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**Before the
FEDERAL COMMUNICATIONS COMMISSION
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Revision of the Commission's Rules)
To Ensure Compatibility with)
Enhanced 911 Emergency)
Calling Systems)

CC Docket No. 94-102/

**UPDATED PHASE II E911 REPORT
AND REQUEST FOR LIMITED WAIVER**

John T. Scott, III
Charon J. Harris
Lolita D. Smith
Stephen J. Berman

VERIZON WIRELESS

1300 I Street, N.W.
Suite 400 West
Washington, D.C. 20005
(202) 589-3740

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To: Wireless Telecommunications Bureau

**UPDATED PHASE II E911 REPORT
AND REQUEST FOR LIMITED WAIVER**

Verizon Wireless, pursuant to Section 20.18(i) of the Commission's Rules, hereby updates its Phase II E911 Report to notify the Commission of its decision to deploy a network-assisted Global Positioning System/Advanced Forward Link Trilateration ("AGPS/AFLT") handset solution for Enhanced 911 Phase II location technology.¹

Although the AGPS/AFLT solution will provide public safety agencies with accurate information as to a 911 caller's location and thus meets the goals of the Commission's E911 rules, it cannot be deployed on the required schedule. Verizon Wireless thus sets forth a specific alternative timetable for compliance, and requests a limited, temporary waiver of the E911 Phase II handset-based location technology deadlines so that it can meet those alternative dates. Verizon Wireless also plans to pursue two interim improvements, separate and apart from deploying the AGPS/AFLT software solution, that can provide network-based location information to PSAPs for

¹ This filing is submitted on behalf of Cellco Partnership d/b/a Verizon Wireless, TRS No. 803807, and all licensee entities in which Cellco Partnership holds a controlling interest, all of which are listed in its letter to the Bureau dated February 1, 2001, supplementing its November 9, 2000, Phase II E911 report.

many customers until AGPS/AFLT is deployed. Approval of Verizon Wireless' comprehensive plan will serve the public interest by permitting Verizon Wireless to provide its customers with what it believes is the most accurate location technology as quickly as possible.

INTRODUCTION AND SUMMARY

Verizon Wireless is fully committed to providing Enhanced 911 location capability to meet the needs of its customers. That commitment is not new. Verizon Wireless has successfully deployed Phase I E911 service to almost 900 public safety agencies throughout the country. It has also devoted substantial resources and personnel to developing and testing enhanced location technologies over the past several years. But wireless location capability, like any new technology, requires considerable time and effort by service providers, vendors and PSAPs to ensure that it will work in real-world situations. Deployment of this capability has proven particularly complex because so many parts of the wireless communications system – handset, cell site, network signaling and switching functions, location equipment and software – must all interface without losing any of the voice or data communications being transmitted. At the time the Commission imposed its Phase II requirements, no technology existed that met the strict accuracy requirements and that had been successfully tested in actual end-to-end wireless systems. Only now are technically feasible, complete solutions starting to become available, but this is not in time for Verizon Wireless, or it believes any other wireless carrier, to meet the deadlines in the rules.

Verizon Wireless' November 9, 2000, Phase II E911 Report stated that it had chosen a network-based technology for Phase II based on the status of development of location technology and the expected availability of that technology. The Company expended great effort and expense in developing and testing the network-based technology, to evaluate its accuracy and its ability to interface with the other parts of the network necessary for successful E911 service. That work, however, generated concern as to whether this technology, despite its suitability in some environments, would provide sufficient accuracy. In addition, given that many of the needed hardware and software components will not be timely available for testing and deployment, it has become clear from Verizon Wireless' own testing and the record in this proceeding that there will not be a network technology that can meet required deadlines. Other carriers have reported similar challenges with the network option.

The Commission has stated that if a Phase II solution is not available or will not fully satisfy the E911 rules, a carrier will be expected to implement another solution that will comply with the rules. If no solution is available that immediately complies with the rules, the Commission has instructed carriers to "come as close as possible." In this regard, Verizon Wireless stated in its November 2000 report that it would continue to evaluate handset solutions as an alternative. Based on all available information, Verizon Wireless has determined that the AGPS/AFLT handset solution will provide the best and most ubiquitous location capability while presenting fewer of the problems that surfaced with the network technology.

AGPS/AFLT has several benefits. It relies on enhancements to the wireless handset and underlying network to provide superior location services, offering accuracy

many times greater than network-based technologies and better coverage over varied terrain scenarios. AGPS/AFLT literally puts location services in the hands of consumers, providing consumers with a personal method to control the use of their location information. Moreover, once location services become widely available, customers will come to expect that carriers will implement solutions that are as accurate as possible and that can be used whether they are roaming or at home. Given that the major carriers in the industry have now selected handset or hybrid solutions, customers and roamers will be best served by this technology.

Although Verizon Wireless is persuaded that AGPS/AFLT is the best solution available, and will press forward to deploy AGPS/AFLT as aggressively as possible, it will be unable to meet the rules' deadlines for Phase II compliance because the network upgrades and Phase II-capable handsets will not be available in time. Verizon Wireless therefore seeks a limited waiver from Section 20.18(g) of the Commission's rules to deploy AGPS/AFLT on a timeline that is based on the scheduled switch and cell software releases from its three network infrastructure vendors (Lucent, Nortel, and Motorola) and the availability of compliant handsets. To meet the Commission's requirement that carriers "come as close as possible" to implementing a compliant solution, Verizon Wireless proposes a series of steps that are premised on the successful completion of the First Office Application ("FOA") process, which includes testing equipment in Verizon Wireless' system. Verizon Wireless will:

- Begin deploying the network-assisted portion of AGPS/AFLT by October 1, 2001 in its switches and cell sites for Lucent markets, January 1, 2002 for Nortel markets, and November 1, 2002 for Motorola markets;

- Complete deployment of these network upgrades by April 1, 2002 for Lucent markets, August 1, 2002 for Nortel markets, and March 1, 2003 for Motorola markets;
- Begin selling AGPS/AFLT Phase II-compliant handsets in December 2001;
- Meet the following milestones for new handset activations:
 - 25% of new activations by July 31, 2002
 - 50% of new activations by March 31, 2003
 - 100% of new activations by December 31, 2003
 - 95% of embedded base by December 31, 2005.

It is important to note that this schedule would result in the deployment of network upgrades in all of Verizon Wireless' markets, irrespective of receiving a PSAP's request. In this regard, Verizon Wireless is committing to deployment of Phase II technology in its network in advance of many PSAPs' own capability to do so. In this way, customers who purchase AGPS/AFLT handsets in those areas will be ready to be served as soon as the PSAP upgrades its own emergency communications capabilities to use the location information that Verizon Wireless will be ready to transmit. This approach is not only desirable, but is far more efficient and will promote the wide geographic availability of Phase II service better than the fragmented approach of the rule, which ties compliance deadlines to the date six months after an individual Phase II-capable PSAP sends a letter to the carrier, resulting in nearly as many different compliance dates as the number of PSAP requests received. The schedule also mitigates the problem of uncertainty over which PSAPs' requests are valid, because the network-assisted portion of the solution will be completed even without valid requests. Because this approach best serves the underlying purposes of Section 20.18, a waiver approving it is justified.

For all markets in which Verizon Wireless has received valid PSAP requests, and those it may receive in the future, Verizon Wireless thus seeks a limited waiver from the Phase II deadlines for handset-based location technologies to deploy the AGPS/AFLT solution on the schedule set forth above.

In addition to committing to the above schedule for Phase II deployment of AGPS/AFLT, Verizon Wireless plans to pursue two separate, further technologies to provide enhanced location capability even earlier. Pending the rollout of the necessary network upgrades and availability of modified handsets, the following interim measures will bridge the transition to AGPS/AFLT by offering customers enhanced location services. Verizon Wireless will:

- Complete the installation of an interim network-based hardware technology in counties with PSAP Phase II requests that have in place the network technology components that Verizon Wireless has been able to test. This would provide Phase II capability to 50% of two counties by October 1: St. Clair County, Illinois (St. Louis market) and Lake County, Indiana (Gary-East Chicago market). Verizon Wireless will provide network capability to 100% of these two counties in addition to several other counties, including Cook County, Illinois (Chicago), St. Louis County (St. Louis), and Harris County, Texas (Houston) by April 1, 2002. This would provide an interim location capability to Verizon Wireless customers in these major metropolitan areas earlier than the rule for network-based solutions requires.
- Continue to evaluate available network software enhancements that will accommodate legacy CDMA mobiles. One such technology, called Enhanced Forward Link Trilateration (“EFLT”), has demonstrated in preliminary tests that it can locate callers on average between 250-350 meters, without the assistance of a modified handset. If testing (to be completed next month) on EFLT proves successful, EFLT would be deployed, providing an interim enhancement to millions of customers.

UPDATED PHASE II E911 REPORT

Section 20.18(e) of the Commission's Rules requires that carriers provide an E911 caller's longitude and latitude in conformance with the Commission's Phase II accuracy requirements. If a location solution is not available or will not fully satisfy the Commission's rules in terms of accuracy, reliability, or timing, the carrier is expected to implement another solution that does comply with the rules, or that comes as close as possible.² Section 20.18(i) requires carriers to submit a report describing the location solution chosen to meet Phase II. Verizon Wireless submitted its Phase II report on November 9, 2000.³

The Commission has stated that a carrier's technology selection would not constitute a final or irrevocable commitment to the automatic location information ("ALI") technology that it would deploy, and that good faith changes in technology are permitted.⁴ Section 20.18(i) provides that changes and updates to carrier reports should be submitted after the carrier's initial Phase II report. On September 14, 2000, the Wireless Telecommunications Bureau ("WTB") released a *Public Notice* providing guidance on how carriers should file initial and updated reports detailing how they intend

² *Revision of the Commission's Rules to Ensure Compatibility with Enhanced E911 Emergency Calling Systems*, CC Docket No. 94-102, *Fourth Memorandum Opinion and Order*, 15 FCC Rcd 17442, ¶ 45 (2000) ("*Fourth MO&O*").

³ E911 Phase II Carrier Report of Verizon Wireless, CC Docket No. 94-102, filed November 9, 2000.

⁴ *Revision of the Commission's Rules to Ensure Compatibility with Enhanced E911 Emergency Calling Systems*, CC Docket No. 94-102, *Third Report and Order*, 14 FCC Rcd. 17388 (1999) ("*Third Report and Order*"), ¶ 89.

to provide wireless E911 Phase II automatic location identification.⁵ Pursuant to these Commission directives, Verizon Wireless hereby updates its November 9, 2000 report.

E911 Phase II Location Technology Information

Verizon Wireless has decided to implement an AGPS/AFLT handset solution, which the Company believes will allow it to provide first-rate location services. Several other CDMA carriers have also indicated their intention to deploy AGPS.⁶ These carriers have found that a network-assisted handset solution, with its superior accuracy and ubiquity, will provide the best Phase II solution for customers and PSAPs.

(1) Type of Technology

Verizon Wireless is a licensee of cellular and broadband PCS spectrum utilizing analog and Code Division Multiple Access (“CDMA”) air interfaces. Verizon Wireless has decided to employ an AGPS/AFLT solution for Phase II E911 to provide the most accurate level of location information.

Handset Component: AGPS/AFLT relies on components in the network and handset to provide location services.⁷ To accommodate AGPS/AFLT for Phase II, the mobile handset will be modified to include additional hardware and software.

Specifically, AGPS is a handset modification incorporating additional hardware and

⁵ *Public Notice*, “Wireless Telecommunications Bureau Provides Guidance on Carrier Reports on Implementation of Wireless E911 Phase II Automatic location Identification,” CC Docket No. 94-102, DA 00-2099 (rel. Sept. 14, 2000), at 1, 3.

⁶ Qwest Wireless, like Verizon Wireless, previously chose the network-based technology, but reconsidered this choice due in part to technical impediments to full compliance, and now intends to rely on a handset solution. Sprint PCS and ALLTEL also have advised the Commission of their intent to deploy a handset-based or hybrid solution.

⁷ The network portion of this solution refers to the fact that location computations will occur in the network, specifically at the Position Determining Equipment (“PDE”), instead of in the handset. The role of the PDE is explained in more detail below.

software, which allows the handset to utilize signals from GPS satellites for location information. Handsets will require hardware such as a GPS-supported chipset, new radio, antenna, and other minor hardware to exist within the handset to make it capable of receiving and sending GPS information to and from the network. AFLT is a handset modification incorporating additional software, which allows the handset to utilize pilot signals from cell sites for location information. While AFLT allows accurate location determination in CDMA environments where sufficient GPS satellites cannot be “seen” by the handset, such as in some urban environments, AGPS allows accurate location determination in environments where sufficient cell sites are not available for AFLT, such as in some rural environments. In this manner, the two technologies complement each other, combining to offer the most accurate location solution for CDMA customers.

At this time, QUALCOMM is the primary chipset supplier for CDMA handsets. QUALCOMM 3300 and 5100 chipsets support AGPS/AFLT and are commercially available for manufacturers to begin mass production. Other chipsets may become available in the future but are not commercially available at this time.

Network Component: In its network, Verizon Wireless must install several Position Determining Equipment (“PDE”) servers. Each PDE server would provide location services to multiple wireless Mobile Switching Centers (“MSCs”). The PDE server contains a current “reference” of GPS signals received from satellites. In addition, the wireless carrier must install software upgrades for its switches and cell sites. When a 911 call is made, the serving MSC queries the Mobile Positioning Center (“MPC”) for the handset location. The MPC passes the request on to the PDE, which then queries the handset for its capabilities. This query is passed along to the handset via the serving

MSC, base station, and air interface. The handset response indicates that it is AGPS and AFLT capable, and also requests aiding data from the PDS. The PDE passes on to the handset a list of which GPS satellites to look for as well as other network-assist parameters to help set up the receiver. The handset now “sees” a number of satellites and stores raw data received from the satellites, which is required for AGPS location computation. The handset also makes pilot phase measurements from a number of “visible” cell sites, which is required for AFLT location computation. The handset sends this raw location data, using the air interface, base station, and MSC, to the PDE server. The server then computes the caller’s location and returns the result to the MPC, which works with the MSC to pass the data on to the appropriate PSAP.

Interim Network Technologies: In addition to AGPS/AFLT, Verizon Wireless is testing an interim network *software* technology that will provide enhanced location service for legacy CDMA handsets, Enhanced Forward Link Trilateration (“EFLT”). EFLT determines a CDMA handset’s position using pilot strength measurements and round-trip delay. Preliminary tests of the technology have been promising, and Verizon Wireless will deploy the technology if these tests are successful, in addition to AGPS/AFLT.

EFLT will be available for use in those markets utilizing Lucent and Nortel switches.⁸ Because most of Verizon Wireless’ switches are supplied and upgraded by these two vendors, deploying EFLT would allow many Verizon Wireless customers and roamers to receive location services with accuracy greater than current Phase I services

⁸ Support of EFLT is not viable under Motorola’s current IOS architecture, requiring a new platform. Motorola has advised Verizon Wireless that it could potentially deliver this new platform in Software Release 17, which is scheduled for FOA in 2003.

with their existing CDMA handsets. This software would continue to reside in the network even after AGPS/AFLT is deployed. In this manner, location information for CDMA users could be determined whether or not they purchase AGPS handsets immediately. The accuracy of the calculated mobile position using EFLT mainly depends on: (1) the number of cell sites the mobile “sees,” (2) the relative position of the mobile to the visible cell sites, (3) the accuracy of the measurements from the mobile and the cell sites involved, (4) the accuracy of the cell sites’ recorded position and antenna orientation, and (5) the complexity of the RF environments. The primary benefit of EFLT as an interim network software technology is its potential for locating all existing CDMA handsets, whether they are used by Verizon Wireless customers or roamers.

Verizon Wireless has also tested the network-based *hardware* technology that was formerly the basis of the Company’s compliance effort. Verizon Wireless will complete deployment of this technology in certain metropolitan areas on an interim basis where the Company has received PSAP requests, pending the deployment of AGPS/AFLT. In this manner, Verizon Wireless endeavors to provide enhanced location services immediately.

(2) Testing and Verification

a) AGPS

Verizon Wireless is involved in preliminary testing of a PDE server with prototype mobiles in New Jersey; the results of those tests will become available within the next few weeks. Verizon Wireless has begun the FOA process, which will include testing in Dallas, and expects the FOA to provide test results in late September.

Sprint PCS, in its Phase II report filed November 9, 2000, stated that it had conducted tests with Lucent to validate the accuracy of assisted GPS technology.⁹ The tests utilized Lucent switches and cell sites and QUALCOMM prototype mobiles and involved twelve scenarios in four environments using Sprint's CDMA network. Sprint's test achieved accuracy results for rural, suburban, urban, and dense urban environments and presented estimated accuracy percentages that appeared to satisfy the Commission's accuracy requirements.¹⁰

With respect to testing of mobiles, Verizon Wireless will work with its handset vendors to test pre-production mobiles beginning this September and extending into next year, followed by approximately one month of post-production quality assurance conducted as part of its normal handset testing process.

b) *EFLT – Network-Based Software Technology*

Verizon Wireless recently conducted preliminary tests in New Jersey. The results were promising and demonstrate that EFLT may offer a viable augmentation to the ability of Verizon Wireless to locate CDMA legacy mobiles. Preliminary tests showed that EFLT performed robustly in nearly all scenarios.¹¹ For stationary mobiles, the mean accuracy in RMS was approximately 250 meters, with 10-point averaging, and approximately 300 meters without averaging. For moving mobiles, it averaged 300-350 meters. Verizon Wireless expects further testing to confirm 250-350 meter average accuracy in all market conditions (*e.g.*, urban, suburban, rural, in all locations stationary

⁹ Joint Sprint PCS Phase II Implementation Report, CC Docket No. 94-102, at 5, filed November 9, 2000.

¹⁰ *Id.* at 7.

¹¹ See Report on EFLT Off-Line Trial with Verizon at Maple Shade, New Jersey, dated July 10, 2001, provided in Appendix 1 to this filing.

and mobile). Verizon Wireless is conducting further testing which should yield results by August 15, 2001.

c) *Network-Based Hardware Technology*

Verizon Wireless' efforts and testing of this technology are discussed in detail in Section II below. The Company will provide this technology on a limited, interim basis until AGPS/AFLT is deployed.

(3) Implementation Details and Schedule

Handset Component

One vendor, Samsung, currently has a CDMA handset available for testing this September that should be available for sale in December. Three other vendors are planning to make new handsets available for testing, beginning this October, with general availability during the first six months of 2002. Below is a chart that shows tentative testing periods and predicted general availability periods for AGPS/AFLT-compliant handsets that could be sold by Verizon Wireless. In addition, Verizon Wireless is engaged in discussions with Kyocera regarding the testing and availability of modified handsets.

Vendor	Test Schedule	General Availability
Samsung	September 2001	December 2001
Audiovox	October- December 2001	January-March 2002
Nokia	December 2001 -January 2002	March-April 2002
Motorola	April 2002	July 2002
LG	Third Quarter 2002	Fourth Quarter 2002

Based on these vendor schedules, Verizon Wireless plans to begin selling and activating at least one model of a Phase II AGPS/AFLT-enabled phone by year end, and to achieve the following Phase II-compliant handset penetration benchmarks:

- i) begin sales by December 31, 2001
- ii) 25% of new activations by July 31, 2002
- iii) 50% of new activations by March 31, 2003
- iv) 100% of new activations by December 31, 2003
- v) 95% of embedded base by December 31, 2005

Verizon Wireless expects that increased penetration of AGPS/AFLT-ready handsets will be possible through normal attrition, Verizon Wireless' "New Every Two" promotional offering in which customers are able to obtain new handsets every two years, and as a result of its marketing efforts. (No new handsets would be required for the network based interim technologies.)

Network Component

To support the network portion of the AGPS/AFLT solution, Verizon Wireless will require installation and testing of network PDE servers. The PDE server performs vital location determining functions by communicating with the handset to calculate the caller's location and providing the result to the MPC. Verizon Wireless has already begun the FOA process, including testing of a PDE server, and expects to complete the FOA by late September.¹² If the FOA is successful, and a vendor is selected, national deployment should occur by April 2002.

¹² The FOA process usually commences with an initial planning or "kick-off" meeting. After the necessary planning, equipment is installed and testing begins. If the process proceeds smoothly, including positive test results, the product is considered "generally available." Any problems with the FOA process, especially during the testing stage, will delay general availability and ultimately national deployment.

With respect to the software upgrades needed for the wireless switches and cell sites, Verizon Wireless will deploy the necessary upgrades, to be installed as rapidly as possible, in all of its markets – whether or not there is a pending PSAP request for Phase II. Verizon Wireless anticipates, based on vendor assurances and successful completion of the FOA process, that this functionality will be installed in all markets by the dates illustrated in the following chart.

MSC Vendor	Technology	Test Schedule	General Availability	*National Deployment	Load
Lucent (switch and cell software)	IS801 (AGPS & AFLT)	FOA process began 7/20/01	10/1/01	4/1/02	17.0 switch & cell
Motorola (switch and cell software)	IS801	FOA ¹³ 9/1/02	11/1/02	3/1/03	16.1
Nortel (switch and cell software)	IS801	FOA 9/14/01	1/1/02	8/1/02	MTX10

*The time required for each vendor is estimated based on past experience and the number of switches and cell sites requiring software loads. Therefore, the amount of time estimated between general availability and national deployment will vary by vendor.

(4) PSAP Interfaces

Verizon Wireless will coordinate with PSAPs in order to ensure implementation of the necessary upgrades for Phase II. Phase I capability will be installed to enable the PSAP to receive latitude and longitude information provided

¹³ Motorola has indicated that an FOA of Release 16.1 for its *switches* is planned for early 2002. Verizon Wireless will pursue discussions with Motorola to allow Verizon Wireless to be the carrier selected for this early FOA. This table, however, provides current estimates for an FOA of Motorola's

with Phase II. Thus, PSAPs requesting Phase II that have not upgraded for Phase I must account for the additional time, typically three to four months, required for Phase I and II upgrades simultaneously.

(5) Location of Non-Compatible Handsets

To accommodate legacy CDMA handsets that are incompatible with Verizon Wireless' AGPS/AFLT solution, Verizon Wireless plans, subject to the results of current testing, to deploy the EFLT network software technology, which will work with existing legacy CDMA handsets without alteration. For non-CDMA handsets that either are not AGPS capable or are AGPS capable but are incompatible with Verizon Wireless' particular solution, location proximity information will be provided in conformance with the Commission's Phase I rules.¹⁴

switches *as well as its cell site* software. Both network elements must undergo an FOA before deployment. Verizon Wireless will update the Commission if these dates change.

¹⁴ See 47 C.F.R. § 20.18(g)(3).

REQUEST FOR LIMITED WAIVER

Under Section 20.18 of the Commission's rules, CMRS carriers must deploy a technology for transmitting Phase II location information (*i.e.*, latitude/longitude) in accordance with accuracy requirements for 911 calls as early as October 1, 2001.¹⁵ Carriers that select handset-based location technologies must begin selling and activating location-capable handsets no later than October 1, 2001, and must thereafter meet certain percentage-of-activation milestones.¹⁶ In addition, those carriers must, within six months of a PSAP request or by October 1, 2001, whichever is later, make any necessary network modifications to provide Phase II E911 service to the PSAP.¹⁷ For carriers that select network-based location technologies, deployment must occur to at least 50 percent of the area covering a PSAP request beginning on October 1, 2001, or within six months of the request, whichever is later, and to 100 percent of the area within 18 months of a PSAP request or by October 1, 2002, whichever is later.¹⁸

The Commission may waive its rules if there is good cause shown and if "special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest."¹⁹ With respect to its Phase II E911 rules, the Commission last year acknowledged that "technology-related issues" or "exceptional circumstances" might in

¹⁵ 47 C.F.R. §§ 20.18(e)-(h).

¹⁶ 47 C.F.R. § 20.18 (g)(1).

¹⁷ 47 C.F.R. § 20.18(g)(2).

¹⁸ 47 C.F.R. § 20.18(f).

¹⁹ *Fourth MO&O* at ¶ 43 (citing *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) and *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969)).

some cases prevent a wireless carrier from meeting the Phase II E911 deployment schedules. The Commission indicated that in such instances, it would consider granting an individual Phase II waiver if the requesting carrier identified the solutions it considered and explained why none could be employed in a way that complies with the Phase II requirements. Requests for Phase II waiver should be “specific, focused, and limited in scope, and with a clear path to full compliance.”²⁰

I. EXTENSION OF THE HANDSET SOLUTION DEADLINES IS WARRANTED.

Verizon Wireless requests a waiver only to extend the Phase II implementation deadlines and handset milestones contained in Section 20.18(g). Verizon Wireless does not seek either a waiver from the accuracy standards, or a reprieve from the E911 rules for an unlimited period of time. Rather, Verizon Wireless proposes specific, aggressive implementation deadlines to deploy the products of each vendor necessary to support the AGPS/AFLT solution, as soon as those products are expected to be commercially available. This timetable is based on discussions with vendors; and may be affected by unforeseen events such as shortages in available products or problems that occur in testing or deployment. Nonetheless, it provides a clear path to compliance to reach as many customers as possible, with what it believes is the most accurate technology, in the shortest time frame.

²⁰ *Fourth MO&O* at ¶ 43.

A. A Limited Waiver of Section 20.18(g)(1) is Justified to Tie Handset Activation Milestones to Handsets' Availability.

Section 20.18(g)(1) sets forth “milestone” dates for activation of handsets that are Phase II compliant. Other carriers have filed reports and requests for waiver with the Commission that detail why the milestones are technically and economically infeasible.²¹ Given the realities of the long process for commercial handset development, testing, manufacture, distribution, and sale, and the negotiation of necessary contracts covering these steps, the rule’s handset deployment schedule is unachievable, for others as well as for Verizon Wireless.

Nevertheless, Verizon Wireless is fully committed to selling AGPS/AFLT-capable handsets as they become available, and to work with all of its handset vendors to expedite their availability. Verizon Wireless faces several constraints in this process. First, as the nation’s largest carrier, Verizon Wireless sells millions of handsets annually. It will take more time than Section 20.18(g)(1) allows in order to ramp up the supply of AGPS/AFLT-capable units and activate those units in quantities that would reach the percentage milestones contained in the rule.²² Second, because many of Verizon Wireless’ customers purchase “tri-mode” handsets that provide analog and digital cellular service as well as CDMA PCS service, designing a product that offers tri-mode capability together with AGPS/AFLT capability mainly for Verizon Wireless customers poses technical challenges. Discussions are, however, under way to develop and procure such phones. Third, because no one vendor has a portion of the market sufficient for it alone

²¹ *E.g.*, Cingular Wireless LLC Petition for Limited Waiver, filed July 6, 2001.

to enable Verizon Wireless to meet the milestone percentages, and because vendors may have competing customer demands, significant quantities of phones must be obtained from multiple vendors, requiring multiple contract negotiations and adding to the necessary time frames.

Despite these constraints, Verizon Wireless has identified one vendor that will be able to supply an AGPS/AFLT-compliant handset late this fall. Verizon Wireless plans to begin selling at least one model of an AGPS-capable handset developed by Samsung in December 2001. Based on a careful review of the time frames involved in handset development, testing, procurement, and distribution, and discussions with handset vendors, Verizon Wireless believes it can achieve the following Phase II-compliant handset penetration benchmarks:

- i) 25% of new activations by July 31, 2002
- ii) 50% of new activations by March 31, 2003
- iii) 100% of new activations by December 31, 2003
- iv) 95% of embedded base by December 31, 2005

These are realistic milestones, although they will require aggressive efforts to speed availability and sale of new handsets. The Company will do all it can to expedite this process and will seek to beat these milestones if possible. Even under this schedule, millions of customers will have GPS-capable handsets in the coming year. Given that the network portion of the handset solution will not be available until April 2002 in Lucent-

²² Large carriers such as Verizon Wireless may in fact be selling far more GPS-capable handsets than smaller carriers, but because Section 20.18(g)(1) is defined in terms of percentage activations, they face increased supply and other burdens in meeting those percentages.

switched markets, and much later in other markets with Motorola and Nortel switches, these milestones will better coincide with the actual availability of Phase II E911.

B. A Limited Waiver of Section 20.18(g)(2) is Justified to Permit Deployment of the Network Components on a Technically Feasible Schedule.

As detailed in the updated Phase II report above, there are three principal components to the AGPS/AFLT solution: the network switch and cell site software, PDE server, and handsets. In addition, Verizon Wireless' network will have to interface with the Mobile Positioning Center ("MPC"). Because each part of this complex system must be equipped to communicate with the others, Verizon Wireless is working with the vendors supporting these products to make the appropriate software and/or hardware upgrades as soon as possible. However, these products will not be ready in time to deploy Phase II by the applicable deadlines. It seeks a waiver to deploy AGPS/AFLT on time schedules that are based on the readiness of each of these products. A key advantage of this approach, beyond rationally tying deployment to technical feasibility, is that it eliminates the need to evaluate the validity of individual PSAP requests, because deployment will proceed without regard to the timing or validity of those requests. Subject to the successful completion of the FOA process, which includes testing the equipment in Verizon Wireless' network, Verizon Wireless expects to:

- Begin deploying the network-assisted portion of AGPS/AFLT by October 1, 2001 for Lucent markets, January 1, 2002 for Nortel markets, and November 1, 2002 for Motorola markets;
- Complete deployment of these network upgrades by April 1, 2002 for Lucent markets, August 1, 2002 for Nortel markets, and March 1, 2003 for Motorola markets.

1. Switch Vendors – Mobile Switching Centers (“MSCs”)

The Verizon Wireless network has switching platforms provided by three different vendors: Lucent, Motorola, and Nortel. Currently, Lucent MSCs comprise the majority of Verizon Wireless’ network. As of the end of 2000, Lucent MSCs served slightly more than half of Verizon Wireless’ subscriber base; Motorola and Nortel MSCs served the remainder.

Section 20.18(g)(2) ties compliance to requests for Phase II from individual PSAPs, requiring carriers to complete work within six months of the request. In retrospect, this has proven to be an unworkable approach. As Verizon Wireless and others have advised the Commission, installing massively complex upgrades to their networks on a schedule almost randomly determined by when individual PSAPs send letters requesting Phase II (or are themselves capable to receive location information) is a recipe for major problems, and those problems have occurred. How and when carriers can become Phase II capable depends in large part on the network technologies and signaling and switching systems that they have deployed in their networks, as well as on the digital technologies (e.g., CDMA, TDMA and GSM) that they have chosen. The rules do not, however, reflect these disparities between carriers’ networks, and instead impose a fragmented approach that is tied to individual requests, rather than to the availability of technically feasible, tested and available solutions.

One of the most critical “gating factors” to the ability of Verizon Wireless (and any carrier) to deploy Phase II is the availability of the network upgrades that are required to transmit Phase II ALI. Such upgrades are necessary regardless of the carrier’s Phase II technology. The Phase II standard for CDMA carriers, J-STD-036, was not even

adopted until mid-2000; only then could the network vendors proceed to develop the upgrades needed. While all of Verizon Wireless' network vendors are working to complete development and testing of the upgrades, none has reached the point that will allow Verizon Wireless to meet the earliest PSAP requests, which ask for Phase II deployment by October. A waiver of Section 20.18(g)(2) is thus warranted to facilitate an efficient deployment schedule, and that schedule should be tied not to the date of an individual PSAP request, but to the particular network technology Verizon Wireless uses to serve that PSAP's community.

Lucent Switches (17.0 switch and cell load): The Lucent Phase II feature is based on the IS801 standard. The handset-based Lucent solution is accomplished by upgrading cell sites and switches with software release 17.0. First Office Application testing of this feature with Verizon Wireless has begun in Dallas, Texas. Assuming successful completion of the FOA, Lucent has indicated it plans to have the necessary software release available before October 1, 2001. On this time schedule, Verizon Wireless should be able to deploy this feature by April 1, 2002, in all Lucent-switched markets, which comprise the majority of its markets. It would do so regardless of whether it had a pending PSAP request for Phase II. This would enable Verizon Wireless to deploy without waiting for specific PSAP requests. Even where there are existing PSAP requests that would otherwise require deployment in October 2001, that deployment would be completed by April, only six months afterward.

Motorola Switches (16.1 switch and cell load): Verizon Wireless has evaluated the requirements of the portion of its network employing Motorola switches to achieve Phase II capability, requested needed switch modifications and technical support, and

asserted the need for timeframes that would enable Verizon Wireless to meet the requirement that it deploy Phase II within six months of receiving a valid request from a PSAP for Phase II service. Verizon Wireless will not, however, be able to meet that deadline in its Motorola switch markets where it has received Phase II requests.

The inability to timely support Phase II requests stems from the fact that Motorola did not initially work to develop a standards-based solution for Phase I. A standards-based solution requires a message set, which is called the "ORREQ" solution for cellular carriers, as defined in J-STD-036. Instead of employing the ORREQ cellular standard, Motorola initially developed a workaround called an "ISUP loopback." The drawback to the ISUP loopback is that it does not support some types of callers, for example those with mismatched MIN, ESN combinations. The ISUP loopback requires changes to provide Phase II location information. Verizon Wireless has been advised that there are no plans to support changes in ISUP signaling for Phase II at this time.

The new Motorola Phase II switching feature currently under development is based on the IS801 standard. Verizon Wireless expects to be able to conduct First Office Application testing of Motorola switching support for Phase II handset feature with its network sometime next year. On this schedule, Verizon Wireless expects the feature to be generally available by November 1, 2002, which means that Verizon Wireless should be able to deploy APGS/AFLT in its Motorola-switched markets nationwide by March 1, 2003. Again, however, because Verizon Wireless has received requests from PSAPs in several markets that, under Section 20.18(g)(2), must be met before that date, a temporary extension of the rule's six-month deadline is needed. Because the necessary switch upgrades are unavailable at this time from Motorola, a waiver is justified.

Nortel Switches (MTX10 switch and cell load): As with Motorola, Verizon Wireless has sought to identify the requirements for meeting its Phase II obligation for the portion of its network comprised of Nortel switches. Nortel's feature is based on the IS801 standard. Nortel estimates that First Office Application testing with Verizon Wireless can begin on September 14, 2001, with general availability of the feature following by January 1, 2002. This should enable Verizon Wireless to complete upgrades in its network to accomplish nationwide deployment by August 1, 2002.

At this time, Verizon Wireless has not received any requests for Phase II deployment from PSAPs in Nortel-switched markets. A waiver is warranted, however, to establish the deadline for responding to requests that may be filed in the future.

2. Position Determining Equipment ("PDE") Vendors

Verizon Wireless is currently testing a PDE server with prototype mobiles in New Jersey. The FOA process, including testing, is also underway in Dallas. The FOA should be completed with test results by late September. Verizon Wireless expects this feature to be generally available by October 1, 2001. Verizon Wireless is also pursuing all other vendor solutions that will enable it to install the PDE component by April 2002. Should the PDE that Verizon Wireless is testing be selected, nationwide deployment could occur in all Verizon Wireless markets by April 1, 2002, with the potential for installation of a second PDE pair in the third quarter 2002 to allow for redundancy and load sharing. This would coincide with the expected completion of the software upgrades the switches and the cell sites in Lucent-switched markets. In short, installation of the PDE component of the AGPS/AFLT requires a deferred Phase II deployment schedule that should allow the work to be completed by April 2002.

3. Mobile Positioning Center (“MPC”) Vendors

Verizon Wireless currently has two MPC vendors: Telecommunication Systems (“TCS”), formerly known as XYPoint, and Intrado, formerly known as SCC. TCS faced the same problem identified above for Motorola: Phase I was implemented outside of the industry standards for signaling. TCS used “ISUP loopback,” which is non-standard and does not support many call types with the degree of accuracy required by the Commission’s rules. Since Phase II implementation is based on the ORREQ standard, J-STD-036, TCS’s ISUP loopback proved incompatible for migration to Phase II.

A significant portion of Verizon Wireless’ network employing a Phase I solution pursuant to PSAP requests utilizes TCS equipment. However, the software release being developed by TCS now for Phase II is necessarily different from its Phase I solution in order to support the various call types with accuracy and precision. Verizon Wireless cannot yet implement Phase II E911 in those markets utilizing a TCS Phase I solution partly because the TCS software release designed to implement the ORREQ standard has not been completely tested or deployed in a First Office Application.

TCS has, however, modified and successfully tested its software interface with Lucent using the network-based hardware technology. TCS is scheduled to do a lab test with Nortel to support the handset solution on August 6, 2001. Accordingly, Verizon Wireless will conduct a First Office Application test with TCS in order to allow Verizon Wireless to deploy the network-assist portion of the AGPS/AFLT solution in Lucent switching markets by April 2002. The Company does not anticipate that upgrades to Intrado-supplied MPCs will necessitate any additional extension beyond that required for the network upgrades.

Placing all of these network-related upgrades together, it should be clear that the key “gating factor” for meeting Phase II is the availability and installation of the network software for switches and cell sites. Subject to the successful completion of the FOA process, which includes testing the equipment in Verizon Wireless’ network, and because availability dates vary depending on the network vendor, Verizon Wireless plans to deploy the upgrades as follows:

- Begin deploying the network-assisted portion of AGPS/AFLT by October 1, 2001 for Lucent markets, January 1, 2002 for Nortel markets, and November 1, 2002 for Motorola markets;
- Complete deployment of these network upgrades by April 1, 2002 for Lucent markets, August 1, 2002 for Nortel markets, and March 1, 2003 for Motorola markets.

A waiver of Sections 20.18(g)(2) should be granted to permit Verizon Wireless to comply with these dates in lieu of meeting the multiple unachievable six-month deadlines the rule would otherwise mandate. Because this schedule does not wait for, and is not dependent on, individual PSAP requests, it is likely to result in the completion of the network-assisted portion of AGPS/AFLT in many communities before completion in response to a PSAP request would otherwise be required. In this way as well, Verizon Wireless’ compliance path fulfills the rules’ underlying purpose.

B. In Addition To AGPS/AFLT, An Interim Network Software Technology May Provide Further Location Capability.

Over the past few months, Verizon Wireless has investigated the feasibility of Enhanced Forward Link Triangulation (“EFLT”). As detailed in the updated E911 Phase II report above, EFLT is a network-based software location technology that has the potential to offer customers and PSAPs greater location accuracy than is currently

available in Phase I markets. Initial testing shows the potential to locate callers within 250-350 meters on average. This could provide even greater accuracy than VoiceStream's interim network technology that the FCC approved last year.²³

Assuming successful completion of all tests, Verizon Wireless believes that EFLT software will be generally available on November 1, 2001 for Lucent markets. On that basis Verizon Wireless would target deployment of EFLT in all markets where it uses Lucent switches within five months, *i.e.*, April 1, 2002, followed closely by those markets where it uses Nortel switches. This period is needed to account for the necessary switch upgrades plus field testing. As soon as Verizon Wireless is able to complete and evaluate the tests of EFLT, it will advise the Commission whether it will deploy this interim step.

The advantage of EFLT is that it can be deployed without the need to install hardware at each cell site, and this can be accomplished next year throughout most of Verizon Wireless' markets.²⁴ Another advantage is that EFLT will provide location capability to all CDMA handsets in the hands of customers today – no new handsets will be needed. This interim technology will thus provide millions of customers with access to greater location accuracy with their existing handsets than is currently available in markets where PSAPs have requested and received Phase I service.²⁵

²³ VoiceStream's NSS network approach provided accuracy to within 500-1,000 meters, 67 percent of the time. *Fourth MO&O*, ¶ 58. If successfully tested, Verizon Wireless expects to be able to deploy its network enhancement in half the time that the Commission granted to VoiceStream.

²⁴ At this time, support of EFLT is not viable under Motorola's current IOS architecture. A new platform is required. Motorola has advised Verizon Wireless that it could potentially deliver this new platform in Software Release 17, which is scheduled for FOA in 2003.

²⁵ The PSAP community has recently recognized the significance of the deployment of an interim technology in carriers' efforts to come "as close as possible" to meeting the FCC's rules. Further Comments of NENA, APCO and NASNA, CC Docket No. 94-102, filed July 19, 2001.

D. In Addition to AGPS/AFLT, Verizon Wireless Will Deploy A Network Hardware Technology In Three Metropolitan Areas On An Interim Basis Beginning This Fall.

During May and June, 2001, a team of Verizon Wireless engineers and other personnel worked for weeks with the Greater Harris County Sheriff's Department in Houston, Texas, and three vendors – Grayson Wireless (PDE), Lucent (switching and cell sites), and Intrado (SCC) (Mobile Positioning Center database) – to install and test for the first time a single network-based location technology in an end-to-end, real-world test environment. While Verizon Wireless has determined that the AGPS/AFLT handset solution is the preferable technology for Phase II E911, it also commits to complete the full deployment of the Grayson-Lucent-Intrado network technology in those communities in which the network uses Lucent switching, where the Intrado technology has been deployed for Phase I E911, and where PSAPs are Phase II-capable. It commits to installing the cell site hardware, using Grayson equipment, and completing the network upgrades, in all of these markets, until the AGPS/AFLT network technology is deployed and modified handsets are available to customers in these markets. This will provide what may be the first Phase II E911 service to PSAPs anywhere in the nation and is an effective transitional step.

Verizon Wireless will first complete the cell site hardware and network upgrades to serve the St. Clair County, Illinois 911 Department (East St. Louis), and the Lake County, Indiana Sheriff's Department (Gary and East Chicago, Illinois). Verizon Wireless intends to deploy the Lucent-Grayson-Intrado technology for these PSAPs to cover 50 percent of their areas by October 1, 2001, and complete deployment to 100 percent of those areas by April 1, 2002. In addition, Verizon Wireless intends to deploy

this technology for the PSAPs in Cook County, Illinois (Chicago), St. Louis County, Missouri (St. Louis), and for several other PSAPs, to cover 100 percent of the areas served by the those PSAPs by April 1, 2002. Finally, it will convert its test system and complete the deployment to 100 percent of the area served by the Harris County PSAP (Houston) by that date.

This commitment will involve equipping more than 400 individual cell sites, at a cost of millions of dollars to the Company. It will, however, provide network-based ALI to all of these PSAPs and thus will provide information for the PSAPs to locate any Verizon Wireless customer placing a 911 call in these major metropolitan areas. It is important to note that, even under the rules, the 100 percent buildout requirement would not be required until much later, at least until October 2002, eighteen months after the PSAPs' requests. These counties would thus have upgraded ALI capability far in advance of what the rule requires. The following chart shows the planned deployment dates for this interim technology in these communities:

	State	County	PSAP
		50% Deployment for 10/1/01, 100% by 4/1/02	
1	IL	St Clair	St. Clair County 911
2	IN	Lake	Lake County Sheriff
		100% Deployment for 4/1/02	
1	IL	Cook	Cook County ETSB
2	IL	Cook	Chicago Office of Emergency Communications
3	IL	Madison	Madison County ETSB
4	IL	Cook/DuPage	Village of Schaumburg Police Department
5	MO	Saint Louis	Saint Louis County PD
6	TX	Harris	Greater Harris County ECD