Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993	)	WT Docket No. 04-111
	)	
Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services	)	

NINTH REPORT

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By the Commission: Chairman Powell issuing a statement; Commissioner Copps concurring and issuing a statement.

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I. EXECUTIVE SUMMARY

1. This report reviews competitive market conditions with respect to commercial mobile radio services ("CMRS") using a framework that groups indicators of the status of competition into four categories: (1) market structure; (2) carrier conduct; (3) consumer behavior; and (4) market performance. The report also examines a number of related topics of interest to the Commission, including urban-rural and international comparisons, wireless-to-wireline competition, and Wi-Fi.

2. In this report the Commission concludes that there is effective competition in the CMRS marketplace. Among the indicators of market structure that form the basis for this conclusion, we note that 97 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service, up from 95 percent in the previous year, and up from 88% in 2000, the first year for which these statistics were kept. In addition, there were somewhat larger increases in the percentage of the U.S. population living in counties with access to 4 or more, 5 or more, 6 or more, and 7 or more different mobile telephone operators in the past year. These increases indicate that competition is robust in terms of the current number of competitors per market, and also that spectrum availability and other key determinants of entry conditions are favorable to continued competitive entry at the local level.

3. With respect to carrier conduct, the record indicates that competitive pressures continue to compel carriers to introduce innovative pricing plans and service offerings, and to match the pricing and service innovations introduced by rival carriers. Price rivalry is evidenced by the continued expansion of pricing innovations such as free night and weekend minutes and free mobile-to-mobile calling among an individual carrier's customers. A notable example of non-price rivalry is that several mobile operators have recently introduced push-to-talk ("PTT") services to compete with Nextel's signature PTT offering. In addition, the deployment of competing technological standards continues to be an important dimension of non-price rivalry in the U.S. mobile telecommunications market. The carriers using TDMA/GSM as their second-generation digital technology continue deploying or planning to deploy the next-generation technologies on the GSM migration path, including General Packet Radio Services ("GPRS"), Enhanced Data Rates for GSM Evolution ("EDGE"), and eventually Wideband CDMA ("WCDMA"). Similarly, many CDMA carriers have been upgrading their networks to CDMA2000 1xRTT, and both Verizon Wireless and Sprint PCS have begun deploying a high-speed wireless data network using CDMA2000 1X EV-DO (evolution-data only, "EV-DO"), the next step in the CDMA migration path after 1xRTT. In addition to investing in network deployment and upgrades, certain carriers have continued to pursue marketing strategies designed to differentiate their brands from rival offerings with regard to various aspects of network performance such as geographic coverage, voice quality, and wireless data speeds.

4. Indicators of market performances show that competition continues to afford many significant benefits to consumers. Consumers continue to contribute to pressures for carriers to compete on price and other terms and conditions of service by freely switching providers in response to differences in the cost and quality of service. Average monthly churn rates remain at about 1.5 to 3.5 percent per month. In addition, the implementation of local number portability ("LNP") beginning in November 2003 has lowered consumer switching costs by enabling wireless subscribers to keep their phone numbers when changing wireless providers. While to date the advent of LNP does not appear to have resulted in an increase in churn, there is evidence to suggest that competitive pressure on carriers to retain existing customers has increased as a result of LNP.

5. In the 12 months ending December 2003, the United States mobile telephony sector increased

subscribership from 141.8 million to 160.6 million, raising the nationwide penetration rate to approximately 54 percent of the population. Mobile subscribers continued to increase the amount of time they spend talking on their mobile phones, with average minutes of use per subscriber per month rising to more than 500 minutes in the second half of 2003 from 427 minutes in 2002 and 255 minutes in 2000. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages ("SMS"), the popularity of text messaging and other handset-based leisure and entertainment applications increased during 2003 as evidenced by, among other indicators, a steep rise in the volume of SMS traffic and an increase in the estimated percentage of U.S. mobile subscribers considered to be casual data users. Evidence on mobile pricing trends is somewhat mixed, with two different indicators of mobile pricing - revenue per minute and the cellular Consumer Price Index ("CPI") - continuing to drop, and a third indicator based on the consumption patterns of hypothetical users showing a slight increase in the cost of mobile service from $35.70 in 2002 to $36.46 in 2003. Nevertheless, international comparisons indicate that mobile voice calls are still far less expensive on a per minute basis in the United States than in Western Europe.

II. INTRODUCTION

A. Background

6. In 1993, Congress created the statutory classification of Commercial Mobile Services[1] to promote the consistent regulation of mobile radio services that are similar in nature.[2] At the same time, Congress established the promotion of competition as a fundamental goal for CMRS policy formation and regulation. To measure progress toward this goal, Congress required the Federal Communications Commission ("FCC" or "Commission") to submit annual reports that analyze competitive conditions in the industry.[3] This report is the ninth of the Commission's annual reports[4] on the state of CMRS

[1] Commercial Mobile Services came to be known as the Commercial Mobile Radio Services, or "CMRS." CMRS includes a large number of terrestrial services and some mobile satellite services. *See* 47 C.F.R. § 20.9(10).

[2] The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b), amending the Communications Act of 1934 and codified at 47 U.S.C. § 332(c). As in the past, this report bases its analysis on a consumer-oriented view of wireless services by focusing on specific product categories, regardless of their regulatory classification. In some cases, this includes an analysis of offerings outside the umbrella of "services" specifically designated by the Commission as CMRS. However, because providers of these other services can compete with CMRS providers, the Commission believes that it is important to consider them in the analysis. As the Commission said, paraphrasing the Department of Justice/Federal Trade Commission guidelines on merger review, "When one product is a reasonable substitute for the other in the eyes of consumers, it is to be included in the relevant product market even though the products themselves are not identical." Application of Echostar Communications Corporation, General Motors Corporation, and Hughes Electronics Corporation (Transferors) and Echostar Communications Corporation (Transferee), *Hearing Designation Order*, 17 FCC Rcd 20559, 20606 (2002).

[3] 47 U.S.C. § 332(c)(1)(C).

[4] *See* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *First Report*, 10 FCC Rcd 8844 (1995) ("*First Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Second Report*, 12 FCC Rcd 11266 (1997) ("*Second Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, 13 FCC Rcd 19746 (1998) ("*Third Report*");

competition.[5]

7. The statute requiring the annual report on CMRS competition states,

> The Commission shall review competitive market conditions with respect to commercial mobile services and shall include in its annual report an analysis of those conditions. Such analysis shall include an identification of the number of competitors in various commercial mobile services, an analysis of whether or not there is effective competition, an analysis of whether any of such competitors have a dominant share of the market for such services, and a statement of whether additional providers or classes of providers in those services would be likely to enhance competition.[6]

8. With the *Ninth Report*, we continue to comply with each of the four statutory requirements for analyzing competitive market conditions with respect to commercial mobile services. As in previous reports, we base our analysis of competitive market conditions on a range of standard indicators commonly used for the assessment of effective competition. We also enhance our analysis by reorganizing the presentation of the various indicators to conform to a framework that groups such indicators into four distinct categories (A) Market Structure, (B) Carrier Conduct, (C) Consumer Behavior, and (D) Market Performance. Use of this framework has the advantage of providing a systematic approach to addressing the four statutory requirements. Thus, Section III identifies the number of competitors in various commercial mobile services as part of the analysis of market structure. Moreover, as in previous reports, this report addresses the issue of whether any competitor has a dominant share of the market based on a comprehensive analysis of market structure, carrier conduct, consumer behavior and market performance. With respect to market structure, Section III.C provides concentration measures based on subscriber market shares for particular geographic areas, and Section III.E assesses entry conditions. In addition, Sections IV, V and VI determine whether, in light of the structural conditions examined in Section III, any single carrier has the ability to act anti-competitively by examining, among other things, various indicators of price- and non-price rivalry, consumer switching

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Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145 (1999) ("*Fourth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fifth Report*, 15 FCC Rcd 17660 (2000) ("*Fifth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Sixth Report*, 16 FCC Rcd 13350 (2001) ("*Sixth Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Seventh Report*, 17 FCC Rcd 12985 (2002) ("*Seventh Report*"); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eighth Report*, 18 FCC Rcd 14783, ¶ 124 (2003) ("*Eighth Report*"). The reports can also be found on the FCC's website at <http://wireless.fcc.gov/cmrs-crforum.html>.

[5] This report, like the others before it, discusses CMRS as a whole because Congress called on the Commission to report on "competitive market conditions with respect to commercial mobile services." 47 U.S.C. § 332(c)(1)(C). Any individual proceeding in which the Commission defines relevant product and geographic markets, such as an application for approval of a license transfer, may present facts pointing to narrower or broader markets than any used, suggested, or implied in this report.

[6] 47 U.S.C. § 332 (c)(1)(C).

behavior and pricing trends.

9. Section II.E presents our assessment of whether or not there is effective competition, drawing on the more detailed and comprehensive analysis of the various indicators of competitive market conditions in the body of the report. Section II.E also addresses the final statutory requirement to provide a statement of whether additional providers would likely enhance competition.

B. Sources of Information

10. Since the release of the *Eighth Report*, the Commission has expanded its efforts to improve the quality and granularity of the data used to examine competition in the CMRS industry. In March 2004, the Commission released a Notice of Inquiry ("*Ninth CMRS NOI*") seeking data and information on the status of competition in the CMRS industry.[7] The Commission requested data based on several metrics, including subscribership, penetration rates, usage, average revenue per unit ("ARPU"), pricing, quality of service, and service availability,[8] For each of these metrics, it requested data on whether they varied between urban and rural areas as well as among different demographic groups.[9] In order to enhance our analysis of CMRS service availability and competition, the Commission asked service providers to submit their coverage maps in an electronic, mapable format and to distinguish between the areas where they offer coverage to subscribers and the areas where they market service to new customers.[10] The *Ninth CMRS NOI* also requested comment on how the Commission should define "rural" for purposes of its analysis of CMRS competition.[11] Furthermore, the *Ninth CMRS NOI* asked for information on wireless-wireline competition, mobile telecommunications costs, mobile telephone service resellers, mobile data service availability, and satellite providers.[12]

11. Eight parties submitted comments or reply comments in response to the *Ninth CMRS NOI.*[13] Three commenters stated that the CMRS marketplace is competitive and cited the data presented in

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[7] Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 04-111, *Notice of Inquiry*, 19 FCC Rcd 5608 (2004) ("*Ninth CMRS NOI*"). *See also*, Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 02-379, *Notice of Inquiry*, 17 FCC Rcd 24923 (2002) ("*Eighth CMRS NOI*").

[8] *Ninth CMRS NOI*, at 5610.

[9] *Id.*

[10] *Id.*, at 5615-5616.

[11] *Id*. *See also*, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, WT Docket No. 02-381, *Notice of Inquiry*, 17 FCC Rcd 25554 (2002) ("*Rural NOI*") (Commission sought comment on whether and how it could modify its policies to promote the further development and deployment of spectrum-based services in rural areas).

[12] *Ninth CMRS NOI*, at 5616, 5617, 5627, and 5631.

[13] *See* Appendix C for a list of parties that filed comments in response to the *Ninth CMRS NOI.*

previous reports as evidence of that assertion.[14] Some commenters also noted that the publicly-available data on the industry that is included in our reports is sufficient for analyzing CMRS competition.[15] Furthermore, some commenters addressed the issue of the extent of competition in rural areas, and offered suggestions on how to define rural for purposes of this report.[16] Such statements and suggestions have been integrated into this report. Other commenters provided input on the extent to which Mobile Virtual Network Operators ("MVNOs") and resellers compete in the CMRS industry.[17] On the other hand, many of the questions posed in the *Ninth CMRS NOI* were not directly addressed in the comments. For example, the Commission received from commenters little new data on subscribership, ARPU, usage, churn, or pricing on a national or sub-national level, or broken down by demographic groups or urban/rural areas. In addition, service providers did not submit maps of their coverage areas or distinguish between areas where they provide coverage and areas where they market service.

12. Prior to the *Seventh Report*, the Commission based its analysis of competition in the CMRS industry solely on numerous publicly-available sources of data on the industry. These sources included: company filings with the Securities and Exchange Commission ("SEC"), data compiled and released by trade associations and by other government agencies, reports by securities analysts and other research companies and consultants, company news releases and web sites, newspaper and periodical articles, and the Commission's Universal Licensing System ("ULS") database. In the *Seventh Report*, the Commission added two new sources of information: the Numbering Resource Utilization / Forecast ("NRUF") database, described below, and information submitted at a Public Forum held at the Commission.[18] Nevertheless, we continue to rely primarily on the aforementioned publicly-available sources and believe that they, when taken together, allow us to analyze the extent of competition in the industry on a nationwide basis. Because many of these publicly-available sources report national averages that reflect trends in the nation as a whole or in urban markets, they may provide limited insight into the extent of competition in particular geographic markets, including markets located in rural areas. However, the

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[14] *See* Cellular Telecommunications & Internet Association, *NOI Comments*, at ii, 45 (filed Apr. 26, 2004) ("*CTIA Comments*"); Rural Cellular Association, *NOI Comments*, at 3 (filed Apr. 26, 2004) ("*RCA Comments*"); Sprint Corporation, *NOI Reply Comments*, at 5-6 (filed May 10, 2004) ("*Sprint Reply Comments*").

[15] *CTIA Comments*, at ii, 3; *Sprint Reply Comments*, at 4.

[16] Blooston, Mordkofsky, Dickens, Duffy & Prendergast, *NOI Comments*, at 7 (filed Apr. 26, 2004) ("*Blooston Carrier* Comments"); RCA Comments at 5-6; Rural Telecommunications Group, Inc., *NOI Reply Comments,* at 2-3 (filed May 10, 2004) ("*RTG Reply Comments*").

[17] *CTIA Comments*, at 21-2; Virgin Mobile USA, LLC, *NOI Comments*, at 3 (filed Apr. 26, 2004) ("*Virgin Mobile Comments*").

[18] The Public Forum was held in order to examine ways in which to better gather and analyze data for its reports, in particular data regarding the development of competition in rural and underserved areas. *See* Wireless Telecommunications Bureau Announces Agenda and Speakers For Public Forum For The 7th Annual Commercial Mobile Radio Services Competition Report, *Public Notice*, DA 02-422 (rel. Feb. 25, 2002). *See* FCC, *Commercial Mobile Radio Services (CMRS) Competition Report Public Forum,* <http://wireless.fcc.gov/cmrs-crforum.html> for access to participants' presentations and forum transcript. The direct link to the forum transcript is <http://wireless.fcc.gov/services/cmrs/presentations/020228.pdf> ("*Transcript*"). Forum participants not only provided additional data, including data on the average price of mobile telephone service in rural areas, but also presented suggestions on how to analyze data more effectively. Research organizations and agencies offered insight into the methodologies they use to gather and analyze data, and the wireless carriers offered anecdotes on the competitive pressures that their companies face. The Commission incorporated these data, suggestions, and insights into the *Seventh Report*.

NRUF data and the information submitted in response to the *Ninth CMRS NOI* have enabled us to conduct a more granular analysis of competition on a regional level and also for the purposes of comparing urban and rural areas.

13. In order to further uphold the integrity of our data on CMRS competition, we include, in many places, multiple data sources to report on the same metric or depict the same trend. For example, this report and previous reports have included data from three separate sources – the U.S. Department of Commerce Bureau of Labor Statistics ("BLS"); economic research and consulting firm, Econ One; and the Cellular Telecommunications and Internet Association ("CTIA") – on the average price of mobile telephone service.[19] In addition to using multiple sources for many metrics, we also emphasize that some of the sources upon which we rely, particularly SEC filings, are required by law to be accurate, and are scrutinized by independent third parties. The CTIA metrics used in the report are compiled and aggregated by an independent third party in a manner that protects carrier confidentiality, provides an incentive for carrier participation, and maintains the integrity of the results.[20] Furthermore, other carrier-reported data included in the report, such as coverage maps, are subject to contractual obligations with customers. Because all carrier-reported data is compiled by the carriers themselves and typically released in the aggregate to protect confidentiality, we are unable to have in-depth knowledge of the minutia of such data. However, we believe it is appropriate to use these sources in our analysis of CMRS competition for the reasons stated above.

14. As mentioned above, the *Seventh Report* integrated a new source of data collected through an FCC order, the NRUF database.[21] The NRUF data tracks phone number usage by all telecommunications carriers, including wireless carriers, in the United States. All mobile wireless carriers must report to the FCC the quantity of their phone numbers that have been assigned to end users, thereby permitting the Commission to make an accurate estimate of the total number of mobile subscribers. As in the *Seventh Report*, we continue to use the NRUF data to determine the total number of mobile telephone subscribers and paging subscribers.[22] In addition, because we collect NRUF data on a small, rate center area basis,[23] we can use this information to estimate mobile telephone subscribership levels and penetration rates on a regional basis in addition to a national basis. In the *Seventh Report*, the Commission therefore began reporting mobile telephone penetration rates on an Economic Area ("EA") basis and continues to report them in this manner in this report.[24] Finally, beginning with this *Ninth Report*, we use NRUF data for the

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[19] *See* Section VI.A.1, Pricing Trends, *infra.*

[20] *See* CTIA, *Wireless Industry Indices: Semi-Annual Data Survey Results* (results through December 2003) ("*Dec 2003 CTIA Survey*"). *See* note 465, *infra*, for a discussion of data reported by CTIA.

[21] *See* Section VI.B.1, Subscriber Growth, *infra*, for a further discussion of NRUF data. Carriers submit the data to NeuStar, Inc., who consolidate the data into a database and supply it to the Commission upon request.

[22] *See Seventh Report*, at 13005, 13049.

[23] Rate centers are small geographic areas used by local exchange carriers for a variety of reasons, including the determination of toll rates. *See* Harry Newton, NEWTON'S TELECOM DICTIONARY: 16TH EXPANDED & UPDATED EDITION, CMP Books, July 2000, at 732. Urban rate centers are generally smaller than rural rate centers. The smallest rate centers are a few square miles in size, while some rural rate centers are hundreds of square miles in size. Rate centers are generally smaller than counties: there are roughly 18,000 rate centers in the United States, compared to 3,000 counties.

[24] *See* Section VI.B.4, Sub-National Penetration Rates, *infra*. EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephony

first time to measure market concentration on an EA basis. In particular, the subscriber market shares we use to calculate the Herfindahl-Hirschman Index ("HHI") for EAs are based on NRUF data.[25] However, although we are using EAs to calculate both sub-national penetration levels and HHIs for the purposes of this report, this does not mean that we find the EA to be a relevant geographic market for other purposes.

15. One of the most important metrics that the Commission has tracked since 1995 is the number of facilities-based mobile telephone carriers providing service in a particular geographic area.[26] To track service launches by broadband Personal Communications Services ("broadband PCS" or "PCS") and Specialized Mobile Radio ("SMR") operators, the Commission has analyzed publicly-available information released by the operators, such as news releases, filings with the SEC, coverage maps available on operators' Internet sites, and filings with the Commission. The Commission has based its analysis of cellular coverage on cellular licensees' service area boundary maps, which are filed with the Commission. The Commission began tracking service launches on a BTA-by-BTA[27] basis in 1995, but switched to the more detailed, county-by-county basis in the *Fifth Report* in an effort to improve accuracy and significantly reduce the level of overcounting.[28] It has derived from these data the number of competitors operating in every U.S. county and hence the percentage of the U.S. population living in areas with a certain number of competitors.[29] These data have also been used to derive the percentage of the U.S. population living in counties with digital coverage. As mentioned in previous reports, there are several important caveats to note when considering the data. First, to be considered as "covering" a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of

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penetration rates for two reasons. First, the defining aspect of mobile telephony is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far as possible, the place of work and the place of residence of its labor force. Thus, an EA may capture the market where the average person would shop for and purchase his or her mobile phone – near home, near the workplace, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas. In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence (but generally still in the same EA). *See Seventh Report*, at 13005.

[25] *See* Section III.C.2, Concentration Measures for Mobile Telephony Services, *infra*.

[26] *See* Section III.C.1, Number of Mobile Telephony Competitors, *infra.*

[27] Basic Trading Areas ("BTAs") are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an agreement with the Federal Communications Commission. BTAs are geographic areas drawn based on the counties in which residents of a given BTA make the bulk of their shopping goods purchases. Rand McNally's BTA specification contains 487 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission added additional BTA-like areas for: American Samoa; Guam; Northern Mariana Islands; San Juan, Puerto Rico; Mayagüez/Aguadilla-Ponce, Puerto Rico; and the U.S. Virgin Islands.

[28] BTAs can be sub-divided into counties. The United States is made up of approximately 3,200 counties versus 493 BTAs.

[29] For a complete list of cellular and PCS licenses on a county-by-county basis, *see* FCC Wireless Telecommunications Bureau, *Broadband PCS Data*, <http://wireless.fcc.gov/services/broadbandpcs/data/>; FCC Wireless Telecommunications Bureau, *Cellular Services Data*, <http://wireless.fcc.gov/services/cellular/data/>.

that county. Third, the figures for POPs[30] and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage. Therefore, our analysis overstates to some unknown and unavoidable degree the total coverage in terms of both geographic areas and population covered. On the other hand, we believe our analysis to be the most accurate in the industry today given the coverage data that is publicly available.

16. Another more general limitation of the Commission's analysis of the number of facilities-based mobile telephone carriers providing service in a particular geographic area is that it does not account for differences in the market shares of mobile telephone carriers. As indicated above, however, the *Ninth Report* supplements the analysis of the number of mobile telephone carriers with the measurement of concentration using HHIs calculated based on subscriber market shares for EAs. The value of HHI reflects both the number of market competitors and the distribution of their market shares.

C. Structure of Report

17. As noted above, we have modified the structure of the *Ninth Report* to conform to a framework that groups the indicators of competitive market conditions into four distinct categories (A) Market Structure, (B) Carrier Conduct, (C) Consumer Behavior, and (D) Market Performance. The section on market performance evaluates the outcomes of competitive conditions in the CMRS industry from the consumer's point of view, focusing on the benefits to consumers of competition such as lower prices, higher quality, greater variety, and more rapid innovation. In contrast, the sections on market structure, carrier conduct, and consumer behavior examine the various structural and behavioral determinants of such market outcomes.

18. In using this framework to analyze competitive market conditions with respect to commercial mobile radio services, we have integrated the discussion and analysis of mobile voice and mobile data services within each of the four categories of indicators. As stated in previous reports, mobile voice and mobile data services are no longer clearly delineated in the marketplace.[31] Many mobile voice operators also offer mobile data services using the same spectrum, network facilities, and customer equipment. Furthermore, many U.S. mobile carriers have integrated the marketing of mobile voice and data services. For these reasons, we find it reasonable to analyze competitive conditions with respect to these services together.[32] As in previous reports, we continue to identify, and to distinguish from such integrated mobile carriers, mobile data providers that offer only mobile data services, instead of both voice and data services, including those providers that offer such data-only services on networks distinct from those traditionally used to provide mobile voice. However, we analyze competitive conditions with respect to the services provided by integrated mobile carriers and data-only providers together, rather than treating mobile data services and data-only service providers in a separate section of the report.

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[30] POPs is an industry term referring to population, usually the number of people covered by a given wireless license or footprint. One "POP" equals one person.

[31] *See Eighth Report*, at 14792.

[32] Although we integrate the analysis of mobile voice and data services for the reasons indicated here, below we define separate product markets for mobile voice services and mobile data services. *See* Section III.A, Services and Product Market Definition, *infra*. Accordingly, our integration of the analysis of mobile voice and data services in the context of this report should not be taken as an indication that the Commission will consider mobile voice and data services as belonging in the same product market in a different context.

19. As in previous reports, the *Ninth Report* includes an analysis of wireless-to-wireline competition. However, since such "intermodal" competition is distinct from "intra-modal" competition among the various wireless carriers, we have placed our analysis of wireless-to-wireline competition in a separate section on intermodal issues (Section VII), following the sections on market structure, carrier conduct, consumer behavior and market performance within the CMRS industry. In addition to the analysis of wireless-to-wireline competition, Section VII also provides an analysis of Wireless Fidelity, or Wi-Fi. Although both CMRS and Wi-Fi are wireless services, Wi-Fi relies on a different wireless technology and spectrum model than CMRS, and it has the potential to act as a substitute as well as a complement to data services offered over mobile telephone networks.

D. Industry Development

20. During 2003, the CMRS industry continued to experience increased service availability, intense price competition, innovation, and a wider variety of service offerings.[33] The mobile telephony sector of CMRS has shown significant growth, and mobile data services have begun to play a more significant role in the CMRS industry. In the 12 months ending December 2003, the mobile telephony sector generated over $88 billion in revenues,[34] increased subscribership from 141.8 million to 160.6 million,[35] and produced a nationwide penetration rate of roughly 54 percent.[36] For some mobile telephone operators, data services now make up 2 to 5 percent of revenues.[37]

21. To date, 276 million people, or 97 percent of the total U.S. population, live in counties with access to three or more different operators (cellular, broadband PCS, and/or digital SMR providers) offering mobile telephone service, a slight increase from what the Commission found in the *Eighth Report*.[38] Almost 250 million people, or 88 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service.[39] Mobile telephone carriers continued to upgrade their networks with next generation technologies that allow them to offer mobile data services at higher data transfer speeds.[40] To date, operators are offering services over these next generation networks in at least some portion of U.S. counties containing 279 million people, or 98 percent of the U.S. population.[41]

22. Mobile telephone carriers continued to offer a variety of handset-based mobile data

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[33] "Increased service availability" refers to the increase in the population living in counties served by 3 or more, 4 or more, 5 or more, 6 or more, and 7 or more CMRS providers. *See* Section III.C.1, Number of Mobile Telephony Competitors, *infra.*

[34] *See* Appendix A, Table 1, at A-2.

[35] *See* Section VI.B.1, Subscriber Growth, *infra*.

[36] *Id.*

[37] *See* Section IV.B.7, Mobile Data Services and Applications, *infra*.

[38] *See* Appendix A, Table 10, at A-11.

[39] *See* Appendix A, Table 5, at A-9.

[40] *See* Section IV.B.1.c Technology Choices and Upgrades of Mobile Telephony Carriers, *infra*.

[41] *See* Section IV.B.1.d, Coverage by Technology Type, *infra.*

applications to consumers during the past year, including text messaging services (also called short messaging services, or "SMS"), multimedia messaging services ("MMS") such as photo messaging, and entertainment applications such as downloadable ring tones and games. These data services continued to grow in popularity. It is estimated that today almost 25 percent of U.S. mobile subscribers can be considered casual data users, most of whom use SMS and some of whom use picture mail, download ring tones or do simple web surfing.[42] Mobile telephone carriers and other mobile data providers also continued to offer large mobile Internet access service packages designed for data-centered laptop and PDA users in the past year, but demand for such bulk wireless data services remained weak due to the limited coverage to date of high-speed wireless data networks and the slow speeds, relative to fixed broadband, of wireless network technologies that are widely available today.[43] Finally, as in the previous four years the use of paging devices continued to decline in the past year.[44]

E. Status of Competition

23. An assessment of effective competition in telecommunications markets requires an analysis of various indicators of market structure, carrier conduct, consumer behavior, and market performance. This report will examine the behavioral as well as the structural characteristics of CMRS markets to determine whether there is effective competition in the CMRS marketplace.

24. The indicators and analysis that form the basis for our conclusion on the status of competition are detailed in the main body of this report. Here we highlight some of the indicators that show clear improvement in competitive conditions in the past year, beginning with indicators of market structure. In addition to the aforementioned slight increase in the percent of the total U.S. population living in counties with access to 3 or more different operators as compared with what the Commission found in the *Eighth Report*, there were somewhat larger increases in the percent of the U.S. population living in counties with access to 4 or more, 5 or more, 6 or more, and 7 or more different operators in the past year.[45] These increases not only suggest that competition is fairly robust in terms of the current number of competitors per market, but they also demonstrate that competitive entry continues to occur at the county level despite possible entry barriers.

25. In the category of carrier conduct, it is noteworthy that several mobile operators have recently introduced push-to-talk ("PTT") services to compete with Nextel's rival PTT offering, an indication of increased non-price rivalry.[46] As far as consumer behavior is concerned, the implementation of local number portability ("LNP") has lowered consumer switching costs by enabling wireless subscribers to keep their phone numbers when changing wireless providers. While to date the advent of LNP does not appear to have resulted in an increase in wireless churn, it does appear to have increased competitive pressures on CMRS carriers with regard to existing customers as evidenced by the aggressive customer retention efforts launched by carriers in anticipation of LNP.[47]

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[42] See Section VI.B.1 Subscriber Growth, *infra*.

[43] *See* Section VI.B.3, Mobile Data Usage, *infra*.

[44] *See* Section VI.B.1, Subscriber Growth, *infra*.

[45] *See* Appendix A, Table 10, at A-11.

[46] *See* Section IV.B.6, Provision of Ancillary Services and Promotional Offers, *infra.*

[47] *See* Section V.B.2, Local Number Portability, *infra.*

26. With respect to market performance, the increased benefits to consumers afforded by competition are evidenced by the increase in the number of mobile subscribers noted above and also greater usage of mobile handsets not only for voice calls but also for new data applications such as text and photo messaging. Evidence on mobile pricing trends is somewhat mixed, with two different indicators of mobile pricing - revenue per minute and the cellular Consumer Price Index ("CPI") - continuing to drop, and a third indicator based on the consumption patterns of hypothetical users showing a slight increase in the cost of mobile service from 2002 to 2003.[48] Nevertheless, mobile voice pricing is far less expensive per minute in the United States than in European mobile markets.[49]

27. Based on an analysis of these and other indicators detailed in the body of the report, we conclude that there is effective competition in the CMRS marketplace. Regarding rural areas specifically, we also conclude that CMRS providers are competing effectively in such areas. Moreover, while it appears that, on average, a smaller number of operators are serving rural areas than urban areas, this difference does not necessarily indicate that effective CMRS competition does not exist in rural areas.[50] On the contrary, as discussed in more detail below, *Ninth CMRS NOI* commenters provide evidence that, despite the differing structure of rural markets, effective CMRS competition does exist in rural areas.[51]

28. As previously mentioned, the final statutory requirement in analyzing competitive market conditions with respect to CMRS is to provide a statement of whether additional providers would likely enhance competition. By way of addressing this requirement, we reiterate that, based on information on launches by county, additional providers are still entering the mobile telephone market at the county level, including some start-ups as well as operators that have previously launched mobile telephone service in other parts of the country, and that, in doing so, these additional providers presumably are enhancing competition. In addition, one of the more recent examples of entry by a new start-up occurred in an innovative niche market rather than in relatively mature CMRS markets such as mobile telephone service. In particular, Space Data Corporation acquired narrowband PCS licenses in two FCC auctions in September 2003 and has since launched its commercial telemetry service using its patented balloon-based SkySite™ technology.[52]

III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE

29. The analysis in this section covers two distinct aspects of mobile telecommunications market structure. The first is the current level of horizontal concentration as reflected in the number of carriers competing in the various mobile service markets and their respective market shares. The second is the ease or difficulty of entry into the various mobile service markets, with particular emphasis on the way

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[48] *See* Section VI.A.1, Pricing Levels and Trends, *infra.*

[49] *See* Section VI.E, International Comparisons, *infra*.

[50] *See* Section III.F.1, Geographical Comparisons: Urban vs. Rural, *infra*; *Seventh Report*, at 13024.

[51] *See* Section III.F.1, Geographical Comparisons: Urban vs. Rural, *infra.*

[52] *See* Section III.B.3, Data-Only Providers, *infra,* S*ection* III.E.1.b, Narrowband Spectrum, *infra*, and Section IV.B.1.e, Data-Only Networks and Technology Deployment, *infra*.

spectrum allocation and availability affect entry conditions and barriers to entry.

30. As background to the discussion of horizontal concentration and entry conditions, Sections III.A and III.B provide an overview of the various types of CMRS services and service providers. Following the analysis of the current level of horizontal concentration in Section III.C, Section III.D examines recent or impending transactions that affect, or have the potential to affect, the level of horizontal concentration. Section III.E examines entry conditions. The final section, III.F, addresses structural differences between rural and non-rural mobile telecommunications markets in the United States.

A. Services and Product Market Definition

31. Since CMRS encompasses a variety of terrestrial and satellite services, an important initial step in analyzing the structure of the mobile telecommunications market is to define the relevant product market for each of these services. The basic economic principle for defining the scope of the relevant product market is to include two mobile services in the same product market if they are essentially interchangeable from the perspective of most consumers – that is, if consumers view them as close substitutes. For the purposes of this report, relatively narrow product market definitions will be used, with a separate product market identified for each of the following services: interconnected mobile voice; interconnected mobile data; and mobile satellite service. However, the identification of separate markets for each service in the context of this report does not preclude the possibility that, in a different context, the Commission may find that two or more of these services belong in the same product market. The Commission may also find that certain types of mobile voice or data services (for example, nationwide calling plans, paging services) constitute a separate relevant product market, or that consumer demand for bundled packages of interconnected mobile voice and mobile data services make it appropriate to define one or more separate markets for bundled mobile services.

32. This report defines the mobile telephone sector to include all operators that offer commercially available, interconnected mobile voice services. These operators provide access to the public switched telephone network ("PSTN") via mobile communication devices employing radiowave technology to transmit calls. As discussed below, providers using cellular radiotelephone, broadband PCS, and SMR licenses dominate this sector.[53]

33. For purposes of this report, mobile data service is considered to be the delivery of non-voice information to a mobile device. Two-way mobile data services include not only the ability to receive non-voice information on an end-user device but to send it from an end-user device to another mobile or landline device using wireless technology. The mobile data services currently available include paging, text messaging (also called short messaging service, or "SMS"), multimedia messaging services ("MMS") such as exchanging digital photos, information alerts, entertainment applications such as ring tones and games, web browsing, e-mail, access to files stored on corporate servers, and wireless telemetry.[54]

34. Although we decline to identify a separate market for paging services for the purposes of this report, as noted above this does not preclude the possibility that the Commission may find that paging

[53] *See* 47 C.F.R. §§ 22.900, 24.200, 90.601.

[54] Wireless telemetry is the use of wireless technology to monitor mobile or fixed equipment in a remote location, such as the remote monitoring of utility meters by utility and energy companies. *See Eighth Report*, at 14864-14865.

services constitute a separate product market, rather than a part of the broader market for mobile data services, in a different context. Traditional paging service consists of one-way data communications sent to a mobile device that alerts the user when it arrives. The communication typically consists of a phone number for the user to call, and can also contain other text-based information. As noted in the *Eighth Report*, mobile telephone carriers also offer paging services, as most digital mobile telephone handsets include a paging component and/or Caller ID feature that allow users to view the phone number of the person who has called them.[55] However, while paging carriers have faced competition from these types of features offered by mobile telephone carriers, traditional paging devices are generally less expensive, and paging networks have a more powerful signal strength which allows them to provide better underground and in-building coverage.[56] As discussed in the *Eighth Report*, paging carriers have been responding to these competitive advantages by targeting their services at a smaller market segment consisting mainly of commercial customers such as medical and emergency personnel and large industrial companies.[57] Nevertheless, paging carrier Metrocall Holdings, Inc. ("Metrocall") argued in comments submitted in response to the *Ninth CMRS NOI* that there is no distinct product market for paging services.[58] Metrocall claimed that consumers have found paging services to be interchangeable with other CMRS services, and that CMRS customers are increasingly substituting mobile telephony services and other wireless services for traditional paging services.[59] Metrocall particularly singled out short message service ("SMS") as competing directly with paging because it is offered at relatively inexpensive rates by all the major mobile telephony carriers.

35. Any mobile satellite service ("MSS") that involves the provision of commercial mobile radio service directly to end users is by statutory definition CMRS.[60] As detailed in the *Eighth Report*, the Commission permits MSS providers in the 2 GHz,[61] Big LEO,[62] and L-Band[63] frequency bands to provide an ancillary terrestrial component ("ATC") to their satellite systems, provided that the MSS licensee: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated ATC; (4) observes existing satellite geographic coverage requirements;

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[55] *See Eighth Report*, at 14846.

[56] *See Seventh Report*, at 13051; John Sullivan, *Motorola's Exit: Death Knell Or New Dawn For Paging Market?*, WIRELESS DATA NEWS, Dec. 19, 2001.

[57] *See Eighth Report*, at 14846.

[58] *See* Metrocall Holdings, Inc., *NOI Comments*, at 3.

[59] *Id*., at 3-9.

[60] 47 C.F.R. § 20.9(10). This rule section also contains an exception for "mobile satellite licensees and other entities that sell or lease space segment capacity, to the extent that it does not provide commercial radio service directly to end users." The exception permits such entities to provide space segment capacity to commercial mobile radio service providers on a non-common carrier basis, if authorized by the Commission.

[61] The 2 GHz MSS band refers to the 2000-2020 MHz uplink (Earth-to-space transmissions) and 2180-2200 MHz downlink (space-to-Earth transmissions) frequencies.

[62] The Big LEO (low-earth orbit) band MSS allocation consists of an uplink at 1610-1626.5 MHz and a downlink at 2483.5-2500 MHz and is sometimes referred to as the 1.6/2.4 GHz band.

[63] The L-Band has MSS allocations at 1525-1559 MHz (downlink) and 1626.5-1660.5 MHz (uplink).

and (5) limits ATC operations only to the authorized satellite footprint.[64] The *Satellite Flexibility Order* noted that, since terrestrial CMRS and MSS ATC are expected to have different prices, coverage, product acceptance and distribution, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments.[65] The Commission has received one application to add ATC to MSS satellite offerings, from Mobile Satellite Ventures ("MSV") in the L-Band.

B. Overview of Service Providers

1. Facilities-Based Mobile Telephony Providers

36. In the United States, there are six mobile telephone operators that analysts typically describe as nationwide: AT&T Wireless, Sprint PCS,[66] Verizon Wireless, LLC ("Verizon Wireless"),[67] T-Mobile,[68] Cingular Wireless, LLC ("Cingular Wireless" or "Cingular"),[69] and Nextel. When an operator is described as being "nationwide," it does not necessarily mean that the operator's license areas, service areas, or pricing plans cover the entire land area of the United States. The six mobile telephony carriers that analyst reports typically describe as nationwide all offer service in at least some portion of the western, midwestern, and eastern United States. In addition, each of the six national operators has networks covering at least 200 million people, while the next largest provider covers less than 60 million people.[70] In addition to the nationwide operators, there are a number of large regional players, including ALLTEL Corp. ("ALLTEL"), Western Wireless Corp. ("Western Wireless"), United States Cellular Corp. ("US Cellular"), and Dobson Communications ("Dobson").

37. Because the six nationwide mobile telephone operators as well as the large regional and numerous other smaller operators have different geographic footprints, they do not all compete head-to-head in each and every region and locality of the country. To provide an accurate count of the number of competitors in the market for mobile telephony services in compliance with the statutory requirement, it is

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[64] *See* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962, 1964 (2003) ("*Satellite Flexibility Order"*).

[65] *Flexibility Order*, at 1984.

[66] Sprint PCS is a division of Sprint Corp. ("Sprint"). *See* Sprint Corp., SEC Form 10-K, Mar. 9, 2004, at 4. Sprint recently recombined its tracking stocks, representing its wireless and wireline divisions, into one stock. *Combination of 'FON' and 'PCS' Tracking Stocks Completed*, News Release, Sprint, Apr. 23, 2004.

[67] Verizon Wireless is a joint venture of Verizon Communications, Inc. ("Verizon") and Vodafone Group PLC ("Vodafone"). Verizon owns 55 percent of Verizon Wireless, and Vodafone owns 45 percent. *See* Verizon Communications, Inc., SEC Form 10-K, Mar. 20, 2002, at 10.

[68] T-Mobile USA, formerly known as VoiceStream Wireless Corp., is a wholly-owned subsidiary of Deutsche Telekom AG ("Deutsche Telekom").

[69] Cingular Wireless is a joint venture of SBC Communications, Inc. ("SBC") and BellSouth Corporation ("BellSouth"). *See Sixth Report*, at 13363-64.

[70] Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Apr. 16, 2004, at 16 ("*Wireless 411*").

necessary as an initial step to define the scope of the geographic market more narrowly on a regional or local basis. For example, Section III.C.1 below identifies the number of mobile telephony competitors on a county-by-county basis.

2. Resale Providers

38. Resellers offer service to consumers by purchasing airtime at wholesale rates from facilities-based providers and reselling it at retail prices.[71] One *Ninth CMRS NOI* commenter suggested that wireless resale may serve to increase intermodal competition by "helping non-wireless carriers compete in the local exchange and interexchange markets by permitting these carriers to offer consumers a complete 'bundle' of telecommunications services."[72] According to information provided to the FCC in its ongoing local competition and broadband data gathering program, the resale sector accounts for approximately 6 percent of all mobile telephone subscribers.[73]

39. With the exception of TracFone Wireless Inc., which serves more than 3 million customers with prepaid offerings,[74] there appear to be few large independent resellers of wireless service.[75] In August 2003, Qwest Corporation ("Qwest") entered into an agreement with Sprint to resell Sprint wireless services, having decided to exit the facilities-based provision of wireless service.[76] Qwest began offering these Sprint services under its own brand name in March 2004.[77] AT&T Corp, former owner of AT&T Wireless, is also planning to reenter the mobile telephone market through resale.[78]

40. Two nationwide operators have partnered with third party resellers to market prepaid offerings aimed at the youth portion of the population. Virgin Mobile USA ("Virgin Mobile"), a joint venture between Sprint PCS and Richard Branson's Virgin Group, LLC, was launched in July 2002,

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[71] Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996). Resellers today are often referred to as MVNOs (Mobile Virtual Network Operators). MVNOs are distinguished from "traditional" resellers by "'brand appeal, distribution channels, and other affinities,' including the potential ability to bundle wireless services with other non-wireless products and services, as well as the ability to provide and support value-added services." *CTIA NOI Comments*, at 22.

[72] *CTIA NOI Comments*, at 21.

[73] *See* Appendix A, Table 2, at A-3.

[74] *TracFone Wireless Reaches 3 Million Customers and Lowers Airtime Rates for 2004*, News Release, TracFone Wireless, Inc., Feb. 3, 2004.

[75] CTIA suggests that the existence of relatively few resellers today may be due to the growth of and intense competition between facilities-based wireless operators. *See CTIA NOI Comments*, at 20.

[76] *See* III.D.4, *infra*.

[77] *Id*.

[78] Shawn Yound and Almar Latour, *A New Cellphone With an Old Name*, WALL STREET JOURNAL, May 6, 2004, at B1. AT&T's Chairman has said that AT&T would enter the wireless market once the current AT&T Wireless is absorbed by Cingular (AT&T has the right to the AT&T Wireless brand name if AT&T Wireless is acquired by Cingular). *Id*.; COMMUNICATIONS DAILY, May 19, 2004. In May 2004, AT&T reached an agreement with Sprint to offer wireless service over Sprint's wireless network. *AT&T Reaches Wireless Deal With Sprint*, AP NEWSWIRE, May 18, 2004.

targeting its prepaid offerings at the youth market.[79] The venture has gained more than 1.75 million subscribers through March 2004.[80] Similarly, Nextel, in conjunction with an Australia-based company, is offering a prepaid service targeted at the teenage market.[81] The service, under the "Boost Mobile" brand name, trialed initially in California and Nevada, and is now available in 16 states.[82] As of Dec. 31, 2003, Nextel had about 400,000 subscribers on Boost Mobile prepaid plans.[83]

3. Data-Only Providers

41. Non-voice services are offered by paging/messaging carriers as well as by mobile telephone carriers. Paging/messaging carriers provide these services using paging and narrowband PCS networks and spectrum, and paging/messaging devices or units. On April 9, 2004, paging carrier Metrocall submitted a transfer of control application to the Commission in conjunction with the announced merger with Arch Wireless Communications, Inc. ("Arch Wireless").[84] Other major paging carriers include SkyTel Communications, Inc., SBC Paging, and Verizon Wireless' paging business.[85]

42. Apart from paging/messaging carriers, there are a few carriers that exclusively sell other types of mobile data services, instead of both mobile voice and data services, including Motient Corp. ("Motient") and Space Data Corp ("Space Data"). Motient has specialized in selling and integrating wireless data solutions to enterprises, including wireless e-mail and other wireless Internet applications.[86] Space Data is currently providing commercial telemetry services for the energy industry in West Texas and eastern New Mexico, and in September 2004 announced that it will extend its telemetry services to the Gulf of Mexico later the same month.[87]

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[79] *See* Virgin Mobile USA, LLC, *Comments*, at 2 (filed Apr. 26, 2004) ("*Virgin Mobile Comments*"). For a detailed discussion of the venture, *see Seventh Report*, at 13026.

[80] *Virgin Mobile Comments*, at 2.

[81] *Eighth Report*, at 14839.

[82] *Eighth Report*, at 14839; Boost Mobile, *Coverage Maps* (visited May 17, 2003) <http://www.boostmobile.com/bshop_coverage_maps.html>.

[83] Nextel, SEC Form 10-K (filed Mar. 11, 2004), at 3.

[84] *See* Application for Transfer of Control of Metrocall USA, Inc. and Associated Request for Waiver of Electronic Filing Requirements in Connection with the Merger of Metrocall Holdings, Inc. and Arch Wireless, Inc., dated April 9, 2004. Since the *Eighth Report,* WebLink Wireless, Inc., another major paging/messaging company was merged into Metrocall. *Metrocall to Acquire WebLink,* Press Release, Metrocall, Nov. 19, 2003.

[85] SkyTel Communications, Inc. is a wholly owned subsidiary of MCI (formerly WorldCom) that was acquired on October 1, 1999. *See Fifth Report*, at 17720-17721. Mike Dano, *Nationwide paging down to one carrier,* RCR WIRELESS NEWS, Apr. 5, 2004, at 3+.

[86] *See* Brad Smith, *Early Data Models Drain Finances*, WIRELESS WEEK, Apr. 15, 2004 ("*Early Data Models Drain Finances*").

[87] *Space Data Launches New Wireless Telemetry Service in West Texas Oil and Gas Fields,* Press Release, Space Data Corporation, Apr. 14, 2004; *Space Data Launches New Wireless Telemetry Service*, Press Release, Space Data Corporation, Apr. 15, 2004; *Space Data Floats Wireless Data Network Over the Gulf*, Press Release, Space Data Corporation, Sept. 14, 2004; *Space Data Corporation Receives Patent for Airborne Constellation*, Press Release, Space Data Corporation, Feb. 2, 2004.

4. Satellite Providers

43. As of year-end 2003, a number of carriers were providing mobile satellite services ("MSS") in the United States.[88] Both Globalstar Telecommunications LTD. ("Globalstar") and Iridium Satellite LLC. ("Iridium Satellite") are using Big LEO MSS licenses to offer mobile voice and data services to a variety of mobile terminals, including hand-held terminals, and to fixed terminals. Inmarsat Ltd. ("Inmarsat") and MSV, the successor to Motient Services Inc., which had previously entered into a joint venture with Mobile Satellite Ventures (Canada) Inc. and the Canadian licensee of MSS satellite MSAT-1 (TMI Corporation), were also providing voice and data communications via satellite in the L-band at year-end 2003. The companies offer voice and data services in fixed and mobile environments. The mobile environment consists of a laptop-sized or larger terminal that can be transported from one location to another. Another company, ICO Global Communications (Holdings) Ltd., has launched one of its twelve U.K.-authorized satellites to operate in the 2 GHz MSS band, but has not yet begun commercial service.

C. Horizontal Concentration

44. The level of market concentration generally depends on both the number of competing carriers per market and the distribution of their respective market shares. Thus, market concentration can result from both a relatively small number of carriers competing in the relevant market and a relatively high degree of inequality in the distribution of market shares among incumbent carriers. In conjunction with entry conditions and the way carriers and consumers behave and interact, market concentration affects the likelihood that a single carrier unilaterally, or a small group of carriers through coordinated action, could successfully exercise market power.

45. The basic economic principle for defining the scope of the relevant geographic market is to include customers facing the choice of similar competitive alternatives in the same geographic market. Because U.S. mobile telephony carriers have different-sized geographic footprints, any individual mobile carrier does not compete with all other mobile carriers in each and every part of the country. This suggests that the relevant geographic market for mobile telephony services is narrower than the entire nation. An attempt to measure concentration in mobile telephony services at the national level would understate the actual level of market concentration because the underlying geographic market definition would be too broad. At the same time, defining the appropriate regional or local geographic market for mobile telephony services is a highly complex exercise due to various factors, including the relatively large number of licensed carriers, the variety of geographic schemes used to license different spectrum bands, the wide variation in carriers' geographic footprints, and the difficulty of collecting accurate information on the geographic coverage each mobile carrier provides in its license areas. To simplify the measurement task, we base our analysis of market concentration on uniform geographic areas that may be broader or narrower than the relevant geographic market. In particular, we estimate the number of

[88] In order to place a satellite telephony call, an "outbound" communication from an MSS mobile phone is transmitted up to the satellite, using "service link" frequencies. The satellite then retransmits the signal back down to the earth, using "feeder link" frequencies, to a gateway ground station, where the call is interconnected with terrestrial networks, such as the PSTN. The return or "inbound" communication works the exact opposite way. The communication from the terrestrial network is transmitted from the gateway earth station up to the satellite, and then retransmitted by the satellite back down to the MSS mobile telephone. In systems with inter-satellite links, the inbound and outbound communications may be transmitted through multiple satellites in order to complete the connection between the originating mobile telephone and the receiving gateway ground station.

competitors per market on a county-by-county basis, and we provide concentration measures at the level of EAs.

1. Number of Mobile Telephony Competitors

46. To track the level of competition in the mobile telephone sector, the Commission compiles a list of counties with some level of coverage by mobile telephone providers. This data is based on publicly-available sources of information released by the operators such as news releases, filings with the SEC, coverage maps available on operators' Internet sites, and information filed publicly[89] with the Commission in proceedings or with applications.[90]

47. As previously discussed, there are several important caveats to note when considering these data. First, to be considered as "covering" a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of that county. Consequently, some of the counties included in this analysis may have only a small amount of coverage from a particular provider. Third, the figures for POPs and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage.[91] Therefore, this analysis overstates the total coverage in terms of both geographic areas and populations covered.

48. On the other hand, this county-by-county analysis reflects a significant improvement in accuracy. In past *Reports*, the Commission provided summaries of estimated coverage by BTAs. Starting with the *Fifth Report*, the Commission decided to re-estimate and enhance these coverage maps using county boundaries in an attempt to provide a more precise picture of network deployment. Moreover, while the newer broadband PCS and digital SMR entrants have less complete networks, the original cellular licensees have extensive networks that provide almost complete coverage of the entire land mass of the continental United States.[92] Cellular licensees were originally awarded a geographical area (CMA) as a license area, but they only retained that portion of the CMA where they had built out and

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[89] This data is not based on information that is subject to a protective order.

[90] The Commission has buildout rules for geographic area licenses, although they do not require operators to deploy networks such that the entire geographic area of a specific license receives coverage. For example, the construction requirements for the 30 megahertz broadband PCS licenses state that an operator's network must serve an area containing at least one-third of the license area's population within five years of the license being granted and two-thirds of the population within 10 years. *See* 47 C.F.R. § 24.203(a). Similarly, the construction requirements for the 10 and 15 megahertz broadband PCS licenses state that an operator must cover one-quarter of a license area's population, or provide "substantial service," within five years of being licensed. *See* 47 C.F.R. § 24.203(b). The details concerning exactly which geographic areas or portions of the population should be covered to meet these requirements are left to the operators. In addition, decisions about whether to increase coverage above these requirements are left to the operators. For information on the buildout requirements for cellular licenses, *see* 47 C.F.R. §§ 22.946, 22.947, 22.949, 22.951. For information on the buildout requirements for non-site based SMR licenses, *see* 47 C.F.R. §§ 90.665 and 90.685.

[91] All population figures are based on the Bureau of the Census's 2000 county population.

[92] *See* Appendix B, Maps 2-3, at B-3 – B-4. In overlapping cellular Service Area Boundaries (SABs) over census block groups, we found that less than one-tenth of one percent of the US lacked cellular coverage. FCC internal analysis. Wireless coverage is so pervasive, in fact, that the Wall Street Journal ran an article rating hotels on their *lack* of wireless service for those who desire to get away from it all. Nancy Keates and Shawn Young, *Destination: Unreachable*, WALL STREET JOURNAL, Apr. 23, 2004, at W1.

expanded their wireless networks.[93]

49. To date, 276 million people, or 97 percent of the total U.S. population, have three or more different operators (cellular, PCS, and/or digital SMR) offering mobile telephone service in the counties in which they live.[94] However, these counties make up only 62 percent of the total land area of the United States, reflecting the nation's uneven population distribution.[95] Roughly 250 million people, or 87 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service, while 216 million people, or 76 percent of the population, live in counties with six or more mobile telephone operators competing to offer service. Finally, 84 million people, or almost 30 percent of the population, can now choose from among seven or more different mobile telephone operators providing service somewhere in their counties, an increase of 16 percent from what was reported in the *Eighth Report*.[96]

2. Concentration Measures for Mobile Telephony Services

50. This section reports the results of using the Herfindahl-Hirschman Index ("HHI") to measure market concentration with respect to the provision of mobile telephony services in EAs.[97] The value of HHI reflects both the number of market competitors and the distribution of their market shares. In general, the value of HHI declines as the number of firms increases and it increases with rising inequality among any given number of firms.[98]

51. In principle, the market shares used to calculate HHIs can be based on various output measures, such as revenues or the number of subscribers. For reasons of data availability we have elected to calculate each mobile carrier's market share based on the number of subscribers served by each carrier. The number of subscribers served by each carrier is determined based on the Commission's NRUF data,

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[93] Cellular licensees were originally awarded a geographical area (CMA) as a license area, but they only retained that portion of the CMA where they had built out and expanded their wireless networks. *See* Amendment of Part 22 of the Commission's Rules to Provide for the Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify other Cellular Rules, *First Report and Order and Memorandum Opinion and Order on Reconsideration*, 6 FCC Rcd 6185, 6196-6200 (1991). Initial cellular system operators were given a five-year period during which to expand their systems within the CMAs in which they were licensees. *Id*.

[94] *See* Appendix A, Table 5, at A-9.

[95] *Id.* We note that the land area of these counties, 2.2 million square miles, is almost 50 percent larger than the combined land area of the 25 member countries of the recently expanded European Union (1.5 million square miles).

[96] *See* Appendix A, Table 10, at A-11.

[97] The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. When a single firm is the sole supplier in the relevant market (a pure monopoly), the HHI attains its maximum value of 10,000 (100 x 100). As the structure of a market becomes progressively more atomistic, the value of HHI approaches 0.

[98] For example, if four carriers are identified as participants in the relevant product and geographic market and each carrier accounts for 25 percent of total sales, the value of HHI would be 2500 [$(25)^2$ x 4]. If the number of carriers increases to five, each with a 20 percent market share, the value of HHI would decline to 2000 [$(20)^2$ x 5]. On the other hand, if there are still only four carriers but the top carrier has a 40 percent market share while each of the remaining three carriers has 20 percent, the value of HHI would increase from 2500 to 2800 [$(40)^2 + (20)^2$ x 3].

which track phone number usage information for the United States. The methodology used to compile NRUF data is described in Section VI.B.1 on subscriber growth. As discussed in detail there, limitations of the NRUF data can result in miscounting of subscribers in a given geographic area. In this regard, we measure the number of subscribers served by each carrier for a given EA because using EAs reduces the distortions arising from the limitations of the NRUF data.

52. In addition to the limitations of the NRUF data, the methodology used to calculate the HHIs for EAs has its own limitations. The methodology gives equal weight to a mobile carrier that reports assigned numbers in one county as it does to a carrier that reports assigned numbers in all counties, or at least more than one county, within the EA. In effect, the methodology is based on the implicit assumption that the EA is the relevant geographic market, so that each carrier with assigned numbers in the EA is competing head to head with all other carriers operating in the EA. However, to the extent that carriers have different coverage areas that do not overlap, not all carriers with assigned numbers in an EA are in fact direct competitors. The implication is that the HHIs for EAs will tend to understate systematically the actual level of market concentration because the underlying geographic market definition is overly broad. On the other hand, there may be factors that would cause the relevant geographic market to be broader. For these reasons, we emphasize that, in using the EA to calculate market shares for the purposes of this report, we are not concluding that the EA is the relevant geographic market for other purposes.[99]

53. Based on NRUF data as of December 2003, the average value of the HHIs weighted by EA population is 2151, and the median value is about 2360.[100] The values of HHIs for individual EAs range from a low of 1325 in EA 107 (covering parts of Wisconsin, Iowa and Minnesota, including the Twin Cities) to a high of 7155 in EA 121 (covering parts of Nebraska and Colorado). Thus, the values of the weighted average HHI and also the HHIs in more than half of all EAs are lower than 2500, which would be the value of HHI for a hypothetical market in which there are four carriers with equal market shares.

54. As a benchmark for examining the EAs with relatively high HHIs, we note that the value of HHI in a market that is equally divided among three competitors is approximately 3333. However, there are six or more competitors in all of the EAs with HHIs in excess of 3300, and the vast majority of the EAs in this category have in excess of ten competitors operating in at least some area within the EA. This suggests that the high values of HHI in these EAs are generally due not to the number of competitors, but rather to the limited effect of competitive entry to date in eroding the market shares of one or both carriers holding the two original cellular licenses.

55. In interpreting these HHIs, it is worth noting that the economic literature does not provide a theoretical or empirical basis for the existence of any critical threshold level of concentration above which adverse competitive effects are likely.[101] In addition, the specific technological and economic

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[99] In other contexts, such as the Commission's review of license transfers and assignments, the relevant geographic market for calculating HHIs may be greater or less than an EA.

[100] *See* Appendix A, Table 3, at A-4. The simple mean (not weighted by population) is 2730.

[101] Barry C. Harris and David D. Smith, *The Merger Guidelines Vs. Economics: A Survey of Economic Studies*, Perspectives on Fundamental Antitrust Theory, American Bar Association, Section of Antitrust Law, July 2001, at 10-12. This includes the 1800 HHI level used in the *DOJ/FTC Guidelines* to identify markets that are considered to be "highly concentrated." *See* U.S. Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, 57 Fed. Reg. 41557 (Apr. 2, 1992, as revised Apr. 8, 1997), at §1.51 ("*DOJ/FTC Guidelines*").

characteristics of an industry are important determinants of the level of market concentration. Of particular importance is the relationship between economies of scale and the potential size of the market. In industries where the scale of output at which a firm can fully exploit scale economies (the minimum efficient scale) is large relative to potential demand, there will be room in the market for only a small number of firms operating at the lowest possible cost. In theory, therefore, market concentration in such industries will tend to be high relative to industries characterized by greater potential demand or smaller minimum efficient scale.

56. In light of the impact of technological and economic factors in determining the level of market concentration, it is noteworthy that the estimated values of HHIs for EAs tend to increase as the EA population declines. In other words, consistent with the theoretical considerations noted above, market concentration tends to be higher in EAs with a smaller potential subscriber base. For example, the EA with the highest HHI has the smallest population, and the EA with the second highest HHI (EA 142, covering parts of Nebraska and Wyoming) has the third smallest population.

57. However, some EAs are clear exceptions to this pattern. In particular, there are a number of EAs with mid-sized or relatively large populations that also have relatively high HHIs. Such apparent discrepancies may arise partly because the EAs also vary with regard to other important determinants of market demand and cost besides total population, including factors such as the age distribution of the population, per capita income, population density, urbanization, and the size and composition of the business sector.[102] Absent a more systematic analysis of the possible relationship between these explanatory factors and market concentration, we cannot make a determination of the extent to which market concentration in any given EA is explained by potential market demand and cost considerations.

3. International Comparison of Mobile Market Concentration

58. Concentration in mobile markets abroad provides another benchmark against which to evaluate U.S. mobile market concentration. This section compares the structure of mobile telephony markets in the United States and selected countries with regard to the number of market competitors and concentration measures calculated using HHIs. We note that international differences in mobile market concentration may reflect a variety of factors, including differences in the regulatory environment.

59. One comparison of mobile telephone markets in 46 countries indicates that the number of mobile market competitors in the fourth quarter of 2003 was higher in the United States than in any of the other countries.[103] In particular, the United States is listed as having "6+" players, whereas the only other countries with as many as six players are Hong Kong and Taiwan. Several other countries, including the United Kingdom, the Netherlands, and Malaysia, are listed as having five players. The vast majority of Western European countries and also comparable Asian-Pacific countries such as Japan, South Korea, and Australia are shown as having only three or four mobile players as of the end of 2003. However, these data on the number of mobile players per market are not strictly comparable since all Western European countries and most of the Asian countries identified above have licensed mobile carriers on a

[102] The average cost of serving a given market tends to decline with higher population density and urbanization because high concentrations of subscribers make it easier for operators to provide adequate coverage with less infrastructure deployment. See Eugence C. Signorini, *Wireless Coverage in the United States: Leaving a Lot to Be Desired*, THE YANKEE GROUP REPORT, Vol. 1, No. 11, Aug. 2000, at 8.

[103] Michel Morin and Linda Mutschler, *Global Wireless Matrix 4Q03*, Merrill Lynch, Global Securities Research, Mar. 19, 2004, at 2 ("*Global Wireless Matrix 4Q03*").

nationwide basis rather than by smaller geographic regions. As detailed above, the number of mobile competitors per market in the United States varies by region, ranging from as many as seven or more in some areas to fewer than four competitors in some other areas. Nevertheless, as previously mentioned 97 percent of the total U.S. population live in counties with a minimum of three different mobile operators, the same as the maximum number of national mobile carriers in Japan, South Korea, and most of the smaller Western European markets.

60. Since European regulators awarded nationwide licenses for second-generation GSM and third-generation services, national boundaries are the relevant geographic market for measuring concentration in European mobile markets. For purposes of comparison, we computed HHIs based on subscriber shares as of the fourth quarter of 2003 for the following seven countries: Finland, France, Germany, Italy, the Netherlands, Spain and the United Kingdom.[104] The lowest HHI values are found in the United Kingdom (2481) and the Netherlands (2538). Mobile subscribers in the United Kingdom are relatively evenly divided among the four GSM operators, and a fifth operator, a 3G start-up, launched service in 2003.[105] The Netherlands, with five GSM operators, is the only European country to have awarded more than four GSM licenses. The values of HHI in the remaining countries range from a low of 3375 in Germany to a high of 4122 in Finland. The relatively high values of HHI in this group of countries reflect two factors. One is the small number of competitors per market, with four carriers in Germany and Italy and only three carriers in the remaining countries. Second, each market tends to be dominated by the top two competitors, which have a combined market share ranging from 78 percent in Spain to 84 percent in Finland and France.[106]

61. Recalling that for EAs in the United States the average value of the HHIs weighted by EA population is 2151 and that the median value is about 2360, it is evident that concentration is somewhat higher in the two least concentrated European mobile markets (the United Kingdom and the Netherlands) than in the U.S. mobile market on average. If we take the top 25 percent of EAs by HHI values, we find that the European mobile markets with higher concentration levels (in other words, with HHIs ranging from 3375 to 4122) would fall within this top 25 percent. At the same time, there are 22 EAs with higher mobile market concentration levels than Finland, the European country with the highest mobile market HHI among the European countries included in this comparison.

D. Consolidation and Exit

62. Consolidation and exit of service providers, whether through secondary market transactions or bankruptcy, may affect the structure of the mobile telecommunications market. A reduction in the

[104] The subscriber shares used to calculate HHIs for European mobile markets were taken from *Global Wireless Matrix 4Q03*, at 50-52, 61, 67, 77, and 85.

[105] The HHI calculation for the United Kingdom (UK) is based on the assumption that all five UK operators had nationwide coverage at the end of 2003. However, having launched service in March 2003, 3G start-up Hutchison initially provided urban and main artery coverage throughout the country, and as of the first quarter of 2004 its coverage was approximately 70 percent of the population. *See* Atsushi Umino, *Developments of Third-Generation Mobile Services in the OECD*, OECD, Mar. 2004, at 38 ("*Developments of Third-Generation Mobile Services in the OECD*"). Since Hutchison did not have nationwide coverage as of December 2003, the HHI of 2481 somewhat understates mobile market concentration in the United Kingdom at that time. If Hutchison's relatively negligible market share (0.4 percent) as of the end of 2003 is ignored, the value of HHI based on the assumption that there are four nationwide operators in the UK is 2502.

[106] *Global Wireless Matrix 4Q03*, at 2.

number of competing service providers due to consolidation or exit may increase the market power of any given service provider, which in turn could lead to higher prices, fewer services, and/or less innovation. However, consolidation does not always result in a negative impact on consumers. Consolidation in the mobile telecommunications market may enable carriers to achieve certain economies of scale and increased efficiencies compared to smaller operators. If the cost savings generated by consolidation encourage the newly enlarged carrier to compete more aggressively, consolidation could result in lower prices and new and innovative services for consumers.[107] Moreover, it is unlikely that competitive harm will result from consolidation among service providers licensed to operate in separate geographic markets.

63. Among the policies potentially affecting consolidation in this market, the Commission eliminated (effective January 1, 2003) a rule limiting the amount of spectrum a CMRS licensee could own or control in a given licensed area.[108] Until recently, the Commission had retained the cellular cross-interest rule in Rural Service Areas ("RSAs"), at the same time creating a waiver process in recognition that there may be RSAs in which such cross interests would not create a significant likelihood of substantial competitive harm.[109] On July 8, 2004, the Commission also eliminated the cellular cross-interest rule then applicable only in RSAs and transitioned to case-by-case competitive review for all applications related to transactions involving cellular licenses.[110]

64. Since the end of 1999, carriers have been building nationwide footprints[111] through various forms of transactions.[112] One of the driving forces behind many of these transactions has been the desire of large regional carriers to enhance their ability to compete with existing nationwide operators that offer attractive nationwide pricing plans.[113] Also, as the Commission has previously concluded, operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints.[114] More recently, national operators have sought to fill in gaps in their coverage

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[107] *See* Jonathan B. Baker, *Developments in Antitrust Economics*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol. 13, No. 1,Winter 1999, at 182.

[108] *Spectrum Aggregation R&O*, 16 FCC Rcd at 22693, ¶ 49.

[109] *Spectrum Cap Order*, at 22708-22710. *See, also*, *Rural NOI*, at 25561.

[110] *FCC Adopts Measures to Increase Rural Investment and Facilitate Deployment of Spectrum-Based Services in Rural Areas*, News Release, Federal Communications Commission, Jul. 8, 2004 ("*Rural Order PN*")

[111] Generally, "footprint" is an industry term of art referring to the total geographic area in which a wireless provider offers service or is licensed to offer service.

[112] The Commission must consent to the transfer of control or assignment of all spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

[113] *See Fifth Report*, at 17699 (For a complete discussion of the motivations for this phenomenon, *see Fourth Report*, at 10159-10160).

[114] *See Seventh Report*, at 12997. One study found bigger companies get better equipment prices because of their size. Shawn Young, *As Wireless Firms Grow, So Can Costs*, WALL STREET JOURNAL, Apr. 29, 2004, at B4. However, the study also found that the cost of signing up new customers increases as wireless companies get bigger.

areas,[115] as well as to increase the capacity of their existing networks. Since the writing of the *Eighth Report*, a number of transactions between market participants have been announced. We discuss the transactions involving the largest impact, either through the exchange of subscribers or spectrum licenses, on the structure of the market below. In addition, we discuss some of the carriers that have declared bankruptcy and/or announced other restructuring plans during the past year.

1. Sales and Swaps

65. *Cingular / AT&T Wireless* – On February 17, 2004, Cingular Wireless announced an agreement to acquire AT&T Wireless for $41 billion in cash.[116] According to the companies, the combined entity would have 46 million subscribers, surpassing Verizon Wireless as the largest wireless operator, with coverage in 97 of the top 100 markets and combined 2003 revenues exceeding $32 billion.[117] The companies, which are both committed to GSM technology, claim that the combined entity would generate more than $1 billion in operating and capital expenditure savings in 2006, and in excess of $2 billion in annual savings beginning in 2007.[118] The companies predict that the acquisition, which requires regulatory approval, will be completed "as soon as late 2004."[119]

66. *Cingular / Nextwave Telecom* – On August 5, 2003, Cingular Wireless and NextWave Telecom announced an agreement for Cingular to purchase spectrum from NextWave in 34 markets for $1.4 billion.[120] The licenses, which cover approximately 83 million people, are primarily in markets where Cingular already provides service.[121] In February 2004, the Commission approved assignment of these licenses from NextWave to Cingular.[122]

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[115] For a more complete discussion of the motivations for this phenomenon, s*ee Fourth Report*, at 10159-10160.

[116] *Cingular to Acquire AT&T Wireless, Create Nation's Premier Carrier*, News Release, Cingular Wireless, Feb. 17, 2004. AT&T Wireless and Cingular Wireless filed applications for Commission consent to the transfer of control in March 2004. *See* Application No. 0001656065 (filed Mar. 17, 2004).

[117] *Id.*

[118] *Cingular to Acquire AT&T Wireless, Create Nation's Premier Carrier*, News Release, Cingular Wireless, Feb. 17, 2004. Some analysts argue that the acquisition is an attempt to offset the decline in Cingular's parent companies' wireline businesses. Almar Latour and Jesse Drucker, *Stocks of Cingular's Parents Ring Out*, WALL STREET JOURNAL, Feb. 2, 2004, at C1.

[119] In a related transaction, Cingular Wireless, AT&T Wireless, and Triton PCS signed a non-binding letter of intent, contingent on the closing of Cingular Wireless's acquisition of AT&T Wireless, to trade Triton PCS's network in Virginia for certain AT&T Wireless network assets and customers in North Carolina and Puerto Rico. *Cingular, AT&T Wireless and Triton PCS Sign Letter of Intent to Exchange Operations in N. Carolina, Puerto Rico and Virginia*, News Release, Cingular Wireless, July 8, 2004. Additionally, AT&T Wireless and Triton PCS will terminate their exclusivity agreement in return for the surrender of AT&T Wireless's equity in Triton PCS. *See* Section III.D.5, Affiliations, *infra*.

[120] *Cingular Wireless and NextWave Telecom Agree to Terms for Spectrum Licenses*, News Release, Cingular Wireless, Aug. 5, 2003

[121] *Id*.

[122] *Applications for Consent to the Assignment of Licenses Pursuant to Section 310(d) of the Communications Act from NextWave Personal Communications, Inc., Debtor-in-Possession, and NextWave Power Partners, Inc.,*

67. *American Cellular / Dobson* – On August 19, 2003, Dobson announced that it had completed its acquisition of American Cellular Corporation ("American Cellular"), following the successful restructuring of American Cellular's debt and equity ownership.[123] American Cellular had been equally owned by Dobson and AT&T Wireless, although Dobson operated the American Cellular markets, under the brand name "Cellular One."[124] AT&T Wireless, which along with Dobson had acquired American Cellular in February 2000, no longer has an equity stake in the subsidiary.[125] The combined company provides service to roughly 1.6 million subscribers in 16 states using its TDMA/GSM network.[126]

2. Joint Ventures

68. *T-Mobile / Western Wireless* – In May 2004, T-Mobile and Western Wireless announced an agreement to expand GSM/GPRS coverage in the western United States.[127] Under the agreement, Western Wireless is building a GSM/GPRS network to cover approximately 4 million people in 65 BTAs using PCS spectrum purchased from T-Mobile.[128] The spectrum is primarily in areas where Western Wireless has already constructed a network, but where T-Mobile has not.[129] By overlaying a GSM network on top of Western Wireless's existing infrastructure, the companies hope to realize significant economic and resource efficiencies by utilizing Western Wireless's existing leases, tower structures, and other components of its cellular network.[130] Western Wireless plans to sell roaming services both to T-Mobile and other operators, and may also utilize the network for its own retail customers.[131]

69. *Cingular / T-Mobile* – In May 2004, Cingular and T-Mobile announced that they were ending

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Debtor-in-Possession, to subsidiaries of Cingular Wireless, Inc., Memorandum Opinion & Order, WT Docket No. 03-217, FCC 04-26 (rel. Feb. 12, 2004). Under the terms of the purchase agreement as well as the term sheet entered into between the United States Government and NextWave, following consummation of the transaction, Cingular paid $714 million to the Commission for the benefit of the U.S. Treasury in full satisfaction of all claims related to the licenses it purchased.

[123] *Dobson Communications Completes Acquisition Of American Cellular Corporation*, News Release, Dobson, Aug. 19, 2003.

[124] *Eighth Report*, at 14810-14811, note 196.

[125] *Dobson Communications Completes Acquisition Of American Cellular Corporation*, News Release, Dobson, Aug. 19, 2003.

[126] *Id*. On Sept. 22, 2003, AT&T Wireless sold all of its ownership interest in Dobson's common stock. AT&T Wireless, Annual Report 2003, at 41.

[127] *T-Mobile USA and Western Wireless To Expand GSM/GPRS 1900 Footprint in Rural U.S.*, News Release, T-Mobile, May 5, 2003.

[128] *Id*.; ULS File No. 0001406731 (filed Aug. 20, 2003).

[129] ULS File No. 0001406731 (filed Aug. 20, 2003).

[130] *Id*.

[131] *Id*.

their infrastructure sharing joint venture in California, Nevada, and New York.[132] Under terms of the deal, T-Mobile will pay $2.5 billion for Cingular's network in California and Nevada, and will receive $200 million for unwinding the venture.[133] In addition, Cingular is selling T-Mobile 10 MHz of spectrum in San Francisco, Sacramento, and Las Vegas for $180 million, but will receive 10 MHz of spectrum in New York City.[134] The companies expect the deal to close at the beginning of 2005.[135] The transaction is contingent on Cingular's acquisition of AT&T Wireless, as well as regulatory approval once the transaction between Cingular and T-Mobile is submitted to the Commission.[136]

3. Restructurings

70. *Leap Bankruptcy* – As reported in the *Eighth Report*, on April 13, 2003, Leap Wireless International, Inc. ("Leap")[137] filed a voluntary petition for reorganization under Chapter 11 of the U.S. Bankruptcy Code in the United States Bankruptcy Court for the Southern District of California.[138] On October 22, 2003, the Bankruptcy Court approved Leap's Fifth Amended Joint Plan of Reorganization.[139] The company's emergence from bankruptcy is contingent on obtaining FCC approval for assignment of its wireless licenses.[140]

71. *Ntelos Bankruptcy* – As reported in the *Eighth Report*, Ntelos, Inc. ("Ntelos") filed for Chapter 11 bankruptcy protection in the U.S Bankruptcy Court for the Eastern District of Virginia on March 4, 2003.[141] Ntelos, which had 266,000 wireless customers at the end of 2002, had missed interest

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[132] *Cingular, T-Mobile USA To End Joint Network Venture*, News Release, Cingular Wireless, May 25, 2004. *See Seventh Report*, at 13001, and *Eighth Report*, at 14808, for a description of the venture.

[133] Taska Manzaroli, *Deutsche Telekom to Acquire Cingular Network in Two States*, DOW JONES NEWSWIRES, May 25, 2004.

[134] COMMUNICATIONS DAILY, May 26, 2004, at 5.

[135] Taska Manzaroli, *Deutsche Telekom to Acquire Cingular Network in Two States*, DOW JONES NEWSWIRES, May 25, 2004.

[136] *Id*. *See also* ULS File No. 0001771442.

[137] *See* Section VII.A.2, Wireless Alternatives, *infra*, for a discussion of Leap's service offerings.

[138] *See Eighth Report*, at 14808.

[139] Order Confirming Debtor's Fifth Amended Joint Plan of Reorganization, *In re: Leap Wireless International, Inc., and Cricket Communications, Inc., et al.,* Case Nos. 03-3470-All through 03-3535-All, (Bankr. S. D. Cal.) (Oct. 22, 2003).

[140] ULS File No. 0001546977 has been designated as the lead application, and all pleadings and other submissions filed in the matter that pertain generally to the transaction and not to a particular application are available through this file number. *See also*, Leap Wireless International, Inc., Debtor-in-Possession, Seeks FCC Consent for the Assignment of Broadband Personal Communications Services Licenses to Leap Wireless International, Inc., *Public Notice*, 18 FCC Rcd 26763 (2003).

[141] *Eighth Report*, at 14809.

payments of more than $24 million on loans from commercial debt holders in February 2003.[142] On September 9, 2003, Ntelos announced that it had completed its financial restructuring and emerged from Chapter 11 proceedings.[143] The company's Joint Plan of Reorganization, which was confirmed by the U.S. Bankruptcy Court for the Eastern District of Virginia on August 12, 2003, became effective on September 9, 2003.[144] Under the company's Joint Plan of Reorganization the restructured company will be privately held, primarily by former noteholders.[145] Existing shares of Ntelos common stock (NTLOQ) were cancelled, along with the company's senior and subordinated notes and outstanding preferred stock.[146] The company still provides service in Virginia, West Virginia, Kentucky, Tennessee, and North Carolina.[147]

72. *NextWave Telecommunications Inc. and NextWave Power Partners, Inc.* ("NextWave") – NextWave was the high bidder for 95 C, D, E and F block broadband PCS licenses covering 174 million POPs in auctions held between 1995 and 1997. On June 8, 1998, NextWave filed for Chapter 11 bankruptcy protection in the U.S. Bankruptcy Court for the Southern District of New York. Following extensive litigation, the U.S. Supreme Court held that NextWave's licenses had not automatically cancelled for non-payment while it was in bankruptcy.[148] As part of its reorganization process, NextWave obtained FCC approval to transfer certain of its C and F block PCS licenses to Cingular.[149] In April 2004, NextWave entered a settlement agreement with the FCC whereby it will retain certain of its C and F block licenses, and will return the remaining licenses to the FCC. On May 25, 2004, this settlement agreement was approved by the bankruptcy court.[150]

73. *Horizon PCS Bankruptcy* – On August 15, 2003, Horizon PCS, Inc. ("Horizon PCS"), a Sprint PCS affiliate, announced that it had filed voluntary petitions for relief under Chapter 11 of Title 11 of the United States Code in the United States Bankruptcy Court for the Southern District of Ohio.[151]

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[142] *NTELOS in Active Discussions with Debtholders*, News Release, Ntelos, Feb. 18, 2003.

[143] *NTELOS Completes Restructuring and Emerges From Chapter 11*, News Release, Ntelos, Sept. 9, 2003. *See also*, ULS File Nos. 0001433008, 0001433014, 0001433028, 0001433042, 0001433048, 0001433051, 0001433045, 0001433033 0001433010, and 0001433442.

[144] *Id*.

[145] *Id*.

[146] *Id.*

[147] *See* http://www.ntelos.com.

[148] *FCC v. NextWave*, 537 U.S. 293 (2003).

[149] *Applications for Consent to the Assignment of Licenses Pursuant to Section 310(d) of the Communications Act from NextWave Personal Communications, Inc., Debtor-in-Possession, and NextWave Power Partners, Inc., Debtor-in-Possession, to subsidiaries of Cingular Wireless, Inc.,* Memorandum Opinion & Order, WT Docket No. 03-217, FCC 04-26, (rel. Feb. 12, 2004).

[150] Order Granting Motion Pursuant to Section 363 of the Bankruptcy Code, *In re: NextWave Personal Communications, Inc. et al.*, 98B21529 (Bankr. S.D.N.Y.) (May 25, 2004).

[151] *Horizon PCS Files For Bankruptcy Protection Under Chapter 11*, News Release, Horizon PCS, Aug. 15, 2003.

Horizon PCS expects to continue to operate its business subject to the supervision and orders of the Bankruptcy Court pursuant to the Bankruptcy Code.[152] Horizon PCS provides services under the Sprint brand name in markets covering 10.2 million people in portions of 12 states.[153] To settle a legal dispute, in May 2004 Sprint agreed to pay $38 million to buy Horizon PCS's customer base (97,000 customers) and retail stores in western Virginia and West Virginia.[154] The company was serving 310,000 subscribers as of June 30, 2003.[155]

74. *Monet Mobile Networks Bankruptcy and Suspension of Service* – On March 11, 2004, Monet Mobile Networks ("Monet"), which had been providing data-only broadband service using its CDMA 1xEV-DO network in eight northwestern cities, suspended its service.[156] Monet, which had been serving about 3,000 customers, filed for Chapter 11 bankruptcy on March 4, 2004, when it was unable to find lenders willing to extend it additional financing.[157] The company had been looking to become acquired by another company since November 2003, but had not found any interested buyers.[158] Monet launched North America's first CDMA 1xEV-DO network in November 2002.[159]

4. Exiting Facility-Based Provision of Service

75. *Qwest Wireless* – As mentioned above, in August 2003 Qwest entered into an agreement with Sprint to resell Sprint PCS wireless services, having decided to exit the facilities-based provision of wireless service.[160] Under the five year agreement, Qwest retains control of all sales and marketing, customer service, billing and collection, pricing, promotion, and product offerings related to the Sprint services that it resells. Qwest began offering these Sprint services under its own brand name, Qwest Wireless, in March 2004.[161] Qwest's customers who are currently being serviced through Qwest's own broadband PCS network are being transitioned onto Sprint's network over time.[162] On July 2, 2004,

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[152] *Id.*

[153] *Id*.

[154] David Hayes, *Sprint Settles Lawsuit By Agreeing To Pay $38 Million*, KANSAS CITY STAR, May 18, 2004.

[155] Horizon PCS, SEC Form 10-Q, Aug. 15, 2003, at 17. Ntelos, a network partner for Horizon PCS, operates 13 markets for Horizon in Virginia and West Virginia, covering approximately 2 million POPs and 70,000 subscribers. Dan Myers, *More Sprint PCS Affiliates Warn Of Tough Road Ahead*, RCR WIRELESS NEWS, Apr. 7, 2003. *See*, *also, Eighth Report* at 14811, note 204, for a discussion of the relationship between Horizon PCS and Ntelos.

[156] Monet Mobile Networks, *Monet Mobile Networks To Suspend Service* (visited May 14, 2004)<http://www.monetmobile.com/cust_buy.asp>.

[157] Mike Dano, *Nation's First DO Operator Shuts Down*, RCR WIRELESS, Mar. 8, 2004.

[158] *Id*.

[159] *Id*.

[160] Qwest Corp, SEC Form 10-K, Filed Mar. 16, 2004, at 5-6.

[161] *Id*.

[162] *Id*.

Verizon Wireless announced an agreement to acquire Qwest's PCS licenses and network assets, but not customers, for $418 million.[163]

5. Affiliations

76. Three of the nationwide operators also have extended their coverage through contractual affiliations with smaller carriers. These affiliations create a "family" of operating companies with much closer relationships than those formed by traditional roaming agreements.[164] All of these affiliations were established to accelerate the build-out of the larger companies' networks by granting smaller affiliates the exclusive right to offer mobile services for those companies, in some cases under the larger companies' brand names, in selected mid-sized and smaller markets.[165]

77. *AT&T Wireless* – The AT&T Wireless family consists of AT&T Wireless, as well as its affiliations with two companies: Triton PCS and Edge Wireless, LLC ("Edge").[166] AT&T Wireless sold portions of some of its broadband PCS licenses to Triton PCS in exchange for a minority ownership interest.[167] While Triton PCS is marketed under the brand name SunCom[168] and Edge is marketed under its own name, both companies provide service as a "Member of the AT&T Wireless Network." These affiliates, like AT&T Wireless, have committed to upgrading their TDMA networks to GSM/GPRS.[169] AT&T Wireless and Triton PCS recently announced an agreement, contingent on Cingular Wireless's acquisition of AT&T Wireless, to terminate the exclusivity arrangement between the two in exchange for

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[163] *Verizon to Pay $418 Million For Qwest's Wireless Assets*, WALL STREET JOURNAL, July 2, 2004, at B4. In its 2003 10-K, Qwest had announced its intention to transfer ownership of its network "in the near future, after which [Qwest] will no longer have significant wireless operations." Qwest Corp., SEC Form 10-K, filed Mar. 16, 2004, at 27

[164] *See* Section IV.B.3 Roaming, *infra*.

[165] *See*, *e.g.*, Nextel, Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Comments*, at note 20 (filed Jan. 5, 2001) ("To facilitate rapid deployment of its network throughout suburban, tertiary and rural areas of the country and move towards more ubiquitous nationwide service, Nextel entered into an agreement with Nextel Partners . . . to construct iDEN coverage using Commission licensed frequencies disaggregated by Nextel to [Nextel Partners], and offering its services to the public under the Nextel brand according to strict service quality standards.").

[166] In addition, AT&T Wireless owns 19.9 percent of Cincinnati Bell Wireless, LLC ("Cincinnati Bell Wireless"). Cincinnati Bell, SEC Form 10-K, Mar. 23, 2004, at 4. These services are sold under the Cincinnati Bell Wireless brand name. AT&T Wireless and Cincinnati Bell Wireless have a non-compete clause. Lance Williams, *Cincinnati Bell Might Sell Wireless Unit*, CINCINNATI BUSINESS COURIER, Mar. 5, 2004.

[167] AT&T Wireless owns 15.7 percent of Triton PCS and 40 percent of Edge. AT&T Wireless, FCC Form 602 (filed Mar. 16, 2004). Even with its close relationship with AT&T Wireless, Triton PCS determines its own service offerings, the terms under which services are offered, and its own prices. Lafayette Communications Company, LLC, FCC Application for Assignment of Authorization, #0001108216 (filed Dec. 4, 2002), at 2. AT&T has an agreement with Triton PCS to not compete in Triton PCS's six southeastern states until 2009. Jessica Hall, *Triton PCS Eyes Some Cingular-AT&T Wireless Assets*, REUTERS, Mar. 3, 2004.

[168] Suncom, *Suncom Fact Sheet* (visited May. 17, 2004) <http://www.suncom.com/pr_news/index.shtml>.

[169] *See Eighth Report*, at 14811.

the surrender of AT&T Wireless's equity in Triton PCS.[170]

78. *Nextel* – The Nextel family consists of Nextel and Nextel Partners, Inc. ("Nextel Partners"). In an arrangement similar to that of AT&T Wireless with its affiliates,[171] in 1999, Nextel sold some of its SMR licenses to Nextel Partners in exchange for a minority ownership interest in the company.[172] Nextel Partners is building out an iDEN network compatible with Nextel's, and Nextel assists Nextel Partners in obtaining terms similar to those Nextel receives from vendors for equipment and services.[173] Both Nextel and Nextel Partners market their services under the Nextel brand name.

79. *Sprint PCS* – The Sprint PCS family consists of Sprint PCS and 10 affiliates.[174] Each of the affiliates has an agreement with Sprint PCS to use the latter's PCS licenses to deploy CDMA technology and Sprint PCS-branded service in specific areas of the country.[175] In return, Sprint PCS receives a percentage of the affiliates' local service revenue.[176] In addition, Sprint PCS performs back-office tasks for most of its affiliates, giving them the benefits of economies of scale for billing and customer service.[177] Recently, Sprint has renegotiated these arrangements with some of its affiliates, responding to disputes with, as well as the financial difficulties of, certain affiliates.[178] The amended agreements cover approximately 40 percent of the customers served by all affiliates.[179] Sprint PCS affiliates now provide service to more than 2.9 million subscribers.[180]

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[170] *Cingular, AT&T Wireless and Triton PCS Sign Letter of Intent to Exchange Operations in N. Carolina, Puerto Rico and Virginia*, News Release, Cingular Wireless, July 8, 2004. Under the agreement, Triton PCS would be permitted to compete beyond its current footprint, and Cingular Wireless could provide service in areas where Triton PCS currently has operations. Triton PCS would also have exclusive right to the SunCom brand. *Cingular, AT&T Wireless and Triton PCS Sign Letter of Intent to Exchange Operations in N. Carolina, Puerto Rico and Virginia*, News Release, Cingular Wireless, July 8, 2004.

[171] For a comparison of the affiliate arrangements of AT&T, Nextel, and Sprint PCS, *see* Luiz Carvalho *et al.*, *Triton PCS*, Morgan Stanley, Equity Research, Mar. 5, 2003, at 2 (Exhibit 1: Difference Among the Affiliates).

[172] Nextel Partners, Inc., SEC Form 10-K, Mar. 22, 2002, at 4. Nextel owns 30 percent of Nextel Partners. Nextel, FCC Form 602 (filed Mar. 15, 2004).

[173] *Id*, at 3.

[174] Five are public companies (Alamosa Holdings Inc., US Unwired Inc., AirGate PCS Inc., UbiquiTel Inc., Horizon PCS Inc., and Shenandoah Telecommunications Co.) and five are privately-held. *See Eighth Report*, at 14811, note 203. *See*, *also*, Section III.D.3, Restructurings *supra*, for a discussion of Horizon PCS's bankruptcy.

[175] *See*, *e.g.*, US Unwired Inc., SEC Form 4249(B)(1), May 17, 2000, at 7.

[176] *See*, *e.g.*, Horizon PCS, SEC Form 10-Q, Aug. 15, 2003, at 8.

[177] *See Eighth Report*, at 14812.

[178] Sprint, SEC Form 10-K, filed Mar. 9, 2004, at 36. *See*, *also*, Section III.D.3, Restructurings, *supra*, and *Eighth Report*, at 14809. Sprint has amended the existing agreements to provide for a "simplified pricing mechanism, as well as refining and changing various business processes." Sprint, SEC Form 10-K, filed Mar. 9, 2004, at 36. For a description of Sprint's revised agreement with Alamosa, *see* John Byrne, *Bondholders Skeptical of Alamosa Restructuring Bid*, KAGAN WIRELESS TELECOM INVESTOR, Sept. 25, 2003, at 8.

[179] Sprint, SEC Form 10-K, filed Mar. 9, 2004, at 36.

[180] *Sprint Reports Fourth Quarter and Full-Year 2003 Results*, News Release, Sprint, Feb. 3, 2004.

E. Entry Conditions and Potential Barriers to Entry

80. Market concentration is a necessary, but not a sufficient structural condition for unilateral or coordinated anti-competitive behavior to occur. If entry into a market is easy, then entry or the threat of entry may prevent incumbent operators from exercising market power, either collectively or unilaterally, even in highly concentrated markets.[181] The ease or difficulty of entry generally depends on the nature and significance of entry barriers. Barriers to entry in the mobile telecommunications market may include first-mover advantages, large sunk costs, and access to spectrum.[182]

1. Spectrum Allocation and Assignment

81. Spectrum allocation and assignment create a potential barrier to entry into mobile telecommunications markets because a limited amount of spectrum is allocated to CMRS and carriers need to obtain a government-issued license in order to use such spectrum for the provision of CMRS services. However, the degree to which the need to obtain a license acts as an impediment to entry depends on several factors. The first is the total amount of spectrum allocated to CMRS services and, of the spectrum that has been allocated, the amount actually assigned to users. This section identifies the types and amount of spectrum currently allocated to CMRS. While much of this CMRS spectrum is already licensed to carriers, some portions of current CMRS spectrum represent relatively recent allocations that the Commission plans to auction to spectrum users in the future. Moreover, in June 2004 the Commission announced an auction to commence on January 12, 2005 (Auction No. 58) for 234 broadband PCS licenses comprising CMRS spectrum that had been offered previously in other auctions but was returned to the Commission as a result of license cancellation or termination.[183] Finally, in addition to current CMRS spectrum due to be auctioned (or re-auctioned) and licensed in the future, the amount of spectrum allocated to CMRS has the potential to increase as a result of the future reallocation of additional frequencies from non-CMRS to CMRS services. The resulting increase in the supply of CMRS spectrum due to both factors could potentially have the effect of reducing spectrum-related entry barriers, depending on the extent to which the demand for CMRS services increases.

82. Given the total amount of spectrum allocated to CMRS and assigned to users, the impact of spectrum allocation and assignment on the ease or difficulty of market entry also depends on the Commission's rules and policies with regard to spectrum assignment and trading. In this regard, the Commission's efforts to shift to a more market-based approach to spectrum management have resulted in the adoption of several policies that tend to reduce barriers to entry arising from spectrum allocation and assignment. First, beginning with the PCS auctions, the Commission's use of auctions to assign spectrum marked the transition from its restrictive cellular licensing rules that limited entry by licensing a prescribed number of competitors in each market area to a more flexible licensing approach that allows market forces to determine the number of competitors in a given geographic area. Thus, whereas the

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[181] *See DOJ/FTC Guidelines* at §3.0; s*ee also* Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed., Addison, Wellsley, Longman, Inc., 1999), at 77.

[182] *See Spectrum Aggregation R&O*, 16 FCC Rcd at 22688-91, ¶¶ 39-43.

[183] Broadband PCS Spectrum Auction Scheduled For January 12, 2005, *Public Notice*, DA 04-1639, Report No. AUC-03-58-A (Auction No. 58) (rel. June 18, 2004). Some of the spectrum to be re-auctioned was returned as a result of the previously mentioned settlement agreement between the FCC and NextWave. *See* Section III.D.3, Restructurings, *supra*.

licensing of cellular spectrum bands created a duopoly in each market, the auctioning of PCS spectrum produced the significant variation in the number of mobile telephony carriers across different geographic regions described in Section III.C.1 above. As shown in Section III.C.3 above, the Commission's market-based policies have resulted in significantly greater numbers of mobile competitors entering many regional geographic markets as compared with countries in Western Europe and Asia that limited entry by licensing just three or four nationwide 2G operators.

83. Second, the Commission's rules afford carriers the flexibility to choose what services to offer and what technologies to deploy on spectrum allocated to mobile telephony services, including the freedom to upgrade their existing systems and services to more advanced next-generation standards.[184] This service and technological flexibility reduces entry barriers by allowing mobile carriers to enter markets for new services without having to obtain a specific new government-issued license prior to doing so.

84. Finally, mobile telephony carriers are allowed, subject to the Commission's authorization and approval, to buy and sell licenses, in whole or in part, on the secondary market. As a result, carriers can enter the market by purchasing a license from incumbent license holders, rather than being limited to obtaining a license directly from the government.

85. Building on these market-oriented spectrum management policies, the Commission continues to take steps to increase spectrum access through secondary trading and flexible use. For example, in the Secondary Markets Report & Order (*"Secondary Markets R&O"*), issued in 2003, the Commission took action to facilitate the development of secondary markets in spectrum usage rights in a number of services.[185] The Commission allowed licensees in the Wireless Radio Services, including CMRS, to lease all or a portion of their spectrum usage rights, for any length of time within the license term, and over any geographic area encompassed by the license. In addition to introducing spectrum leasing in many wireless services, the Commission reduced the review time for transfer/assignment applications. As a result, licensees that utilize only a portion of their licensed spectrum (in terms of bandwidth or geographic area), and entities that seek to gain access to spectrum, have additional opportunities and face fewer impediments to moving the unused portion of this asset to higher valued uses. In a follow-up *Secondary Markets Second R&O* adopted in July 2004, the Commission further streamlined the processing of applications and notifications where the parties certify that the proposed transaction meets specific criteria indicating the absence of potential public interest concerns relating to eligibility, use restrictions, foreign ownership, designated entity policies, and competition.[186] Lease filings and transfer/assignment applications that meet these criteria will be eligible for overnight electronic processing.

a. Cellular, Broadband PCS, and SMR

86. Currently, mobile telephone operators primarily use three types of spectrum licenses to

[184] 47 C.F.R §§ 20.901(a) and 24.3.

[185] Promoting Efficient Use of Spectrum through Elimination of Barriers to the Development of Secondary Markets, *Report and Order and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 20604 (2003) ("*Secondary Markets Second R&O*").

[186] FCC Expands Spectrum Leasing Rules and Speeds Processing to Create Additional Opportunities for Access to Spectrum Through Secondary Markets, *News Release*, Federal Communications Commission, Jul. 8, 2004.

provide mobile voice and, in most cases, mobile data services: cellular, broadband PCS, and SMR.[187] This information is provided as a basis for understanding the formation of the current industry structure.

87. Cellular – The Commission began licensing commercial cellular providers in 1982 and completed licensing the majority of operators by 1991. The Commission divided the United States and its possessions into 734 cellular market areas ("CMAs"), including 305 Metropolitan Statistical Areas ("MSAs"), 428 Rural Statistical Areas ("RSAs"), and a market for the Gulf of Mexico.[188] Two cellular systems were licensed in each market area. The Commission designated 50 megahertz of spectrum in the 800 MHz frequency band for the two competing cellular systems in each market (25 megahertz for each system). Initially, cellular systems offered service using analog technology, but today most of the service offered using cellular spectrum is digital.[189]

88. Broadband PCS – Broadband PCS is similar to cellular service, except that broadband PCS systems operate in different spectrum bands and have been designed from the beginning to use a digital format. Broadband PCS licenses have been assigned through auction, beginning in 1995.[190] The most recent broadband PCS auction was completed in 2001.[191] The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephony, divided originally into three blocks of 30 megahertz each (blocks A, B, and C) and three blocks of 10 megahertz each (blocks D, E, and F).[192] Two of the 30 megahertz blocks (A and B

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[187] *See* Appendix B, Table 1 and Maps 11-14, at B-11 – B-15, for descriptions and maps of various geographical licensing schemes employed by the Commission.

[188] Under the original cellular licensing rules, one of the two cellular channel blocks in each market (the B block) was awarded to a local wireline carrier, while the other block (the A block) was awarded competitively to a carrier other than a local wireline incumbent. After awarding the first 30 MSA licenses pursuant to comparative hearing rules, the Commission adopted rules in 1984 and 1986 to award the remaining cellular MSA and RSA licenses through lotteries. By 1991, lotteries had been held for every MSA and RSA, and licenses were awarded to the lottery winners in most instances. In some RSA markets, however, the initial lottery winner was disqualified from receiving the license because of a successful petition to deny or other Commission action. Implementation of Competitive Bidding Rules to License Certain Rural Service Areas, *Report and Order*, 17 FCC Rcd 1960, 1961-1962 (2002). In 1997, the Commission auctioned cellular spectrum in areas unbuilt by the original cellular licensees. *See* FCC, *Auction 12: Cellular Unserved* (visited Apr. 12, 2002) <http://wireless.fcc.gov/auctions/12/>. In 2002, the Commission auctioned three RSA licenses where the initial lottery winner had been disqualified. *See* FCC, *Auction 45: Cellular RSA* (visited Jun. 7, 2002) <http://wireless.fcc.gov/auctions/45/>.

[189] *See* Section VI.B.1, Subscriber Growth, *infra*.

[190] The first auction was for two license blocks of 30 megahertz each. *FCC Grants 99 Licenses For Broadband Personal Communications Services In Major Trading Areas,* News Release, FCC, Jun. 23, 1995. The Commission has had five additional broadband PCS auctions. *See* FCC, *Auctions Home* (visited Apr. 29, 2003) <http://wireless.fcc.gov/auctions/>. Three licenses were also awarded as part of a pioneer preference program in 1994. *Three Pioneer Preference PCS Applications Granted*, News Release, FCC, Dec. 14, 1994.

[191] *See Sixth Report*, at 13368. *See also,* Disposition of Down Payment and Pending Applications By Certain Winning Bidders in Auction No. 35; Requests for Refunds of Down Payments Made In Auction No. 35, *Order and Order on Reconsideration*, 17 FCC Rcd 23354 (2002); and *Federal Communications Commission v. NextWave Personal Communications, et al*., 537 U.S. 293 (2003).

[192] The Commission's broadband PCS allocation includes 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS.

blocks) are assigned on the basis of 51 Major Trading Areas ("MTAs").[193] One of the 30 megahertz blocks (C block) and all three of the 10 megahertz blocks are assigned on the basis of 493 BTAs.[194] As noted above, the Commission has announced that it will hold another auction of broadband PCS spectrum in January of 2005.

89. SMR - The Commission first established SMR in 1979 to provide for land mobile communications on a commercial basis. The Commission initially licensed spectrum in the 800 and 900 MHz bands for this service, in non-contiguous bands, on a site-by-site basis.[195] The Commission has since licensed additional SMR spectrum through auctions.[196] In total, the Commission has licensed 19 megahertz of SMR spectrum, plus an additional 7.5 megahertz of spectrum that is available for SMR as well as other services.[197] While Commission policy permits flexible use of this spectrum, including the

[193] Major Trading Areas are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with the Federal Communications Commission. Rand McNally's MTA specification contains 47 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission has added three MTA-like areas: Guam and the Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands, and American Samoa. In addition, Alaska was separated from the Seattle MTA into its own MTA-like area. MTAs are combinations of two or more BTAs. *See* note 27 for a description of BTAs.

[194] In June 1998, broadband PCS C block licensees were permitted to elect to disaggregate their licenses and return 15 megahertz of C block spectrum to the Commission. As a result, a number of licensees elected to disaggregate some or all of their licenses, creating some BTAs with seven broadband PCS spectrum licenses. *See* Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Second Report and Order and Further Notice of Proposed Rule Making*, 12 FCC Rcd 16436 (1997); Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Order on Reconsideration of the Second Report and Order*, 13 FCC Rcd 8345 (1998). In August 2000, the Commission decided to reconfigure each 30 megahertz C block license available for auction, beginning with Auction No. 35, into three 10 megahertz licenses. Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Sixth Report and Order and Order on Reconsideration*, 15 FCC Rcd 16266, 16267 (2000).

[195] The "900 MHz" SMR band refers to spectrum allocated in the 896-901 and 935-940 MHz bands; the "800 MHz" band refers to spectrum allocated in the 806-824 and 851-869 MHz bands. *See* 47 C.F.R. § 90.603; *see also* 47 C.F.R. § 90.7 (defining "specialized mobile radio system").

[196] The Commission has held multiple auctions for SMR licenses. FCC, *FCC Auctions* (visited Mar. 7, 2002) <http://wireless.fcc.gov/auctions/>.

[197] There are five megahertz in the 900 MHz band (200 paired channels x 12.5 kHz/channel). *See* 47 C.F.R. § 90.617, Table 4B. There are 21.5 megahertz in the 800 MHz band: 14 megahertz in the 800 SMR Service (280 paired channels x 25 kHz/channel) and 7.5 megahertz in the 800 MHz General Category (150 paired channels x 25 kHz/channel). *See* 47 C.F.R. § 90.615, Table 1 (SMR General Category) and 47 C.F.R. § 90.617, Table 4A (SMR Service). In 2000, the Commission amended its rules to allow Business and Industrial/Land Transportation licensees in the 800 MHz band to use their spectrum for CMRS operations under certain conditions. Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz; Petition for Rule Making of The American Mobile Telecommunications Association, *Report and Order and Further Notice of Proposed Rule Making*, 15 FCC Rcd 22709, 22760-61 (2000). This could make up to five megahertz of additional spectrum available for digital SMR providers: 2.5 megahertz in the Industrial/Land Transportation Category (50 paired channels x 25 kHz/channel) and 2.5 megahertz in the Business Category (50 paired channels x 25 kHz/channel). *See* 47 C.F.R. § 90.617, Tables 2A and 3A.

provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,[198] the primary use for SMR traditionally has been trunked dispatch services.[199] Dispatch differs from mobile voice communications offered by PCS and cellular carriers in that it allows both one-to-one and one-to-many communication (including real-time conferencing with groups), and it generally does not operate through interconnection with the public switched telephone network.[200] SMR systems have also had the ability to offer interconnected service, but until the development of digital technologies, analog SMR systems had limited capacity to provide mobile telephony. In recent years, however, the nature of SMR service has evolved significantly. SMR providers such as Nextel and Southern LINC, a unit of energy concern Southern Company, have used digital technologies to increase spectral efficiency and to become more significant competitors in mobile telephony, while also providing dispatch functionality as a part of their service offerings.[201] Furthermore, in apparent response to the dispatch functionality of SMR services, some cellular and broadband PCS carriers have begun to offer push-to-talk functionality on their networks, including Verizon Wireless, Sprint PCS, and ALLTEL.[202] SMR spectrum is also used for certain data-only networks.[203]

90. Available Licenses and Spectrum Aggregation – In every geographical area of the country, the Commission initially authorized up to eight different mobile telephony licenses (two cellular and six broadband PCS), not including additional digital SMR licenses.[204] Moreover, under Commission rules,

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[198] Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, Policy Statement, 14 FCC Rcd 19868 (1999); *see also* Applications of Various Subsidiaries and Affiliates of Geotek Communications, Inc., Debtor-In-Possession, Assignors, and Wilmington Trust Company or Hughes Electric Corporation, Assignees, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, Memorandum Opinion and Order, 15 FCC Rcd 790, 802 (2000).

[199] Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units (*e.g.*, between a taxicab dispatch office and a taxi) or between two or more mobile units (*e.g.*, between a car and a truck). *See Fifth Report*, at 17727-17728, for a detailed discussion. A number of providers continue to provide both commercial and private dispatch services at 800 MHz, 900 MHz, 220 MHz, 217-219 MHz, and 450-470 MHz. *See* Applications of Motorola, Inc.; Motorola SMR, Inc.; and Motorola Communications and Electronics, Inc. Assignors; and FCI 900, Inc., Assignee, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Order*, 16 FCC Rcd 8451 (2001) ("*Motorola Order*"). Dispatch and SMR are often used interchangeably, although SMR refers to specific spectrum ranges.

[200] *See* The Strategis Group, THE STATE OF THE SMR INDUSTRY: NEXTEL AND DISPATCH COMMUNICATIONS (Sept. 2000), at 57; The Strategis Group, U.S. DISPATCH MARKETS (Jan. 2000), at 1. *See also Motorola Order*, at 8457.

[201] According to Nextel, "[We are] referred to as an 'SMR provider' . . ., although [our] services compete directly with and are regulated virtually identically to those of cellular and PCS providers." Nextel, Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Comments*, at note 4 (filed Jan. 5, 2001). However, in comparison with cellular and broadband PCS providers, digital SMR providers are more focused on the business than the individual consumer market. *See, e.g.,* Nextel Communications, Inc., SEC Form 10-Q, Nov. 14, 2000, at 16.

[202] *See* Section IV.B.6, Provision of Ancillary Services and Promotional Offers, *infra*.

[203] *See* Section IV.B.1.e, Data-Only Networks and Technology Deployment, *infra.*

[204] Some areas may have fewer than eight active licenses because certain auction winners or licensees have defaulted on payments to the Commission, because some licensees did not meet their buildout requirements, some licensees returned their licenses, or some licenses remained unsold in an auction.

broadband PCS, cellular, and auctioned SMR licensees may, with Commission approval, disaggregate (divide the spectrum into smaller amounts of bandwidth) or partition (divide the license into smaller geographical areas) their licenses, or both, to other entities.[205] Many licensees hold more than one license in a particular market. While no longer in operation, the Commission's CMRS spectrum cap molded the current distribution of spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR[206] spectrum in an MSA, or more than 55 megahertz in an RSA.[207] In November 2001, however, the Commission raised the spectrum cap to 55 megahertz in all markets, and decided to eliminate the restriction entirely effective January 1, 2003.[208]

b. 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange

91. On July 8, 2004, the Commission adopted a new band plan for the 800 MHz band to resolve the problem of interference to public safety radio systems operating in the band from CMRS providers operating systems on channels in close proximity to those utilized by public safety entities.[209] The new band plan addresses the root cause of the interference problem by separating generally incompatible technologies, with the costs of relocating 800 MHz incumbents to be paid by Nextel. To accomplish the reconfiguration, the Commission will require Nextel to give up rights to certain of its licenses in the 800 MHz band and all of its licenses in the 700 MHz band. In exchange, the Commission will modify Nextel's licenses to provide the right to operate on two five-MHz blocks in the 1.9 GHz band – specifically 1910-1915 MHz and 1990-1995 MHz – conditioned on Nextel fulfilling certain obligations specified in the Commission's decision. As a new entrant in the 1.9 GHz band, Nextel is also obligated to fund the transition of incumbent users to comparable facilities. The Commission determined that the overall value of the 1.9 GHz spectrum is $4.8 billion, less the cost of relocating incumbent users. In addition, the Commission decided to credit to Nextel the value of the spectrum rights that Nextel will relinquish and the actual costs Nextel incurs to relocate all incumbents in the 800 MHz band. To the extent that the total of these combined credits is less than the assessed value of the 1.9 GHz spectrum rights, Nextel will make an anti-windfall payment equal to the difference to the United States Department of the Treasury at the conclusion of the relocation process.

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[205] 47 C.F.R. § 24.714 (PCS); 47 C.F.R. § 22.948 (cellular); 47 C.F.R. §§ 22.948, 90.813, and 90.911 (auctioned SMR). As a result of partitioning and disaggregation, there often are more than eight cellular and broadband PCS licenses in a market.

[206] No more than 10 megahertz of SMR spectrum was attributable to an entity under the cap. 47 C.F.R. § 20.6(b).

[207] 47 C.F.R. § 20.6(a).

[208] 2000 Biennial Regulatory Review Spectrum Aggregation Limits For Commercial Mobile Radio Services, *Report and Order*, 16 FCC Rcd 22668 (2001), *petitions for reconsideration pending* ("*Spectrum Cap Order*"). The increase to 55 megahertz took effect February 13, 2002. *See* 67 Fed. Reg. 1626 (Jan. 14, 2002). All license transfers are still subject to review by the Commission to determine whether they are in the public interest. *Spectrum Cap Order*, at 22670-22671.

[209] FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio Systems, *News Release*, Federal Communications Commission, Jul. 8, 2004.

c. Narrowband Spectrum

92. In addition to the spectrum that mobile telephone carriers use to offer both voice and data CMRS services, two additional spectrum bands – paging and narrowband PCS – are used by licensees to offer CMRS services that consist only of data communications. Spectrum designated for commercial messaging/paging is spread across several non-contiguous bands: 35-36 MHz, 43-44 MHz, 152-159 MHz, 454-460 MHz, and 929-932 MHz.[210] Each license consists of between 20 and 50 kilohertz.[211] The Commission first allocated spectrum for paging in 1949 and licensed the spectrum on a site-by-site basis through the mid-1990s.[212] In 2000 the Commission began auctioning additional paging licenses on a geographic area basis using EAs and MEAs.[213] The Commission completed its third paging auction on May 28, 2003.[214]

93. Narrowband PCS spectrum is located in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands and allows licensees to offer an array of two-way data services such as text messaging.[215] The Commission first auctioned narrowband PCS spectrum in 1994.[216] Licenses consisted of between 50 and 100 kilohertz each and were offered on both a nationwide and regional basis.[217] On Sept. 25, 2003, the Commission completed an auction of six, 62.5 kilohertz regional narrowband PCS licenses.[218] Space Data Spectrum Holding, LLC won a package of 5 regional licenses covering the continental U.S. in this auction.[219] On Sept. 29, 2003, the Commission completed an auction of licenses covering 48 MTAs and

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[210] FCC, *Paging (Lower) Bandplan*, <http://wireless.fcc.gov/auctions/data/bandplans/pagingLwrband.pdf>; FCC, *929 and 931 MHz Paging Bandplan*, <http://wireless.fcc.gov/auctions/data/bandplans/auc26bnd.pdf>.

[211] *Id.*

[212] Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Notice of Proposed Rulemaking*, 11 FCC Rcd 3108, 3109-3110 (1996).

[213] *See* 929 and 931 MHz Paging Auction Closes, *Public Notice*, DA 00-508 (rel. Mar. 6, 2000); *Seventh Report*, at 13050-13051.

[214] Lower and Upper Paging Bands Auction Closes, *Public Notice*, DA 03-1836 (rel. May 30, 2003).

[215] Implementation of Section 309(j) of the Communications Act – Competitive Bidding Narrowband PCS, PP Docket No. 93-253, *Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 10 FCC Rcd 175 (1994).

[216] Announcing the High Bidders in the Auction of Ten Nationwide Narrowband PCS Licenses; Winning Bids Total $617,006,674, *Public Notice*, PNWL 94-4 (Aug. 2, 1994).

[217] *Id.*; Announcing the High Bidders in the Auction of 30 Regional Narrowband PCS Licenses; Winning Bids Total $490,901,787, *Public Notice,* PNWL 94-27 (rel. Nov. 9, 1994).

[218] Regional Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3006 (rel. Oct. 1, 2003).

[219] Space Data offers a two-way telemetry service using balloon-based base stations operating at approximately 100,000 feet. With the additional spectrum purchased in Auctions 50 and 51, Space Data will be licensed for over 1.7 megahertz of the 3 megahertz of narrowband PCS spectrum. *Space Data Corporation Captures 262.5 kHz of New Spectrum – Controls Majority of Narrowband PCS,* Press Release, Space Data Corporation, Nov. 19, 2003.

ranging in size from 50 to 200 kilohertz.[220] Space Data Spectrum Holding, LLC won 42 of the 48 licenses in this auction.

d. 700 MHz Bands

94. As discussed in the *Eighth Report,* the 700 MHz spectrum is being reclaimed from use by broadcast services in connection with the transition of the analog television service to digital television.[221] The reclamation of television spectrum has been addressed in two parts, primarily as a result of different statutory requirements applicable to the two bands and differing degrees of incumbency in the two bands.[222] These two bands are the 698-746 MHz (known as the "Lower 700 MHz") band and the 746-806 MHz (or "Upper 700 MHz") band. The Upper 700 MHz Band is currently used by TV stations on Channels 60-69 and comprises 60 megahertz, while the Lower 700 MHz Band, which is used by TV stations on Channels 52-59, comprises 48 megahertz of spectrum.[223]

95. Seventy-eight megahertz of the total 108 megahertz of Upper and Lower 700 MHz spectrum will generally be open to a broad range of flexible uses.[224] Pursuant to statutory mandate, licenses for this spectrum will be assigned through competitive bidding.[225] These bands have many permissible uses: winning bidders may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.[226] The Commission expects that many of the new technologies to be developed and deployed in this band will support advanced wireless applications.[227] However, much of the Upper and Lower 700 MHz spectrum is currently encumbered by television broadcasters, and may remain so until the end of period when broadcasters convert from analog to digital transmission systems.[228] That the

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[220] Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3012 (rel. Oct. 2, 2003).

[221] *See Eighth Report*, at 14798-14799.

[222] Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Notice of Proposed Rulemaking*, 16 FCC Rcd 7278, 7282 (2001).

[223] The Commission has allocated 24 megahertz of the Upper 700 MHz band for use by public safety entities, pursuant to Section 337(a) of the Communications Act. 47 U.S.C. § 337(a).

[224] *See* Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Report and Order*, 17 FCC Rcd 1022 (2002) ("*Lower 700 MHz Report and Order*"); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Third Report and Order*, 16 FCC Rcd 2703 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20845 (2000); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000) ("*Upper 700 MHz Second Report and Order*").

[225] *See* Lower 700 MHz Report and Order, at 1024; Upper 700 MHz Second Report and Order, at 5301-2.

[226] *Id.*

[227] Lower 700 MHz Report and Order, at 1032.

[228] *Id.*, at 1028.

period is defined by statute.[229] Nevertheless, there may be some portions of these bands that are not so encumbered and are available for immediate use by winning bidders.

96. The Balanced Budget Act of 1997 and subsequent legislation initially directed the Commission to license these reclaimed spectrum bands well in advance of the end of the DTV transition period.[230] However, after the Commission had scheduled auctions of the Upper 700 MHz band (Auction No. 31) and Lower 700 MHz band (Auction No. 44) pursuant to statutory deadlines established in that legislation,[231] the Auction Reform Act of 2002 eliminated these statutory deadlines[232] and provided the Commission with discretion to "determine the timing of and deadlines for the conduct of competitive bidding under [Section 309(j) of the Communications Act of 1934, as amended], including the timing of, and deadlines for, qualifying for bidding; conducting auctions; collecting, depositing, and reporting revenues; and completing licensing processes and assigning licenses."[233] The Auction Reform Act further ordered the Commission to delay the A, B, and E block portion of Auction No. 44 (Lower 700 MHz) and the entire Auction No. 31 (Upper 700 MHz), yet it also directed the Commission to proceed with an auction of the C and D blocks starting "no earlier than August 19, 2002, and no later than September 19, 2002."[234]

97. On September 18, 2002, the initial auction of Lower 700 MHz C and D block licenses (Auction No. 44) closed, raising $88.7 million in net bids.[235] The Commission offered 740 licenses: one 12 megahertz license in 734 CMAs, and one 6 megahertz license in 6 Economic Area Groupings ("EAG").[236] The Commission selected CMAs as the license areas in part to address the needs of small, regional, and rural carriers.[237] A total of 102 bidders won 484 licenses;[238] 47 of the winning bidders were

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[229] *See* 47 U.S.C. § 309(j)(14)(A)-(B).

[230] Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 § 3003 (1997) (adding new Section 309(j)(14) to the Communications Act of 1934, as amended); § 3007 (uncodified; reproduced at 47 U.S.C. § 309(j) note 3); Consolidated Appropriations Act, 2000, Pub. L. No. 106-113, 113 Stat. 2502, App. E, § 213, 145 Cong. Rec. H12493-94 (Nov. 17, 1999) ("Consolidated Appropriations Act"); 47 U.S.C. § 309(j)(14)(C)(ii).

[231] The Commission initially announced that it would conduct both auctions starting on June 19, 2002. Later, on May 24, 2002, the Commission announced that Auction No. 31 was postponed until January, 2003. Auction of Licenses in the 747-762 and 777-792 MHz Band (Auction No. 31) Postponed Until January 14, 2003; Auction of Licenses in the 698-746 MHz Band (Auction No. 44) Will Proceed As Scheduled, *Public Notice*, FCC 02-158, Report No. AUC-02-31-F (Auction No. 31) and AUC-02-44-D (Auction No. 44) (rel. May 24, 2002).

[232] Auction Reform Act of 2002, Pub. L. No. 107-195, 116 Stat. 715 ("*Auction Reform Act*").

[233] 47 U.S.C. § 309(j)(15), as added by the Auction Reform Act.

[234] 47 U.S.C. § 309(j)(15)(C)(iii), as enacted by the Auction Reform Act.

[235] FCC, Auction 44: Lower 700 MHz Band, *Factsheet* (visited Mar. 11, 2003) <http://wireless.fcc.gov/auctions/44/factsheet.html>.

[236] *Id.*

[237] Lower 700 MHz Report and Order, at 1061-1062.

[238] FCC, Auction 44: Lower 700 MHz Band, *Factsheet* (visited Mar. 11, 2003) <http://wireless.fcc.gov/auctions/44/factsheet.html>.

rural telcos, and they won 136 licenses.[239] On June 13, 2003, the Commission completed the auction (Auction No. 49) of the remaining 256 licenses in the Lower 700 MHz band C and D blocks that did not have winning bidders in Auction No. 44, raising (in net high bids) a total of $56.8 million.[240] In that auction, 35 winning bidders won a total of 251 licenses.[241]

98. As required by the Auction Reform Act, we have prepared a report announcing when we intend to reschedule the remaining 700 MHz band auctions, and submitted the report to Congress on June 19, 2003.[242]

e. Advanced Wireless Services

99. As previously mentioned, U.S. mobile carriers have the flexibility to deploy technologies, including those commonly called Third Generation or "3G," that allow them to offer high-speed mobile data services using their existing CMRS spectrum.[243] Nevertheless, the Commission has continued its efforts over the past year to allocate and license additional spectrum suitable for offering advanced wireless services.[244] As noted in the *Eighth Report*, in 2002 the Commission, together with the National Telecommunications and Information Administration ("NTIA"), allocated 90 megahertz of spectrum in the 1710-1755 and 2110-2155 MHz bands that can be used to offer advanced wireless services, including 3G services.

100. In November 2003, in WT Docket No. 02-353, the Commission released a *Report and Order* adopting service rules for licensed fixed and mobile services, including advanced wireless services, for the 90 megahertz of spectrum at 1710-1755 and 2110-2155 MHz.[245] These service rules include application, licensing, operating and technical rules, and competitive bidding provisions. The Commission determined that this spectrum could be used for any wireless service that is consistent with the spectrum's fixed and mobile allocations and to license this spectrum under the Commission's flexible, market-oriented Part 27 rules.[246] In order to meet a variety of needs, including the needs of both large and small service providers, the Commission adopted a band plan for this spectrum that included a variety of licensing areas and paired spectrum blocks.

101. Specifically, the Commission adopted a band plan using regional and localized service areas

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[239] Based on data available at the Commission's Auction Form 175 database, *available at* <http://auctionfiling.fcc.gov/form175/index.htm> (last visited Mar. 12, 2002) ("*Form 175 Database*").

[240] Lower 700 MHz Band Auction Closes, *Public Notice*, DA 03-1978 (rel. Jun. 18, 2003).

[241] *Id.*

[242] Auction Reform Act of 2002, *Report To Congress*, FCC 03-138 (rel. Jun. 19, 2003).

[243] 47 C.F.R §§ 20.901(a) and 24.3.

[244] Advanced Wireless Services (AWS) is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as internet browsing, message services, and full-motion video) content.

[245] Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Report and Order*, 18 FCC Rcd 25162 (2003); *petitions for reconsideration pending*.

[246] 47 C.F.R. Part 27.

and employing symmetrically paired spectrum blocks with the pairings being comprised of different bandwidths. Under the band plan that the Commission adopted for this spectrum, 946 licenses will be made available to the public under the Commission's competitive bidding rules. The band plan permits spectrum to be easily aggregated. Economic Areas (EAs) can be aggregated to form Regional Economic Areas (REAGs) and Metropolitan Statistical Areas (MSAs) and Rural Service Areas (RSAs) allow service providers to mix and match rural and urban areas according to their business plans.[247] In addition, the band plan places the smaller spectrum blocks toward the middle of the bands to facilitate aggregation.

102. The Commission also decided not to impose ownership restrictions (other than those contained in Section 310 of the Communications Act), spectrum aggregation limits, eligibility restrictions, or interim performance requirements. The Commission did determine to limit the lower band (*i.e.*, 1710-1755 MHz band) to mobile transmissions and the upper band (*i.e.*, 2110-2155 MHz band) to base transmissions and established rules to protect co-channel and adjacent channel operations from interference. The Commission also determined to assign licenses for this spectrum using the Commission's Part 1 competitive bidding rules and award bidding credits of 15 percent for small businesses and 25 percent for very small businesses.

2. Other Potential Barriers to Entry

103. There are three other types of entry barriers, each of which captures separate dimensions of the difficulty of entering an industry. The first type consists of the impediment to entry erected by advertising expenditures. Unlike tangible capital, advertising can neither be resold nor otherwise transferred to prospective buyers. Upon its demise the advertiser can recover none of the money spent to promote its products; such expenditures are irrecoverable or sunk. While the incumbent has already incurred the sunk costs, the entrant has not. Therefore, the entrant has higher incremental cost and incremental risk associated with its decision to enter. According to Baumol and Willig, the two effects combine to lower expected profitability, thereby deterring entry.[248] Bain, on the other hand, argues that higher advertising generates brand loyalty and scale economies for incumbent firms.[249] To achieve these benefits and be on equal footing, an entrant must incur high selling costs, which increase with the advertising intensity of the industry. The high selling costs can depress expected profitability and dissuade entry. Both the selling and sunk cost aspects of advertising are typically measured by the advertising-to-sales ratio, a barometer of advertising intensity.[250]

104. The second type of entry barrier arises from economies of scale, which allow firms to lower the cost per unit of producing and distributing a product as the volume of output expands. The more extensive economies of scale are, the larger is the minimum efficient scale relative to the size of the market, meaning a nascent firm risks depressing market price by producing at optimal scale. The alternative is to produce at less than minimum cost. Either way, expected profitability is lowered, and entry is dissuaded. The minimum efficient scale is measured by the quotient of the average plant size

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[247] MSAs and RSAs are collectively referred to as Cellular Market Areas (CMAs).

[248] William J. Baumol and Robert D. Willig, *Fixed Cost, Sunk Cost, Entry Barriers and Sustainability of Monopoly*, QUARTERLY JOURNAL OF ECONOMICS, Vol. 96, Aug. 1981, at 406-431.

[249] Joe S. Bain, *Barriers to New Competition*, 1956, at 55 ("*Barriers to New Competition*").

[250] William S. Comanor and Thomas A. Wilson, *Advertising Market Structure and Performance*, THE REVIEW OF ECONOMICS AND STATISTICS, Vol. 49, Nov. 1967), at 425 ("*Advertising Market Structure and Performance*").

among the largest plants accounting for 50 percent of output and total industry sales.[251] The resulting number, a percentage of total industry output, indicates what fraction of industry sales a new entrant must capture to be as efficient as a larger incumbent firm.

105. The third type of entry barrier, and closely related to the second, is the inability of new firms to borrow sums sufficient to finance efficient start-ups. With the larger absolute capital requirement needed to realize minimum cost grows the inability to borrow sufficiently, erecting a staunch entry barrier. "That is, the absolute capital requirement may be so large that relatively few individuals or groups could secure the needed capital, or that entrants could secure it only at interest rates and other terms which placed them at a net cost disadvantage to established sellers."[252] The height of the barrier is usually measured by the minimum capital-requirement variable, which is the product of the capital-to-sales ratio and the average plant size among the largest plants accounting for 50 percent of output.[253]

106. All three types of entry barriers have the potential to afford incumbent carriers first-mover advantages over latecomers. We believe it is probable that the three types of entry barriers are high in CMRS mobile voice. Telecommunications has historically been an industry characterized by large investments in network infrastructure and vast scale economies, suggesting the scale economy and capital requirement barriers are both high. Increasing advertising expenditures by CMRS carriers as they seek to brand their products suggests that the product differentiation barrier in CMRS mobile voice is similarly high. As documented below in Section IV.B.4 on carrier rivalry with respect to advertising and marketing, total advertising expenditures by the six nationwide operators alone exceeded $3 billion in 2003, and advertising expenditures per subscriber have been rising since 2001.[254] We note, however, CTIA's suggestion that first-mover advantages may no longer be relevant to the CMRS industry given that non-cellular entrants such as T-Mobile and Nextel were leaders in adding subscribers in 2003.[255]

F. Rural Markets

1. Geographical Comparisons: Urban vs. Rural

107. Since the release of the *Sixth Report,*[256] the Commission has attempted to obtain a better understanding of the state of competition below the national level, and particularly in rural areas.[257] In order to analyze the mobile telecommunications market structure in rural areas, it is necessary first to define "rural areas." The federal government has multiple ways of defining rural, reflecting the multiple

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[251] *Id*., at 429.

[252] *Barriers to New Competition*, at 55.

[253] *Advertising Market Structure and Performance*, at 428.

[254] Section IV.B.4, Advertising and Marketing, *infra*.

[255] *CTIA Comments*, at 31.

[256] See *Sixth Report*, at 13350..

[257] The Commission held a public forum in February 2002 to discuss, among other things, CMRS competition issues in rural areas. In addition, the *Eighth CMRS NOI* included questions on a range of rural wireless issues.

purposes for which the definitions are used.[258] In the *Eighth Report*, the Commission analyzed service availability in rural areas using three different proxy definitions, and similar results were obtained for each definition.[259] The Commission compared the number of competitors in: 1) RSA counties versus MSA counties; 2) non-nodal EA counties versus nodal EA counties;[260] and 3) counties with population densities below 100 persons per square mile versus those with population densities above 100 persons per square mile.[261] In addition, the Commission released a *Notice of Proposed Rulemaking* in 2003 to examine ways to promote the rapid and efficient deployment of spectrum-based services in rural areas.[262] Similarly, as stated above, in its *Ninth CMRS NOI*, the Commission asked for comments on how the Commission should define "rural areas" for purposes of the *Ninth Report*.[263]

2. Definition of Rural

108. The Commission does not have a statutory definition of what constitutes a rural area. The Commission has used RSAs as a proxy for rural areas for certain purposes, such as the current cellular cross-interest rule and the former CMRS spectrum cap, stating that "other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas."[264] In its recently adopted report and order concerning deployment of wireless services in rural areas, the Commission adopted a default definition of "rural" as a county with a population density of 100 persons or fewer per square mile.[265] For this reason, we adopt this same definition to analyze service availability in rural areas for this report.[266]

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[258] *See Eighth Report,* 18 FCC Rcd at 14834, ¶ 108-109. *See also* Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, 18 FCC Rcd 20802, 20808-11 ¶¶ 10-12 (2003) ("*Rural NPRM*").

[259] *See Eighth Report*, 18 FCC Rcd at 14835-37, ¶¶ 111-121.

[260] Each EA consists of one or more counties that are "Economic Nodes" and the surrounding counties that are economically related to it. An EA may have more than one economic node. The counties that are economic nodes are metropolitan areas or similar areas that serve as the EA's center(s) of economic activity. As a proxy for urban and rural geographic areas, the Commission looked at counties which make up economic nodes, i.e. nodal counties, versus those counties that do not make up economic nodes, i.e. non-nodal counties. *See Eighth Report*, 18 FCC Rcd at 14836, ¶ 112.

[261] *See Eighth Report*, 18 FCC Rcd at 14836, ¶ 114.

[262] *See Rural NPRM*, 18 FCC Rcd at 20803-04, ¶1.

[263] *See* note 11, *supra*.

[264] Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd 9219, 9256 at note 203 (1999).

[265] *Rural Order PN*.

[266] We note that this definition is supported by many of the commenters. *See CTIA Comments*, at 11; *RSA Comments*, at 5; *RTC Reply Comments*, at 3. One commenter suggested using a 25 persons per square mile definition, but we rejected that definition in the *Eighth Report*. *Blooston Rural Carrier Comments*, at 7; *Eighth Report*, at 14836.

3. Rural Competition

109. In comparing competitive entry in counties with population densities of 100 persons per square mile or less to those with densities greater than 100 persons per square mile, we find that the less densely populated counties have an average of 3.7 mobile competitors, while the more densely populated counties have an average of 5.9 competitors.

110. Rural Cellular Association members can participate in a voluntary survey, similar to CTIA's biannual survey, conducted by Keisling Associates, LLP ("*Keisling RCA Survey*").[267] For 2002 (the most recent survey results available), the survey showed that there was an average of 5.1 wireless competitors in survey participants' markets, having increased steadily from 3.0 competitors in the 1998 *RCA Survey*.[268] RCA concludes that the survey indicates that there is "robust and effective competition, increasing year-to-year, in the markets served by RCA members." The *Keisling RCA Survey* also presented evidence of increasing customer usage and declining per minute pricing in rural areas, similar to trends that we have seen nationally.[269]

4. Conclusion

111. Based on our rollout analysis and information provided by commenters, we conclude that CMRS providers are competing effectively in rural areas.[270] While it appears that, on average, a smaller number of operators are serving rural areas than urban areas, this difference does not necessarily indicate that effective CMRS competition does not exist in rural areas. In this regard, we note that the average number of mobile operators estimated to be serving rural areas in the United States is greater than the total number of national mobile operators serving countries with a reputation of having highly advanced mobile service markets such as Japan, South Korea, and Finland. In addition, data and statements presented by commenters on the *Ninth CMRS NOI* support the conclusion that effective CMRS competition does exist in rural areas. Finally, we emphasize that market structure is only a starting point for a broader analysis of the status of competition based on the totality of circumstances, including the pattern of carrier conduct, consumer behavior, and market performance.

IV. CARRIER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET

112. A concentrated market, in conjunction with significant entry barriers, may lessen competition in the market for commercial mobile services in two distinct ways. First, it may increase the likelihood

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[267] *See RCA Comments*, at 2.

[268] *See* Appendix A, Table 6: Keisling RCA Survey, at A-9. We note that this analysis is not directly comparable with our own, since the *Keisling RCA Survey* measures competitors by market (which is undefined) while ours is county-based.

[269] *See* Appendix A, Table 6: Keisling RCA Survey, at A-9. We note that RCA represents companies that serve markets where 14.6 million people reside. *RCA Comments*, at note 1. Thus, the *Keisling RCA Survey* results represent 25 percent of rural customers, since the 2000 Census found that 59 million people were "rural." *See Eighth Report*, at 14836.

[270] *See*, *e.g.*, *CTIA Comments*, at 8 ("The wireless industry has consistently provided highly competitive services throughout all regions of the U.S., including rural America"); *RCA Comments*, at 7 ("RCA members are competitive in their wireless service offering").

that a group of competing carriers will successfully engage in coordinated interaction aimed at raising prices and lowering output. Second, it may enable an individual carrier to profitably raise price and lower output unilaterally. However, neither coordinated interaction nor unilateral action to lessen competition is a necessary consequence of market concentration and entry barriers. For example, unilateral or coordinated action to lessen competition may be thwarted or undermined by the presence of one or more maverick carriers who have the ability and incentive to expand sales by undercutting the prices of rivals, offering innovative service packages and engaging in aggressive advertising and promotional campaigns.[271] The analysis of carrier conduct thus focuses on whether incumbent carriers, given the prevailing market structure, engage in intense price and non-price rivalry or instead behave as if they are content to live peacefully with one another.

A. Price Rivalry

1. Developments in Mobile Telephony Pricing Plans

113. The continued rollout of differentiated pricing plans also indicates a competitive marketplace. In the mobile telephone sector, we observe independent pricing behavior, in the form of continued experimentation with varying pricing levels and structures, for varying service packages, with various available handsets and policies on handset pricing. AT&T Wireless's Digital One Rate plan, introduced in May 1998, is one notable example of an independent pricing action that altered the market and benefited consumers.[272] Today all of the nationwide operators offer some version of a national rate pricing plan in which customers can purchase a bucket of MOUs to use on a nationwide or nearly nationwide network without incurring roaming or long distance charges.

114. Another trend in mobile telephone pricing has been the expansion of free calling among a particular company's customers, known as "in-network" or "mobile-to-mobile" calling.[273] Such callers do not have to pay any additional fees for incoming or outbound calls with other subscribers of the same company. In January 2004, AT&T announced that new customers who sign a two-year contract for plans of at least $40 monthly would also receive unlimited mobile-to mobile calling, as long as they call from their mobile-to-mobile calling area.[274] In February 2004, Verizon Wireless added unlimited in-network calling to "America's Choice" calling plans of at least $40 a month.[275] Also in February, Cingular Wireless launched a new suite of national rate plans, "Cingular Nation GSM," where customers received

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[271] An example is when AT&T introduced its digital-one-rate plan in May 1998, which was the first plan to include a large quantity of monthly minutes at a fixed rate and no long distance charges when used on the operator's network. *See Fourth Report*, at 10155, and *Fifth Report*, at 17677-78.

[272] *See AT&T Launches First National One-Rate Wireless Service Plan*, News Release, AT&T Corp., May 7, 1998.

[273] The carriers' plans described below had previously included 1,000 "in-network" minutes. Jesse Drucker, *AT&T Verizon Go 'Unlimited' As Wireless Battle Accelerates*, WALL STREET JOURNAL, Feb. 2, 2004, at B5; Dan Meyer, *Party's Over, Carriers Hike Rate Plans*, RCR WIRELESS NEWS, Feb. 9, 2004.

[274] *Groundbreaking AT&T Wireless Offer Provides Free, Unlimited Mobile-To-Mobile Calling*, News Release, AT&T Wireless, Jan. 30, 2004. Existing customers on such plans can request the new offer at no charge. *Id*.

[275] Dan Meyer, *Party's Over, Carriers Hike Rate Plans*, RCR WIRELESS NEWS, Feb, 9, 2004; Jesse Drucker, *AT&T Verizon Go 'Unlimited' As Wireless Battle Accelerates*, WALL STREET JOURNAL, Feb. 2, 2004, at B5.

5,000 mobile-to-mobile minutes to use on its GSM network (since expanded to unlimited) on plans starting at $50 a month.[276] Sprint PCS also offers unlimited in-network calling on its "Free & Clear Nationwide" plans for an additional $5 per month.[277]

2. Prepaid Service

115. In the United States, most mobile telephony subscribers pay their phone bills after they have incurred charges (known as postpaid service). Prepaid service, in contrast, requires customers to pay for a fixed amount of minutes prior to making calls. Although prepaid plans are considered a good way to increase penetration rates, they typically produce lower ARPUs and higher churn rates in comparison to postpaid subscribers.[278]

116. One analyst estimated that 6 percent of U.S. wireless phone users subscribed to prepaid plans in 2003, roughly what we found in the *Eighth Report*.[279] AT&T Wireless, Cingular Wireless, and Verizon Wireless all had about 6 percent of subscribers on prepaid plans, while T-Mobile had about 11 percent. Sprint PCS and Nextel have partnered with third-party resellers to market prepaid offerings aimed at the youth portion of the population.[280]

3. Mobile Data Pricing

117. In addressing both price-rivalry and non-price rivalry in the mobile data market, it is useful to divide the market into two distinct segments.[281] The first segment consists of simple handset-based applications marketed to consumers primarily as an add-on to mobile voice service, including text messaging ("SMS"), multimedia messaging services ("MMS") such as photo messaging, and entertainment applications such as ring tones and games. The second segment consists of monthly mobile Internet access service packages for customers who wish to connect to wireless networks primarily or exclusively for data, rather than voice use, and who typically access the Internet through laptops or Personal Digital Assistants ("PDAs"). Given the limited coverage to date of high-speed wireless data networks and the slow speeds, relative to fixed broadband, of wireless network technologies that are

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[276] *Cingular's New Mobile-To-Mobile Plan Offers Customers More Coverage, More Advantages*, News Release, Cingular Wireless, Feb. 10, 2004; Cingular Wireless, *Rate Plans* (visited May, 27, 2004) <www.cingular.com>.

[277] Dan Meyer, *Party's Over, Carriers Hike Rate Plans*, RCR WIRELESS NEWS, Feb. 9, 2004.

[278] *See Eighth Report*, at 14830. *See, also*, *Nextel Communications, Inc.*, Raymond James & Associates, Equity Research, Feb. 9, 2004, at 15. However, in the trial stage of its prepaid offering, Boost Mobile, Nextel found that customers were using, on average, 300 MOUs, two to three times the minutes used by prepaid customers of other carriers. *Virtual Networks Make a Splash in 2003*, KAGAN WIRELESS MARKET STATS, Feb. 27, 2004, at 6.

[279] David Janazzo *et al., US Wireless Matrix 4Q03,* Merrill Lynch, Equity Research, Mar. 15, 2004, at 1, ("*US Wireless Matrix 4Q03*"); *Eighth Report*, at 14830.

[280] *See* Section III.B.2, Resale Providers, *supra*.

[281] *See* Frank J. Governali, Robert D. Barry, and Marje Soova, *Wireless Data Prospects Brightening*, Goldman Sachs, Global Investment Research, Apr. 16, 2004, at 31 and 34, ("*Wireless Data Prospect Brightening*"); *Eighth Report*, at 14843-14844.

widely available today, the first segment is more developed than the second.[282]

118. As detailed in the *Eighth Report*, in the first half of 2003 mobile carriers were experimenting with a variety of different options for pricing and measuring usage of handset-based applications, including pricing based on kilobytes consumed, flat rate pricing for each use of an application ("*pay-as-you-go*"), volume discounts on bundled packages of an application, and unlimited use pricing.[283] Use of these pricing options varied by type of application as well as by provider.[284] Furthermore, whether or not individual applications were offered on a stand-alone basis also varied by type of application and provider. In particular, most carriers allowed customers to purchase and send text messages without purchasing other mobile data services.[285] In contrast, whereas Verizon Wireless allowed customers to purchase and use selected applications, including ring tones, games, e-mail and photo messaging, on an *a la carte* basis through its "*Get It Now*" offering, several other carriers made subscribing to a monthly mobile Internet access service plan a precondition for obtaining some of the same handset applications offered by Verizon on an *a la carte* basis.[286] As a result of this diversity in pricing options, mobile data pricing has tended to be characterized by considerable complexity as compared with mobile voice pricing.

119. During the past year the six nationwide mobile carriers have restructured their pricing of handset-based applications.[287] As detailed below, carriers have tended to move away from pricing based on kilobytes consumed in favor of flat rate, volume discount and, to a lesser extent, unlimited use pricing.[288] According to one analyst report, it is not surprising that mobile data pricing has been evolving given that mobile data is still a new service and "it's hard to price a service for which there is little knowledge of usage patterns or end user appetite."[289] The report also points to rapid change in data capabilities, end user awareness and network functionality in explaining why mobile data pricing has been in flux.[290]

120. In 2003 some carriers were pricing certain applications based on kilobytes consumed, including T-Mobile for games and photo messaging, and AT&T Wireless, Cingular, and Verizon Wireless for photo messaging.[291] By March 2004, all these carriers had abandoned kilobyte-based pricing of photo messaging in favor of pricing options similar to those used for text messaging.[292] In particular,

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[282] *Id*., at 34. *See also* Section IV.B.1, Technology Deployment and Upgrades, *infra*.

[283] *See Eighth Report*, at 14843-14856 and 14905-14907.

[284] *Id*., at 14843.

[285] *Id*.

[286] *Id*., at 14843-14844.

[287] *Wireless Data Prospects Brightening*, at 2 and 31.

[288] *Id*., at 31.

[289] *Id*.

[290] *Id*.

[291] *Id*., at 33 and 34.

[292] *Id*., at 31-32 and 34.

most of the six nationwide mobile carriers were offering two alternative pricing options for both text messaging and photo messaging: a *pay-as-you-go* option consisting of a flat rate per message sent or received, and bundled options consisting of volume discount rates for variously sized packages that afford users a lower unit price per message as compared with the flat *pay-as-you-go* rate.[293] T-Mobile also abandoned kilobyte-based pricing on games and instead began to price games per download.[294] The other nationwide mobile carriers similarly offer the option of pricing mobile games per download or per session.[295]

121. In addition to moving away from kilobyte-based pricing, some carriers added, revised or discontinued unlimited use pricing on handset-based data applications in the past year. In 2003, Sprint PCS differentiated its mobile data service by offering unlimited use of a variety of handset-based applications, including SMS, MMS, ring tones, games and web browsing, for a flat monthly fee through its PCS Vision plan.[296] In addition, Verizon Wireless offered an unlimited use pricing option for mobile games, and Nextel offered the same option for text messaging.[297] As of March 2004, Sprint PCS continued to differentiate its data offering through unlimited use pricing, but it had restructured this option with respect to certain applications. In particular, while PCS Vision continued to include unlimited photo messaging, unlimited text messaging was only offered either as an add-on to Vision for an additional monthly fee or separately for a higher monthly fee.[298] As an alternative to unlimited SMS, Sprint also introduced a package of text messages to compete with rival text messaging bundles, and Sprint PCS customers could also send text messages on a *pay-as-you-go* basis for a flat fee per message.[299] T-Mobile also started to offer unlimited photo messaging through its monthly mobile Internet access service plan called T-Zones, as well as continuing to offer *pay-as-you-go* photo messaging.[300] In addition to restructuring its unlimited SMS offerings, Sprint PCS discontinued unlimited use pricing on games and ring tones, and instead began to include monthly credits toward the download of games, ring tones, and similar applications in PCS Vision.[301] In contrast, Verizon Wireless continued to offer an unlimited use pricing option for mobile games.[302] Finally, Nextel discontinued its unlimited SMS offering.[303]

122. With respect to the other segment of the mobile data market, as of March 2004 most of the

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[293] *Id*., at 32 and 34.

[294] *Id*., at 31 and 33.

[295] *Id*., at 33.

[296] *Id*., at 32-34; *Eighth Report*, at 14844 and14905-14907.

[297] *Wireless Data Prospects Brightening*, at 32-33.

[298] *Id*., at 32 and 34.

[299] *Id*, at 32.

[300] *Id*., at 34.

[301] *Id*., at 33.

[302] *Id*., at 33.

[303] *Id*., at 31.

nationwide carriers continued to price mobile Internet access service packages for data-centered laptop users based primarily on the amount of megabytes consumed each month.[304] Under this pricing scheme, the monthly rate per package increases with the amount of megabytes included in the package, but the volume discounts provided by larger packages result in a progressively lower price per megabyte. In addition, several carriers, including AT&T Wireless, Cingular, and Verizon Wireless, offered unlimited megabyte mobile Internet access service packages for a flat monthly fee alongside their megabyte-based offerings, and one carrier, T-Mobile, discontinued megabyte-based pricing in favor of its unlimited megabyte offering.[305] On the other hand, Sprint PCS discontinued its previous unlimited megabyte plan while retaining its megabyte-based offerings.[306]

B. Non-Price Rivalry

123. Service providers in the mobile telecommunications market also compete on non-price characteristics such as coverage, quality of service, and ancillary services. Non-price competition is a response to consumer preferences and demand. Indicators of non-price rivalry include advertising and marketing, capital expenditures, technology deployment and upgrades, and the provision of ancillary services.

1. Technology Deployment and Upgrades

a. Overview

124. The subject of technology deployment and upgrades by U.S. mobile telecommunications carriers is properly analyzed under the heading of carrier conduct because of the Commission's market-based approach to managing spectrum for commercial mobile voice and data services. In particular, the Commission's policies allow mobile telecommunications carriers the freedom to choose among the various standards for second-generation and more advanced network technologies that are identified and described below. In contrast, the European Community mandated a single harmonized standard for second-generation mobile telecommunications services, and has also adopted a single standard for third-generation services.[307] Thanks to the flexibility afforded by the Commission's market-based approach, different U.S. carriers have chosen a variety of different technologies and associated technology migration paths, and competition among multiple incompatible standards has emerged as an important dimension of non-price rivalry in the U.S. mobile telecommunications market and a distinctive feature of the U.S. mobile industry model. In addition, economists argue that multiple competing technological standards may have other pro-competitive advantages, including greater variety of services and greater

[304] *Id.*, at 36.

[305] *Id.*

[306] *Id.*

[307] Neil Gandal, David Salant, and Leonard Waverman, *Standards in Wireless Telephone Networks*, TELECOMMUNICATIONS POLICY, Vol. 27, 2003. The authors note that, although the European Community backed away from mandating a single standard for third-generation services, the absence of a mandate has had little practical effect as all European mobile operators have opted for the same standard and migration path. *Id.*, at 330.

price competition among carriers using incompatible standards.[308]

125. The following analysis of technology deployment and upgrades is divided into four parts. As background to examining the particular technological choices made by different carriers, Section IV.B.1.b provides an introduction to cellular network design and technology and identifies and describes the major digital technologies and associated migration paths. Section IV.B.1.c examines the specific technological choices made by mobile carriers that use the same spectrum bands, network design and technologies to offer both voice and data services. Section IV.B.1.d examines the impact of these choices on coverage by technology type. Finally, Section IV.B.1.e examines the technology deployment decisions of carriers with regard to data-only networks and services.

b. Background on Network Design and Technology

126. Cellular, PCS, and digital SMR networks use the same basic design. All use a series of low-power transmitters to serve relatively small areas ("cells"), and all employ frequency reuse to maximize spectrum efficiency.[309] In the past, cellular and SMR networks used an analog technology, while PCS networks were designed from the start to use a digital format. Digital technology provides better sound quality and increased spectral efficiency than analog technology. Competitive forces combined with increased capacity have induced companies to offer calling plans with large buckets of relatively inexpensive minutes, free enhanced services such as voicemail and caller ID, and wireless data and mobile Internet offerings.[310] From a customer's perspective, digital service in the cellular band or SMR bands is virtually identical to digital service in the PCS band. Digital technology is now dominant in the mobile telephone sector, with approximately 91 percent of all wireless subscribers using digital service.[311]

127. The four main digital technologies used in the United States are: Code Division Multiple Access ("CDMA"), Global System for Mobile Communications ("GSM"), integrated Digital Enhanced Network ("iDEN"), and Time Division Multiple Access ("TDMA"). These four technologies are commonly referred to as Second Generation, or "2G," because they succeeded the first generation of analog cellular technology, Advanced Mobile Phone Systems ("AMPS").[312] As discussed in the *Seventh Report*, in light of industry developments this report no longer distinguishes between TDMA and GSM networks in its analysis of digital coverage, but considers the two as one migration path towards more advanced digital capabilities. We recognize that TDMA as currently deployed will continue to be used by

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[308] *Id*., at 329-330.

[309] PCS, digital SMR, and cellular networks are all "cellular" systems since all divide service regions into many small areas called "cells." Cells can be as small as an individual building or as large as 20 miles across. Each cell serves as a base station for mobile users to obtain connection to the fixed network and is equipped with its own radio transmitters/receivers and associated antennas. Service regions are divided into cells so that individual radio frequencies may be reused in different cells ("frequency reuse"), in order to enhance frequency efficiency. When a person makes a call on a wireless phone, the connection is made to the nearest base station, which connects with the local wireline phone network or another wireless operator. When a person is using a wireless phone and approaches the boundary of one cell, the wireless network senses that the signal is becoming weak and automatically hands off the call to the base station in the next cell. *See Sixth Report*, at 13361, note 55.

[310] *See Sixth Report*, at 13361.

[311] *See* SectionVI.B.1, Subscriber Growth, *infra*.

[312] *See* note 324 for a discussion of the cellular analog requirement and its sunset.

millions of subscribers for a number of years.[313]

128. Beyond the 2G digital technologies, mobile telephone carriers have been deploying next-generation network technologies[314] that allow them to offer mobile data services at higher data transfer speeds and, in some cases, increase voice capacity. TDMA/GSM carriers are deploying General Packet Radio Service ("GPRS" or "GSM/GPRS"), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.[315] While initially it was expected that GPRS would provide data rates of up to 171.2 kbps, in practice the typical data rate experienced by users is 40-60 kbps.[316] Beyond GPRS, most U.S. TDMA/GSM carriers have begun to deploy Enhanced Data Rates for GSM Evolution ("EDGE") and eventually Wideband CDMA ("WCDMA," also known as Universal Mobile Telecommunications System, or "UMTS").[317] EDGE and WCDMA are expected to raise peak network speeds to 384 kbps and at least 2 Mbps, respectively.[318]

129. Many CDMA carriers have been upgrading their networks to CDMA2000 1xRTT (also referred to as "CDMA2000 1X" or "1xRTT"), a technology that doubles voice capacity and delivers peak data rates of 307 kbps in mobile environments and typical speeds of 40-70 kbps.[319] The next step in the CDMA migration beyond 1xRTT is CDMA2000 1X EV-DO (evolution-data only, "EV-DO") or 1X EV-DV (evolution data and voice, "EV-DV"), which allow maximum data throughput speeds of 2.4 and 3.09 Mbps, respectively.[320]

c. Technology Choices and Upgrades of Mobile Telephony Carriers

130. Of the six nationwide mobile telephone operators, Cingular, T-Mobile, and AT&T Wireless use TDMA/GSM as their 2G digital technology, Sprint PCS and Verizon Wireless use CDMA, and

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[313] *See Seventh Report*, at 13011.

[314] For purposes of this report, all of the network technologies beyond 2G that carriers have deployed, as well as those that they plan to deploy in the future, are generally referred to as "next-generation network technologies." The International Telecommunication Union ("ITU") has defined 3G network technologies as those that can offer maximum data transfer speeds of 2 megabits per second ("Mbps") from a fixed location, 384 kbps at pedestrian speeds, and 144 kbps at traveling speeds of 100 kilometers per hour. *See Fifth Report*, at 17695. There is ambiguity among other industry players, however, as to which network technologies constitute 3G and which constitute interim technologies, often labeled "2.5G." *See Seventh Report*, at 12990 and 13038. Therefore, this report uses a more general label to describe all of the technologies beyond 2G.

[315] *See Seventh Report*, at 12990. This upgrade is also labeled GSM/GPRS because many TDMA/GSM carriers are upgrading their TDMA markets with GSM and GPRS simultaneously.

[316] *Developments of Third-Generation Mobile Services in the OECD*, at 7.

[317] *See* Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephony Carriers, *infra.*

[318] *Developments of Third-Generation Mobile Services in the OECD*, at 7 and 12.

[319] *See Seventh Report*, at 12990; *Developments of Third-Generation Mobile Services in the OECD*, at 11.

[320] *See Seventh Report*, at 12990; *Developments of Third-Generation Mobile Services in the OECD*, at 12. CDMA2000 1XEV-DO puts voice and data on separate channels to achieve a data rate of 2.4 Mbps, while CDMA2000 1XEV-DV provides integrated voice and simultaneous high-speed packet data services at speeds of up to 3.09 Mbps. *Id*.

Nextel uses iDEN.[321] All six nationwide mobile carriers, together with other U.S. mobile carriers, have continued to deploy next generation network technologies over the past year.

131. During the past year, AT&T Wireless has invested over $2.5 billion in its GSM/GPRS/EDGE network[322] and has reached expanded roaming agreements with other carriers, doubling GSM coverage area and improving signal strength.[323] In November 2003, AT&T Wireless announced the deployment of its EDGE network, which, according to AT&T Wireless, offers average data speeds of 100-130 kbps.[324] EDGE is currently available nationally to AT&T Wireless customers located in areas served by the AT&T Wireless GSM/GPRS Next Generation Network, which covers approximately 215 million people, 6,500 cities and towns, and areas along more than 30,000 miles of major highways.[325] AT&T Wireless continues its rollout of EDGE-enabled phones from various manufacturers[326] and AT&T Wireless customers inside the EDGE coverage area can use the new Sony-Ericsson GC-82 modem card to access the EDGE network with their laptops.[327] In addition, following through on its commitment to offer WCDMA services in selected U.S. cities by the end of 2004,[328] in July 2004 AT&T Wireless launched WCDMA services in Detroit, Phoenix, San Francisco, and Seattle, and then extended its WCDMA network coverage to Dallas and San Diego in August 2004.[329]

132. Cingular Wireless's GSM/GPRS operations continue to expand, with 66 percent of Cingular's minutes now using the digital network.[330] Currently, more than 53 percent of Cingular's handsets are GSM capable, up from 22 percent a year ago.[331] At the end of the first quarter of 2004,

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[321] In addition, all operators using cellular spectrum must deploy AMPS, an analog technology, throughout the part of their networks using cellular spectrum. *See* 47 C.F.R. §§ 22.901, 22.933. In 2002, the Commission decided to eliminate the requirement after a five-year transition period. Year 2000 Biennial Regulatory Review – Amendment of Part 22 of The Commission's Rules to Modify or Eliminate Outdated Rules Affecting The Cellular Radiotelephone Service and Other Commercial Mobile Radio Services, *Report and Order*, 17 FCC Rcd 18401, 18414 (2002).

[322] *AT&T Wireless Pre-Announces First Quarter Services Revenue and Subscriber Results*, Press Release, AT&T Wireless, Apr. 20, 2004, available at <http://www.attwireless.com/press/releases/2004_releases/042004.jhtml>.

[323] *Id*.

[324] *AT&T Wireless Takes its Customers to the EDGE*, Press Release, AT&T Wireless, Nov. 18, 2003, <http://www.attwireless.com/press/releases/2003_releases/111803.jhtml>.

[325] *Id*.

[326] *EDGE Enabled Phones*, AT&T Wireless (visited May 21, 2004) <http://www.attwireless.com/personal/products/phones.jhtml?titleNumber=14>.

[327] *Id*.

[328] *See Eighth Report*, at 14820; Jesse Drucker, *Cingular to Test Wireless Network*, THE WALL STREET JOURNAL, May 26, 2004.

[329] Dan Meyer, *AWS Launches UMTS in Two More Markets*, RCR WIRELESS NEWS, Sept. 1, 2004.

[330] *Cingular Wireless Reports First-Quarter Results: Solid Subscriber Growth, Improved Margins, Continued GSM Success*, Press Release, Cingular Wireless, Apr. 20, 2004.

[331] *Id*.

Cingular's GSM/GPRS network was available to 94 percent of the company's POPs, up from approximately 56 percent a year earlier.[332] Cingular expects to achieve 100 percent GSM/GPRS coverage by July 2004.[333] Cingular also continues to deploy EDGE data technology throughout its network and expects to have nearly all its markets enabled with the technology by the end of summer 2004.[334] In addition to upgrading its existing GSM network, Cingular is planning to start its initial trial of WCDMA technology in its hometown of Atlanta during the summer of 2004.[335]

133. Verizon Wireless's 1xRTT is now generally deployed across its entire network.[336] In the past year, Verizon began rolling out its national BroadbandAccess network based upon 1xEV-DO technology.[337] Currently, only Verizon subscribers in Washington, DC and San Diego, California[338] have access to that technology, but when subscribers in those cities travel in other parts of the country, they can seamlessly access Verizon's next-generation data network based upon 1xRTT technology because the more advanced technologies on the CDMA migration path are backwards compatible.[339] Verizon plans to expand subscriber access to one-third of the Verizon network by the end of 2004 to reach over 75 million users.[340] Verizon indicates that BroadbandAccess delivers average user speeds of 300-500 kbps.[341]

134. At the writing of the *Eighth Report*, Sprint PCS had already deployed 1xRTT across its entire network footprint, but reportedly planned to wait until 1XEV-DV is available for commercial deployment instead of building out 1XEV-DO.[342] Some analysts had speculated that the increased spending by Verizon Wireless on EV-DO deployment might put pressure on rivals such as Sprint to increase their capital spending on similar network upgrades or risk losing share in the nascent wireless data market.[343] Nevertheless, as of March 2004 Sprint PCS continued to look at deploying CDMA 1XEV-DV for its next mobile data network upgrade, while not ruling out EV-DO deployment should enough customers demand the service.[344] By mid-2004 Sprint had evidently decided that customers' demands for faster wireless

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[332] *Id*.

[333] *Id*.

[334] *Id*.

[335] Jesse Drucker, *Cingular to Test Wireless Network*, THE WALL STREET JOURNAL, May 26, 2004

[336] Verizon Wireless, SEC Form 10-K, Mar. 15, 2004, at 5.

[337] *Verizon Wireless Makes Strides with Planned BroadbandAccess 3G Network Expansion*, Press Release, Verizon Wireless, Mar. 22, 2004, available at <http://news.vzw.com/news/2004/03/pr2004-03-22c.html>.

[338] *Id*.

[339] *Id*.

[340] *Id*.

[341] *Id*.

[342] *See Eighth Report*, at 14820-14821.

[343] Jesse Drucker, *Cingular to Test Wireless Network*, THE WALL STREET JOURNAL, May 26, 2004.

[344] Dan O'Shea, *Sprint unmoved by EV-DO movement . . . so far*, TelephonyOnline.com, Mar. 23, 2004 <http://telephonyonline.com/ar/telecom_sprint_unmoved_evdo/>. Most industry analysts believe that the EV-DV market will not be viable until late 2005 or 2006, when new handsets become broadly available. Sprint was

data speeds warranted a change of plans. In June 2004, Sprint announced plans to deploy EV-DO in the majority of top metropolitan markets in 2005, with initial service available in select markets in the second half of 2004.[345] Sprint's change in strategy with regard to deployment of technologies on the CDMA migration path can be seen as a competitive response to Verizon's EV-DO offering, and thus provides a clear-cut example of non-price rivalry.

135. In February 2004, Nextel launched a trial wireless broadband service in the Raleigh-Durham, N.C. market.[346] The service uses OFDM (orthogonal frequency division multiplexing) technology to achieve average download speeds of 1.5 mbps with burst rates of up to 3.0 mbps.[347] According to Flarion Technologies, developer of Nextel's OFDM system, OFDM combines attributes of CDMA and TDMA by using IP (Internet protocol) packet technology to achieve data rates that are five to ten times faster than competing 3G standards.[348] Nextel Wireless Broadband service will ultimately offer turn-key bundled ISP services such as multiple e-mail accounts (up to seven), online disk storage (up to 70 megabytes), and website traffic (up to 300 megabytes/month).[349]

d. Coverage by Technology Type

136. To date, 283 million people, or 99 percent of the total U.S. population, live in counties where operators offer digital mobile telephone service, using CDMA, TDMA/GSM, or iDEN (including their respective next generation technologies), or some combination of the three.[350] These counties make up 83 percent of the total land area of the United States. To estimate the current levels of deployment of the three main digital mobile telephone technologies individually, we have prepared maps of each technology, which combine the network coverage of all of the relevant operators.[351] We have also

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reported to like EV-DV because it is more spectrum efficient than EV-DO, allowing for voice and data transmission on the same channel. *Id*.

[345] *Sprint Announces Plans to Extend its Wireless Data Leadership with Launch of High-Speed Wireless Data Technology*, Press Release, Sprint, June 22, 2004; Nick Baker, *Sprint Announces Plans For Wireless Broadband*, THE WALL STREET JOURNAL, June 22, 2004.

[346] *Nextel Testing Wireless Broadband Service; Market Trial in Raleigh-Durham, N.C. to Evaluate Flarion's FLASH-OFDM Technology, Service Offering and Market Demand*, Press Release, Nextel Communications Inc., Feb. 6, 2004, available at <http://phx.corporate-ir.net/phoenix.zhtml?c=63347&p=irol-newsArticle&t=Regular&id=492688&>.

[347] *Id*.

[348] *See* Flarion Technologies, *Products and Technology – Introduction* (visited May 18, 2004) < http://www.flarion.com/products/default.asp>; Flarion Technologies, *FLASH-OFDM Technology* (visited May 18, 2004) <http://www.flarion.com/products/flash_ofdm.asp>.

[349] *Nextel Expands Successful Broadband Trial to Include Paying Customers and Larger Coverage Area*, Press Release, Nextel Communications Inc., Apr. 14, 2004, available at <http://phx.corporate-ir.net/phoenix.zhtml?c=63347&p=irol-newsArticle&t=Regular&id=514459&>.

[350] Broadband PCS-based and digital SMR-based coverage are estimated using counties, and cellular-based coverage is estimated using CMAs. The caveats mentioned in Section II.B, Sources of Information, and in Section II.C.1, Number of Mobile Telephone Competitors, *supra*, apply to this analysis as well.

[351] *See* Appendix B, Maps 5-8, at B-6 – B-9.

prepared maps showing the extent of next generation network technology deployment.[352]

137. CDMA has been launched in at least some portion of counties containing 276 million people, or roughly 97 percent of the U.S. population, while TDMA/GSM has been launched in at least some portion of counties containing 273 million people, or 96 percent of the U.S. population.[353] To date, digital SMR operators have launched iDEN-based service in at least some portion of counties containing over 261 million people, or approximately 92 percent of the U.S. population.[354]

138. CDMA 1xRTT and/or 1xEVDO has been launched in at least some portion of counties containing 273 million people, or roughly 96 percent of the U.S. population, while GPRS has been launched in at least some portion of counties containing 264 million people, or about 93 percent of the U.S. population.[355]

e. Data-Only Networks and Technology Deployment

139. In addition to the networks discussed above, which mobile telephone carriers use to offer both voice and data services, mobile carriers operate a number of other types of networks in order to provide data-only commercial mobile services. First, carriers use paging spectrum to operate networks in order to offer traditional one-way paging services.[356] Some paging carriers also operate data networks using narrowband PCS spectrum, which allow them to offer two-way messaging services. Narrowband PCS carriers use the ReFLEX technology protocol, which can transmit data at speeds ranging from 3.2 to 25 kbps.[357] Metrocall, for example, acquired WebLink Wireless's extensive PCS narrowband (two-way) wireless data network in 2003,[358] which is based on ReFLEX25 technology developed by Motorola. The network covers 90 percent of the U.S. population and has been extended to Canada and Mexico.[359] As previously mentioned, in March 2004 Metrocall and Arch Wireless announced a merger that, if approved, would make the combined company the largest paging carrier in the nation.[360] The new company would

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[352] *See* Appendix B, Map 9, at B-10.

[353] *See* Appendix A, Table 7, at A-10.

[354] *Id*.

[355] *Id*.

[356] *See* Section III.A, Services and Product Market Definition, and Section III.B.3, Data-Only Providers, *supra*, for a discussion of traditional paging services and paging carriers

[357] WebLink Wireless, *ReFLEX Wireless Data Technology*, 2000, at 18-19, <http://www.weblinkwireless.com/aboutweblinkwireless/whitepapers/ReFLEX2.PDF>.

[358] Metrocall, Inc., *Metrocall Reports Operating Results of Fourth Quarter and Fiscal 2003*, Press Release, Mar. 15, 2004, available at <http://storefront.metrocall.com/pressreleases/03152004.asp?mscssid=LBHRC8SMN7HT8ML62XVEP9KRQX5KDNF8>.

[359] WebLink Wireless, *Overview of WebLink Wireless* (visited May 21, 2004) <http://www.pagemart.com/aboutweblinkwireless/overview/index.html>.

[360] Metrocall, Inc., *Metrocall and Arch Wireless to Merge*, Press Release, Mar. 29, 2004, available at <http://storefront.metrocall.com/pressreleases/03292004.asp?mscssid=LBHRC8SMN7HT8ML62XVEP9KRQX5KDNF8>.

provide paging services on traditional paging spectrum as well as narrowband PCS spectrum.[361]

140. In addition, several mobile telephone carriers, including AT&T Wireless and Verizon Wireless, have operated Cellular Digital Packet Data ("CDPD") networks on top of their existing mobile telephone networks, which they use to provide mobile Internet access services at speeds of around 19.2 kbps.[362] However, as documented above in Section IV.B.1.c, AT&T Wireless and Verizon Wireless are now upgrading their mobile telephone networks with next generation technologies and shall soon be terminating their transitional CDPD service.[363]

141. Two other carriers, Cingular Wireless and Motient Corp. ("Motient"), operate two-way data networks using the 900 MHz SMR and 800 MHz SMR spectrum bands, respectively. These networks have provided a variety of mobile data services to personal digital assistants ("PDAs") and laptops. Cingular Wireless's network, known as the Mobitex, is a packet-switched radio technology that provides always-on, instant two-way messaging and data delivery.[364] It covers 93 percent of the urban business population in the U.S.[365] The Motient (formerly ARDIS) network is the nation's largest two-way wireless data network.[366] With more than 2,200 base stations, the network provides in-building and on-street coverage to all the nation's MSAs and extends service to the 520 most populated U.S. cities.[367] More than 100 million messages are transmitted via the network each month.[368]

142. Space Data is using narrowband PCS spectrum in the 900 MHz band and balloon-borne platforms, called SkySites™, to roll out a commercial telemetry service.[369] Although national weather services have been using balloon systems to transmit atmospheric data to ground-based weather stations for decades, Space Data is the first to make commercial use of this platform.[370] Space Data developed, and has been granted a patent on, the technology to create an entire constellation of SkySites™ to provide ubiquitous wireless service.

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[361] *Id*.

[362] *See Seventh Report*, at 13046.

[363] AT&T intends to terminate its CDPD service in June 2004. *See Early Data Models Drain Finances*.

[364] *Our Technology*, Cingular Wireless (visited May 20, 2004). <http://www.cingular.com/about/our_technology>.

[365] *Id*.

[366] Motient Corp., *Network Coverage Overview* (visited May 21, 2004) <http://www.motient.com/Content/NetworkCoverage/networkoverview.htm>.

[367] *Id*.

[368] Motient Corp., *Network Facts* (visited May 21, 2004) <http://www.motient.com/content/NetworkCoverage/NetworkFacts/networkfacts.htm>.

[369] *Space Data Corporation Captures 262.5 kHz of New Spectrum*, Press Release, Space Data Corporation, Nov. 19, 2003; *Space Data Corporation Receives Patent for Airborne Constellation*, Press Release, Space Data Corporation, Feb. 2, 2004. *See also* Section III.B.3, Data-Only Providers, *supra*.

[370] *Id*.

2. Capital Expenditures

143. Capital expenditures, alternatively called "capital spending" or abbreviated to "capex," are funds spent during a particular period to acquire or improve long-term assets such as property, plant, or equipment.[371] In the mobile telephone industry, capex consists primarily of spending to expand and improve the geographic coverage of networks, increase the capacity of existing networks so they can serve more customers, and improve the capabilities of networks (by allowing higher data transmission speeds, for example).[372] One analyst estimated that the wireless industry spent roughly $21 billion on capex in 2003, a decline of 16 percent from the $25 billion spent in 2002, on top of a 6 percent drop from 2001.[373] One analyst argued that capex spent to expand coverage is now mostly over and that future capex will be spent largely on technological upgrades and capacity needs.[374] We also note that wireless capex is rapidly approaching the level of wireline capex.[375]

3. Roaming

144. All mobile calling plans specify a calling area – such as a particular metropolitan area, a state, a region, the carrier's entire network, or the entire United States – within which the subscriber can make a call without incurring additional charges. When a subscriber exits this area, or "roams," he or she incurs additional charges for each minute of use. Sometimes these roaming charges go directly to the subscriber's carrier, and sometimes the charges are used to pay a carrier other than the subscriber's, on whose network the subscriber was roaming.[376] This source of revenue is particularly important to many rural and smaller carriers.[377]

145. CTIA reported that roaming revenues for the mobile telephony industry declined over the past year, from $3.9 billion in 2002 to $3.8 billion in 2003.[378] Roaming revenues as a percentage of total service revenue also continued to decline, from 6.1 percent reported in 2001 to 5.1 percent in 2002 followed by 4.3 percent in 2003.[379] One analyst attributes the decline in roaming revenues to "larger

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[371] CNNMoney, *Money 101 Glossary* (visited Mar. 20, 2003) <http://money.cnn.com/services/glossary/c.html.>. There are differing opinions on what constitutes capital spending versus non-capital spending.

[372] *Eighth Report*, at 14818.

[373] Luiz Carvalho *et al.*, *Wireless Capex Conference Supports Thesis*, Morgan Stanley, Equity Research, Feb. 4, 2004, at 2.

[374] *Wireless 411*, at 90 (citing carrier's SEC filings).

[375] *See* Goldman Sachs, Telecom Services Equity Research, Feb. 19, 2004, at 6 (Exhibit 4: Capex by Telecom Segment).

[376] The fees that a carrier collects from non-subscribers using its network are called "outcollect" fees, and the fees that a carrier pays for its subscribers to roam on other networks are called "incollect" fees. Margo McCall, *Roaming Feeds Regional Carriers*, WIRELESS WEEK, Mar. 26, 2001, at 23.

[377] *See Wireless 411*, at 50 (Table 21: Roaming Revenues as a Percentage of Total Service Revenues).

[378] *See* Appendix A, Table 1, at A-2.

[379] *Id*.

operators negotiating lower roaming rates, as well as national carriers expanding their footprints through buildout, acquisition, and joint buildout/roaming agreements."[380]

4. Advertising and Marketing

146. Firms may engage in advertising and marketing either to inform consumers of available products or services or to increase sales by changing consumer preferences. Mobile telecommunications service is an "experience good,"[381] and in general, advertising for an experience good tends to be persuasive rather than informational in nature.

147. As a group, the six nationwide operators spent a total of $3.7 billion on advertising in 2003, up 19 percent from 2002, and up more than 50 percent from 2001.[382] Advertising expenditures - including television, radio, newspaper, magazine, and outdoor spending - are now almost 5 percent of wireless service revenues.[383] Verizon Wireless spent nearly $1 billion on advertising in 2003, including $246 million on network TV advertising, making it the number two advertiser on television after McDonald's.[384] Advertising expenditures per subscriber have been rising since 2001, and increased for every nationwide carrier except T-Mobile in 2003.[385] As one analyst wrote, "faced with intense competition, carriers are spending money to differentiate themselves."[386]

5. Quality of Service

148. Section IV.B.1 above of this report, as well as similar sections in previous reports, detail the digital and next-generation upgrades that carriers have been making to improve the quality and increase the capacity of their networks, while Section IV.B.2 provides an estimate of total spending by wireless carriers on network expansion and improvements.[387] By increasing network coverage and call handling capacity and improving network performance and capabilities, carriers' investments in network deployment and upgrades have the potential to result in service quality improvements that are perceptible to consumers, such as better voice quality, higher call-completion rates, additional calling features, more rapid data transmission, and advanced data applications. For example, one analyst report cites Cingular as indicating that it plans to add thousands of cell sites over the next several years largely to enhance

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[380] *Wireless 411*, at 44.

[381] An experience good is a product or service that the customer must consume before determining its quality. *See* Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed., Addison, Wellsley, Longman, Inc., 1999), at 484.

[382] Michael Russell *et al.*, *Wireless Ad Spend Disappoints Almost Everyone*, Morgan Stanley, Equity Research, Mar. 31, 2004, at 1.

[383] *Id.*, at 7.

[384] *Id.*, at 6.

[385] *Id.*, at 7.

[386] Simon Flannery *et al.*, *1Q04 Preview: The Fast and The Furious*, Morgan Stanley, Equity Research, Apr. 16, 2004, at 7.

[387] *See Eighth Report*, at 14824.

voice coverage and quality.[388]

149. In addition to investing in their networks, certain carriers continue to pursue marketing strategies designed to differentiate their service from rival offerings with regard to consumer perceptions of service quality. The *Eighth Report* cited Verizon Wireless's "Can You Hear Me Now?" advertising campaign as an example of an attempt at such brand differentiation based on superior network coverage, reliability and voice quality.[389] In recent reports analysts consistently single out Verizon Wireless for continuing to distinguish its brand and maintain its reputation by highlighting the quality of its network.[390] As indicated in the *Eighth Report*, analysts view brand differentiation as working in tandem with network investment to create a competitive advantage in attracting and retaining subscribers.[391] In this regard, one analyst report posits that Verizon Wireless is trying to further leverage customer perception of a quality advantage by implementing the high-speed EV-DO data service.[392]

150. Consumer satisfaction surveys afford one means of gauging the effects of network investment and brand differentiation on customer perceptions of service quality. The results of one such survey are summarized below in the section on mobile telecommunications market performance.

6. Provision of Ancillary Services and Promotional Offers.

151. Mobile telecommunications providers offer ancillary services and promotions such as caller ID, voice mail, call forwarding, long distance, push-to-talk ("PTT"), free or reduced priced handsets, and free night and weekend minutes. The cost of these services is either included in the monthly charge or billed separately. Carriers use ancillary services and promotional offers to differentiate their products from those of their competitors. They compete not only in terms of the monthly charge, but also with the price and scope of ancillary services and promotions.

152. Nextel has offered PTT as a fundamental part of its product offering since it launched its wireless service in 1993. Recently, a number of mobile wireless operators have begun to offer competing PTT services. Verizon Wireless began offering "Push to Talk" in August, 2003, quickly followed by Sprint PCS's "Ready Link" in November 2003,[393] and ALLTEL's"Touch2Talk" in January 2004.[394]

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[388] *Wireless Data Prospects Brightening*, at 23.

[389] *See Eighth Report*, at 14825.

[390] David Janazzo, Wendy Liu, and Linda Mutschler, *The Next Generation VIII*, Merrill Lynch, Global Securities Research & Economics Group, Mar. 15, 2004 at 43,("*Nextgen VIII*"); Colette M. Fleming, Mark Kinarney, and Rise A. Barron, *As If You Were There – Recap of the Wireless Service Providers*, UBS Warburg, Equity Research, Nov. 21, 2003, at 8; *Wireless Data Prospects Brightening*, at 29.

[391] *See Eighth Report*, at 14824-14825.

[392] *NextGen VIII*, at 43.

[393] In May 2004, Sprint PCS said 275,000 customers, or 1 percent of its subscribers, were using its PTT service. COMMUNICATIONS DAILY, May 25, 2004, at 6.

[394] Simon Flannery *et al.*, *Wireless CTOs Unplugged: A Wireless Preview*, Morgan Stanley, Equity Research, Feb. 8, 2004, at 6, ("*Wireless CTOs Unplugged*"). Morgan Stanley reports the Ready Link launch in December, but Sprint announced the service in November. *See Sprint Launches Nationwide Two-Way Walkie-Talkie Style Service*

These three carriers each price their service around $15-$20 per month for unlimited use.[395] Some analysts believe that the longer latency[396] of these competitors' products make them somewhat less desirable than Nextel's "Direct Connect" service.[397] However, in Sprint PCS's case, the company has stated that it is not attempting to compete directly for Nextel's core business users, but instead is trying to attract the consumer who might not mind some latency.[398] Nevertheless, one analyst claims that the launch of these competing services "will pressure Nextel to improve its offerings in ways that are important to users outside its traditional government and enterprise niche, the most notable being wireless data services."[399]

7. Mobile Data Services and Applications

153. As documented in the *Eighth Report* and previous reports, in recent years the major mobile telephone carriers and other mobile data providers have introduced a wide variety of mobile data services and applications, including text messaging, information alerts, e-mail, web browsing, multimedia messaging services such as photo messaging, and entertainment applications such as ring tones and games.[400] Typically, one of the six nationwide mobile telephone carriers is the first to introduce a particular data application, and the availability of the new application quickly spreads as the remaining nationwide carriers together with their affiliates and some smaller regional carriers progressively match the innovator with similar rival service offerings.[401] Currently, all six nationwide mobile carriers and some smaller regional carriers such as ALLTEL offer a variety of handset-based applications as add-ons to mobile voice service, such as text messaging, photo messaging, ring tones and games.[402] In addition, the six nationwide mobile carriers and certain other mobile data providers also offer monthly mobile Internet access service packages targeted at data-centered laptop users.[403]

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to Provide Customers with aQuick Way to Communicate One-on-One or in Groups, News Release, Sprint, Nov. 17, 2003.

[395] *Wireless CTOs Unplugged*, at 6.

[396] Latency refers to the delays in setting up a PTT call and the pushes between conversation breaks.

[397] *See* Ric Prentis and Tanya Nelson, *Nextel Communications, Inc*., Raymond James, Equity Research, Feb. 9, 2004, at 10; and COMMUNICATIONS DAILY, Nov. 26, 2004, at 7 (citing Moody's outlook on Nextel).

[398] Colette M. Fleming *et al.*, *Global Communications Conference*, UBS Warburg, Equity Research, Nov. 21, 2003, at 2.

[399] Frank J. Governali et al., *PCS: Ready Link Enhance Service Offering*, Raymond James, Equity Research, Nov. 18, 2003, at 1.

[400] *See Eighth Report*, at 14843-14856.

[401] For example, the introduction and diffusion of text messaging followed this pattern, as documented in the *Seventh Report*, at 13051-13052.

[402] *See Eighth Report*, at 14846-14855. It is not necessarily the case that each of the six nationwide operators offers the full range of handset-based based applications. For example, as of March 2004 Nextel had not introduced photo messaging. *See Wireless Data Prospects Brightening*, at 34.

[403] *Eighth Report*, at 14844-14845; *Wireless Data Prospects Brightening*, at 36.

154. In the past year carriers have continued to take steps to expand and enhance their mobile data offerings. For example, in November 2003 Sprint PCS became the first U.S. mobile carrier to introduce a live video service when it began offering MobiTV, a service that makes live audio and video images available from 15 cable news, sports, and entertainment channels, including College Sports Television and Fox Sports.[404] In May 2004, it was announced that a Major League Baseball highlights channel and an audio channel carrying broadcasts of all New York Yankees games would be added to Sprint PCS's existing MobiTV package, and that an additional package of 30 game-audio channels, each playing the home broadcasts for a single team, would be offered.[405] Both the MobiTV package and the baseball game-audio package are available only as add-ons for an additional fee to Sprint PCS subscribers who have signed up for the Sprint PCS data package called PCS Vision, which for a flat monthly fee affords them unlimited use of certain applications such as web browsing and e-mail.[406] Some of the other nationwide carriers are reported to be interested in offering similar video services, with Verizon Wireless expected to launch one, among other broadcast applications, by the end of 2004.[407] At present these video services are characterized as being more like slideshows than streaming video due to the slow speeds offered by existing wireless networks and handsets, but quality is expected to improve as network upgrades result in faster data rates and as handset prices drop.[408]

155. While the mobile data offerings of all six nationwide mobile carriers are broadly similar in terms of the types of services and applications available to subscribers, the carriers vary in terms of their degree of emphasis on implementing and promoting mobile data services. For example, both Sprint PCS and Verizon Wireless are characterized in one analyst report as being very focused on mobile data, while other carriers such as Cingular and Nextel are described in the same report as having had less mass market data focus so far.[409] The same report argues that AT&T Wireless began promoting its more advanced network capabilities more aggressively after launching its EDGE data network, including the offering of free EDGE PC cards to encourage use of the network, while T-Mobile is viewed as more aggressively promoting its Wi-Fi offering rather than mobile data.[410] As a result of its data focus, Sprint PCS has taken an early lead in consumer wireless data as measured by the percentage of mobile service revenues from data services.[411] At five percent of service revenues in the fourth quarter of 2003, Sprint generates the highest level of mobile data usage among the nationwide carriers, whose mobile data revenues during the same period range from 2 to 3.5 percent of service revenues.[412]

156. Early differences in the nationwide carriers' mobile data strategies may in part reflect their

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[404] Carl Bialik, *Watching Sports on Cellphones May be Small-Time Broadcasts*, THE WALL STREET JOURNAL, Dec. 11, 2003.

[405] Carl Bialik, *Major League Baseball, Sprint in Cellphone Deal*, THE WALL STREET JOURNAL, May 6, 2004.

[406] *Id*.

[407] *Id*.

[408] *Id*.

[409] *Wireless Data Prospects Brightening*, at 24.

[410] *Id*., at 20 and 24.

[411] *Id*., at 28.

[412] *Global Wireless Matrix 4Q03* at 87.

divergent choices with regard to the migration path from second-generation to next-generation technologies. Thus, the same analyst report argues that Sprint PCS has differentiated its mobile data service from rival offerings by leveraging its 1xRTT network and more advanced devices, and that Verizon Wireless is positioning itself to become the market leader in mobile data through its 1XEV-DO upgrade.[413] More generally, some analysts believe that CDMA carriers Verizon Wireless and Sprint PCS have a network advantage over GSM carriers Cingular, AT&T Wireless and T-Mobile, as well as iDEN carrier Nextel, for two reasons.[414] First, it is easier and less expensive for CDMA carriers to extend broadband data coverage across the entire network footprint because the upgrade on the CDMA migration path is software based. Second, because the more advanced technologies on the CDMA migration path are backward compatible, devices will be able to function on earlier technologies such as 1xRTT.

157. The adoption of differing and incompatible technology standards has affected carrier conduct in the mobile data market in another important way. Until a few years ago, U.S. mobile subscribers could not send an SMS to subscribers on another mobile carrier's network.[415] As documented in the *Seventh Report*, following the introduction of cross-carrier network SMS capabilities by AT&T Wireless in December 2001, U.S. mobile carriers progressively implemented inter-carrier interoperability of SMS in early 2002, thereby enabling subscribers to exchange text messages with other carriers' customers.[416] In contrast, SMS interoperability has never been an issue in Europe because all incumbent European mobile operators have long deployed GSM in accordance with the previously mentioned decision of the European Community to mandate a single harmonized standard for second-generation mobile telecommunications services.[417] Thus, SMS interoperability in the U.S. mobile market was achieved as the result of a proactive competitive strategy on the part of the major U.S. mobile carriers. As noted in the *Eighth Report*, many carriers and analysts have credited the introduction of inter-carrier interoperability with stimulating the subsequent growth in text messaging.[418]

V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

158. A mobile carrier can exercise market power only to the extent that mobile subscribers do not respond to price increases or other adverse competitive effects. If, to the contrary, enough consumers are sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider, and likewise, if enough consumers have the ability and propensity to switch service providers in response to an increase in price or other harmful conduct, then the carrier will have an incentive to compete on price and non-price factors. Consumer behavior will be more effective in constraining market power when the transaction costs subscribers incur in choosing and switching carriers are low. Transaction costs depend on, among other factors, subscribers' access to and ability to use information, and costs and barriers to switching carriers.

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[413] *Wireless Data Prospects Brightening*, at 25 and 28-29.

[414] *Id*., at 2 and 6.

[415] *Id*., at 13.

[416] *See Seventh Report*, at 13052.

[417] *Wireless Data Prospects Brightening*, at 13.

[418] *See Eighth Report*, at 14847.

A. Access to Information on Mobile Telecommunications Services

159. It is apparent that wireless consumers are demanding more information on the availability and quality of mobile telecommunications services, and that numerous third parties have been responding to this demand by compiling and reporting such information. The *Eighth Report* enumerated the considerable sources of information available to consumers, including publications such as *Consumer Reports*, trade associations, marketing and consulting firms, and several web sites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area.[419] These sources continue to update consumers on the wireless service options available to them. For example, the February 2004 issue of *Consumer Reports* magazine published the results of a new customer satisfaction survey on mobile telephone service.[420]

160. In addition, within the past year the wireless industry itself launched a new initiative designed to educate consumers and help them make informed choices when purchasing wireless services. On September 9, 2003, the Cellular Telecommunications and Internet Association ("CTIA") held a press conference to unveil its voluntary "10-Point Consumer Code" ("Code").[421] The Code enumerates ten principles, disclosures and practices to be adopted by wireless carriers on a voluntary basis: (1) provide every new consumer a minimum 14-day trial period for new service; (2) provide coverage maps, illustrating where service is generally available; (3) in every advertisement that mentions pricing, specifically disclose the rates and terms; (4) for every rate plan or contract, provide consumers specific disclosures regarding rates and terms of service; (5) on billing statements carriers will not label cost recovery fees or charges as taxes, and will separately identify carrier charges from taxes; (6) when initiating or changing service, carriers will clearly state contract terms to customers and confirm changes in service; (7) provide customers the right to terminate service for significant changes to contract terms; (8) provide ready access to customer service; (9) promptly respond to consumer inquiries and complaints received from government agencies; and (10) abide by policies for protection of customer privacy. To date, all of the six major nationwide carriers, as well as many regional carriers, have committed to adhere to the ten principles set forth in the Code.[422]

B. Consumer Ability to Switch Service Providers

1. Churn

161. Churn refers to the number of customers an operator loses over a given period of time. Mobile telephone operators usually express churn in terms of an average percent churn per month. For example, an operator might report an average monthly churn of 2 percent in a given fiscal quarter. In other words, on average, the operator lost 2 percent of its customers in each of the quarter's three months. At this rate, the operator would lose approximately 24 percent of its customers in a single year.[423] Most

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[419] *See Eighth Report*, at 14826.

[420] Carl Bialik, *Verizon Wireless Leads Customer-Satisfaction Survey*, THE WALL STREET JOURNAL, Jan. 7, 2004 ("Customer-Satisfaction Survey").

[421] *See Wireless Industry Unveils 10-Point Consumer Code*, News Release, CTIA, Sept. 9, 2003.

[422] *Id*.

[423] This assumes that each churned customer is a unique individual and that the same customers do not churn multiple times.

carriers report churn rates between 1.5 percent and 3.5 percent per month.[424] One September 2003 study found that 26 percent of wireless subscribers said that they had switched providers at least once in the past 12 months.[425] While average monthly churn rates for mobile telephone service have remained fairly constant over the past three years,[426] it is not yet clear how the introduction of wireless local number portability (see below) will affect churn rates, if at all. Consistent with findings in previous reports,[427] customers indicated cost and network quality as the main reasons for changing providers.[428]

2. Local Number Portability

162. Local number portability (LNP) refers to the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers when switching from one telecommunications carrier to another.[429] Although the Act requires only local exchange carriers (LECs) to provide LNP, the Commission extended number portability requirements to CMRS providers, requiring them to provide for porting both to other CMRS carriers and to LECs.[430] The Commission concluded that enabling wireless subscribers to keep their phone numbers when changing carriers would enhance competition between wireless carriers as well as promote competition between wireless and wireline carriers.[431]

163. Under the Commission's rules and orders, covered CMRS carriers operating in the 100 largest Metropolitan Statistical Areas (MSAs) were required to begin providing number portability by November 24, 2003.[432] Most LECs in the top 100 MSAs were required to be capable of wireline-to-wireless porting by the same date.[433] CMRS carriers outside of the top 100 MSAs were not required to be

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[424] *Wireless 411*, at 39.

[425] *Customer Loyalty Becoming a More Critical Issue in the Wireless Industry*, News Release, J.D. Powers and Associates, Sept. 30, 2003, ("*Customer Loyalty Becoming a more Critical Issue*").

[426] *See NextGen VIII*, at 28.

[427] *See Sixth Report*, at 13372-73; *Seventh Report*, at 13007; *Eighth Report*, at 14817.

[428] *See*, *e.g.*, *Wireless CTOs Unplugged,* at 3; and *Customer Loyalty Becoming a More Critical Issue*.

[429] 47 C.F.R. § 52.21(l).

[430] 47 U.S.C. § 251(b); *Telephone Number Portability*, CC Docket No. 95-116, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8352, 8431-8442, paras. 152-170 (1996) ("*LNP First Report and Order"*).

[431] *LNP First Report and Order*, 11 FCC Rcd at 8434-36, paras. 157-160.

[432] 47 C.F.R § 52.31(a); Verizon Wireless's Petition for Partial Forbearance From Commercial Mobile Radio Services Number Portability Obligation and Telephone Number Portability, WT Docket No. 01-184, Telephone Number Portability, CC Docket No. 95-116, Memorandum Opinion and Order, 17 FCC Rcd 14972, 14986, para. 31 (2002) ("*Verizon Wireless LNP Order*").

[433] *Telephone Number Portability*, CC Docket No. 95-116, 19 FCC Rcd 875, 876, para. 3 (2004) ("*Two-Percent Carriers LNP Order"*). LECs that operate in the top 100 MSAs and have fewer than two percent of the nation's subscriber lines in the aggregate nationwide were not required to provide wireline-to-wireless porting until May 24, 2004. *Id.* at 875, para. 1.

LNP-capable until May 24, 2004.[434] Similarly, LECs outside of the top 100 MSAs were not required to provide intermodal porting until May 24, 2004.[435]

164. Since CMRS carriers began providing LNP on November 24, 2003 in the largest 100 markets, wireless-to-wireless porting volume has been significant.[436] The number of wireless-to-wireless ports was 713,272 in January, 2004, and remained above 500,000 in February, March, and April.[437] Wireline-to-wireless porting volume reached a peak of 79,080 in March, 2004.[438] Overall, since November 2003, there have been more than 2 million ports involving wireless carriers.

165. Porting activity did not lead to a significant increase in wireless churn towards the end of 2003, although analysts predict increases in the churn rate through 2004.[439] LNP does appear to have had an impact on CMRS competition, however. Aggressive customer retention efforts have been launched by wireless carriers acting in anticipation of wireless LNP.[440] As one analyst reports, "In the past, it was common for wireless operators to offer significantly better deals to new activations than to existing subscribers (i.e., upgrades). This practice moderated ahead of the implementation of wireless local number portability. Essentially, operators have been forced to increase resources with regard to keeping existing subscribers since it is now easier for them to leave.[441]

166. Thus, the advent of wireless LNP has indeed increased competitive pressures on CMRS carriers with regard to existing customers, with the result that such customers are receiving improved service. This competitive effect of LNP is likely to continue.[442] We also note, however, the assertions of some commenters that the costs of regulatory mandates such as LNP and enhanced 911 are imposing

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[434] *Verizon Wireless LNP Order*, 17 FCC Rcd at 14986, para. 31.

[435] *Telephone Number Portability*, CC Docket No. 95-116, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 23697, 23709, para. 29 (2003).

[436] Porting volume data was obtained from Neustar.

[437] Specifically, wireless-to-wireless porting volumes per month from December, 2003 were: 713,272 in January; 591,326 in February; 631,680 in March; and 612,534 in April.

[438] Wireline-to-wireless porting volumes per month were: 24,068 in January; 64,608 in February; 79,080 in March; and 48,555 in April.

[439] *Wireless 411*, at 2, 39 (finding that average monthly churn for the six major carriers was 2.4% in both the 3rd and 4th quarters of 2003); David Janazzo, *et al.*, *US Wireless Store Visits*, Merrill Lynch, Global Securities Research & Economics Group, Apr. 6, 2004 ("U.S. Wireless Store Visits"), at 2 (estimating churn during 1st quarter of 2004 for six national carriers to be 2.55%, compared with weighted average churn rates of 2.45% for the 4th quarter of 2003 and 2.43% during the first quarter of 2003); In-State MDR Market Alert, *Wireless Churn Rates Headed Up*, Apr. 13, 2004, <http://www.instat.com/newmk.asp?ID=934> (concluding that with earlier technical problems solved and more customers switching as their current service contracts expire, "churn will definitely be on the rise over the course of the year."); *CTIA Comments*, at 35.

[440] *Wireless 411*, at 1; *U.S. Wireless Store Visits*, at 3 ("the price for better than expected churn in a WLNP environment includes increasing retention expenses and increasing capital expenditures.").

[441] *NextGen VIII*, at 20; *see also Wireless 411*, at 80 (noting that in the 4th quarter of 2003, carriers "spent aggressively on customer care and retention").

[442] *NextGen VIII*, at 20.

disproportionate burdens on small carriers because the costs must be recovered from a smaller customer base, threatening their ability to compete with the larger carriers.[443] Commenters allege that such costs have in some cases hindered competition and forced some small CMRS carriers to delay for years planned cell site additions and network upgrades for the provision of broadband data services.[444]

VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

167. The structural and behavioral characteristics of a competitive market are desirable not as ends in themselves, but rather as a means of bringing tangible benefits to consumers such as lower prices, higher quality and greater choice of services. Such consumer outcomes are the ultimate test of effective competition. To determine if these goals are met and whether there is still effective competition in the market, in this section we analyze various metrics including pricing levels and trends, subscriber growth and penetration, minutes of use ("MOU"), innovation and diffusion of services, and quality of service.

A. Pricing Levels and Trends

1. Pricing Trends.

168. Equity analysts and other industry observers continue to describe wireless price competition in the United States as "intense."[445] However, wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephony service, and consequently it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.[446] As documented in previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. Although one study of mobile telephone pricing shows a slight increase in the cost of mobile telephone services in 2003, two other indicators of mobile telephony pricing show that the long-term decline in the cost of mobile telephone services continued through 2003.[447]

169. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities increased 2.1 percent in 2003.[448] The average cost of monthly service[449] –

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[443] *Blooston Rural Carriers Comments*, at 1,4; *CTIA Comments*, at 9; *Rural Cellular Association Comments*, at 5; *Rural Telecommunications Group Reply*, at 2.

[444] *Blooston Rural Carriers Comments*, at 5; *CTIA Comments*, at 10-11.

[445] *See, e.g.,* Michel Morin, *et al., Global Telecom Services*, Merrill Lynch, Equity Research, Jan. 16, 2004, at 8, ("Global Telecom Services"), ("the competitive intensity in wireless shows no sign of abating").

[446] *See Fourth Report*, at 10164-10165. Pricing analysis is further complicated by the addition on bills of recurring monthly line items charged by wireless carriers, separated from the advertised month rates. *See also* National Association of State Utility Consumer Advocates Petition for Declaratory Ruling Regarding Truth-in-Billing, CC Docket No. 98-170, CG Docket No. 04-208, filed Mar. 30, 2004.

[447] Fees for actual service is only one element of cost that consumers face. One analyst estimates that the average price a consumer pays for a wireless handset has fallen from $128 in 1999 to $88 in 2003, a decline of 31 percent. J.D. Powers and Associates, *Likelihood Of Purchasing New Cell Phone Is On The Rise*, News Release, Oct. 23, 2003.

[448] *Econ One Wireless Survey: Costs Nudge Down in December*, News Release, Econ One, Jan. 12, 2004. The survey is based on an analysis of pricing plan data collected from carriers' websites. *Transcript*, at 78.

which was calculated across four typical usage plans (50, 200, 500 and 800 minutes) – increased from $35.70 in December 2002 to $36.46 in December 2003.[450] Costs increased the most in Phoenix (+7.4 percent), while they decreased most rapidly in Sacramento (-2.4 percent).[451]

170. Another source of price information is the cellular telephone services component of the Consumer Price Index ("Cellular CPI") produced by the United States Department of Labor's Bureau of Labor Statistics ("BLS").[452] Cellular CPI data is published on a national basis only.[453] From 2002 to 2003, the annual Cellular CPI decreased by about 1.0 percent while the overall CPI increased by 2.3 percent. The Cellular CPI has declined 33 percent since 1997 when BLS began tracking it.

171. As a third pricing indicator, some analysts believe average revenue per minute ("RPM") is a good proxy for mobile pricing.[454] This is calculated by dividing a carrier's estimate of ARPU by its estimate of MOUs, yielding the revenue per minute that the carrier is receiving.[455] Using its estimates of industry-wide ARPU and MOUs, CTIA's survey indicates that RPM fell 13 percent between December 2002 and December 2003. Since 1994, RPM has fallen from $0.47 in December 1994 to $0.10 in December 2002, a decline of 79 percent.[456]

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[449] This does not include any additional costs for roaming or long distance.

[450] *Econ One Wireless Survey: Costs Nudge Down in December*, News Release, Econ One, Jan. 12, 2004. The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used.

[451] *Id*.

[452] *See* Appendix A, Table 8, at A-10. The Consumer Price Index ("CPI") is a measure of the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The basket of goods includes over 200 categories including items such as food and beverages, housing, apparel, transportation, medical care, recreation, education, and communications. The CPI provides a way for consumers to compare what the market basket of goods and services costs this month with what the same market basket cost a month or a year ago. Starting in December of 1997, this basket of goods included a category for cellular telephone services. All CPI figures discussed in this paragraph were taken from BLS databases found on the BLS Internet site at <http://www.bls.gov>. The index used in this analysis, the CPI for All Urban Consumers (CPI-U), represents about 87 percent of the total U.S. population. Bureau of Labor Statistics, *Consumer Price Index: Frequently Asked Questions* (visited Mar. 18, 2002) <http://www.bls.gov/cpi/cpifaq.htm>. While the CPI-U is urban-oriented, it does include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

[453] *Transcript*, at 50. The Cellular CPI includes charges from all telephone companies that supply "cellular telephone services," which are defined as "domestic personal consumer phone services where the telephone instrument is portable and it sends/receives signals for calls by wireless transmission." This measure does not include business calls, telephone equipment rentals, portable radios, and pagers. Bureau of Labor Statistics, *How BLS Measures Price Change for Cellular Telephone Service in the Consumer Price Index* (visited Mar. 18, 2002) <http://www.bls.gov/cpi/cpifactc.htm>.

[454] *See US Wireless Matrix 4Q03*, at 42.

[455] Note that this version of ARPU is CTIA's "average monthly local bill" and does not include toll or roaming revenues where they are not priced into a calling plan. *See* note 458, *supra*.

[456] *See* Appendix A, Table 9, at A-11.

2. Average Revenue Per Unit

172. One financial metric widely used in analyzing the mobile telephone sector is average monthly revenue per subscriber (often referred to as average revenue per unit, or "ARPU").[457] CTIA's estimate of ARPU decreased almost continuously between December 1988 and December 1998, when it reached a low of $39.43.[458] However, since 1999, ARPU has been increasing, rising to $49.91 in December 2003, a 27 percent increase from the low of five years ago, but only a 3 percent rise from $48.40 in December 2002. This trend is evident even though per-minute prices declined throughout this period.[459] The recent ARPU increases might be due to a variety of factors, including increased usage offsetting per-minute price declines, as well as the adoption by wireless consumers of higher-priced calling plans.[460] Rising ARPU may also be due to increase use of data services by wireless subscribers. In the fourth quarter of 2003, data revenues accounted for 5 percent of Sprint PCS's ARPU, 3.5 percent of T-Mobile's ARPU, and 3 percent of Verizon Wireless's ARPU.[461]

B. Quantity of Services Purchased

1. Subscriber Growth

a. Mobile Telephony

173. Since the *Seventh Report*, in an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, the Commission began analyzing information filed directly with the FCC. This information, the NRUF data,[462] tracks phone number usage information for the United States.[463] All

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[457] Some analysts argue that average margin per user, or "AMPU," is a better gauge of the financial well-being of wireless operators. Brad Smith, *ARPU:What Lies Ahead*, WIRELESS WEEK, July 15, 2003. *See also*, *Prepaid to Reach 1.35 Billion by 2009*, CELLULAR-NEWS.COM, Mar. 17, 2004

[458] *See* Appendix A, Table 1, at A-2. There are different ways of calculating ARPU. The measure used here, CTIA's "average local monthly bill," does not include toll or roaming revenues (CTIA calls it "the equivalent of 'local ARPU'"). *Dec 2003 CTIA Survey*, at 191. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, *see Dec 2003 CTIA Survey*, at 192.

[459] *See* Section VI.A.1, Pricing Trends, *supra*.

[460] Regardless of whether customers use the large bundles of minutes included with such plans, the higher monthly access fees increase operators' ARPU figures.

[461] *NextGen VIII*, at 4.

[462] Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC requires mobile wireless carriers with over 10,000 facility-based subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. In their December 31, 2003 filings, operators reported that they served 157 million subscribers. *See* Appendix A, Table 2, at A-3. However, the Commission recognizes that its reporting rules result in some level of undercount of total industry subscribers since it does not count subscribers served by mobile telephony providers in states where the provider has fewer than 10,000 customers. *See* Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743 (2000).

mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end-users, thereby permitting the Commission to make more accurate estimates of subscribership.[464] In previous years, for purposes of this report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.[465] While the Commission, for purposes of this report, now uses NRUF data as the basis for its estimate of mobile telephone subscribership, we continue to report the CTIA data as well for comparison.[466]

174. As of December 2003, we estimate that there were 160.6 million mobile telephone subscribers,[467] up from 141.8 million at the end of 2002, which translates into a nationwide penetration rate of 54 percent.[468] This addition of 18.8 million subscribers was an almost 40 percent increase from the 13.3 million added in 2002, a reversal of declining subscriber trends that we reported in the *Seventh*

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[463] When the North American Numbering Plan ("NANP") was established in 1947, only 86 area codes were assigned to carriers in the United States. Only 61 new codes were added during the next 50 years. But the rate of activation has increased dramatically since then. Between January 1, 1997 and December 31, 2000, 84 new codes were activated in the United States. Because the remaining supply of unassigned area codes is dwindling, and because a premature exhaustion of area codes imposes significant costs on consumers, the Commission has taken a number of steps to ensure that the limited numbering resources are used efficiently. Among other things, the Commission requires carriers to submit data on numbering resource utilization and forecasts twice a year. Federal Communications Commission*, Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. This information is submitted to the FCC on Form 502. *Id.*

[464] Federal Communications Commission*, Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. An assigned number is one that is in use by an end-user customer. *Id*., at 3. Carriers also report other phone number categories, including: intermediate – numbers given to other companies; aging – numbers held out of circulation; administrative – numbers for internal uses; reserved – numbers reserved for later activation; and available – numbers available to be assigned. *Id*. Assigned numbers are not necessarily from facilities-based carriers. A reseller can assign a number to an end user. This does not double-count in the assigned total, since the facilities-based carrier only counts that number as an "intermediate" number given to the reseller. *Id.*

[465] *See Dec 2003 CTIA Survey*. The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. *See Eighth Report*, at 14813, note 211.

[466] The advantages of NRUF data over CTIA's survey are discussed in the *Seventh Report*, at 13004.

[467] Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2003*, Federal Communications Commission, May 2004, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2003). The number of subscribers refers to the number of separate wireless accounts. A particular individual may have more than one wireless account.

[468] The nationwide penetration rate is calculated by dividing total mobile telephone subscribers by the total U.S. population. According to the Bureau of the Census, the combined population of the 50 states, the District of Columbia, and Puerto Rico as of July 1, 2003 was estimated to be 294.7 million. *See* U.S. Census Bureau, *Population Estimates: Annual Population Estimates 2000 to 2003* (visited May. 13, 2004) <http://eire.census.gov/popest/data/states/tables/NST-EST2003-01.xls>.

and *Eighth Reports*.[469]

175. CTIA's estimate for year-end 2003 was 158.7 million subscribers, a 13 percent increase over its estimate of 140.8 million subscribers as of year-end 2002.[470] These additions show a similar reversal of declining subscriber trends, and the survey's absolute increase of 18 million is the third largest increase in its history.[471] One analyst argues that the turnaround in subscriber growth may be due to three factors: 1) wireless is economically sensitive and with the improving economy the industry is experiencing improved growth; 2) around the current penetration rate, a network effect[472] takes over that promotes increased subscriber growth; and 3) the increased availability of data applications increases the desirability and utility of a cell phone.[473] Another analyst attributed the increased growth to a different set of factors: 1) the take up of family plans; 2) the take up of prepaid plans and hybrid plans for prepaid credit customers; 3) continuing fixed-to-mobile substitution trends; and 4) the fall in certain equipment prices.[474]

176. Digital subscribers made up approximately 91 percent of all wireless subscribers at the end of 2003, up from 88 percent at the end of 2002.[475] During 2003, the number of customers subscribing to digital services climbed 17 percent, from approximately 125 million to 146 million.[476] Approximately 14 million analog-only mobile telephone subscribers remain.[477]

b. Mobile Data

177. Using NRUF data, we estimate there were 11.2 million paging units in service as of the end

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[469] *See Seventh Report*, at 13005; *Eighth Report*, at 14813-14814.

[470] *See* Appendix A, Table 1, at A-2.

[471] *Id*.

[472] "For many information technologies, consumers benefit from using a popular format or system. When the value of a product to one user depends on how many other users there are, economists say that this product exhibits *network externalities*, or *network effects*." Carl Shapiro and Hal R. Varian, INFORMATION RULES, at 13 (Harvard Business School Press, 1999).

[473] Frank J. Governali, *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, May 14, 2004, at 1-2.

[474] *NextGen VIII*, at 27. A number of analysts have attributed the increased subscriber growth to the appeal of family plans. *See* Yukar Iwatani, *Family Wireless Plans Pull In Kids, Spur Growth*, REUTERS, Oct. 7, 2003 (citing Craig Mallitz of Legg Mason, Jeff Kagan, and Thomas Lee of J.P. Morgan); and Blake Bath, *Wireless Services Industry Update*, Lehman Bros., Equity Research, Sept. 22, 2003, at 2-3.

[475] *See US Wireless Matrix*, at 18. CTIA found a similar rate: More than 92 percent of subscribers of responding carriers in its YE2003 survey were digital (CTIA does not estimate the digital percentage for its total estimate of subscribers). CTIA, *Digital Migration Keeps a Steady Pace* (visited May 20, 2004) <http://files.ctia.org/img/survey/2003_endyear/752x571/Digital_Migration_Dec03.jpg>.

[476] Based on *U.S. Wireless Matrix* digital penetration rates.

[477] Subscribers that can access both the digital and analog networks of carriers are considered to be digital subscribers.

of 2003, down 21 percent from 14.1 million units at the end of 2002.[478]

178. While subscriber numbers for paging continue to drop, the number of mobile data users appears to be rising both absolutely and as a percentage of the mobile telephone subscriber base. The *Eighth Report* cited an estimate by one analyst that there were 11.9 million mobile telephone users who subscribed to some type of mobile data service at the end of 2002, less than 10 percent of the total number of U.S. mobile telephone subscribers at that time.[479] In contrast, an analyst report published in April 2004 estimates that almost 25 percent of U.S. mobile subscribers can be considered casual data users, most of whom use SMS and some of whom use picture mail, download ring tones or do simple web surfing.[480] Sprint PCS, which as previously mentioned currently leads the other nationwide mobile carriers in wireless data usage, reported that at the end of the first quarter of 2004 more than 6 million of its customers, or about 28 percent of the total, were subscribing to Sprint PCS data services, including more than 4 million customers of its mobile Internet service plan PCS Vision.[481]

179. With respect to the number of data-only mobile users, the same analyst report estimates that there are only about 1 million wireless data devices in service today, with a data device defined as a PDA such as a Blackberry or a laptop card.[482] While this estimate comes from a report published in April 2004, it is lower than the figure of 2.3 million data-only mobile users at the end of 2002 cited in the *Eighth Report*.[483]

c. Satellite

180. Satellite industry analysis firm TelAstra estimates that the number of subscribers to mobile satellite telephone services worldwide, including the United States, grew to 885,000 in 2004, up by 27 percent from 695,000 in 2003.[484]

2. Minutes of Use

181. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones. Average minutes-of-use per subscriber per month ("MOUs") jumped again in 2003, to 599 minutes, or 10 hours of use, for the average subscriber of a nationwide operator in the last quarter of

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[478] Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2003*, Federal Communications Commission, May 2004, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2003).

[479] *See Eighth Report*, at 14839.

[480] *Wireless Data Prospects Brightening*, at 10.

[481] Sprint, *Sprint Reports First Quarter Results*, News Release, Apr. 20, 2004. For the purpose of calculating the percentage of Sprint PCS customers who subscribe to mobile data services, subscribers from Sprint PCS affiliates as well as its direct retail and wholesale subscribers were included in its subscriber base.

[482] *Wireless Data Prospects Brightening*, at 1 and 9.

[483] *See Eighth Report*, at 14839.

[484] Roger J. Rusch, *Satellite Statistics: Is Recovery a Mirage?*, TelAstra, Presentation at Satellite 2004, Washington, D.C., Mar. 3, 2004.

the year.[485] This is an increase of 100 MOUs, or one and one half hours of additional use, from a year earlier.[486] Increasing MOUs most likely are a result of the decreasing prices and the wider acceptance of and reliance upon wireless service.[487] According to CTIA, MOUs averaged 507 between June and December 2003, an increase of 19 percent from 427 average MOUs during the same period in 2002, and an increase of 330 percent from an average of 380 MOUs from the same period in 2001.[488]

3. Mobile Data Usage

182. As previously noted, the limited coverage to date of high-speed wireless data networks and the slow speeds, relative to fixed broadband, of the most widely available next-generation wireless network technologies have tended to limit demand for mobile Internet access service, especially among data-centered users who typically access the Internet via laptops.[489] Data on the use of handset-based mobile data applications are fragmentary and their availability varies with the particular type of application. By a number of indicators, however, handset-based mobile data applications have been gaining popularity among U.S. mobile subscribers. For example, the volume of SMS traffic continued to increase at a rapid pace in the past year. CTIA estimates that SMS traffic volume rose to more than 2 billion messages per month in December 2003, double the figure cited in the *Eighth Report* of 1 billion messages per month during June 2002.[490] One analyst report credits increased penetration of advanced devices with stimulating the growth of SMS, citing as an example the fact that the percentage of AT&T Wireless's subscriber base with two-way SMS capable handsets has now risen to 68 percent, up from 56 percent in early 2002 and nearly zero only a couple of years prior to that.[491]

183. The popularity of mobile gaming also appears to have increased in the past year. One analyst estimates that some 12.2 million Americans downloaded or subscribed to wireless games through their cell phone in 2003.[492] Verizon Wireless announced at the end of the fourth quarter of 2003 that game downloads had surpassed those of ring tones.[493] Mobile gaming on the Sprint network has also expanded in the past year, with Sprint selling more than 3.5 million games in 2004 and thereby increasing its total

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[485] *NextGen VIII*, at 22.

[486] *Id*. There apparently is still lots of room for growth. According to one survey, only 56 percent of wireless subscribers use all of their available minutes on a monthly basis. *Customer Loyalty Becoming a More Critical Issue in the Wireless Industry.*

[487] *See*, *e.g.*, *Wireless 411*, at 57 (attributing growth in usage to "the lower effective price per minute").

[488] *Dec 2003 CTIA Survey*, at 213. CTIA aggregated all of the carriers' MOUs from July 1 through December 31, then divided by the average number of subscribers, and then divided by six.

[489] *Wireless Data Prospects Brightening*, at 34.

[490] *CTIA Comments*, at 16; *Eighth Report*, at 14847.

[491] *Wireless Data Prospects Brightening*, at 7.

[492] Roland Jones, *Cell Phone Gaming Gathers Momentum*, MSNBC, Aug. 17, 2004 (citing Schelley Olhava, a wireless gaming analyst at market research firm IDC).

[493] Aude Lagorce, *Verizon's Get It Now Vs. Sprint PCS's Vision*, FORBES.COM, Apr. 19, 2004.

game sales since the launch of Sprint PCS Vision in 2003 to 9.5 million.[494]

184. In addition to playing more mobile games, Sprint PCS customers shared and uploaded more than 23 million pictures in the third quarter of 2003,[495] and in March 2004 Sprint announced that Sprint PCS Vision customers have shared a total of more than 100 million images and 15-second video clips using the photo and video messaging services offered through Sprint's PCS Vision mobile data plan.[496] Similarly, Verizon Wireless advertises that customers shared more than 21 million picture messages over its nationwide network between January 2004 and March 2004, and that customers now share an average of 7 million picture messages per month.[497]

4. Sub-National Penetration Rates.

185. NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile telephone subscribership across different areas within the United States.[498] EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephony penetration rates for two reasons.[499] First, the defining aspect of mobile telephony is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far as possible, the place of work and the place of residence of its labor force.[500] Thus, an EA would seem to capture the market where the average person would shop for and purchase his or her mobile phone most of the time – near home, near the workplace, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their

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[494] *Sprint Announces More than 3.5 Million Game Purchases in 2004*, Press Release, Sprint PCS, May 10, 2004, available at <http://www3.sprint.com/PR/CDA/PR_CDA_Press_Releases_Detail/0,3681,1112042,00.html?refurl=03ar>.

[495] *Lights, Camera, Action! Sprint Introduces Video Mail*, Press Release, Sprint PCS, Dec. 3, 2003.

[496] *Sprint Customers Share More Than 100 Million Memories via Enhanced Sprint Nationwide PCS Network*, Press Release, Sprint PCS, Mar. 22, 2004.

[497] *Wireless Network,* Verizon Wireless (visited June 8, 2004) <http://www.verizonwireless.com/b2c/aboutUs/wirelessNetwork.jsp>.

[498] NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

[499] There are 172 EAs, each of which is an aggregation of counties. *See* Kenneth P. Johnson, *Redefinition of the EA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75, (Redefinition of the EA"). For its spectrum auctions, the FCC has defined four additional EAs: Guam and the Northern Mariana Islands (173); Puerto Rico and the U.S. Virgin Islands (174); American Samoa (175); and Gulf of Mexico (176). *See* FCC, *FCC Auctions: Maps* (visited Mar. 25, 2002) <http://wireless.fcc.gov/auctions/data/maps.html>.

[500] *Redefinition of the EA*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75.

operating areas.[501] In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage (but generally still in the same EA).[502]

186. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA population density, can be seen in Appendix A, Table 3.[503] The rates range from a high of 70 percent in the Atlanta, GA-AL-NC EA (EA 40) to a low of 36 percent in the Paducah, KY-IL EA (EA 72). In 2003, the EA with the lowest penetration rate had a rate three times as high as the EA with the lowest rate in 2002 (Northern Michigan, with 11 percent).[504] Ninety-Six EAs (twice as many as in 2002), with a combined population of over 230 million, have penetration rates of over 50 percent. Twenty-one EAs, with a combined population of 83 million, have penetration rates of over 60 percent. The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 46 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 59 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 54 percent.

C. Variety, Innovation, and Diffusion of Service Offerings

187. Section IV on carrier conduct detailed the variety of service offerings available to U.S. mobile subscribers, ranging from the multitude of mobile calling plans to the various types of mobile data plans. Consumers can choose from service offerings that vary widely with regard to a number of characteristics, including pricing level and structure, handset type, and the scope of ancillary services such as push-to-talk and caller ID as well as mobile data applications such as short text messaging, web browsing, and games. In addition, as discussed in Section VII.A below on wireless-wireline competition, some mobile wireless carriers offer service plans designed to compete directly with wireline local telephone service by allowing subscribers to make unlimited local calls and receive unlimited calls from anywhere for a flat monthly fee.

188. The U.S. mobile telecommunications market continued to be marked by rapid innovation and diffusion of service offerings in the past year. A prime example is the expansion of free "mobile-to-mobile" calling among a particular carrier's customers. As with earlier innovations such as national single-rate calling plans, this innovation was initiated by a single carrier but soon spread as other carriers sought to match their rival with broadly similar offerings. Verizon Wireless's deployment of a

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[501] According to one analyst, wireless carriers assign numbers so as to minimize the access charges paid to local wireline companies. *See* Linda Mutschler *et al.*, *Wireless Number Portability*, Merrill Lynch, Equity Research, Jan 9, 2003, at 8 ("For wireless operators, the standard practice is to aggregate phone numbers within the same area code onto the same or several rate centers, whose physical locations would result in the least amount of access charges paid to ILECs. Therefore, in each market, wireless operators are present in only a small number of rate centers. According to our industry sources, this percentage is probably below 20%, and could be meaningfully lower than 20%.").

[502] "Once the NPA-NXX (i.e., 212-449) is assigned to the wireless carrier, the carrier may select any one of its NPA-NXXs when allocating that number to a particular subscriber. Therefore, with regard to wireless, the subscriber's physical location is not necessarily a requirement in determining the phone number assignment – which is very different from how wireline numbers are assigned." Linda Mutschler *et al.*, *US Wireless Services: Wireless Number Portability – Breaking Rules*, Merrill Lynch, Equity Research, Feb. 28, 2003, at 3.

[503] *See also,* Appendix B, Map 4, at B-5.

[504] *See Eighth Report*, at 14815.

nationwide high-speed data network based on CDMA EV-DO technology is another noteworthy example of innovation in the past year. As previously indicated, although Sprint PCS initially planned to wait until 1xEV-DV is commercially available rather than building out 1xEV-DO, analysts report that Verizon's decision to deploy 1xEV-DO ultimately pressured Sprint to announce plans to deploy EV-DO across its PCS network in an apparent effort to match Verizon's high-speed data offering.

189. As discussed above, carriers have continued to upgrade their networks over the past year with next generation technologies that allow for faster mobile Internet access at speeds ranging from 30 to 70 kbps.[505] To date, 277 million people, or 98 percent of the U.S. population, live in counties where GPRS, 1xRTT, and/or 1xEV-DO networks have been deployed.[506]

D. Quality of Service

190. To evaluate the quality of service, this section summarizes the results of relevant consumer satisfaction surveys and reports on the incidence of customer complaints. When examining such indicators of the quality of mobile telephone service, it is important to keep in mind that they are based on consumers' subjective perceptions of service quality. There are several points to note in this regard. First, mobile telecommunications service is an experience good, and therefore the quality of the product is unknown until the consumer actually uses it. Second, the perceived quality of any good or service depends partly on its price, and a consumer's evaluation of the relationship between price and quality determines his or her level of satisfaction. As stated in one survey of cellular customer satisfaction, "When customers make a purchase, they are choosing a price/quality package that they expect to meet their needs and desires. Ordinarily, higher price is associated with higher quality."[507] Third, consumer perceptions can change independently of actual changes in network performance as their expectations evolve.

191. Finally, service quality in this market is dependent on when and where the service is used. In this regard, service quality concerns may stem from customer expectations that mobile phone service should be available at all times and at all points within the coverage area. Many mobile phone providers make maps of their service areas available to their subscribers either at their service stores or on their websites. Although these maps may contain disclaimers that the maps only show approximate coverage areas or contain other conditions or limitations, customers nevertheless may expect to be able to complete all calls and use all services within the entire service areas shown on the maps. When the full range of expected services is not available, consumer expectations may not be met.

192. Based on the national Consumer Utility Benchmark Survey ("CUBS") conducted over the internet between January 9 and February 3, 2003, the National Regulatory Research Institute ("NRRI") found that a relatively high proportion of cellular customers are satisfied with their cellular service

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[505] *See* IV.B.1.c. Technology Choices and Upgrades of Mobile Telephone Carriers, *supra.*

[506] *See* IV.B.1.d, Coverage by Technology Type, *supra.*

[507] Vivian Witkind Davis, *Consumer Utility Benchmark Survey: Consumer Satisfaction and Effective Choice for Cellular Customers*, The National Regulatory Research Institute at The Ohio State University, Nov. 2003, at 4 ("*Consumer Utility Benchmark Survey*").

provider.[508] In particular, nearly 72 percent of customers reported that they are satisfied with their provider, with the remaining 28 percent indicating that they are dissatisfied.[509] The CUBS estimate of the level of consumer satisfaction is lower than, but still generally consistent with, the 83 percent customer satisfaction rate found by the General Accounting Office ("GAO")[510] in a telephone survey of mobile phone customers that was discussed in the *Eighth Report*.[511] NRRI suggests that the difference between the customer satisfaction rates found in the CUBS and the GAO survey is due in part to the GAO's use of a telephone survey rather than an internet survey.[512]

193. The CUBS results are also similar to those of the GAO survey in suggesting that, despite the fairly high percentage of respondents who expressed satisfaction with their current overall level of call quality, many mobile phone customers report that they are experiencing specific problems.[513] In addition to the question on overall customer satisfaction, CUBS measured quality based on: (1) the number of contacts respondents reported having with their service providers on a variety of aspects of service; and (2) how respondents graded their service providers for customer service. In particular, respondents were questioned on how many times in the twelve months prior to the answering the survey they had contacted their service provider about selected quality of service issues, including billing, difficulty understanding the phone's features, dropped calls, static/line noise, sales practices, or other issues. NRRI notes that "contacts" do not equate with "complaints," but may be indicators of problems. The percentage of customers who reported contacting their service providers one or more times was slightly more than 23 percent for dropped calls and 20 percent for static/line noise.[514] These categories ranked third and fourth behind billing (55.7 percent) and difficulty understanding the phone's features (28.3 percent) in terms of the percentage of respondents reporting contacts with their service providers.

194. CUBS respondents were also asked to grade nine utility and telecommunications (local, long-distance and cellular) industries on customer service by choosing one of the following: A (excellent), B (very good), C (good), D (poor) or F (very poor). Based on the results, NRRI computed a grade-point

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[508] *Id*., at 7-8. The purpose of the survey is to provide state commissions, regulated industries and other stakeholders with insights on consumer perceptions of quality and price for the utilities and telecommunications industries. Almost 19,000 consumers filled out the survey, of which 11,492, or 64 percent of the respondents, reported they have a cellular phone. The survey results are weighted to reflect the actual age and gender distribution of the U.S. population. However, because the CUBS was conducted over the internet, the results may include proportionately more high-end users of technology than would be the case in the general population.

[509] *Id*., at 7-8.

[510] *FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services*, General Accounting Office, GAO-03-501, Apr. 2003 at 27 ("*GAO Report*").

[511] *See Eighth Report*, at 14825-14826.

[512] *Consumer Utility Benchmark Survey*, at 7-8. In particular, due to a poor response rate to the GAO telephone survey, a very large number of telephone numbers (19,000) needed to be dialed to reach the desired quota of 1,000 survey respondents, of which about 550 had mobile phones. NRRI asserts that "the increasingly poor response rate to telephone surveys, which means that respondents are self-selected, is one reason that internet surveys, with their *ex post* weighting, provide ever more valuable information on consumer behavior."

[513] *GAO Report*, at 28 and 42. The problems reported by respondents to the GAO survey included dead zones and dropped calls.

[514] *Consumer Utility Benchmark Survey*, at 5.

average ("GPA") the same way it is done by high schools and colleges. The resulting GPAs for all industries were clumped together at the low end of possible values, ranging from a high of 2.09 for water to a low of 1.66 for cable, with an average for all utilities of 1.93. Cellular service received a grade point average of 1.78, second to last.[515] In addition, cellular service received fewer A's, B's, and C's, and more D's and F's, than the average of all industries.

195. In interpreting the GPAs computed by NRRI, it is noteworthy that the utilities with the four highest GPAs – in order, water, electric, natural gas, and local phone service – are all dominated by monopolies or near-monopolies. Long-distance telephone service, which ranked only slightly ahead of cellular phone service, is highly competitive, while even cable service, which ranked last behind cellular, is subject to competition from direct broadcast satellite providers and, in some locations, cable over-builders. In light of this consideration, the poor showing of cellular service in this part of the CUBS does not seem to have any bearing on the assessment of effective competition in the CMRS market.

196. The Commission releases a report on the informal inquiries and complaints processed by its Consumer & Governmental Affairs Bureau ("CGB") four times a year. The most recent report, issued on November 20, 2003, provides data on consumer inquiries and informal complaints during the third quarter of calendar year 2003.[516] Since consumers who submit complaints are self-selected, the data in these reports are not representative of the U.S. population or mobile phone customers as a whole, unlike the results of consumer satisfaction surveys conducted by NRRI and the GAO. Of the services regulated by the FCC, wireless services ranked third behind radio and television broadcasting and wireline telecommunications services in terms of number of complaints during the reporting period. Of the 36,274 complaints registered in the third quarter, wireless complaints accounted for 4,825 or 13 percent of the total.

197. Of those 4,825 complaints from wireless consumers, service quality ranked third behind billing and rates and early termination of service contracts in terms of the number of complaints during the reporting period. In particular, 2,666 of the complaints were related to billing and rates, 665 of the complaints were related to contract and early terminations issues, and 647 of the complaints were related to service quality issues, with the remaining complaints being related to carrier marketing and advertising (584 complaints) and equipment issues (263 complaints). For purposes of the report, service quality addresses a broad range of disputes and inquiries regarding quality of service or the lack of coverage within a geographic area served by a wireless provider, including dead zones, dropped calls, overall quality of service within the subscriber's local calling area, network busy signal, and roaming availability.

E. International Comparisons

1. Mobile Telephony

198. The *Eighth Report* and previous reports compared mobile market performance in the United States, Western Europe and parts of the Asia-Pacific region with regard to mobile penetration, usage, and

[515] *Id*., at 4 and 6.

[516] *See Quarterly Report on Informal Consumer Inquiries and Complaints Released*, Federal Communications Commission, News Release, Nov. 20, 2003.

pricing.[517] As noted in the *Eighth Report*, these comparisons have shown three consistent differences in performance between the U.S. mobile market and mobile markets abroad. First, mobile penetration is significantly higher in Western Europe and parts of the Asia-Pacific region than in the United States. Second, average minutes of use per subscriber are significantly higher in the United States than in Western Europe and parts of the Asia-Pacific region. Third, revenue per minute, a commonly used proxy for pricing, is significantly lower in the United States than in Western Europe and parts of the Asia-Pacific region.

199. More recent data confirm that the same pattern of international differences in mobile market performance continued into the year 2003.[518] Mobile penetration remains significantly higher in Western Europe and parts of the Asia-Pacific region than in the United States. Mobile penetration averaged an estimated 87 percent in Western Europe at the end of 2003.[519] In several countries, including Italy, Greece, and Sweden, mobile penetration reached 99 percent at the end of 2003, while in Portugal reported mobile subscribers actually exceeded the total population at the end of 2003 due to apparent double counting.[520] As in years past, France finished 2003 with the lowest mobile penetration rate in Western Europe at 68 percent.[521] Thus, as in previous years, U.S. mobile penetration at the end of 2003, at approximately 54 percent, was lower than the lowest mobile penetration rate in Western Europe.

200. Japan finished the year with a mobile penetration level of 67 percent,[522] just slightly below the low end of the range in Western Europe and significantly higher than the U.S. level. In contrast, year-end mobile penetration rates in South Korea and Australia were within the range of European levels at 70 percent and 78 percent, respectively.[523] In Taiwan, as in Portugal, estimated mobile penetration at the end of 2003 exceeded 100 percent due to apparent double counting of some mobile subscribers.[524]

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[517] *Eighth Report*, at 14867-14875. In accordance with established practice in using international benchmarking for the purpose of assessing effective competition in mobile markets, the comparison of mobile market performance is restricted to Western Europe and parts of the Asia-Pacific in order to ensure that the countries being compared are roughly similar to the United States with regard to their level of economic and telecommunications infrastructure development. *See, for example*, UK regulator Oftel's review of effective competition in the mobile market: *Effective Competition Review: Mobile*, Office of Telecommunications, Feb. 2001, at 7.

[518] *See* Appendix A, Table 11, at A-12.

[519] *Global Wireless Matrix 4Q03*, at 2.

[520] As noted in previous reports, reported mobile subscriber figures and penetration may tend to be significantly overstated in countries with a high percentage of prepaid subscribers due to double counting of subscribers with more than one handset and lags by some carriers in removing inactive prepaid subscribers from their subscriber base. See *Seventh Report*, at 13033, and *Sixth Report*, at 13391. See also Linda Mutschler, Sean Salji and Benjamin Billiard, *European Wireless*, Merrill Lynch, Global Securities Research, Feb. 9, 2004, at 13-14 ("*European Wireless*").

[521] *Global Wireless Matrix 4Q03*, at 2.

[522] *Id*.

[523] *Id*.

[524] *Id*.

201. Average minutes of use per subscriber continued to be significantly higher in the United States than in Western Europe and parts of the Asia-Pacific region.[525] In particular, average MOUs were estimated to be approximately 557 per month in the United States in the fourth quarter of 2003.[526] This compares with an average across Western Europe of 129, and with figures in individual European countries that ranged from a high of 243 in Finland to a low of 75 in Germany.[527] MOUs in Japan, South Korea, and Australia remained considerably higher than the Western European average, but still well below the U.S. figure, ranging from a low of 161 in Japan to a high of 311 in South Korea.[528]

202. Revenue per minute[529] in Western Europe averaged nearly $0.27 in the fourth quarter of 2003, and ranged from a high of $0.33 in Germany to a low of $0.18 in Finland.[530] Average revenue per minute in the United States during the same period, at $0.10, was less than half the European average and well below the low end of the European range.[531]

203. The two previous reports[532] found that revenue per minute in Japan was the highest in the group of European and Asian-Pacific countries being compared. As of the end of 2003, this was no longer the case. At $0.31, revenue per minute in Japan is triple the U.S. figure in 2003, but slightly lower than the European high of $0.33 in the German mobile market.[533] In contrast, revenue per minute is as low or nearly as low in South Korea ($0.10) and Taiwan ($0.12) as in the United States.[534]

204. The results of this international comparison can be interpreted as evidence that the U.S. mobile market is effectively competitive relative to mobile markets in Western Europe and Japan. As discussed in the *Eighth Report*,[535] analysts argue that revenue per minute is significantly lower in the

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[525] For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing traffic, and usually exclude traffic related to mobile data services. *Id.*, at 89.

[526] *Id*., at 2. MOUs figures are potentially somewhat overstated in the United States, and more generally in countries that do not employ calling party pays, relative to countries that do employ calling party pays, as a result of the double-counting of same-network ("on-net") mobile-to-mobile minutes. The double counting occurs because under the "mobile party pays" system used in the United States the same minute of an on-net call is billed to both the caller and the receiver. *Id*., at 89.

[527] *Id*., at 2.

[528] *Id*.

[529] Revenue per minute is calculated by dividing monthly voice-only ARPU by MOUs. For purposes of international comparison, service revenues included in ARPU reflect the fees mobile operators collect from other network operators for terminating incoming calls on their networks as well as monthly service charges and usage fees paid by mobile subscribers. *Id*., at 89.

[530] *Id*., at 2.

[531] *Id*.

[532] *See Seventh Report*, at 13036, and *Eighth Report*, at 14869.

[533] *Global Wireless Matrix 4Q03*, at 2.

[534] *Id*.

[535] *See Eighth Report*, at 14869-14871.

United States than in Western Europe or Japan in part because the United States has a more competitive mobile market environment. As Merrill Lynch analysts put it in their analysis of global wireless industry metrics for the fourth quarter of 2003, "the pricing environment is generally much better in Europe than in the U.S.,"[536] by which they mean that the pricing environment is *less competitive* in Europe. Analysts further argue that MOUs are higher, and revenue per minute lower, in the United States than in Europe in part because competition among U.S. mobile carriers has resulted in much greater prevalence of bucket plans compared to the situation in Europe.[537]

205. Lower mobile penetration in the United States as compared to Western Europe and parts of Asia appears to reflect factors other than differences in the competitive environment.[538] One possible factor is that local landline telephone service is relatively more expensive abroad and that, in Europe and some Asian markets, consumers pay for local landline calls, as well as calls from a mobile phone, on a per minute basis.[539] Another likely explanatory factor is that all the foreign countries included in the above comparison employ calling party pays ("CPP"), whereas the United States employs the mobile party pays ("MPP") system. The use of CPP may stimulate mobile subscriber growth in two ways.[540] First, CPP may encourage consumer take-up of mobile phones because the mobile subscriber only incurs airtime charges for outgoing calls, while receiving unlimited incoming calls free of charge. Second, in many CPP markets use of CPP tends to drive up mobile service revenues by enabling a mobile carrier to charge relatively high rates for terminating traffic on its network. According to a 2003 study, high termination rates on incoming calls may help mobile operators attract new subscribers by generating resources enabling them to offer handset subsidies and low outgoing call rates, but the effect of this subsidy mechanism also has been to harm wireline subscribers who absorb the high mobile termination rates through the high rates they pay for fixed to mobile calls.[541] In addition to stimulating mobile subscriber growth from the supply side, high mobile termination rates also contribute to relatively high revenue per minute in CPP countries.

206. The Canadian mobile market is similar to the U.S. model in that Canada also uses MPP rather than CPP. Significantly, Canadian mobile market performance is more consistent with the performance of the U.S. mobile market than that of mobile markets in Europe and parts of Asia.[542] In particular,

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[536] *Global Wireless Matrix 4Q03*, at 3.

[537] *See Eighth Report*, at 14871; *European Wireless*, at 17-24.

[538] *See Eighth Report*, at 14871-14874.

[539] *Id*., at 14871.

[540] *Id*., at 14871-14873.

[541] Olivier Bomsel, Martin Cave, Gilles Le Blanc and Karl-Heinz Newmann, *How Mobile Termination Revenues Shape the Dynamics of the Telecom Sector*, Jul. 9, 2003, at 7 and 53. The authors further argue that competition in European mobile markets has generally not been sufficiently intense to compete away all excess profits on mobile termination through handset subsidies and low outgoing call rates, as a result of which surpluses from call termination may have been shared in varying proportions between mobile operators and consumers. *Id*. In addition to harming wireline subscribers, the study concludes that the effect of transfers from fixed networks and their customers as a result of high mobile termination charges for fixed to mobile calls has been to damage competition in the wireline market and to distort competition between fixed and mobile operators. *Id*., at 7 and 65-66. Furthermore, as noted in the *Eighth Report*, high mobile termination rates may contribute to lower usage (MOUs) in CPP countries by discouraging calls to mobile phones. *See Eighth Report*, at 14874.

[542] *See* Appendix A, Table 11, at A-12.

Canada's mobile penetration (41 percent) is lower than that of the United States, revenue per minute in Canada ($0.12) is nearly as low as that of the United States, and MOUs in Canada (296) are higher than those of any European country.[543] We recognize, however, that certain countries such as Hong Kong and Singapore have achieved the relatively high mobile penetration rates of CPP countries while still maintaining MPP.[544]

2. Mobile Data

207. The *Eighth Report* observed that the percentage of mobile service revenues from data services is significantly higher in Western Europe than in the United States.[545] This difference in mobile data market performance continued into 2003. In the fourth quarter of 2003 revenues from mobile data services averaged nearly 14 percent of European mobile carriers' ARPU, and ranged from an estimated 6 to 21 percent in individual European markets.[546] This compares with just 3 percent of U.S. mobile carriers' ARPU in the same period.[547] The percentage of ARPU derived from mobile data services was even higher in Japan (24 percent) and the Philippines (35 percent) than in Western Europe.[548] As was the case in previous years,[549] SMS continues to be the most frequently used mobile data service in Europe, accounting for 92 to 94 percent of data revenues in the UK, Germany and Italy.[550] This compares to 47 percent in the United States, 35 percent in Japan and 30 percent in Korea, where the role of other types of mobile data services appears to be larger.[551] The more rapid spread of mobile data services in overseas markets than in the United States may reflect a variety of factors influencing the demand for mobile data services, including differences in the age composition of the mobile subscriber base, the degree of technological standardization and compatibility among competing mobile networks, the availability of more advanced handsets, wireline Internet penetration rates, and the relative prices of mobile voice,

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[543] *Global Wireless Matrix 4Q03*, at 2.

[544] *Id*. Mobile penetration in Hong Kong and Singapore at the end of 2003 was 95 percent and 82 percent, respectively. *Id*. The possible impact of CPP versus MPP on mobile subscriber growth and penetration is controversial. One 2003 study of the effects of introducing CPP on mobile market growth finds that there is no statistical correlation between penetration and whether CPP or MPP is applied, but nevertheless concludes that "MPP certainly has held back growth in the US and Canada" and, more generally, that "in the longer term CPP is likely to lead to more rapid market growth and higher penetration levels." *See* Stefan Zehle, *CPP Benchmark Report*, Coleago Consulting Ltd., Feb. 23, 2003, at 11. In contrast, another study predicts that mobile penetration in the United States and Canada will likely catch up with the penetration rates of CPP countries in the near term. *See* Robert W. Crandall and J. Gregory Sidak, *Should Regulators Set Rates to Terminate Calls on Mobile Networks?*, forthcoming in YALE JOURNAL ON REGULATION, Vol. 21, 2004, at 18.

[545] *Eighth Report*, at 14875.

[546] *Global Wireless Matrix 4Q03*, at 2.

[547] *Id*.

[548] *Id*.

[549] *See Eighth Report,* at 14875.

[550] *See European Wireless*, at 34.

[551] *Id*.

mobile data, and wireline Internet access. For example, given that average mobile voice usage is steeply higher in the United States than in Europe and that, according to analysts, mobile voice is still relatively expensive on a per minute basis in Europe compared to the United States,[552] U.S. mobile subscribers may appear to lag behind their European counterparts in mobile data usage in part simply because they prefer to use their mobile phones to talk rather than to send text messages, whereas European mobile subscribers are more likely to opt for text messaging because it is cheaper than placing a call on their mobile phones.[553]

208. The number of foreign mobile telephone carriers providing mobile data services over next-generation networks continued to grow in the past year, but as in previous years the pace of 3G deployment abroad continues to lag behind initial expectations. During 2000 and 2001, countries in Western Europe and parts of Asia raced to award 3G licenses in the apparent belief that early licensing would jump-start the market for 3G services.[554] To this end, the European Commission required Member States to take all measures necessary to allow for the coordinated introduction of 3G services by January 2002, and in particular to establish an authorization system no later than January 2000.[555] As noted in previous reports, however, in October 2001 Japan's NTT DoCoMo became the world's first carrier to launch commercial service over a WCDMA network, whereas European carriers delayed the launch of commercial WCDMA service until 2003 at the earliest and in most cases 2004.[556] As of the end of 2003, commercial start-up of WCDMA service in Europe was limited to a small number of carriers in a handful of markets, including Hutchison 3G in Austria, Denmark, Italy, Sweden and the UK, Mobilkom in Austria, and Tele2 and P&T Luxembourg in Luxembourg.[557] Moreover, in 2002 and 2003 a number of European 3G license winners suspended their planned WCDMA deployments and withdrew from the 3G market in certain countries, in some cases returning the license to the regulator or selling it to another carrier.[558] In several cases the license holders who pulled out of the 3G market had paid millions and even billions of dollars for the license in 3G auctions, but withdrawals also occurred in countries that awarded licenses through a so-called "beauty contest" for a low administrative fee or free of charge. In all cases, the license winners who have pulled out of the 3G market are would-be new entrants to national mobile markets rather than incumbent GSM operators.

209. Analysts attribute the delays in 3G deployment abroad to a number of factors. One is a lack of adequate handsets, due initially to technical problems with handsets and subsequently to the inability of equipment manufacturers to keep pace with rising demand.[559] In addition, sluggish demand due to a

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[552] *Id*., at 23-24.

[553] *Wireless Data Prospects Brightening*, at 12.

[554] *See Seventh Report*, Appendix D, Table 1, at 13103-13105.

[555] *Decision No. 128/199/EC of the European Parliament and of the Council of 14 December 1998 on the co-ordinated introduction of a third-generation mobile and wireless communications system (UMTS) in the Community*, Official Journal L 17, Jan. 22, 1999.

[556] *See Eighth Report*, at 14874-14875.

[557] *Developments of Third-Generation Mobile Services in the OECD*, at 27-28.

[558] *Id*., at 26-27.

[559] *Id*., at 26.

lack of attractive applications ("killer applications") and consequently a lack of interest on the part of consumers has made it difficult for carriers to market 3G services.[560] Together with the relatively high cost of 3G network deployment and a difficult financial environment, the resulting erosion of confidence in the profitability of 3G services lead carriers to postpone network deployment in order to reduce capital expenditures.[561] In this regard, incumbent carriers in Europe have been able to meet consumer demand for mobile data services, albeit at much lower speeds than WCDMA potentially affords, by making relatively inexpensive GPRS upgrades to their existing GSM networks. Analysts also emphasize the role of entry barriers due to the first-mover and scale-economy advantages of incumbent GSM operators with an existing customer base in explaining why a number of potential new entrants decided to exit national 3G markets in Europe even before launching service.[562] Despite these setbacks, recent sales figures for third-generation handsets suggest that third-generation mobile services may be finally gaining momentum in Europe. In April 2004, about 225,000 third-generation cell phones were sold to European consumers.[563] Although this figure represents only about 2 percent of the European cell phone market, unit sales in April 2004 were more than double those in March.[564]

210. After two years of relatively sluggish growth, consumer uptake of NTT DoCoMo's WCDMA service, which the company calls FOMA (Freedom of Multimedia Access), picked up speed in late 2003 and the first half of 2004. As of the end of April 2004, the number of FOMA subscribers had jumped to 3,575,700, more than ten times the figure of 330,000 at the end of March 2003.[565] Despite this acceleration in subscriber growth, consumer uptake of rival Japanese carrier KDDI's CDMA2000 service continues to outpace that of NTT DoCoMo's WCDMA service. The number of subscribers to KDDI's 1xRTT-based service more than doubled from 6.8 million at the end of March 2003 to nearly 14 million at the end of April 2004.[566] Data services offered over next-generation CDMA networks continue to be popular with consumers in Korea. Through March 2004 South Korea had accumulated a total of over 27.6 million CDMA2000 subscribers - more than 80 percent of South Korea's mobile telephone subscriber base - including 6.4 million subscribers who are using services offered over 1xEV-DO networks.[567]

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[560] *Id*., at 26; The Harris Poll, *Europeans Uninterested in 3G; Many Say Benefits Are Unclear*, THE WALL STREET JOURNAL ONLINE NEWS ROUNDUP, Mar. 23, 2004.

[561] *Developments of Third-Generation Mobile Services in the OECD*, at 16.

[562] *Developments of Third-Generation Mobile Services in the OECD*, at 27.

[563] David Pringle, *High-Tech Cellphones Catch On In Europe as Models Get Lighter*, THE WALL STREET JOURNAL, June 1, 2004.

[564] *Id*.

[565] Telecommunications Carriers Association ("TCA"), *Number of Subscribers* (visited May 17, 2004) <http://www.tca.or.jp/eng/database/daisu/index.html>.

[566] *Id*.

[567] *3G Subscribers,* 3G TODAY, (visited May 19, 2004) <http://www.3gtoday.com/subscribers/index.html>.

VII. INTERMODAL ISSUES

A. Wireless – Wireline Competition

211. Once solely a business tool, wireless phones are now a mass-market consumer device.[568] As one reporter commented, "Few products have ever fallen so fast from luxury perk to ubiquitous commodity."[569] The overall wireless penetration rate in the United States is now at 54 percent.[570] Over 230 million people live in EAs with penetration rates of over 50 percent, while 83 million live in EAs with penetration rates of over 60 percent.[571] Industry survey firm Telephia estimated that 58 percent of the total population in 48 major metropolitan areas subscribed to wireless service at the end of 2003, with the highest being Greenville, SC and St. Louis, MO at 77 percent.[572] In addition, wireless is now penetrating deeply into the youth market. One study found that 56 percent of 11- to 17-year olds have or shared a phone, while another study found that 29 percent of 8- to 10-year olds have a cell phone.[573] One study from June 2003 found that 88.5 percent of surveyed mobile phones users said they kept their phones with them 24 hours a day.[574]

1. Wireless Substitution

212. While specific data is largely unavailable, it appears that only a small percent of wireless customers use their wireless phones as their only phone, and that relatively few wireless customers have "cut the cord" in the sense of canceling their subscription to wireline telephone service.[575] As one analyst argued, "the wireless impact on wireline has more to do with opportunity lost for the wireline side."[576]

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[568] *See Sixth Report*, at 13381.

[569] Jesse Drucker, *Big-Name Mergers Won't Ease Crowding in Cellphone Industry*, WALL STREEET JOURNAL, Feb. 13, 2004.

[570] *See* note 468, *supra*.

[571] *See* Section VI.B.4, Sub-National Penetration Rates, *supra*.

[572] *KC Mobile Phone Use Rises From Last Year*, Business Journal of Kansas City, Nov. 11, 2003 (citing Telephia survey).

[573] Jeffrey Selingo, *Hey Kid, Your Backpack Is Ringing*, NEW YORK TIMES, Mar. 18, 2004. *See also*, discussion of family plans in note 474.

[574] COMMUNICATIONS DAILY, July 22, 2004, at 10 (citing a survey by technology vendor SMS.as).

[575] In February 2004, the Current Population Survey of the Census Bureau included a special supplement about wireless phone usage. On the basis of this supplement, they estimate that 5 to 6 percent of all households now have wireless phones only. This is up from a previous estimate in November 2001 of a little over 1 percent. As part of the Consumer Expenditure Survey of the Bureau of Labor Statistics, demographic information about those who have a wireless bill an no wireline bill indicates that young single people are those most likely to have cut the cord. Tucker, Clyde, Michael Brick, and Brian Meekins, "Telephone Service in U.S. Households in 2004," paper presented at the 2004 Annual Meeting of the American Association for Public Opinion Research. *See, also Seventh Report*, at 13017.

[576] *NextGen VIII*, at 40.

213. Evidence continues to mount, however, that consumers are substituting wireless service for traditional wireline communications. One analyst estimated, for example, that 23 percent of voice minutes in 2003 were wireless, up from 7 percent in 2000.[577] In the *Eighth Report*, we discussed the effects of mobile telephone service on the operational and financial results of companies that offer wireline services. Such effects included a decrease in the number of residential access lines,[578] a drop in long distance revenues, and a decline in payphone profits.[579] In 2003 these trends continued, with the four largest LECS losing 4 percent of their access lines, and wireline long distance voice revenues declining further.[580] One analyst stated that "wireless cannibalization remains a key driver of access line erosion."[581]

214. Certainly, this is due to the relatively low cost, widespread availability, and increased use of wireless service. As we discussed in the *Eighth Report*, a number of analysts have argued that wireless service is cheaper than wireline, particularly if one is making a long distance call or when traveling.[582] More recently, one analyst said, "we believe that a wireless customer is now indifferent as to whether he makes a call from a fixed line or from a wireless phone, given the prevalence of big buckets of cheap minutes."[583] The analyst later added:

> Let's think about this another way. If [the average] customer were sitting in a room, with his fixed line on a table and his wireless phone in his pocket, and he needed to make a call, he would reach for whichever device was more convenient – without thinking about price. And, if the number that he needed to call was stored in his mobile phone, he might

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[577] *Id*, at 41.

[578] Total residential access lines can decline without wireline customers "cutting the cord" completely, as customers can replace additional residential lines ("second lines") with DSL, cable broadband, or wireless connections. *NextGen VIII*, at 39-40. *See*, *also*, *Trends in Telephone Service*, Federal Communications Commission, May 2004, at 7-1 and 7-6 (Table 7.4: *Additional Residential Lines For Households with Telephone Service*, showing the decline of second lines since 2000).

[579] *See Eighth Report,* at 14832.

[580] *Global Telecom Services*, at 6 (declining access lines); Simon Flannery *et al.*, *Picking Winners and Losers in a Changing Industry View*, Morgan Stanley, Equity Research, Feb. 24, 2004, at 5 (LD voice revenues). *See, also*, Frank J. Governali *et al*., *Downgrading CTL and CTCO to IL/C*, Goldman Sachs, Equity Research, Jan. 24, 2004 (noting that CenturyTel Inc. cited wireless substitution of long distance as a reason for weaker long distance demand in 2004). Moreover, the Commission has affirmed that the LNP rules that went into effect on November 24, 2003 require "intermodal" number porting between wireline and wireless carriers, thus enabling a wireline customer to port his or her telephone number to a wireless carrier serving the customer's local calling area. Telephone Number Portability, CC Docket No. 95-116, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 18 FCC Rcd. 23,697 (2003).

[581] Frank J. Governali *et al.*, *Telecom Services: Wireless & Wireline*, Goldman Sachs, Equity Research, Apr. 1, 2004, at 10. ALLTEL attributed approximately 40 percent of its access line losses in the fourth quarter of 2004 to wireless substitution and 25 to 30 percent to broadband substitution. Colette M. Fleming *et al.*, *ALLTEL Corp.*, UBS Warburg, Equity Research, Jan 26, 2004, at 6.

[582] *See Eighth Report*, at 14832-14833.

[583] *European Wireless*, at 3.

well reach for his mobile phone first.[584]

2. Wireless Alternatives

215. The number of mobile wireless carriers offering service plans designed to compete directly with wireline local telephone service continues to increase. These plans offer unlimited local calling for around $35 to $40 a month. The largest of such providers, Leap, under its "Cricket" brand, offers mobile telephone service in 39 markets in 20 states.[585] At the end of 2003, Leap had roughly 1.5 million customers.[586] Leap claims that 43 percent of its customers do not have a wireline phone at home.[587] MetroPCS, which began offering a similar unlimited calling plan in 2002, had almost 1 million customers at the end of 2003.[588] According to MetroPCS, its customers average approximately 1,700 minutes of use per month, which it believes exceeds the average monthly usage for the typical wireline customer.[589] The company also believes that a majority of its customers use their service as their primary means of communications, and that it is the sole telecommunications service provider for many of its customers.[590] MetroPCS offers service in California, Florida, and Georgia.[591]

216. Other companies offering unlimited local calling plans include: Triton PCS in Virginia, North Carolina, South Carolina, Georgia, and Tennessee;[592] Qwest in Arizona, Colorado, Idaho, Iowa, Minnesota, Nebraska, New Mexico, Oregon, Utah, Washington, and Wyoming;[593] Northcoast PCS in Ohio;[594] First Cellular of Southern Illinois in Illinois;[595] Kiwi PCS in North Carolina;[596] Rural Cellular in

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[584] *European Wireless*, at 23.

[585] *Leap Reports Results for First Fiscal Quarter of 2004*, News Release, Leap, May 17, 2004. This is one market fewer than was reported in the *Eighth Report*. *Eighth Report*, at 14833.

[586] *See* Appendix A, Table 4, at A-8.

[587] *Leaping Over Landline: Leap Leads Wireless Displacement Trend*, News Release, Leap Wireless, Jun. 24, 2002.

[588] MetroPCS, SEC Form S-1, filed Mar. 23, 2004, at 1; Appendix A, Table 4, at A-8; MetroPCS, *Service & Phone* (visited May 20, 2004) <http://www.metropcs.com/coverage/coverage.shtml>.

[589] *Id*., at 1.

[590] *Id*., SEC Form S-1, filed Mar. 23, 2004, at 1.

[591] *See* MetroPCS, *Service & Phone* (visited May 26, 2004) <http://www.metropcs.com/coverage/coverage.shtml>.

[592] *See* SunCom, *SunCom UnPlan "FREE" Zones* (visited May 27, 2004) <http://www.suncom.com/maps/suncom_unplan_maps.html>.

[593] *See Qwest*, Q*west Choice*™ (visited May 28, 2004) <http://www.qwestwireless.com/service/checkCoverage.jsp>.

[594] *See* Northcoast PCS, *Service Plans* (visited May 27, 2004) <http://www.northcoastpcs.com/Web/Service_Plans.html>.

[595] *See* First Cellular, *Southern Illinois Unlimited Plan* (visited May 27, 2004) <http://www.firstcellular.com/pages/rates_details.php?id=1&cat=2>.

Vermont, New Hampshire, New York, Kansas, Minnesota, Maine, North Dakota, and South Dakota;[597] Ntelos in Virginia, West Virginia, and North Carolina;[598] Iowa Wireless in Iowa and Illinois;[599] Hargray Wireless in southeastern Georgia;[600] Bluegrass Cellular in Kentucky;[601] Onelink PCS in Missouri and Illinois;[602] Immix Wireless in Pennsylvania;[603] Corr Wireless in Alabama;[604] and Leaco Wireless in New Mexico.[605]

217. In addition, in 2003 many carriers began offering calling plans that are effectively unlimited, with 1,000 "anytime" minutes and unlimited night and weekend minutes for around $50-$65 per month.[606] One analyst commented, "We think that such plans were yet more evidence of the threat to the fixed line, which, for a similar price, offers unlimited local and long distance – without mobility."

B. Wi-Fi

218. Wi-Fi or Wireless Fidelity, also known as the Institute of Electrical and Electronics Engineers' ("IEEE") family of 802.11x standards, is a technology used to create wireless local area networks ("WLANs") with a range of 150 to 250 feet.[607] Wi-Fi operates on an unlicensed basis and allows data transfer speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g. Users of mobile devices with Wi-Fi capabilities can establish high-speed wireless Internet connections within buildings or spaces, commonly called "hot spots," where Wi-Fi technology has been deployed.

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[596] *See* Kiwi PCS (visited May 28, 2004) < http://www.kiwipcs.com/service.htm>.

[597] *See* Rural Cellular, *Welcome To Rural Cellular Corporation* (visited May 27, 2004) <http://www.ruralcellular.com/>.

[598] *See* Ntelos, h*omefree* (visited May 28, 2004) <http://www.ntelos.com/P/pdr_homefree.html>.

[599] *See* Iowa Wireless MEGAtalk plan (visited May 28, 2004) <http://www.strawberrycomputing.net/IWS-plans.htm#$89%20MEGAtalk%20PHONE%20PACKAGE>.

[600] *See* Hargray Wireless Local Unlimited Plan (visited May 28, 2004) <http://www.hargraywireless.com/hws/Search.bok?category=calling+plans>.

[601] *See* Bluegrass Cellular Local Digital Price Plans (visited May 28, 2004) <http://www.bluecell.com/local_cellular.html>.

[602] *See* OneLink Communications *Home*Link plan (visited May 28, 2004) <http://www.onelinkpcs.com/home.html>.

[603] *See* Immix Cellular Telezone Rate plan (visited May 28, 2004) <http://www.immix.com/_page/rate_telezone.htm>.

[604] *See* Corr Wireless HomeFree Endless Minutes (visited May 27, 2004) <http://www.corrcomm.net/>.

[605] *See* Leaco Mobile One Rate (visited May 28, 2004) <http://www.rodeo.leaco.net/brochures41803/4999.htm>.

[606] *NextGen VIII*, at 33.

[607] Kenneth R. Carter, Ahmed Lahjouji, and Neal McNeal, *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*, OSP Working Paper #39, May 2003, at 28-29. ("*OSP-OET White Paper*")

Hot spots typically rely on high-speed landline technologies, such as T-1 lines, DSL, or cable modems, to connect to the PSTN and Internet. Public hot spots include restaurants, coffee shops, hotels, airports, convention centers, and city parks, streets, and squares.[608] The industry estimates there were more than 71,000 Wi-Fi hot spots worldwide as of May 2003, of which more than 28,000 were in North America, with retail outlets followed by hotels being the leading hot spot locations both worldwide and in North America.[609]

219. While Wi-Fi itself is not a CMRS service,[610] it has begun to play an increasingly important role in the CMRS industry, and many CMRS providers have recently entered the Wi-Fi business. Because the technology allows consumers to obtain high-speed wireless Internet connections within certain locations, it has the potential to act as both a substitute and a complement to data services offered over mobile telephone networks. However, several obstacles currently prevent Wi-Fi from competing directly with CMRS-based mobile data services. First, roaming among Wi-Fi hotspots that are not part of the same network or are maintained by different providers can be problematic. Second, frequent handoffs are required in order for Wi-Fi users to roam beyond the relatively short service radii of individual hotspots. Technical obstacles also currently prevent Wi-Fi from connecting seamlessly with wide area CMRS networks and therefore acting as a more effective complement to such networks. However, carriers and equipment providers are working to overcome these obstacles.[611]

220. There are several business models for Wi-Fi hot spots. These include: individuals or companies who install Wi-Fi equipment in commercial locations; wholesale aggregators who combine local installations to provide a national footprint; major CMRS providers; grass roots individuals who offer free or low-cost access; and providers of other products, such as restaurants, that offer Wi-Fi in order to sell their primary product.[612] When a Wi-Fi network operator chooses to install hot spot equipment in partnership with another commercial entity, the resulting Wi-Fi offering typically combines and builds on the special expertise derived from each member of the partnership.[613] Generally speaking, hot spot operators are companies that set up and maintain Wi-Fi networks in public locations and sell Wi-Fi access to end users. In return, hot spot operators share the revenue derived from the Wi-Fi access with the hosting business.

221. As noted in the *Eighth Report*, several mobile telephone carriers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments. Over the past year their list of hotspots has grown.[614] Subscribers to carriers' Wi-Fi services may choose from a wide range

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[608] *See Seventh Report*, at 13062-13063. Private Wi-Fi networks – typically not open to the public – have also been deployed in locations such as homes, office buildings, hospitals, and schools.

[609] *Public Wireless LAN Hotspots: Worldwide, 2002-2008*, GARTNER, May 15, 2003, at 7.

[610] *See* 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services.

[611] *See*, e.g., Stephen Lawson, *Cisco to Ship Wi-Fi Mobile Phone in June, Device Will Work Only Within Facilities*, INFOWORLD, Apr. 16, 2003.

[612] *OSP-OET White Paper*, at 37.

[613] *Id*.

[614] *See, for example*, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 20, 2004) <http://locations.hotspot.t-mobile.com/>.

of service plans including annual access, month-to-month access, daily access, and metered access.[615] In addition, some mobile carriers extended their Wi-Fi coverage in the past year by entering into agreements with other carriers. For example, Sprint PCS signed a reciprocal agreement with AT&T Wireless that would allow each carrier's Wi-Fi subscribers to access the airport hotspots operated by the other carrier.[616] Likewise, T-Mobile entered into an agreement with AT&T Wireless, whereby the customers of both carriers will have access to the airport Wi-Fi hotspots operated by the other carrier.[617]

VIII. CONCLUSION

222. By a number of performance indicators, U.S. consumers continue to benefit greatly from robust competition in the CMRS marketplace. During 2003, the CMRS industry experienced another year of growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2003, we estimate there were approximately 160.6 million mobile telephone subscribers, which translates into a nationwide penetration rate of roughly 54 percent.[618] Consumers continued to increase their use of mobile telephones for both voice and data services. Partly because of the prevalence of mobile service packages with large buckets of inexpensive minutes, on average U.S. mobile subscribers continued to spend more than twice as much time per month talking on their mobile phones than mobile subscribers in Western Europe or Japan.[619] Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, the popularity of text messaging and other handset-based data applications increased during 2003 as evidenced by, among other indicators, a steep rise in the volume of SMS traffic and an increase in the estimated percentage of U.S. mobile subscribers considered to be casual data users.[620] Relatively low prices on mobile voice and data services appear to have been a key factor stimulating subscriber growth and usage. While only two of three different indicators of mobile pricing continued to drop in 2003,[621] it is estimated that mobile voice calls are still two to three times less expensive on a per minute basis in the United States than in Western Europe, and that mobile data pricing is about 50 percent cheaper in the United States than in Western Europe.[622]

223. In addition to the indicators of mobile market performance cited in the preceding paragraph, a wide variety of indicators of carrier conduct and market structure also show that competition in mobile

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[615] *See*, *for example*, Sprint PCS, *PCS for Business: Voice and Data* (visited May 20, 2004) <https://wifi.sprintpcs.com/signup/terms.aspx>; T-Mobile, *T-Mobile Hotspot: Service Plans* (visited May 20, 2004) <https://selfcare.hotspot.t-mobile.com////services_plans.do>.

[616] *Sprint and AT&T Wireless Sign Bilateral Airport Wi-Fi Roaming Agreement*, Press Release, Sprint PCS, Apr. 19, 2004.

[617] *AT&T Wireless and T-Mobile USA Sign Airport Wi-Fi Roaming Agreement*, Press Release, T-Mobile USA, Feb. 5, 2004.

[618] *See* Section, Section VI.B.1, Subscriber Growth, *supra*.

[619] *See* Section VI.E, International Comparisons, *supra*.

[620] *See* Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Data Usage, *supra*.

[621] *See* Section VI.A.1, Pricing Trends, *supra*.

[622] *See Wireless Data Prospects Brightening*, at 12.

telecommunications markets is robust. For example, mobile telephony providers continued to build out their networks and expand service availability during 2003.[623] Carriers also continued to deploy GPRS, 1xRTT, or 1xEV-DO networks that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and/or laptops. With respect to market structure, to date 276 million people, or 97 percent of the total U.S. population, have three or more different operators offering mobile telephone service in the counties in which they live. Roughly 250 million people, or 87 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service.

224. In addition, while relatively few wireless customers have "cut the cord" in the sense of canceling their subscription to wireline telephone service, evidence continues to mount that consumers are substituting wireless service for traditional wireline communications. One analyst estimated, for example, that 23 percent of voice minutes in 2003 were wireless, up from 7 percent in 2000.

225. Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services[624] and conclude that the CMRS marketplace is effectively competitive.

IX. ADMINISTRATIVE MATTERS

226. This Ninth Report is issued pursuant to authority contained in Section 332 (c)(1)(C) of the Communications Act of 1934, as amended, 47 U.S.C. § 322 (c)(1)(C).

227. It is ORDERED that the Secretary shall send copies of this Report to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

228. **It is FURTHER ORDERED that the proceeding in the WT Docket No. 04-111 IS TERMINATED.**

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

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[623] *See* Section IV.B.1, Technology Deployment and Upgrades, *supra*.

[624] *See* Section II.A, Background, *supra.*

APPENDIX A:
MOBILE TELEPHONY

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Table 1: CTIA's Semi-Annual Mobile Telephone Industry Survey

Date	Estimated Subscribers	Year End over Year End Subscriber Increase	Total Six-Month Service Revenues (000s)	Roamer Services Revenues	Cell Sites	Employees	Cumulative Capital Investment (000s)	Average Local Monthly Bill
Jan 85	91,600		$178,085		346	1,404	$354,760	
June 85	203,600		$176,231		599	1,697	$588,751	
Dec 85	340,213	248,613	$306,197		913	2,727	$911,167	
June 86	500,000		$360,585		1,194	3,556	$1,140,163	
Dec 86	681,825	341,612	$462,467		1,531	4,334	$1,436,753	
June 87	883,778		$479,514		1,732	5,656	$1,724,348	
Dec 87	1,230,855	549,030	$672,005		2,305	7,147	$2,234,635	$96.83
June 88	1,608,697		$886,075		2,789	9,154	$2,589,589	$95.00
Dec 88	2,069,441	838,586	$1,073,473	$89,331	3,209	11,400	$3,274,105	$98.02
June 89	2,691,793		$1,406,463	$121,368	3,577	13,719	$3,675,473	$85.52
Dec 89	3,508,944	1,439,503	$1,934,132	$173,199	4,169	15,927	$4,480,141	$83.94
June 90	4,368,686		$2,126,362	$192,350	4,768	18,973	$5,211,765	$83.94
Dec 90	5,283,055	1,774,111	$2,422,458	$263,660	5,616	21,382	$6,281,596	$80.90
June 91	6,380,053		$2,653,505	$302,329	6,685	25,545	$7,429,739	$74.56
Dec 91	7,557,148	2,274,093	$3,055,017	$401,325	7,847	26,327	$8,671,544	$72.74
June 92	8,892,535		$3,633,285	$436,725	8,901	30,595	$9,276,139	$68.51
Dec 92	11,032,753	3,475,605	$4,189,441	$537,146	10,307	34,348	$11,262,070	$68.68
June 93	13,067,318		$4,819,259	$587,347	11,551	36,501	$12,775,967	$67.31
Dec 93	16,009,461	4,976,708	$6,072,906	$774,266	12,805	39,775	$13,946,406	$61.48
June 94	19,283,306		$6,519,030	$778,116	14,740	45,606	$16,107,920	$58.65
Dec 94	24,134,421	8,124,960	$7,710,890	$1,052,666	17,920	53,902	$18,938,677	$56.21
June 95	28,154,415		$8,740,352	$1,120,337	19,833	60,624	$21,709,286	$52.45
Dec 95	33,785,661	9,651,240	$10,331,614	$1,422,233	22,663	68,165	$24,080,466	$51.00
June 96	38,195,466		$11,194,247	$1,314,943	24,802	73,365	$26,707,046	$48.84
Dec 96	44,042,992	10,257,331	$12,440,724	$1,465,992	30,045	84,161	$32,573,522	$47.70
June 97	48,705,553		$13,134,551	$1,392,440	38,650	97,039	$37,454,294	$43.86
Dec 97	55,312,293	11,269,301	$14,351,082	$1,581,765	51,600	109,387	$46,057,911	$42.78
June 98	60,831,431		$15,286,660	$1,584,891	57,674	113,111	$50,178,812	$39.88
Dec 98	69,209,321	13,897,028	$17,846,515	$1,915,578	65,887	134,754	$60,542,774	$39.43
June 99	76,284,753		$19,368,304	$1,922,416	74,157	141,929	$66,782,827	$40.24
Dec 99	86,047,003	16,837,682	$20,650,185	$2,163,001	81,698	155,817	$71,264,865	$41.24
June 00	97,035,925		$24,645,365	$1,971,625	95,733	159,645	$76,652,358	$45.15
Dec 00	109,478,031	23,431,028	$27,820,655	$1,911,356	104,288	184,449	$89,624,387	$45.27
June 01	118,397,734		$30,905,721	$1,727,058	114,059	186,317	$99,728,965	$45.56
Dec 01	128,374,512	18,896,481	$34,110,163	$2,209,387	127,540	203,580	$105,030,101	$47.37
June 02	134,561,370		$36,707,086	$1,846,267	131,350	186,956	$118,418,677	$47.42
Dec 02	140,766,842	12,392,330	$39,801,101	$2,049,245	139,338	192,410	$126,922,347	$48.40
June 03	148,065,824		$41,384,171	1,825,243	147,719	187,169	$134,147049	$49.46
Dec 03	158,721,981	17,955,139	$46,239,922	1,941,024	162,986	205,629	$145,866,914	$49.91

Source**:** CTIA, *Semi-Annual Wireless Industry Survey* <http://www.wow-com.com/industry/stats/surveys/>.

Table 2: FCC's Semi-Annual Local Telephone Competition Survey

State	December 2003		Subscribers									Percent Change Dec 02 - Dec 03
	Carriers [1]	Percent Resold [2]	1999	2000		2001		2002		2003		
			Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	
Alabama	10	7 %	1,080,410	1,253,084	1,386,294	1,930,631	1,979,075	2,027,845	1,987,254	2,100,557	2,242,108	13 %
Alaska	4	4	165,221	169,892	*	218,424	240,216	242,133	267,630	*	303,184	13
Arizona	14	5	1,125,321	1,624,668	1,855,115	2,018,410	2,171,021	2,412,998	2,520,058	2,643,952	2,843,061	13
Arkansas	7	4	719,919	715,467	743,928	891,275	970,127	1,130,302	1,156,345	1,351,291	1,296,901	12
California	15	6	8,544,941	12,283,369	12,710,520	14,184,625	15,052,203	16,007,376	17,575,105	18,892,619	20,360,454	16
Colorado	10	3	1,552,718	1,654,989	1,856,075	1,983,405	2,145,816	2,247,166	2,358,748	2,426,929	2,554,731	8
Connecticut	6	4	1,077,089	1,136,618	1,277,123	1,418,367	1,639,914	1,577,873	1,694,110	1,791,944	1,928,988	14
Delaware	6	4	270,848	275,219	371,014	389,284	412,611	433,059	438,196	503,353	543,526	24
Dist. of Columbia	6	9	346,681	333,815	354,735	382,457	404,489	415,399	472,832	520,182	513,102	9
Florida	11	13	5,158,079	4,983,478	6,369,985	7,536,670	8,937,063	8,607,715	9,482,349	10,252,348	10,855,430	14
Georgia	13	6	2,538,983	2,687,238	2,754,784	4,076,119	4,149,717	4,300,831	4,497,576	4,709,288	4,940,091	10
Guam	*	*	*	*	0	*	*	*	*	*	*	NA
Hawaii	5	1	288,425	454,364	524,291	543,283	595,721	640,247	689,857	732,262	771,023	12
Idaho	10	10	271,436	296,066	344,564	398,781	444,864	500,693	536,064	572,406	605,488	13
Illinois	10	7	3,922,482	4,309,660	5,143,767	5,621,044	5,631,172	5,409,370	6,476,683	6,834,217	7,183,989	11
Indiana	8	10	1,318,975	1,717,378	1,715,074	1,781,247	1,921,356	2,032,290	2,390,567	2,456,509	2,642,810	11
Iowa	12	9	774,773	975,629	832,106	861,382	1,087,608	1,157,580	1,239,384	1,250,305	1,342,931	8
Kansas	12	4	669,472	724,024	801,293	901,225	956,050	1,061,171	1,117,277	1,195,230	1,261,242	13
Kentucky	11	8	911,700	999,544	1,026,334	1,176,756	1,405,043	1,505,982	1,456,705	1,595,290	1,812,657	24
Louisiana	10	11	1,227,106	1,294,693	1,306,457	1,677,292	1,920,740	2,187,811	2,190,613	2,365,224	2,470,146	13
Maine	5	2	187,003	283,640	359,786	399,616	427,313	457,835	466,896	524,246	568,159	22
Maryland	8	4	1,634,625	2,013,058	2,298,651	2,446,818	2,614,216	2,684,441	2,913,943	3,108,086	3,319,605	14
Massachusetts	6	3	1,892,014	2,228,169	2,649,130	2,753,685	2,996,816	3,289,934	3,375,726	3,506,039	3,741,975	11
Michigan	14	7	3,512,813	3,423,535	3,551,719	4,071,091	4,238,399	4,758,538	4,674,980	4,889,269	5,114,259	9
Minnesota	12	9	1,550,411	1,595,560	1,851,430	2,014,317	2,153,857	2,254,895	2,415,033	2,564,783	2,677,472	11
Mississippi	10	12	673,355	509,038	786,577	993,781	1,048,061	1,106,700	1,112,765	1,232,750	1,324,160	19
Missouri	11	6	1,855,452	1,848,775	1,767,411	1,937,684	2,106,599	2,246,430	2,289,831	2,515,325	2,691,255	18
Montana	4	2	*	*	*	*	279,349	291,429	315,512	343,160	373,947	19
Nebraska	9	2	576,296	600,885	659,380	712,685	791,799	838,568	867,810	900,744	937,184	8
Nevada	8	6	750,335	825,163	684,752	766,581	842,155	895,586	984,486	1,077,380	1,216,838	24
New Hampshire	8	11	280,508	309,263	387,264	445,181	492,390	529,795	525,689	598,504	648,788	23
New Jersey	6	3	2,289,181	2,750,024	3,575,130	3,896,778	4,283,643	4,531,457	4,587,640	5,392,240	5,799,417	26
New Mexico	10	12	363,827	395,111	443,343	619,582	660,849	735,107	780,855	828,869	859,408	10
New York	12	5	4,833,816	5,016,524	5,918,136	6,749,096	7,429,249	7,915,526	8,937,683	8,829,070	9,453,613	6
North Carolina	11	8	2,536,068	2,730,178	3,105,811	3,377,331	3,767,598	4,610,120	4,094,715	4,305,521	4,554,723	11
North Dakota	*	*	*	*	*	*	*	245,578	*	*	*	NA
Ohio	14	5	3,237,786	3,278,960	4,150,498	4,255,934	4,739,795	4,887,376	5,212,204	5,659,459	5,817,211	12
Oklahoma	13	4	826,637	979,513	1,124,214	1,200,234	1,288,357	1,366,475	1,440,970	1,574,588	1,614,191	12
Oregon	10	4	914,848	1,082,425	1,201,207	1,268,909	1,399,279	1,473,883	1,682,343	1,682,036	1,778,936	6
Pennsylvania	10	5	2,767,474	3,850,372	4,129,186	4,378,216	4,849,085	4,987,067	5,258,844	5,681,653	6,073,573	15
Puerto Rico	6	11	*	1,090,005	757,613	1,374,747	1,128,736	1,136,619	1,516,808	1,401,599	1,631,266	8
Rhode Island	6	3	279,304	313,550	355,889	401,805	456,059	463,636	515,547	527,366	567,331	10
South Carolina	11	16	1,137,232	1,236,338	1,392,586	1,502,345	1,752,457	1,830,516	1,896,369	2,041,541	2,149,480	13
South Dakota	5	7	*	*	*	*	278,646	292,210	325,114	344,825	365,211	12
Tennessee	12	5	1,529,054	1,876,444	1,985,851	2,251,208	2,510,978	2,660,068	2,674,566	2,800,735	2,974,512	11
Texas	20	6	5,792,453	6,705,423	7,548,537	8,294,338	9,156,187	9,650,715	10,133,280	10,776,234	11,327,700	12
Utah	9	3	643,824	692,006	750,244	833,492	919,002	970,854	1,052,522	1,094,563	1,154,992	10
Vermont	*	*	*	*	*	*	*	*	*	*	*	NA
Virgin Islands	*	*	*	0	0	*	*	*	*	*	*	NA
Virginia	11	4	2,262,567	2,447,687	2,708,342	3,059,420	3,270,165	3,429,450	3,753,106	3,879,582	4,147,182	10
Washington	10	5	1,873,475	2,144,767	2,286,082	2,493,214	2,706,030	2,849,043	2,869,784	3,102,750	3,377,193	18
West Virginia	10	10	241,265	347,916	392,384	452,036	498,811	549,722	576,503	579,983	675,257	17
Wisconsin	11	8	1,525,818	1,342,908	1,698,520	2,008,679	2,229,389	2,523,956	2,396,562	2,533,215	2,723,985	14
Wyoming	4	2	127,634	*	*	173,939	194,665	168,232	191,939	276,344	295,706	54
Nationwide	86	6 %	79,696,083	90,643,058	101,043,219	114,028,928	123,990,857	130,751,459	138,878,293	147,623,734	157,042,082	13 %

NA – Not Applicable

* Data withheld to maintain firm confidentiality.

1/ Carriers with under 10,000 subscribers in a state were not required to report for that state.

2/ Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

Source: Local Telephone Competition: Status as of December 31, 2003, Federal Communications Commission, June 2004 (Table 13: Mobile Wireless Telephone Subscribers).

Table 3: Economic Area Penetration Rates

EA	EA Name	Subscribers	EA Population	2003 Penetration Rate	2003 HHI	2002 Penetration Rate	EA density
34	Tampa-St. Petersburg-Clearwater, FL	1,420,786	2,395,997	59.30%	1578	55.73%	890.99
10	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-VT	15,287,972	25,712,577	59.46%	2091	52.92%	890.56
12	Philadelphia-Wilmington-Atl. City, PA-NJ-DE-MD	4,356,857	7,309,792	59.60%	2009	52.78%	778.84
161	San Diego, CA	1,922,868	2,813,833	68.34%	2078	57.86%	660.48
64	Chicago-Gary-Kenosha, IL-IN-WI	5,952,494	10,328,854	57.63%	1538	52.81%	556.54
31	Miami-Fort Lauderdale, FL	3,595,876	5,602,222	64.19%	1524	59.10%	483.20
55	Cleveland-Akron, OH-PA	2,341,367	4,692,460	49.90%	2152	42.26%	427.84
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	4,530,215	7,954,554	56.95%	2083	53.60%	421.83
13	Washington-Baltimore, DC-MD-VA-WV-PA	5,572,046	8,403,130	66.31%	1881	59.55%	402.76
63	Milwaukee-Racine, WI	1,226,088	2,255,183	54.37%	2194	46.85%	366.88
57	Detroit-Ann Arbor-Flint, MI	4,297,348	6,963,637	61.71%	1830	54.49%	364.07
50	Dayton-Springfield, OH	608,034	1,133,004	53.67%	*	39.82%	318.52
49	Cincinnati-Hamilton, OH-KY-IN	1,211,492	2,184,860	55.45%	2404	49.22%	294.08
11	Harrisburg-Lebanon-Carlisle, PA	589,975	1,125,265	52.43%	2798	44.34%	292.42
20	Norfolk-Virginia Beach-Newport News, VA-NC	1,016,383	1,722,764	59.00%	1748	53.66%	289.89
160	Los Angeles-Riverside-Orange County, CA-AZ	11,020,865	18,003,420	61.22%	1971	52.69%	286.10
53	Pittsburgh, PA-WV	1,517,384	2,971,829	51.06%	2534	45.92%	284.77
33	Sarasota-Bradenton, FL	416,557	763,795	54.54%	1716	51.04%	273.56
163	San Francisco-Oakland-San Jose, CA	5,725,178	9,111,806	62.83%	1990	56.27%	271.07
30	Orlando, FL	2,160,936	3,642,540	59.32%	1646	53.34%	265.84
40	Atlanta, GA-AL-NC	3,826,757	5,471,412	69.94%	1815	62.10%	246.04
23	Charlotte-Gastonia-Rock Hill, NC-SC	1,224,010	2,031,519	60.25%	1790	52.73%	240.50
32	Fort Myers-Cape Coral, FL	456,278	692,265	65.91%	1769	62.11%	234.27
133	McAllen-Edinburg-Mission, TX	400,030	978,369	40.89%	2650	48.86%	221.96
8	Buffalo-Niagara Falls, NY-PA	674,874	1,507,759	44.76%	2449	38.70%	212.89
62	Grand Rapids-Muskegon-Holland, MI	921,107	1,881,991	48.94%	2079	34.92%	206.76
170	Seattle-Tacoma-Bremerton, WA	2,508,180	4,135,291	60.65%	2070	55.28%	190.45
51	Columbus, OH	1,244,662	2,349,060	52.99%	2089	41.50%	190.40
18	Greensboro-Winston-Salem-High Point, NC-VA	922,422	1,854,853	49.73%	1847	47.30%	189.09
19	Raleigh-Durham-Chapel Hill, NC	1,086,930	1,831,510	59.35%	1858	55.08%	188.38
164	Sacramento-Yolo, CA	1,424,043	2,311,567	61.61%	1951	54.43%	188.08
172	Honolulu, HI	790,232	1,211,537	65.23%	2243	58.33%	187.20
65	Elkhart-Goshen, IN-MI	396,919	936,245	42.39%	2335	33.67%	185.73
41	Greenville-Spartanburg-Anderson, SC-NC	675,919	1,248,824	54.12%	2704	50.57%	183.62
70	Louisville, KY-IN	774,340	1,416,914	54.65%	1672	47.37%	180.92
83	New Orleans, LA-MS	957,082	1,725,338	55.47%	2009	51.09%	171.93
67	Indianapolis, IN-IL	1,548,388	3,066,469	50.49%	2316	44.49%	171.37
131	Houston-Galveston-Brazoria, TX	3,439,905	5,632,853	61.07%	1953	56.53%	169.25
7	Rochester, NY-PA	704,473	1,493,518	47.17%	3257	31.24%	167.21
44	Knoxville, TN	524,635	983,329	53.35%	1833	47.52%	165.64
22	Fayetteville, NC	282,041	528,224	53.39%	1930	48.85%	164.57
56	Toledo, OH	626,108	1,294,395	48.37%	2919	44.50%	163.94
66	Fort Wayne, IN	322,538	725,847	44.44%	3357	37.26%	158.50
130	Austin-San Marcos, TX	879,957	1,349,267	65.22%	1768	59.74%	156.06
81	Pensacola, FL	382,214	623,252	61.33%	1674	51.64%	154.06

26	Charleston-North Charleston, SC	363,532	587,297	61.90%	1964	57.50%	149.80
43	Chattanooga, TN-GA	371,278	720,375	51.54%	1974	44.46%	145.32
45	Johnson City-Kingsport-Bristol, TN-VA	280,985	576,081	48.78%	1993	44.90%	144.51
60	Appleton-Oshkosh-Neenah, WI	210,533	433,250	48.59%	2496	37.79%	143.62
82	Biloxi-Gulfport-Pascagoula, MS	213,257	396,754	53.75%	1737	45.64%	143.45
84	Baton Rouge, LA-MS	408,833	739,673	55.27%	3333	48.78%	140.30
78	Birmingham, AL	935,055	1,578,903	59.22%	2143	53.20%	137.13
5	Albany-Schenectady-Troy, NY	564,646	1,171,669	48.19%	2751	40.77%	134.71
46	Hickory-Morganton, NC-TN	219,830	519,208	42.34%	2581	38.50%	131.90
42	Asheville, NC	246,863	444,594	55.53%	3190	49.02%	128.63
96	St. Louis, MO-IL	1,917,848	3,558,651	53.89%	2057	48.16%	127.01
24	Columbia, SC	527,821	932,115	56.63%	2206	50.46%	125.95
52	Wheeling, WV-OH	123,003	327,645	37.54%	4170	29.92%	124.54
15	Richmond-Petersburg, VA	831,285	1,446,123	57.48%	1871	53.46%	124.03
74	Huntsville, AL-TN	566,031	997,824	56.73%	2379	49.04%	119.14
127	Dallas-Fort Worth, TX-AR-OK	4,369,646	7,645,530	57.15%	1743	51.53%	119.00
54	Erie, PA	200,808	519,348	38.67%	4151	32.45%	116.41
29	Jacksonville, FL-GA	1,173,446	1,885,190	62.25%	1329	53.47%	112.52
14	Salisbury, MD-DE-VA	161,757	363,970	44.44%	5560	36.69%	111.17
102	Davenport-Moline-Rock Island, IA-IL	281,431	558,913	50.35%	2562	44.61%	108.27
25	Wilmington, NC-SC	467,980	878,267	53.28%	1978	49.80%	107.39
71	Nashville, TN-KY	1,324,487	2,444,643	54.18%	1927	47.99%	105.12
6	Syracuse, NY-PA	812,041	1,902,640	42.68%	3159	36.05%	104.74
73	Memphis, TN-AR-MS-KY	1,009,301	1,882,332	53.62%	1702	46.19%	102.99
103	Cedar Rapids, IA	232,667	384,577	60.50%	2799	57.27%	101.33
85	Lafayette, LA	314,496	601,654	52.27%	3531	46.75%	99.99
162	Fresno, CA	688,956	1,419,998	48.52%	2455	41.73%	98.64
2	Portland, ME	370,657	748,817	49.50%	2778	42.50%	98.56
17	Roanoke, VA-NC-WV	389,827	826,284	47.18%	1915	45.04%	97.83
158	Phoenix-Mesa, AZ-NM	1,992,943	3,407,197	58.49%	1545	53.85%	93.91
9	State College, PA	333,346	809,979	41.15%	3665	34.68%	92.41
28	Savannah, GA-SC	392,450	668,214	58.73%	1675	48.11%	91.95
101	Peoria-Pekin, IL	264,545	528,671	50.04%	3487	44.05%	90.99
27	Augusta-Aiken, GA-SC	311,550	604,799	51.51%	2048	42.34%	89.79
87	Beaumont-Port Arthur, TX	231,219	456,637	50.64%	3242	46.79%	89.20
99	Kansas City, MO-KS	1,416,864	2,469,340	57.38%	1892	51.10%	88.73
92	Fayetteville-Springdale-Rogers, AR-MO-OK	210,732	405,160	52.01%	2842	43.83%	88.43
21	Greenville, NC	412,842	823,517	50.13%	2691	46.43%	87.74
48	Charleston, WV-KY-OH	454,265	1,199,373	37.88%	2502	33.72%	85.35
39	Columbus, GA-AL	272,995	496,538	54.98%	1638	51.30%	84.08
134	San Antonio, TX	1,150,957	2,141,060	53.76%	1960	47.34%	82.99
107	Minneapolis-St. Paul, MN-WI-IA	2,522,006	4,498,286	56.07%	1325	50.29%	82.98
47	Lexington, KY-TN-VA-WV	727,500	1,851,367	39.30%	1761	35.35%	80.39
167	Portland-Salem, OR-WA	1,596,419	2,883,737	55.36%	2160	49.89%	76.01
69	Evansville-Henderson, IN-KY-IL	416,392	854,714	48.72%	3407	42.96%	75.31
80	Mobile, AL	358,691	676,258	53.04%	2185	42.81%	74.75
93	Joplin, MO-KS-OK	123,942	263,904	46.96%	2554	38.77%	74.68
68	Champaign-Urbana, IL	300,716	630,898	47.66%	2998	40.16%	73.47
124	Tulsa, OK-KS	728,014	1,384,426	52.59%	1788	47.01%	72.44
104	Madison, WI-IL-IA	472,036	933,823	50.55%	4365	43.09%	71.33

72	Paducah, KY-IL	81,938	226,586	36.16%	5158	24.73%	70.02
79	Montgomery, AL	281,736	481,137	58.56%	1842	49.84%	66.86
125	Oklahoma City, OK	711,495	1,698,197	41.90%	1836	45.61%	65.04
35	Tallahassee, FL-GA	412,759	720,434	57.29%	2140	46.41%	63.51
38	Macon, GA	349,525	768,701	45.47%	1810	40.78%	62.88
37	Albany, GA	219,967	468,178	46.98%	3074	32.43%	62.74
118	Omaha, NE-IA-MO	570,420	1,044,156	54.63%	1988	47.14%	62.40
159	Tucson, AZ	543,130	999,882	54.32%	1468	49.56%	60.03
97	Springfield, IL-MO	279,411	517,462	54.00%	3503	47.48%	58.20
98	Columbia, MO	205,585	369,014	55.71%	2559	42.64%	58.00
88	Shreveport-Bossier City, LA-AR	274,163	573,616	47.80%	2524	40.73%	57.96
4	Burlington, VT-NY	238,286	605,393	39.36%	4638	30.76%	57.62
89	Monroe, LA	171,614	333,519	51.46%	3466	44.84%	56.12
106	Rochester, MN-IA-WI	173,893	318,374	54.62%	3056	49.32%	55.65
36	Dothan, AL-FL-GA	148,980	332,409	44.82%	2422	36.23%	53.70
105	La Crosse, WI-MN	89,458	241,903	36.98%	4326	22.64%	53.67
86	Lake Charles, LA	248,726	536,758	46.34%	2291	40.12%	52.41
141	Denver-Boulder-Greeley, CO-KS-NE	2,510,708	3,984,105	63.02%	1955	58.63%	52.02
95	Jonesboro, AR-MO	139,986	303,852	46.07%	3163	35.50%	51.30
16	Staunton, VA-WV	168,045	334,087	50.30%	1747	51.47%	50.99
61	Traverse City, MI	184,273	286,745	64.26%	4316	24.44%	50.67
119	Lincoln, NE	214,999	379,321	56.68%	3986	46.95%	50.24
75	Tupelo, MS-AL-TN	278,151	625,002	44.50%	4373	36.83%	49.76
77	Jackson, MS-AL-LA	705,007	1,432,518	49.21%	2297	41.44%	49.67
94	Springfield, MO	418,473	859,559	48.68%	2719	37.35%	48.14
100	Des Moines, IA-IL-MO	833,124	1,683,257	49.49%	3111	44.48%	47.32
91	Fort Smith, AR-OK	148,448	329,136	45.10%	3146	34.82%	46.51
132	Corpus Christi, TX	270,785	549,012	49.32%	2135	42.84%	46.47
90	Little Rock-North Little Rock, AR	867,186	1,614,850	53.70%	3357	43.41%	46.09
166	Eugene-Springfield, OR-CA	389,541	791,776	49.20%	2756	41.57%	43.10
76	Greenville, MS	99,751	252,280	39.54%	3266	38.59%	40.96
117	Sioux City, IA-NE-SD	100,868	252,656	39.92%	3658	36.32%	39.51
152	Salt Lake City-Ogden, UT-ID	1,105,180	2,088,974	52.91%	2217	48.33%	35.68
123	Topeka, KS	221,648	454,539	48.76%	1783	39.56%	35.62
59	Green Bay, WI-MI	332,011	671,225	49.46%	2748	43.10%	34.15
108	Wausau, WI	181,806	487,723	37.28%	2654	39.38%	34.13
157	El Paso, TX-NM	390,818	955,602	40.90%	2229	32.42%	33.04
58	Northern Michigan, MI	119,818	269,986	44.38%	3290	11.45%	28.53
169	Richland-Kennewick-Pasco, WA	312,611	677,674	46.13%	2347	40.63%	27.68
137	Lubbock, TX	195,402	374,626	52.16%	2760	47.31%	27.17
153	Las Vegas, NV-AZ-UT	1,063,232	1,709,797	62.18%	1740	52.57%	23.74
147	Spokane, WA-ID	396,838	829,735	47.83%	2244	42.51%	23.63
1	Bangor, ME	219,874	526,106	41.79%	*	*	20.94
156	Albuquerque, NM-AZ	491,964	921,086	53.41%	1816	49.30%	20.89
122	Wichita, KS-OK	565,858	1,175,577	48.13%	1948	35.42%	20.49
128	Abilene, TX	95,681	222,147	43.07%	3472	36.13%	20.35
109	Duluth-Superior, MN-WI	158,866	350,059	45.38%	3694	41.64%	18.53
113	Fargo-Moorhead, ND-MN	182,726	371,691	49.16%	2769	43.48%	16.40
155	Farmington, NM-CO	97,146	193,872	50.11%	5371	44.55%	16.04
116	Sioux Falls, SD-IA-MN-NE	264,570	519,143	50.96%	3448	46.49%	15.11

165	Redding, CA-OR	160,583	336,820	47.68%	2184	41.01%	14.36
149	Twin Falls, ID	84,477	162,397	52.02%	2448	43.96%	14.08
150	Boise City, ID-OR	304,405	574,876	52.95%	2285	47.64%	13.69
139	Santa Fe, NM	126,983	258,790	49.07%	2855	44.21%	13.06
126	Western Oklahoma, OK	64,654	139,761	46.26%	3032	41.54%	12.04
138	Amarillo, TX-NM	233,841	481,633	48.55%	1579	44.91%	11.79
120	Grand Island, NE	147,025	288,047	51.04%	6566	35.13%	11.56
136	Hobbs, NM-TX	75,534	190,340	39.68%	3850	34.52%	11.21
148	Idaho Falls, ID-WY	170,065	306,120	55.56%	2566	45.49%	10.85
146	Missoula, MT	183,193	399,183	45.89%	4546	38.67%	10.79
110	Grand Forks, ND-MN	101,995	230,253	44.30%	3996	38.64%	10.16
135	Odessa-Midland, TX	190,603	388,007	49.12%	3461	42.52%	10.13
129	San Angelo, TX	85,352	202,679	42.11%	2254	39.37%	10.05
140	Pueblo, CO-NM	117,524	279,600	42.03%	2261	35.82%	8.71
168	Pendleton, OR-WA	76,267	200,681	38.00%	3656	30.75%	8.67
154	Flagstaff, AZ-UT	192,091	401,766	47.81%	2629	41.05%	8.24
142	Scottsbluff, NE-WY	44,944	92,360	48.66%	7084	26.91%	7.81
151	Reno, NV-CA	361,148	670,013	53.90%	2019	46.75%	7.56
111	Minot, ND	*	111,195	*	*	*	7.00
112	Bismarck, ND-MT-SD	81,663	175,427	46.55%	*	41.68%	6.26
114	Aberdeen, SD	*	82,608	*	*	*	5.39
143	Casper, WY-ID-UT	219,622	408,708	53.74%	4187	40.86%	5.17
115	Rapid City, SD-MT-NE-ND	94,190	213,696	44.08%	4612	38.09%	5.04
121	North Platte, NE-CO	*	61,758	*	*	*	4.95
144	Billings, MT-WY	196,797	404,902	48.60%	4205	39.99%	4.89
145	Great Falls, MT	65,214	166,564	39.15%	*	33.40%	4.23
171	Anchorage, AK	290,245	626,932	46.30%	5227	45.51%	1.07

* Data withheld to maintain firm confidentiality.
Source: Federal Communications Commission internal analysis based on preliminary year-end 2003 filings for Numbering Resource Utilization in the United States. Population based on 2000 Census. Density is persons per square mile.

Table 4: Top 25 Mobile Telephone Operators by Subscribers (in thousands)

	Year-End 2002		Year-End 2003	
	Operator	Total	Operator	Total
1	Verizon Wireless	32,491	Verizon Wireless	37,522
2	Cingular Wireless	21,900	Cingular Wireless	24,027
3	AT&T Wireless	20,900	AT&T Wireless	21,980
4	Sprint PCS	14,760	Sprint PCS	15,900
5	Nextel	10,612	T-Mobil	13,128
6	T-Mobile	9,913	Nextel	12,882
7	ALLTEL	7,600	ALLTEL	8,023
8	US Cellular	4,103	US Cellular	4,409
9	Leap Wireless	1,512	Dobson Comm. (2)	1,552
10	Western Wireless	1,197	Leap Wireless	1,473
11	Qwest	1,034	Western Wireless	1,290
12	Centennial (1)	897	Nextel Partners	1,233
13	Nextel Partners	877	Centennial (3)	997
14	Triton PCS	830	Metro PCS	977
15	Dobson Comm.	768	Triton PCS	895
16	Rural Cellular	722	Qwest	871
17	American Cellular	690	Rural Cellular	746
18	Alamosa PCS	622	Alamosa PCS	727
19	AirGate	589	US Unwired	618
20	US Unwired	561	Cincinnati Bell Wireless (4)	474
21	Broadwing	470	Cellular South	400
22	Midwest Wireless	300	Airgate (5)	360
23	Horizon PCS	271	Midwest Wireless	350
24	Ntelos	267	Ubiquitel	328
25	Southern LINC	260	Southern LINC	260

Sources: For 2002, see *Eighth Report*, at 14897. For 2003, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. Southern LINC, *Frequently Asked Questions* (visited May 12, 2004) <http://southernlinc.com/faqs.asp)> (Southern LINC); Midwest Wireless, Frequently Asked Questions (visited May 12, 2004) <http://www.midwestwireless.com/Home/Newsroom/FAQs> (Midest Wireless); Rhonda Wickham, *Down Home In The Cellular South*, WIRELESSWEEK, Mar. 22, 2004 (Cellular South). Horizon PCS reported 310,000 subscribers as of June 30, 2003.

Notes
(1) As of Nov. 30, 2002, includes Puerto Rico.
(2) American Cellular is now part of Dobson Communications.
(3) As of Nov. 30, 2003, includes Puerto Rico.
(4) Broadwing is now Cincinnati Bell Wireless.
(5) AirGate no longer includes its subsidiary iPCS Inc.'s results following iPCS' bankruptcy filing last year. *See Eighth Report*, at 14809.

Table 5: Estimated Mobile Telephone Rollouts by County

Total Number of Providers in a County	Number of Counties	POPs Contained in Those Counties (1)	% of Total US POPs	Square Miles Contained in Those Counties	% of Total US Square Miles
3 or More	2477	276,261,963	96.8%	2,224,551	61.7%
4 or More	1984	265,410,528	93.0%	1,667,769	46.2%
5 or More	1519	249,735,162	87.5%	1,250,235	34.7%
6 or More	1002	216,266,842	75.8%	809,837	22.5%
7 or More	390	84,117,506	29.5%	316,104	8.8%

Source: Federal Communications Commission estimates based on publicly available information.
Notes:
(1) POPs from the 2000 Census;
(2) United States and Puerto Rico

Table 6: Keisling RCA Survey

	1998	1999	2000	2001	2002
ARPU	$44.92	$46.03	$46.48	$45.74	$48.18
ARPU (excluding Roaming Revenues)	$35.08	$35.43	$35.12	$35.12	$35.80
MOU	106	118	124	165	221
Price Per Minute (RPM)	$0.33	$0.30	$0.28	$0.21	$0.16
Monthly Churn	1.55%	1.6%	1.9%	2.2%	2.2%
Prepaid revenue as percent of total revenue	.1%	.34%	.61%	.083%	1.22%
Competitors in RCA member markets	3.0	3.6	4.7	4.9	5.1

Source: *RCA Comments*, at 3.

Table 7: Mobile Telephone Digital Coverage

Technology	POPs in Those Areas (1)	% of Total POPs (2)	Square Miles Contained in Those Counties	% of Total Square Miles
CDMA	275,710,198	96.63%	2,541,061	70.45%
TDMA / GSM	273,188,386	95.74%	2,200,750	61.02%
iDEN	261,280,668	91.57%	1,650,614	45.76%
Total Digital	283,165,002	99.24%	2,981,514	82.66%

Source: Federal Communications Commission estimates based on publicly available information.

Notes:
Broadband PCS and digital SMR licensees are analyzed by county; cellular licensees are analyzed by cellular market areas ("CMAs").
POPs from the 2000 Census.

Table 8: Change in CPI

	CPI		Cellular CPI		All Telephone CPI		Local Telephone CPI		Long Distance Telephone CPI	
	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change
1997	100		100		100		100		100	
1998	101.6	1.6%	95.1	-4.9%	100.7	0.7%	101.6	1.6%	100.5	0.5%
1999	103.8	2.2%	84.9	-10.7%	100.1	-0.6%	103.4	1.8%	98.2	-2.3%
2000	107.3	3.4%	76	-10.5%	98.5	-1.6%	107.7	4.1%	91.8	-6.5%
2001	110.3	2.8%	68.1	-10.4%	99.3	0.8%	113.3	5.2%	88.8	-3.3%
2002	112.1	1.6%	67.4	-1.0%	99.7	0.4%	118.5	4.5%	84.9	-4.4%
2003	114.6	2.3%	66.8	-0.9%	98.3	-1.4%	123.3	4.1%	77.8	-8.4%
1997 to 2003		14.6%		-33.2%		-1.7%		23.3%		-15.1 %

Source: Bureau of Labor Statistics.

Table 9: Average Revenue Per Minute

	Average Local Monthly Bill	Minutes of Use Per Month	Average Revenue Per Minute	Annual Change
1993	$61.49	140	$0.44	
1994	$56.21	119	$0.47	8%
1995	$51.00	119	$0.43	-9%
1996	$47.70	125	$0.38	-11%
1997	$42.78	117	$0.37	-4%
1998	$39.43	136	$0.29	-21%
1999	$41.24	185	$0.22	-23%
2000	$45.27	255	$0.18	-20%
2001	$47.37	380	$0.12	-30%
2002	$48.40	427	$0.11	-9%
2003	$49.91	507	$0.10	-13%

Note: Data covers the last six months of each year.
Source: *See* Appendix D, Table 1, at D-2 (ARPU); *Dec 2003 CTIA Survey*, at 213 (minutes of use).

Table 10: Market Entry Over Time

	Percent of Total US POPs Covered				
Total Number of Providers in a County	Ninth Report	Eighth Report	Seventh Report	Sixth Report	Fifth Report
3 or more	96.8%	94.7%	94.1%	90.8%	87.8%
4 or more	93.0%	89.3%	88.7%	84.4%	79.8%
5 or more	87.5%	82.6%	80.4%	75.1%	68.5%
6 or more	75.8%	71.1%	53.1%	46.7%	34.6%
7 or more	29.5%	25.4%	21.2%	11.9%	4.4%

Source: FCC estimates

Table 11: Mobile Market Structure and Performance in Selected Countries

Country	Number of Players	Penetration (%)	MOUs	Revenue per Minute ($)	Data (% of ARPU)
MPP					
USA	6+	54	557	0.10	3
Canada	4	41	296	0.12	4
Hong Kong	6	95	380	0.07	N.A.
Singapore	3	82	231	0.11	14
CPP					
UK	5	91	147	0.22	17
Germany	4	79	75	0.33	17
Italy	4	99	116	0.25	13
France	3	68	174	0.23	11
Spain	3	94	109	0.29	12
Finland	3	92	243	0.18	13
Japan	3	67	161	0.31	24
South Korea	3	70	311	0.10	14
Australia	4	78	176	0.20	13

Sources: Michel Morin and Linda Mutschler, *Global Wireless Matrix 4Q03*, Global Securities Research, Merrill Lynch, Mar. 19, 2004.

APPENDIX B:
MAPS

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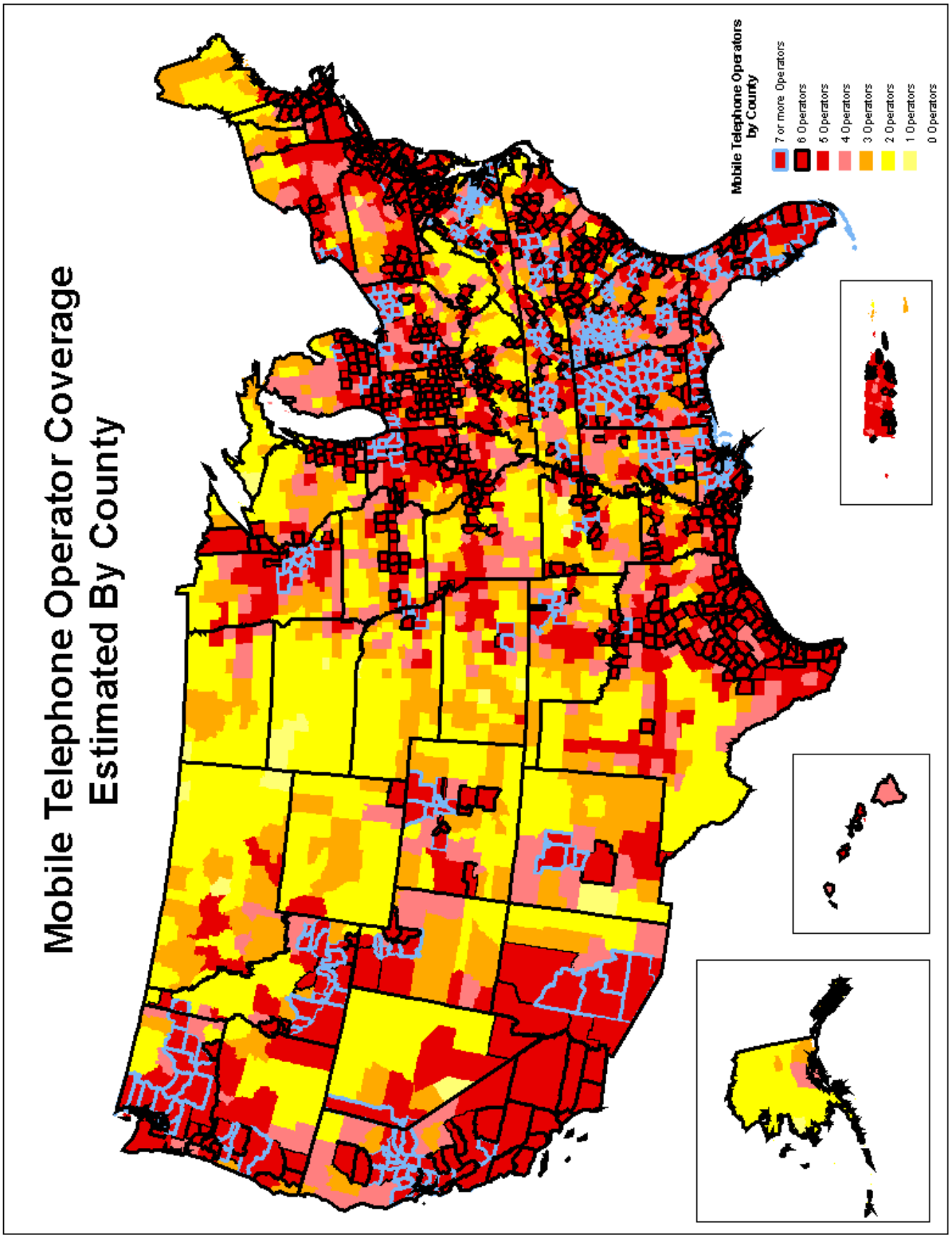
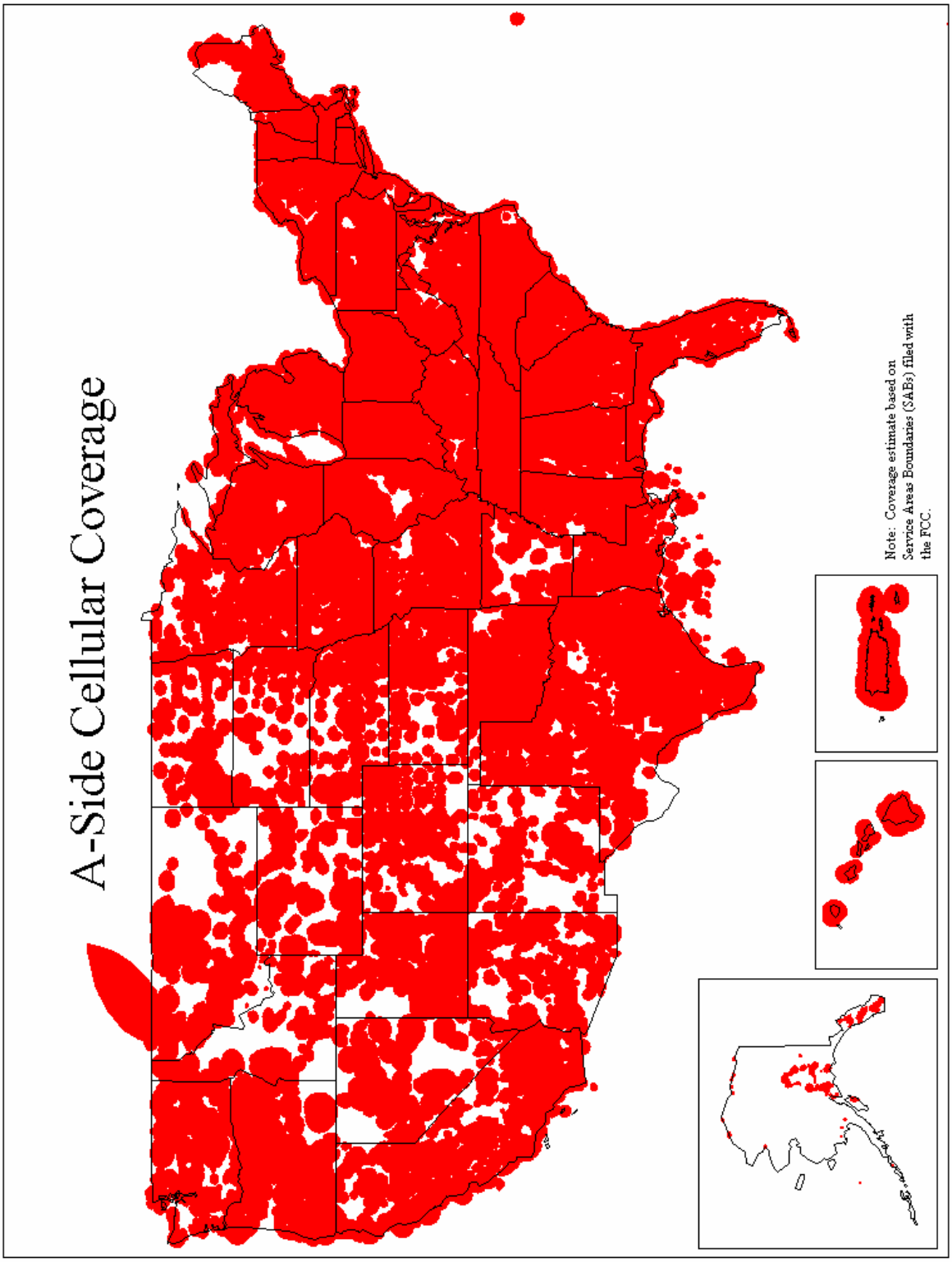
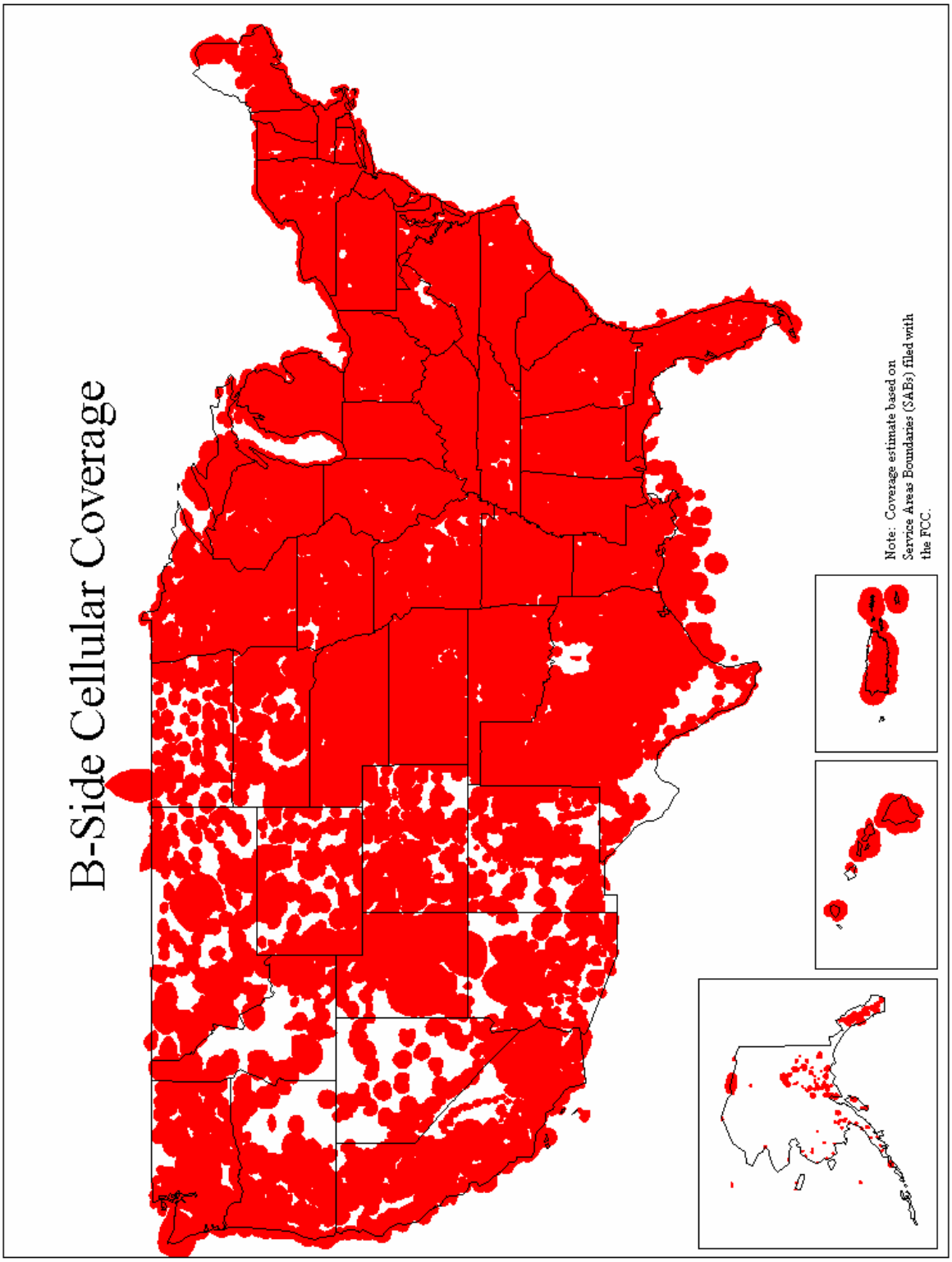
Map 1


Mobile Telephone Operator Coverage
Estimated By County
Mobile Telephone Operators
by County
7 or more Operators
6 Operators
5 Operators
4 Operators
3 Operators
2 Operators
1 Operators
0 Operators

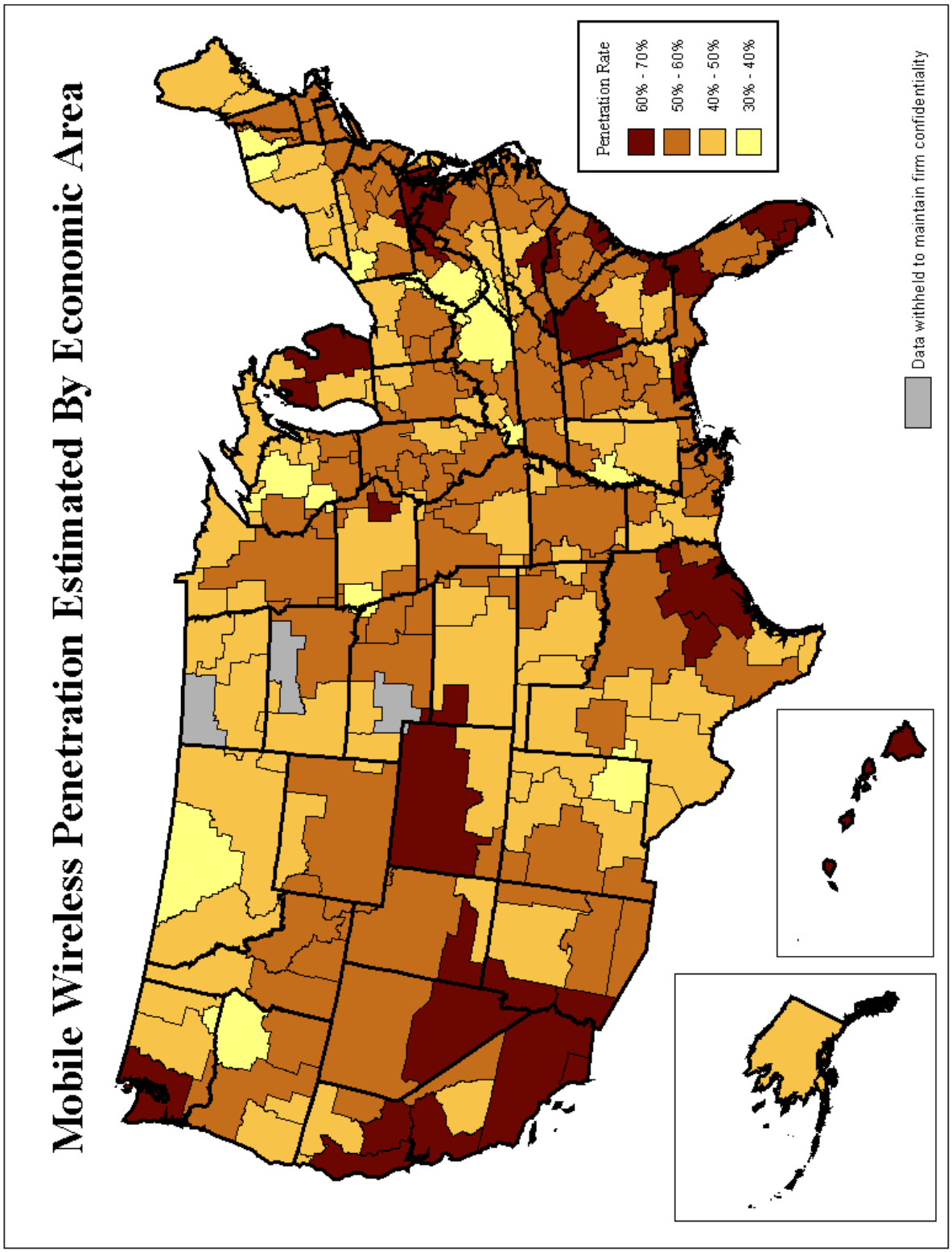
Map 2


A-Side Cellular Coverage
Note: Coverage estimate based on Service Areas Boundaries (SABs) filed with the FCC.

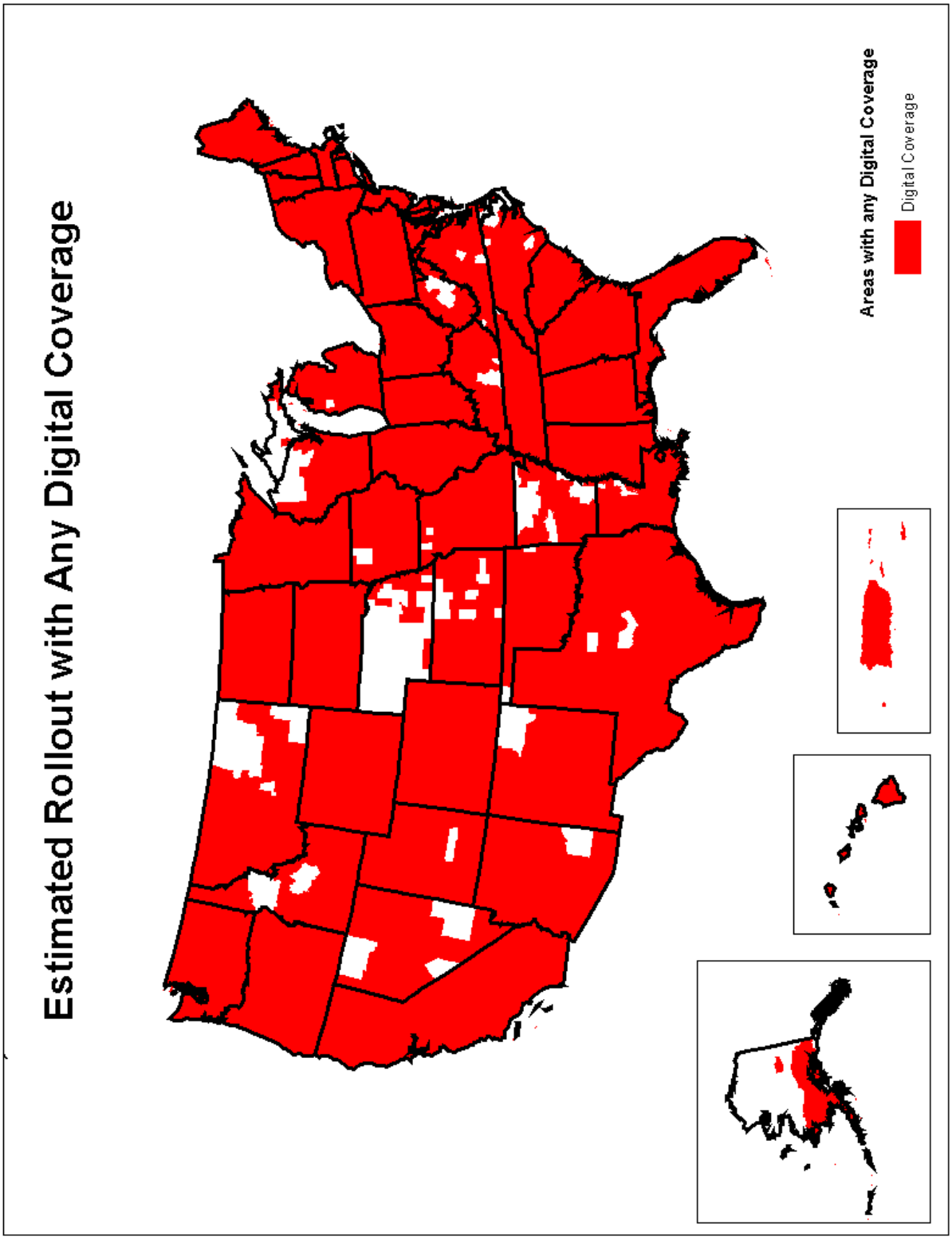
Map 3


B-Side Cellular Coverage
Note: Coverage estimate based on Service Areas Boundaries (SABs) filed with the FCC.

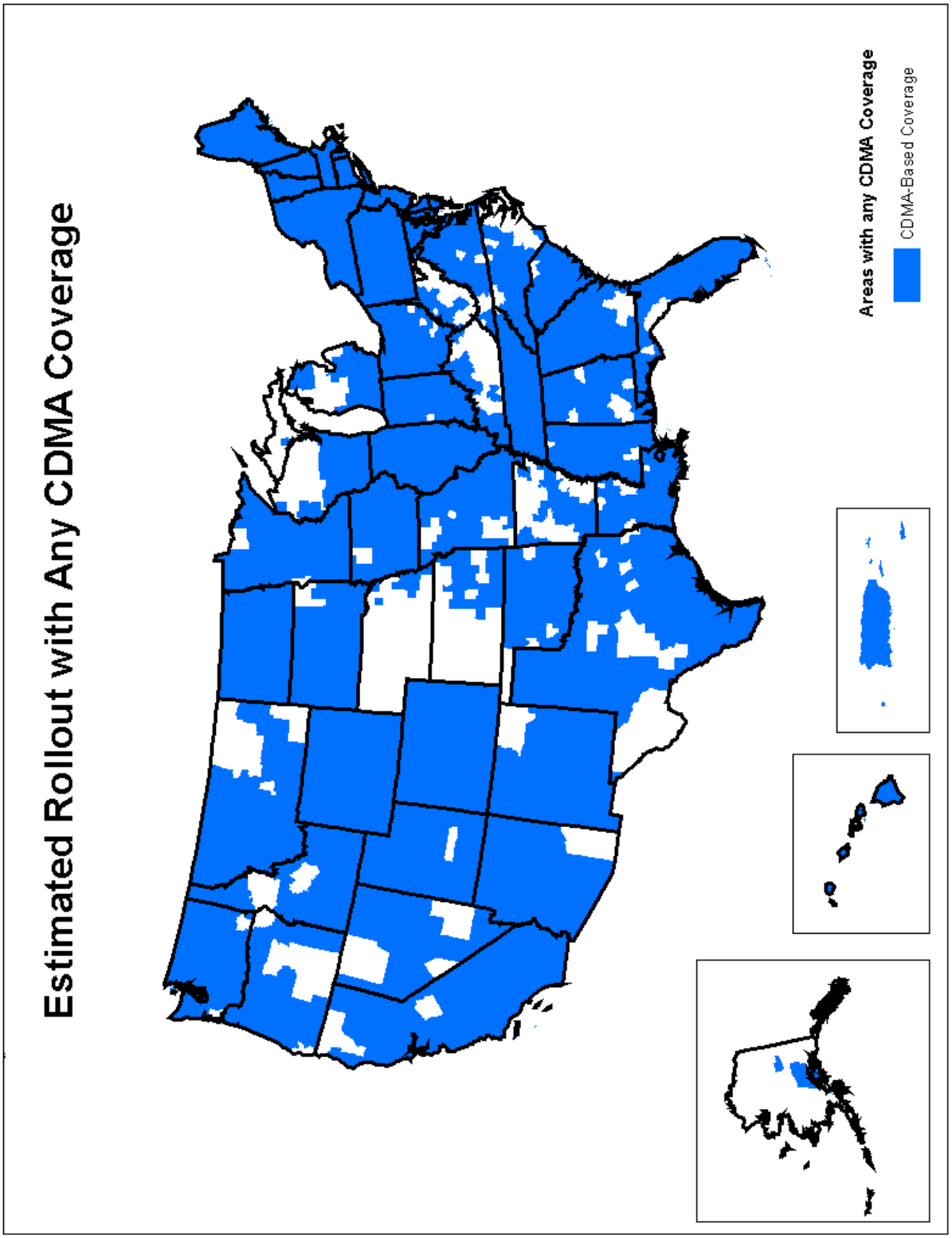
Map 4


Mobile Wireless Penetration Estimated By Economic Area
Penetration Rate
60% - 70%
50% - 60%
40% - 50%
30% - 40%
Data withheld to maintain firm confidentiality

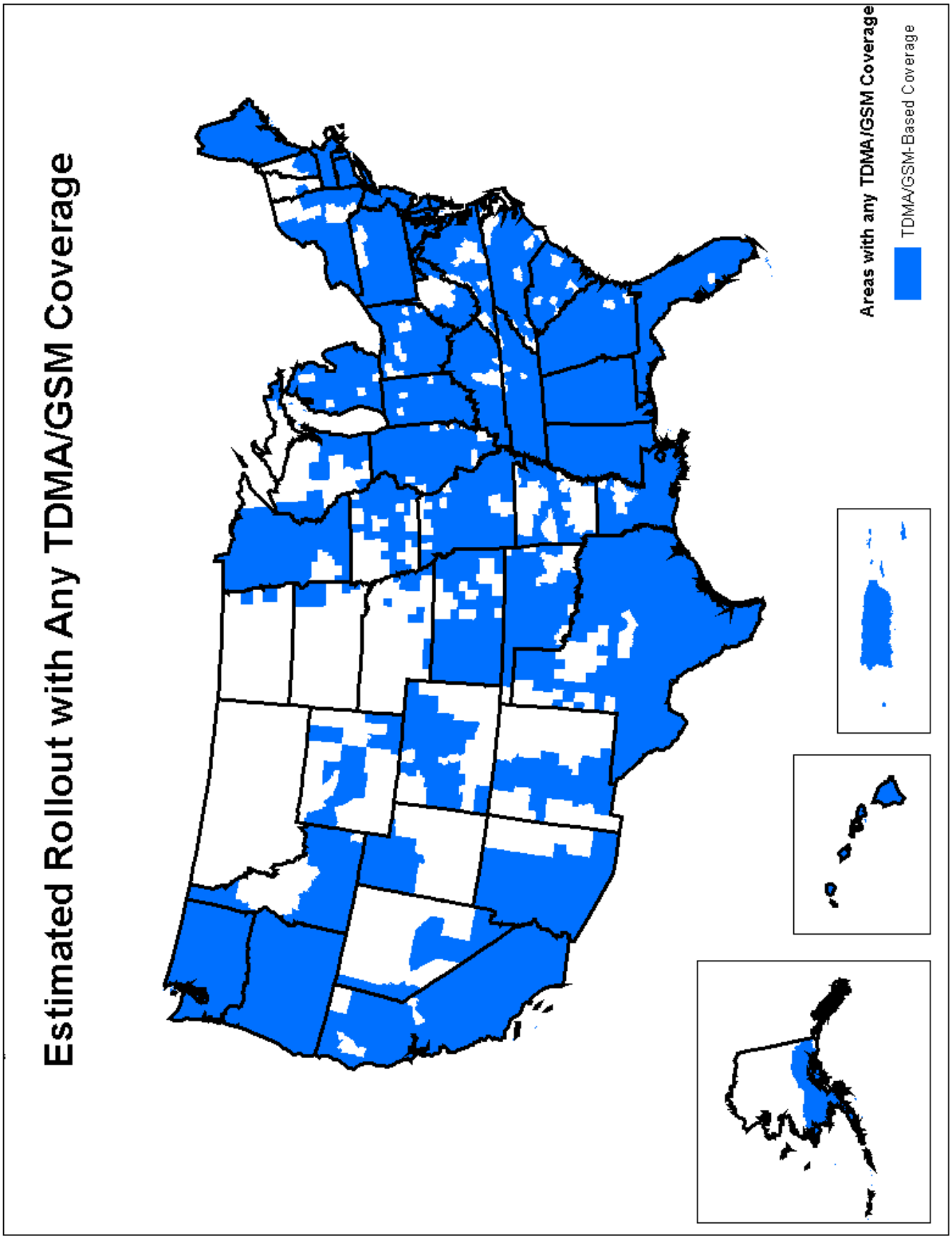
Map 5


Estimated Rollout with Any Digital Coverage
Areas with any Digital Coverage
Digital Coverage

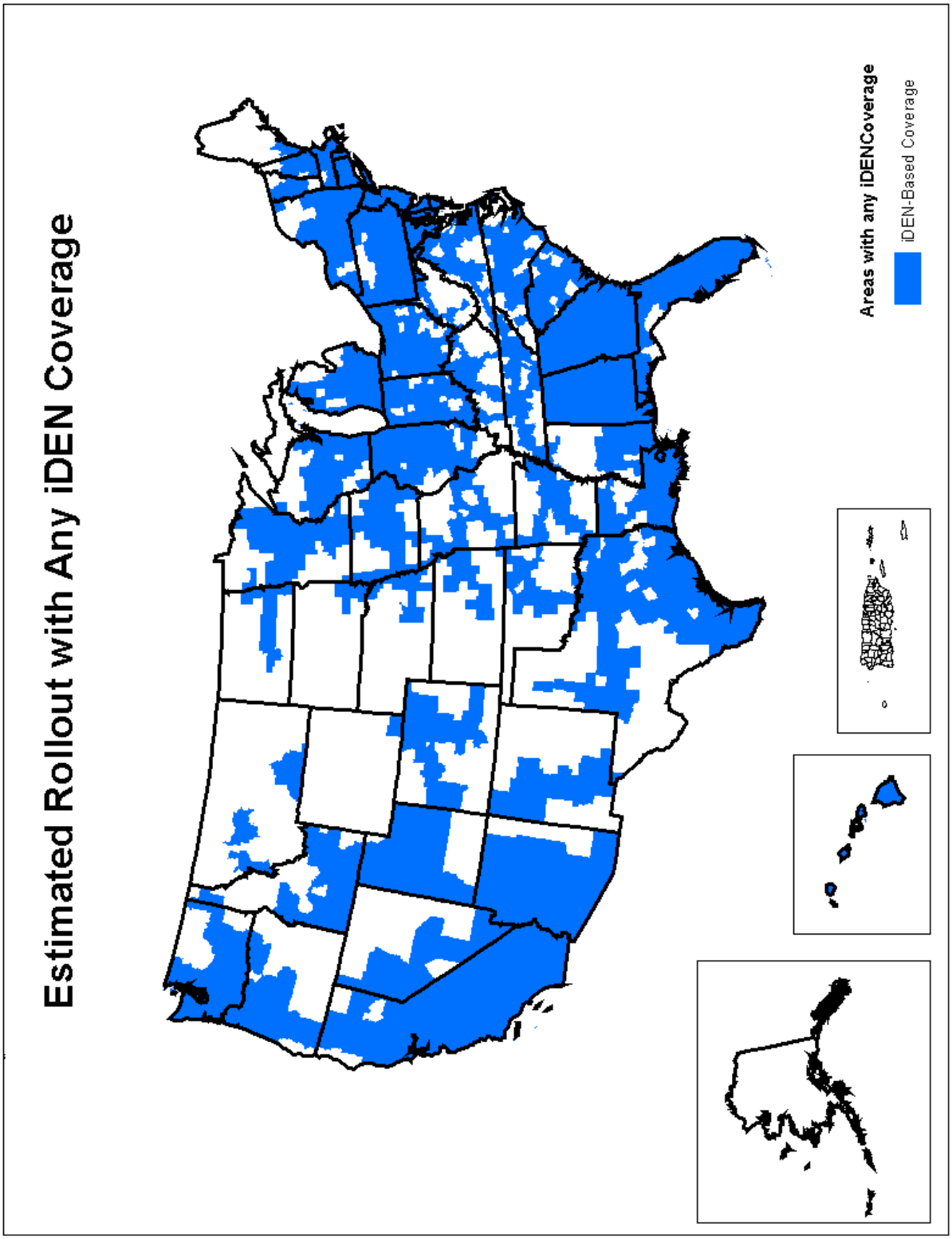
Map 6


Estimated Rollout with Any CDMA Coverage
Areas with any CDMA Coverage
CDMA-Based Coverage

Map 7


Estimated Rollout with Any TDMA/GSM Coverage
Areas with any TDMA/GSM Coverage
TDMA/GSM-Based Coverage

Map 8


Estimated Rollout with Any iDEN Coverage
Areas with any iDENCoverage
iDEN-Based Coverage

Map 9

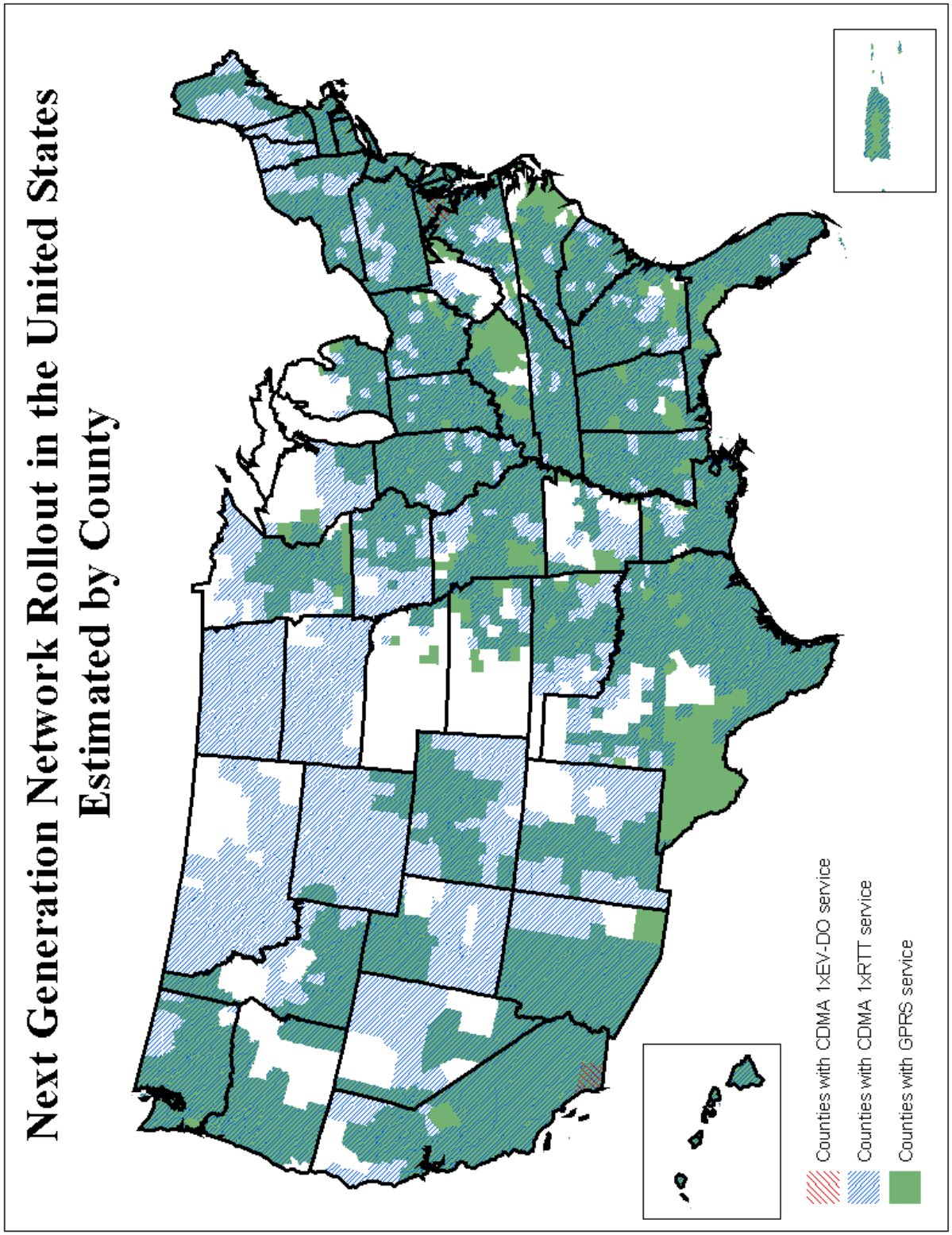
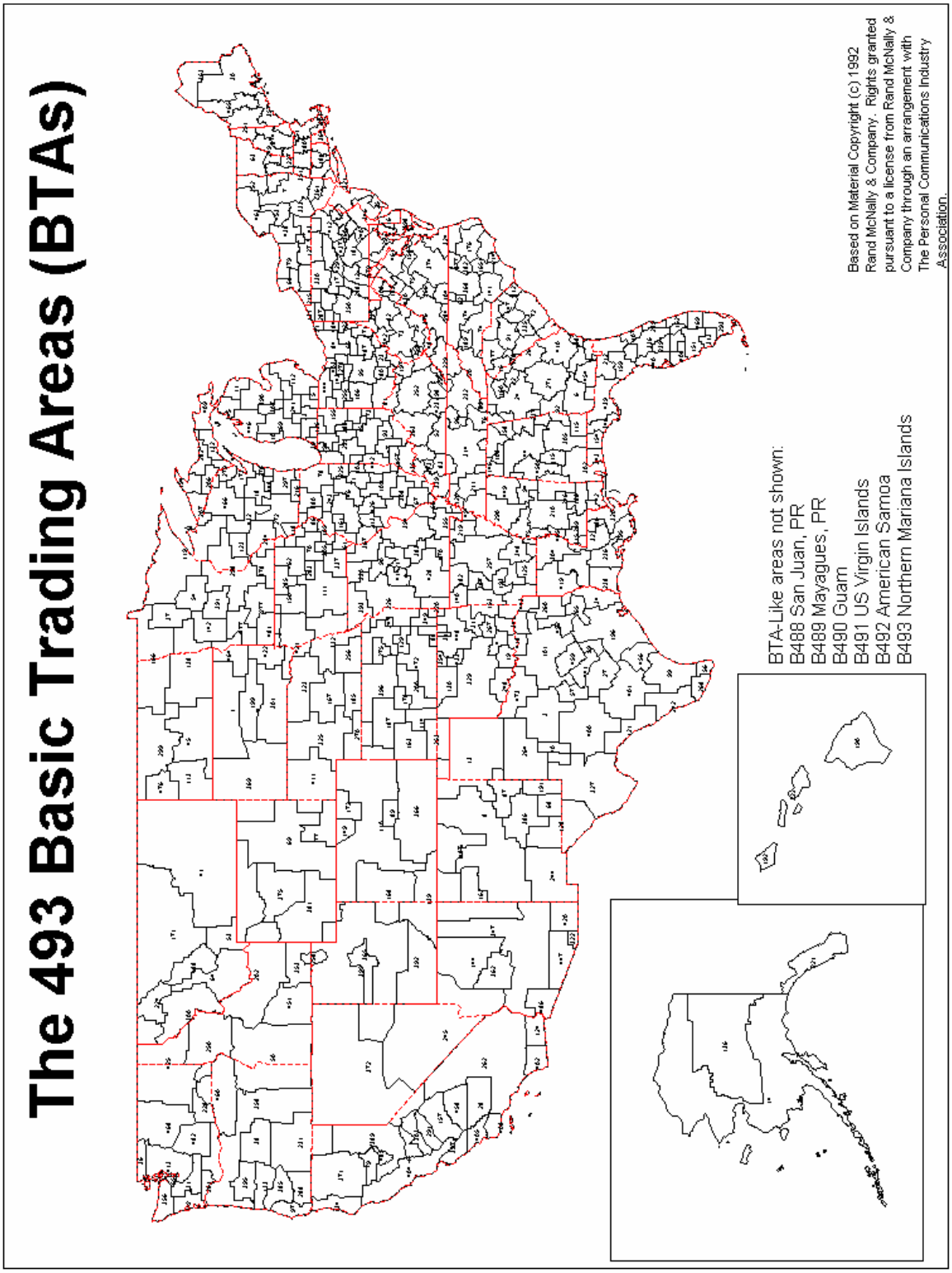

Next Generation Network Rollout in the United States
Estimated by County
Counties with CDMA 1xEV-DO service
Counties with CDMA 1xRTT service
Counties with GPRS service

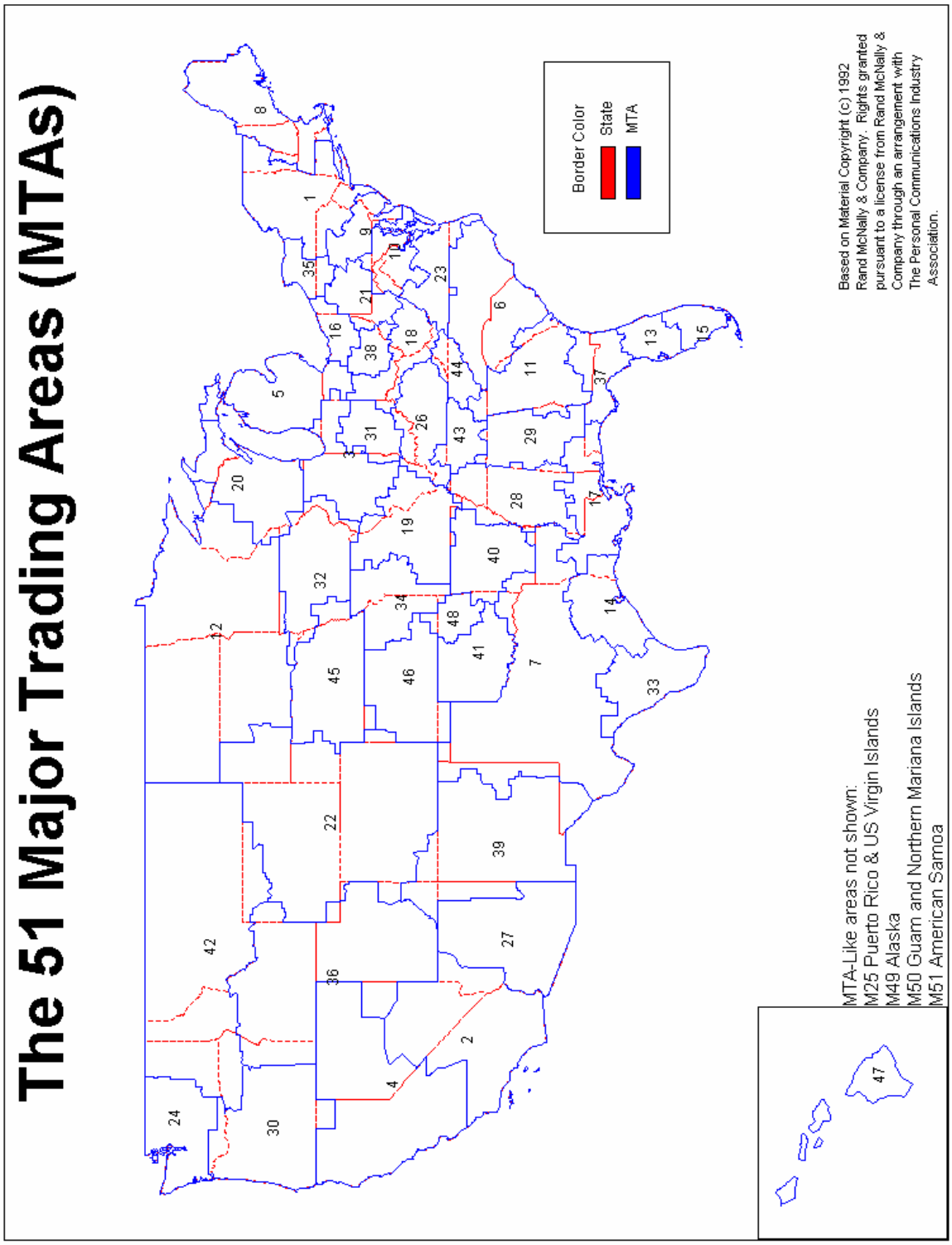
Table 1: Geographic Licensing Schemes

Geographic Licensing Schemes	Number of Market Areas	Note
Basic Trading Areas (BTAs)	**493**	**BTAs make up MTAs**
Major Trading Areas (MTAs)	**51**	
Cellular Market Areas (CMAs)	**734**	**Also known as MSAs and RSAs**
Economic Areas (EAs)	**175**	

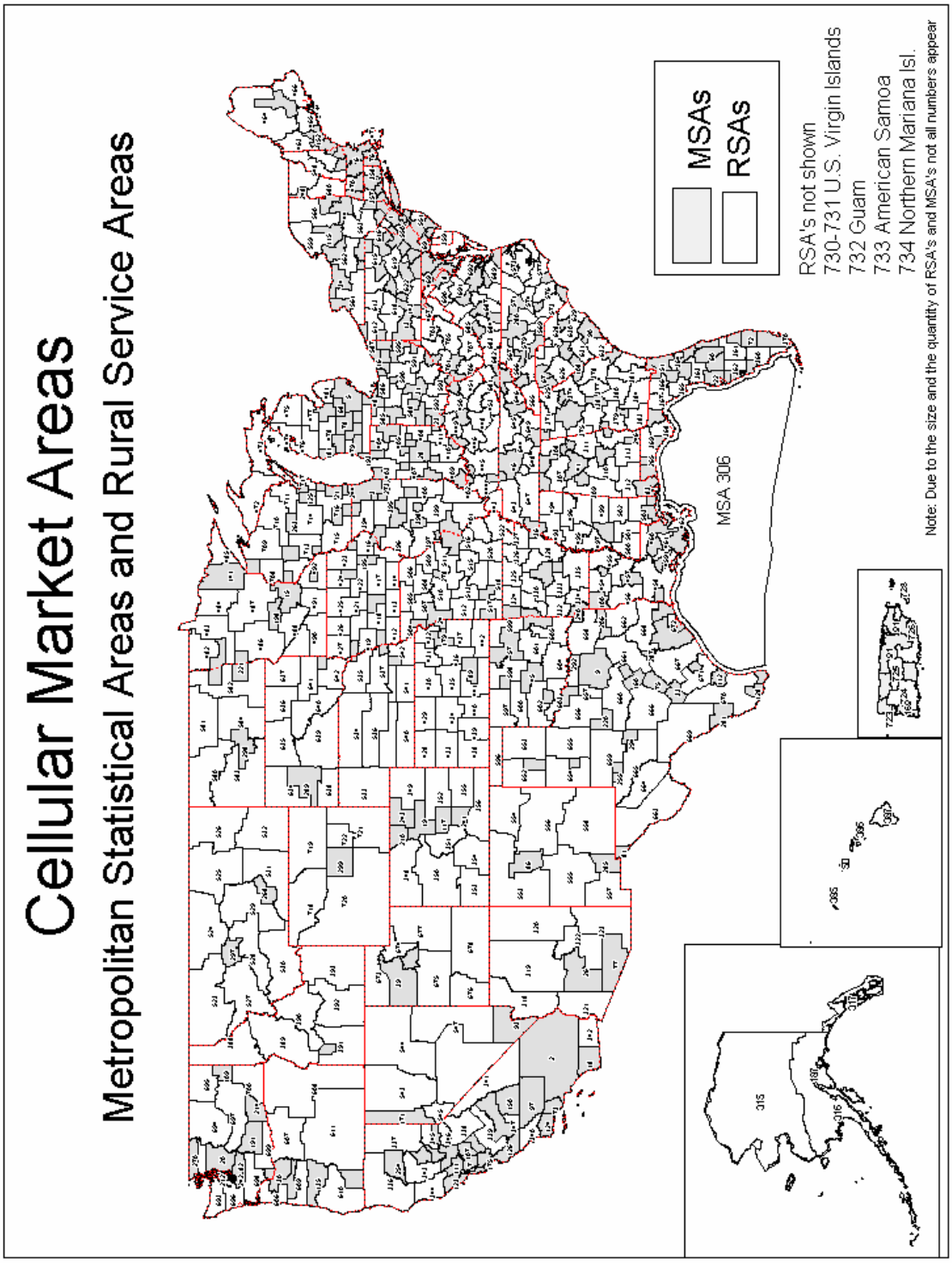
Map10


The 493 Basic Trading Areas (BTAs)
Based on Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with The Personal Communications Industry Association.
BTA-Like areas not shown:
B488 San Juan, PR
B489 Mayagues, PR
B490 Guam
B491 US Virgin Islands
B492 American Samoa
B493 Northern Mariana Islands

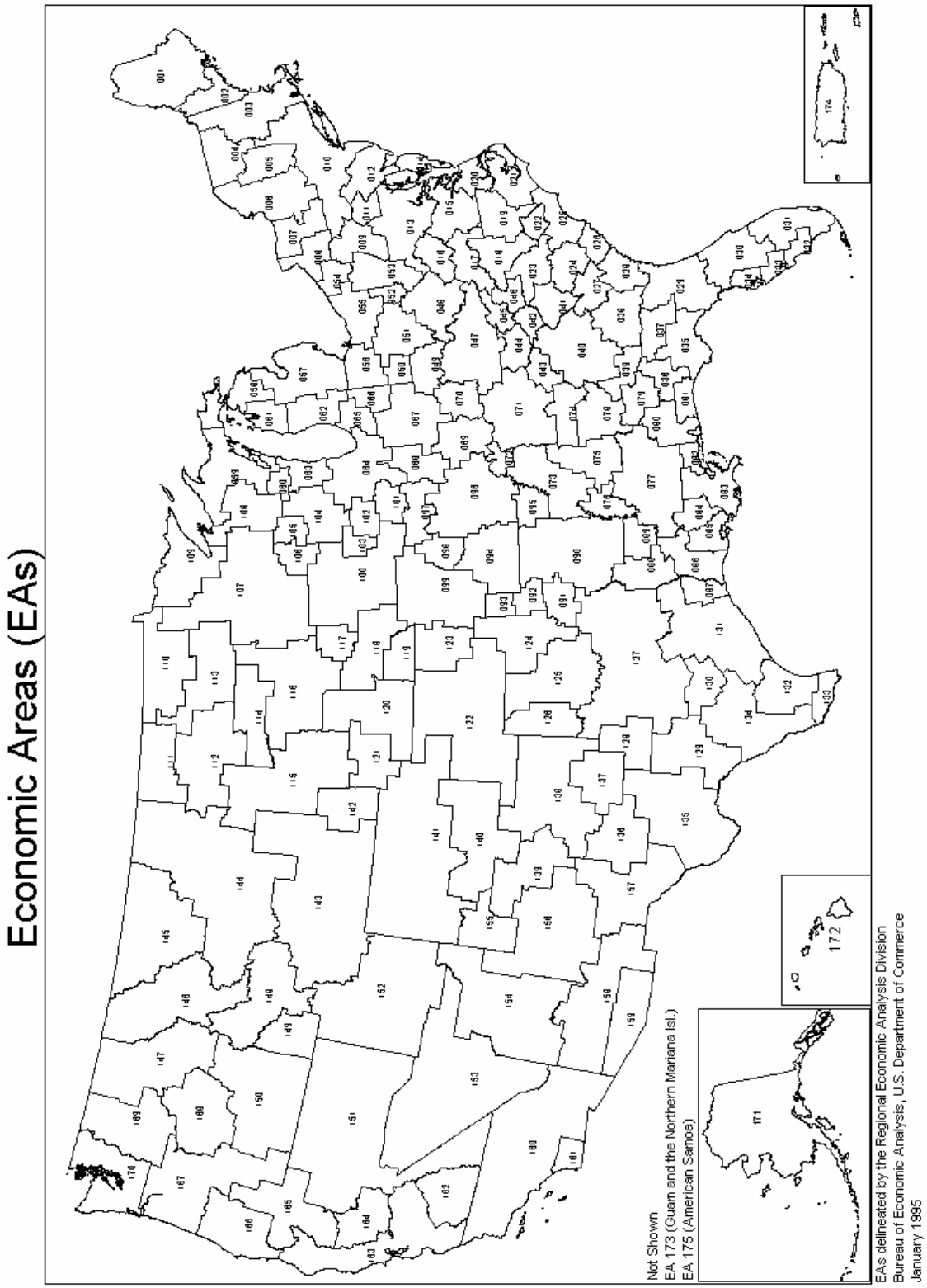
Map 11


The 51 Major Trading Areas (MTAs)
Border Color
State
MTA
Based on Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with The Personal Communications Industry Association.
MTA-Like areas not shown:
M25 Puerto Rico & US Virgin Islands
M49 Alaska
M50 Guam and Northern Mariana Islands
M51 American Samoa

Map 12


Cellular Market Areas
Metropolitan Statistical Areas and Rural Service Areas
MSAs
RSAs
RSA's not shown
730-731 U.S. Virgin Islands
732 Guam
733 American Samoa
734 Northern Mariana Isl.
Note: Due to the size and the quantity of RSA's and MSA's not all numbers appear
MSA 306

Map 13


Economic Areas (EAs)
Not Shown
EA 173 (Guam and the Northern Mariana Isl.)
EA 175 (American Samoa)
EAs delineated by the Regional Economic Analysis Division
Bureau of Economic Analysis, U.S. Department of Commerce
January 1995

APPENDIX C:
LIST OF COMMENTERS

Comments

Blooston Rural Carriers
Cellular Telecommunications & Internet Association
Metrocall Holdings, Inc.
National Telecommunications Cooperative Association
Rural Cellular Association
Virgin Mobile USA, LLC

Reply Comments

Cellular Telecommunications & Internet Association
Rural Telecommunications Group, Inc.
Sprint Corporation

STATEMENT OF
CHAIRMAN MICHAEL K. POWELL

Re: Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Education and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands (WT Docket No. 03-66); et al., Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access. Educational and Other Advanced Services in the 2150-2162 and 2500- 2690 MHz Bands (WT Docket No. 03-66); Part 1 of the Commission's Rules – Further Competitive Bidding Procedures, (WT Docket No. 03-67); Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and the Instructional Television Fixed Service Amendment of Parts 21 and 74 to Engages in Fixed Two-Way Transmissions (MM Docket No. 97-127); Amendment of Parts 21 and 74 of the Commission's Rules with Regard to Licensing in the Multipoint Distribution Service and the Instructional Television Fixed Service for the Gulf of Mexico (WT Docket No. 02-68), Report and Order and Further Notice of Proposed Rulemaking.Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Ninth Reportune10.

Today's *Ninth Report* highlights that U.S. consumers continue to benefit from robust competition in the CMRS marketplace. As is evident by simply walking down the street and seeing so many people on their mobile phone, the continued growth in the CMRS industry in 2003, demonstrates the increased demand for and reliance upon mobile services. With over 160.6 million mobile telephone subscribers, roughly a 54 percent penetration rate, it is imperative that the Commission and Congress continue to work together to ensure customers can benefit from increased carrier competition and continue to enjoy new and innovative products and quality service.

Wireless voice communications is by far the most competitive and innovative market in the Commission's purview. Today's *Report* informs us that an astonishing 97 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service, and that 30 percent of the population can now choose from seven or more carriers. Although these numbers are impressive, I look forward to working with my colleagues to increase access to wireless services to *all* U.S. consumers.

This is the most comprehensive report to date and I applaud the Wireless Telecommunications Bureau's hard work in continually striving to obtain the most accurate and diverse data.

CONCURRING STATEMENT OF
COMMISSIONER MICHAEL J. COPPS

Re: Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Education and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands (WT Docket No. 03-66); et al., Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access. Educational and Other Advanced Services in the 2150-2162 and 2500- 2690 MHz Bands (WT Docket No. 03-66); Part 1 of the Commission's Rules – Further Competitive Bidding Procedures, (WT Docket No. 03-67); Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and the Instructional Television Fixed Service Amendment of Parts 21 and 74 to Engages in Fixed Two-Way Transmissions (MM Docket No. 97-127); Amendment of Parts 21 and 74 of the Commission's Rules with Regard to Licensing in the Multipoint Distribution Service and the Instructional Television Fixed Service for the Gulf of Mexico (WT Docket No. 02-68), Report and Order and Further Notice of Proposed Rulemaking.Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Ninth Reportune10.

This year's CMRS Competition Report is a marked improvement over last year's Report. For the first time we begin to use traditional competition analysis tools by calculating HHI scores for each EA in the country. We have also updated our analysis of the prices that consumers face. And I'm also heartened by our more complete analysis of the U.S. competitive position in comparison with the rest of the world. The information that it provides shows that consumers continue to benefit as wireless technologies march forward. The report shows that coverage is increasing, new services and pricing plans are being introduced, and more consumers have phones than ever before.

Nonetheless, the Report still contains arguments and omissions that trouble me. The central question of the legislation that requires this Report is whether the market is characterized by "effective competition." Yet again this year the Report does not provide a useful definition of this term. Without an well-articulated "effective competition" standard, the Report will always have trouble providing an analytically solid foundation for Commission or Congressional action. The Report also claims that consumers do not face difficulties obtaining the information that they need to adequately comparison shop for wireless plans. But just about every consumer I meet complains that wireless bills are bewilderingly confusing; that hidden and expensive line items magically appear on their bills that they weren't told about when comparing prices; and that the service maps that carriers provide don't allow them to determine where they will get service and where they won't. I also hear from small and rural carriers that the state of the roaming market is hardly as competitive as described in the Report, with large carriers allegedly imposing upon them unreasonable prices and also instituting new call blocking technologies that deny consumers the ability to roam in order to avoid compensating other carriers. I think we need to be looking into this, and I urge the Bureau to do so.

So I am going to concur. Again, I am impressed with the improvements in this Report, but I don't want us to rush to judgment. We need to be monitoring and studying these developments vigilantly, especially as consolidation creeps into the industry, if we are going to see improvements continue rather than witness new problems that threaten both consumers and competitors.

Thanks to the staff for their hard work.