is now the predominant mobile location technology, and functions as a key selling point for new mobile devices. This market might never have existed had the Commission not imposed its original location mandate.

Today, however, Sprint makes the same argument with respect to barometric sensor technology, asserting that barometry is not a "viable solution" and that barometric sensors can be "inaccurate depending on the pressure characteristics within buildings."[29] Sprint also warns that the unit cost to equip all future devices with barometric sensors will "impose a substantial cost to consumers."[30] This restatement of AT&T's 1999 argument ignores the realities of the semiconductor manufacturing industry and the consumer handset industry that have been made astonishingly clear since the introduction of the iPhone in 2007: New and better sensors can be incorporated into consumer devices with lightning speed, and at costs that do not excessively impact the Bill-of-Materials cost of wireless devices.

It is true that carriers were not able to achieve 95% handset penetration for A-GPS chipsets in five years. Unlike A-GPS chips in the late '90s, however, barometric pressure sensors have already been deployed in some fraction of handsets. Notably, Samsung's Galaxy line has incorporated barometric pressure sensors in some devices – including the S IV, the top-selling smartphone for three of the four major carriers – since 2011.[31] Such

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[28] *Id.* at 23 & fn.69

[29] Sprint, *Comments* at 7 (PS Docket No. 07-114) (May 12, 2014).

[30] *Id.*

[31] *E.g.,* Rodriguez, Salvador, *iPhone Still King: 5S the Top Selling Smartphone at US Carriers* LA Times (Dec. 13, 2013)

sensors are thus clearly not subject to the same technical and economic risks that existed for A-GNSS chips in the late 1990s. Moreover, should the Commission adopt its proposed rules in final form, the economies of scale associated with the manufacture of semiconductor devices like Micro Electro-Mechanical Systems pressure sensors dictate that hardware prices *will* fall further – and quickly.

Sprint goes further, however, arguing that barometric sensors can be inaccurate.[32] As with any weather-related phenomenon, this is technically correct: Differences in local sea-level reference pressure occasioned by passing frontal systems, topology, and building techniques *will* introduce systemic errors into reported barometric or altimetric data.[33] This argument, however, misses a key point: Adding even imprecise vertical data will significantly improve the ability of field responders to locate callers over the prevailing techniques of whole-building searches. That is, even if currently-available barometric sensor technology will not give telecommuni-

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(*available at:* http://articles.latimes.com/2013/dec/13/business/la-fi-tn-iphone-5s-top-selling-device-us-carriers-20131213) (noting that the Samsung Galaxy S4 had been the top-selling smartphone for Sprint, T-Mobile, and Verizon before the release of the iPhone 5S); Covert, Adrian, *Why the Barometer is Android's New Trump-Card*, Gizmodo: The Gadget Blog (Oct. 19, 2011) (*available at:* http://gizmodo.com/5851288/why-the-barometer-is-androids-new-trump-card).

[32] Sprint, *Comments* at 8 (PS Docket No. 07-114) (May 12, 2014) (citing Rick Quirouette, B.Arch, Air Pressure and the Building Envelope, at 1-2 (Nov. 2004), *available at* https://www.cmhcschl.gc.ca/en/inpr/bude/himu/coedar/upload/Air-Pressure-and-the-Building- Envelope.pdf).

[33] Bosch Sensortec, *Comments* at 6 (PS Docket No. 07-114) (May 12, 2014) (noting typical building-envelope impact on implied altimetry of ~1m).

cators an accurate floor level in every emergency, *some* z-axis data will still be an enormous and often life-saving benefit to wireless customers that encounter emergencies in large, multi-story buildings by reducing the area that must be searched to locate the caller.[34]

As noted in our previous comments, NENA believes that variations in the pressure characteristics within buildings do not present an insurmountable obstacle to widespread adoption of barometric techniques, because the barometric sensors in responders' own devices will be subject to exactly the same systematic errors as those in the caller's.[35] Despite AT&T's claim that "there doesn't appear to be consensus on how or even if police, EMTs/paramedics, and firefighters can translate z-axis data into particular building floor designations," [36] NENA believes that even indirect z-axis data can be quickly and easily utilized. If field responders are equipped with pressure sensors that meet specifications similar to those in commercial handsets, they will get the same readings inside the building as the caller's phone. Then, emergency responders can read their barometric sensor-equipped device as they ascend floors in the building, rather than having to search the entirety of each consecutive floor, shaving off crucial minutes from response times. This is a common-sense solution to a grave problem that the Commission has sought to rectify since at least 1994. Nor will equipping first responders with barometric devices be prohibitively expensive: Both by leveraging the scale of consumer deployment and by incorporating a barometric requirement into FirstNet de-

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[34] *Accord* Bosch Sensortec, *Comments* at 2 (PS Docket No. 07-114) (May 12, 2014).

[35] NENA: The 9-1-1 Association, *Comments* at 23 (PS Docket 07-114) (May 14, 2014).

[36] AT&T, *Comments* at 17 (PS Docket 07-114) (May 12, 2014).

vice specifications, the public safety community can effectively minimize its costs of deployment.[37]

Finally, the Commission should not wait to implement a z-axis standard until all PSAPs are using Geographic Information Services (GIS) databases that can utilize z-axis information.[38] While AT&T is correct that advanced GIS capabilities would *assist* in public safety agencies' use of z-axis data, it is wrong to assume that such use *requires* a z-ready GIS system. As NENA has previously noted, even having raw barometric data relayed by voice to a field responder will improve public safety outcomes.[39] This is true even without the ability to map a z-axis location at the dispatching PSAP.

### C. Economies of scale will reduce the cost of supplying indoor and z-axis location, but only once a mandate or commitment is in place.

In 1995, AT&T argued that GPS chips were not a suitable location solution because "it would cost fifty dollars per phone to put GPS capabilities in new handsets."[40] While it may have been true in 1995 that GPS chips cost $50 dollars per unit, that price dropped exponentially once handset manufacturers began incorporating GPS into most new handsets. Today a combined Wi-Fi/Bluetooth/Two-Way FM/GPS chip used in the iPhone 5S is estimated to cost only $4.20 per unit.[41] If carriers

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[37] *See* Bosch Sensortec, *Comments* at 2 (PS Docket No. 07-114 (May 12, 2014).

[38] AT&T, *Comments* at 17 (PS Docket 07-114) (May 12, 2014).

[39] NENA: The 9-1-1 Association, *Comments* at 23 (PS Docket No. 07-114) (May 14, 2014).

[40] AT&T, *Comments* at 24 (PS Docket No. 94-102) (Mar. 17, 1995).

[41] Rassweiler, Andrew and Lam, Wayne, *Groundbreaking iPhone 5s Carries $199 BOM and Manufacturing Cost, IHS Teardown Reveals* IHS Technology (Sep. 25, 2013) (*available at:* https://technology.ihs.com/451425/groundbreaking-iphone-

add barometers to all new handsets in the future, the cost of barometer chips will experience a similar price drop.

Already, one manufacturer offers a multi-sensor chip that includes a barometer as well as accelerometers, magnetometers, gyros, and a temperature & humidity sensor that lists for only $16.00, and likely sells for much less, at least in bulk.[42] This is well below the price of GPS before GPS chips became ubiquitous in handsets. It would not be unreasonable, then, to expect barometric sensors to drop to a tiny per-handset cost once production is scaled up to the point that there is enough supply to equip all new handsets. This is a small price to pay for the lives that may be saved if first responders need no longer search each floor of a multi-level building.

### D. Dispatchable addresses are only part of a workable, long-term location accuracy solution.

The comments of major wireless carriers and others place a surprising – and encouraging – emphasis on supplying dispatchable address information when consumers call 9-1-1 from indoors.[43] This much, NENA

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5s-carries-199-bom-and-manufacturing-cost-ihs-teardown-reveals).

[42] IHS iSuppli Research, Preliminary Samsung Galaxy S4 Teardown BOM Estimate (Mar. 2013) (*available at*: http://press.ihs.com/sites/ihs.newshq.businesswire.com/files/2013-03-19_Samsung-S4-Table1.jpg). *Accord* Bosch Sensortec, *Comments* at 6 (PS Docket No. 07-114) (May 12, 2014) (citing industry-consensus estimates of $0.24 to $0.35 per-chip costs by 2017).

[43] *E.g.*, AT&T, *Comments* at 1 (PS Docket No. 07-114) (May 12, 2014); Sprint, *Comments* at 17 (PS Docket No. 07-114) (May 12, 2014); T-Mobile, *Comments* at 5 (PS Docket No. 07-114) (May 12, 2014); TeleCommunications Systems, Inc., *Comments* at 23 (PS Docket No. 07-114) (May 12, 2014); Verizon

supports: A dispatchable address, including the floor and apartment, suite, or room number, remains the gold standard for facilitating a public safety response. NENA wholeheartedly endorses proposals to begin supplying such accurate information.[44] In particular, NENA recognizes that permitting dispatchable address delivery to substitute for some fraction of calls that would otherwise be required to meet the Commission's proposed 50m horizontal and 3m vertical requirements will reduce the technical difficulty of meeting those requirements for the required fractions of calls. Such an approach also has the secondary benefit of permitting carriers to choose whether they will leverage unlicensed and beacon technologies to improve geodetic fixes, dispatchable addresses, or both.

NENA wishes to emphasize, however, that the dispatchable address approach represents only part of an acceptable solution to the indoor location problem: Even in the best case scenario, it could take years longer to deploy dispatchable address technologies like trusted WiFi location databases, Bluetooth beacons, and femtocells to a coverage density sufficient to affect a meaningful fraction of wireless 9-1-1 calls. Moreover, this path, if followed by itself, would be fraught with significant risks. If, for example, the Commission did not couple dispatchable address delivery with a complementary geodetic accuracy requirement, a small, declining, but still very real fraction of consumers calling 9-1-1 from an indoor location might *never* be locatable within the limits of the Commission's proposed rules or the requirements for valid, corroborated, dispatchable addresses. Additionally, there is a grave risk that hoped-for deployments of location-aware beacons and

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and Verizon Wireless, *Comments* at 7 (PS Docket No. 07-114) (May 12, 2014).

[44] NENA: The 9-1-1 Association, *Comments* at 18 (PS Docket No 07-114) (May 14, 2014).

supporting changes to state and local building codes might not materialize: Such changes have proven difficult to negotiate and politically sensitive to implement in the past, and there is no guarantee that they will not again. Consequently, NENA views dispatchable address as only one part – important though it is – of a long-term campaign to improve wireless location accuracy, indoors and out.

NENA has consistently maintained – and the Commission's rules have consistently recognized – that Access Network Providers ("ANPs") are ultimately responsible for locating consumers who originate 9-1-1 calls over their networks.[45] NENA strongly encourages the Commission to maintain this critical link between consumers and ANPs that has served so well for so long.

### E. NENA does not oppose reasonable revisions to the Commission's proposed implementation timeframes.

NENA notes broad industry opposition to the Commission's proposed timeframes for both horizontal and vertical location accuracy improvements. While NENA believes that the timeframes proposed by the Commission are reasonable, we recognize that some changes may be desirable to accommodate common handset development and deployment cycles. We therefore express our cautious support for limited modifications to the Commission's proposed timeframes.

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[45] The one exception to this general consistency has been VoIP Originating Service Providers, who have, historically, been required to locate consumers without the assistance of the ANPs on which their services depend. This exception, however, arose by virtue of an historical accident: VoIP rose to prominence before a transition to all-IP Access Networks was widely contemplated, and, as such, had to be incorporated into 9-1-1 systems in a less-than-desirable manner. This problem will be resolved, however, once ANPs deploy Location Information Servers to support NG9-1-1 service.

With respect to horizontal accuracy improvements, one alternative approach the Commission could pursue would be to tie carrier obligations to the introduction and penetration of new handset models. For example, the Commission could require the introduction of the first compliance-capable handset within two years, with a steady phase-in after that. One such model, which NENA believes is consistent with device manufacturer and standards-group realities, is shown below:

| Metric | Timeline |
|---|---|
| First Compliant Handset Model on Offer | 2 years |
| 50% of Handset Models on Offer | 3 years |
| 50% of Handsets Sold | 4 years |
| 100% of Handsets Sold | 5 years |

NENA believes that a similar approach could work for z-axis capabilities, if the Commission determines it to be necessary. These proposals would maintain the focus on improving carrier location performance while recognizing that the mobile location ecosystem is not solely dependent on activities of the regulated entities.

## III. The Commission should carefully craft its final rules to avoid creating ambiguities.

### A. The Commission's proposed Time-to-First-Fix requirement is appropriate.

While there has been some confusion expressed in this docket concerning exactly what the Commission intended by its 10 second / 30 second proposal,[46] NENA believes the proposed rule to be clear and appropriate.[47] NENA reads the Commission's proposal to require that

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[46] *Compare* CTIA: The Wireless Association, *Comments* at 19 (PS Docket No. 07-114) (May 12, 2014) *with* T-Mobile USA, Inc., *Comments* at 20 (PS Docket No. 07-114) (May 12, 2014).

[47] NENA: The 9-1-1 Association, *Comments* at 11-12 (PS Docket No. 07-114) (May 14, 2014).

carriers divide the number of test calls placed for which a compliant fix was obtained in 30 seconds or less by the total number of test calls placed that either lasted longer than 10 seconds or generated a fix within 10 seconds, and multiply the quotient by 100 to obtain the percentage of compliant test calls. This approach clarifies both that all calls of non-trivial duration are to be counted when computing the compliant fraction, regardless of whether they ultimately produce a fix, and that a carrier may take no longer than 30 seconds, from the time the test call was initiated, to generate a compliant fix. NENA does not read the proposed rule to state a requirement relating to live call data, for which ground-truth location determinations are unlikely to be available in the near future.

### B. Changes in the structure of the residential telephone market should not be allowed to degrade 9-1-1 service.

NENA has grown particularly concerned that accelerating deployments of wireless home phone services are substantially degrading 9-1-1 service for consumers. Whether marketed as fixed wireline replacements or as quasi-nomadic network interface devices for legacy wireline handsets, these devices in many ways replicate the wireline telephone experience from the consumer standpoint. At the outset, it should have been clear to manufacturers and carriers that these devices would require differing treatment than truly mobile devices like ordinary wireless handsets. Instead, many such devices have failed to live up to the reasonable expectations of both consumers and public safety agencies in two critical respects. First, many such devices do not currently supply 9-1-1 systems with an MSAG-valid address when a user places a 9-1-1 call from an attached wireline or cordless telephone. Second, even where an address is supplied, mobile networks do not currently use it for routing purposes. These twin disappointments reduce the ability of public safety agencies to quickly locate res-

idential telephone customers and, for a non-trivial fraction of calls, will significantly increase response time by requiring a call transfer.

To combat these problems, the Commission should clarify that fixed and nomadic wireless services are required to meet the same location accuracy and routing standards as the wireline services they are designed to replace. This can be accomplished in two ways: Initially, the Commission should establish a deadline by which such services must deliver an MSAG-valid address to the serving 9-1-1 system. To prevent data conflicts, the Commission should also require that providers corroborate the location of the device periodically, or at least at call-time, through some automated onboard means (e.g., a GNSS measurement, enhanced Cell ID record, etc.). Additionally, the Commission should establish a related deadline by which all such services must begin routing calls based on the service address. In adopting these requirements, the Commission should move swiftly: If it does not, the rapid deployment of devices with insufficient 9-1-1 capabilities could reach a critical mass that would long delay the restoration of key 9-1-1 service capabilities that should never have been ignored in the first place.

## CONCLUSION

The Commission should quickly proceed to a Report and Order implementing final rules consistent with its analysis in the *Third Further Notice of Proposed Rulemaking*, the *Second Further Notice of Proposed Rulemaking*, and with the changes suggested above.

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