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

In the Matter of	
Wireless E911 Location Accuracy Requirements	PS Docket No. 07-114
911 Requirements for IP-Enabled Service Providers	WC Docket No. 05-196

T-MOBILE USA, INC. COMMENTS ON SECTION III.B OF THE WIRELESS E911 LOCATION ACCURACY NPRM

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I. Introduction and Summary.

T-Mobile supports Chairman Martin's and the Commission's efforts to assure the American public and PSAPs that they are getting the best possible E911 location accuracy performance. Nonetheless, the comments in response to Part A of the NPRM uniformly demonstrated that, even using the Commission's existing standards, PSAP-level accuracy at every PSAP is not possible with current location technologies, deployed alone or in combination.[1] New technology solutions will need to be developed and deployed to deliver service at current accuracy standards at every PSAP.

The same is true for the major accuracy standard changes proposed in Part B.[2] As desirable as it may seem on the surface to unify accuracy standards and to seek even tighter accuracy at every PSAP, no technology exists to deliver the level of performance

[1] Notice of Proposed Rulemaking, PS Docket No. 07-114, CC Docket No. 94-102, WC Docket No. 05-196, §III.A at 3 (rel. June 1, 2007) ("NPRM"). Section III.A of the NPRM is referred to herein as "Part A". Section III.B of the NPRM is referred to herein as "Part B".

[2] NPRM, §III.B at ¶¶ 8-16.

described in Part B. Similarly, no current technology can deliver elevation estimates that are useful to PSAPs. Even GPS, the only existing technology capable of providing vertical estimates, is only capable of estimating elevation within at least 77 meters 95 percent of the time – the equivalent of at least *25* stories. For these reasons, setting forth new mandates now that require wholesale technological change will not yield improved E911 location estimates for many years.

The Commission and carriers nevertheless can provide PSAPs with a near-term assurance that they are receiving the best possible performance out of currently deployed technologies. The Commission should consider moving forward in three meaningful stages:

- **Stage 1 – Optimizing Existing Technologies at the PSAP Level.** Starting immediately, carriers and PSAPs can work to optimize current technologies for performance at the PSAP-level. Carriers would be required to implement the Network Reliability and Interoperability Council VII Focus Group 1A ("NRIC VII FG-1A") recommended optimization process, and compliance with that process would create a rebuttable presumption that the carrier had achieved PSAP-level accuracy to the extent technically feasible and economically reasonable. This ensures that PSAPs get the best location performance reasonably possible in the near term.

- **Stage 2 – Advisory Committee Process To Evaluate Technical Feasibility and Net Benefits of Potential Accuracy Requirements.** As both public safety and industry commenters proposed, the Commission should establish a WARN Act-type advisory committee to investigate new location technologies, and what can actually be achieved in a variety of real-world settings. This committee would form the foundation of a meaningful partnership among industry, technology providers and public safety agencies envisioned by all interested parties, including the Commission, as the most desirable way to move forward.

- **Stage 3 – Adopt and Implement Any New Standards.** In this phase, the Commission would adopt any technically feasible and reasonable new standards, and carriers, their network and handset vendors, and PSAPs would begin to transition to those new standards according to a reasonable transition schedule. In addition to technical issues, such a transition should also recognize the differing levels of resources that PSAPs have, and should not

require implementation of changes where the PSAP is unable to accept or use any new information.

This three-stage process would give the Commission the opportunity, with the assistance of the advisory committee, to conduct a cost-benefit review to ensure that any new requirements will benefit both public safety and overall consumer welfare. To date, there has been no systematic evaluation of the actual utility of increased accuracy, and what information does exist is anecdotal. If E911 requirements become so onerous that carriers withdraw from, or decide not to initiate, service in areas where compliance is overly difficult, public safety will be harmed, particularly in rural areas, because the public will no longer be able to place wireless 911 calls (or any other wireless calls) in those areas. Even if only some carriers withdraw or choose not to enter, the public interest will be compromised because competition will be reduced. Loss of competition will in turn mean higher prices, lower quality of service, and slower rollout of innovative new services in these areas.

As a number of Part A commenters emphasized, to the extent that the Commission does change the current standards, it should also allow a reasonable amount of time with technically feasible milestones for carriers to come into compliance before any new rules become effective. For example, moving to any kind of new technology with a handset-based component (including a hybrid solution) will require change out of at least all non-location enabled handsets and possibly even the existing location-enabled handsets. The handset exchange by itself will take years, as the Commission's past experience has shown. Moreover, during the interim, location accuracy will not be improved for any users that do not have upgraded handsets with the new technology.

With respect to both the parameters of accuracy testing and the schedule for testing, T-Mobile supports the work and recommendations of both Emergency Services Interconnection Forum (ESIF) and the NRIC VII FG-1A. Both of these efforts reflect substantial work by all stakeholders on these issues and address many of the concerns raised by the NPRM; their consensus results are achievable and reasonable. However, if the FCC changes or specifies testing parameters beyond those currently called for under existing ESIF and NRIC guidelines, it would need to include those changes in its evaluation of the technical feasibility of the accuracy requirements, as the testing parameters themselves will affect whether it is technically feasible to comply with a given standard.

With respect to accuracy data, such information should be provided to PSAPs where confidentiality can be assured (as recommended by NRIC VII FG-1A) and upon request, rather than automatically. Some PSAPs may not have the capability to utilize this information, and those that can use it are very likely to request it. Moreover, compliance with this requirement for all 6,000 – 8,000 PSAPs without regard to whether or not they ask for the data will be highly resource intensive and would unnecessarily divert carrier efforts away from deployment and development efforts that will deliver much more "bang-for-the-buck" in terms of enhancing 911 service.

II. As an Initial Step, Optimization Can Assure PSAPs and the Public that the Best Possible Location Accuracy Performance Is Being Delivered.

As the Part A comments showed, the public safety community is concerned – as it should be – with obtaining the most useable location information possible to help guide emergency response. In the near term, the best way to do that is to adopt and follow

PSAP-level optimization procedures, which could be modeled after those included in the NRIC VII FG-1A recommendations.

Although NRIC VII FG-1A recommended that compliance with the accuracy parameters of Rule 20.18 be assessed at the state level, it went also much further. It recommended an optimization process, the express goal of which was to "require carriers to optimize the performance of their deployed location technology at the Public Safety Answering Point (PSAP) level, to the extent technologically feasible and commercially reasonable. . . ."[3] This recommendation "capture[d] the best commercial efforts of the carriers and maximizes performance in underperforming areas, while taking into account the physical limitations of existing location technology."[4] The recommendation also "recognizes the long-term goal of all parties working together to achieve the FCC standard of location accuracy at the PSAP-level, as this becomes possible through future network expansion and as the carrier's deployed location technology advances."[5]

The optimization processes would give PSAPs an unprecedented view into the carrier's accuracy data and performance, and help pinpoint refinements that could improve accuracy. As part of the optimization process, NRIC VII FG-1A proposed that the carrier, upon request at the time of deployment, review the results of its performance evaluation "with the PSAP jurisdiction and both the PSAP or public safety authority," and address any outstanding issues.[6] Post-deployment, if a PSAP that has conducted its own testing, believes the results are substantially below the FCC standard, and that the

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[3] NRIC VII, Focus Group 1A, Near Term Issues for Emergency/E9-1-1 Services, Final Report, Sec 4.1.2, *Indoor versus Outdoor Location Testing*, at 50 (Dec. 2005) ("NRIC VII FG-1A Report").

[4] *Id.*

[5] *Id.*

[6] *Id.* at 52.

carrier has not made a good faith effort to optimize performance at the local level, it can notify the carrier and begin a Performance Trouble Reporting and Resolution Process.[7] A carrier responding to the PSAP must, within 30 days, provide a written plan of steps that it plans to take to address any reported deficiency.[8] When the carrier has taken all the steps pledged in its response, it must provide documentation to the PSAP that it has done so.[9]

T-Mobile has implemented these processes and has found that they work. The optimization processes help both to identify any steps that can be taken to improve performance and provide PSAPs with an understanding of the measures the carriers have taken and the types of results they can expect within their jurisdictions. In T-Mobile's experience, implementing optimization from the outset is preferable to waiting for complaints because of the NRIC timelines.

The optimization process is the only realistic means of improving accuracy performance at the PSAP-level in the near-term. It is not dependent upon inventing, developing, and deploying new technical solutions. Instead, it ensures that the current technologies are providing the best results they reasonably can. This can yield significant benefits immediately in those areas where carriers have not yet optimized their location technology deployments and, just as importantly, help PSAPs gain a better understanding of and confidence with the location data they are provided. In addition, it fosters a collaborative and cooperative working relationship between PSAPs and carriers for the betterment of public safety.

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[7] *Id.*

[8] *Id*. at 53. The NRIC VII FG-1A Report contains a representative, but not exclusive, list of such actions.

[9] *Id.*

III. The Commission Should Establish an Advisory Committee to Ensure that Any New Rules Are Based on Sound Science and Engineering Evaluations of Technical Feasibility and Net Benefits.

If technical feasibility and cost were no object, industry, government, and public safety stakeholders would want to be able to pinpoint, in times of emergency, for every call at every PSAP, the precise location of the 911 caller so that first responders would literally know which door to kick down, even in the case of multi-story apartment buildings.[10] But the comments in response to Part A uniformly reveal that – notwithstanding the significant progress of wireless E911 since it was first mandated in 1996 – technical feasibility, cost, and maintaining the availability, quality, and usefulness of the overall service continue to limit what is reasonably achievable. The Part A comments show that there are no available technologies today that used alone or in demonstrated combination will allow carriers to meet the current, bifurcated 100/300 network and 50/150 handset/hybrid accuracy standards at each and every PSAP.[11] Even to meet the current standards at every PSAP, if at all possible, new technologies will have to be developed and deployed.[12] Accordingly, as the second stage of its efforts to improve E911 accuracy – which could run concurrently with the first stage – the

[10] *See* Comments of the King County E911 Program at 6; Comments of the New York State Department of Public Services at 1-2; Initial Comments of the Texas 9-1-1 Alliance at 6.

[11] Comments of Qualcomm Incorporated at 5 ("Qualcomm Part A Comments") (none of the solutions "currently in the pipeline will make the dramatic changes that would be necessary to guarantee that the Phase II requirements will be met in each and every one of the 6,000 PSAPs, with their arbitrarily defined boundaries."); Reply Comments of T-Mobile USA, Inc. at 6 (filed July 11, 2007) ("T-Mobile Part A Reply Comments") (explaining that TruePosition's comments show that PSAP level accuracy requirements cannot be met at every PSAP using U-TDOA, either alone or in combination with other technologies).

[12] *See* T-Mobile Part A Reply Comments at 3; *see also*, *e.g.*, Comments of T-Mobile USA, Inc. at 3 ("T-Mobile Part A Comments"), Comments of Verizon Wireless at 11-13 ("Verizon Wireless Part A Comments"), Sprint Nextel Comments at 9-12 ("Sprint Part A Comments"), Comments of AT&T Inc. at 3 ("AT&T Part A Comments"), Qualcomm Part A Comments at 3-4, Comments of TruePosition Inc. at 5-6, Comments of Cincinnati Bell Wireless LLC at 4.

Commission should create a WARN Act-type advisory committee to investigate new location technologies and assess their feasibility in a variety of real-world settings.

A. A Single Nationwide Accuracy Standard Is Technically Infeasible.

The NPRM tentatively concludes that there should be a single accuracy standard.[13] As desirable as that may be, the Part A comments make clear that a single nationwide standard is not achievable under any combination of current technology at all PSAPs unless standards are relaxed, not tightened. The Part A comments demonstrate, for example, that A-GPS's performance varies substantially by topography and/or RF environment, with performance in urban or rural canyons, wooded areas and indoor environments all different and less reliable than in open fields with a clear view of a broad horizon.[14] Indeed, Verizon Wireless – which deploys a "hybrid" solution of A-GPS and advanced forward link trilateration (A-FLT) – reports that even in parts of cities that are away from buildings it may not "be able to achieve accuracy due to tree cover, overpasses, and other obstacles."[15] When an A-GPS handset cannot receive signals from a sufficient number of satellites, it must rely on its network-based triangulation systems, which have a lower level of accuracy.[16]

U-TDOA similarly varies in performance depending on the RF environment and topography. Although U-TDOA produces results that are well within the FCC's accuracy standards in most cases, some environments and topologies are particularly challenging for the technology. U-TDOA, like any triangulation solution, works only when the handset's signal can be received by at least three cell sites. In some rural and

[13] NPRM at ¶10.

[14] *See* Verizon Wireless Part A Comments at 20. *See also* Sprint Part A Comments at 11.

[15] Verizon Wireless Part A Comments at 21.

[16] *Id*. at 16.

isolated areas that have only a few, widely-dispersed cell sites, there simply will not be enough measurements to perform a triangulation. In addition to highways or similar areas with "string of pearls" cell site configurations, areas where handsets may encounter difficulty in connecting with at least three cell sites include sparsely populated areas with only one or two cell sites, coverage area edges, and wooded, mountainous and other challenging terrain. In some urban and suburban settings, local restrictions on antenna deployment limit the number of cell sites that will be "in-range" of a handset at a particular location. Similarly, indoor environments can be challenging because the building structure may itself limit the number of cell sites that can receive the handset's signals, and reflections from walls can cause RF multipath issues that make it more difficult to accurately determine the correct timing of signal arrival.[17]

Notably, A-GPS is not always strong where U-TDOA is weak and vice versa. Thus, a "hybrid" solution combining these technologies is not the easy route to a unified accuracy standard that can be met at the PSAP level in all cases. As Qualcomm concluded, "it would be inaccurate to say that the accuracy requirements can be met on a PSAP-by-PSAP basis merely by the deployment of hybrid solutions."[18] Not only do both technologies have areas where they are strong and weak, in some cases both technologies have difficulties in the same locations:

- A handset located at the bottom of a rural canyon or in a wooded area both may not be able to receive enough satellites to determine a GPS location estimate, and may not be able to get a well triangulated network-based

[17] *See* Verizon Wireless Part A Comments at 17-18 ("To provide the most accurate data, satellite transmissions must be 'line-of-sight.' GPS signals that are received after bouncing off of buildings or other obstructions are known as 'multipath' signals. They bias measurements by introducing time delays that the system cannot adjust for since it does not know that the single is not being received line-of-site.").

[18] Qualcomm Part A Comments at 7. This includes the "hybrid" A-GPS/A-FLT solution discussed by the Commission, NPRM at n. 18, and already deployed by Verizon Wireless.

location estimate because cell sites may be widely dispersed or have a "string-of-pearls" configuration.

- In dense urban settings, the handset may not be able to receive enough satellites for a GPS location estimate. At the same time, the handset may not be able to be received by enough cell sites (because some cell sites, although relatively nearby, may be blocked by buildings or other structures) or multipath issues may introduce greater error into the network triangulation calculations.

- Similarly, indoor environments present challenges to both technological solutions because of limited or reduced visibility of satellites and cell sites and associated multipath issues.[19] A handset served by a single pico cell, for example, may see no other cell sites, and would most likely be out of view of the GPS satellites.

As NASNA said, "there is no silver bullet" for E911 location accuracy.[20]

The foregoing suggests that it is not technically feasible to adopt a single nationwide accuracy requirement that would apply at every PSAP, irrespective of the technologies used. One possible approach suggested by Commissioner Adelstein to address this issue holds promise and should be explored, *i.e.*, that the Commission may need to set different standards for different topological or RF environments, which would still mean different levels of accuracy performance for different PSAPs, or even parts of PSAPs. In this way each PSAP in the country would be assured a specified level of accuracy based on the topologies within its boundaries, but that level would vary in light of technological limitations based on conditions in their area.

Furthermore, in T-Mobile's experience, the requirement that 95 percent of calls provide estimates within 300 meters is generally more difficult to meet than the requirement to provide estimates within 100 meters for 67 percent of calls. (Similarly,

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[19] *See also* Verizon Part A Comments at 19.

[20] Letter from Steve Marzolf, President, National Association of State 9-1-1 Administrators to Chairman Martin, CC Docket No. 94-102 at 1 (Sept. 19, 2005).

the requirement that 95 percent of calls provide estimates within 150 meters appears to be the most difficult to meet of the handset/hybrid-based accuracy standards.)[21] Any new standards would need to reflect the real-world difficulties in achieving a 95th percentile requirement of even 300-meter accuracy.

T-Mobile continually evaluates E911 technologies and has yet to see any available technology that, alone or in demonstrated combination with other technologies, will lead to a substantial improvement over today's accuracy performance. Moreover, as discussed further in Section V below, the anticipated benefits of a single accuracy standard will not actually be realized for years. Even if it becomes technically feasible, it will take years to make the changes necessary to implement the new unified standard – particularly if handset changes are required.

B. Elevation Estimates Are Not Technically Feasible for Network-Based Technologies and Are of Limited Practical Utility Even When Obtainable.

Other accuracy standard changes proposed in the NPRM likewise are not technically feasible. For example, U-TDOA is not capable of providing elevation estimates because the Location Measurement Units (LMUs) reside essentially in the same geographic plane as the mobile handset to be located.[22] Indeed, no currently available network-based location technology is capable of providing elevation estimates. Requiring elevation estimates would be a virtual mandate for GPS technology.

Moreover, even with A-GPS, elevation estimates are very coarse and essentially useless for E911. In the first instance, if an A-GPS handset cannot receive a minimum of four satellites, it will not be able to generate any elevation estimate. In addition, GPS

[21] Verizon Wireless Part A Comments at 18.

[22] *See* NPRM at ¶12.

does not produce elevation estimates that are nearly as accurate as its latitude/longitude estimates. Under ideal conditions, U.S. government performance standards for GPS specify a 77-meter (~250 foot) vertical error at the 95 percent threshold – which would likely be much greater in actual application.[23] This translates to an error range of at least 25 stories – essentially useless information for the vast majority of buildings across the country, let alone enough to allow first responders to know "which door to kick down" in a multi-story apartment building.

Furthermore, PSAPs may need to complete another round of equipment upgrades to use elevation information effectively as this factor may not be available in current mapping and CAD software. Also, the maps used in CAD systems may not have relative sea level altitude information for individual buildings and floors within the varying topology and architectural designs of the PSAP area. Keeping the GIS contour information up-to-date over time and associated training efforts will be recurring costs for the PSAPs that not all PSAPs may be ready or able to bear. In any event, elevation should not be required anywhere that the PSAP is not ready and able to utilize such information, and even then only where the PSAP has not specifically requested that it be provided.

[23] Global Positioning System Standard Positioning Service Performance Standard, Assistant Secretary of Defense for Command, Control, Communications, and Intelligence at 13 (Table 3-3) (October 2001). This specified 77-meter error range is considered ideal and actual performance will tend to be worse, for example, in urban settings, because of limited sky visibility. In addition, the specified vertical accuracy is relative to the 'WGS84 Ellipsoid' – not true elevation above sea/ground level. Conversion to elevation above ground/sea level would add more error.

C. Mandating Higher Percentages of Indoor Testing Will Make the Current Standards Even More Difficult To Achieve at the PSAP-Level and Will Be Operationally Difficult To Test.

The Commission has proposed increasing the percentage of indoor test locations above the current NRIC-recommended level of five percent if there is a higher percentage of wireless calls actually made from indoors.[24] As reasonable as that sounds, however, it is not technically feasible to meet even the current accuracy requirements with substantially higher percentages of indoor testing points. As discussed above, from a technical perspective, indoor environments are significantly more challenging than outdoor environments in terms of generating accurate estimates: typically, GPS cannot be used because satellite reception by the handset is insufficient inside buildings, and U-TDOA has limits because an indoor handset is not likely to be received by as many towers. Indoor environments can dramatically attenuate RF transmissions – typical indoor attenuation in the range from 30 to 50 dB is not uncommon, depending on the type of building and building materials. Further, indoor environments are plagued with increased RF multipath as signals frequently bounce off walls and windows compromising the ability to resolve signal arrival times (whether network-based or A-GPS technology). Multipath degrades location estimates by skewing the timing measurements used to calculate location.

As an operational matter, moreover, indoor accuracy testing is extremely difficult. First, indoor testing is a highly manual process, because GPS generally cannot be used to establish ground truth and thus other labor intensive methods such as surveys must be used for each test point. As a result, indoor testing cannot be conducted using the

[24] *See* NPRM at ¶ 14.

efficient, semi-automated methods used for outdoor testing. Second, building access is limited and dependent upon being able to get premises owners' permission to test. To run an effective and valid test program, a carrier must plan for a sufficient number of indoor test points, appropriately distributed throughout the test area, and then obtain prior access permissions. Commercial and government building managers have no obligation to cooperate with carriers' testing programs, and are unlikely to do so considering their own priorities and security arrangements. Indoor testing in residential areas would be similarly problematic, if not impossible. The intrusive nature of indoor testing makes it extremely difficult for a carrier to obtain enough building access permissions in appropriately distributed locations to validate compliance with a new large scale indoor testing requirement, and there are no guarantees that such access permissions could be maintained over time to conduct maintenance testing. Thus, a requirement to conduct substantial indoor testing will undermine the Commission's directive that testing methods be "efficient, reliable, simple, [and] cost-effective."[25]

D. The Commission Should Use Rigorous Scientific and Engineering Evaluations in its Efforts To Improve E911 Accuracy.

The only way to chart a reasonable and legally sustainable path forward is for the Commission, preferably through the WARN Act-style advisory committee recommended by many Part A commenters, to conduct a rigorous scientific and engineering evaluation of the available technical solutions and capabilities in diverse test-bed settings and to weigh the relative benefits and costs of any new accuracy standards.[26] Such thorough

[25] OET Bulletin No. 71, Guidelines for Testing and Verifying the Accuracy of Wireless E911 Location Systems at 5 (April 12, 2000) ("OET Bulletin").

[26] *See e.g.* NENA Comments at 5; AT&T Comments at 3-6; Comments of CTIA – The Wireless Association ® at 6-7 ("CTIA Comments"); Comments of Rural Cellular at 8-10.

evaluation is particularly important because "vaporware" claims by vendors for technologies that cannot deliver the promised results in real world environments will not improve actual E911 location accuracy and reliability for first responders. Rather, uncritically accepting such claims would simply lead the Commission, public safety and the industry on a wild goose chase as vendors compete in making exaggerated performance claims in an attempt to convince the Commission to push the adoption of their purported solutions. The only solution that helps improve first responders' capabilities is one that works in multiple, real-world environments.

In addition, the advisory committee should be given sufficient time to perform its wide-ranging tasks. Because technologies that can meet tighter accuracy requirements at every PSAP do not exist and must be developed, the advisory committee will likely need more than a year to study and test technical alternatives before crafting a report.

The advisory committee evaluations should also be conducted using the same testing methodologies or parameters that the FCC will ultimately prescribe. For example, if the FCC were to change the percentage of indoor testing above the NRIC guideline of five percent,[27] technology evaluation would have to be performed subject to that new testing parameter. Otherwise, the Commission, PSAPs, and the public could be misled into believing that a technology exists that can reach a specific level of accuracy, but compliance will not actually be technically feasible.

As T-Mobile discussed in its Part A comments, moving forward in this manner will also minimize the legal risk to any standards the Commission prescribes.[28] It is

[27] NRIC VII FG-1A Report, at 24.

[28] T-Mobile Part A Comments at 10-15.

plainly arbitrary and capricious to prescribe technically infeasible rules.[29] Moreover, to meet its Administrative Procedures Act obligation to consider all aspects of an issue, the Commission must also conduct a rigorous cost benefit and risk analysis.[30]

IV. Adopting a Unified Accuracy Standard By Forcing Network-Based Carriers to Meet Handset-Based Standards Would be Grossly Inequitable and Ignore the Benefits of Network-Based Solutions.

Unifying the CMRS accuracy requirements by requiring the network-based providers to meet handset-based standards would be grossly inequitable, ignoring the substantial benefits of network-based technologies. First, unlike handset-based technologies, network-based technologies can provide location information for 100 percent of handsets as soon as the technology is deployed. Regardless of whether the user has an older, legacy handset without location technology, or is a roamer from another system that may have adopted a different location solution, a Phase II location estimate can be provided for all handsets.

Second, this trade-off between the level of Phase II accuracy for location-enabled handsets and the ability to provide a Phase II location for all handsets was expressly part of what the FCC considered in setting two differing accuracy thresholds. The Commission recognized that, while network-based technologies would not be as precise as GPS-based handsets, they had the benefit of locating all handsets, not just the location-

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[29] In the absence of an express statutory authorization, it is arbitrary and capricious for an agency to issue requirements that are technologically infeasible. *Alliance for Cannabis Therapeutics v. DEA*, 930 F.2d 936, 940 (D.C. Cir 1991) ("Impossible requirements imposed by an agency are perforce unreasonable"); *Bunker Hill Co. v. EPA*, 572 F.2d 1286, 1301 (9th Cir. 1977) ("[t]he record must establish that the required technology is feasible, not merely *possibly* feasible."). *Cf. Edison Electric Institute v. EPA*, 996 F.2d 326, 337 (D.C. Cir. 1993) ("the fact that technology may not be able to keep up with time-tables established by Congress does not mean that courts are at liberty to ignore them, however burdensome the resulting enforcement.") Congress has enacted no such legislation. *See* T-Mobile Part A Comments at 11-12.

[30] T-Mobile Part A Comments at 13-15, Verizon Wireless Part A Comments at 7.

enabled ones.[31] In the initial years of deployment in particular, this meant that network-based solutions achieved a far higher level of performance than the handset-based solutions, simply because only a minority of consumers had location-enabled handsets. Indeed, it is still the case today that 911 calls made by millions of subscribers served by A-GPS carriers do not have any Phase II location information associated with them, even in areas where the PSAP is Phase II capable, because those callers do not have location-enabled handsets.

Carriers made their technology selections based on the rules the Commission put forth. If the Commission is now going to change those rules, it should not penalize carriers that accepted the Commission's trade-offs and worked hard to implement an expressly permitted 911 location solution.

V. Any Change in Accuracy Standards that Requires Changing Technologies Cannot Be Feasibly Implemented Without an Extended Transition Period.

Because meeting any new accuracy requirement that is more stringent than the current requirements, or even implementing the current requirements at the PSAP level, will require installation of new technology and swapping out existing technology, an extended transition will be needed. This transition will take years, not months, and will be even longer if the Commission adopts a standard that essentially requires the entire industry – including those providers currently using a network-based solution – to move to a handset or some sort of hybrid location solution.

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[31] *Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Third Report and Order, 14 FCC Rcd 17388, 17391-2 (1999) ("*Third Report and Order*") ("Allowing a phase-in for handsets potentially can delay the full availability of Phase II location information for callers and PSAPs. To offset this drawback, we require that handset-based solutions be held to a higher accuracy standard, which will help locate callers more quickly and assist PSAPs in handling 911 calls more efficiently.").

First, as discussed both in the Part A comments and above, any significant change in the accuracy standards, including requiring that current standards be met at the PSAP-level or unifying location standards at the 50/150 handset standard, will require new technology development.[32] And, developing and verifying that new location technologies are actually capable of meeting new accuracy requirements is only the first step.

Second, new location technologies must be incorporated into industry standards. This typically takes at least 12 months in the appropriate standards bodies, as the new location technologies have to work in the context of the rest of the CMRS network.

Third, the new technologies must then be implemented into actual equipment, software and products, which typically takes two to three years. Prior experience during the initial Phase II technology development and implementation showed that because the U.S. is only a small part of global CMRS equipment markets, particularly for GSM equipment, U.S. requirements have to be coordinated with other product changes being implemented around the world. Also, the technology choices of the largest companies will affect the range of technological solutions available to others.[33]

Fourth, after all of the above occur, at least two years will be needed to deploy any new network equipment throughout networks. If new equipment and/or antennas need to be added to towers, carriers will need additional time to negotiate new site terms in many cases – particularly if the technological solution increases the equipment "footprint" on the site, adds weight, adds antennas, or increases tower wind load. The

[32] T-Mobile Part A Comments at 4, T-Mobile Part A Reply Comments at 3-4, Verizon Wireless Part A Comments at 11-13, Sprint Part A Comments at 11, Qualcomm Part A Comments at 4.

[33] T-Mobile Part A Comments at 7.

zoning and permitting processes alone often take a significant amount of time for both new sites and enhancements to existing sites.

Finally, as discussed in the Part A comments and above, changes requiring modified handsets require long lead times to replace handsets in the subscriber base. In 1999, the Commission required carriers electing handset-based solutions to begin marketing E911 capable handsets. Eight years later, many carriers of all sizes have not yet been able to meet the requirement that 95 percent of subscribers have location-capable handsets.[34] Unless the Commission is going to require consumers to replace handsets and mandate that carriers shut off service to those consumers that do not do so, network-based carriers will need at least as long a period to have manufacturers begin to supply handsets, and for those handsets to be purchased by consumers as they change out their existing handsets.

In sum, even after technically feasible solutions are identified to meet the Commission's new accuracy requirements, the requirements themselves will not be reasonably achievable for years. This makes it all the more important for the Commission in the near-term to pursue steps, such as implementing the NRIC VII FG-1A

[34] As the Commission recognized in 1999, "For any of several reasons, (*e.g.*, a recession, declining growth rates, or early deployment of non-ALI-capable digital phones that customers elect not to replace), the actual pace of ALI-capable handset deployment could lag and may take several years. Some customers will undoubtedly elect to economize by keeping their handsets for much longer than average, despite the advantages of ALI-capable handsets." *Third Report and Order*, 14 FCC Rcd at 17412. Indeed, it appears that no major CDMA carrier was able to meet the Commission's deadline for 95% penetration of location-capable handsets by December 31, 2005. *See Request for Waiver of Location-Capable Handset Penetration Deadline by Sprint Nextel Corporation*, Order, 22 FCC Rcd 400, 412 (2007) (referring Sprint Nextel to Enforcement Bureau for failure to meet handset penetration requirement notwithstanding that "but for Sprint's acquisition of Nextel, Sprint would have been the only major handset-based carrier to have timely achieved compliance with the December 31, 2005 deadline"); *Request for Waiver of Location-Capable Handset Penetration Deadline by Verizon Wireless*, Order, 22 FCC Rcd 316 (2007). Many handset-based carriers are still working to meet the 95% handset penetration requirement.

optimization processes, that can improve the performance of existing location technologies as deployed.

VI. The Commission Should Follow the ESIF Guidelines and NRIC Recommendations with Respect to Compliance Testing and the Testing Schedule.

The Commission seeks comments on requirements for compliance and maintenance testing for Phase II service and tentatively concludes that maintenance testing should occur every two years, with accuracy data provided to PSAPs.[35] Rather than adopt rules on these topics, which by their nature will be inflexible and not easily adaptable to changing circumstances, the Commission should defer to the large body of existing standards work that has already been completed on this subject. Not only would such action respect the substantial amount of effort that has gone into reaching a consensus solution, but would encourage the continued use of consensus-driven processes to address practical issues.

Both ESIF and NRIC VII FG-1A addressed testing in detail. Both bodies' processes included a wide range of stakeholders – including public safety, carriers, third party 911 vendors, and equipment and technology vendors – in developing their consensus recommendations.[36] ESIF adopted consensus methodologies for common

[35] NPRM at ¶¶ 14-16.

[36] The current participants in ESIF are: from the public sector, Association of Public-Safety Commissions Officials (APCO), Bexar Metro 9-1-1 Network District (Texas), Denco Area 9-1-1 District (Texas), Greater Harris County 9-1-1 Emergency Network (Texas), Mid-America Regional Council (MARC), National Emergency Number Association (NENA), Tarrant County 9-1-1 District (Texas), Texas Commission on State Emergency Communications (CSEC), Virginia Information Technologies Agency, and Washington State Emergency Management; from the private sector, Alcatel-Lucent, ALLTEL, Andrew Corporation, AT&T, British Telecom, Cox Communications, Electronics and Telecommunications, Embarq Corporation, Ericsson Netqual, HBF Group, Intrado, The Melcher Group, Noblis (formerly Mitretek), NeuStar, Nortel Networks, Openwave, Polaris Wireless, Qualcomm, Qwest, RedSky Technologies, Rural Cellular Association, Sprint Nextel, State of Washington, T-Mobile USA, TeleCommunication Systems (TCS), TechnoCom, Telcordia, TruePosition, VeriSign, Verizon, Verizon Wireless, Vonage, and

accuracy testing in 2004,[37] which provide a common frame of reference for stakeholders to use in validating the accuracy testing methodology for E911 location solutions. The ESIF guidelines provide a set of minimum requirements with which individual test methodologies should comply. NRIC VII endorsed the use of ESIF testing methodologies when testing compliance with accuracy requirements at the NRIC-recommended state level.[38]

NRIC also recommended that maintenance testing be performed according to ESIF-developed guidelines. In the context of its overall recommendations, which included compliance at the state level, NRIC proposed that maintenance testing be performed either when there were major network changes affecting accuracy, or otherwise every two years, at a minimum.[39] In February 2007, ESIF adopted standards for maintenance testing consistent with the NRIC VII FG-1A recommendations.[40]

Similarly, NRIC addressed the issue of to whom data should be provided. In addition to providing data to the FCC, NRIC VII FG-1A recommended that accuracy data

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Windstream Communications. Under ESIF procedures, issues are resolved through consensus, which is determined with each entity having a single vote.

In addition to the federal government participants, the participants in NRIC VII Focus Group 1A were: from the public sector, Association of Public-Safety Commissions Officials (APCO), Mid-America Regional Council (MARC), NASNA (National Association of State 9-1-1 Administrators), National Emergency Number Association (NENA), State of Virginia, Tarrant County TX 911, and University of Wisconsin-Madison; from the private sector, Alltel, AT&T, BellSouth, Cingular, Cisco Systems Inc., Cox Communications, CTIA, Ericsson Inc., Intrado, Lucent, Motorola, Nokia, Nortel, Polaris Wireless, Qualcomm, Qwest, Rural Cellular Assoc., SBC, Sprint, TeleCommunication Systems (TCS), TechnoCom, T-Mobile, True Position, Verizon Wireless, and Western Wireless.

[37] Emergency Services Interconnection Forum Technical Report, ATIS-0500001: High Level Requirements for Accuracy Testing Methodologies (July 23, 2004).

[38] NRIC VII FG-1A Report, at 22.

[39] Id. at 22-23.

[40] ATIS-0500010: Maintenance Testing, Ver. 1.0 (Feb. 28, 2007). ESIF also adopted standards for end-to-end functionality testing in 2006. ATIS-0500009: High Level Requirements for End-to-End Functional Testing, (Apr. 5, 2006).

for both initial compliance testing and maintenance testing be provided to PSAPs upon request, provided that confidentiality of data could be maintained.[41]

The Commission should utilize the wealth of existing common test methodologies (accuracy testing, maintenance testing, functionality/end-to-end testing) already developed and endorsed by ESIF and NRIC, with broad participation and the consensus of all stakeholders, including public safety. Re-starting this time-consuming process from scratch would divert resources from actually optimizing location accuracy to the extent technically feasible and economically reasonable. Moreover, the Commission should not require the automatic provision of data to those PSAPs who do not request it. Many PSAPs are not ready to use such data, and those that are can easily request it.

The Commission should adopt the NRIC VII FG-1A recommendations and ESIF guidelines in total, not piecemeal, into the rules. As consensus documents, these recommendations and standards reflect practical give-and-take by all stakeholders. For example, if the Commission mandates use of a smaller geography, testing intervals may need to be less frequent because the amount of testing would then mushroom. Furthermore, breaking apart compromises and picking some elements but not others would chill future cooperative standards setting efforts, which have proven to be the most effective way to address these issues over time.

In addition to following these consensus recommendations and guidelines, one alternative to detailed field testing that the Commission should consider is type-approval of location technology. This alternative was suggested by OET Bulletin No. 71.[42] The Commission could charter either a WARN Act-type advisory committee or a Public

[41] NRIC VII FG-1A Report, at 23.

[42] OET Bulletin at 5.

Safety/Industry forum, such as ESIF, to investigate the feasibility of 'type-accepting' location technology equipment for compliance.

Accordingly, the Commission should defer to the consensus recommendations and guidelines of NRIC and ESIF to frame the testing processes and timelines.

VII. Conclusion.

The record to date makes clear that even the current accuracy requirements cannot be met at every PSAP, and that new technologies will need to be developed to provide location estimates with the accuracy at the PSAP-level suggested by the Commission's tentative conclusions. Rather than mandating changes in the accuracy standards now, the Commission should follow a three-step process that will both assure PSAPs that they are receiving the most accurate possible location estimates with currently-deployed technologies, while at the same time investigating and testing potential longer term changes and solutions.

- **Stage 1 – Optimizing Existing Technologies at the PSAP Level.**
- **Stage 2 – Advisory Committee Process To Evaluate Technical Feasibility and Net Benefits of Potential Accuracy Requirements.**
- **Stage 3 – Adopt and Implement Any New Standards.**

Proceeding in this manner would deliver near-term improvements in accuracy performance where location technology deployments have not been optimized for public safety, while ensuring that any new requirements can actually be implemented and achieved. As carriers and PSAPs are optimizing the performance of existing location technologies, a WARN Act-type advisory committee can examine the state of location technology and assess whether proposed improvements are technically feasible. Such an advisory committee could and should also undertake a rigorous examination of the

incremental benefits and costs of adopting new E911 rules, with the goal of ensuring that the requirements do not cause carriers to withdraw from or fail to initiate service in areas where compliance is difficult. This stepped process also would make it much less likely that any new standards would be challenged, and much more likely that they would, in any event, be sustained after judicial review. Moreover, because any new requirements would require years of development and deployment to bear the fruit of improved location accuracy, it is all the more important now to focus on near-term, achievable measures that can improve the performance of the currently-deployed location technologies.

As part of its efforts to improve E911 accuracy, T-Mobile likewise urges the Commission to adopt the ESIF and NRIC consensus recommendations for testing. This action would maximize the pace of adoption of reliable testing requirements, make the most efficient use of carrier and PSAP resources, and further encourage industry consensus.

Respectfully submitted,

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