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ATTORNEYS AT LAW

December 8, 2008

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

Re: *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

Dear Ms. Dortch:

Attached please find for the record the Declaration of John F. Pottle and Ryan N. Jensen in support of the Comments and Reply Comments filed by T-Mobile in the Federal Communication Commission's proceeding in PS Docket 07-114, with respect to the Public Notice issued by the Commission on September 22, 2008.

Sincerely,

John T. Nakahata
Counsel to T-Mobile USA, Inc.

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

DECLARATION OF JOHN F. POTTLE AND RYAN N. JENSEN

Declarants hereby state as follows, under penalty of perjury:

1. My name is John F. Pottle. I am the Director of National Systems Engineering, Engineering Services for T-Mobile USA, Inc. (T-Mobile). I have been employed at T-Mobile for 14 years. I have 28 years experience as an electrical engineer and manager in the wireless industry, the last ten of which have been involved in the development and deployment of location technologies and E911 systems. I manage several functional areas within T-Mobile including the teams responsible for deployment and maintenance of E911 services, compliance with mandated PSAP request timelines, assurance of Phase 2 location accuracy performance, and providing PSAP technical support. I am also responsible for formulating T-Mobile's technology roadmap for E911 services and ongoing assurance that T-Mobile systems and networks continue to meet requirements for E911 as the network grows and new technologies are introduced. In this capacity, I have direct and personal knowledge regarding T-Mobile's E911 location technology and deployments, and of the accuracy issues presented in this proceeding.

2. My name is Ryan N. Jensen. I am a Member of the Technical Staff, National Systems Engineering for T-Mobile. I have been employed at T-Mobile for 18 years, with ten of those years spent in the research, development, deployment and analysis of the performance of various location technologies for mobile phones. I have 25 years experience as an electrical engineer, hold a Masters of Science in Electrical Engineering, and have been issued 22 U.S. Patents. I am responsible for investigating potential new location technologies for T-Mobile, and for E911 performance and accuracy compliance methodology and testing within T-Mobile. I have participated extensively in the Emergency Services Interconnection Forum (ESIF) since its inception, including working on the development of ESIF's Technical Reports on Accuracy Testing, Maintenance Testing, and Functional/End-to-End Testing for wireless E911. In this capacity, I have direct and personal knowledge regarding T-Mobile's E911 location technology and deployments, and of the accuracy issues presented in this proceeding.

3. We previously provided a declaration dated September 7, 2007, in support of T-Mobile's previous Comments and Reply Comments in PS Docket 07-114, both with respect to Part III.A and III.B of the Notice of Proposed Rulemaking issued therein.[1]

4. This declaration is intended to support the Comments and Reply Comments filed by T-Mobile in the Federal Communications Commission's proceeding in PS Docket 07-114, with respect to the Public Notice issued by the Commission on

[1] *See*, Comments of T-Mobile USA, Inc., PS Docket No. 07-114 (filed July 5, 2007) ("*T-Mobile Part III.A Comments")*; Reply Comments of T-Mobile USA, Inc., PS Docket No. 07-114 (filed July 11, 2007) ("*T-Mobile Part III.A Reply Comments")*; T-Mobile USA, Inc. Comments on Section III.B of the Wireless E911 Location Accuracy NPRM, PS Docket No. 07-114 (filed Aug. 20, 2007) ("*T-Mobile Part III.B Comments")*.

September 22, 2008.[2] We are familiar with the technical aspects of these comments filed in this docket, and with both the Verizon Wireless and AT&T county-level accuracy proposals.[3] For counties in which a carrier has deployed Phase 2 E911 service, AT&T has proposed that network-based carriers ultimately be able to deliver E911 location estimates within 100 meters for 67 percent of calls in all counties in which a carrier has at least one cell site, and within 300 meters for 90 percent of calls in 85 percent of the counties in which a carrier has a least one cell site.[4]

[2] *See* Public Notice, Comment Sought on Proposals Regarding Service Rules for Wireless Enhanced 911 Phase II Location Accuracy and Reliability, DA 08-2129, 23 FCC Rcd 13797 (rel. September 22, 2008).
[3] *See* Letter from Brian Fontes, CEO, NENA, Robert M. Gurss, Director, Legal & Government Affairs, APCO, and John T. Scott, III, Vice President and Deputy General Counsel, Verizon Wireless, to Chairman Kevin Martin, PS Docket No. 07-114 (filed August 20, 2008); Letter from Brian Fontes, CEO, NENA, Robert M. Gurss, Director, Legal & Government Affairs, APCO, and Robert W. Quinn, Jr., Senior Vice President – Federal Regulatory, AT&T, to Chairman Kevin Martin, PS Docket No. 07-114 (filed August 25, 2008)("AT&T Proposal").
[4] AT&T Proposal at 2.

5. AT&T has also proposed a timeline for reaching this ultimate requirement, and a series of intermediate benchmarks. These benchmarks and timelines are summarized in Table 1.

Table 1 – AT&T Proposed Benchmarks

Bench-mark No.	*AT&T Proposed Year (assuming Dec. 2008 effective date)*	*67%/100 Meters Requirement*	*90%/300 Meters Requirement*	*Permitted Measurements*
Bench-mark 1	Year 1 (2009)	60% of counties covering 70% of POPs	Not applicable	Network-based only
Bench-mark 2	Year 3 (2011)	70% of counties covering 80% of POPs	60% of counties covering 70% of POPs	Network-based; or Blended Network-based and A-GPS
Bench-mark 3	Year 5 (2013)	100% of counties	70% of counties; 80% of POPs	Network-based; Blended Network-based and A-GPS; or A-GPS only if handset penetration is > 95% nationwide.[5]
Bench-mark 4	Year 8 (2016)	100% of counties	85% of counties	Network-based; Blended Network-based and A-GPS; or A-GPS only if handset penetration is > 95% nationwide[6].

One important point is that, as a practical matter, in order to meet the third benchmark's requirement that a carrier provide location estimates that are accurate within 100 meters

[5] At both the third (100m/67%) and fourth (300m/90%) benchmarks, the AT&T Proposal would also permit a carrier to measure compliance in a county using handset-based measurements only if the carrier offered subscribers in that county free A-GPS handsets.
[6] *See* n. 5, supra.

for 67 percent of calls in all counties, a carrier would likely have to meet 95 percent handset penetration within five years, so that it could rely on handset-based measurements only for assessing compliance with that benchmark in some counties.[7]

6. We support the conclusion that although it should ultimately be possible for network-based carriers to meet the county-level accuracy standards proposed by AT&T, the benchmarks and timeframes for such compliance proposed by AT&T will not be technically and economically feasible for carriers other than AT&T.[8] It is our judgment that in order to be more likely to be technically and economically feasible, AT&T's proposed benchmarks and timeframes must be modified as proposed by T-Mobile and the Rural Cellular Association.

A. AT&T's Proposal is Keyed to AT&T's Unique Network Design, Cell Site Density and Geometry, Topography and Timeline and Capability to Deploy A-GPS Capable Handsets.

7. AT&T's proposal appears keyed to the particular counties that it serves, its particular network design, cell site density and geometry, the topography of the areas within those counties, and its timeline and capabilities to deploy A-GPS handsets. Presumably, AT&T has proposed benchmarks that it believes it can meet given those factors. However, as discussed further below, these factors will be different for other carriers, which can alter for other carriers the technical and economic feasibility of meeting AT&T's proposed benchmarks. Thus, although AT&T has stated in its reply

[7] As discussed further below, the alternative of offering free A-GPS handsets is not reasonably economically feasible.

[8] We assume that because AT&T made its proposal, it believes it will be able to meet the proposed benchmarks. However, in its comments, AT&T also stated that the proposed benchmarks "cannot be met solely in reliance on technology that is available today," and that its proposal "reflect[s] an optimistic assessment of the speed with which carriers will be able to develop and deploy new technologies." Comments of AT&T Inc., PS Docket No. 07-114, at 3 (filed October 6, 2008) ("AT&T Comments"). AT&T did not elaborate on the nature of the technical breakthroughs it expected to occur, or the basis for its "optimistic assessment."

comments that it "is confident that the [AT&T proposal] is technically feasible for carriers that currently rely on network-based solutions,"[9] we do not find any basis for that confidence in the record, and we believe, based on our actual technical analysis, that AT&T's conclusion is incorrect.

B. T-Mobile Cannot Meet AT&T's Proposed Ultimate Performance Requirements Only Using Its Existing Network-Based E911 Location Technology.

8. T-Mobile has deployed a network-based Uplink-Time Difference of Arrival (U-TDOA) solution. This solution has several advantages, not the least of which is that under normal conditions, it allows T-Mobile to provide a Phase 2 location estimate for all wireless handsets in the deployed area, including all roamers, even when the caller is not using a location-capable handset.

9. T-Mobile's comments and reply comments in this docket, including those filed in response to the Commission's Notice of Proposed Rulemaking[10] as well as the recent Public Notice, accurately describe the capabilities and challenges faced in estimating location using U-TDOA, some of which are discussed further below. We have analyzed U-TDOA's capabilities using both data from actual empirical field testing as well as from accuracy modeling tools that are provided by our U-TDOA vendor. These analyses show that U-TDOA is not capable of delivering location estimates within 100 meters for 67% of calls in 100 percent of counties in which T-Mobile has at least one

[9] Reply Comments of AT&T, Inc., PS Docket No. 07-114, at 2 (filed Oct. 14, 2008).
[10] *See T-Mobile Part III.A Comments*; *T-Mobile Part III.A Reply Comments*; *T-Mobile Part III.B Comments*; Comments of T-Mobile USA, Inc. and the Rural Cellular Association on the 911 Location Accuracy Remand, PS Docket No. 07-114 (filed October 6, 2008); Reply Comments of T-Mobile USA, Inc. on the E911 Accuracy Remand, PS Docket No. 07-114 (filed October 14, 2008) ("*T-Mobile Remand Reply Comments*").

cell site. Moreover, U-TDOA is also not capable of delivering location estimates within 300 meters for 90 percent of calls in 85% of counties.[11]

10. U-TDOA varies in performance depending on the radiofrequency (RF) environment, topography, network design and cell site density and geometry. Although U-TDOA produces results that are within the FCC's accuracy standards in most cases, some RF environments, topologies and/or network designs are particularly challenging for the technology. U-TDOA, like any triangulation method, works only when the handset's signal can be received by at least three cell sites. In some rural and isolated counties that have only one or two cell sites, there simply will not be enough measurements to perform a triangulation. In those counties, it is very unlikely that U-TDOA will be able to triangulate a location – except in the rare circumstance in which a third cell site in another county is located within range of those cell sites. Even in counties with three or more cell sites, it will not be possible for U-TDOA to triangulate a location in areas within the county where a handset's signal is not able to be received by at least three cell sites. This would occur, for example, when the distance between the cell sites is too great for three cell sites to receive the signal, when terrain obstructions (for example, mountains, urban or rural canyons, forests) block a handset's signal from reaching three cell sites, or when the handset is located along the coverage area boundary.

11. In addition, even when a handset's signal can be received by three cell sites, U-TDOA will still not be able to determine an accurate location estimate in some areas. For example, when cell sites are arrayed along a highway or similar areas in a

[11] Even True Position, a leading vendor of U-TDOA, does not assert that U-TDOA can meet county-level accuracy in rural areas on a standalone basis. See Reply Comments of True Position, Inc., PS Docket No. 07-114 at 3 (filed Oct. 14, 2008).

"string of pearls" cell site configuration, triangulation will not typically yield position estimates within the proposed accuracy standards because the cell sites do not have sufficient angular separation. In other situations, mountains or buildings can channel signals in ways that delay the receipt of the handset's signal at the cell site, or that create multipath issues (where a signal from a handset reaches a cell site by multiple paths, each with a different time of arrival, creating uncertainty as to the measurement to be used for the location calculation).

12. By the end of 2009, T-Mobile estimates it will provide service in 1516 counties in which it has at least one cell site and in which Phase 2 E911 service has been deployed. Of these counties, 225 counties (representing only about 1% of T-Mobile's total covered population (POPs)) have only one or two cell sites. Thus, it will be impossible for T-Mobile to meet AT&T's proposed ultimate accuracy standards at a county-level using just its U-TDOA technology, because there are a significant number of counties in which no terrestrial triangulation is possible.

13. Building additional cell sites for location estimation purposes only is not a feasible way to comply with AT&T's proposed county-level standards and benchmarks. Although in theory further accuracy might be gained by building sites solely to create additional time of arrival measuring points (*i.e.*, not because the additional sites are needed to support the provision of the underlying service), this is not a practical or an economically viable option. Because the costs of building and operating additional sites are substantial, we think it likely that in order to comply with a requirement to meet AT&T's proposed county-level accuracy standards based on U-TDOA only, we would have to turn off – or not deploy – service in many locations where the standards could not

be met. In addition, the costs of building and operating these location-only sites would detract from the ability to build and operate sites that would enhance coverage and/or service, with the associated safety benefits for consumers from such enhanced coverage and/or service. Given the limitations of U-TDOA technology, this factor comes into play most acutely in underserved rural areas, where the economic case for entry by new carriers already is the most challenging. Thus, the Commission's new rules could have an unintended consequence of less coverage, less competition, and less ability to use mobile 911 and E911 in rural areas.

14. In addition to the cost of building and operating new location-only cell sites, in some instances, it will not be possible to build such sites given geographic and other constraints on tower siting. Moreover, even in areas where additional tower deployments otherwise would be technically feasible, some local jurisdictions have opposed new sites (the "Not In My Back Yard" phenomenon) even if they understand that they could improve E911 performance. Furthermore, whether the initial benchmark is set at one year, as AT&T proposes, or at 18 months, as T-Mobile proposed, the zoning and tower siting processes, and the time required to complete those processes, will likely make adding new cell sites infeasible in many areas prior to the first benchmark.

C. Technical and Economic Infeasibility of the Interim Benchmarks Relying on Existing Network-Based Location Technology.

15. In its first benchmark, AT&T proposes that, within one year of the effective date of the rules, network-based carriers be able to demonstrate that, in at least 60% of counties covering 70% of a carrier's POPs, they can provide location estimates that are accurate to within 100 meters for 67% of calls, using its current network-based location technology. Because this benchmark is framed as a percentage of the total

number of counties served, the technical and economic feasibility of a carrier meeting this benchmark will depend on its mix of counties in which it either has performance exceeding the 100 meters/67% of calls standard or in which it can achieve that level of performance by installing additional equipment or optimizing its network performance. The higher the number of counties in which triangulation is impossible (such as a county with only one or two cell sites) or highly inaccurate due to "string of pearls" configurations, or terrain or coverage boundaries, the less likely a carrier is to be able to meet this benchmark.

16. Simply because AT&T predicts it can meet this benchmark does not mean that it will be technically and economically feasible for other carriers to do so, even if the same network-based location technology is utilized by both carriers. AT&T has its particular mix of counties in which it has met, or believes it can reasonably meet, the 100 meter/67% of calls requirement, and in which it cannot reasonably meet the 100 meter 67% of calls requirement. This mix will vary by carrier and will determine whether a carrier can meet AT&T's proposed benchmark, and some carriers will not be able to meet the benchmark simply because of the mix of counties that they serve. In the extreme, this can be illustrated by comparing a hypothetical set of 100 counties, in which Carrier A serves all 100 and Carrier B serves only forty of those counties. Under AT&T's proposed first benchmark, Carrier A would not have to meet the 100 meter/67% of calls requirement in any of the 40 counties served by Carriers A and B, so long as it could meet that requirement in the other 60 counties that Carrier A serves. But Carrier B would still have to meet the 100 meter/67% of calls requirement in 24 of the 40 counties that are served by both Carrier A and Carrier B. In other words simply because it serves fewer

counties in total than Carrier A, Carrier B could be required to meet the accuracy requirements in a given county even though Carrier A does not have to do so at the same time. This result is wholly arbitrary and has nothing to do with the technical and engineering realities facing both Carrier A and Carrier B in that same county.

17. In addition, there are many reasons why AT&T and another carrier might serve the same county with at least one cell site in the county, but have a dramatically different ability to achieve highly accurate terrestrially triangulated location estimates. In the first instance, AT&T might serve one part of a county, while the other carrier serves another, each with different terrain. Secondly, AT&T might serve most of the county, and the other carrier might serve just a small portion, such as when the county is at the edge of the other carrier's coverage area, or if the other carrier only provides service along a highway through the county. Finally, each carrier's cell site density and geometry could be dramatically different. For example, the other carrier's cell sites could be in a "string of pearls" arrangement, while AT&T's are distributed more widely with greater angular separation – thus leading to a very different ability to generate highly accurate location estimates. And the other carrier may not even sell service to subscribers in that county, but may simply have installed a network to provide service to subscribers that are driving through the area (such as along the highway). There is no logical basis that we can see for assuming that AT&T's proportion of hard-to-terrestrially-triangulate areas will be the same or higher than other carriers', and we are not aware of any available data in the record, or any other readily available data source, that would provide a basis for such an assumption

18. These potential differences in achievable performance at the county level between carriers are exacerbated by including all counties with only one or two cell sites, but where Phase 2 service has been deployed, within the universe of counties in which compliance must be achieved, at least until a carrier can use A-GPS measurements alone to assess its compliance. The more counties that a carrier serves with only one or two cell sites, the less likely a carrier will be to be able to meet AT&T's proposed first (and subsequent) benchmark(s). T-Mobile's situation illustrates the problem. By the time of the first benchmark, T-Mobile will serve approximately 225 Phase 2 counties that have only one or two cell sites – or nearly 15% of Phase 2 counties. If these counties are included in measuring compliance, to reach the first benchmark of 60% of counties meeting the 67%/100 meter requirement, T-Mobile would have to meet that 67%/100 meter performance in nearly 70% of its other Phase 2 counties.[12] And if Phase 2 service is deployed in an additional 100 counties with only one or two cell sites prior to the benchmark, T-Mobile would have to meet the 67%/100 meter requirement in more than 75% of its other Phase 2 counties.[13]

19. These variations demonstrate the arbitrariness of requiring carriers to include counties with fewer than 3 cell sites in the compliance benchmarks so long as they must rely at least in part on terrestrial triangulation-based results for compliance. Notably, they afflict not just the first benchmark, but all benchmarks for so long as a carrier must rely, at least in part, on network-based measurements without being able to

[12] This assumes that all of the counties with only 1 or 2 cell sites fail, which may not be the case. Nonetheless, even if only 75% of Phase II counties failed because they had only 1 or 2 cell sites, T-Mobile would have to meet the 67%/100 meter performance in more than 67% of its other Phase 2 counties.
[13] This is plausible. T-Mobile serves 132 counties that contain only one or two cell sites, but where T-Mobile has not deployed Phase 2 service.

rely solely on handset-based measurements and standards in some counties. The arbitrariness inherent in these benchmarks would be reduced – but not eliminated – if carriers are permitted to exclude counties with fewer than three cell sites until they have reached the handset penetration level necessary to measure compliance according to handset-based measurements and standards only.

D. Technical and Economic Infeasibility of AT&T's Interim and Ultimate Benchmarks That Rely At Least in Part on A-GPS Deployment.

20. In order to be able to meet AT&T's proposed ultimate accuracy standards at the county-level, as well as the second and third interim benchmarks, T-Mobile will have to deploy another location technology.[14] The only location technology that we are aware of that can potentially feasibly provide location estimates within AT&T's proposed ultimate accuracy standard in these rural areas in which a caller's location cannot be accurately terrestrially triangulated is Assisted Global Positioning System (A-GPS).[15] From what AT&T describes in its proposal, it appears that it is deploying A-GPS as the means to meet its proposed second, third and fourth benchmarks and timelines.

21. T-Mobile also plans to implement an A-GPS location solution. However, A-GPS cannot be implemented quickly for all customers. As the FCC's rules have

[14] T-Mobile has also requested to be able to use A-GPS measurements in assessing compliance with the first benchmark. *See* ¶ 37, *infra*.

[15] Angle-of-arrival technology (AOA) in combination with U-TDOA is not a feasible solution. AOA combined with U-TDOA would not improve location accuracy estimates enough to meet the proposed accuracy in many instances, including areas where the handset signal is being received by fewer than three cell sites. In addition, AOA accuracy degrades with increased distance from the cell site. Where the degradation is most evident is in the same areas that U-TDOA accuracy is most challenged (*e.g.*, rural areas and highways). Furthermore, AOA requires additional and larger antennas than U-TDOA. The addition of these antennas would present significant challenges in obtaining necessary permitting approvals to place these antennas on cell towers, and would, even when approved, make the installation and space rental for these antennas much more difficult and costly due, among other things, to the increased weight and wind load factors involved.

recognized, unlike network-based solutions such as U-TDOA, A-GPS requires that the user have an A-GPS-capable handset.

22. The use of A-GPS technology is built into AT&T's proposal in two ways. First, as one means of meeting the second, third and fourth benchmarks, AT&T proposes that carriers can blend their A-GPS measurements and their network-based measurements, weighted according to the national penetration of handsets. T-Mobile estimates that in order to be able to meet the required percentage of compliant counties, it will have to use blending, at least in part.

23. However, as discussed in T-Mobile's comments, even the use of "blending" does not cure the technical infeasibility of meeting AT&T's proposed county level accuracy requirement of 100 meters for 67% of calls in all counties. A simple example illustrates why this is true. Assume that a carrier has achieved 90% nationwide penetration of A-GPS capable handsets, and that the A-GPS technology is achieving county level accuracy of 40 meters for 67% of calls. Under the proposed "blending" methodology, the carrier would be permitted to weight its A-GPS accuracy and its network-based accuracy results, according to the percentage of nationwide A-GPS handset penetration, or 90/10 in this example. In this county, the carrier would have to achieve network-based accuracy readings of under 640 meters.[16] But that will not be possible if, for example, a handset will never or rarely be in range of at least 3 cell sites, or if the cell sites are simply lined up along a highway.

[16] ((100 meters-(percentage of A-GPS handsets (90%)*average A-GPS accuracy (40 meters)))/% non-A-GPS handsets nationwide (10%)) = 640 meters.

24. Second, once a carrier reaches 95% handset penetration, under the AT&T proposal, it does not have to weight its A-GPS measurements with network based measurements, but can use only the A-GPS measurements and handset-based standards to assess county level compliance. As explained in paragraphs 5 and 23, in order to comply with AT&T's proposed requirement that, for counties in which a carrier has deployed Phase 2 E911 service, a network-based carrier be able to deliver E911 location estimates within 100 meters for 67 percent of calls in all counties in which a carrier has at least one cell site, T-Mobile and other GSM carriers will likely have to achieve a nationwide penetration of A-GPS handsets of at least 95 percent so that they can measure compliance in some counties according to A-GPS measurements and handset-based accuracy standards only. In other words, 95 percent of T-Mobile's subscribers (currently over 30 million subscribers) will have to upgrade their current handsets to A-GPS capable handsets, or, if new subscribers, purchase A-GPS handsets.

25. AT&T has unique advantages as compared to all other GSM carriers with respect to deployment of A-GPS handsets. For GSM carriers, deployment of A-GPS-capable handsets is tied directly to deployment of 3G services. At present, with only a couple of known exceptions among high-end products, the only A-GPS handsets being produced by any major handset manufacturers are 3G handsets.[17]

26. In contrast to T-Mobile, AT&T was able to launch its 3G services on spectrum that it already had in its inventory which was fully cleared and which had been in commercial use for many years, so that handset vendors had ample time to develop A-

[17] Our understanding is buttressed by the reply comments filed by Motorola, which stated, "there are no second generation ("2G") GSM A-GPS handsets sold today." Reply Comments of Motorola Inc., PS Docket No, 07-114, at 4 (filed Oct. 14, 2008).

GPS products. This allowed AT&T Wireless to begin offering 3G services as early as 2004 in some markets.[18] The current AT&T was able to achieve an even deeper spectrum position and other economies of scale because it was formed in 2005 from the merger of two of the three then largest national carriers – Cingular and AT&T Wireless – in 2005. AT&T rolled out its 3G services in a significant number of markets and on a near national scale in 2005 and 2006.[19]

27. T-Mobile, on the other hand, had a much longer journey to be able to deploy 3G services, and the associated A-GPS-capable handsets. T-Mobile first had to acquire the spectrum it would use for 3G services in the AWS-1 auctions in 2006. It then had to work with federal users to clear that spectrum, a challenging, time-consuming process that meant that AWS spectrum did not become usable until this year, and then only on a market-by-market basis. After launching its first 3G market in May 2008, T-Mobile has continued to work aggressively to clear additional markets so that, by the end of 2008, it plans to have launched its 3G service in 27 major markets.[20] While this is a significant accomplishment, it comes almost three years after AT&T launched its 3G services in a comparable number of markets and pales next to AT&T's current deployment of 3G on an almost ubiquitous basis throughout its network. Moreover, T-Mobile has significantly more clearing to do to free up additional spectrum in the AWS band to meet future capacity needs – even in the markets it has launched this year.

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[18] *See* Press Release, AT&T Wireless, "AT&T Wireless Delivers 3G UMTS Service in the United States" (June 20, 2004) (*available at*: http://www.pdatoday.com/comments/P1833_0_1_0/).

[19] *See* Tom Keathley, VP Radio Access & Standards, AT&T, "AT&T: Deploying UMTS/HSPA," at 2, 5, *available at*: http://3gamericas.com/English/Technology_Center/Presentations/UMTS/06_Deploying_UMTS-HSPA.pdf

[20] *See* Press Release, T-Mobile, "T-Mobile USA Announces Commercial 3G Network Availability in 21 Markets By Mid-October" (September 18, 2008), available at: http://www.fiercewireless.com/press-releases/t-mobile-usa-announces-commercial-3g-network-availability-21-markets-mid-october.

28. This lead in deploying 3G services meant that, when AT&T launched A-GPS-capable 3G handsets ahead of the rest of the GSM carriers, it likely had the ability immediately to begin to shift substantial numbers of subscribers to these handsets. By contrast, it is much harder for T-Mobile to sell A-GPS-capable 3G handsets to its customers in areas where 3G services are not yet available.

29. AT&T's head start in deploying 3G services directly gives it a greater ability to meet all three benchmarks after the first, as compared with other carriers such as T-Mobile. The impact is probably most clearly illustrated at the AT&T proposed third (Year 5) benchmark. Because that benchmark requires that a carrier meet the 67%/100 meter requirement in *all* eligible counties, there will likely be a significant number of counties in which a carrier will be able to meet the benchmark only if it can use only A-GPS measurements and standards, rather than blending A-GPS and network-based measurements, and, in order to rely on A-GPS measurements only, the carrier must achieve 95% handset penetration. Accordingly, by 2013, the fifth year after the effective date assuming a December 2008 effective date, AT&T's proposal may effectively require GSM carriers to achieve 95% handset penetration.[21] At that time, AT&T will have had more than seven years from its near-nationwide 3G deployment to achieve 95% A-GPS handset penetration. In contrast, under AT&T's proposal, T-Mobile and every other GSM carrier would have to do the same in far less time – no more than five years.

30. It is also not the case that AT&T's early start in deployment of 3G services and A-GPS-capable 3G handsets makes it easier and provides economies of

[21] The only alternative in the AT&T plan is to offer free A-GPS handsets in every county in which the carrier seeks to use only A-GPS measurements and standards. This is not a practical solution, for obvious reasons, if there are a large number of affected counties.

scale to support more rapid deployment by other carriers such as T-Mobile. AT&T and T-Mobile, for example, utilize different spectrum bands for their 3G services, so equipment that is usable on AT&T's network is not automatically usable on T-Mobile's network. Indeed, because T-Mobile is launching its 3G services in the AWS spectrum, manufacturers must develop 3G A-GPS handsets specifically for T-Mobile's use.

31. In addition, the time required for the initial handset-based carriers (CDMA and iDEN carriers) to achieve 95% handset penetration does not provide a reliable basis for predicting the time GSM carriers would need now to do so. In contrast to when CDMA and iDEN carriers were deploying A-GPS handsets, the wireless industry now is not growing nearly as quickly.[22] This makes it much harder for the network-based carriers to "grow" their way to a 95% handset penetration. Significant change-outs of the existing base will be required. In addition, for CDMA and iDEN, the U.S. constituted the vast bulk of international demand for those handsets, and the CDMA chip manufacturer, Qualcomm, owned the A-GPS technology provider, SnapTrack, such that manufacturers were implementing A-GPS for CDMA across all handsets. This is not the case for GSM, for which the U.S. constitutes a much smaller portion of worldwide handset demand. Furthermore, the trend toward opening wireless networks to a broader range of devices may mean that wireless carriers have less control over the devices that are used on their network.[23]

32. The bottom line is AT&T's benchmarks are uniquely suited to AT&T's network and handset deployments. The benchmarks proposed in its plan are not going to

[22] In addition, churn rates for some carriers are at near record lows, resulting in lower turnover of handsets.
[23] In addition, GSM customers' ability to use "gray market" handsets purchased in other countries could complicate carriers' compliance efforts and assessments.

be automatically technically and economically feasible for other carriers. In our judgment, carriers other than AT&T will not have a reasonable chance of meeting those benchmarks through technically and economically feasible actions unless AT&T's proposed benchmarks for Years 3, 5 and 8 are extended by two years to Years 5, 7 and 10, starting from the later of the effective date of the rules or, for non-Tier I carriers, from the time a carrier starts offering 3G services. Even with those additional two years, it will still be extremely challenging for carriers to meet the benchmarks.

33. These second, third, and fourth benchmarks occur after a carrier has already met the first benchmark, which requires a carrier to meet the 67%/100 meter requirement in 60% of counties covering 70% of POPs. T-Mobile projects that approximately 83% of its POPs will meet the 67%/100 meter requirement after the first benchmark. So while these later benchmarks are important, they do not affect service for the overwhelming majority of subscribers.

34. We also note that unless the AT&T proposal is further modified so that, for the third benchmark only, a carrier may use only handset-based measurements and standards to assess compliance so long as the carrier has reached a nationwide handset penetration of at least 85%, a carrier's mix of cost-conscious versus high-end customers could significantly affect its ability to meet the benchmarks. Cost-conscious customers are less likely to move rapidly to the new 3G services and A-GPS handsets. A carrier with more cost-conscious customers, like T-Mobile, might not meet the benchmarks, even if a higher end-focused competitor would – solely because of each carrier's mix of customers. That is a wholly arbitrary result. This modification of temporarily reducing the percentage of handsets required for using handset-only measurements and standards

mitigates what could otherwise be an arbitrary result that depends not on network and handset capability, but on a carrier's customer mix.

E. Feasibility of Meeting the First Benchmark Within One Year.

35. In our judgment, simply because of logistical issues, the first benchmark should be extended by six months for Tier I and Tier II carriers, and by at least one year for Tier III carriers. To meet the first benchmark, carriers including T-Mobile will likely have to install additional network equipment, conduct empirical testing at the county level, optimize their networks in areas where performance may fall short, and then conduct additional empirical testing in those areas. This will be extremely difficult, and potentially impossible, to do within one year of the adoption of a new rule.

36. Extending this deadline by 6 months for carriers such as T-Mobile would provide much needed additional time to complete these many tasks. In order to meet this deadline, carriers will still have to work extremely vigorously and diligently. The extension will simply help ensure that carriers are measured on their actual performance capabilities, and not just on supply-chain logistics. It is quite likely that suppliers and contractors will become backlogged due to all carriers implementing changes simultaneously nationwide.

37. In addition, T-Mobile and the Rural Cellular Association also requested the ability to use "blended" A-GPS and network-based measurements in meeting the first benchmark, as well as for subsequent benchmarks. Neither AT&T nor any other party has articulated any basis for excluding blended measurements for assessing compliance with the first benchmark. Such a modification would further mitigate the risk that a

carrier, such as T-Mobile, would fall short of the first benchmark despite very best efforts to optimize and maximize network-based location performance. It would also incent carriers to activate A-GPS capability in the network more quickly and acknowledge the extent to which they were successful in getting some A-GPS capable handsets into the hands of subscribers in the initial eighteen months.

F. Indoor Measurements

38. Our analysis of the technical feasibility of the AT&T proposal assumes that only outdoor measurements are used. If indoor measurements were to be required, the AT&T proposal would likely become technically infeasible to meet, even with the proposed modifications. This is true since both A-GPS and U-TDOA struggle to produce high-yield and high-accuracy location estimates indoors. Indoor environments can be very challenging because the signal attenuation of the building structure often limits the number of cell sites that can receive the handset's signals – and the number of GPS satellites that an A-GPS handset can "see." In addition, reflections from walls can cause RF multipath issues that make it more difficult to accurately determine the correct time of arrival measurement.

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