

**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. 06-17
(Terminated)

Annual Report and Analysis of Competitive)
Market Conditions With Respect to)
Commercial Mobile Services)

ELEVENTH REPORT

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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 Wireless Local Area Networks (“WLANs”). The report is retrospective, focusing on conditions prevailing in the CMRS marketplace as of the end of the 2005 calendar year and the first half of the 2006 calendar year.

2. In this report the Commission concludes that there is effective competition in the CMRS marketplace. Among the indicators of market structure that support this conclusion, 98 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service, slightly higher than in the previous year, and up from 88 percent in 2000, the first year for which these statistics were kept. The percentage of the U.S. population living in counties with access to four or more different mobile telephone operators is also slightly higher than in the previous year. In contrast, the U.S. population living in counties with access to five or more different mobile telephone operators has declined as compared with the previous year, due largely to the merger between Sprint PCS and Nextel in August 2005. This transaction, which followed the acquisition of AT&T Wireless by Cingular Wireless in October 2004, resulted in a drop in the number of nationwide competitors from five to four. Nevertheless, although the mobile telephone market has become more concentrated as a result of these mergers, none of the remaining competitors has a dominant share of the market, and the market continues to behave and perform in a competitive manner.

3. With respect to carrier conduct, the record indicates that competitive pressure continues to drive 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 introduction of “mobile to anyone” calling options, and by the proliferation of a variety of prepaid plans, or distinct prepaid brands (such as “Boost Mobile”), targeted at previously untapped segments of the market. The result has been a further increase in the percentage of wireless users who subscribe to prepaid plans in the past year, from 9.5 percent at the end of 2004 to 11 percent at the end of 2005.¹ In addition, the deployment of next-generation networks based on competing technological standards continues to be an important dimension of non-price rivalry in the U.S. mobile telecommunications market. In December 2005, Cingular Wireless commercially launched UMTS (or WCDMA) with HSDPA in 16 U.S. cities to compete with the EV-DO-based wireless broadband services previously launched by Verizon Wireless, Sprint Nextel, and some regional CDMA carriers such as Alltel. Because the speeds on EV-DO and WCDMA/HSDPA networks are much faster than the speeds on European WCDMA networks, it has been argued that the deployment of these next-generation technologies by U.S. wireless carriers has given the United States an edge over Europe in wireless data networks for the first time in years.²

¹ See Section IV.A.2, Prepaid Service, *infra*.

² See Section VI.D, International Comparisons, *infra*.

4. Consumers continue to pressure 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. Monthly churn rates averaged about 1.5 to 3.0 percent per month in the past year. 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.

5. Indicators of market performance show that competition between wireless carriers continues to yield significant benefits to consumers. In the 12 months ending December 2005, the United States mobile telephone sector increased subscribership from 184.7 million to 213 million, raising the nationwide penetration rate to approximately 71 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 740 minutes in the second half of 2005 from 584 minutes in 2004 and 507 minutes in 2003. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages (also called short messaging service, or “SMS”), the volume of SMS traffic grew to 48.7 billion messages in the second half of 2005, nearly double the 24.7 billion messages in the same period of 2004. Some customer surveys also indicate an improvement in the quality of mobile telephone service in the past year. For example, the J.D. Power and Associates 2006 Wireless Call Quality Study found that the overall rate of customers experiencing a wireless call quality problem declined for a second consecutive year, with reported problems per 100 calls reaching the lowest level since the inaugural study in 2003. Evidence on mobile pricing trends remains somewhat mixed, with two different indicators of mobile pricing – revenue per minute and the cellular Consumer Price Index (“CPI”) – continuing to show a decline in the price of mobile telephone service, and a third indicator based on the consumption patterns of hypothetical users showing a slight increase in the cost of mobile service in 2005. 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 and Japan.

II. INTRODUCTION

A. Background

6. In 1993, Congress created the statutory classification of Commercial Mobile Services³ to promote the consistent regulation of mobile radio services that are similar in nature.⁴

³ 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).

⁴ 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).

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.⁵ This report is the eleventh of the Commission’s annual reports⁶ on the state of CMRS competition.⁷

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.⁸

⁵ 47 U.S.C. § 332(c)(1)(C).

⁶ 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*”); 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 (2003) (“*Eighth 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, *Ninth Report*, 19 FCC Rcd 20597 (2004) (“*Ninth 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, *Tenth Report*, 20 FCC Rcd 15908 (2005) (“*Tenth Report*”). The reports can also be found on the FCC’s web site at <<http://wireless.fcc.gov/cmrsreports.html>>.

⁷ 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.

⁸ 47 U.S.C. § 332 (c)(1)(C).

8. With the *Eleventh 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. Beginning with the *Ninth Report*, we have reorganized 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.⁹ This framework provides a systematic approach to addressing the four statutory requirements. For example, Section III on market structure identifies the number of competitors in various commercial mobile services, and it also uses subscriber market shares to measure concentration in mobile telephone markets. In addition, Section III tracks the entry of additional providers or classes of providers in commercial mobile services, and more generally provides an analysis of the conditions affecting the ability of additional providers or classes of providers to enter the market for commercial mobile services. The framework also clarifies that indicators of market structure such as the number of competitors and their market shares are not, by themselves, a sufficient basis for determining whether there is effective competition, and whether any of the competitors have a dominant share of the market for commercial mobile services. Rather, we make these determinations based on an analysis of both the structural and the behavioral characteristics of the CMRS marketplace.

B. Sources of Information

9. The Commission has expanded its efforts to improve the quality and granularity of the data used to examine competition in the CMRS industry. In January 2006, the Wireless Telecommunications Bureau (“Bureau”) released a Public Notice (“*Eleventh CMRS PN*”) seeking data and information on the status of competition in the CMRS industry.¹⁰ The Bureau requested data based on several metrics, including subscribership, penetration rates, market shares, usage, average revenue per unit (“ARPU”), pricing, quality of service, and service availability. In order to enhance our analysis of CMRS service availability and competition, the Bureau invited service providers to submit their coverage maps in an electronic, mappable format and to distinguish between the areas where they offer coverage to subscribers and the areas where they market service to new customers. Furthermore, the *Eleventh CMRS PN* asked for information on the deployment of next-generation network technologies, the competitive impact of resale providers, pricing and competition in rural markets, the effect of local number portability on consumer churn, and wireless-to-wireline competition.

⁹ *Ninth Report*, at 20602-20603 and 20607.

¹⁰ WTB Seeks Comment on CMRS Market Competition, WT Docket No. 06-17, *Public Notice*, 21 FCC Rcd 211 (2006) (“*Eleventh CMRS PN*”). See also, WTB Seeks Comment on CMRS Market Competition, WT Docket No. 05-71, *Public Notice*, 20 FCC Rcd 4073 (2005) (“*Tenth CMRS PN*”); 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 NOP*”); 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 NOP*”).

10. Thirteen parties submitted comments or reply comments in response to the *Eleventh CMRS PN*.¹¹ Some commenters stated that the CMRS marketplace remains competitive.¹² One commenter asserted that competition in its rural service areas is strong, and that it competes with ten or more competitors in much of its service area.¹³ A few service providers submitted maps of their coverage area, but not in an electronic, mappable format.¹⁴ In general, commenters submitted little new data relating to the various metrics used to assess competitive market conditions with respect to CMRS.

11. 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 a new source of information: the Numbering Resource Utilization / Forecast (“NRUF”) database, described below.¹⁵ 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. The NRUF data have enabled us to conduct a more granular analysis of competition on a regional level and also to compare competitive conditions in urban and rural areas.

12. 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 CTIA - The Wireless Association (“CTIA”) – on the average price of mobile telephone service.¹⁶ In addition to using multiple sources for many metrics, we also emphasize that some of the sources upon which we rely, particularly SEC

¹¹ See Appendix C, *infra*, for a list of parties who filed comments in response to the *Eleventh CMRS PN*.

¹² See CTIA-The Wireless Association, *PN Comments*, at ii, 6 (filed Feb. 17, 2006) (“CTIA Comments”); T-Mobile USA, *PN Reply Comments*, at 1-4 (filed Mar. 6, 2006) (“T-Mobile Reply Comments”); Cingular Wireless, *PN Reply Comments*, at 1-4 (filed Mar. 6, 2006).

¹³ See Cellular South, *PN Comments*, at 3 (filed Feb. 17, 2006) (“Cellular South Comments”).

¹⁴ *Id.*; Cellular 29 Plus and Lyrrix Wireless, *PN Comments*, at 3-4 (filed Feb. 17, 2006).

¹⁵ See also 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*”).

¹⁶ See Section VI.A.1, Pricing Trends, *infra*.

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.¹⁷ 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 are compiled by the carriers themselves and typically released in the aggregate to protect confidentiality, we are unable to have in-depth knowledge of the details of such data. However, we believe it is appropriate to use these sources in our analysis of CMRS competition for the reasons stated above.

13. As mentioned above, the *Seventh Report* integrated a new source of data collected through an FCC order, the NRUF database.¹⁸ 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. Consistent with our practice since the *Seventh Report*, we continue to use the NRUF data to determine the total number of mobile telephone subscribers and paging subscribers.¹⁹ In addition, because we collect NRUF data on a small, rate center area basis,²⁰ 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”)²¹ basis and continues to report them in this manner in this report.²² Finally, beginning with the *Ninth Report*, we have used NRUF data to measure market concentration on an EA basis.²³ In particular, the subscriber market shares we use to calculate the Herfindahl-Hirschman

¹⁷ See CTIA, *Wireless Industry Indices: Semi-Annual Data Survey Results* (results through December 2005) (“Dec 2005 CTIA Survey”). See note 427, *infra*, for a discussion of data reported by CTIA.

¹⁸ 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.

¹⁹ See *Seventh Report*, at 13005, 13049.

²⁰ 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 roughly 3,200 counties.

²¹ 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>>. In November 2004, the Bureau of Economic Analysis released updated definitions of EAs; however, for this report we use the previous release of definitions. See *New BEA Economic Areas For 2004*, Bureau of Economic Analysis, Nov. 17, 2004.

²² *Seventh Report*, at 13005; See Section VI.B.4, Sub-National Penetration Rates, *infra*.

²³ *Ninth Report*, at 20618-20620.

Index (“HHI”) for EAs are based on NRUF data.²⁴ 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.

14. 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.²⁵ 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-BTA²⁶ 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.²⁷ 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.²⁸ 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 that county. Third, the figures for POPs²⁹ 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 are publicly available.

²⁴ The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. See Section III.C.2, Concentration Measures for Mobile Telephone Services, *infra*.

²⁵ See Section III.C.1, Number of Mobile Telephone Competitors, *infra*.

²⁶ 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.

²⁷ BTAs can be sub-divided into counties. The United States is made up of approximately 3,200 counties versus 493 BTAs.

²⁸ 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/>>.

²⁹ 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.

15. 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 analysis of the number of mobile telephone carriers is supplemented 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.³⁰

C. Structure of Report

16. As noted above, the structure of the *Eleventh Report* conforms 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.

17. 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.

³⁰ We further note, however, that in the analysis of the Cingular-AT&T Wireless transaction, the Commission concluded that two important factors to consider in determining whether competitive market conduct and performance will be observed are the presence and capacity of other carriers, rather than simply their current market shares. See *Applications of AT&T Wireless Services, Inc., Transferor, and Cingular Wireless Corp., Transferee, Memorandum Opinion and Order*, 19 FCC Rcd 21522, 21593-21595 (2004).

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.

18. As in previous reports, the *Eleventh 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 a brief discussion of Wireless Local Area Networks, or WLANs. Although both CMRS and WLAN services are wireless services, WLAN services are based on a different wireless technology and spectrum model than CMRS, and they have the potential to act as a substitute as well as a complement to data services offered over mobile telephone networks.

III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE

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

20. 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

21. 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.

22. 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 account for most of this sector.³³

23. For purposes of this report, mobile data service is considered to be the delivery of non-voice information to a mobile device. This includes two-way mobile data services that involve 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, multimedia messaging services (“MMS”) such as exchanging digital photos, information alerts, entertainment applications such as ringtones and games, web browsing, email, access to files stored on corporate servers, and wireless telemetry.³⁴

24. Any mobile satellite service (“MSS”) that involves the provision of commercial mobile radio service directly to end users is by statutory definition CMRS.³⁵ The Commission permits MSS providers in the 2 GHz MSS,³⁶ Big LEO,³⁷ and L-Band³⁸ frequency bands to provide an ancillary terrestrial component (“ATC”) to their satellite systems, provided that the MSS operator: (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; and (5) limits ATC operations only to the authorized satellite footprint.³⁹ 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.⁴⁰ The Commission has granted two applications to

³³ See 47 C.F.R. §§ 22.900, 24.200, 90.601.

³⁴ 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.

³⁵ 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.

³⁶ 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.

³⁷ 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.

³⁸ The L-Band has MSS allocations at 1525-1559 MHz (downlink) and 1626.5-1660.5 MHz (uplink).

³⁹ 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*”), modified sua sponte, *Order on Reconsideration*, 18 FCC Rcd 13590 (2003), on reconsideration, *Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005), further recon pending.

⁴⁰ *Satellite Flexibility Order*, at 1984.

add ATC to MSS satellite offerings, to Mobile Satellite Ventures (“MSV”) in the L-Band and to Globalstar in the Big LEO frequency bands.⁴¹

B. Overview of Service Providers

1. Facilities-Based Mobile Telephone Providers

25. As of year-end 2005, there were four mobile telephone operators in the United States that analysts typically describe as “nationwide”: Sprint Nextel Corp. (“Sprint Nextel”),⁴² Verizon Wireless, LLC (“Verizon Wireless”),⁴³ T-Mobile,⁴⁴ and Cingular Wireless, LLC (“Cingular Wireless” or “Cingular”).⁴⁵ 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 four mobile telephone carriers that analyst reports typically describe as nationwide all offer facilities-based service in at least some portion of the western, midwestern, and eastern United States. In addition, each of the four national operators has networks covering at least 230 million people, while the next largest provider covers less than 80 million people.⁴⁶ In addition to the nationwide operators, there are a number of large regional players, including Alltel Corp. (“Alltel”),⁴⁷ United States Cellular Corp. (“US Cellular”), and Dobson Communications (“Dobson”).

26. Because the four 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 telephone services in

⁴¹ Mobile Satellite Ventures Subsidiary LLC, *Order and Authorization*, 19 FCC Rcd 22144 (Int’l Bur. 2004); Globalstar LLC, *Order and Authorization*, 21 FCC Rcd 398 (Int’l Bur. 2006).

⁴² Sprint Nextel was created by the merger of Sprint Corp. (“Sprint”) and Nextel Communications, Inc. (“Nextel”). See *Tenth Report*, at 15931.

⁴³ 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. 14, 2006, at 11.

⁴⁴ T-Mobile USA is a wholly-owned subsidiary of Deutsche Telekom AG (“Deutsche Telekom”).

⁴⁵ Cingular Wireless is a joint venture of AT&T, Inc. (“AT&T”) (formerly known as SBC Communications, Inc.) and BellSouth Corporation (“BellSouth”). Cingular Wireless, LLC, SEC Form 10-K, Feb. 24, 2006, at 3. On March 5, 2006, AT&T and Bellsouth announced plans to merge. AT&T and Bellsouth, *AT&T, BellSouth to Merge*, News Release, Mar. 5, 2006.

⁴⁶ Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Apr. 25, 2006, at 19 (“4Q05 Wireless 411”).

⁴⁷ Due to its sizeable customer base and extensive geographic (but limited population) coverage, some analysts refer to Alltel as a “super-regional.” Ric Prentis and Eric Mallis, *Leap Wireless International*, Raymond James, Equity Research, Apr. 3, 2006, at 23 (“Alltel is a super-regional operator given its large customer base and geographical footprint, but it does not have enough licenses in Top 50 markets to be considered a national operator”). In addition, Alltel has a very low roaming rate with Verizon Wireless which allows it to offer customers attractive national rate plans. Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns, Equity Research, June 2005, at 60. One analyst reports that “Alltel believes customers view their business as ‘national’ because of their national roaming agreement with Verizon.” Simon Flannery and Jessica Yau, *Alltel Corporation, Conference Takeaways: On Track with Western Deal*, Morgan Stanley, Equity Research, May 5, 2005, at 1.

compliance with the statutory requirement, it is 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 telephone competitors on a county-by-county basis.

2. Resale/MVNO Providers

27. Resellers purchase airtime from facilities-based providers and resell service to the public for profit.⁴⁸ Resellers today are often referred to as MVNOs (Mobile Virtual Network Operators). One commenter argued that “resold wireless services can provide significant competition to traditional wireless services so long as the resold provider differentiates its services from those of the national carriers.”⁴⁹ Typically, MVNOs offer prepaid plans rather than standard monthly billing.⁵⁰ According to information provided to the FCC in its ongoing local competition and broadband data gathering program, the resale sector accounted for approximately 6 percent of all mobile telephone subscribers at the end of June 2005.⁵¹ One analyst estimated that there were 13.4 million wireless subscribers currently receiving service from a resale provider, nearly triple the 4.7 million customers at the end of 2003.⁵²

28. With the exception of TracFone Wireless Inc., which served more 6.1 million customers with prepaid offerings at the end of 2005,⁵³ there are few large, independent⁵⁴ resellers of wireless service. However, resale competition has been growing.⁵⁵ There are now more than two dozen MVNOs focusing on groups of individuals who lack traditional wireless service, such as people who are credit-challenged, teenagers, and those who want a cellphone for limited use.⁵⁶ As one commenter argued, “MVNOs that develop and market unique service offerings targeted to niche demographics traditionally ignored by larger carriers have a proven track record of competitive success.”⁵⁷ Virgin Mobile USA (“Virgin Mobile”), a joint venture between Sprint

⁴⁸ Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996). *See, also*, Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission’s Competitive Bidding Rules and Procedures, *Second Report and Order and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 4753 (2006) (“*Designated Entity Second Report*”); *Order on Reconsideration of the Second Report and Order*, FCC 06-78 (rel. June 2, 2006) (“*Designated Entity Order on Reconsideration*”) (The Commission recently adopted rules to limit the award of designated entity benefits to any applicant or licensee that has “impermissible material relationships” or an “attributable material relationship” created by certain agreements with one or more other entities for the lease or resale (including under a wholesale arrangement) of its spectrum capacity.).

⁴⁹ Virgin Mobile, *PN Reply Comments*, at 2 (filed Mar. 6, 2006) (“Virgin Mobile Reply Comments”).

⁵⁰ Mark Walsh, *Prepaid Cellphone Plans*, NYTIMES.COM, Aug. 11, 2005.

⁵¹ *See* Appendix A, Table 2, *infra*.

⁵² Virgin Mobile Reply Comments, at 6-7 (citing the Yankee Group).

⁵³ TracFone Wireless, *TracFone Wireless Fact Sheet*, <<http://www.tracfone.com/about.jsp?task=about¤tView=factSheet>> (visited Apr. 19, 2006).

⁵⁴ That is, without an equity interest from a facilities-based carrier.

⁵⁵ *See* Section IV.A.2, Prepaid Service, *infra*, for some of the reasons for this increased interest.

⁵⁶ Mark Walsh, *Prepaid Cellphone Plans*, NYTIMES.COM, Aug. 11, 2005.

⁵⁷ Virgin Mobile Reply Comments, at 6.

Nextel and Richard Branson's Virgin Group, LLC, was launched in July 2002, targeting its prepaid offerings at the youth market.⁵⁸ The venture now serves almost four million subscribers.⁵⁹ Recently launched MVNOs include Amp'd Mobile (focusing on the youth/young adult market),⁶⁰ Mobile ESPN (focusing on sports content),⁶¹ Talk and Go Mobile (sold by Circle K convenience stores),⁶² and Movida Cellular (targeting Hispanic consumers).⁶³

3. Data-Only Providers

29. In addition to the voice and data services offered by mobile telephone carriers, other providers, including those using BRS/EBS spectrum and paging/messaging carriers, offer or are preparing to offer a range of mobile broadband and narrowband data services.

30. As of June 2006, Clearwire was offering wireless broadband service in 29 small cities across the United States, up from 12 markets in August 2005, using BRS/EBS spectrum in the 2.5 GHz band.⁶⁴ Clearwire's service provides consumers with wireless high-speed Internet access at downstream speeds ranging from 768 kbps to 1.5 Mbps using a "plug-and-play" wireless modem device connected directly to a desktop or laptop computer.⁶⁵ Customers can transport the devices to other locations within Clearwire's coverage area where a network signal is available and in some cases use them while traveling at high speeds.⁶⁶ In April 2006, Clearwire also began offering voice over IP service to its broadband customers.⁶⁷

31. Sprint Nextel holds or leases a significant amount of spectrum in the BRS/EBS band and, in February 2006, the company began using this spectrum to offer a wireless broadband video service to NASCARTM spectators called FanView. The FanView service delivers live race and audio from in-car cameras, as well as race statistics and replay functions, to

⁵⁸ *Id.*, at 2. For a detailed discussion of the venture, see *Seventh Report*, at 13026. Sprint Nextel also targets the teenage market through a subsidiary with its iDEN-based push-to-talk product, using an alternative prepaid brand, "Boost Mobile." Nextel, SEC Form 10-K (filed Mar. 15, 2005), at 2. See *Ninth Report*, at 20615, for more history on the venture.

⁵⁹ Virgin Mobile Reply Comments, at 4.

⁶⁰ Tim Horan, *Datetimes*, CIBC World Markets, Dec. 16, 2005.

⁶¹ *Mobile ESPN Expands Retail Distribution to Sprint Stores*, News Release, Mobile ESPN, Apr. 5, 2006.

⁶² Tim Horan, *Datetimes*, CIBC World Markets, Nov. 16, 2005.

⁶³ *The Cisneros Group Launches First Hispanic Wireless Service Provider*, News Release, Movida Communications, Apr. 20, 2005.

⁶⁴ Clearwire, *Service Plans/Coverage Areas* (visited June 5, 2006) <http://www.clearwire.com/store/service_areas.php>.

⁶⁵ Clearwire, *Service Plans* (visited June 5, 2006) <http://www.clearwire.com/store/service_plans.php>.

⁶⁶ See *Tenth Report*, at 15922.

⁶⁷ *Clearwire Becomes First International Wireless Broadband Company to Offer Simple, Reliable Internet Phone Service*, News Release, Clearwire, April 10, 2006. The VOIP service was first offered to Clearwire's customers in Stockton, CA, and the company will only sell the VOIP service to those customers who qualify for Enhanced 911 service. *Id.*

spectators using customized mobile devices that can be rented at NASCAR™ events.⁶⁸ Over the past year, Sprint Nextel tested other wireless broadband technologies that could eventually be deployed in the BRS/EBS band,⁶⁹ and in August 2006 Sprint Nextel announced its plans to deploy a fourth-generation (“4G”) wireless broadband network in this band using the mobile WiMAX (Worldwide Interoperability for Microwave Access) IEEE 802.16e-2005 technology standard.⁷⁰ As one of the conditions of the August 2005 merger of Sprint and Nextel, the Commission required Sprint Nextel to fulfill its voluntary commitment to provide service in the 2.5 GHz band; the first milestone requires the company to offer service using BRS/EBS spectrum to at least 15 million Americans by August 2009 and to additional 15 million Americans by August 2011.⁷¹

32. In addition, several small wireless broadband providers use BRS/EBS spectrum licenses to offer wireless broadband services. These providers include, for example, Plateau Telecommunications in New Mexico and Texas; Info-Link.net in west central Minnesota; Evertek in Iowa; SpeedNet in Michigan; Gryphon Wireless in Kearny, NE; W.A.T.C.H. TV in Lima, OH; BeamSpeed in Yuma, AZ; and Rioplex Wireless in Port Isabel, TX.

33. BellSouth currently offers wireless broadband service in five southern cities – Athens, GA; Palatka and Deland, FL; New Orleans, LA; and Gulfport, MS – using its WCS spectrum licenses in the 2.3 GHz band.⁷² The service is similar to those offered in the BRS/EBS band and allows portable, wireless high-speed Internet access via plug-and-play wireless modem devices.⁷³

34. There are several narrowband mobile data service providers that offer service to enterprise customers using paging and narrowband PCS networks and spectrum. USA Mobility is the largest U.S. paging company and offers both traditional paging services and two-way messaging services to enterprise customers.⁷⁴ In addition, Motient Corp. (“Motient”) sells wireless e-mail and other wireless Internet applications, and Space Data Corp (“Space Data”)

⁶⁸ *NASCAR Nextel FanView Gives Fans a New Perspective*, News Release, Sprint Nextel and NASCAR, Feb. 9, 2005.

⁶⁹ Kelly Hill, *Sprint Nextel Delves Deeper into 4G with New Devices*, ‘Global Reach,’ RCR Wireless News, May 25, 2006; *Sprint and Samsung to Explore Wireless Broadband*, News Release, Sprint Nextel, Sept. 16, 2005; *Sprint and Motorola in Wireless Broadband Development Pact*, News Release, Sprint Nextel, June 30, 2005; *Sprint and Intel to Explore Wireless Broadband Technologies*, News Release, Sprint Nextel, May 5, 2005.[to be updated to reflect 2.5 GHz efforts]

⁷⁰ *Sprint Nextel Announces 4G Wireless Broadband Initiative with Intel, Motorola and Samsung*, News Release, Sprint Nextel, Aug. 8, 2006.

⁷¹ Applications of Nextel Communications, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations, File Nos. 0002031766, *et al.*, WT Docket No. 05-63, *Memorandum Opinion and Order*, at ¶¶ 163-165, FCC 05-148 (rel. Aug. 8, 2005).

⁷² *BellSouth Expands Availability of Wireless Broadband in Athens*, News Release, BellSouth, Nov. 17, 2005; BellSouth, *Experience the Power and Freedom of Wireless Broadband* (visited June 5, 2006) <http://www.wirelessbb.bellsouth.net/sales/asp/WBB_OrderNow.asp>.

⁷³ *Id.*

⁷⁴ USA Mobility, *Business Solutions – Wireless Messaging Solutions* (visited June 22, 2006) <http://www.usamobility.com/bus_solutions/wireless_messaging/>; Tenth Report, at 15923.

provides commercial telemetry services across the south-central United States to energy and other industrial companies.⁷⁵

4. Satellite Providers

35. As of year-end 2005, a number of carriers were providing mobile satellite services in the United States.⁷⁶ 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 were also providing voice and data communications via satellite in the L-band at year-end 2005. 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. Two additional companies, ICO Global Communications (Holdings) Ltd. and TerreStar Networks, Inc., had not yet begun commercial service.

C. Horizontal Concentration

36. 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.

37. 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 telephone 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 telephone services is narrower than the entire nation. An attempt to measure concentration in mobile telephone 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 telephone services is a highly complex exercise due to various factors, including the relatively large

⁷⁵ Space Data Corp., *Overview of SkySite Network* (visited June 22, 2006) <<http://www.spacedata.net/technology.htm>>; Motient, *Welcome to Motient* (visited June 22, 2006) <http://www.motient.com/index.php>; *Tenth Report*, at 15923.

⁷⁶ In order to place a satellite telephone 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.

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

1. Number of Mobile Telephone Competitors

38. 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 publicly⁷⁷ with the Commission in proceedings or with applications.⁷⁸

39. 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.⁷⁹ Therefore, this analysis overstates the total coverage in terms of both geographic areas and populations covered.

40. 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

⁷⁷ This data is not based on information that is subject to a protective order.

⁷⁸ The Commission has buildout rules for geographic area licenses, which 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. Licensees may, in the alternative, provide substantial service to their licensed area within the appropriate five- and ten-year benchmarks. 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.

⁷⁹ All population figures are based on the Bureau of the Census's 2000 county population.

provide almost complete coverage of the entire land mass of the continental United States.⁸⁰ 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.⁸¹

41. To date, 280 million people, or 98 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.⁸² However, these counties make up only 68 percent of the total land area of the United States, reflecting the nation's uneven population distribution.⁸³ Roughly 268 million people, or 94 percent of the U.S. population, live in counties with four or more mobile telephone operators competing to offer service. In addition, roughly 145 million people, or 51 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service, while 50 million people, or 18 percent of the population, live in counties with six or more mobile telephone operators competing to offer service. While the percentage of the U.S. population living in counties with three or more and four or more mobile telephone carriers is slightly higher since the *Tenth Report*, there has been a sharp drop in the percentage of the population living in counties with more than four providers,⁸⁴ due to the mergers of Sprint and Nextel and, to a lesser extent, Alltel and Western Wireless Corporation.⁸⁵

2. Concentration Measures for Mobile Telephone Services

42. This section reports the results of using the Herfindahl-Hirschman Index ("HHI") to measure market concentration with respect to the provision of mobile telephone services in EAs.⁸⁶ The value of the HHI reflects both the number of market competitors and the distribution of their market shares. In general, the value of the HHI declines as the number of firms increases and it increases with rising inequality among any given number of firms.⁸⁷

⁸⁰ See Appendix B, Maps 2-3, *infra*. Utilizing information filed by cellular licensees with the Commission, we found that less than one-tenth of one percent of the US population lacked cellular coverage. FCC internal analysis.

⁸¹ 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.*

⁸² See Appendix A, Table 5, *infra*.

⁸³ *Id.* We note that the land area of these counties, 2.5 million square miles, is 50 percent larger than the combined land area of the 25 member countries of the expanded European Union (1.5 million square miles).

⁸⁴ See Appendix A, Table 9, *infra*.

⁸⁵ See *Tenth Report*, at 15931.

⁸⁶ 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.

⁸⁷ 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 (continued....)

43. 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, which track phone number usage information for the United States.⁸⁸

44. Finally, we use EAs as the geographic unit for measuring concentration in mobile telephone markets because an EA captures the area in which the average person shops for and purchases a mobile phone, most of the time.⁸⁹ 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.⁹⁰

45. Based on NRUF data as of December 2005, the average value of the HHIs weighted by EA population is 2706, and the median value is about 2785.⁹¹ This represents an increase in average concentration from the weighted average value of 2450 and the median value of about 2583 estimated for December 2004.⁹² As a benchmark for comparison, the value of HHI for a hypothetical market in which there are four carriers with equal market shares is 2500. The value of HHI for individual EAs ranges from a low of 1605 in EA 28 (covering parts of South Carolina and Georgia, including Savannah) to a high of 9042 in EA 120 (covering parts of Nebraska). The value of HHI in 49 EAs representing nearly nine percent of the U.S. population exceeds 3333, which would be the approximate value of HHI in a market that is equally divided among three competitors. However, there are four or more competitors in all but two of the EAs with HHIs in excess of 3333. This suggests that the relatively high HHI values in most of these EAs primarily reflect the limited effect of competitive entry to date in eroding the market shares of one or both carriers holding the two original cellular licenses, rather than simply a limited number of competitors.

(Continued from previous page)

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 $[(40)^2 + (20)^2 \times 3]$.

⁸⁸ The methodology used to compile NRUF data is described in Section VI.B.4, Sub-National Penetration Rates.

⁸⁹ See Section VI.B.4, Sub-National Penetration Rates, *infra*. As discussed in note 469, the use of EAs also reduces distortions inherent in the use of NRUF data. In addition to the inherent limitations of the NRUF data detailed below, 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.

⁹⁰ 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.

⁹¹ See Appendix A, Table 3, *infra*. The simple mean (not weighted by population) is 2901.

⁹² See *Tenth Report*, at 15926.

46. In interpreting these HHIs, it is worth noting that the specific technological and economic 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.

47. 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 least populated EA (EA 121, covering parts of Nebraska and Colorado) and the EA with the third lowest population (EA 142, covering parts of Nebraska and Wyoming) have the second and third highest HHIs, respectively. However, apart from differences in population size, EAs also vary significantly with regard to other important determinants of market demand and cost, including factors such as per capita income, population density, urbanization, the age distribution of the population, and the size and composition of the business sector.⁹³ Absent a more systematic analysis of the possible relationship between these 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

48. Concentration in mobile markets abroad provides another benchmark against which to evaluate U.S. mobile market concentration. This section compares the structure of mobile telephone 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.

49. Prior to the merger of Sprint and Nextel, the United States had one or two more national mobile telephone operators than most other industrialized countries of comparable income levels.⁹⁴ By reducing the number of national mobile operators from five to four, the merger of Sprint and Nextel made the U.S. mobile market more similar in structure to comparable mobile telephone markets in Western Europe and Asia. There are three or four national mobile telephone operators in most Western European mobile markets.⁹⁵ Only two Western European countries – the United Kingdom (“UK”) and Austria – have five national

⁹³ 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.

⁹⁴ *Tenth Report*, at 15927.

⁹⁵ Glen Campbell *et al.*, *Interactive Global Wireless Matrix 4Q05*, Merrill Lynch, Telecom Services Research, Apr. 2006 (“*Interactive Global Wireless Matrix 4Q05*”).

mobile operators.⁹⁶ Some comparable Asian-Pacific countries, such as Japan and Australia, also have three or four national mobile operators.⁹⁷ The principal exception is Hong Kong, with six mobile operators.⁹⁸

50. Apart from the number of national competitors, there are significant structural differences between mobile markets in the United States and Western Europe. In addition to the four nationwide mobile telephone operators, several large regional operators and a large number of mobile telephone operators with smaller geographic footprints compete in many regional and local markets in the United States. In contrast, national mobile operators do not face competition from smaller facilities-based carriers in Western European mobile markets. 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 counties to fewer than four competitors in other counties. Nevertheless, as previously mentioned, 98 percent of the total U.S. population lives in counties with a minimum of three different mobile operators, the same as the maximum number of national mobile carriers in a number of Western European markets.

51. Because Western European regulators awarded nationwide licenses for second-generation GSM and third-generation services, consumers' choices of mobile telephone operators are uniform throughout each country. Accordingly, we measure concentration in European mobile markets on a national basis. For purposes of comparison, we computed HHIs based on subscriber shares as of the fourth quarter of 2005 for the following seven countries: Finland, France, Germany, Italy, the Netherlands, and the UK.⁹⁹ The least concentrated mobile market is in the UK, with an HHI of 2282. Mobile subscribers in the UK are relatively evenly divided among the four GSM operators, and a fifth operator, a 3G start-up, had acquired a five percent subscriber share by the end of 2005. The value of HHI in the remaining countries ranges from a low of 3082 in Germany to a high of 3979 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 national operators in Germany, the Netherlands, and Italy, and three national operators in France and Finland. Second, each market tends to be dominated by the top two competitors, which have a combined market share ranging from 74 percent in Germany and Italy to 85 percent in Finland.¹⁰⁰

52. Given our previous finding that the average value of HHI weighted by EA population in the U.S. mobile market is 2706 and that the median value is about 2785, it is evident that, on average, concentration is lower in the U.S. mobile market than in Western European mobile markets with the exception of the UK. At the same time, there are 31 EAs representing approximately five percent of the U.S. population with higher mobile market

⁹⁶ In August 2005, Dutch regulators cleared telecommunications company Royal KPN's takeover of its smaller mobile telephone competitor Telfort, allowing the number of national mobile operators in Netherlands to decline from five to four. *Royal KPN Gets Go-Signal in \$1.3b Telfort Takeover*, TELECOM ASIA DAILY, Aug. 31, 2005.

⁹⁷ *Interactive Global Wireless Matrix 4Q05*.

⁹⁸ *Id.*

⁹⁹ The subscriber shares used to calculate HHIs for European mobile markets were taken from *Interactive Global Wireless Matrix 4Q05*.

¹⁰⁰ *Id.*

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

53. 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 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.¹⁰¹ If the cost savings generated by consolidation give the newly enlarged carrier the ability and the incentive to compete more aggressively, consolidation could result in lower prices and new and innovative services for consumers.¹⁰² Moreover, it is unlikely that competitive harm will result from consolidation among service providers licensed to operate in separate geographic markets.

54. Among the policies potentially affecting consolidation in this market, the Commission eliminated a rule limiting the amount of spectrum a CMRS licensee could own or control in a given licensed area, effective January 2003.¹⁰³ On July 8, 2004, the Commission also eliminated the cellular cross-interest rule then applicable only in Rural Service Areas (“RSAs”) and transitioned to case-by-case competitive review for all applications related to transactions involving cellular licenses.¹⁰⁴

55. Since the end of 1999, carriers have been building nationwide footprints¹⁰⁵ through various forms of transactions.¹⁰⁶ One of the driving forces behind many of these transactions has been the desire of regional carriers to enhance their ability to compete with existing nationwide operators that offer attractive nationwide pricing plans.¹⁰⁷ Moreover,

¹⁰¹ See Section III.C.2, *supra*, and Section III.E.2, *infra*, for a fuller discussion of how economies of scale may affect market structure.

¹⁰² See Jonathan B. Baker, *Developments in Antitrust Economics*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol. 13, No. 1, Winter 1999, at 182.

¹⁰³ 2000 Biennial Regulatory Review, Spectrum Aggregation Limits for Commercial Mobile Radio Services, *Report and Order*, 16 FCC Rcd 22668, at 22693 (2001) (“*Spectrum Cap Order*”).

¹⁰⁴ 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*”). Until then, the Commission had retained the cellular cross-interest rule in RSAs, while 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.

¹⁰⁵ 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.

¹⁰⁶ The Commission must consent to the transfer of control or assignment of all non pro-forma spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

¹⁰⁷ See *Fifth Report*, at 17699. For a complete discussion of the motivations for this phenomenon, see *Fourth Report*, at 10159-10160.

national operators have sought to fill in gaps in their coverage areas, as well as to increase the capacity of their existing networks. 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.¹⁰⁸ Since the writing of the *Tenth Report*, a number of transactions between market participants have been completed or announced. We discuss the largest of these transactions below.

1. Sales and Swaps

56. *Sprint Nextel / Affiliates* – On August 12, 2005, Sprint and Nextel completed their merger, after having received regulatory approval from the Commission and the DOJ.¹⁰⁹ When the merger was first announced in December 2004, Sprint and Nextel had thirteen affiliates between them (twelve Sprint affiliates plus Nextel Partners). Currently, only four smaller affiliates – iPCS, Northern PCS, Shentel, and Swiftel – of the original thirteen remain independent.¹¹⁰ The others have been acquired by Sprint Nextel.¹¹¹ A number of analysts expect Sprint Nextel to acquire the remaining four affiliates, which now serve about 800,000 subscribers.¹¹²

57. *Alltel / Midwest Wireless* – On November 18, 2005, Alltel announced an agreement to purchase Midwest Wireless, a privately-held company with approximately 400,000

¹⁰⁸ 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.

¹⁰⁹ *Sprint Nextel Completes Merger*, News Release, Sprint Nextel, Aug. 12, 2005; *Sprint Nextel Says It Intends to Pursue Appraisal Process with Nextel Partners*, News Release, Sprint Nextel, Aug. 17, 2005; FCC Consents to Sprint Corporation Acquisition of Nextel Communications Licenses and Authorizations, *News Release*, Federal Communications Commission, Aug. 3, 2005.

¹¹⁰ Ric Prentiss, *et al.*, *UbiquiTel Inc.*, Raymond James, Equity Research, Apr. 21, 2006, at 1.

¹¹¹ Ric Prentiss and Eric Mallis, *Leap Wireless International*, Raymond James, Equity Research, Apr. 3, 2005, at 23. As of November 2004, there were 12 Sprint affiliates, including Alamosa Holdings Inc., US Unwired Inc., AirGate PCS Inc., UbiquiTel Inc., Horizon PCS Inc., Shenandoah Telecommunications Co., Enterprise Wireless, Gulf Coast Wireless, iPCS Inc, Independent Wireless One (IWO), Northern PCS, and Swiftel. Phil Cusick and Richard Choe, *Airgate PCS Inc.*, Bear Stearns, Equity Research, Nov. 24, 2004, at 19. In February 2005, Alamosa completed its acquisition of AirGate, while iPCS completed its acquisition of Horizon PCS in July. *Alamosa Closes Acquisition of AirGate PCS*, News Release, Alamosa, Feb. 15, 2005; *iPCS Announces Closing of Merger with Horizon PCS*, News Release, iPCS, July 1, 2005. Sprint Nextel completed its acquisition of Nextel Partners in June 2006 and of UbiquiTel in July 2006. *Sprint Nextel Completes Acquisition of Nextel Partners*, News Release, June 26, 2006; *Sprint Nextel Completes Acquisition of Wireless Affiliate UbiquiTel Inc.*, News Release, July 1, 2006.

¹¹² Timothy Horan *et al.*, *Sprint Acquires PCS Affiliate UbiquiTel for \$1.3B*, Daily Datatimes, CIBC, Apr. 21, 2006, at 3 (“We expect [Sprint Nextel] to acquire the remaining smaller affiliates”). See, also, Ric Prentiss and Eric Mallis, *Leap Wireless International*, Raymond James, Equity Research, Apr. 3, 2005, at 23 (“We would expect Sprint-Nextel will acquire more of its affiliates in the coming quarters”); Phil Cusick, *et al.*, *U.S. Wireless Services*, Bear Stearns, Equity Research, April 2006, at 11 (“We believe UbiquiTel, iPCS, Shentel, and other remaining private Sprint affiliates may announce deals in the next few months [to be bought]”). The remaining affiliates include two public companies (ShenTel and iPCS) and two private companies (Swiftel and Northern PCS). Sprint Nextel stated it is currently in talks with ShenTel and Swiftel and in litigation with iPCS and Northern PCS. Ric Prentiss *et al.*, *UbiquiTel Inc.*, Raymond James, Equity Research, Apr. 21, 2006, at 1. Sprint Nextel’s acquisitions of its affiliates may be driven by a desire to settle legal disputes with its affiliates over whether Sprint’s integration with Nextel conflicts with Sprint’s obligations to its affiliates. See *Tenth Report*, at 15933.

wireless subscribers in southern Minnesota, northern and eastern Iowa, and western Wisconsin.¹¹³ These markets are contiguous to existing Alltel operations and cover a population of 1.9 million.¹¹⁴ Under the agreement, Alltel will pay \$1.075 billion in cash to purchase Midwest Wireless' licenses, customers, and network assets.¹¹⁵ According to Alltel, "Midwest Wireless' business strengthens our position in the wireless industry by adding CDMA properties that are contiguous to our existing markets in the Midwestern U.S.. ...Midwest Wireless' network is well suited to deliver advanced data applications to customers through a reliable and robust 1x network."¹¹⁶

2. Affiliations

58. As discussed in previous reports, some of the nationwide operators had extended their coverage through contractual affiliations with smaller carriers.¹¹⁷ These affiliations created a "family" of operating companies with much closer relationships than those formed by traditional roaming agreements.¹¹⁸ 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.¹¹⁹ However, in the past two years, the vast majority of these affiliations have ended, either through the outright acquisition of the affiliate or through termination of the affiliation agreements.¹²⁰ As one analyst observed, "the old national operators ... utilized affiliates to extend the national brands and networks into smaller markets quickly using the time, talent, and treasure of other companies. The need for affiliates diminished as smaller markets were built out and the financials of the national operators improved since affiliates were, in essence, off-balance sheet means to extend brand and network."¹²¹

E. Entry Conditions and Potential Barriers to Entry

59. Market concentration is necessary but not sufficient 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

¹¹³ *Alltel Agrees to Purchase Midwest Wireless for \$1 Billion in Cash*, News Release, Alltel, Nov. 18, 2005. *See, also*, Application Transferring Control of Licenses Held by Midwest Wireless Communications L.L.C., Midwest Wireless Iowa L.L.C., Midwest Wireless Wisconsin L.L.C., and Switch 2000 L.L.C. to Alltel Communications, Inc., Lead File No. 0002391997 (filed December 2, 2005).

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ The use of the term "affiliations" and the discussion of the various relationships between these entities in this section are made in the context of general business matters and are not indicative of how these relationships may or may not be characterized in the context of the Commission's designated entity rules. *See* 47 C.F.R. 1.2110; *see also* *Designated Entity Second Report*; *Designated Entity Order on Reconsideration*.

¹¹⁸ *See* Section IV.B.3, *Roaming, infra*.

¹¹⁹ *See Tenth Report*, at 15932, note 127.

¹²⁰ *See Tenth Report*, at 15929-15933; Section III.D.1, *Sales and Swaps, supra*.

¹²¹ Ric Prentis and Eric Mallis, *Leap Wireless International*, Raymond James, Equity Research, Apr. 3, 2006, at 23.

unilaterally, even in highly concentrated markets.¹²² 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.¹²³

1. Spectrum Allocation and Assignment

60. Government control of spectrum allocation and assignment has the potential to create a significant barrier to entry into markets for mobile communications services by limiting the amount of spectrum allocated to CMRS and by requiring carriers to obtain a government-issued license in order to use such spectrum for the provision of CMRS.¹²⁴ However, the Commission has helped to reduce any potential entry-limiting effects of government-controlled spectrum allocation and assignment through various policies. First, as discussed in greater detail below, the amount of spectrum available for the provision of CMRS has been increased. For example, the allocation of 120 MHz of spectrum to broadband PCS ended the cellular duopoly by facilitating the entry of new mobile telephone service providers. Second, the Commission has progressively implemented a more flexible, market-oriented model of spectrum allocation and assignment for spectrum used to provide commercial mobile services. For example, initially spectrum policy restricted the use of cellular spectrum to analog service and limited the number of cellular entrants to two in each local market. In contrast, as detailed below, current policy affords licensees greater flexibility to decide what services to offer and what technologies to deploy on cellular spectrum, as well as other spectrum used for the provision of CMRS, and allows market forces to play a greater role in determining the number of entrants in each local market for mobile telephone service. Finally, subject to the Commission's approval, CMRS licensees are allowed to buy and sell licenses, in whole or in part, on the secondary market. As noted in the *Ninth Report*, beginning in 2003 the Commission also allowed CMRS licensees 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.¹²⁵ The effect of this flexible, market-oriented spectrum model has been to help reduce any entry barriers that may arise from government regulation of spectrum.

a. Cellular, Broadband PCS, and SMR

61. Currently, mobile telephone operators primarily use three types of spectrum licenses to provide mobile voice and, in most cases, mobile data services: cellular, broadband

¹²² See *DOJ/FTC Guidelines* at §3.0; see also Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed.), Addison, Wellsley, Longman, Inc., 1999, at 77.

¹²³ See *Spectrum Cap Order*, 16 FCC Rcd at 22688-91, ¶¶ 39-43.

¹²⁴ See, e.g., Thomas W. Hazlett, *The Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's "Big Joke"*, Working Paper 01-01, AEI-Brookings Joint Center for Regulatory Studies, Jan. 2001; *Spectrum Framework Review: Implementation Plan*, Consultation Document, Office of Communications, Jan. 13, 2005, at 77 and 81-82.

¹²⁵ *Ninth Report*, at 20631.

PCS, and SMR.¹²⁶ This information is provided as a basis for understanding the formation of the current industry structure.

62. 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.¹²⁷ 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.¹²⁸

63. 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 1995.¹²⁹ The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephone services, 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).¹³⁰ Two of the 30 megahertz blocks (A and B blocks) are assigned on the basis of 51 Major Trading Areas (“MTAs”).¹³¹ One of the 30

¹²⁶ See Appendix B, Table 1 and Maps 11-14, *infra*, for descriptions and maps of various geographical licensing schemes employed by the Commission.

¹²⁷ 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/>>.

¹²⁸ See Section VI.B.1, Subscriber Growth, *infra*.

¹²⁹ 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.

¹³⁰ The Commission’s broadband PCS allocation includes 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS.

¹³¹ 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 (continued....)

megahertz blocks (C block) and all three of the 10 megahertz blocks are assigned on the basis of 493 BTAs.¹³²

64. 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.¹³³ The Commission has since licensed additional SMR spectrum through auctions.¹³⁴ 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.¹³⁵ While Commission policy permits flexible use of this spectrum, including the provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,¹³⁶ the primary use for SMR traditionally has been dispatch services.¹³⁷ Dispatch differs from mobile voice communications

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from the Seattle MTA into its own MTA-like area. MTAs are combinations of two or more BTAs. *See* note 26 for a description of BTAs.

¹³² The Commission has also reconfigured returned C block licenses. *See Tenth Report*, at 15935, note 150.

¹³³ 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”).

¹³⁴ The Commission has held multiple auctions for SMR licenses. FCC, *FCC Auctions* (visited Mar. 7, 2002) <<http://wireless.fcc.gov/auctions/>>.

¹³⁵ 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. As discussed below in Section III.E.1.b, *infra*, the configuration of the 800 MHz band is changing as a result of a new band plan adopted by the Commission.

¹³⁶ 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).

¹³⁷ 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.

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.¹³⁸ 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 telephone services. In recent years, however, the nature of SMR service has evolved significantly. SMR providers such as Sprint Nextel (on its iDEN network) and SouthernLINC Wireless, 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.¹³⁹ Furthermore, in apparent response to the dispatch functionality of SMR services, many cellular and broadband PCS carriers have begun to offer push-to-talk functionality on their networks, including Verizon Wireless, Cingular, Sprint Nextel (on its CDMA network), and Alltel. SMR spectrum is also used for certain data-only networks.¹⁴⁰

65. Available Licenses and Spectrum Aggregation – In every geographical area of the country, the Commission initially authorized up to eight different mobile telephone licenses (two cellular and six broadband PCS), not including additional digital SMR licenses.¹⁴¹ Moreover, under Commission rules, 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.¹⁴² Many licensees hold more than one license in a particular market. While no longer in operation, at one time the Commission's CMRS spectrum cap molded the distribution of spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR¹⁴³ spectrum in an MSA, or more than 55 megahertz in an

¹³⁸ 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.

¹³⁹ 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.

¹⁴⁰ See Section IV.B.1.e, Data-Only Networks and Technology Deployment, *infra*.

¹⁴¹ 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.

¹⁴² 47 C.F.R. § 24.714 (PCS); 47 C.F.R. § 22.948 (cellular); 47 C.F.R. §§ 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.

¹⁴³ No more than 10 megahertz of SMR spectrum was attributable to an entity under the cap. 47 C.F.R. § 20.6(b).

RSA.¹⁴⁴ 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, 2003.¹⁴⁵

b. 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange

66. 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.¹⁴⁶ 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 required 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 modified 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 is relinquishing and the actual costs Nextel incurs to relocate all incumbents in the 800 MHz and 1.9 GHz bands. 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.

c. Narrowband Spectrum

67. 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.¹⁴⁷ Each license consists of between 20 and 50 kilohertz.¹⁴⁸ The Commission first allocated spectrum for paging in 1949

¹⁴⁴ 47 C.F.R. § 20.6(a).

¹⁴⁵ *Spectrum Cap Order*, at 22669. The increase to 55 megahertz took effect February 13, 2002. See 67 Fed. Reg. 1626 (Jan. 14, 2002). All non pro forma 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.

¹⁴⁶ FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio Systems, *News Release*, Federal Communications Commission, Jul. 8, 2004.

¹⁴⁷ 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>>.

¹⁴⁸ *Id.*

and licensed the spectrum on a site-by-site basis through the mid-1990s.¹⁴⁹ In 2000 the Commission began auctioning additional paging licenses on a geographic area basis using EAs and MEAs.¹⁵⁰ The Commission completed its third paging auction on May 28, 2003.¹⁵¹

68. 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.¹⁵² The Commission first auctioned narrowband PCS spectrum in 1994.¹⁵³ Licenses consist of between 50 and 200 kilohertz each and were auctioned on a nationwide, regional, and MTA basis.¹⁵⁴ The Commission completed its most recent auction of narrowband PCS licenses on September 25, 2003.¹⁵⁵

d. 700 MHz Bands

69. 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 (DTV).¹⁵⁶ 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.¹⁵⁷ 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.¹⁵⁸

¹⁴⁹ 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).

¹⁵⁰ See 929 and 931 MHz Paging Auction Closes, *Public Notice*, DA 00-508 (rel. Mar. 6, 2000); *Seventh Report*, at 13050-13051.

¹⁵¹ Lower and Upper Paging Bands Auction Closes, *Public Notice*, DA 03-1836 (rel. May 30, 2003).

¹⁵² 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).

¹⁵³ 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).

¹⁵⁴ *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).

¹⁵⁵ Regional Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3006 (rel. Oct. 1, 2003); Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3012 (rel. Oct. 2, 2003). See, also, *Ninth Report*, at 20636-20637.

¹⁵⁶ See *Eighth Report*, at 14798-14799.

¹⁵⁷ 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).

¹⁵⁸ 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).

70. 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.¹⁵⁹ These bands have many permissible uses: new licensees may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.¹⁶⁰ The Commission expects that many of the new technologies to be developed and deployed in this band will support advanced wireless applications.¹⁶¹ However, portions of the Upper and Lower 700 MHz spectrum are currently encumbered by television broadcasters, and may remain so until the end of period when broadcasters convert from analog to digital transmission systems.¹⁶² The Digital Television and Public Safety Act of 2005 (“DTV Act of 2005”) amended the statutory definition of that period and established February 17, 2009 as the end of the DTV transition.¹⁶³ Nevertheless, there may be some portions of these bands that are not so encumbered and are available for immediate use by new licensees.

71. The Balanced Budget Act of 1997 and certain subsequent legislation initially directed the Commission to license these reclaimed spectrum bands well in advance of the end of the DTV transition period.¹⁶⁴ The Auction Reform Act of 2002 eliminated these statutory deadlines¹⁶⁵ and provided the Commission with a level of discretion on the timing of and deadlines for issuing licenses.¹⁶⁶ 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), but directed it to proceed with an auction of the Lower 700 MHz C and D blocks.¹⁶⁷ The initial auction of Lower 700 MHz C and D block licenses (Auction No. 44)

¹⁵⁹ 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*”).

¹⁶⁰ *Id.*

¹⁶¹ *Lower 700 MHz Report and Order*, at 1032.

¹⁶² *Id.*, at 1028.

¹⁶³ See Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 4 (2006) (“DRA”) (amending Section 309(j)(14) and Section 337(e) of the Communications Act, as amended). Title III of the DRA is the DTV Act.

¹⁶⁴ 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).

¹⁶⁵ Auction Reform Act of 2002, Pub. L. No. 107-195, 116 Stat. 715 (“*Auction Reform Act*”).

¹⁶⁶ See 47 U.S.C. § 309(j)(15), as added by the *Auction Reform Act*.

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

raised \$88.7 million in net bids.¹⁶⁸ Subsequent auctions of licenses in these bands (Auction Nos. 49 and 60) resulted in winning bids for all of the licenses that remained held by the Commission after Auction No. 44 and raised additional net bids of over \$57 million.¹⁶⁹

72. The DTV Act of 2005 provides a number of changes to the transition of the analog television service to digital television and the reclamation of the 700 MHz spectrum.¹⁷⁰ These include amending Section 309(j)(14) of the Communications Act to establish February 17, 2009 as the end of the DTV transition.¹⁷¹ Congress also addressed the timing of auctions for the assignment of remaining spectrum from TV Channels 52-69. The Communications Act now requires the Commission to commence the auction of recovered analog broadcast spectrum no later than January 28, 2008¹⁷² and deposit the proceeds of such auction in the Digital Television Transition and Public Safety Fund no later than June 30, 2008.¹⁷³ Congress also extended the Commission's auction authority to September 30, 2011.¹⁷⁴

e. Advanced Wireless Services

73. U.S. mobile carriers have the flexibility to deploy advanced wireless technologies, including those commonly called Third Generation or "3G," that allow them to offer high-speed mobile data services using their existing CMRS spectrum.¹⁷⁵ To further the goal of promoting the deployment of advanced services, the Commission has made efforts to allocate and license additional spectrum suitable for offering advanced wireless services (AWS).¹⁷⁶ As noted in the *Tenth 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.¹⁷⁷

¹⁶⁸ Lower 700 MHz Band Auction Closes, *Public Notice*, DA 02-2323 (rel. Sept. 20, 2002). *See also Ninth Report*, at 20638.

¹⁶⁹ Lower 700 MHz Band Auction Closes, *Public Notice*, DA 03-1978 (rel. June 18, 2003); Auction of Lower 700 MHz Band Licenses Closes, *Public Notice*, DA 05-2239 (rel. Aug. 5, 2005).

¹⁷⁰ In light of these statutory changes, the Commission recently issued a Notice of Proposed Rule Making that revisits some of the Commission's early decisions regarding the 700 MHz band licenses by seeking public comment on a variety of licensing and service rules affecting recovered analog broadcast spectrum in these bands. *See* Notice of Proposed Rule Making, Fourth Further Notice of Proposed Rule Making, and Second Further Notice of Proposed Rule Making, FCC 06-114 (rel. Aug. 10, 2006).

¹⁷¹ DTV Act of 2005 § 3002.

¹⁷² *Id.* § 3003. "Recovered analog spectrum" is defined in the DTV Act of 2005. *Id.*

¹⁷³ DTV Act of 2005 §§ 3003(a), 3004 (establishing a Digital Television and Public Safety Fund).

¹⁷⁴ DTV Act of 2005 § 3003.

¹⁷⁵ 47 C.F.R. §§ 20.901(a) and 24.3.

¹⁷⁶ 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.

¹⁷⁷ *Tenth Report*, at 15941. The Commercial Spectrum Enhancement Act, signed into law on December 23, 2004, establishes a Spectrum Relocation Fund to reimburse federal agencies operating on certain frequencies that have (continued....)

74. Since that time, the Commission has completed the process of establishing service rules for the 1710-1755 and 2110-2155 MHz bands in preparation for the auctioning of this spectrum in 2006. Initially, in November 2003, in WT Docket No. 02-353, the Commission released a *Report and Order* adopting rules in the 1710-1755 and 2110-2155 MHz bands including application, licensing, operating and technical rules, and competitive bidding provisions (*AWS-I Service Rules Order*).¹⁷⁸ More specifically, 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 would be licensed under the Commission's flexible, market-oriented Part 27 rules.¹⁷⁹ 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 employing paired spectrum blocks and Economic Areas (EAs), Regional Economic Areas (REAGs) and Rural Service Areas/Metropolitan Statistical Areas (RSA/MSA) licensing areas. The band plan also permitted spectrum to be easily aggregated.

75. The Commission 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 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.¹⁸⁰

76. Subsequent to the *AWS-I Service Rules Order*, the Commission released additional orders further clarifying the service rules for the 1710-1755 MHz and 2110-2155 MHz bands. In 2005, in response to petitions for reconsideration of the *AWS-I Service Rules Order*, the Commission amended the band plan, providing for a greater amount of spectrum to be licensed on a small geographic basis to encourage the participation of small and rural carriers in the AWS auction, and making other changes in response to the spectrum needs reflected in the record.¹⁸¹ In 2006, the Commission adopted rules establishing new restrictions on the award of designated entity auction credits to an applicant or licensee that has an "impermissible" or "attributable" material relationship with a non-designated entity resulting from a spectrum lease or resale agreement, in order to ensure that the benefits of designated entity status at auction are reserved for actual designated entities and to prevent unjust enrichment of unintended

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been reallocated to non-federal use, including the 1710-1755 MHz band, for the cost of relocating their operations. See Commercial Spectrum Enhancement Act, Pub. L. No. 108-494, 118 Stat. 3986, Title II (2004).

¹⁷⁸ 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) (*AWS-I Service Rules Report and Order*); *Order on Reconsideration*, FCC 05-149 (rel. Aug. 15, 2005) (*AWS-I Service Rules Order on Reconsideration*).

¹⁷⁹ 47 C.F.R. Part 27.

¹⁸⁰ *Designated Entity Second Report; Designated Entity Order on Reconsideration*.

¹⁸¹ See *AWS-I Service Rules Order on Reconsideration* at ¶¶ 10-21.

beneficiaries.¹⁸² Also in 2006, the Commission established procedures by which AWS licensees in the 2110-2155 MHz band, among others, could relocate existing incumbents in that band to other spectrum, including fixed microwave service licensees in the 2110-2150 MHz band and Broadband Radio Service licensees in the 2150-2162 MHz band, and also established rules under which other new licensees benefiting from the relocation of an incumbent would share in the costs of the relocation.¹⁸³ In addition to these service rule orders, the Commission in 2006 also established procedures for the upcoming auction of the 1710-1755 MHz and 2110-2155 MHz bands that started on August 9, 2006.¹⁸⁴

77. The Commission has also taken significant steps toward licensing other bands of spectrum for use by AWS. In 2004, the Commission allocated an additional twenty megahertz of spectrum in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands.¹⁸⁵ The Commission additionally released the *AWS-2 Service Rules NPRM*, which sought comment on appropriate service rules for the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands, and also offered some tentative conclusions consistent with existing AWS service rules, such as allowing flexible use of this spectrum and licensing this spectrum under Part 27 of the Commission's rules. Finally, in 2005, the Commission designated yet another 20 MHz of spectrum for AWS, specifically the 2155-2175 MHz band, thus establishing 70 MHz of contiguous AWS spectrum in the 2.1 GHz band (from 2110 to 2180 MHz).¹⁸⁶

f. Broadband Radio Service

78. In July 2004, the Commission transformed the rules and policies governing the Multipoint Distribution Service (MDS) and the Instructional Television Fixed Service (ITFS) in the 2500-2690 MHz band by providing licensees with greater flexibility and establishing a more

¹⁸² See Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures, *Second Report and Order and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 4753 (2006), *Order on Reconsideration*, FCC 06-78 (rel. June 2, 2006).

¹⁸³ See Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, *Services Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, *Ninth Report and Order and Order*, FCC 06-45 (rel. Apr. 21, 2006).

¹⁸⁴ See Public Notice, "Auction of Advanced Wireless Services Licenses Scheduled For June 29, 2006," AU Docket No. 06-30, FCC 06-47 (rel. Apr. 12, 2006); Public Notice, "Auction of Advanced Wireless Services Licenses Rescheduled for August 9, 2006," AU Docket No. 06-30, FCC 06-71 (rel. May 19, 2006).

¹⁸⁵ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Sixth Report and Order, Third Memorandum Opinion and Order and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720 (2004); *Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands*; *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 04-356; WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 19 FCC Rcd 19263 (2004) (*AWS-2 Service Rules NPRM*).

¹⁸⁶ See Amendment Of Part 2 Of The Commissions Rules To Allocate Spectrum Below 3 Ghz For Mobile And Fixed Services To Support The Introduction Of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Eighth Report and Order, Fifth Notice of Proposed Rule Making and Order*, FCC 05-172 (2005).

functional band plan.¹⁸⁷ As one part of this action, the Commission renamed the MDS service the “Broadband Radio Service” (BRS) and renamed the ITFS service the Educational Broadband Service (EBS).

79. The Commission took several steps to restructure the BRS/EBS band and facilitate more efficient use of the spectrum. First, the Commission expanded the 2500-2690 MHz band by five megahertz, from 2495-2690 MHz, to accommodate the relocation of BRS Channels 1 and 2, which are presently located in the 2.1 GHz band. Specifically, the Commission created a one megahertz guard-band, 2495-2496 MHz, to separate incumbent operations below 2495 MHz and new BRS Channel 1 licensees that would operate at 2496-2502 MHz. Second, the Commission created a new BRS/EBS band plan for the 2496-2690 MHz band that eliminated the use of interleaved channels and created distinct band segments for high power operations, such as one-way video transmission, and low power operations, such as two-way fixed and mobile broadband applications. By grouping high and low power users into separate portions of the band, the new band plan reduces the likelihood of interference caused by incompatible uses and creates incentives for the development of low-power, cellularized broadband operations, which were inhibited by the prior band plan.

80. In addition, the Commission provided licensees with the flexibility to employ the technologies of their choice in the band and to lease spectrum under the Commission’s secondary market spectrum leasing policies and procedures. The Commission also implemented geographic area licensing for all licensees in the band, which will allow increased flexibility while reducing administrative burdens on both licensees and the Commission.

81. In April 2006, the Commission continued its transformation of the rules governing BRS and EBS by revising the mechanism for transition from the existing band configuration to the new band plan.¹⁸⁸ BRS and EBS providers will have thirty months from the effective date of the new rules during which they may propose transition plans for relocating existing facilities of all other licensees within the same Basic Trading Area (BTA) to new spectrum assignments in the revised band plan. Plan proponents must notify all licensees in the BTA and file their plans with the Commission. The Commission also allowed licensees to transition themselves if no proponent came forward in a BTA by the deadline for filing transition plans. It also made other changes to the transition rules to facilitate transitions to the new band plan. With respect to lease agreements, the Commission held that EBS licensees are permitted to

¹⁸⁷ 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, *Report and Order and Further Notice of Proposed Rulemaking*, 19 FCC Rcd 14165 (2004). The rules for this band were initially established in 1963 but have evolved significantly since that time. In October 2002, three organizations representing MDS and ITFS providers – the Wireless Communications Association International, the National ITFS Association, and the Catholic Television Network (collectively, the Coalition) – submitted a proposal to the FCC requesting that it substantially change the rules governing this band. In April 2003, the FCC released a Notice of Proposed Rulemaking seeking comment on the Coalition proposal and on other ways to foster efficient and effective use of this spectrum.

¹⁸⁸ 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, *et al.*, *Order on Reconsideration and Fifth Memorandum Opinion and Order and Third Memorandum Opinion and Order and Second Report and Order*, FCC 06-46 (rel. Apr. 27, 2006).

enter into excess capacity leases for a maximum of 30 years, but leases with terms of 15 years or longer must include a right to review the educational use requirements of the leases every five years starting at year 15.

82. The changes made to the 2496-2690 MHz band should enable BRS/EBS providers to use this spectrum in a more technologically and economically efficient manner. The goal of the new rules is to facilitate the growth of new and innovative wireless technologies and services, including wireless broadband services that have the potential to compete with cable and DSL broadband providers and to extend broadband service to rural and underserved areas.

2. Other Potential Barriers to Entry

83. There are three other types of potential entry barriers, each of which captures separate dimensions of the difficulty of entering an industry.¹⁸⁹ 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; 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. 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 the minimum efficient scale is relative to the size of the market. Consequently, 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 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. The inability to borrow sufficiently increases with the larger absolute capital requirement needed to realize minimum cost.

84. All three types of entry barriers have the potential to afford incumbent carriers first-mover advantages over latecomers. Therefore, it is possible that the three types of entry barriers are significant in mobile telephone service. 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 mobile telephone carriers as they seek to brand their products suggests that the product differentiation barrier in mobile telephone service is similarly high. As documented below in Section IV.B.4 on carrier rivalry with respect to advertising and marketing, the four nationwide operators alone spent a total of \$3.5 billion on advertising in 2005, and one analysis determined that Cingular Wireless and Verizon Wireless were two of the top three U.S. brands as measured by dollars spent on advertising.¹⁹⁰ At the same time, regardless of the nature and potential significance of entry barriers, we nevertheless continue to observe entry in local markets due to the continued expansion of existing carriers. Furthermore, we have an expectation that the auction of AWS spectrum will facilitate entry into local mobile

¹⁸⁹ See 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; Joe S. Bain, *Barriers to New Competition*, 1956, at 55; William S. Comanor and Thomas A. Wilson, *Advertising Market Structure and Performance*, THE REVIEW OF ECONOMICS AND STATISTICS, Vol. 49, Nov. 1967, at 425.

¹⁹⁰ Section IV.B.4, Advertising and Marketing, *infra*.

telephone markets by existing carriers, or possibly entirely new firms, despite the potential entry barriers discussed above.

F. Rural Markets

1. Geographical Comparisons: Urban vs. Rural

85. Since the release of the *Sixth Report*,¹⁹¹ the Commission has attempted to obtain a better understanding of the state of competition below the national level, and particularly in rural areas.¹⁹² The Commission does not have a statutory definition of what constitutes a rural area.¹⁹³ The Commission has used RSAs as a proxy for rural areas for certain purposes, such as the former 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.”¹⁹⁴ In its Report and Order concerning deployment of wireless services in rural areas, the Commission adopted a “baseline” definition of rural as a county with a population density of 100 persons or fewer per square mile.¹⁹⁵ For this reason, we adopt this same definition to analyze service availability in rural areas for this report.¹⁹⁶

2. Rural Competition

86. 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 3.6 mobile competitors,

¹⁹¹ *Sixth Report*, at 13350.

¹⁹² For example, In 2003, 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. Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, *Notice of Proposed Rulemaking*, 18 FCC Rcd 20802 (2003) (“*Rural NPRM*”). More recently, the *11th CMRS NOI* included questions on a range of rural wireless issues.

¹⁹³ The federal government has multiple ways of defining rural, reflecting the multiple purposes for which the definitions are used. *Eighth Report*, at 14834; *Rural NPRM*, at 20808-11.

¹⁹⁴ Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd 9219, 9256 at note 203 (1999).

¹⁹⁵ Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, *Report and Order*, 19 FCC Rcd. 19078, at 19087-19088 (2004) (“We recognize, however, that the application of a single, comprehensive definition for ‘rural area’ may not be appropriate for all purposes. . . Rather than establish the 100 persons per square mile or less designation as a uniform definition to be applied in all cases, we instead believe that it is more appropriate to treat this definition as a presumption that will apply for current or future Commission wireless radio service rules, policies and analyses for which the term ‘rural area’ has not been expressly defined. By doing so, we maintain continuity with respect to existing definitions of ‘rural’ that have been tailored to apply to specific policies, while also providing a practical guideline.”).

¹⁹⁶ We note that this definition was supported by many of the commenters responding to the *Ninth Report NOI*. See *Ninth Report*, note 266, at 20642. 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. *Eighth Report*, at 14835-37.

while the more densely populated counties have an average of 4.9 competitors.¹⁹⁷ The average number of competitors in the less densely populated counties generally has remained unchanged for the past two years, whereas the average number of competitors in the more densely populated counties declined by 11 percent from an average of 5.5 competitors in the previous year, which itself represented a 7 percent decline from the previous year as reported in the *Tenth Report*.¹⁹⁸

87. A number of commenters claimed there was strong innovation and competition occurring in rural areas. One commenter said, “carriers, including large and small, regional and local providers, have deployed new technologies and overlaid existing networks in order to meet consumers’ evolving expectations and needs,” adding later that “consumers enjoy a rich variety (and number) of rate plan choices in both rural and urban markets, in coastal cities and small towns, at competitive rates.”¹⁹⁹ Another commenter said, “[c]ompetition in our rural areas is strong. In much of our service area we compete with ten or more competitors. In fact, most of the national carriers cover parts of the areas that we serve and compete with us daily for customers.”²⁰⁰ A third commenter said, “[competition from nationwide carriers indicates that] larger carriers are increasingly building out their networks in rural and underserved areas.”²⁰¹

3. Conclusion

88. Based on our rollout analysis, information and statements provided by commenters, and industry reports, we conclude that CMRS providers are competing effectively in rural areas. In addition, some analysts report that wireless competition is increasing in rural areas, particularly as a wireline substitute.²⁰² While it does appear that, on average, a smaller number of operators are serving rural areas than urban areas, this structural difference is not, by itself, a sufficient basis for concluding that CMRS competition is not effective in rural areas. We note 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 as discussed more fully below. Despite the smaller number of mobile operators in rural areas as compared to urban areas, there is no evidence in the record to indicate that this structural difference has enabled carriers in rural areas to raise prices above competitive levels or to alter other terms and conditions of service to the detriment of rural

¹⁹⁷ In its 2005 Wireless Survey, NTCA found that its “survey respondents are facing considerable competition from other carriers—the average respondent indicated that their company competes with between two and five other carriers.” CTIA Comments, at 22-23 (citing NTCA’s 2005 Wireless Survey). However, NTCA cautions that these numbers may be misleading, as many competitors may serve only a small portion of a rural area. NTCA, *PN Comments*, at 4 (filed Feb. 17, 2006).

¹⁹⁸ *Ninth Report*, at 20643; *Tenth Report*, at 15945.

¹⁹⁹ CTIA Comments, at 23 and 25.

²⁰⁰ Cellular South Comments, at 3.

²⁰¹ T-Mobile Reply Comments, at 6.

²⁰² See Raina Smyth *et al.*, *Telecom Services: Initiation of Coverage: High Payout Rural Telecoms Offer Near-term Opportunities, Long-term Risks*, Morgan Stanley, Equity Research, Apr. 17, 2006, at 3 (“wireless competition is gradually increasing in the non-metro markets where the RLECs operate”); and Jason Armstrong *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Mar. 3, 2006, at 2 (“Line loss trends accelerated across most RLECs owing to wireless substitution”).

consumers. To the contrary, one analyst found that rural carriers are rolling out competitive national pricing plans with “surprisingly low per-minute pricing.”²⁰³

IV. CARRIER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET

89. 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 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.²⁰⁴ 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 compete in a less aggressive manner.

A. Price Rivalry

1. Developments in Mobile Telephone Pricing Plans

90. 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 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 to the benefit of consumers.²⁰⁵ Today all of the nationwide operators offer some version of a national rate pricing plan in which customers can purchase a bucket of minutes to use on a nationwide or nearly nationwide network without incurring roaming or long-distance charges. A more recent example is the introduction and spread of “family plan” packages, in which subscribers sign up for two lines and then have the option of adding additional lines at

²⁰³ John Byrne, *Sprint Simplifies Plan Structure*, KAGAN WIRELESS MARKET STATS, July 22, 2005, at 3-4 (“Regional and local carriers with national plans report surprisingly low per-minute pricing”). Another analyst wrote, “[W]ith the national carriers expanding their networks into rural areas, rural wireless carriers were forced to modify/lower their pricing, which in turn has been pressuring their ARPUs.” Tim Horan, *Implications of AT’s Results On U.S. Wireless Industry*, Daily Datatimes, CIBC World Markets, Jan. 23, 2006.

²⁰⁴ 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.

²⁰⁵ See *AT&T Launches First National One-Rate Wireless Service Plan*, News Release, AT&T Corp., May 7, 1998.

reduced prices, with all lines sharing the available minutes on the plan jointly.²⁰⁶ As noted in the *Tenth Report*, all the nationwide carriers also offer some version of a family plan.²⁰⁷

91. Recently, a few U.S. providers have introduced “mobile to anyone” calling options. The new feature, currently offered by regional operators Alltel and Suncom, allow subscribers unlimited free calling to and from any ten designated numbers in the United States, regardless of wireline or wireless carrier.²⁰⁸ Alltel’s new service is available to customers with plans that cost at least \$59.99 a month and offer 1,200 minutes,²⁰⁹ while Suncom feature costs an additional \$10 a month for regional calling or \$15 monthly for national calling.²¹⁰ These plans are premised on statistics showing that many consumers make most of their calls to about half a dozen numbers.²¹¹ Most other carriers have recognized the same trend, but their plans typically provide free calls only to customers who use the same wireless provider (“on-net”).²¹² While carriers typically pay fees to other carriers to connect calls on their networks (“off-net”), Alltel expects to offset that loss of revenue by getting customers to sign up for the higher priced monthly plans necessary to receive the “mobile to anyone” feature.²¹³ In addition, Sprint Nextel launched a similar, but more limited, calling service that allows for unlimited calling between a customer’s mobile phone and a designated home phone or office phone number, regardless of their local provider, for an additional fee.²¹⁴ One analyst wrote that they “expect wireless carriers to continue to offer these types of value added services, as they provide a way to help increase overall customer ARPU and reduce churn.”²¹⁵

92. The *Tenth Report* noted that early termination fees (“ETFs”) are a widespread phenomenon in the marketplace.²¹⁶ In June 2006, Verizon Wireless announced that the company

²⁰⁶ See *Tenth Report*, at 15946. One analyst estimated that 54 percent of adult postpaid users, and 81% of all teens (13 to 17 years of age), were on a family plan in 2005. *Yankee Group Reveals Family and Prepaid Plans Continue to Drive Growth in the United States*, News Release, Yankee Group, June 12, 2006.

²⁰⁷ See *Tenth Report*, at 15946.

²⁰⁸ Timothy Horan, *et al.*, *Alltel Launches New Mobile-to-Anyone Service*, Daily Datatimes, CIBC, Apr. 24, 2006, at 2; Timothy Horan, *et al.*, *SunCom Launches New Mobile-to-Anyone Service*, Daily Datatimes, CIBC, Mar. 2, 2006, at 3.

²⁰⁹ Ken Belson, *Alltel to Offer Free-Calling Plan, With Limits*, NYTIMES.COM, Apr. 21, 2006, at 1.

²¹⁰ Timothy Horan, *et al.*, *SunCom Launches New Mobile-to-Anyone Service*, Daily Datatimes, CIBC, Mar. 2, 2006, at 3.

²¹¹ Ken Belson, *Alltel to Offer Free-Calling Plan, With Limits*, NYTIMES.COM, Apr. 21, 2006, at 1.

²¹² *Id.*

²¹³ *Id.*

²¹⁴ COMMUNICATIONS DAILY, Mar. 9, 2006, at 12.

²¹⁵ Timothy Horan *et al.*, *Alltel Launches New Mobile-to-Anyone Service*, Daily Datatimes, CIBC, Apr. 24, 2006, at 2.

²¹⁶ See *Tenth Report*, at 15946. The Commission has initiated two separate proceedings on this matter. See “Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by CTIA Regarding Whether Early Termination Fees are ‘Rates Charged’ Within 47 U.S.C. Section 332(c)(3)(A),” *Public Notice*, 20 FCC Rcd 9100 (2005); “Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by SunCom, and Opposition and Cross-Petition for Declaratory Ruling Filed by Debra (continued....)”

will pro-rate ETFs for customers nationwide beginning in fall 2006.²¹⁷ The company will include new terms in customer contracts that will progressively reduce the amount a customer has to pay if they cancel their service with Verizon Wireless before the term of their contract expires. The pro-rated fees will apply to contracts signed or renewed after the new policy takes effect, and the amount owed will vary depending on the time remaining in the contract.²¹⁸ Verizon Wireless is the first major U.S. carrier to commit to a national policy to pro-rate ETFs. It has been suggested that Verizon Wireless's plan to pro-rate ETFs may put competitive pressure on other carriers to follow suit.²¹⁹ Thus, like AT&T's introduction of its digital-one-rate plan in 1998, Verizon Wireless's plan to pro-rate ETFs may be interpreted as a sign of competitive rivalry.

2. Prepaid Service

93. In the United States, most mobile telephone subscribers pay their phone bills after they have incurred charges, an approach 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 ARPU's and higher churn rates in comparison to postpaid service.²²⁰ For these reasons, the industry generally has not heavily promoted prepaid offerings in the past.²²¹ However, the pool of unsubscribed customers qualified for postpaid plans²²² has declined to the point where prepaid offerings, which do not require credit checks, seem more attractive to carriers.²²³ In response,

(Continued from previous page) —————

Edwards, Seeking Determination of Whether State Law Claims Regarding Early Termination Fees are Subject to Preemption Under 47 U.S.C. Section 332(c)(3)(A)," *Public Notice*, 20 FCC Rcd 9103 (2005).

²¹⁷ *From Yankee Group Summit, Verizon Wireless CEO: Verizon Wireless to Pro-Rate Early Termination Fees; Will Add Customer Loyalty Benefits*, News Release, Verizon Wireless, June 28, 2006.

²¹⁸ *Id.*

²¹⁹ *Citing Negative Impact on Industry, Verizon Wireless to Pro-Rate ETFs*, TRDAILY, June 29, 2006.

²²⁰ Simon Flannery *et al.*, *Prepaid Takes Share in Quarterly Wireless Survey*, Morgan Stanley, Equity Research, Jan. 17, 2006, at 1. But prepaid subscribers have lower levels of bad debt, are cheaper to acquire, and pay more on a per-minute basis than postpaid subscribers. Simon Flannery *et al.*, *Prepaid Wireless: Revisiting a Diamond in the Rough*, Morgan Stanley, Equity Research, Apr. 6, 2005, at 5 ("*Diamond in the Rough*"). "Prepaid offerings will almost certainly have a detrimental effect on key wireless metrics such as ARPU, churn and MOUs. Ultimately, however, if prepaid service can add to profitability and free cash flow and generate a respectable return on investment, it is worth pursuing." *Id.*, at 6.

²²¹ Li Yuan, *Pay First, Call Later*, WALL STREET JOURNAL, Apr. 25, 2005, at R10 ("*Pay First*"); Yuki Noguchi, *The Push Behind Prepaid*, WASHINGTON POST, June 2, 2005, at D01 ("*The Push Behind Prepaid*").

²²² Only about 58 percent of the US population has prime credit. *Diamond in the Rough*, at 4. See, also, Roger Cheng, *Pre-Paid Customers Gain Traction With Wireless Carriers*, MarketWatch, Feb 22, 2006, at 1, citing Todd Rethemeier, an analyst for Soleil Securities Group ("We're running out of good customers in this industry. Do you know anyone who doesn't have a cellphone?").

²²³ Roger Cheng, *Pre-Paid Customers Gain Traction With Wireless Carriers*, MarketWatch, Feb 22, 2006, at 1 ("There's greater growth in prepaid," said Sprint Chief Financial Officer Paul Saleh. "That's what's happening in the market. It's really on a fast-growth pace." As a result, the big carriers have increasingly accepted higher credit risks and aggressively pursued the market.").

some carriers have introduced new prepaid plans, or entire brands.²²⁴ In some cases, they are tailoring their offerings to suit segments of the market that do not want or cannot get a traditional cellular plan, particularly the youth market.

94. The result of these efforts has been a significant rise in the percentage of wireless users who subscribe to prepaid plans. According to one analyst, prepaid accounted for roughly 11 percent of U.S. subscribers at the end of 2005, versus 9.5 percent at the end of 2004 and 8.1 percent at the end of 2003.²²⁵ According to another analyst's survey, 27 percent of the net subscriber adds in the fourth quarter of 2005 were prepaid customers.²²⁶ Among the nationwide carriers, T-Mobile had 15 percent of its subscribers on prepaid plans, Cingular Wireless and Sprint Nextel each had 6 percent,²²⁷ and Verizon Wireless had 3 percent.²²⁸

3. Mobile Data Pricing

95. As noted in the *Ninth Report*, mobile data services that enable subscribers to browse customized web sites, send text and multimedia messages, download ringtones and games, and access other content on their cellphones are marketed primarily as an add-on to mobile voice service.²²⁹ During the past year carriers continued to use a variety of different options for pricing such handset-based mobile data services. These options include pricing based on kilobytes consumed, a flat rate for each use or download of an application ("pay-as-you-go" or "pay-per-use"), and fixed monthly subscription fees for packages allowing either a set amount of data usage or unlimited data use.²³⁰ The availability of these pricing options varies by type of application as well as by provider, with providers frequently offering customers a choice of pricing options for a particular application. In addition to allowing customers to purchase particular applications on a stand-alone or *a la carte* basis, carriers also offer certain applications bundled with monthly data packages for cellphones. As in the past, mobile data pricing

²²⁴ See Section III.B.2, Resale/MVNO Providers, *supra*. According to one analyst, "each of the major carriers has recently launched or re-launched its prepaid service, which is another move to increase penetration of lower income brackets at the expense of ARPU and margins." Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 2. See, also, Kelly K. Spors, *Paying Before You Talk on a Cellphone*, WALL STREET JOURNAL, July 24, 2005.

²²⁵ David Janazzo *et al.*, *US Wireless Matrix 4Q05*, Merrill Lynch, Equity Research, Mar. 24, 2006, at 16 ("US Wireless Matrix 4Q05").

²²⁶ Simon Flannery *et al.*, *Prepaid Takes Share in Quarterly Wireless Survey*, Morgan Stanley, Equity Research, Jan. 17, 2006, at 1.

²²⁷ Sprint Nextel does not offer prepaid plans under its own name, but markets prepaid offerings through its subsidiary brand, Boost Mobile. This percentage excludes subscribers to its Virgin Mobile joint venture, who are counted as wholesale subscribers. See Section III.B.2, Resale/MVNO Providers, *supra*, for a discussion of Virgin Mobile and Boost Mobile.

²²⁸ *4Q05 Wireless 411*, at 8.

²²⁹ *Ninth Report*, at 20645.

²³⁰ *Id.*, at 20646.

continues to be characterized by considerable complexity due to the diversity of pricing options.²³¹

96. Mobile subscribers who wish to browse web sites that have been customized for handsets generally have two principal pricing options to choose from. First, they can purchase monthly data packages that allow subscribers to browse the customized web sites, view email, and access other services and content on their cellphones for a fixed monthly fee.²³² This includes wireless data plans for mobile broadband networks such as Verizon Wireless's V Cast and Sprint Nextel's Power Vision services.²³³ The specific content of such mobile data packages varies by provider.²³⁴ While these data packages typically allow unlimited data use or unlimited use of selected services such as web browsing and email access, some carriers also offer metered plans that include a fixed amount of megabytes and keep track of the number of kilobytes subscribers use when they download applications and transmit or receive information.²³⁵ If a subscriber exceeds the monthly allotment of megabytes under a metered plan, the carrier charges additional data fees on a per-kilobyte basis. Alternatively, some carriers deduct from a subscriber's airtime for using their data plans.²³⁶ Second, mobile subscribers may also access the same content on a pay-as-you-go basis, without purchasing a monthly data plan, by paying a casual usage rate such as a per-kilobyte fee.²³⁷ However, Telephia estimates that subscribers who access the web via their cellphones are nearly twice as likely to subscribe to monthly data packages as to use a pay-per-use option.²³⁸ According to Telephia, this is because consumers perceive mobile web browsing to be too expensive without using monthly data packages, and want to avoid being surprised by additional charges billed to their monthly cellphone invoices.²³⁹

97. Mobile subscribers who use communications data services such as text messaging services ("SMS") and photo or other multimedia messaging services ("MMS") can choose from

²³¹ *Id.* See also Sandeep Junnarkar, *A Dizzying Array of Options for Using the Web on Cellphones*, NEW YORK TIMES, June 23, 2005 ("Options for Using the Web on Cellphones").

²³² Cingular Wireless, *Media and Services* (visited March 30, 2006) <www.cingular.com>; Nextel, *Services* (visited March 30, 2006) <www.sprint.com>. See also, *Cell Services That Go Beyond the Call*, CONSUMER REPORTS, Jan. 2006, at 22 (noting that Sprint offers unlimited access, email, and instant messages for a fixed monthly fee) ("Cell Services That Go Beyond the Call").

²³³ See Section IV.B.6, Mobile Data Services and Applications, *infra*.

²³⁴ See, e.g., *Options for Using the Web on Cellphones*.

²³⁵ See, e.g., Cingular Wireless, *Media and Services* (visited March 30, 2006) <www.cingular.com>. See also, *Options for Using the Web on Cellphones* (noting that Cingular Wireless, in contrast to other carriers, offers metered wireless data plans that track usage based on the number of megabytes downloaded).

²³⁶ *Cell Services That Go Beyond the Call* (noting that Verizon deducts from a subscriber's airtime for using its data plans).

²³⁷ See, e.g., Cingular Wireless, *Media and Services* (visited March 30, 2006) <www.cingular.com> ("Cingular Media and Services"); Sprint, *Sprint PCS Vision Guide*, at 77 (visited March 30, 2006) <www.sprint.com>.

²³⁸ *Telephia Reports Mobile Data Usage Adoption Hits 50 Percent Mark, With Text Messaging Consumption Leading the Way*, News Release, Telephia, Apr. 5, 2006 ("Telephia Reports Mobile Data Usage Adoption"). Telephia's estimates are based on consumer billing records.

²³⁹ *Id.*

a number of pricing options. Some carriers bundle various packages and combinations of text messages and multimedia messages with monthly mobile data packages.²⁴⁰ In addition, carriers typically offer customers a choice of two *a la carte* pricing options for SMS and MMS: (1) send and receive messages on a pay-as-you-go basis for a flat rate per message sent or received; or (2) purchase a messaging package for a fixed monthly fee that yields a lower unit price per message as compared with the flat pay-as-you-go rate.²⁴¹ Some carriers also offer unlimited text or photo messaging packages for a fixed monthly fee.²⁴² The pay-as-you-go option is significantly more expensive on a per message basis for photo messaging and other types of MMS than it is for simple text messaging.²⁴³ Consequently, Telephia estimates that MMS users are nearly three times as likely to subscribe to monthly MMS packages as to use the pay-per-use option, whereas among SMS users the pay-per-use option and monthly SMS packages are almost equally popular.²⁴⁴

98. Downloadable applications such as ringtones and games are generally priced on a pay-as-you-go basis. Some carriers charge just a one-time fixed fee per game or ringtone to purchase such an application and use it for an unlimited period.²⁴⁵ Other carriers charge customers for the kilobytes or minutes of airtime used while downloading a ringtone or game, in addition to a one-time fixed fee to purchase and use each application.²⁴⁶ Under the latter pricing approach, the subscriber may be able to avoid the additional kilobyte-based charge by purchasing a monthly data plan with unlimited data use or a sufficient allotment of metered data usage.²⁴⁷ Some carriers offer other pricing options for downloadable applications. For example, in addition to a one-time fee for unlimited use of a game, some carriers offer customers the option of paying a lower fee for a monthly subscription to the same game.²⁴⁸

99. The pricing of advanced multimedia services such as streaming video clips, mobile television, and over-the-air music downloading services for cellphones also varies by

²⁴⁰ *Cingular Media and Services*; Nextel, *Services* (visited March 30, 2006) <www.sprint.com>. See also, *Options for Using the Web on Cellphones*.

²⁴¹ *Cingular Media and Services*; T-Mobile, *Services & Accessories* (visited March 30, 2006) <www.t-mobile.com> (“T-Mobile Services & Accessories”); Nextel, *Services* (visited March 30, 2006) <www.sprint.com> (“Nextel Services”).

²⁴² *T-Mobile Services & Accessories*; Nextel *Services*. See also, *Cell Services That Go Beyond the Call* (noting that Sprint and T-Mobile both offer unlimited text messaging for a fixed monthly fee, and that Verizon Wireless offers unlimited messaging to anyone within the Verizon Wireless network for a fixed monthly fee).

²⁴³ *Cingular Media and Services*; *T-Mobile Services & Accessories*; Nextel *Services*. In general, these carriers were charging \$0.25 per message to send a photo message or other type of multimedia message on a pay-as-you-go basis, versus \$0.10 per message for a text message.

²⁴⁴ *Telephia Reports Mobile Data Usage Adoption*.

²⁴⁵ *T-Mobile Services & Accessories*.

²⁴⁶ See, e.g., *Cingular Media and Services*.

²⁴⁷ *Id.*; Sprint, *Sprint PCS Vision Guide*, at 77 (visited March 30, 2006) <www.sprint.com>.

²⁴⁸ See, e.g., Verizon Wireless, *Get It Now* (visited March 30, 2006) <www.verizonwireless.com>.

type of application and by provider.²⁴⁹ Depending on the carrier, type of content, or its source, video content for cellphones may be available bundled with a carrier's monthly mobile data package, on a subscription basis for an additional fixed monthly fee, or on a pay-per-view basis.²⁵⁰ Both Sprint Nextel and Verizon Wireless price their new over-the-air music downloading services on a pay-as-you-go basis for a flat rate per song. In particular, both carriers charge customers a uniform fee to purchase and download a full-length song directly to their mobile handsets.²⁵¹ For the same price, customers get two copies of a song, one for their cellphone and the other for a personal computer. Verizon Wireless also allows customers to purchase and download songs from their personal computer and transfer them to their cellphone at a lower price than that for a direct over-the-air download to a cellphone. Verizon Wireless customers need a subscription to a monthly V Cast data package, as well as a calling plan, to access its music service. Although Sprint Nextel customers technically do not need a monthly data plan to purchase songs from the Sprint Music Store, a subscription to a monthly data plan is necessary to avoid paying additional per-kilobyte data fees for casual usage while downloading each song.

100. Aside from handset-based applications, carriers offer monthly mobile Internet access packages for data users who access the Internet through laptops or Personal Digital Assistants ("PDAs"). The nationwide carriers continue to price mobile Internet access packages in two principal ways: based on a set amount of megabytes per month or unlimited monthly data use.²⁵² This pricing approach extends to mobile Internet access packages for wireless broadband networks, including Verizon Wireless's EV-DO-based BroadbandAccess service, Sprint's EV-DO service, and Cingular's WCDMA/HSDPA-based BroadbandConnect service.²⁵³ As noted in the *Ninth Report*, under the megabyte-based pricing scheme, the monthly rate per package

²⁴⁹ See Section IV.B.6, Mobile Data Services and Applications, *infra*, for a discussion of over-the-air music downloading services for cellphones. For information on video services for cellphones, see *Tenth Report*, at 15960; see, also, *Implementation of Section 19 of the 1992 Cable Act (Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming)*, 2006 Report, ¶¶ 133-134 (2006).

²⁵⁰ See, e.g., *Sprint TV Live Launches on Sprint Multimedia Handsets*, Press Release, Sprint, Sept. 26, 2005 (announcing the availability of a new TV package for cellphones for a monthly subscription fee); *Watch This! Cingular Video™ Now Available*, Press Release, Cingular, Mar. 7, 2006 (indicating that, in addition to video content that is bundled with an unlimited use data package, premium content is available on a monthly subscription basis, while certain other content is available on a pay-per-view basis for a 24-hour period). See also, *Tenth Report*, at 15961.

²⁵¹ *Sprint Launches the First Instant, Over the Air Music Download Service in the U.S.*, Press Release, Sprint, Oct. 31, 2005; *V CAST Music From Verizon Wireless: Call Your Music*, Press Release, Verizon Wireless, Jan. 17, 2006.

²⁵² Cingular Wireless, *Data Connect* (visited April 14, 2006) <www.cingular.com>; Sprint, *Wireless Laptop Access Plans* (visited April 14, 2006) <www.sprint.com>; T-Mobile, *Internet & E-mail Plans* (visited April 14, 2006) <www.t-mobile.com>; Verizon Wireless, *NationalAccess* (visited April 14, 2006) <www.verizonwireless.com>.

²⁵³ Verizon Wireless, *BroadbandAccess* (visited April 14, 2006) <www.verizonwireless.com>; *Sprint Begins Launch of EV-DO Wireless High-Speed Data Service*, Press Release, Sprint, July 7, 2005; *Cingular Launches 3G Network*, Press Release, Cingular, Dec. 6, 2005; Walter S. Mossberg, *Cingular Joins Rivals With Fast, Reliable Wireless Broadband*, WALL STREET JOURNAL, Jan. 19, 2006, p. A9. See, also, Amol Sharma and Dionne Searcey, *Cell Carriers to Web Customers: Use Us, But Not Too Much*, WALL STREET JOURNAL, May 11, 2006, p. B1.

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.²⁵⁴

B. Non-Price Rivalry

101. Service providers in the mobile telecommunications market also compete on many more dimensions other than price, including non-price characteristics such as coverage, call quality, data speeds, and mobile data content. Indicators of non-price rivalry include advertising and marketing, capital expenditures, technology deployment and upgrades, and the provision of mobile data services.

1. Technology Deployment and Upgrades

a. Overview

102. 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.²⁵⁵ 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.

103. Theory and evidence suggest that allowing the use of multiple standards may have several pro-competitive advantages over standardization of wireless network technologies. Since the types of services tend to differ across technologies, use of multiple standards may result in greater product variety and greater differentiation of services offered by carriers using different technologies.²⁵⁶ Diversified and heterogeneous services make it more difficult for carriers to coordinate their behavior so as to restrict competition with regard to pricing. Other potential pro-competitive advantages of multiple standards include greater technological competition and greater price competition between operators using different technologies.²⁵⁷ In particular, competition between carriers using competing incompatible technologies tends to put pressure on carriers to achieve sufficiently high adoption of their technology in order to ensure it survives

²⁵⁴ *Ninth Report*, at 20648.

²⁵⁵ Neil Gandal, David Salant, and Leonard Waverman, *Standards in Wireless Telephone Networks*, TELECOMMUNICATIONS POLICY, Vol. 27, 2003 ("Standards in Wireless Telephone Networks"). 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.

²⁵⁶ *Id.*, at 329-330.

²⁵⁷ *Id.*

the “standards war.”²⁵⁸ The pressure to fill their networks may lead carriers to enact price cuts and handset subsidies.²⁵⁹ Finally, the adoption of a particular standard may enable one carrier, or a subset of carriers, to gain a temporary competitive advantage over rival carriers, which may also tend to undermine the incentive and the ability of carriers to coordinate their conduct in such a way as to restrict competition.

104. 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

105. 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 reuse spectrum to maximize efficiency.²⁶⁰ 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. 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 97 percent of all wireless subscribers using digital service.²⁶¹

106. 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

²⁵⁸ Carl Shapiro and Hal R. Varian, *Information Rules*, Harvard Business School Press, 1999, at 261-296; Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 11 (“3G Economics a Cause for Concern”).

²⁵⁹ *3G Economics a Cause for Concern*, at 10-11.

²⁶⁰ 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.

²⁶¹ *See* Section VI.B.1, Subscriber Growth, *infra*.

(“AMPS”).²⁶² 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. The large U.S. carriers are in the process of phasing out TDMA.²⁶³

107. Beyond the 2G digital technologies, mobile telephone carriers have been deploying next-generation network technologies²⁶⁴ that allow them to offer mobile data services at higher data transfer speeds and, in some cases, to increase voice capacity.²⁶⁵ For TDMA/GSM carriers, the first step in the migration to next-generation network technologies is 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.²⁶⁶ Beyond GPRS, most U.S. TDMA/GSM carriers have begun to deploy Enhanced Data Rates for GSM Evolution (“EDGE”) technology, which offers average data speeds of 100-130 kbps. Wideband CDMA (“WCDMA,” also known as Universal Mobile Telecommunications System, or “UMTS”) is the next migration step for GSM carriers beyond EDGE and allows maximum data transfer speeds of up to 2 Mbps and average user speeds of 220-320 kbps.²⁶⁷ Finally, deployment of WCDMA with HSDPA (High Speed Data Packet Access) technology will allow average download speeds of 400-700 kbps with burst rates of up to several Mbps.²⁶⁸ Although WCDMA/HSDPA is not backwards compatible with GPRS/EDGE, wireless modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE, and enable handoff between the two types of networks, are available for use with laptop computers.²⁶⁹

108. Many CDMA carriers have upgraded their networks to CDMA2000 1xRTT (also referred to as “CDMA2000 1X” or “1xRTT”), a technology that doubles voice capacity and

²⁶² See note 273, *infra*, for a discussion of the cellular analog requirement and its sunset.

²⁶³ See, e.g., Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 8-9 (noting that TDMA is used by Cingular in some markets pending subscriber migration to GSM-based technologies, and also that, as of the end of 2005, more than 86 percent of its subscriber base was GSM-equipped and 95 percent of its minutes were being carried by its GSM network).

²⁶⁴ 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.

²⁶⁵ See Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Carriers, *infra*.

²⁶⁶ 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.

²⁶⁷ *Tenth Report*, at 15951.

²⁶⁸ *Id.*

²⁶⁹ See, e.g., Novatel Wireless, *Products: Merlin U730 Wireless PC Modem Card* (visited May 12, 2006) <www.novatelwireless.com>.

delivers peak data rates of 307 kbps in mobile environments and typical speeds of 40-70 kbps.²⁷⁰ The next step in the CDMA migration beyond 1xRTT is CDMA2000 1xEV-DO (evolution-data only, “EV-DO”), which allows maximum data throughput speeds of 2.4 Mbps.²⁷¹ Whereas WCDMA and HSDPA are incompatible with earlier technologies on the GSM migration path, the more advanced technologies on the CDMA migration path are backwards compatible.²⁷²

c. Technology Choices and Upgrades of Mobile Telephone Carriers

109. Of the four nationwide mobile telephone operators, Cingular and T-Mobile use TDMA/GSM as their 2G digital technology, Verizon Wireless and Sprint Nextel use CDMA, and Sprint Nextel also uses iDEN on the former Nextel network.²⁷³ The four nationwide mobile carriers, together with other U.S. mobile carriers, have continued to deploy next-generation network technologies over the past year.

110. Verizon Wireless has deployed 1xRTT technology throughout “virtually all” of its network.²⁷⁴ In addition, since October 2003, Verizon Wireless has launched EV-DO technology in 181 markets, covering approximately 150 million people.²⁷⁵ With the EV-DO service, subscribers can access the Internet while mobile via a wireless modem card connected to a laptop computer or PDA, or they can download a range of multimedia content and advanced applications on certain mobile handset models.²⁷⁶ Furthermore, when EV-DO subscribers travel to other parts of the country where EV-DO networks have not been deployed, they can seamlessly roam on and access Verizon Wireless’s 1xRTT network because the more advanced technologies on the CDMA migration path are backwards compatible.²⁷⁷ Verizon Wireless reports that its EV-DO delivers average user speeds of 400-700 kbps.²⁷⁸ Verizon Wireless plans additional market launches and an expansion of EV-DO coverage in existing markets in 2006.²⁷⁹

²⁷⁰ See *Seventh Report*, at 12990; *Ninth Report*, at 20650.

²⁷¹ *Id.*

²⁷² *Standards in Wireless Telephone Networks*, at 328.

²⁷³ 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).

²⁷⁴ Verizon Wireless, SEC Form 10-K, filed Mar. 14, 2006, at 9.

²⁷⁵ *Id.*

²⁷⁶ See *Tenth Report*, at 15961.

²⁷⁷ See *Ninth Report*, at 20652.

²⁷⁸ Verizon Wireless, SEC Form 10-K, filed Mar. 14, 2006, at 9.

²⁷⁹ *Id.*

111. Prior to its merger with Nextel in August 2005, the former Sprint had already deployed 1xRTT across its entire CDMA network footprint.²⁸⁰ In addition, Sprint had begun rolling out EV-DO technology in July 2005, initially deploying its EV-DO network to business districts and major airports in 34 U.S. cities.²⁸¹ By the end of 2005, Sprint Nextel had deployed EV-DO in markets where approximately 50 percent of the U.S. population lives or works.²⁸² The company plans to offer EV-DO-based services in additional markets in 2006.²⁸³ As noted in the *Ninth Report*, Sprint altered its technology strategy by deploying EV-DO, rather than waiting for a successor technology to become commercially available, in response to competitive pressure from Verizon Wireless's deployment of EV-DO.²⁸⁴ In addition to offering Sprint-branded wireless services over its CDMA network, Sprint Nextel provides Nextel postpaid and Boost Mobile prepaid wireless services over the former Nextel iDEN network.²⁸⁵ Sprint Nextel operates an iDEN network that serve 297 of the top 300 U.S. markets where approximately 270 million people live or work.²⁸⁶ In order to offer customers the benefits of all of its services, Sprint Nextel expects to introduce a dual-mode handset designed to operate on both the CDMA and iDEN network platforms.²⁸⁷

112. Apart from the two nationwide CDMA carriers, some of the regional CDMA carriers have also begun to deploy EV-DO, including Alltel, Midwest Wireless, and Alaska Communications Systems. As noted in the *Tenth Report*, Alltel initially launched EV-DO in Akron and Cleveland, OH.²⁸⁸ During 2005, Alltel expanded its EV-DO deployments to include 12 markets, covering 20 percent of its POPs.²⁸⁹ Alltel plans to continue to expand EV-DO into approximately 60 percent of its markets by the end of 2006.²⁹⁰ In addition, Alltel's deployment of 1xRTT technology covers 92 percent of its POPs, up from 50 percent in 2004.²⁹¹ It plans to continue expanding its deployment of 1xRTT technology to cover 94 percent of its POPs by the end of 2006.²⁹²

113. As noted in the *Tenth Report*, when Cingular acquired AT&T Wireless in October 2004, the latter had already deployed UMTS (or WCDMA) in six U.S. cities: Seattle, San

²⁸⁰ *Ninth Report*, at 20652.

²⁸¹ *Tenth Report*, at 15952.

²⁸² Sprint Nextel, SEC Form 10-K, filed March 31, 2006, at 8.

²⁸³ *Sprint Begins Launch of EV-DO Wireless High-Speed Data Service*, Press Release, Sprint, July 7, 2005.

²⁸⁴ See *Ninth Report*, at 20653.

²⁸⁵ Sprint Nextel, SEC Form 10-K, filed March 31, 2006, at 7.

²⁸⁶ *Id.*

²⁸⁷ *Id.*, at 5.

²⁸⁸ *Tenth Report*, at 15952.

²⁸⁹ Alltel, SEC Form 10-K, filed March 10, 2006, at 10.

²⁹⁰ *Id.*

²⁹¹ *Id.*

²⁹² *Id.*

Francisco, Phoenix, Detroit, San Diego, and Dallas.²⁹³ In December 2005, Cingular commercially launched WCDMA with HSDPA in sixteen cities across the United States: Austin, Baltimore, Boston, Chicago, Dallas, Houston, Las Vegas, Phoenix, Portland, Salt Lake City, San Diego, San Francisco, San Jose, Seattle, Tacoma and Washington, DC.²⁹⁴ This included the replacement of the six WCDMA systems which had been previously deployed by AT&T Wireless.²⁹⁵ As noted in the *Tenth Report*, it has been reported that Cingular decided to upgrade WCDMA with HSDPA in an effort to compete with Verizon Wireless's EV-DO network, which offers speeds similar to or slightly below HSDPA and faster than WCDMA.²⁹⁶ As with the EV-DO service offered by Verizon Wireless and Sprint Nextel, subscribers on Cingular's WCDMA/HSDPA network can access the Internet while mobile via a wireless modem card connected to a laptop computer or PDA, or they can download a range of multimedia content and advanced applications on certain mobile handset models.²⁹⁷ In markets where WCDMA/HSDPA is not available, laptop modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE will seamlessly fall back to Cingular's EDGE and GPRS networks, albeit at lower speeds.²⁹⁸ Cingular plans to continue deploying WCDMA with HSDPA throughout the majority of the largest U.S. metropolitan markets in 2006.²⁹⁹ In addition to launching WCDMA with HSDPA and replacing the WCDMA systems deployed by AT&T Wireless, during 2005 Cingular continued the process of integrating the former AT&T Wireless GSM/GPRS/EDGE network with its own existing GSM/GPRS/EDGE network footprint in areas where they had overlapping coverage, a task Cingular expects to have substantially completed by the end of 2006.³⁰⁰

114. T-Mobile has a nationwide EDGE network but has not yet announced a schedule for deploying a next-generation network beyond EDGE.³⁰¹ Analysts expect T-Mobile to launch a wireless broadband network in late 2007 or in 2008, provided T-Mobile is a successful bidder in the auction of AWS spectrum.³⁰²

²⁹³ *Tenth Report*, at 15953.

²⁹⁴ Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 9.

²⁹⁵ *Id.*

²⁹⁶ *Tenth Report*, at 15953. *See, also*, Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 14 (stating Cingular's belief that it is well positioned to offer competitive 3G services and that its WCDMA/HSDPA technology is superior to EV-DO in terms of peak speed and applicability to voice as well as data).

²⁹⁷ *See* Section IV.B.6, Mobile Data Services and Applications, *infra*.

²⁹⁸ Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 6. As noted in the *Tenth Report*, prior to its merger with AT&T Wireless Cingular had deployed GSM/GPRS technology across its entire network footprint and had upgraded its data network to EDGE with respect to two-thirds of its covered network POPs. *See Tenth Report*, at 15953, note 274. As of the end of 2005, more than 86% of Cingular's subscriber base was equipped with GSM/GPRS devices. Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 9.

²⁹⁹ *Id.*, at 6.

³⁰⁰ *Id.*, at 9-10.

³⁰¹ Mark Shuper *et al.*, *The North American 3G Wireless Report*, Morgan Stanley, Equity Research, Feb. 28, 2006, at 4 ("North American 3G"); Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 14.

³⁰² *North American 3G*, at 4.

d. Coverage by Technology Type

115. Virtually the entire population of United States 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.³⁰³ These counties make up almost the entire 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.³⁰⁴ We have also prepared maps showing the extent of next generation network technology deployment.³⁰⁵

116. CDMA has been launched in at least some portion of counties containing 284 million people, or roughly 99 percent of the U.S. population, while TDMA/GSM has been launched in at least some portion of counties containing 280 million people, or 98 percent of the U.S. population.³⁰⁶ To date, iDEN-based service is available at least some portion of counties containing over 268 million people, or approximately 94 percent of the U.S. population.³⁰⁷

117. CDMA 1xRTT and/or 1xEV-DO has been launched in at least some portion of counties containing 283 million people, or roughly 99 percent of the U.S. population, while GPRS, EDGE, and/or WCDMA/HSDPA has been launched in at least some portion of counties containing 269 million people, or about 94 percent of the U.S. population.³⁰⁸ The higher speed technologies, EV-DO and WCDMA/HSDPA, are available in counties containing 63 percent and 20 percent of the U.S. population, respectively.

e. Data-Only Networks and Technology Deployment

118. 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 IP-based broadband, as well as narrowband, data-only commercial mobile services.

119. Clearwire has launched wireless broadband service in 29 U.S. cities using Orthogonal Frequency Division Multiplexing (OFDM) and Time Division Duplex (TDD) technology, and spectrum in the 2.5 GHz BRS/EBS band.³⁰⁹ Because it allows signals to pass through buildings and trees, OFDM technology enables carriers to offer wireless broadband

³⁰³ 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.

³⁰⁴ See Appendix B, Maps 5-8, *infra*.

³⁰⁵ See Appendix B, Map 9, *infra*.

³⁰⁶ See Appendix A, Table 7, *infra*.

³⁰⁷ *Id.*

³⁰⁸ See Appendix B, Map 9, *infra*.

³⁰⁹ See Section III.B.3, Data-Only Providers, *supra*; Clearwire Corporation, SEC Form S-1, filed May 11, 2006, at 53.

services without a direct line-of-sight between the transmitter and the receiver.³¹⁰ Using OFDM technology, Clearwire has eliminated the need for customers to attach an antenna to their rooftop and instead allows them to access the Internet with “plug-and-play” modem devices connected to a personal or laptop computer. Customers can transport these devices to other locations where a network signal is available, and downstream speeds range from 768 kbps to 1.5 Mbps.³¹¹ Clearwire’s equipment is developed and manufactured by its equipment subsidiary, NextNet Wireless, and Clearwire has announced that it will deploy wireless broadband equipment based on the IEEE 802.16e WiMax standard, which also employs OFDM technology, once the standard has been finalized and equipment becomes commercially available.³¹²

120. Sprint Nextel holds a significant amount of spectrum in the 2.5 GHz BRS/EBS band and, over the past year, has been testing different wireless broadband technologies, including WiMax, that could eventually be deployed in this spectrum.³¹³ In February 2006, the company launched its FanView service which uses BRS/EBS spectrum to enable NASCARTM spectators to watch live race and audio at the races via customized mobile devices that can be rented at NASCARTM events.³¹⁴

121. As previously mentioned, BellSouth currently offers a non-line-of-sight, portable wireless broadband service using OFDM technology in five southern cities.³¹⁵ The service allows wireless high-speed Internet access via a plug-and-play wireless modem device manufactured by Navini Networks.³¹⁶ Downstream speeds range from 384 kbps to 1.5 Mbps.³¹⁷

122. Among the providers of narrowband mobile data services to enterprise customers, several carriers use paging spectrum to operate networks that offer traditional one-way paging services. 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.³¹⁸

³¹⁰ See *Tenth Report*, at 15954; Clearwire Corporation, SEC Form S-1, filed May 11, 2006, at 53.

³¹¹ See *Tenth Report*, at 15954; Clearwire, *Service Plans* (visited June 5, 2006) <http://www.clearwire.com/store/service_plans.php>.

³¹² See *Tenth Report*, at 15954; Clearwire Corporation, SEC Form S-1, filed May 11, 2006, at 82.

³¹³ Kelly Hill, *Sprint Nextel Delves Deeper into 4G with New Devices, ‘Global Reach,’* RCR Wireless News, May 25, 2006; *Sprint and Samsung to Explore Wireless Broadband*, News Release, Sprint Nextel, Sept. 16, 2005; *Sprint and Motorola in Wireless Broadband Development Pact*, News Release, Sprint Nextel, June 30, 2005; *Sprint and Intel to Explore Wireless Broadband Technologies*, News Release, Sprint Nextel, May 5, 2005.

³¹⁴ *NASCAR Nextel FanView Gives Fans a New Perspective*, News Release, Sprint Nextel and NASCAR, Feb. 9, 2005.

³¹⁵ See Section III.B.3, Data-Only Providers, *supra*.

³¹⁶ *BellSouth to Launch Wireless Broadband in August*, News Release, BellSouth and Navini Networks, June 7, 2005.

³¹⁷ BellSouth, *Wireless Broadband Service - Products* (visited June 5, 2006) <http://www.wirelessbb.bellsouth.net/sales/asp/wbb_Products.asp>.

³¹⁸ See *Tenth Report*, at 15955.

USA Mobility's narrowband PCS network uses ReFLEX technology developed by Motorola and covers 90 percent of the U.S. population.³¹⁹

123. In addition, Sprint Nextel's subsidiary, Velocita Wireless, and Motient operate two-way data network that use the 900 MHz SMR and 800 MHz SMR spectrum bands, respectively. Velocita Wireless's network, known as Mobitex, uses packet-switched radio technology to provide always-on, two-way messaging and data delivery, and covers 93 percent of the urban business population in the U.S.³²⁰ The DataTAC network includes more than 2,200 base stations and provides coverage in 400 U.S. cities covering 90 percent of the U.S. business population. In February 2006, Motient announced that it was modifying the DataTAC network to focus on on-street coverage and that in-building signal strength would diminish.³²¹ Space Data is using narrowband PCS spectrum in the 900 MHz band and balloon-borne platforms, called SkySitesTM, to offer wireless telemetry services to oil and gas companies in Texas, Louisiana, Oklahoma, New Mexico, and the Gulf of Mexico.³²²

2. Capital Expenditures

124. 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.³²³ 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).³²⁴ One analyst estimated that the wireless industry spent roughly \$25 billion on capex in 2005, an increase of 18 percent from the \$22 billion spent in 2004, which in turn was on top of a 12 percent increase from 2003.³²⁵ One

³¹⁹ *Id.*; USA Mobility, *Wireless Messaging Network Advantages – Messaging Reliability* (visited June 22, 2006) <http://www.usamobility.com/bus_solutions/wireless_messaging/network_advantages/default.htm>.

³²⁰ Mobitex Technology, *Velocita Wireless* (visited June 22, 2006) <http://www.mobitex.com/operators/reference_operators/4-2-18_cingular.asp>. In October 2004, Cingular Wireless spun off its Cingular Interactive unit, which included the Mobitex network, and the unit was acquired by an affiliate of Cerberus Capital Management, L.P., which changed its name to Velocita Wireless. In February 2006, Sprint Nextel completed its acquisition of Velocita Wireless. *Acquisition of Cingular Interactive Completed, Company Changes Name to Velocita Wireless*, News Release, Velocita Wireless, Oct. 26, 2004; *Sprint Nextel Completes Acquisition of Velocita Wireless*, News Release, Velocita Wireless, Feb. 28, 2006.

³²¹ *Motient Communications to Initiate Changes to DataTAC Network Coverage*, News Release, Motient, Feb. 10, 2006; *Tenth Report*, at 15955.

³²² *Id.*, at 15955-15956; Space Data Corp., *Coverage Area* (visited June 6, 2006) <<http://www.spacedata.net/coverage.htm>>.

³²³ 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.

³²⁴ *Eighth Report*, at 14818.

³²⁵ Phil Cusick, Richard Choe, and Colin V. Morawski, *U.S. Wireless Services: Preview of First-Quarter 2006 Results*, Bear Stearns, Equity Research, Apr. 2006, at 70; *Tenth Report*, at 15956. It does not appear that this increase is due to Hurricane Katrina. For example, one measure of the hurricane's impact on expenditures, capex as a percentage of service revenues, is not appreciably different for carriers in the last half of 2005 than it was in previous periods. Phil Cusick, Richard Choe, and Colin V. Morawski, *U.S. Wireless Services: Preview of First-Quarter 2006 Results*, Bear Stearns, Equity Research, Apr. 2006, at 70. However, the hurricane did impose some (continued....)

analyst has 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.³²⁶

3. Roaming

125. 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 may incur 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.³²⁷ Roaming revenues account for a higher percentage of total service revenues for many rural and smaller regional carriers than for nationwide carriers.³²⁸ In the *Tenth Report*, we noted that the roaming revenues of these carriers were under pressure as roaming rates have declined and nationwide carriers continued to expand into smaller communities.³²⁹ In 2005, there was a reversal of this trend, as most of the regional and smaller carriers grew roaming revenues on a year-over-year basis for four consecutive quarters, with rural carriers showing particular improvement.³³⁰

126. Nevertheless, CTIA reported that roaming revenues for the entire mobile telephone industry decreased over the past year, from \$4.2 billion in 2004 to \$3.8 billion in 2005, roughly the level of 2003.³³¹ The contribution of roaming revenues to total service revenues continued its decline, from 4.1 percent in 2004 to 3.3 percent in 2005, down from over 10 percent six years ago.³³² One analyst explains that these trends are not surprising “given the fall in roaming rates as well as the consolidation activity in the wireless industry. Also, a smaller portion of revenues are classified as roaming, as compared to historical years, given the proliferation of much larger ‘home’ footprints and national pricing plans.”³³³

(Continued from previous page) —————

additional costs on many carriers. Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Jan. 3, 2006, at 12 (“3Q05 Wireless 411”), at 53 (“Hurricane-related charges adversely impacted cash costs in the third quarter of 2005 for many carriers. Cingular reported \$96 million of charges due to significant damage in Louisiana, Mississippi, Alabama, and Texas markets. Verizon Wireless incurred hurricane-related costs of \$44 million and Sprint Nextel recorded hurricane-related charges of \$65 million for its wireless business.”).

³²⁶ *Ninth Report*, at 20656. *See, also*, *4Q05 Wireless 411*, at 14 (“We believe the trend of fewer cell site additions will continue given that the majority of capital expenditures will relate to capacity increases and 3G deployment (which will generally involve adding capacity and equipment upgrade to existing cell sites), as well as quality enhancements such as better in-building coverage.”)

³²⁷ 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.

³²⁸ *See 4Q05 Wireless 411*, at 47 (Table 22: Roaming Revenues as a Percentage of Total Service Revenues).

³²⁹ *Tenth Report*, at 15956.

³³⁰ *4Q05 Wireless 411*, at 41. *See, also*, *4Q05 Wireless 411*, at 46, for year-over-year growth in roaming revenues.

³³¹ *See* Appendix A, Table 1, *infra*.

³³² *Id.*

³³³ *4Q05 Wireless 411*, at 13.

127. In May 2006, Sprint Nextel and Alltel announced a 10-year roaming deal that covers cellphone calls as well as new wireless data services.³³⁴ It has been argued that the roaming arrangement “could give Sprint an edge over competitor Verizon Wireless ... in the race to extend wireless broadband access to more American consumers” by enabling Sprint’s customers to get access to Alltel’s data services in areas where Sprint does not make those services available.³³⁵ From Sprint Nextel’s standpoint, therefore, the roaming deal with Alltel may provide a means to overcome any first-to-market advantage Verizon Wireless gained by being the first nationwide CDMA carrier to launch a commercial EV-DO network. At the same time, since Alltel has a roaming deal with Verizon Wireless that covers voice service, one analyst also argues that the new roaming deal with Sprint Nextel gives Alltel “another option for a national roaming partner if Verizon Wireless tries to pressure it for higher rates when their roaming agreement is up in 2011.”³³⁶

4. Advertising and Marketing

128. 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,”³³⁷ and in general, advertising for an experience good tends to be persuasive rather than informational in nature.

129. In 2005, telecommunications ad spending for the top seven cellphone carriers dropped to \$4 billion from \$4.7 billion in 2004, or 14.6 percent.³³⁸ Much of the falloff was due to the merger of Sprint and Nextel.³³⁹ The four nationwide operators spent a total of \$3.5 billion on advertising in 2005,³⁴⁰ with three being (through their parent corporations) among the top ten advertisers in the United States.³⁴¹ Another analysis found that Cingular Wireless and Verizon Wireless were two of the top three brands (in terms of dollars spent on advertising) in the United States, ahead of American Express, Macy’s, Wendy’s, and The Home Depot.³⁴²

³³⁴ Amol Sharma, *Sprint and Alltel Announce 10-Year Roaming-Service Deal*, WALL STREET JOURNAL, May 9, 2006, at B4.

³³⁵ *Id.*

³³⁶ Philip Cusick, *AT/S Roaming Deal Could be Big Positive for Alltel, Small Positive for Sprint*, Bear Stearns, Equity Research, May 9, 2006.

³³⁷ 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.

³³⁸ Alice Z. Cuneo, *AT&T Deal Signals Spending Falloff*, ADVERTISING AGE, Mar. 13, 2006, at 8 (citing Advertising Age and TNS Media Intelligence).

³³⁹ *Id.*

³⁴⁰ Ken Belson, *Best Cellphone Company? All of Them, to Hear Them Say It*, NEW YORK TIMES, May 3, 2006, at C3.

³⁴¹ This includes AT&T Inc., Sprint Nextel Corp., and Verizon Communications, with their wireless divisions accounting for a significant part of those advertising dollars. *TNS Media Intelligence Reports U.S. Advertising Expenditures Increased 3.0 Percent in 2005*, TNS MEDIA INTELLIGENCE, News Release, Feb. 27, 2006; Sue Marek, *Wireless Ad Dollars on the Rise*, EXECUTIVE PROFILE WIRE, Jan. 1, 2006.

³⁴² Todd Wasserman, *Nielsen: 2005 advertising spending jumped 7.4%*, BRANDWEEK, Feb. 27, 2006, at 12.

5. Quality of Service

130. Analysts stress that competition to attract and retain customers puts pressure on carriers to improve service quality. According to the senior director of wireless services at J.D. Power and Associates, “It’s clear that wireless providers have made great strides in improving the quality of calls, especially in those areas that impact customer churn the most, such as calls that are dropped or disconnected. With an increasingly competitive environment and an increase in the number of services used in conjunction with a cell phone, carriers that offer superior network quality will improve their likelihood of attracting new customers and will increase customer retention. In fact, improving network quality is a beneficial financial incentive for wireless carriers, as customers experiencing at least one call quality problem are three times more likely to indicate they ‘definitely will’ switch carriers in the future.”³⁴³ Similarly, an analyst with research firm In-Stat states that “People who are happy with their customer care are less likely to churn.”³⁴⁴

131. Carriers continue to rely on a diversified portfolio of strategies for improving their customers’ wireless service experience. Network investment remains a key element of this portfolio. 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 coverage, capacity, and capabilities of their networks, while Section IV.B.2 provides an estimate of total spending by wireless carriers on network expansion and improvements. 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, fewer dropped calls and deadzones, additional calling features, more rapid data transmission, and advanced data applications. As noted in the *Ninth Report*, one of the principal ways carriers have improved network coverage and quality is by increasing the number of cell sites.³⁴⁵ The *Tenth Report* added that carriers have been deploying micro-cell sites, or antennas that provide coverage in highly localized areas, to improve coverage in locations such as tunnels, airports, and certain neighborhoods, while some carriers have also used devices that amplify cellular signals, called repeaters, to improve indoor coverage in office buildings, shopping malls, and convention centers.³⁴⁶

132. In addition to investing in their networks, carriers can increase capacity and improve service quality by acquiring additional spectrum. As detailed in Sections III.D and III.E.1 above, carriers have added to their spectrum holdings through the Commission’s spectrum auctions, the purchase of licenses in the secondary market, and mergers and acquisitions. However, the *Tenth Report* cautioned that improvements in service quality tend to follow mergers with a lag due to the time it takes to complete the process of network

³⁴³ J.D. Power and Associates Reports: *The Number of Call Quality Problems Experienced With a Wireless Service has Declined for a Second Consecutive Year*, Press Release, J.D. Power and Associates, Mar. 16, 2006.

³⁴⁴ Antone Gonsalves, *Wireless Carriers Cutting Churn Rates*, TECHWEB NEWS, Nov. 30, 2005.

³⁴⁵ *Ninth Report*, at 20657-20658.

³⁴⁶ *Tenth Report*, 15958.

integration.³⁴⁷ For example, the acquisition of AT&T Wireless in October 2004 provided Cingular with both an additional network of cell sites and significantly more spectrum.³⁴⁸ As of the end of 2005 Cingular was still in the process of fully integrating the two networks of former Cingular and AT&T Wireless in areas where they had overlapping coverage. In particular, Cingular has reported that nearly a third of the cell sites in these overlap areas were integrated by the end of 2005, and it expects to substantially finalize network integration by the end of 2006.³⁴⁹ When completed, Cingular expects this network integration to improve the customer experience by producing a “combined network [that] will have higher average signal strength and greater network depth, thus improving network quality by reducing dropped and blocked calls, and enhancing the transmission quality.”³⁵⁰

133. In addition to investing in network infrastructure and acquiring spectrum, carriers continue to pursue marketing strategies designed to differentiate their brand from rival offerings based on dimensions of service quality such as superior network coverage, reliability, and voice quality. Verizon Wireless pioneered this brand differentiation strategy first with its “Can You Hear Me Now?” advertising campaign, and then with its “America’s most reliable wireless network” slogan.³⁵¹ As noted in the *Tenth Report*, a 2005 survey of wireless subscribers found that 40 percent of Verizon Wireless customers indicated that network quality was their main reason for choosing Verizon Wireless.³⁵² Beginning in 2006, Cingular launched an advertising campaign emphasizing it has the fewest dropped calls of any wireless carrier.³⁵³ According to one journalist specializing in consumer issues, “the advertising blitz by Cingular is further evidence that wireless carriers are shifting their marketing focus away from pricing toward network reliability, figuring that consumers are more concerned about calls going through than how much they cost.”³⁵⁴ As indicated in the *Eighth Report*, brand differentiation works in tandem with quality-enhancing network investment to create a competitive advantage in attracting and retaining subscribers.³⁵⁵

134. An alternative strategy adopted by T-Mobile to differentiate its service is to provide customers with more accurate information and assurances about service quality. As noted in the *Tenth Report*, T-Mobile has added an interactive “Personal Coverage Check” feature to its web site that enables customers to check the quality of network coverage where they live

³⁴⁷ *Id.*

³⁴⁸ Cingular Wireless, SEC Form 10-K, filed Feb. 24, 2006, at 9.

³⁴⁹ *Id.*, at 10.

³⁵⁰ *Id.* Cingular also maintains that network integration will reduce costs by eliminating approximately 7,600 cell sites.

³⁵¹ Bruce Mohl, *The Fewest Dropped Calls*, BOSTON GLOBE, Apr. 23, 2006.

³⁵² *Tenth Report*, at 15958, citing Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 25.

³⁵³ Bruce Mohl, *The Fewest Dropped Calls*, BOSTON GLOBE, Apr. 23, 2006.

³⁵⁴ *Id.*

³⁵⁵ See *Eighth Report*, at 14824-14825.

and work before they purchase service.³⁵⁶ T-Mobile's computerized mapping tool allows users to search on any street address or intersection in the United States and get a rating of the signal strength at that location and in the surrounding area. For each search, T-Mobile provides a color-coded map with eleven shades of coverage ranging from "none" to "great." According to T-Mobile, the top rating means that calls are rarely dropped.³⁵⁷ T-Mobile has also made its new interactive maps available on computers in its stores, with signs urging customers to "put our coverage to the test before you sign up."³⁵⁸ In contrast, although all carriers provide national or regional coverage maps to customers that show the cities where they provide some level of service, these coverage maps generally provide only a broad overview of a carrier's coverage.³⁵⁹ By discouraging potential customers who live or work in areas with poor reception from signing up, this innovation may result in a more positive wireless service experience for T-Mobile customers and thereby reduce churn and customer complaints.³⁶⁰

135. Consumer satisfaction surveys afford one means of gauging the effects of carrier strategies for improving service quality on customer perceptions of service quality. Survey results and related evidence of customer satisfaction with cellphone service quality are summarized below in the section on mobile telecommunications market performance.³⁶¹

6. Mobile Data Services and Applications

136. As documented in the *Ninth Report* and previous reports, the major mobile telephone carriers and other mobile data providers have progressively introduced a wide variety of mobile data services and applications.³⁶² Currently, the largest segment of the mobile data market consists of 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, entertainment applications such as ringtones and games, and other content, such as customized web sites. A second market segment consists of monthly mobile Internet access 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"). In the case of both handset-based services and Internet access service for laptops, it is also important to distinguish between mobile data services provided over wireless broadband networks using technologies such as EV-DO and WCDMA/HSDPA, and those provided over slower wireless networks using earlier technologies. As noted in the *Tenth Report*, wireless broadband network technologies enable laptop users to download files, play streaming video and audio, and receive emails at speeds that are comparable

³⁵⁶ See *Tenth Report*, at 15959, citing David Kesmodel, *T-Mobile Offers More Details On Coverage to Ease Concerns*, WALL STREET JOURNAL, Apr. 27, 2005.

³⁵⁷ *Id.* More specifically, the top rating means that customers have a 95 percent chance of making a call without it being dropped.

³⁵⁸ *Id.*

³⁵⁹ *Id.*

³⁶⁰ *Id.*

³⁶¹ See Section VI.C, Quality of Service, *infra*.

³⁶² See *Eighth Report*, at 14843-14856; *Ninth Report*, at 20659-20661.

to what many users get from fixed broadband connections such as DSL, and the capabilities of handsets that can access wireless broadband networks make viewing streaming video and downloading various other applications on cellphones feel more like a broadband experience on a personal computer.³⁶³ In particular, the faster speeds offered by wireless broadband network technologies greatly enhance the viewing quality of video streamed onto cellphones by increasing the rate at which frames are shown.³⁶⁴

137. In the past year carriers have continued to expand and enhance their mobile data offerings. A notable example is the introduction of an over-the-air music downloading service for mobile phones. Mobile telephone carriers had earlier begun selling cellphones that are able to play songs copied from personal computers or streamed from an online radio service, and they have been selling short clips of songs that can be downloaded onto mobile phones for use as ringtones since at least 2002.³⁶⁵ With the launch of Sprint Music Store™ in October 2005, Sprint became the first U.S. carrier to offer a service that allows customers to purchase and download full-length songs over a wireless telephone network directly onto their cellphones.³⁶⁶ Verizon Wireless launched a rival over-the-air music downloading service for cellphones called V CAST Music in January 2006.³⁶⁷ Although Sprint Music Store™ and Verizon Wireless's V CAST Music differ in a number of respects, they share certain features and capabilities – for example, both services run on the carriers' respective wireless broadband networks based on EV-DO technology, both allow customers to transfer music from their computers to their cellphones and to download copies of the same song to both their cellphone and their personal computer for a single price, and both carriers market their music service as a competitor to online music downloading services such as Apple's iTunes Music Store. Cingular has said it will offer an over-the-air music downloading service later in 2006.³⁶⁸ In the fall of 2005, Cingular began selling a cellphone called the ROKR that plays songs downloaded from Apple's iTunes Music Store, and also began offering a new radio service for mobile phones with MobiTV.³⁶⁹

138. Mobile data competition intensified in the past year with two of the nationwide carriers launching wireless broadband services to compete with Verizon Wireless's EV-DO offerings, including a service based on a rival technology. As noted in the *Tenth Report*, Verizon

³⁶³ *Tenth Report*, at 15961.

³⁶⁴ *Id.*

³⁶⁵ Walter S. Mossberg, *Sprint Brings Music Direct to Cellphones, But Price is Too High*, WALL STREET JOURNAL, Nov. 17, 2005, p. B1 (“*Sprint Brings Music Direct to Cellphones*”); *Eighth Report*, at 14848-14849.

³⁶⁶ *Sprint Launches the First Instant, Over the Air Music Download Service in the U.S.*, Press Release, Sprint, Oct. 31, 2005; *Sprint Brings Music Direct to Cellphones*; Li Yuan, *Sprint Launches Service That Sells Song Downloads*, WALL STREET JOURNAL, Oct. 31, 2005, p. B6.

³⁶⁷ *Verizon Wireless Introduces V CAST Music*, Press Release, Verizon Wireless, Jan. 5, 2006; Jesse Drucker, *Verizon Wireless Prepares Launch of Music Service*, WALL STREET JOURNAL, Jan. 6, 2006, p. A14; *Verizon Wireless Unveils V Cast Music Service*, COMMUNICATIONS DAILY, Vol. 26, No. 4, Jan. 6, 2006, pp. 1-2.

³⁶⁸ Jesse Drucker, *Verizon Wireless Prepares Launch of Music Service*, WALL STREET JOURNAL, Jan. 6, 2006, p. A14.

³⁶⁹ Walter S. Mossberg, *Music-Playing Cellphones Hit a Flat Note*, WALL STREET JOURNAL, Sept. 14, 2005, p. D1; *Cingular Offers Radio Service*, WALL STREET JOURNAL, Nov. 14, 2005.

Wireless has been offering a wireless Internet access service called BroadbandAccess over its EV-DO network for use on laptops with a special modem card since late 2003.³⁷⁰ In early 2005, Verizon Wireless launched a wireless multimedia service called V CAST that is also provided over the EV-DO network but is available on advanced handsets.³⁷¹ Sprint Nextel launched competing EV-DO wireless data and multimedia offerings in the second half of 2005. The former Sprint began rolling out an EV-DO-based wireless Internet access service for use on laptop computers with a special modem card during July 2005, focusing initially on business corridors with high wireless-data traffic demands such as major airports and central business districts.³⁷² In November 2005, Sprint Nextel launched a package of high-speed entertainment and data services called Power Vision that enables customers to use new multimedia phones to watch TV, download songs, receive information, and access other content at broadband-like speeds.³⁷³ The other nationwide carrier to begin offering commercial wireless broadband service in the past year is Cingular. In contrast to the EV-DO-based services offered by Verizon Wireless and Sprint Nextel, Cingular's mobile broadband offerings are based on WCDMA/HSDPA technology. Cingular launched a high-speed wireless data service for use on laptops with a modem card called BroadbandConnect in December 2005, becoming the first carrier in the world to launch a commercial HSDPA service.³⁷⁴ Cingular followed up in March 2006 with the launch of a streaming video service, called Cingular VideoTM, which uses Cingular's WCDMA/HSDPA network to enable customers to watch video clips of television shows, sports, news, weather, and other content on advanced handsets.³⁷⁵

139. Verizon Wireless has taken the lead in the data market as measured by the contribution of data to overall ARPU. In the fourth quarter of 2005, data accounted for 9.8 percent of Verizon Wireless's ARPU, followed by Sprint Nextel (9.7 percent), Cingular (9.6 percent), and T-Mobile (9.6 percent).³⁷⁶ In past years, the former Sprint was the market leader in pre-broadband wireless data services.³⁷⁷ However, the merger with Nextel brought Sprint into line with the other national carriers because data accounted for a relatively small percentage of Nextel's ARPU prior to the merger.³⁷⁸ Nevertheless, Sprint Nextel continues to sell more data services to its customers than its competitors. In the fourth quarter of 2005, Sprint Nextel

³⁷⁰ *Tenth Report*, at 15960.

³⁷¹ *Id.*

³⁷² *Sprint Begins Launch of EV-DO Wireless High-Speed Data Service*, Press Release, Sprint, July 7, 2005.

³⁷³ *Sprint Premieres High-Speed Entertainment and Information Services Via Sprint Power VisionTM Network*, Press Release, Sprint, Oct. 31, 2005; Mark Shuper *et al.*, *The North American 3G Wireless Report*, Morgan Stanley, Equity Research, Feb. 28, 2006, at 4 ("North American 3G").

³⁷⁴ *Cingular Launches 3G Network*, Press Release, Cingular, Dec. 6, 2005; *North American 3G*, at 4.

³⁷⁵ *Watch This! Cingular VideoTM Now Available*, Press Release, Cingular, Mar. 7, 2006.

³⁷⁶ Simon Flannery *et al.*, *4Q05 Trend Tracker*, Morgan Stanley, Equity Research, Mar. 30, 2006, at 35 ("4Q05 Trend Tracker").

³⁷⁷ *Tenth Report*, at 15961.

³⁷⁸ *Id.*; *4Q05 Trend Tracker*, at 35.

customers spent an average of \$6 per month on mobile data services, followed by T-Mobile customers (\$5.21), Verizon Wireless customers (\$4.85), and Cingular customers (\$4.71).³⁷⁹

140. Another significant development during the past year was the introduction of broadband-speed mobile data offerings by a new class of MVNOs, including AMP'D, ESPN Mobile, and Helio, each of which is targeting a specific demographic with a premium data/video service offering.³⁸⁰ For example, ESPN Mobile offers a sports news and information service that runs on an EV-DO network using capacity leased from Sprint.³⁸¹ The sports service offers subscribers a multimedia package that includes news, scores, statistics, videos, alerts, ESPN columnists, and other content. Although ESPN has offered scores and other sports data through other carriers, this particular package of sports news and information can only be accessed via ESPN phones and the ESPN service, and not through traditional facilities-based wireless carriers, including Sprint.³⁸² Helio, a joint venture of the Internet company EarthLINK and Korean cellphone carrier SK Telecom, launched a service in May 2006 which aims to bring advanced Asian cellphone technology to the United States.³⁸³ Featuring South Korean phones that have not been available in the United States, Helio will target young, affluent customers with games, video clips, and other forms of entertainment, including a feature that allows customers to buy entertainment for their friends and have it sent to their cellphones.³⁸⁴

V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

141. A mobile carrier can exercise market power only to the extent that mobile subscribers do not respond to price increases or adverse changes in other terms of service. 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.

A. Access to Information on Mobile Telecommunications Services

142. Wireless consumers continue to demand more information on the availability and quality of mobile telecommunications services, and numerous third parties have been responding to this demand by compiling and reporting such information. The *Eighth Report* enumerated the

³⁷⁹ *Id.*

³⁸⁰ *North American 3G*, at 5.

³⁸¹ Walter S. Mossberg, *ESPN Cellphone Has Great Sports Content But Many Trade-Offs*, WALL STREET JOURNAL, Feb. 16, 2006.

³⁸² *Id.*

³⁸³ *Id.*; Shawn Young, *New Cellphone Service to Offer Entertainment to Young, Affluent*, WALL STREET JOURNAL, May 2, 2006, p. D6.

³⁸⁴ *Id.*

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.³⁸⁵ These sources continue to update consumers on the wireless service options available to them. For example, the January 2006 issue of *Consumer Reports* magazine published the results of a new customer satisfaction survey on mobile telephone service.³⁸⁶

143. In addition, the wireless industry itself has responded to this demand by launching various initiatives designed to educate consumers and help them make informed choices when purchasing wireless services. One early example of such an initiative, the voluntary “10-Point Consumer Code” sponsored by CTIA, was discussed in the *Ninth Report*.³⁸⁷ As noted above in Section IV.B.5, another example is the interactive “Personal Coverage Check” feature which T-Mobile added to its web site to enable customers to check the quality of network coverage where they live and work before they purchase service.

B. Consumer Ability to Switch Service Providers

1. Churn

144. 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.

145. Most carriers report churn rates between 1.5 percent and 3.0 percent per month.³⁸⁸ Churn rates have shown a slight decline over the past year, continuing a trend we noted in the *Tenth Report*.³⁸⁹ However, this level of churn still creates significant challenges for the industry. For example, one analyst explained the effects of “high industry churn” in the following way: “A carrier with typical monthly churn of 2.5% will lose 30% of its customers each year. Replacing these subscribers just to maintain the subscriber base is a full time job, and this also explains why

³⁸⁵ See *Eighth Report*, at 14826.

³⁸⁶ *Best Cell Service*, CONSUMER REPORTS, Jan. 2006, at 20.

³⁸⁷ *Ninth Report*, at 20662.

³⁸⁸ *US Wireless Matrix 4Q05*, at 14.

³⁸⁹ *Id.*, at 4, 14; *Tenth Report*, at 15963. One analyst attributes this decline to the following factors: “(1) greater industry maturity - many customers have already switched several times and are settling with the carrier most suitable for their needs; (2) industry structure rationalization and larger size - carriers seem reluctant to engage in a price war that would result in repricing a very large base of incumbent subscribers; and (3) less perceived differentiation [of] terms of service and network quality.” Jason Armstrong *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Apr. 22, 2005, at 2. See, also, *3Q05 Wireless 411*, at 4 (“Significantly improved retention efforts (better deals on upgrade handsets, incentives for signing longer contracts, better customer service, and higher network spending) following the implementation of local number portability in November 2003, have led to lower churn rates, in our view. Also, industry consolidation has aided churn rates as there are fewer operators to choose from.”). Another analyst attributes reductions in churn “largely to improvements in customer service over the last year.” Antone Gonsalves, *Wireless Carriers Cutting Churn Rates*, TECHWEB NEWS, Nov. 30, 2005 (citing In-Stat analyst David Chamberlain).

gross adds dwarf net adds in the wireless industry.”³⁹⁰ Another analyst described churn as “the problem of this industry, wiping out 20% of the industry revenue.”³⁹¹

2. Local Number Portability

146. 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.³⁹² Thus, subscribers can port numbers between two CMRS carriers (intramodal porting) or between a CMRS and wireline carrier (intermodal porting). 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, 2003.³⁹³ CMRS carriers outside of the top 100 MSAs were required to be LNP-capable by May 24, 2004.³⁹⁴

147. Wireless number porting activity since the advent of porting has been significant. Overall, approximately 20.4 million wireless subscribers ported their numbers to another wireless carrier from December 2003 through December 2005.³⁹⁵ Monthly rates of intramodal porting activity averaged about 812,000 ports during this period, and ranged from a low of 591,000 ports in February 2004 to a high of 1,153,000 in June 2005.³⁹⁶ Porting data also show a slight increase in intramodal porting during this period, from 8.9 million ports (or a monthly average of nearly 743,000) in 2004 to 10.6 million ports (or a monthly average of nearly 887,000) in 2005.³⁹⁷ The *Tenth Report* noted that monthly levels of intermodal porting from wireline carriers to CMRS carriers had increased significantly over 2004, from an average rate of nearly 76,000 ports per month in the first six months of 2004 to an average rate of approximately 99,000 in the second half of the year.³⁹⁸ In contrast, the past year saw a reversal of this trend, with monthly levels of intermodal porting from wireline carriers to CMRS carriers declining first to an average rate of 59,500 ports in the first six months of 2005, and then again to an average

³⁹⁰ *North American 3G*, at 6.

³⁹¹ Timothy Horan *et al.*, *Despite Recent Concerns, Wireless Pricing Remains Relatively Stable*, CIBC World Markets, Equity Research, Jan. 26, 2006, at 4. As another analyst wrote, “We continue to believe that lower churn will be the primary driver of both improved subscriber and profitability growth.” Timothy Horan *et al.*, *Raising 3Q Wireless Subs Forecast On Continued Strong Demand*, CIBC, Equity Research, Sept. 19, 2005, at 3.

³⁹² 47 C.F.R. § 52.21(l).

³⁹³ 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*”).

³⁹⁴ *Verizon Wireless LNP Order*, 17 FCC Rcd at 14986, ¶ 31.

³⁹⁵ Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of June 30, 2005*, Federal Communications Commission, May 2006, at 34 (“*May 2006 NRUF Report*”). This figure excludes significant porting activity between Cingular and AT&T Wireless following the closing of their merger in October 2004.

³⁹⁶ *Id.*

³⁹⁷ *Id.*

³⁹⁸ *Tenth Report*, at 15964.

rate of approximately 37,000 ports in the second half of the year.³⁹⁹ Intermodal porting from wireless to wireline carriers, however, remained steady at 1,000-2,000 ports per month during 2005, roughly the same level as in 2004 and still significantly lower than wireline-to-wireless porting.⁴⁰⁰

148. We noted in the *Ninth Report* that the advent of porting in late 2003 did not lead to a significant increase in wireless churn, but did appear to have had a positive impact on service quality by inducing carriers to engage in aggressive customer retention efforts.⁴⁰¹ An explanation offered by one analyst report for the aforementioned decline in churn rates suggests that this conclusion remained valid through 2005: “Significantly improved retention efforts (better deals on upgrade handsets, incentives for signing longer contracts, better customer service, and higher network spending) following the implementation of local number portability in November 2003, have led to lower churn rates, in our view.”⁴⁰²

VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

149. 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

150. Equity analysts and other industry observers continue to describe wireless price competition in the United States as intense, so much so that one analyst asserted that “even a carrier with large market share in an area has very little pricing power.”⁴⁰³ More recently, another analyst wrote that “Pricing yields have generally fallen fairly significantly . . . as operators have tried to match each other’s pricing and features.”⁴⁰⁴ However, wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephone service, and consequently it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.⁴⁰⁵ As documented in

³⁹⁹ *May 2006 NRUF Report*, at 34.

⁴⁰⁰ *Id.*

⁴⁰¹ *Ninth Report*, at 20664.

⁴⁰² *3Q05 Wireless 411*, at 4.

⁴⁰³ Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns, Equity Research, June 2005, at 10. *See, also, Drops in Cellular Fees to Slow: Sprint Exec*, BOSTON.COM, Mar. 29, 2006 (referring to the “fiercely competitive market”); and *Analysts, Carriers Disagree on Wireless Pricing*, COMMUNICATIONS DAILY, Mar. 31, 2006, at 8 (referring to the “super-competitive wireless pricing market”).

⁴⁰⁴ *4Q05 Wireless 411*, at 55.

⁴⁰⁵ *See Fourth Report*, at 10164-10165.

previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. One analyst estimated that the average per-minute cost of wireless calling plunged 72 percent in the past five years alone.⁴⁰⁶

151. Two indicators of mobile telephone pricing show that the long-term decline in the cost of mobile telephone services continued through 2005.⁴⁰⁷ One study of mobile telephone pricing shows a slight increase in the cost of mobile telephone services in 2005.

152. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities increased 1.4 percent in 2005.⁴⁰⁸ The average cost of monthly service⁴⁰⁹ – which was calculated across four typical usage plans (200, 500, 800 and 1100 minutes) – increased from \$44.26 in December 2005 to \$44.90 in December 2006.⁴¹⁰

153. 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”).⁴¹¹ Cellular CPI data is published on a national basis only.⁴¹² From 2004 to 2005, the annual Cellular CPI decreased by about 1.8 percent while the

⁴⁰⁶ *Drops in Cellular Fees to Slow: Sprint Exec*, BOSTON.COM, Mar. 29, 2006 (citing Ovum analyst Roger Entner). See, also, *Analysts, Carriers Disagree on Wireless Pricing*, COMMUNICATIONS DAILY, Mar. 31, 2006, at 8 (citing Susan Eustis, principal at Wintergreen Research).

⁴⁰⁷ Fees for actual service are only one element of cost that consumers face. One analyst estimated that the average price a consumer paid for a wireless handset had fallen from \$128 in 1999 to \$88 in 2003, a decline of 31 percent. *Likelihood Of Purchasing New Cell Phone Is On The Rise*, News Release, J.D. Powers and Associates, Oct. 23, 2003.

⁴⁰⁸ *Econ One Wireless Survey: Wireless Costs Rise*, News Release, Econ One, Jan. 20, 2005; *Econ One Wireless Survey: Wireless Costs Down*, News Release, Econ One, Jan. 17, 2006. The survey is based on an analysis of pricing plan data collected from carriers’ web sites. *Transcript*, at 78.

⁴⁰⁹ This does not include any additional charges for roaming or long-distance service.

⁴¹⁰ The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used.

⁴¹¹ See Appendix A, Table 7, *infra*. 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 May 1, 2006) <<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.

⁴¹² *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 May 1, 2006) <<http://www.bls.gov/cpi/cpifactc.htm>>.

overall CPI increased by 3.4 percent. The Cellular CPI has declined 35 percent since December 1997, when BLS began tracking it.⁴¹³

154. As a third pricing indicator, some analysts believe average revenue per minute (“RPM”) is a good proxy for mobile pricing.⁴¹⁴ This is calculated by dividing a carrier’s estimate of average monthly revenue per subscriber (often referred to as average revenue per unit, or “ARPU”) by its estimate of MOUs, yielding the revenue per minute that the carrier is receiving.⁴¹⁵ Using estimates of industry-wide ARPU and MOUs from CTIA’s survey, we estimate that RPM fell 22 percent between December 2004 and December 2005. In the eleven years since 1994, RPM has fallen from \$0.47 in December 1994 to \$0.07 in December 2005, a decline of 86 percent.⁴¹⁶

2. Average Revenue Per Unit

155. ARPU is a widely used financial metric in analyzing the mobile telephone sector. Since 1999, following a decade of declines, CTIA’s estimate of ARPU began increasing, rising to \$50.64 in December 2004, a 28 percent increase from the low of seven years ago.⁴¹⁷ However, in the last year, ARPU declined slightly to \$49.98. Analysts attribute this decline to a variety of factors, including further declines in the per-minute price of mobile calls due to more offers of free minutes and other promotions,⁴¹⁸ an increase in the share of subscribers who typically spend less per month on mobile calls (such as prepaid and family plan customers),⁴¹⁹ and a decrease in the elasticity of demand below one.⁴²⁰ In particular, if elasticity of demand falls below one, increased usage will not be sufficient to offset per-minute price declines, causing ARPU to drop

⁴¹³ From December 1997 compared to the annual index.

⁴¹⁴ See *US Wireless Matrix 4Q05*, at 42.

⁴¹⁵ 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 417, *infra*.

⁴¹⁶ See Appendix A, Table 9, *infra*.

⁴¹⁷ See Appendix A, Table 1, *infra*. 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 2005 CTIA Survey*, at 199. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, see *Dec 2005 CTIA Survey*, at 200.

⁴¹⁸ See Section VI.A.1, Pricing Trends, *supra*. See, also, Simon Flannery *et al.*, *3Q05 Preview*, Morgan Stanley, Equity Research, Oct. 14, 2005, at 21 (“We continue to attribute the weakness [in ARPU] to the advent of cheaper minutes in the form of free nights and weekends, free in-network calling, free incoming minutes, rollover and family plans”).

⁴¹⁹ See *4Q05 Trend Tracker*, at 37. See, also, Phil Cusick *et al.*, *Mid-Quarter Update*, Bear Stearns, Equity Research, Jan. 27, 2006, at 1 (“Voice ARPU is being pressured by the industry focus on family and prepaid plans, which we expect to continue as the industry matures. Our checks indicate that ~50% of customers at VZW and Cingular are on a family plan of some sort”); and, Phil Cusick *et al.*, *ARPU Upside For 2006?*, Bear Stearns, Equity Research, Jan. 30, 2006, at 1 (“We believe that a substantial portion of Big Four subscriber growth since the second of half 2004 came from family plans for customers who typically spend far less than the industry average”).

⁴²⁰ *4Q05 Trend Tracker*, at 37.

in response to a drop in price. As one analyst wrote, “Elasticity below one means that cheaper minutes are no longer driving high enough incremental usage to support ARPU.”⁴²¹

156. In the last quarter of 2005, data accounted for almost 10 percent of ARPU for each of the four nationwide carriers, almost twice the percentage of a year earlier.⁴²² While the growth in data revenue has been significant, it has not been large enough to offset the decline in voice revenue. As one analyst wrote, “we feel the jury is still out on how successful next-gen data will be in driving profitable growth.”⁴²³

B. Quantity of Services Purchased

1. Subscriber Growth

a. Mobile Telephony

157. 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,⁴²⁴ tracks phone number usage information for the United States.⁴²⁵ All 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.⁴²⁶ In previous years, for the purposes of this

⁴²¹ *Id.*

⁴²² *Id.*, at 35.

⁴²³ *Id.*

⁴²⁴ 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 used to require only 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. *See* Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743 (2000). In 2004, however, the Commission changed the requirement so that all carriers must report the number of their subscribers, regardless of how many they serve, beginning in June 30, 2005. Local Telephone Competition and Broadband Reporting, *Report and Order*, 19 FCC Rcd 22340, 22345 (2004). In their Dec. 31, 2005 filings, operators reported that they served 203 million subscribers. *See* Appendix A, Table 2, *infra*.

⁴²⁵ 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.*

⁴²⁶ 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.*

report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.⁴²⁷ While the Commission now uses NRUF data as the basis for its estimate of mobile telephone subscribership for the purposes of this report, we continue to report the CTIA data as a benchmark for comparison.⁴²⁸

158. As of December 2005, we estimate that there were 213.0 million mobile telephone subscribers,⁴²⁹ up from 184.7 million at the end of 2004, which translates into a nationwide penetration rate of 71 percent.⁴³⁰ This addition of 28.3 million subscribers was a 17 percent increase from the 24.1 million added in 2004, and a 51 percent increase over the 18.8 million added in 2003.⁴³¹ In the last three years alone, the total mobile telephone subscriber base has increased 50 percent.

159. CTIA's estimate for year-end 2005 was 207.9 million subscribers, a 12 percent increase over its estimate of 182.1 million subscribers as of year-end 2004.⁴³² CTIA's estimate shows a similar surge in subscriber growth, with the increase of 25.8 million subscribers shown by its 2005 survey its largest ever.⁴³³

160. Similar to our findings in the *Tenth Report*, analysts attribute this high subscriber growth to the attractiveness of innovative service models such as prepaid and family plans –

⁴²⁷ See *Dec 2005 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.

⁴²⁸ The advantages of NRUF data over CTIA's survey are discussed in the *Seventh Report*, at 13004.

⁴²⁹ FCC estimate, based on preliminary year-end 2005 filings for Numbering Resource Utilization in the United States, adjusted for porting. In NRUF, carriers do not report numbers that have been ported to them. See Section V.B.2, Local Number Portability, *supra*. Therefore, in order to develop an estimate of wireless subscribership, it is necessary to adjust the raw NRUF data to account for wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting database managed by the Local Number Portability Administrator, which is currently NeuStar, Inc. The database contains all ported numbers currently in service. It also contains information about when the number was most recently ported (to a carrier other than the carrier to which the number originally was assigned) or, in some cases, when the database was updated to reflect a new area code. *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-2 – 8-3.

⁴³⁰ 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, 2005 was estimated to be 300.3 million. See U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2005* (visited Apr. 25, 2006) <<http://www.census.gov/popest/states/tables/NST-EST2005-01.xls>>. The number of subscribers refers to the number of separate wireless accounts. A particular individual may have more than one wireless account.

⁴³¹ See Appendix A, Table 5, *infra*.

⁴³² See Appendix A, Table 1, *infra*.

⁴³³ *Id.*

which target previously underserved markets such as youth and the credit-challenged – as well as wireless substitution.⁴³⁴

161. Digital subscribers made up more than 98 percent of all wireless subscribers at the end of 2005,⁴³⁵ leaving approximately 3.2 million analog-only mobile telephone subscribers.⁴³⁶

b. Mobile Data

162. The adoption of mobile data services by U.S. mobile telephone subscribers continued to rise in the past year. Based on consumer billing records, Telephia estimates that mobile data usage reached approximately 50 percent of U.S. mobile subscribers in the fourth quarter of 2005, up from 43 percent in the first quarter of 2005.⁴³⁷ This compares with earlier estimates of mobile data adoption of between 33 and 40 percent of the customer base of several large individual wireless carriers in the fourth quarter of 2004, and approximately 25 percent of U.S. mobile subscribers as of early 2004.⁴³⁸

163. The popularity of mobile data services varies by type of application, with text messaging, or SMS, maintaining its lead as the most popular application. According to Telephia, consumer billing records indicate that an estimated 41 percent of mobile subscribers used text messaging on their cellphones in the fourth quarter of 2005, 22 percent paid to access the web via their wireless device, 13 percent used multimedia messaging, and 11 percent downloaded content from their cellphones.⁴³⁹ In contrast with Telephia's methodology, research firm M:Metrics measures the consumption of mobile content and applications based on monthly surveys of mobile subscribers rather than consumer billing records. Using this methodology, M:Metrics estimates that 34.9 percent of U.S. mobile subscribers sent text messages in the first quarter of 2006, 10.9 percent used photo messaging, 9.9 percent browsed news and information, 9.9 percent purchased ringtones, 7.1 percent used personal email, 6.3 percent used mobile instant messenger, 4.1 percent used work email, 3.7 percent purchased wallpaper or screensavers, and 2.7 percent downloaded a mobile game.⁴⁴⁰ Similarly, 37 percent of the respondents to the annual

⁴³⁴ Timothy Horan *et al.*, *4Q05 Mid-Quarter Review*, CIBC, Equity Research, Jan. 30, 2006, at 2; Simon Flannery *et al.*, *Deteriorating Wireless Trends*, Morgan Stanley, Equity Research, Jan. 9, 2006, at 2; Phil Cusick *et al.*, *4Q05 Wireless Preview*, Bear Stearns, Equity Research, Jan. 17, 2006, at 5.

⁴³⁵ *4Q05 Wireless 411*, at 12. CTIA estimated that more than 96 percent of its estimated subscribers were digital. *Dec 2005 CTIA Survey*, at 49.

⁴³⁶ Based on digital penetration rates found in *4Q05 Wireless 411*, at 12 (98.5 percent). Subscribers that can access both the digital and analog networks of carriers are considered to be digital subscribers. Another analyst estimated that, as of December 2005, there were just 2.3 million consumers subscribed to analog cellphone plans, primarily in rural areas. Ken Belson, *Analog Callers Hung Up in a Digital Country*, NYTIMES.COM, May 3, 2006 (citing Ana Hermoso, an analyst at Informa Telecoms & Media, a research firm in London).

⁴³⁷ *Telephia Reports Mobile Data Usage Adoption Hits 50 Percent Mark, With Text Messaging Consumption Leading the Way*, News Release, Telephia, Apr. 5, 2006 (“*Telephia Reports Mobile Data Usage Adoption*”). Telephia bases its estimates on the consumer billing records of 30,000 mobile phone users for the top five wireless services providers. *Id.*, at 2.

⁴³⁸ *Ninth Report*, at 20670; *Tenth Report*, at 15969.

⁴³⁹ *Telephia Reports Mobile Data Usage Adoption*.

⁴⁴⁰ *M:Metrics: What Ails the Mobile Games Industry?*, Press Release, M:Metrics, May 2, 2006 (“*M:Metrics March 2006 Benchmark Survey*”).

survey of cellphone users conducted in September 2005 by *Consumer Reports* magazine said they were using text messaging, while only 12 percent of the respondents reported that they had used their cellphones for emailing.⁴⁴¹

164. Estimates from other sources show similar levels of adoption of particular applications. Telephia estimates that the number of mobile game buyers in the United States grew to 5 million in March 2006, or approximately 2.4 percent of mobile subscribers, a 44 percent increase from nearly 3.5 million in January 2006.⁴⁴² Cingular reports that more than 7.5 million of its subscribers, or 14 percent of the total, browse the Internet monthly.⁴⁴³ Yankee Group estimates that about 11 million wireless customers, or 6 percent of the total, actively use picture-messaging services.⁴⁴⁴ Moreover, Gartner estimates that about 47 percent of cellphones sold in the U.S. in 2005 are camera phones, up from 21 percent in 2004 and 6 percent in 2003.⁴⁴⁵ Yankee Group also estimates that one million people were subscribers to TV services on their cellphones at the end of 2005.⁴⁴⁶ One of these services, called MobiTV, has attracted more than 500,000 subscribers since launching its live video programming service for mobile phones.⁴⁴⁷ More recently, Telephia research shows that more than 2 million wireless customers, or 1.4 percent of the U.S. wireless user base, subscribed to a mobile video plan during the first quarter of 2006.⁴⁴⁸

165. With the launch of wireless broadband services based on EV-DO or WCDMA/HSDPA technologies by three of the nationwide carriers and some smaller regional carriers, the number of subscribers using mobile data services at broadband-like speeds has also been growing. Since special handsets with advanced capabilities (“3G handsets”) or special modem cards for laptop computers (“3G PC cards”) are needed to access wireless broadband networks based on EV-DO and WCDMA/HSDPA technologies, one method of estimating the number of wireless broadband users is based on the number of 3G handsets in service and the number of 3G PC cards in use.⁴⁴⁹ However, not all 3G handset owners are subscribers to wireless broadband services because, as Morgan Stanley analysts put it, “many of the handsets are being purchased for their fashion or “cool” factor, rather than their broadband

⁴⁴¹ *Best Cell Service: Exclusive Survey Results*, CONSUMER REPORTS, Jan. 2006, p. 20 (“*Consumer Reports Survey*”). The survey collected responses from more than 50,000 cellphone users in 18 metropolitan areas.

⁴⁴² *Mobile Game Market is Growing Rapidly With Purchases Soaring 53 Percent During Q1 2006, According To Telephia*, Press Release, Telephia, May 9, 2006.

⁴⁴³ Li Yuan, *Cingular Upgrades Phones’ Web Access*, WALL STREET JOURNAL, Nov. 17, 2005, p. D2.

⁴⁴⁴ Li Yuan and Brian Steinberg, *Sales Call: More Ads Hit Cellphone Screens*, WALL STREET JOURNAL, Feb. 2, 2006.

⁴⁴⁵ *Id.*

⁴⁴⁶ *Id.*

⁴⁴⁷ *Id.* As explained in the *Tenth Report*, MobiTV service is powered onto cellphones by a company called Idetic Inc., which streams the programs onto the phones via the Internet from servers that first convert the TV signals into digital files. Movitv-based services are offered by Sprint Nextel and Cingular Wireless, among other carriers. See *Tenth Report*, at 15960.

⁴⁴⁸ *Telephia Launches Audience Measurement Panel for Mobile TV*, Press Release, Telephia, May 24, 2006.

⁴⁴⁹ *North American 3G*, at 6.

capabilities.”⁴⁵⁰ Morgan Stanley estimates there were 2.3 million 3G handsets in service in the United States at the end of 2005, but only about half of these customers were actually paying for wireless broadband service.⁴⁵¹ Morgan Stanley also estimates there were many more than 2.3 million 3G PC cards in use at the end of 2005, but cautions that this will prove to be a niche market with smaller growth opportunities than 3G handset sales.⁴⁵²

166. In contrast with text messaging and other handset-based mobile data applications, subscriber numbers for paging continue to drop. Using NRUF data, we estimate there were 8.3 million paging units in service as of the end of 2005, down from 8.5 million paging units at the end of 2004, 11.2 million units at the end of 2003, and 14.1 million units at the end of 2002.⁴⁵³

c. Satellite

167. According to satellite industry analysis firm TelAstra, estimates place the number of subscribers to mobile satellite telephone services worldwide, including the United States, at 1.1 million at the end of 2005, up from the estimate of 892,000 subscribers cited in the *Tenth Report*.⁴⁵⁴

2. Minutes of Use

168. 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 2005, to 820 minutes, or more than 13 hours of use, for the average subscriber of a nationwide operator in the last quarter of the year.⁴⁵⁵ This is an increase of 110 MOUs, or almost two hours of additional use, from a year earlier.⁴⁵⁶ Sprint Nextel, the nationwide operator with the highest MOUs, averaged over 1,000 MOUs per month per subscriber for most of the year.⁴⁵⁷

169. According to CTIA, MOUs averaged 740 between June and December 2005, an increase of 21 percent from the average of 584 MOUs reported during the same period in

⁴⁵⁰ *Id.*, at 5.

⁴⁵¹ *Id.*, at 6. Of these 2.3 million 3G handsets, Morgan Stanley estimates Verizon Wireless had sold roughly 2 million 3G handsets by the end of 2005, but only half of these customers were actually paying for Verizon Wireless’s V CAST service, while Sprint had 150,000 3G handsets in service and 75,000 subscribers paying for Power Vision service at year end. *Id.* However, Morgan Stanley also notes that Sprint reported having 250,000 Power Vision customers in early 2006. *Id.*, at 3-4.

⁴⁵² *Id.*

⁴⁵³ FCC estimate, based on preliminary year-end 2005 filings for Numbering Resource Utilization in the United States.

⁴⁵⁴ Private communication, TelAstra; *Tenth Report*, at 15969.

⁴⁵⁵ *US Wireless Matrix 4Q05*, at 25.

⁴⁵⁶ *Id.*

⁴⁵⁷ *Id.*

2004.⁴⁵⁸ Increasing MOUs are most likely a result of the demand-stimulating effect of falling prices and the wider acceptance of and reliance upon wireless service.⁴⁵⁹

3. Mobile Data Usage

170. 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. According to CTIA, more than 9.76 billion SMS messages were reported for the month of December 2005, more than double the nearly 4.66 billion messages reported for the month of December 2004.⁴⁶⁰ In addition to tracking the volume of SMS messages sent in June and December of each year, beginning with the second half of 2004 CTIA now collects SMS traffic volumes for the entire six-month period of its semi-annual survey. The reported SMS traffic volume for the period July through December 2005 was 48.7 billion messages, nearly double the 24.7 billion messages reported in the same period of 2004.⁴⁶¹ For 2005 as a whole, reported SMS traffic volumes (including Instant Messaging and text messaging) were 81 billion.⁴⁶²

171. While text messaging continues to be the most widely used type of messaging service, the volume of photo messaging and other multimedia messaging services is also growing. CTIA initiated coverage of MMS traffic volumes this year, and although prior CTIA estimates are unavailable for comparison, more than 1.1 billion MMS messages were reported for 2005.⁴⁶³ Figures reported by individual carriers do show increased MMS traffic volumes. Cingular reports that it delivered 91 million multimedia messages in the first quarter of 2006, up from 30 million multimedia messages that were sent or received by its customers in the first quarter of 2005.⁴⁶⁴ Verizon Wireless reports that its customers exchanged more than 171 million picture and video messages in the first quarter of 2006, up from 41.4 million multimedia messages during the first quarter of 2005.⁴⁶⁵

172. Entertainment applications such as ringtones and games also continued to grow in popularity. Telephia estimates that U.S. wireless consumers purchased more than 8.2 million games on their cellphones in March 2006, up 53 percent from nearly 5.4 million games in

⁴⁵⁸ See Appendix A, Table 8, *infra*. 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.

⁴⁵⁹ See Section VI.A., Pricing Levels and Trends, *supra*, and Section VII.A, Wireless – Wireline Competition, *infra*.

⁴⁶⁰ Robert F. Roche, *CTIA's Wireless Industry Indices*, CTIA-The Wireless Association, May 2006, at 224-225.

⁴⁶¹ *Id.*, at 226.

⁴⁶² *Id.*

⁴⁶³ *Id.*

⁴⁶⁴ *Cingular Wireless Reports Strong First-Quarter 2006 Results*, Press Release, Cingular, Apr. 19, 2006, at 3; *Tenth Report*, at 15970.

⁴⁶⁵ *Verizon Reports Strong First-Quarter 2006 Results*, Press Release, Verizon, May 2, 2006, at 4; *Tenth Report*, at 15971.

January 2006.⁴⁶⁶ Performance rights organization BMI estimates that U.S. retail sales of mobile phone ringtones grew to \$500 million in calendar year 2005, up from \$245 million in 2004 and \$68 million in 2003.⁴⁶⁷ BMI expects additional music-based revenues to come from the newly launched over-the-air music downloading services. Since its launch at the end of October 2005, the Sprint Music Store's number of over-the-air song downloads passed the two million mark in April 2006, after hitting one million downloads in February 2006.⁴⁶⁸

4. Sub-National Penetration Rates

173. 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.⁴⁶⁹ EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephone penetration rates for two reasons.⁴⁷⁰ First, the defining aspect of mobile telephone 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.⁴⁷¹ 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 operating areas.⁴⁷² In other words, a mobile telephone subscriber can be assigned a phone

⁴⁶⁶ *Mobile Game Market is Growing Rapidly With Purchases Soaring 53 Percent During Q1 2006, According To Telephia*, Press Release, Telephia, May 9, 2006.

⁴⁶⁷ *BMI Forecasts U.S. Ringtones Sales to Hit \$600 Million in 2006*, Press Release, BMI, Apr. 3, 2006.

⁴⁶⁸ *CTIA Notebook*, COMMUNICATIONS DAILY, Apr. 10, 2006, p. 5; Li Yuan, *Spotty Reception: Cellphone Firms Grapple With Music, Video Push*, WALL STREET JOURNAL, Apr. 1, 2006.

⁴⁶⁹ 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.

⁴⁷⁰ See note 21, *supra*, for a description of EAs.

⁴⁷¹ *Redefinition of the EA*, at 75.

⁴⁷² 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%.”).

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).⁴⁷³

174. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA penetration rate, can be seen in Appendix A, Table 3.⁴⁷⁴ The rates range from a high of 95 percent in the Fort Myers-Cape Coral, FL EA (EA 32) to a low of 41 percent in the Northern Michigan, MI EA (EA 58). There are 71 EAs, with a combined population of 208 million, in which penetration rates exceed 70 percent, and 4 EAs, with a combined population of 151 million, in which penetration rates exceed 90 percent. Only 7 EAs, with a combined population of 2 million, have penetration rates under 50 percent. The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 57 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 85 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 71 percent.

C. Quality of Service

175. To evaluate the quality of service, this section summarizes the results of relevant consumer 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 services are experience goods, and therefore the quality of a particular 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."⁴⁷⁵

176. Third, consumer perceptions can change independently of actual changes in network performance as their expectations evolve. In this regard, the president of Telephia, a provider of performance measurement information to the mobile telecommunications industry, has observed that "[t]he fact that consumer satisfaction has not increased in response to these large quality improvements [in wireless service] speaks to rising expectations among wireless consumers. These rising expectations are driven by consumers' desire to use their phones more often, in more places and for more applications."⁴⁷⁶

⁴⁷³ "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.

⁴⁷⁴ See also, Appendix B, Map 4, *infra*.

⁴⁷⁵ 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.

⁴⁷⁶ *Letter to the Wall Street Journal*, Press Release, Telephia, June 1, 2005.

177. 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 web sites. These maps typically contain disclaimers to the effect that the maps only show approximate coverage areas and are not a guarantee of coverage, or warnings that even in areas with a strong signal, service may be adversely affected by the volume of traffic on the network.⁴⁷⁷ Nevertheless, customers 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.

178. J.D. Power and Associates conducts three different surveys of wireless users that measure various dimensions of service quality: the U.S. Wireless Regional Customer Satisfaction Index Study (“Wireless Customer Satisfaction Study”); the Wireless Call Quality Performance Study (“Wireless Call Quality Study”); and the Wireless Customer Care Performance Study (“Wireless Customer Care Study”).⁴⁷⁸ The Wireless Customer Satisfaction Study measures customer satisfaction broadly based on a number of criteria, including call performance and customer service. In contrast, the other two studies are narrowly focused on measuring call performance and customer care, respectively. In addition to measuring the performance of the wireless industry as a whole, each study also ranks carriers based on their individual performance.

179. The Wireless Customer Satisfaction Study measures customer satisfaction based on 42 specific service-related measures grouped into six key factors that impact overall wireless carriers’ performance. These six factors are, in order of importance: call performance and reliability (26 percent); customer service (17 percent); service plan options (17 percent); brand image (14 percent); cost of service (14 percent); and billing (12 percent). Based on the results of this survey over the past three-year period, J.D. Power and Associates concludes that overall satisfaction has fluctuated significantly with major changes in the industry such as competitive expansion, regulatory programs, and mergers.⁴⁷⁹ As detailed below, however, the most recent survey shows an upward trend in overall customer satisfaction.

180. According to the results of the 2006 Wireless Customer Satisfaction Study, overall satisfaction with wireless service providers has increased significantly from 2005.⁴⁸⁰ In

⁴⁷⁷ *Tenth Report*, at 15973.

⁴⁷⁸ *J.D. Power and Associates Reports: Satisfaction With Wireless Service Improves as New Service Offerings and Aggressive Pricing Plans Positively Impact Customer Perceptions of the Service Experience*, Press Release, J.D. Power and Associates, Apr. 19, 2006 (“2006 Wireless Customer Satisfaction Study”); *J.D. Power and Associates Reports: The Number of Call Quality Problems Experienced With a Wireless Service has Declined for a Second Consecutive Year*, Press Release, J.D. Power and Associates, Mar. 16, 2006 (“2006 Wireless Call Quality Performance Study”); *J.D. Power and Associates Reports: The Average Number of Contacts Needed to Resolve a Wireless Customer Care Issue Over the Phone Continues to Rise*, Press Release, J.D. Power and Associates, Jan. 25, 2006 (“2006 Wireless Customer Care Study”).

⁴⁷⁹ *2006 Wireless Customer Satisfaction Study*.

⁴⁸⁰ *Id.* The 2006 Wireless Customer Satisfaction Study is based on responses from 22,871 wireless users. The results are from two reporting waves, which were conducted in October 2005 and February 2006.

particular, the 2006 study found that satisfaction has improved three percent from 2005, with service plan options and cost of service factors receiving the largest increase in satisfaction ratings over 2005 levels.⁴⁸¹ J.D. Power and Associates argues that these particular improvements have occurred in areas where the industry has been aggressively marketing new services and offering more attractive pricing options. According to the senior director of wireless services at J.D. Power and Associates, “expanded service offerings and aggressive service plan pricing have resulted in more positive overall wireless service experiences” for customers.⁴⁸²

181. The improvement in overall satisfaction shown by the 2006 Wireless Customer Satisfaction Study follows a significant downturn in overall satisfaction in 2005. In particular, the 2005 Wireless Customer Satisfaction Study found that overall satisfaction with the performance of wireless service providers decreased ten percent over 2004, the largest year-over-year change since the study’s inception.⁴⁸³ In contrast, the 2004 Wireless Customer Satisfaction Study showed a five-percent increase in overall satisfaction over 2003.⁴⁸⁴ In the 2005 Wireless Customer Satisfaction Survey, J.D. Power and Associates singled out the recent large wireless mergers as the key factor behind the downturn in customer satisfaction in 2005. In particular, the company notes that “as past experience has shown, mergers, at least in the short-term, negatively impact customer attitudes and perceptions with their wireless service, creating a sense of confusion and uncertainty.”⁴⁸⁵ The company adds that those carriers directly involved in a merger are most affected, with Nextel and Sprint experiencing the largest declines compared to their overall satisfaction index ratings in 2004. Nevertheless, the company argues that the negative impact of mergers on customer attitudes explains why even carriers not involved in mergers experienced some decline in overall satisfaction from 2004. The rebound in overall customer satisfaction in the 2006 Wireless Customer Satisfaction Study appears to confirm that the initial impact of mergers on customer perceptions of their wireless service experience tends to be short-lived.

182. The Wireless Call Quality Study measures the number of problems experienced with wireless call quality on a semi-annual basis. Call quality is measured based on seven customer-reported problem areas that impact overall carrier performance. These areas are: dropped/disconnected calls; static/interference; connection on first try; voice distortion; no echoes; no immediate voice mail notification; and no immediate text message notification. Consistent with the improvement in overall customer satisfaction suggested by the 2006 Wireless Customer Satisfaction Study, the J.D. Power and Associates 2006 Wireless Call Quality Study found that the overall rate of customers experiencing a wireless call quality problem declined for a second consecutive year, with reported problems per 100 calls reaching the lowest level since

⁴⁸¹ *Id.*

⁴⁸² *Id.*

⁴⁸³ *J.D. Power and Associates Reports: Satisfaction With Wireless Service Providers Decreases Significantly as Recent Mergers Impact Customers Perceptions on the Service Experience*, Press Release, J.D. Power and Associates, Sept. 7, 2005 (“2005 Wireless Customer Satisfaction Study”).

⁴⁸⁴ *Tenth Report*, at 15973.

⁴⁸⁵ *2005 Wireless Customer Satisfaction Study*.

the inaugural study in 2003.⁴⁸⁶ In particular, the study found that the percentage of wireless calls with at least one problem has declined from 26 per 100 calls in 2005 to 24 per 100 calls in the 2006 study, an eight percent improvement.⁴⁸⁷ Moreover, the number of wireless calls that involved a problem declined by 15 percent by comparison with the results of the 2004 (30 per 100 calls) and 2005 studies. J.D. Power and Associates attributes the improvement in the quality of calls to competitive pressure on carriers to attract and retain customers.

183. In addition to the decline in overall call quality problems, the 2006 Wireless Call Quality Study concluded that considerable improvements have been made in the areas of dropped/disconnected calls and calls with voice distortion. The number of dropped/disconnected calls decreased by 15 percent when compared to the 2005 study, while the number of calls experiencing voice distortion decreased by 25 percent when compared to 2005.⁴⁸⁸ However, the 2006 Wireless Call Quality Study also found that overall call quality performance varies based on where a call is placed or received. In particular, wireless calls within a local calling area have significantly lower reported problems (27 per 100 calls) when compared to calls placed or received while roaming (55 per 100 calls).⁴⁸⁹ Moreover, users typically experience fewer problems with outdoor wireless calls than with calls placed inside of buildings, particularly calls made from home.

184. Finally, the Wireless Customer Care Study measures wireless provider customer care performance based on customer experiences with three point-of-contact methods: telephone with a service representative and/or automated response system (“ARS”); walk-in at a retail store; and online Internet connection. For each contact method, processing issues such as problem resolution efficiency and hold-time duration are also measured. The 2006 Wireless Customer Care Study found that wireless customers contact their service provider an average of 1.94 times by phone to resolve an issue or problem, the highest level since measurement of the average problem resolution frequency (“PRF”) rate began in 2000.⁴⁹⁰ The average PRF rate was 1.36 in 2000 and has climbed steadily since then at an average annual rate of 14 percent. According to J.D. Power and Associates, the main factors contributing to this increase are not only the rise of new wireless services and products, but also the complexity of using new products such as photos and video clips, ringtones, and other more advanced wireless data applications. The introduction and spread of these products “puts pressure on the carrier’s service representative to understand the issue or problem and try and get the inquiry resolved in a timely manner.”⁴⁹¹ The senior director of wireless services at J.D. Power and Associates argues that because of the increased difficulty of ensuring that the customer service representative is fully trained and kept apprised on the latest products, carriers that succeed in encouraging

⁴⁸⁶ *2006 Wireless Call Quality Performance Study*. The 2006 Wireless Call Quality Study is based on responses from 23,368 wireless users.

⁴⁸⁷ *Id.*

⁴⁸⁸ *Id.* Voice distortion occurs when voice patterns become inconsistent due to problems with digital frequency.

⁴⁸⁹ *Id.*

⁴⁹⁰ *2006 Wireless Customer Care Study*. The 2006 Wireless Customer Care Study was based on responses from more than 11,490 wireless users who contacted customer care within the past year.

⁴⁹¹ *Id.*

customers to try new wireless services may run the downside risk of decreasing customer satisfaction and losing customers to other carriers.

185. The 2006 Wireless Customer Care Study also made a number of findings regarding customer care patterns.⁴⁹² First, more than one-half (52 percent) of wireless users have contacted the customer service department for assistance within the past year, a slight decrease from 2005 (54 percent). Second, among those who contact their carriers, 71 percent do so via telephone and 25 percent through their carrier's retail stores, with email and Internet connections accounting for only 4 percent. Third, the average initial reported hold time on calls to the customer service department is 3.57 minutes, an increase from 3.44 minutes in 2005. In contrast, on average a customer waits more than nine minutes before speaking to a representative at a retail store. Finally, more than four in ten users (42 percent) contact their carrier with a service inquiry that is related to billing, one-half of which are due to incorrect charges. An additional one-third of all customer care inquiries are related to call quality. A consumer satisfaction survey commissioned by industry initiative MyWireless.org was conducted via telephone in February 2006 by McLaughlin & Associates.⁴⁹³ This survey found that more than 85 percent of the cellphone users polled are satisfied with their cellphone service.

186. *Consumer Reports* magazine conducted its most recent annual survey of cellphone users in September 2005.⁴⁹⁴ The *Consumer Reports* survey is similar in approach to the J.D. Power and Associates Wireless Customer Satisfaction Study in that it asks respondents about a number of dimensions of service quality, including the quality of their calls, how well their inquiries or complaints were handled, and billing problems. The 2005 *Consumer Reports* survey found the overall satisfaction score for wireless carriers to be essentially unchanged from the result of the 2004 survey at 67.⁴⁹⁵ As in 2004, this overall score ranks wireless carriers below services such as hotels, supermarkets, digital cable TV, and HMOs in terms of how well they please the consumer.⁴⁹⁶ Nevertheless, the responses to certain questions show some improvement over the 2004 survey results. In particular, while only 47 percent of the respondents to the 2005 survey said that they were either completely satisfied or very satisfied with their cellphone service, this was slightly up from 45 percent of respondents to the 2004 survey.⁴⁹⁷ In addition, 31 percent of respondents said they were seriously considering changing their providers, down from 35 percent in 2004.⁴⁹⁸ Of those who had changed providers in the past three years, the top reasons given were poor phone service (54 percent) and price (36 percent).

⁴⁹² *Id.*

⁴⁹³ *New Poll Finds Consumers Overwhelmingly Satisfied With Their Wireless Service*, Press Release, MyWireless.org, Mar. 20, 2006. The survey polled 1000 cellphone users. *See, also*, Paul Kirby, *Wireless Carrier Executives Stress Need for Better Customer Service*, TRDAILY, Apr. 10, 2006, at 10-11.

⁴⁹⁴ *Best Cell Service: Exclusive Survey Results*, CONSUMER REPORTS, Jan. 2006, p. 20 ("Consumer Reports Survey"). The survey collected responses from more than 50,000 cellphone users in 18 metropolitan areas.

⁴⁹⁵ *Id.*

⁴⁹⁶ *See Tenth Report*, at 15974.

⁴⁹⁷ *Id.*; *Consumer Reports Survey*.

⁴⁹⁸ *Tenth Report*, at 15974-15975; *Consumer Reports Survey*.

187. The Commission releases a report on the informal inquiries and complaints processed by its Consumer & Governmental Affairs Bureau (“CGB”) four times a year. 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. The report on consumer inquiries and informal complaints during the fourth quarter of calendar year 2005 was issued on February 16, 2006.⁴⁹⁹ Of the services regulated by the FCC, wireless services ranked third behind radio and television broadcasting and wireline telecommunications in terms of number of complaints during the reporting period. Of the 71,194 complaints registered in the fourth quarter, wireless complaints accounted for 4,956, or nearly 7 percent of the total. This represented a decline from the number of wireless complaints recorded in the first (7,330 complaints), second (6,783), and third (6,873) quarters of 2005.⁵⁰⁰

188. There were declines in each of the five wireless categories as compared with the previous three quarters. Of the 4,956 complaints from wireless consumers, service quality ranked second behind billing and rates in terms of the number of complaints during the reporting period. In particular, 2,480 complaints were related to billing and rates, 865 complaints were related to service quality issues, 699 complaints were related to contract and early terminations issues, 559 complaints were related to carrier marketing and advertising, and the remaining 353 complaints were related to equipment issues. 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.

D. International Comparisons

1. Mobile Voice

189. This section compares mobile market performance in the United States, Western Europe and Asia-Pacific countries of comparable income levels with regard to mobile penetration, usage, and pricing.⁵⁰¹ To ensure that a consistent methodology is used to compile the data for different countries, the comparison is based on international cross-section data compiled by Merrill Lynch.⁵⁰² Consequently, the estimates of mobile penetration, MOUs, and

⁴⁹⁹ Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission, February 16, 2006.

⁵⁰⁰ Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission, August 12, 2005; Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission, September 28, 2005; Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission, November 4, 2005.

⁵⁰¹ In accordance with established practice in using international benchmarking to assess 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.

⁵⁰² *Interactive Global Wireless Matrix 4Q05*.

revenue per minute in the United States cited in this section may differ somewhat from estimates provided in previous sections of the report because they come from different sources.⁵⁰³ As in the *Tenth Report* and previous reports, this comparison shows three major differences between the U.S. mobile market and comparable mobile markets abroad.⁵⁰⁴ First, mobile penetration is still higher in Western Europe and developed Asia-Pacific countries than in the United States. Second, the United States continues to lead the world in average minutes of use per subscriber. Third, mobile calls continue to be significantly less expensive on a per minute basis in the United States than in Western Europe and Japan.

190. Mobile penetration averaged an estimated 103.5 percent in Western Europe at the end of 2005.⁵⁰⁵ In most West European countries, estimated mobile penetration exceeded 100 percent at the end of 2005 due in part to greater use of prepaid service plans and multiple subscriber identity module (“SIM”) cards.⁵⁰⁶ As in years past, France finished 2005 with the lowest mobile penetration rate in Western Europe at 79 percent.⁵⁰⁷ Thus, as in previous years, U.S. mobile penetration at the end of 2005, at approximately 70 percent,⁵⁰⁸ was lower than the lowest mobile penetration rate in Western Europe.

191. Japan finished the year with a mobile penetration level of 74 percent,⁵⁰⁹ lower than the lowest penetration rate in Western Europe but somewhat higher than the U.S. level. In comparison, year-end mobile penetration rates in a number of other Asian-Pacific countries were within the range of European levels, including Australia (94.6 percent), South Korea (79 percent), Hong Kong (106 percent), and Singapore (98 percent).⁵¹⁰

⁵⁰³ In addition, Merrill Lynch has noted that these data have certain limitations for comparing countries that use calling party pays (“CPP”) versus mobile party pays (also known as receiving party pays). For reasons explained below, the figures for minutes of use may be somewhat understated, and the revenue figures used to calculate average revenue per minute may be somewhat overstated, in markets where CPP is used relative to non-CPP markets.

⁵⁰⁴ See Appendix A, Table 10, *infra*.

⁵⁰⁵ *Interactive Global Wireless Matrix 4Q05*.

⁵⁰⁶ *Id.* As noted in previous reports, reported mobile subscriber figures and penetration may be overstated in some countries, particularly those with a high percentage of prepaid subscribers, due to double counting of subscribers who have switched service providers but have not yet been removed from their former provider’s subscriber base, or those who subscribe to multiple mobile service providers and therefore have multiple SIM cards. As noted in the *Tenth Report*, carriers have widely different policies to determine when to cut off inactive subscribers and to remove them from their reported subscriber base. In addition, it is becoming more prevalent for people to subscribe to multiple mobile service providers. See *Tenth Report*, at 15976, note 452. See, also, *Seventh Report*, at 13033, and *Sixth Report*, at 13391. As one analyst recently commented, “While the proportion of the population using mobile phones has stabilized in most developed-world markets at around 80-85%, the trend among many users for buying second or even third subscriptions shows no sign of slowing. Operators in these markets are actively encouraging the practice, selling prepaid SIM cards with \$5 to \$10 of preloaded credit in order to boost their subscription numbers...” See Bob Wallace, *30 Countries Passed 100% Mobile Phone Penetration in Q1*, Telecommunications Online, June 9, 2006 (quoting Devine Kofiloto, Principal Analyst at Informa Telecoms and Media).

⁵⁰⁷ *Interactive Global Wireless Matrix 4Q05*.

⁵⁰⁸ *Id.*

⁵⁰⁹ *Id.*

⁵¹⁰ *Id.*

192. The United States widened its lead in mobile voice usage in 2005, with average MOUs estimated to be approximately 798 per month in the fourth quarter of 2005.⁵¹¹ This compares with an average across Western Europe of 142.6 MOUs, and estimates in individual countries that range from a high of 279 in Finland to a low of 81 in Germany.⁵¹² MOUs in comparable Asian-Pacific countries were generally higher than the Western European average, but still well below the U.S. figure, including Japan (147), Australia (178), South Korea (321.6), Hong Kong (395), and Singapore (313).⁵¹³

193. As noted above, some analysts regard average revenue per minute as a good proxy for mobile pricing.⁵¹⁴ Revenue per minute in Western Europe averaged \$0.22 in the fourth quarter of 2005, and ranged from a high of \$0.36 in Switzerland to a low of \$0.11 in Finland, with most countries clustered in the range between \$0.17 and \$0.23.⁵¹⁵ At \$0.07, average revenue per minute in the United States during the same period remained less than one-third of the European average despite significant declines in most Western European countries.⁵¹⁶ Revenue per minute in Japan, at \$0.27, was nearly four times the U.S. figure at the end of 2005 and also higher than the European average, but lower than the European high of \$0.36 in the Swiss mobile market.⁵¹⁷ In contrast, revenue per minute was nearly as low in some Asian countries as in the United States, including South Korea (\$0.10) and Singapore (\$0.08).⁵¹⁸ At

⁵¹¹ *Id.* For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing minutes, and usually exclude traffic related to mobile data services. Figures for MOUs are potentially somewhat understated in markets that employ CPP as compared to the U.S. mobile market and other non-CPP markets due to double-counting of same-network (“on-net”) mobile-to-mobile minutes under the mobile party pays system used in the U.S. and other non-CPP markets. The double counting occurs because each minute of an on-net call is billed to both the caller and the receiver under the mobile party pays system, whereas under CPP each on-net minute is billed only to the calling party, and therefore counted only once. See *Tenth Report*, at 15976, note 457.

⁵¹² *Interactive Global Wireless Matrix 4Q05*.

⁵¹³ *Id.*

⁵¹⁴ See Section VI.A.1, Pricing Trends, *supra*. Average revenue per minute (“RPM”) is calculated by dividing monthly voice-only ARPU by MOUs. 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. As noted above, MOUs figures may be somewhat understated in CPP markets relative to non-CPP markets (due to the aforementioned double-counting of on-net mobile-to-mobile minutes in non-CPP markets), and the revenue figures used to calculate ARPU may be somewhat overstated in CPP markets relative to non-CPP markets (due to double-counting of mobile termination revenues for off-net mobile-to-mobile calls in CPP markets). Consequently, the RPM figures (ARPU divided by MOUs) probably overstate the difference between RPM in the United States and CPP markets. The potential for service revenues to be somewhat overstated in CPP markets was brought to the Commission’s attention by Professor Stephen Littlechild, and confirmed by Merrill Lynch through email correspondence.

⁵¹⁵ *Interactive Global Wireless Matrix 4Q05*.

⁵¹⁶ *Id.* In email correspondence, Merrill Lynch indicates that RPM figures may overstate the difference between RPM in CPP and non-CPP markets by about 15 percent due to the two factors mentioned above. This adjustment would narrow the difference between the European average and U.S. RPM by about three cents.

⁵¹⁷ *Id.*

⁵¹⁸ *Id.*

\$0.04, Hong Kong continues to have the only comparable mobile market with lower revenue per minute than the United States.⁵¹⁹

194. One of the reasons revenue per minute is higher in Western Europe and Japan than in the United States is that the calling party pays system used throughout Western Europe and in Japan tends to give mobile operators the ability and the incentive to set mobile termination charges that are high relative to those in the United States and other countries that use the mobile party pays system.⁵²⁰ In addition, because these higher mobile termination charges are absorbed by the calling party, the calling party pays system may also reduce usage relative to mobile party pays system by increasing the cost of calls to mobile phones.⁵²¹ Based on a regression analysis of international cross-section data for countries with high per capita income, economist Stephen Littlechild finds that a mobile party pays system significantly reduces average revenue per minute (by about twelve cents per minute compared to a calling party pays system), while significantly increasing average usage (by about 143 minutes per month).⁵²²

195. Apart from the effects of a calling party pays system on mobile termination charges, analysts have argued that intense competition led U.S. mobile operators to price aggressively through bucket plans and various promotions, driving prices down well below levels in Western Europe and Japan.⁵²³ Accordingly, 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 also Japan.

2. Mobile Data

196. The percentage of mobile service revenues from data services continues to be higher in Western Europe and parts of Asia than in the United States.⁵²⁴ In the fourth quarter of 2005 revenues from mobile data services contributed an estimated 16.5 percent of European mobile carriers' service revenues on average, and ranged from a low of 5 percent of service revenues in Sweden to a high of 21.5 percent of service revenues in the UK.⁵²⁵ This compares

⁵¹⁹ *Id.*

⁵²⁰ See, for example, Robert W. Crandall and J. Gregory Sidak, *Should Regulators Set Rates to Terminate Calls on Mobile Networks?*, YALE JOURNAL ON REGULATION, Vol. 21, No. 2, Summer 2004, pp. 1-46, at 6-8; Stephen C. Littlechild, *Mobile Termination Charges: Calling Party Pays Versus Receiving Party Pays*, TELECOMMUNICATIONS POLICY, Vol. 30, No. 5-6, June-July 2006, pp. 242-277, at 244-245, 253-254 (“*Calling Party Pays Versus Receiving Party Pays*”).

⁵²¹ *Calling Party Pays Versus Receiving Party Pays*, at 255. While theory also suggests the possibility that mobile party pays may lead mobile subscribers to switch off their phones or withhold their mobile phone numbers to avoid paying for incoming calls, in practice U.S. mobile operators have overcome the disincentive to receive calls under mobile party pays through the introduction of bucket plans with low per-minute rates and other schemes for stimulating usage, such as free night and weekend minutes. *Id.*, at 254, 268.

⁵²² *Id.*, at 259. Littlechild also concludes there is no evidence that mobile party pays lowers the mobile penetration rate compared to calling party pays. *Id.*

⁵²³ See, e.g., Timothy Horan *et al.*, *International Wireless Trends Reinforce Our Bullish View On U.S. Wireless*, CIBC World Markets, Equity Research, June 6, 2005, at 4-6.

⁵²⁴ See *Tenth Report*, at 15977.

⁵²⁵ *Interactive Global Wireless Matrix 4Q05*.

with 9.6 percent of U.S. mobile carriers' service revenues in the same period, up from 6 percent at the end of 2004.⁵²⁶ The percentage of service revenues derived from mobile data services was even higher in Japan (26.4 percent), Singapore (20 percent), and South Korea (18 percent) than in Western Europe on average.⁵²⁷

197. Text messaging continues to be far more popular in Western Europe and parts of Asia than in the United States. Based on monthly surveys of mobile subscribers in the U.K., Germany, and the U.S., M:Metrics estimates that 83.4 percent of U.K. subscribers and 79.4 percent of German subscribers sent a text message in the first quarter of 2006, as compared with 34.9 percent of U.S. mobile subscribers.⁵²⁸ A recent IDC survey in Asian Pacific countries, including Australia, Hong Kong, Singapore, and South Korea, found that 65 percent of mobile users send text messages on a daily basis.⁵²⁹ As noted in the *Tenth Report* and previous reports, a higher percentage of mobile subscribers use text messaging in Europe and Asia partly because mobile voice calls are still relatively more expensive on a per minute basis in these mobile markets.⁵³⁰ In particular, European and Asian mobile subscribers have an incentive to send text messages because it is generally cheaper than placing a call on their mobile phones.⁵³¹ In contrast, most U.S. mobile subscribers are on calling plans that include large buckets of minutes plus unlimited free night and weekend minutes. These bucket plans create a disincentive to send text messages because the incremental cost of a mobile voice call is close to zero, whereas there is usually an additional charge for sending a text message.⁵³²

198. Despite the increased availability of multimedia messaging options and email for mobile phones as well as other mobile content and applications, text messaging continues to be the most popular mobile data service in Europe and Asia, as well as the United States. Nevertheless, although text messaging is more widely used than multimedia messaging, photo messaging is also more popular in Europe than in the United States. In particular, M:Metrics' survey results indicate that 27.3 percent of U.K. subscribers and 19.4 percent of German

⁵²⁶ *Id.*

⁵²⁷ *Id.*

⁵²⁸ *M:Metrics March 2006. Benchmark Survey.*

⁵²⁹ *SMS Text Messaging Keeps Strong Edge in Asia Pacific*, TELECLICK, Mar. 9, 2006 ("SMS Keeps Strong Edge in Asia Pacific").

⁵³⁰ *Tenth Report*, at 15978; *Ninth Report*, at 20680.

⁵³¹ Frank J. Governali *et al.*, *Wireless Data Prospects Brightening*, Goldman Sachs, Global Investment Research, Apr. 16, 2004, at 12; Li Yuan, *Text Messages Sent by Cellphone Finally Catch on in U.S.*, WALL STREET JOURNAL, Aug. 11, 2005, p. B1.

⁵³² *Id.* As noted above, the pay-as-you-go option and monthly SMS packages are almost equally popular among SMS users in the United States, and carriers typically charge around \$0.10 per message to send a text message on a pay-as-you-go basis. See Section IV.A.3, Mobile Data Pricing, *supra*. As noted in the *Ninth Report*, 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, mobile data, and wireline Internet access. See *Ninth Report*, at 20680.

subscribers used photo messaging in the first quarter of 2006, as compared with nearly 11 percent of U.S. mobile subscribers.⁵³³

199. Apart from text and photo messaging, M:Metrics' survey results reveal little difference between the rates at which mobile subscribers in the U.S., U.K., and Germany are adopting various mobile data applications. Mobile subscribers in the U.K. used their cellphones to browse news and information at a somewhat higher rate (11.1 percent) than subscribers in the United States (9.9 percent) and Germany (4.1 percent).⁵³⁴ For the remaining mobile data applications survey respondents were asked about, including ringtones, games, instant messaging and email, adoption rates were less than 10 percent in all three countries.⁵³⁵ Similarly, the aforementioned IDC survey in Asian Pacific countries found that less than 10 percent of mobile users are consistently using advanced messaging and other multimedia features on their cellphones.⁵³⁶

200. The number of foreign mobile telephone carriers providing mobile data services over next-generation networks continued to grow in the past year. The GSM trade association ("GSM Association") reports that operators had launched more than 105 commercial WCDMA networks across fifty countries as of May 2006.⁵³⁷ GSM Association also reports that WCDMA networks had attracted 62.7 million subscribers worldwide by the first quarter of 2006, up from 16.3 million at the end of 2004 and 2.8 million at the end of 2003.⁵³⁸ This compares with 23.9 million subscribers on CDMA 1xEV-DO networks in the first quarter of 2006, up from 12.3 million at the end of 2004 and 4.6 million at the end of 2003.⁵³⁹

201. Although the European Commission had originally targeted the beginning of 2002 as the date for the coordinated introduction of 3G services, most European carriers delayed the launch of commercial WCDMA service until 2004.⁵⁴⁰ As of September 2005, operators had commercially launched 46 WCDMA networks in sixteen Western European markets, up from 40 networks in sixteen markets at the end of 2004, and ten networks in six markets at the end of 2003.⁵⁴¹ GSM Association reports that WCDMA networks served 32.145 million subscribers in Western Europe in the first quarter of 2006, up from 7.7 million at the end of 2004.⁵⁴² Based on

⁵³³ *M:Metrics March 2006. Benchmark Survey.*

⁵³⁴ *Id.*

⁵³⁵ *Id.*

⁵³⁶ *SMS Keeps Strong Edge in Asia Pacific.*

⁵³⁷ *Global Momentum for High-Speed Mobile Broadband Accelerates on an Unprecedented Scale*, GSM Association, Press Release, May 5, 2006.

⁵³⁸ GSM Association, *GSM Subscriber Statistics Q1 2006* (visited May 8, 2006) <<http://www.gsmworld.com>> ("GSM Subscriber Statistics Q1 2006").

⁵³⁹ *Id.*

⁵⁴⁰ *See Ninth Report*, at 20681.

⁵⁴¹ Peter Rysavy, *Data Capabilities: GPRS to HSDPA and Beyond*, White Paper Developed for 3G Americas, Rysavy Research, Sept. 2005, at 52-53.

⁵⁴² *GSM Subscriber Statistics Q1 2006.*

surveys of mobile subscribers in the U.K., Germany, and the United States, M:Metrics estimates that the percentage of mobile subscribers on 3G networks at the end of 2005 was highest in the U.K. at 7.7 percent, followed by Germany (3.2 percent) and the United States (1.9 percent).⁵⁴³ Survey results also indicate that subscribers to 3G services in the U.K. and Germany are significantly more likely to use mobile data services than their counterparts on 2G networks. In addition to higher rates of SMS, instant messaging, and purchasing games and ringtones, 3G subscribers are far more likely to use multimedia applications that benefit from the superior transmission capabilities of 3G networks, such as capturing videos, sending videos to another user's handset, and viewing short video clips.⁵⁴⁴

202. Although early 3G licensing gave European operators a head start in the deployment of WCDMA networks, *Wall Street Journal* personal technology columnist Walt Mossberg argues that the superior next-generation technologies deployed by U.S. wireless carriers have given the United States an edge over Europe in wireless data networks for the first time in years.⁵⁴⁵ In particular, speeds on the EV-DO networks deployed by Verizon Wireless, Sprint Nextel, and other U.S. CDMA carriers are much faster than the speeds on European WCDMA networks.⁵⁴⁶ Moreover, in December 2005, U.S. operator Cingular became the first carrier in the world to launch a commercial WCDMA/HSDPA network, which also provides much faster speeds than Europe's WCDMA networks.⁵⁴⁷ Europe then followed, with a handful of Western European 3G operators beginning to upgrade their WCDMA networks by deploying HSDPA in the first half of 2006.⁵⁴⁸ The advantages of technological competition over standardization may account for the ability of U.S. carriers to leapfrog their European counterparts. As noted above, Cingular decided to deploy WCDMA with HSDPA to compete with Verizon Wireless's EV-DO network because the latter offers faster speeds than WCDMA alone.⁵⁴⁹ In contrast, with all competing carriers using the same technology, European carriers may be under less pressure to upgrade, knowing that a competitor's early lead will not be insurmountable.⁵⁵⁰

203. Japan's NTT DoCoMo launched the world's first commercial 3G service over a WCDMA network in October 2001.⁵⁵¹ NTT DoCoMo's WCDMA service, which the company calls FOMA (Freedom of Multimedia Access), had more than 23.4 million subscribers as of the

⁵⁴³ *European 3G Users Embracing New Multimedia Mobile Culture*, Press Release, M:Metrics, Feb. 7, 2006.

⁵⁴⁴ *Id.*

⁵⁴⁵ Walter S. Mossberg, *Cingular Joins Rivals With Fast, Reliable Wireless Broadband*, WALL STREET JOURNAL, Jan. 19, 2006, p. A9.

⁵⁴⁶ *Id.*

⁵⁴⁷ *Id.* See, also, *North American 3G*, at 4.

⁵⁴⁸ *3G Operators*, 3G TODAY (visited May 8, 2006) <<http://www.3gtoday.com>>.

⁵⁴⁹ See Section IV.B.1.C, Technology Choices and Upgrades of Mobile Telephone Carriers, *supra*.

⁵⁵⁰ Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 11.

⁵⁵¹ *Ninth Report*, at 20681.

end of March 2006, nearly double the number of subscribers at the end of April 2005.⁵⁵² In January 2006, FOMA overtook and surpassed rival Japanese carrier KDDI's CDMA2000 service, which had nearly 22 million subscribers at the end of March 2006.⁵⁵³ However, KDDI has migrated more than 96 percent of its subscribers to its CDMA2000 service, whereas FOMA accounts for less than 50 percent of NTT DoCoMo's subscriber base. Data services offered over next-generation CDMA networks continue to be popular with consumers in Korea. South Korea had accumulated more than 36.7 million CDMA2000 subscribers, representing nearly 96 percent of its total mobile telephone subscriber base, through March 2006, over 13 million of which are on CDMA2000 1xEV-DO networks.⁵⁵⁴

VII. INTERMODAL ISSUES

A. Wireless – Wireline Competition

204. Once solely a business tool, wireless phones are now a mass-market consumer device.⁵⁵⁵ As the chief operating officer of Sprint Nextel recently noted, “there are only three forgotten things consumers will return home for: a cellphone, a wallet or purse and keys.”⁵⁵⁶ The overall wireless penetration rate in the United States is now at 71 percent,⁵⁵⁷ and virtually everyone in the United States between the ages of 20 and 49 has a wireless phone.⁵⁵⁸ NTT DoCoMo Inc.'s Chief Executive has said, “[Cellphones are] already evolving as a multifunctional tool for everyday life.”⁵⁵⁹

1. Wireless Substitution

205. While exact percentages are difficult to determine, wireless substitution has grown significantly in recent years. According to the 2005 National Health Interview Survey (NHIS), 7.8 percent of adults lived in households with only wireless phones in the second half of 2005, up from 5.5 percent in the second half of 2004, and 3.5 percent in the second half of 2003.⁵⁶⁰ Similarly, based on a survey conducted in the fourth quarter of 2005, one analyst found

⁵⁵² Telecommunications Carriers Association (“TCA”), *Number of Subscribers* (visited May 8, 2006) <<http://www.tca.or.jp/eng/database/daisu/index.html>>.

⁵⁵³ *Id.*

⁵⁵⁴ *3G Subscribers*, 3G TODAY (visited May 8, 2004) <<http://www.3gtoday.com>>.

⁵⁵⁵ See *Sixth Report*, at 13381. One analyst estimated that, in 2004, only 25 percent of wireless users were business customers, with the remaining 75 percent being consumers. *10-Year Wireless Projections*, KAGAN WIRELESS TELECOM INVESTOR, June 6, 2005, at 2.

⁵⁵⁶ Roger Cheng, *Telecom Companies Pin Hopes On Developing Mobile Commerce*, WALL STREET JOURNAL, Apr. 17, 2006, at B6.

⁵⁵⁷ See Section VI.B.1, Subscriber Growth, *supra*.

⁵⁵⁸ Simon Flannery *et al.*, *Deteriorating Wireless Trends*, Morgan Stanley, Equity Research, Jan. 9, 2006, at 7. The authors add, “the inescapable conclusion is that the population aged 20-69 must be highly penetrated.”

⁵⁵⁹ Roger Cheng, *Telecom Companies Pin Hopes On Developing Mobile Commerce*, WALL STREET JOURNAL, Apr. 17, 2006, at B6.

⁵⁶⁰ Stephen J. Blumberg, Ph.D. and Julian V. Luke, *Wireless Substitution: Preliminary Data from the 2005 National Health Interview Survey*, National Center for Health Statistics, Centers for Disease Control, available at <<http://www.cdc.gov/nchs/products/pubs/pubd/hestats/wireless/wireless2005.htm>> (visited May 15, 2006).

that about 8 percent of U.S. households that subscribe to cellphone service had given up their landline phones, up from 5 percent in 2004 and 4 percent in 2003.⁵⁶¹ The analyst observed, “[h]ouseholds are ditching home wired phones faster because cellphone service is getting cheaper, wireless coverage is improving and fewer people need their land lines for access to the Internet.”⁵⁶² Moreover, the survey found that more than six million households, and nearly 6 percent of the total U.S. population, rely exclusively on wireless phones.⁵⁶³ Another survey from early 2006 found that 12 percent of cellphone users use cellphones as their only phone.⁵⁶⁴ A fourth survey from October 2005 found that nearly one in five consumers who recently purchased mobile phones said they had no landline service.⁵⁶⁵

206. Even when not “cutting the cord” completely, consumers increasingly are choosing wireless service over traditional wireline service, particularly for certain uses. For example, according to one analyst, customers in nearly a third of American households make at least half their long-distance calls at home from their cell phones rather than from their landlines.⁵⁶⁶ In the early 2006 survey of cellphone users described above, an additional 42 percent of cellphone users said that they also had a landline phone, but that they used their cellphones “most.”⁵⁶⁷

207. These trends appear to be due to the relatively low cost, widespread availability, and increased use of wireless service. As we discussed in past reports, a number of analysts have argued that wireless service is competitive or cheaper than wireline, particularly if one is making a long-distance call or when traveling.⁵⁶⁸ As one analyst wrote, “[a]t currently effective yields, we continue to believe wireless pricing is competitive with traditional wireline pricing (especially relative to long-distance calling). Lower yields, combined with the convenience of mobility, should continue to drive wireline displacement.”⁵⁶⁹

2. Wireless Alternatives

208. A number of mobile wireless carriers offer service plans designed to compete directly with wireline local telephone service. These plans offer unlimited local calling for

⁵⁶¹ Li Yuan, *More U.S. Households Are Ditching Landline Phones for Wireless*, WALL STREET JOURNAL, Mar. 31, 2006, at A12 (citing a survey by Forrester Research Inc.).

⁵⁶² *Id.*

⁵⁶³ *Id.*

⁵⁶⁴ *Id.* (citing a survey by the NPD Group). Another 42 percent said that they also had a landline phone, but they used their cellphones “most.” Only 43 percent said they still used their landline phones as the primary phone. *Id.*

⁵⁶⁵ *Nearly One in Five Wireless Service Buyers Report No Landline Service, Survey Says*, TRDAILY, Dec. 6, 2005 (citing a survey by the Consumer Electronics Association).

⁵⁶⁶ Sebastian Rupley, *The Cellular Home*, PC MAGAZINE, Aug 16, 2005.

⁵⁶⁷ Only 43 percent said they still used their landline phones as the primary phone. Li Yuan, *More U.S. Households Are Ditching Landline Phones for Wireless*, WALL STREET JOURNAL, Mar. 31, 2006, at A12 (citing a survey by the NPD Group). Another 42 percent said that they also had a landline phone, but they used their cellphones “most.” *Id.*

⁵⁶⁸ See *Eighth Report*, at 14832-14833; *Ninth Report*, at 20684-20685; *Tenth Report*, at 15980.

⁵⁶⁹ *4Q05 Wireless 411*, at 55.

around \$30 to \$40 a month. The two largest such providers, Leap, under its “Cricket” brand, and MetroPCS, served a combined total of 3.7 million customers at the end of 2005.⁵⁷⁰ Leap offers service in 41 markets in 20 states,⁵⁷¹ while MetroPCS offers service in certain major metropolitan areas in California, Florida, Georgia, Texas, and Michigan.⁵⁷²

209. In addition to unlimited local wireless calling plans, the nationwide carriers offer plans that offer large buckets of minutes, with around 1,000 “anytime” minutes and unlimited night and weekend minutes (some with free “in-network” calling), for around \$50-\$60 per month.⁵⁷³

B. Wireless Local Area Networks

210. Wireless Local Area Networks (WLANs) and Wireless Metropolitan Area Networks (WMANs) are playing an increasingly important role as a competitor and supplement to the services offered by the CMRS industry.⁵⁷⁴ WLANs are already widely deployed and enable consumers to obtain high-speed wireless Internet connections within a range of 150 to 250 feet from a wireless access point (AP).⁵⁷⁵ The most prevalent WLAN technology is equipment manufactured in accordance with the IEEE 802.11 family of standards, commonly known as “Wi-Fi,” short for wireless fidelity. Basic WLAN data transfer rates range from speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g. New “SpeedBoost” or “Super G” routers, marketed as “pre-802.11n,” employ MIMO (Multiple Input Multiple Output) technology, making them capable of providing speeds from 108 to 240 Mbps. The 802.11n standard did not receive enough support to be ratified as an official standard by IEEE in the latest round of voting in November 2005. After modification, the revised 802.11n specification will be reconsidered.

211. WLAN users often access high-speed Internet connections at so-called “hot spots,” including locations such as restaurants, coffee shops, hotels, airports, convention centers,

⁵⁷⁰ *Leap Reports Results for Fourth Quarter and Full Year 2005*, News Release, Leap, Mar. 16, 2006; *MetroPCS Reaches Two Million Customers on Four Year Anniversary of Service*, News Release, MetroPCS, Feb. 7, 2006 (as of February 2006).

⁵⁷¹ See Cricket, *View Coverage Maps* (visited May 3, 2006) <<http://www.mycricket.com/coverage/>>.

⁵⁷² See MetroPCS, *Find Your Coverage Area* (visited May 3, 2006) <<http://www.metropcs.com/coverage/coverageareas.php?currentNav=none>>.

⁵⁷³ See, e.g., T-Mobile, *All Plans* (visited May 3, 2006) <<http://www.t-mobile.com/>>; Cingular, *Rate Plans* (visited May 23, 2006) <<http://www.cingular.com/>>; Verizon Wireless, *America's Choice* (visited May 3, 2006) <<http://www.verizonwireless.com/>>; and, Sprint Nextel, *Planes for Sprint PCS Phones* (visited May 3, 2006) <<http://www.sprint.com/>>. See, also, Tim Horan, *Datetimes*, CIBC World Markets, May 3, 2006 (“By comparison, the larger national carriers offer 1,000 minutes for between \$50-\$56 per month and 2,000-2,500 for \$100 per month, but do not offer data services in those plans”). In addition, T-Mobile offers regional plans with 3,000 “Whenever” minutes for \$50 a month. T-Mobile, *All Plans* (visited May 8, 2006) <<http://www.t-mobile.com/>>.

⁵⁷⁴ Services provided over WLANs are not CMRS services. See 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services. WLANs are permitted to operate on an unlicensed basis under Part 15 of the FCC’s rules. See 47 C.F.R. §15, et seq.

⁵⁷⁵ 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*”)

and city parks.⁵⁷⁶ Estimates on the number of public Wi-Fi hot spots vary considerably. Wi-Fi411 estimates there are 13,178 public Wi-Fi hot spots in the United States.⁵⁷⁷ However, Intel's web site counts 39,951 Wi-Fi locations in United States.⁵⁷⁸ The Telecommunications Industry Association (TIA) cites data that places the number of hot spots in the United States at 39,200 in 2005.⁵⁷⁹ In addition to public hot spots, WLANs are also proliferating in homes and businesses. As users contract for wired broadband services for their home or business, they find that the "plug and play" wireless local area network extendibility made possible by devices from companies like Linksys and Netgear both affordable and convenient.

212. As noted in the *Ninth Report*, several mobile telephone carriers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments.⁵⁸⁰ Generally, mobile telephone carriers offer WLAN services to augment their voice service offerings with data access.⁵⁸¹ Subscribers to carriers' WLAN services may choose from a wide range of service plans including annual access, month-to-month access, daily access, and metered access.⁵⁸² In the past year mobile carriers continued to extend their Wi-Fi coverage by entering into agreements with other carriers. T-Mobile now claims 7,661 hotspots where its customers can get connectivity.⁵⁸³

VIII. CONCLUSION

213. Even with one less nationwide mobile telephone carrier to choose from, U.S. consumers continue to benefit from robust competition in the CMRS marketplace. During 2005, the CMRS industry experienced another year of strong growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2005, we estimate there were approximately 213 million mobile telephone subscribers, which translates into a nationwide penetration rate of roughly 71 percent.⁵⁸⁴ Consumers continue 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, the average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to 740 minutes per month in the second half of 2005, an increase of more than two hours from a year earlier and more than quadruple the

⁵⁷⁶ See *Seventh Report*, at 13062-13063. 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.

⁵⁷⁷ See <<http://www.wifi411.com/>> (visited May 18, 2006).

⁵⁷⁸ See <http://intel.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1> (visited May 18, 2006).

⁵⁷⁹ TIA's 2006 Telecommunications Market Review and Forecast at 190.

⁵⁸⁰ *Ninth Report*, at 20687.

⁵⁸¹ See *Tenth Report*, at 15983.

⁵⁸² See, for example, Sprint PCS, *PCS for Business: Voice and Data* (visited May 18, 2006) <<https://wifi.sprintpcs.com/signup/terms.aspx>>; T-Mobile, *T-Mobile Hotspot: Service Plans* (visited May 18, 2006) <https://selfcare.hotspot.t-mobile.com/#!/services_plans.do>.

⁵⁸³ See, for example, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 18, 2006) <<http://locations.hotspot.t-mobile.com/>>.

⁵⁸⁴ See Section, Section VI.B.1, Subscriber Growth, *supra*.

average usage of mobile subscribers in Western Europe and Japan.⁵⁸⁵ Survey evidence also indicates that U.S. mobile subscribers have experienced an improvement in call quality in the past year. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, they sent more than 48 billion text messages in the second half of 2005, nearly double the volume of text messages in the same period of 2004.⁵⁸⁶ 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 showed a continued decline in the cost of mobile service in 2005,⁵⁸⁷ mobile telephone service in the United States remains relatively inexpensive on a per minute basis compared with that in Western Europe.⁵⁸⁸

214. 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 telecommunications markets is robust. For example, mobile telephone providers continued to build out their networks and expand service availability during 2005.⁵⁸⁹ Carriers also continued to deploy networks based on CDMA2000 1xEV-DO or WCDMA/HSDPA technologies that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and laptops at speeds comparable to what many users get from fixed broadband connections such as DSL. With respect to market structure, the merger of Sprint and Nextel has resulted in a decline in the number of nationwide carriers from five to four.⁵⁹⁰ Due largely to this transaction, there was a decline in the percentage of the U.S. population living in counties with access to five or more different mobile telephone operators, from 87 percent at the end of 2004 to nearly 51 percent at the end of 2005. Nevertheless, 98 percent of the total U.S. population continues to live in counties where three or more different operators compete to offer mobile telephone service in some parts of those counties, while nearly 94 percent of the U.S. population continues to live in counties with four or more mobile telephone operators competing to offer service.⁵⁹¹

215. In addition, while relatively few wireless customers have “cut the cord” in the sense of canceling their subscription to wireline telephone service, consumers appear increasingly to choose wireless service over traditional wireline service, particularly for certain uses. According to one survey from early 2006, while only 12 percent of cellphone users use cellphones as their only phone, an additional 42 percent said they also had a landline phone but used their cellphones “most.” In addition, one analyst estimates that customers in nearly a third

⁵⁸⁵ See Section VI.D.2, Minutes of Use, *supra*, and VI.E, International Comparisons, *supra*.

⁵⁸⁶ See Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Data Usage, *supra*.

⁵⁸⁷ See Section VI.A.1, Pricing Trends, *supra*.

⁵⁸⁸ See Section VI.E, International Comparisons, *supra*.

⁵⁸⁹ See Section IV.B.1, Technology Deployment and Upgrades, *supra*.

⁵⁹⁰ As noted earlier, the mergers of Sprint and Nextel and of Alltel and Western Wireless mergers closed too recently for their effects to be reflected in the indicators of market structure, carrier conduct, and market performance. The structural changes resulting from these transactions, and their potential impact on carrier conduct and market performance, will be reflected in future reports.

⁵⁹¹ See Appendix A, Table 9, *infra*.

of American households make at least half their long-distance calls at home from their cell phones rather than from their landlines.

216. 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,⁵⁹² and conclude that the CMRS marketplace is effectively competitive.

IX. PROCEDURAL MATTERS

217. This Eleventh 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).

218. 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.

219. It is FURTHER ORDERED that the proceeding in the WT Docket No. **XXX** IS TERMINATED.

COMMISSION

FEDERAL COMMUNICATIONS

Marlene H. Dortch
Secretary

⁵⁹² See Section II.A, Background, *supra*.

APPENDIX A**Mobile Telephony****Table of Contents**

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Table 1: CTIA's Semi-Annual Mobile Telephone Industry Survey

| Date | Estimated Total Subscribers | Year End over Year End Subscriber Increase | 12-Month Total Service Revenues (in \$000s) | 12-Month Roamer Services Revenues (in \$000s) | Cell Sites | Direct Service Provider Employees | Average Local Monthly Bill (Dec. Survey Periods) |
|------|-----------------------------|--|---|---|------------|-----------------------------------|--|
| 1985 | 340,213 | 248,613 | \$482,428 | N/A | 913 | 2,727 | N/A |
| 1986 | 681,825 | 341,612 | \$823,052 | N/A | 1,531 | 4,334 | N/A |
| 1987 | 1,230,855 | 549,030 | \$1,151,519 | N/A | 2,305 | 7,147 | \$96.83 |
| 1988 | 2,069,441 | 838,586 | \$1,959,548 | N/A | 3,209 | 11,400 | \$98.02 |
| 1989 | 3,508,944 | 1,439,503 | \$3,340,595 | \$294,567 | 4,169 | 15,927 | \$83.94 |
| 1990 | 5,283,055 | 1,774,111 | \$4,548,820 | \$456,010 | 5,616 | 21,382 | \$80.90 |
| 1991 | 7,557,148 | 2,274,093 | \$5,708,522 | \$703,651 | 7,847 | 26,327 | \$72.74 |
| 1992 | 11,032,753 | 3,475,605 | \$7,822,726 | \$973,871 | 10,307 | 34,348 | \$68.68 |
| 1993 | 16,009,461 | 4,976,708 | \$10,892,175 | \$1,361,613 | 12,805 | 39,775 | \$61.48 |
| 1994 | 24,134,421 | 8,124,960 | \$14,229,922 | \$1,830,782 | 17,920 | 53,902 | \$56.21 |
| 1995 | 33,785,661 | 9,651,240 | \$19,081,239 | \$2,542,570 | 22,663 | 68,165 | \$51.00 |
| 1996 | 44,042,992 | 10,257,331 | \$23,634,971 | \$2,780,935 | 30,045 | 84,161 | \$47.70 |
| 1997 | 55,312,293 | 11,269,301 | \$27,485,633 | \$2,974,205 | 51,600 | 109,387 | \$42.78 |
| 1998 | 69,209,321 | 13,897,028 | \$33,133,175 | \$3,500,469 | 65,887 | 134,754 | \$39.43 |
| 1999 | 86,047,003 | 16,837,682 | \$40,018,489 | \$4,085,417 | 81,698 | 155,817 | \$41.24 |
| 2000 | 109,478,031 | 23,431,028 | \$52,466,020 | \$3,882,981 | 104,288 | 184,449 | \$45.27 |
| 2001 | 128,374,512 | 18,896,481 | \$65,316,235 | \$3,752,826 | 127,540 | 203,580 | \$47.37 |
| 2002 | 140,766,842 | 12,392,330 | \$76,508,187 | \$3,895,512 | 139,338 | 192,410 | \$48.40 |
| 2003 | 158,721,981 | 17,955,139 | \$87,624,093 | \$3,766,267 | 162,986 | 205,629 | \$49.91 |
| 2004 | 182,140,362 | 23,418,381 | \$102,121,210 | \$4,210,331 | 175,725 | 226,016 | \$50.64 |
| 2005 | 207,896,198 | 25,755,836 | \$113,538,221 | \$3,786,331 | 183,689 | 233,067 | \$49.98 |

Source: CTIA, *Background on CTIA's Semi-Annual Wireless Industry Survey*

http://www.ctia.org/research_statistics/statistics/index.cfm/AID/10030 (Annualized Wireless Industry Survey Results - December 1985 To December 2005: Reflecting Domestic U.S. Commercially-Operational Cellular, ESMR and PCS Providers).

**Table 2: FCC's Semi-Annual Local Telephone Competition Survey:
Mobile Telephone Subscribership**

| State | Dec 2005 | | Subscribers | | | | | | | |
|-----------------------|-----------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Carriers ¹ | Percent Resold ² | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | |
| | | | Dec | Dec | Dec | Dec | Dec | Dec | Jun | Dec |
| Alabama | 13 | 6 % | 1,080,410 | 1,386,294 | 1,979,075 | 1,987,254 | 2,242,108 | 2,580,810 | 2,843,385 | 3,071,359 |
| Alaska | 10 | 2 | 165,221 | * | 240,216 | 267,630 | 303,184 | 321,152 | 340,507 | 376,695 |
| American Samoa | * | * | 0 | 0 | 0 | 0 | 0 | * | * | * |
| Arizona | 10 | 9 | 1,125,321 | 1,855,115 | 2,171,021 | 2,520,058 | 2,843,061 | 3,299,222 | 3,547,280 | 3,849,152 |
| Arkansas | 6 | 5 | 719,919 | 743,928 | 970,127 | 1,156,345 | 1,296,901 | 1,458,673 | 1,681,404 | 1,781,266 |
| California | 11 | 4 | 8,544,941 | 12,710,520 | 15,052,203 | 17,575,105 | 20,360,454 | 23,457,761 | 24,598,429 | 25,564,483 |
| Colorado | 8 | 10 | 1,552,718 | 1,856,075 | 2,145,816 | 2,358,748 | 2,554,731 | 2,808,195 | 3,053,186 | 3,260,286 |
| Connecticut | 5 | 5 | 1,077,089 | 1,277,123 | 1,639,914 | 1,694,110 | 1,928,988 | 2,181,133 | 2,332,045 | 2,466,372 |
| Delaware | 4 | 6 | 270,848 | 371,014 | 412,611 | 438,196 | 543,526 | 646,064 | 710,853 | 751,042 |
| Dist. of Columbia | 4 | 5 | 346,681 | 354,735 | 404,489 | 472,832 | 513,102 | 657,774 | 746,529 | 819,061 |
| Florida | 7 | 6 | 5,158,079 | 6,369,985 | 8,937,063 | 9,482,349 | 10,855,430 | 13,169,278 | 12,577,898 | 12,521,686 |
| Georgia | 9 | 6 | 2,538,983 | 2,754,784 | 4,149,717 | 4,497,576 | 4,940,091 | 5,730,223 | 6,023,302 | 6,103,234 |
| Guam | * | * | * | 0 | * | * | * | * | * | 61,670 |
| Hawaii | 4 | 3 | 288,425 | 524,291 | 595,721 | 689,857 | 771,023 | 880,965 | 935,189 | 983,998 |
| Idaho | 14 | 6 | 271,436 | 344,564 | 444,864 | 536,064 | 605,488 | 705,948 | 777,445 | 838,095 |
| Illinois | 9 | 6 | 3,922,482 | 5,143,767 | 5,631,172 | 6,476,683 | 7,183,989 | 8,075,938 | 8,575,211 | 9,026,588 |
| Indiana | 7 | 10 | 1,318,975 | 1,715,074 | 1,921,356 | 2,390,567 | 2,642,810 | 3,158,002 | 3,276,910 | 3,540,375 |
| Iowa | 39 | 7 | 774,773 | 832,106 | 1,087,608 | 1,239,384 | 1,342,931 | 1,557,542 | 1,593,673 | 1,767,830 |
| Kansas | 11 | 9 | 669,472 | 801,293 | 956,050 | 1,117,277 | 1,261,242 | 1,454,087 | 1,538,945 | 1,666,340 |
| Kentucky | 10 | 10 | 911,700 | 1,026,334 | 1,405,043 | 1,456,705 | 1,812,657 | 2,189,345 | 2,495,494 | 2,657,782 |
| Louisiana | 8 | 6 | 1,227,106 | 1,306,457 | 1,920,740 | 2,190,613 | 2,470,146 | 2,834,716 | 2,997,513 | 3,258,336 |
| Maine | 6 | 12 | 187,003 | 359,786 | 427,313 | 466,896 | 568,159 | 662,623 | 785,814 | 823,242 |
| Maryland | 6 | 5 | 1,634,625 | 2,298,651 | 2,614,216 | 2,913,943 | 3,319,605 | 3,900,172 | 4,177,782 | 4,470,611 |
| Massachusetts | 5 | 6 | 1,892,014 | 2,649,130 | 2,996,816 | 3,375,726 | 3,741,975 | 4,042,592 | 4,316,120 | 4,544,572 |
| Michigan | 10 | 8 | 3,512,813 | 3,551,719 | 4,238,399 | 4,674,980 | 5,114,259 | 5,766,616 | 6,238,846 | 6,613,341 |
| Minnesota | 9 | 10 | 1,550,411 | 1,851,430 | 2,153,857 | 2,415,033 | 2,677,472 | 2,973,126 | 3,124,214 | 3,370,196 |
| Mississippi | 9 | 7 | 673,355 | 786,577 | 1,048,061 | 1,112,765 | 1,324,160 | 1,517,702 | 1,627,762 | 1,817,099 |
| Missouri | 12 | 8 | 1,855,452 | 1,767,411 | 2,106,599 | 2,289,831 | 2,691,255 | 3,109,167 | 3,482,839 | 3,732,549 |
| Montana | 7 | 4 | * | * | 279,349 | 315,512 | 373,947 | * | 467,795 | 526,954 |
| Nebraska | 10 | 4 | 576,296 | 659,380 | 791,799 | 867,810 | 937,184 | 1,045,810 | 1,078,955 | 1,169,068 |
| Nevada | 8 | 7 | 750,335 | 684,752 | 842,155 | 984,486 | 1,216,838 | 1,463,370 | 1,605,708 | 1,778,411 |
| New Hampshire | 6 | 8 | 280,508 | 387,264 | 492,390 | 525,689 | 648,788 | 727,985 | 916,833 | 989,443 |
| New Jersey | 4 | 4 | 2,289,181 | 3,575,130 | 4,283,643 | 4,587,640 | 5,799,417 | 7,388,722 | 7,269,330 | 7,723,622 |
| New Mexico | 9 | 7 | 363,827 | 443,343 | 660,849 | 780,855 | 859,408 | 987,813 | 1,025,143 | 1,170,436 |
| New York | 11 | 6 | 4,833,816 | 5,918,136 | 7,429,249 | 8,937,683 | 9,453,613 | 10,834,741 | 11,901,311 | 12,634,420 |
| North Carolina | 14 | 6 | 2,536,068 | 3,105,811 | 3,767,598 | 4,094,715 | 4,554,723 | 5,363,630 | 5,496,422 | 5,784,334 |
| North Dakota | 6 | 3 | * | * | * | * | * | * | 388,609 | 454,456 |
| Northern Mariana Isl. | * | * | * | * | * | * | * | * | * | * |
| Ohio | 11 | 8 | 3,237,786 | 4,150,498 | 4,739,795 | 5,212,204 | 5,817,211 | 6,627,910 | 7,056,675 | 7,559,975 |
| Oklahoma | 14 | 7 | 826,637 | 1,124,214 | 1,288,357 | 1,440,970 | 1,614,191 | 1,760,122 | 2,000,787 | 2,187,424 |
| Oregon | 9 | 8 | 914,848 | 1,201,207 | 1,399,279 | 1,682,343 | 1,778,936 | 2,029,224 | 2,128,710 | 2,417,992 |
| Pennsylvania | 11 | 8 | 2,767,474 | 4,129,186 | 4,849,085 | 5,258,844 | 6,073,573 | 7,037,296 | 7,340,862 | 7,881,534 |
| Puerto Rico | 6 | 1 | * | 757,613 | 1,128,736 | 1,516,808 | 1,631,266 | 2,076,698 | 2,002,851 | 2,110,798 |
| Rhode Island | 4 | 7 | 279,304 | 355,889 | 456,059 | 515,547 | 567,331 | 607,489 | 653,900 | 709,525 |
| South Carolina | 12 | 5 | 1,137,232 | 1,392,586 | 1,752,457 | 1,896,369 | 2,149,480 | 2,369,252 | 2,593,000 | 2,768,481 |
| South Dakota | 6 | 2 | * | * | 278,646 | 325,114 | 365,211 | 428,513 | 435,063 | 482,623 |
| Tennessee | 12 | 7 | 1,529,054 | 1,985,851 | 2,510,978 | 2,674,566 | 2,974,512 | 3,531,286 | 3,791,154 | 4,114,401 |
| Texas | 28 | 6 | 5,792,453 | 7,548,537 | 9,156,187 | 10,133,280 | 11,327,700 | 13,092,007 | 14,402,814 | 15,620,248 |
| Utah | 7 | 6 | 643,824 | 750,244 | 919,002 | 1,052,522 | 1,154,992 | 1,345,205 | 1,415,896 | 1,531,763 |
| Vermont | 4 | 14 | * | * | * | * | * | * | 295,971 | 315,382 |
| Virgin Islands | * | * | * | 0 | * | * | * | * | * | * |
| Virginia | 8 | 6 | 2,262,567 | 2,708,342 | 3,270,165 | 3,753,106 | 4,147,182 | 4,240,462 | 4,900,018 | 5,126,651 |
| Washington | 9 | 9 | 1,873,475 | 2,286,082 | 2,706,030 | 2,869,784 | 3,377,193 | 3,770,602 | 3,995,325 | 4,177,196 |
| West Virginia | 9 | 13 | 241,265 | 392,384 | 498,811 | 576,503 | 675,257 | 761,658 | 821,103 | 858,599 |
| Wisconsin | 12 | 6 | 1,525,818 | 1,698,520 | 2,229,389 | 2,396,562 | 2,723,985 | 2,997,029 | 3,191,190 | 3,355,951 |
| Wyoming | 8 | 5 | 127,634 | * | 194,665 | 191,939 | 295,706 | 302,203 | 330,567 | 358,593 |
| Nationwide | 155 | 6 % | 79,696,083 | 101,043,219 | 123,990,857 | 138,878,293 | 157,042,082 | 181,105,135 | 192,053,067 | 203,669,128 |

* Data withheld to maintain firm confidentiality. Some data have been revised.

¹ For data through December 2004, only facilities-based wireless carriers with at least 10,000 mobile telephony subscribers per state were required to report data, and they were instructed to use billing addresses to determine subscriber counts by state. Starting with the June 2005 data, all facilities-based wireless carriers are required to report, and to use the area codes of telephone numbers provided to subscribers to determine subscriber counts by state.

² Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

Source: Local Telephone Competition: Status as of Dec. 31, 2005, Federal Communications Commission, July 2006 (Table 14: Mobile Wireless Telephone Subscribers).

Table 3: Economic Area Penetration Rates

| EA | EA Name | Subscribers | 2000 EA Population | 2005 Penetration Rate | 2005 HHI | 2004 Penetration Rate | 2004 HHI | EA density |
|-----|--|-------------|--------------------|-----------------------|----------|-----------------------|----------|------------|
| 32 | Fort Myers-Cape Coral, FL | 655,340 | 692,265 | 95% | 2416 | 78% | 1799 | 234.27 |
| 40 | Atlanta, GA-AL-NC | 5,015,564 | 5,471,412 | 92% | 2360 | 80% | 2096 | 246.04 |
| 153 | Las Vegas, NV-AZ-UT | 1,575,070 | 1,709,797 | 92% | 2584 | 77% | 2155 | 23.74 |
| 13 | Washington-Baltimore, DC-MD-VA-WV-PA | 7,558,747 | 8,403,130 | 90% | 2739 | 79% | 2283 | 402.76 |
| 30 | Orlando, FL | 3,284,186 | 3,642,540 | 90% | 3028 | 74% | 2288 | 265.84 |
| 29 | Jacksonville, FL-GA | 1,662,868 | 1,885,190 | 88% | 2303 | 75% | 1797 | 112.52 |
| 31 | Miami-Fort Lauderdale, FL | 4,903,372 | 5,602,222 | 88% | 2418 | 74% | 2080 | 483.20 |
| 81 | Pensacola, FL | 549,964 | 623,252 | 88% | 2080 | 77% | 1744 | 154.06 |
| 161 | San Diego, CA | 2,476,716 | 2,813,833 | 88% | 2789 | 78% | 2486 | 660.48 |
| 34 | Tampa-St. Petersburg-Clearwater, FL | 2,039,328 | 2,395,997 | 85% | 2018 | 72% | 1727 | 890.99 |
| 57 | Detroit-Ann Arbor-Flint, MI | 5,884,704 | 6,963,637 | 85% | 2831 | 70% | 2118 | 364.07 |
| 82 | Biloxi-Gulfport-Pascagoula, MS | 337,071 | 396,754 | 85% | 1896 | 63% | 1844 | 143.45 |
| 130 | Austin-San Marcos, TX | 1,148,691 | 1,349,267 | 85% | 2920 | 76% | 2440 | 156.06 |
| 78 | Birmingham, AL | 1,324,715 | 1,578,903 | 84% | 2559 | 71% | 2265 | 137.13 |
| 172 | Honolulu, HI | 999,770 | 1,211,537 | 83% | 2504 | 74% | 2200 | 187.20 |
| 131 | Houston-Galveston-Brazoria, TX | 4,620,647 | 5,632,853 | 82% | 2510 | 70% | 2313 | 169.25 |
| 23 | Charlotte-Gastonia-Rock Hill, NC-SC | 1,645,981 | 2,031,519 | 81% | 2219 | 68% | 2019 | 240.50 |
| 74 | Huntsville, AL-TN | 808,774 | 997,824 | 81% | 2579 | 71% | 2560 | 119.14 |
| 160 | Los Angeles-Riverside-Orange County, CA-AZ | 14,655,513 | 18,003,420 | 81% | 2662 | 70% | 2433 | 286.10 |
| 26 | Charleston-North Charleston, SC | 468,541 | 587,297 | 80% | 2046 | 68% | 1908 | 149.80 |
| 84 | Baton Rouge, LA-MS | 593,055 | 739,673 | 80% | 4331 | 63% | 4103 | 140.30 |
| 141 | Denver-Boulder-Greeley, CO-KS-NE | 3,177,341 | 3,984,105 | 80% | 2342 | 71% | 2025 | 52.02 |
| 158 | Phoenix-Mesa, AZ-NM | 2,740,841 | 3,407,197 | 80% | 2068 | 68% | 1807 | 93.91 |
| 12 | Philadelphia-Wilmington-Atl. City, PA-NJ-DE-MD | 5,808,070 | 7,309,792 | 79% | 2749 | 69% | 2409 | 778.84 |
| 33 | Sarasota-Bradenton, FL | 603,137 | 763,795 | 79% | 2377 | 67% | 1863 | 273.56 |
| 85 | Lafayette, LA | 473,285 | 601,654 | 79% | 4193 | 60% | 4003 | 99.99 |
| 164 | Sacramento-Yolo, CA | 1,817,843 | 2,311,567 | 79% | 2567 | 68% | 2545 | 188.08 |
| 170 | Seattle-Tacoma-Bremerton, WA | 3,271,644 | 4,135,291 | 79% | 2600 | 69% | 2336 | 190.45 |
| 10 | New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-VT | 20,121,151 | 25,712,577 | 78% | 2659 | 69% | 2326 | 890.56 |
| 19 | Raleigh-Durham-Chapel Hill, NC | 1,421,115 | 1,831,510 | 78% | 2191 | 69% | 1865 | 188.38 |
| 127 | Dallas-Fort Worth, TX-AR-OK | 5,964,163 | 7,645,530 | 78% | 2825 | 66% | 2708 | 119.00 |
| 163 | San Francisco-Oakland-San Jose, CA | 7,108,019 | 9,111,806 | 78% | 2636 | 69% | 2598 | 271.07 |
| 20 | Norfolk-Virginia Beach-Newport News, VA-NC | 1,318,081 | 1,722,764 | 77% | 2036 | 66% | 1712 | 289.89 |
| 28 | Savannah, GA-SC | 512,403 | 668,214 | 77% | 1605 | 60% | 1760 | 91.95 |
| 35 | Tallahassee, FL-GA | 553,429 | 720,434 | 77% | 2298 | 65% | 2105 | 63.51 |
| 70 | Louisville, KY-IN | 1,095,457 | 1,416,914 | 77% | 2572 | 67% | 2233 | 180.92 |
| 83 | New Orleans, LA-MS | 1,324,220 | 1,725,338 | 77% | 3040 | 63% | 2570 | 171.93 |
| 134 | San Antonio, TX | 1,656,504 | 2,141,060 | 77% | 3173 | 64% | 2687 | 82.99 |
| 3 | Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT | 6,016,321 | 7,954,554 | 76% | 2664 | 67% | 2319 | 421.83 |
| 15 | Richmond-Petersburg, VA | 1,098,675 | 1,446,123 | 76% | 2250 | 66% | 1895 | 124.03 |
| 42 | Asheville, NC | 335,779 | 444,594 | 76% | 3538 | 62% | 3609 | 128.63 |
| 99 | Kansas City, MO-KS | 1,872,482 | 2,469,340 | 76% | 2328 | 66% | 1954 | 88.73 |
| 155 | Farmington, NM-CO | 148,156 | 193,872 | 76% | 3462 | 59% | 4516 | 16.04 |
| 71 | Nashville, TN-KY | 1,832,718 | 2,444,643 | 75% | 2526 | 64% | 2212 | 105.12 |
| 87 | Beaumont-Port Arthur, TX | 340,858 | 456,637 | 75% | 3151 | 57% | 3187 | 89.20 |
| 151 | Reno, NV-CA | 502,641 | 670,013 | 75% | 2282 | 64% | 2115 | 7.56 |

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| EA | EA Name | Subscribers | 2000 EA Population | 2005 Penetration Rate | 2005 HHI | 2004 Penetration Rate | 2004 HHI | EA density |
|-----|--|-------------|--------------------|-----------------------|----------|-----------------------|----------|------------|
| 64 | Chicago-Gary-Kenosha, IL-IN-WI | 7,663,354 | 10,328,854 | 74% | 2178 | 65% | 1884 | 556.54 |
| 167 | Portland-Salem, OR-WA | 2,122,657 | 2,883,737 | 74% | 2392 | 63% | 2251 | 76.01 |
| 24 | Columbia, SC | 679,824 | 932,115 | 73% | 2257 | 63% | 2170 | 125.95 |
| 25 | Wilmington, NC-SC | 644,206 | 878,267 | 73% | 1897 | 60% | 1828 | 107.39 |
| 103 | Cedar Rapids, IA | 282,140 | 384,577 | 73% | 2862 | 67% | 2826 | 101.33 |
| 44 | Knoxville, TN | 709,837 | 983,329 | 72% | 2491 | 62% | 2266 | 165.64 |
| 51 | Columbus, OH | 1,687,113 | 2,349,060 | 72% | 2914 | 61% | 2279 | 190.40 |
| 73 | Memphis, TN-AR-MS-KY | 1,348,071 | 1,882,332 | 72% | 2552 | 63% | 2395 | 102.99 |
| 98 | Columbia, MO | 265,695 | 369,014 | 72% | 3742 | 63% | 3565 | 58.00 |
| 154 | Flagstaff, AZ-UT | 290,386 | 401,766 | 72% | 2782 | 56% | 2809 | 8.24 |
| 159 | Tucson, AZ | 722,581 | 999,882 | 72% | 2011 | 62% | 1741 | 60.03 |
| 22 | Fayetteville, NC | 376,588 | 528,224 | 71% | 1971 | 62% | 1880 | 164.57 |
| 41 | Greenville-Spartanburg-Anderson, SC-NC | 885,169 | 1,248,824 | 71% | 2840 | 61% | 2731 | 183.62 |
| 43 | Chattanooga, TN-GA | 514,315 | 720,375 | 71% | 2892 | 60% | 2476 | 145.32 |
| 49 | Cincinnati-Hamilton, OH-KY-IN | 1,561,714 | 2,184,860 | 71% | 2357 | 62% | 2136 | 294.08 |
| 86 | Lake Charles, LA | 380,920 | 536,758 | 71% | 2906 | 54% | 2680 | 52.41 |
| 97 | Springfield, IL-MO | 364,828 | 517,462 | 71% | 3589 | 62% | 3518 | 58.20 |
| 107 | Minneapolis-St. Paul, MN-WI-IA | 3,205,089 | 4,498,286 | 71% | 1910 | 64% | 1554 | 82.98 |
| 143 | Casper, WY-ID-UT | 288,281 | 408,708 | 71% | 4577 | 61% | 4378 | 5.17 |
| 148 | Idaho Falls, ID-WY | 215,833 | 306,120 | 71% | 2522 | 63% | 2540 | 10.85 |
| 150 | Boise City, ID-OR | 409,295 | 574,876 | 71% | 2643 | 61% | 2391 | 13.69 |
| 152 | Salt Lake City-Ogden, UT-ID | 1,479,612 | 2,088,974 | 71% | 2192 | 61% | 2137 | 35.68 |
| 156 | Albuquerque, NM-AZ | 651,793 | 921,086 | 71% | 2046 | 60% | 2012 | 20.89 |
| 37 | Albany, GA | 326,796 | 468,178 | 70% | 2306 | 58% | 2540 | 62.74 |
| 67 | Indianapolis, IN-IL | 2,156,501 | 3,066,469 | 70% | 3021 | 58% | 2721 | 171.37 |
| 96 | St. Louis, MO-IL | 2,503,004 | 3,558,651 | 70% | 2751 | 61% | 2613 | 127.01 |
| 11 | Harrisburg-Lebanon-Carlisle, PA | 779,990 | 1,125,265 | 69% | 3028 | 61% | 2906 | 292.42 |
| 69 | Evansville-Henderson, IN-KY-IL | 585,718 | 854,714 | 69% | 4003 | 56% | 3851 | 75.31 |
| 135 | Odessa-Midland, TX | 266,150 | 388,007 | 69% | 3483 | 56% | 3411 | 10.13 |
| 16 | Staunton, VA-WV | 227,848 | 334,087 | 68% | 2036 | 57% | 1849 | 50.99 |
| 18 | Greensboro-Winston-Salem-High Point, NC-VA | 1,264,918 | 1,854,853 | 68% | 1980 | 58% | 1829 | 189.09 |
| 50 | Dayton-Springfield, OH | 775,636 | 1,133,004 | 68% | 2662 | 59% | 2354 | 318.52 |
| 77 | Jackson, MS-AL-LA | 970,771 | 1,432,518 | 68% | 3108 | 56% | 2883 | 49.67 |
| 89 | Monroe, LA | 227,890 | 333,519 | 68% | 4051 | 59% | 4044 | 56.12 |
| 90 | Little Rock-North Little Rock, AR | 1,098,112 | 1,614,850 | 68% | 4163 | 60% | 3968 | 46.09 |
| 92 | Fayetteville-Springdale-Rogers, AR-MO-OK | 274,800 | 405,160 | 68% | 3960 | 59% | 3685 | 88.43 |
| 122 | Wichita, KS-OK | 800,782 | 1,175,577 | 68% | 2154 | 57% | 1862 | 20.49 |
| 137 | Lubbock, TX | 253,694 | 374,626 | 68% | 2841 | 60% | 2669 | 27.17 |
| 38 | Macon, GA | 512,836 | 768,701 | 67% | 2242 | 56% | 1868 | 62.88 |
| 63 | Milwaukee-Racine, WI | 1,502,765 | 2,255,183 | 67% | 2344 | 61% | 2339 | 366.88 |
| 80 | Mobile, AL | 451,303 | 676,258 | 67% | 3291 | 63% | 2431 | 74.75 |
| 106 | Rochester, MN-IA-WI | 214,030 | 318,374 | 67% | 3246 | 61% | 3176 | 55.65 |
| 132 | Corpus Christi, TX | 366,378 | 549,012 | 67% | 3066 | 57% | 2834 | 46.47 |
| 14 | Salisbury, MD-DE-VA | 239,395 | 363,970 | 66% | 5101 | 54% | 5693 | 111.17 |
| 39 | Columbus, GA-AL | 329,335 | 496,538 | 66% | 2186 | 69% | 1669 | 84.08 |
| 75 | Tupelo, MS-AL-TN | 411,182 | 625,002 | 66% | 5034 | 57% | 4820 | 49.76 |
| 88 | Shreveport-Bossier City, LA-AR | 376,462 | 573,616 | 66% | 3389 | 55% | 3387 | 57.96 |
| 93 | Joplin, MO-KS-OK | 174,937 | 263,904 | 66% | 3162 | 56% | 3133 | 74.68 |

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| EA | EA Name | Subscribers | 2000 EA Population | 2005 Penetration Rate | 2005 HHI | 2004 Penetration Rate | 2004 HHI | EA density |
|-----|---------------------------------------|-------------|--------------------|-----------------------|----------|-----------------------|----------|------------|
| 116 | Sioux Falls, SD-IA-MN-NE | 344,606 | 519,143 | 66% | 3754 | 58% | 3567 | 15.11 |
| 118 | Omaha, NE-IA-MO | 690,413 | 1,044,156 | 66% | 2310 | 60% | 1985 | 62.40 |
| 119 | Lincoln, NE | 250,803 | 379,321 | 66% | 5484 | 62% | 3819 | 50.24 |
| 124 | Tulsa, OK-KS | 917,117 | 1,384,426 | 66% | 2694 | 59% | 2777 | 72.44 |
| 149 | Twin Falls, ID | 107,304 | 162,397 | 66% | 2413 | 58% | 2429 | 14.08 |
| 162 | Fresno, CA | 930,478 | 1,419,998 | 66% | 3122 | 55% | 3387 | 98.64 |
| 166 | Eugene-Springfield, OR-CA | 522,915 | 791,776 | 66% | 1882 | 57% | 1938 | 43.10 |
| 2 | Portland, ME | 489,986 | 748,817 | 65% | 2479 | 58% | 2614 | 98.56 |
| 5 | Albany-Schenectady-Troy, NY | 764,498 | 1,171,669 | 65% | 3138 | 57% | 2740 | 134.71 |
| 21 | Greenville, NC | 532,002 | 823,517 | 65% | 2660 | 56% | 2687 | 87.74 |
| 27 | Augusta-Aiken, GA-SC | 395,954 | 604,799 | 65% | 2021 | 57% | 2004 | 89.79 |
| 94 | Springfield, MO | 556,416 | 859,559 | 65% | 3350 | 56% | 3303 | 48.14 |
| 101 | Peoria-Pekin, IL | 344,542 | 528,671 | 65% | 3343 | 56% | 3451 | 90.99 |
| 102 | Davenport-Moline-Rock Island, IA-IL | 365,550 | 558,913 | 65% | 2666 | 57% | 2514 | 108.27 |
| 53 | Pittsburgh, PA-WV | 1,907,756 | 2,971,829 | 64% | 2887 | 57% | 2649 | 284.77 |
| 55 | Cleveland-Akron, OH-PA | 2,994,142 | 4,692,460 | 64% | 2368 | 54% | 2269 | 427.84 |
| 144 | Billings, MT-WY | 260,249 | 404,902 | 64% | 4581 | 55% | 4397 | 4.89 |
| 59 | Green Bay, WI-MI | 419,852 | 671,225 | 63% | 2583 | 56% | 2468 | 34.15 |
| 60 | Appleton-Oshkosh-Neenah, WI | 272,802 | 433,250 | 63% | 2118 | 54% | 2427 | 143.62 |
| 62 | Grand Rapids-Muskegon-Holland, MI | 1,179,499 | 1,881,991 | 63% | 2926 | 55% | 2204 | 206.76 |
| 68 | Champaign-Urbana, IL | 394,350 | 630,898 | 63% | 3097 | 54% | 2923 | 73.47 |
| 100 | Des Moines, IA-IL-MO | 1,061,186 | 1,683,257 | 63% | 2947 | 56% | 3011 | 47.32 |
| 104 | Madison, WI-IL-IA | 591,008 | 933,823 | 63% | 4009 | 57% | 4237 | 71.33 |
| 128 | Abilene, TX | 139,810 | 222,147 | 63% | 3449 | 52% | 3095 | 20.35 |
| 138 | Amarillo, TX-NM | 302,510 | 481,633 | 63% | 2039 | 56% | 1695 | 11.79 |
| 146 | Missoula, MT | 252,695 | 399,183 | 63% | 4737 | 53% | 4762 | 10.79 |
| 165 | Redding, CA-OR | 213,119 | 336,820 | 63% | 2325 | 55% | 2031 | 14.36 |
| 169 | Richland-Kennewick-Pasco, WA | 424,544 | 677,674 | 63% | 2583 | 54% | 2638 | 27.68 |
| 17 | Roanoke, VA-NC-WV | 511,813 | 826,284 | 62% | 1988 | 53% | 1898 | 97.83 |
| 45 | Johnson City-Kingsport-Bristol, TN-VA | 359,589 | 576,081 | 62% | 2134 | 54% | 1945 | 144.51 |
| 56 | Toledo, OH | 800,279 | 1,294,395 | 62% | 3049 | 54% | 2873 | 163.94 |
| 66 | Fort Wayne, IN | 450,281 | 725,847 | 62% | 3294 | 53% | 3274 | 158.50 |
| 123 | Topeka, KS | 283,135 | 454,539 | 62% | 2308 | 55% | 1760 | 35.62 |
| 133 | McAllen-Edinburg-Mission, TX | 608,620 | 978,369 | 62% | 3423 | 50% | 2902 | 221.96 |
| 136 | Hobbs, NM-TX | 117,764 | 190,340 | 62% | 3283 | 52% | 3198 | 11.21 |
| 142 | Scottsbluff, NE-WY | 57,143 | 92,360 | 62% | 6440 | 56% | 7064 | 7.81 |
| 147 | Spokane, WA-ID | 518,155 | 829,735 | 62% | 2815 | 54% | 2609 | 23.63 |
| 121 | North Platte, NE-CO | 37,616 | 61,758 | 61% | 8720 | 57% | 7018 | 4.95 |
| 139 | Santa Fe, NM | 158,172 | 258,790 | 61% | 3031 | 54% | 3014 | 13.06 |
| 46 | Hickory-Morganton, NC-TN | 313,298 | 519,208 | 60% | 2500 | 51% | 2428 | 131.90 |
| 95 | Jonesboro, AR-MO | 182,232 | 303,852 | 60% | 4773 | 51% | 4657 | 51.30 |
| 111 | Minot, ND | 66,459 | 111,195 | 60% | 3858 | 60% | 3465 | 7.00 |
| 112 | Bismarck, ND-MT-SD | 105,492 | 175,427 | 60% | 4838 | 52% | 5005 | 6.26 |
| 113 | Fargo-Moorhead, ND-MN | 223,859 | 371,691 | 60% | 3008 | 54% | 2806 | 16.40 |
| 125 | Oklahoma City, OK | 1,022,155 | 1,698,197 | 60% | 2574 | 61% | 3714 | 65.04 |
| 157 | El Paso, TX-NM | 577,453 | 955,602 | 60% | 2403 | 49% | 2131 | 33.04 |
| 65 | Elkhart-Goshen, IN-MI | 551,262 | 936,245 | 59% | 2436 | 50% | 2197 | 185.73 |
| 79 | Montgomery, AL | 283,576 | 481,137 | 59% | 2196 | 68% | 1724 | 66.86 |

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| EA | EA Name | Subscribers | 2000 EA Population | 2005 Penetration Rate | 2005 HHI | 2004 Penetration Rate | 2004 HHI | EA density |
|-----|------------------------------|-------------|-----------------------|-----------------------------|-------------|-----------------------------|-------------|---------------|
| 91 | Fort Smith, AR-OK | 194,148 | 329,136 | 59% | 3860 | 51% | 3655 | 46.51 |
| 120 | Grand Island, NE | 168,676 | 288,047 | 59% | 9043 | 55% | 6654 | 11.56 |
| 115 | Rapid City, SD-MT-NE-ND | 126,199 | 213,696 | 59% | 4688 | 52% | 4672 | 5.04 |
| 6 | Syracuse, NY-PA | 1,111,128 | 1,902,640 | 58% | 3667 | 51% | 3461 | 104.74 |
| 7 | Rochester, NY-PA | 865,630 | 1,493,518 | 58% | 4017 | 52% | 3530 | 167.21 |
| 8 | Buffalo-Niagara Falls, NY-PA | 879,395 | 1,507,759 | 58% | 2980 | 51% | 2597 | 212.89 |
| 61 | Traverse City, MI | 165,381 | 286,745 | 58% | 4220 | 54% | 4192 | 50.67 |
| 72 | Paducah, KY-IL | 128,444 | 226,586 | 57% | 5630 | 46% | 6137 | 70.02 |
| 117 | Sioux City, IA-NE-SD | 143,266 | 252,656 | 57% | 3671 | 48% | 3437 | 39.51 |
| 126 | Western Oklahoma, OK | 79,124 | 139,761 | 57% | 2574 | 52% | 2956 | 12.04 |
| 171 | Anchorage, AK | 355,240 | 626,932 | 57% | 4198 | 51% | 4436 | 1.07 |
| 1 | Bangor, ME | 294,771 | 526,106 | 56% | 4932 | 51% | 4862 | 20.94 |
| 4 | Burlington, VT-NY | 339,019 | 605,393 | 56% | 4885 | 47% | 4686 | 57.62 |
| 47 | Lexington, KY-TN-VA-WV | 1,038,532 | 1,851,367 | 56% | 2768 | 47% | 2229 | 80.39 |
| 110 | Grand Forks, ND-MN | 129,534 | 230,253 | 56% | 3922 | 49% | 3973 | 10.16 |
| 9 | State College, PA | 445,347 | 809,979 | 55% | 4035 | 49% | 3724 | 92.41 |
| 109 | Duluth-Superior, MN-WI | 191,475 | 350,059 | 55% | 3464 | 48% | 3720 | 18.53 |
| 140 | Pueblo, CO-NM | 151,911 | 279,600 | 54% | 2654 | 49% | 2385 | 8.71 |
| 36 | Dothan, AL-FL-GA | 168,520 | 332,409 | 51% | 2039 | 58% | 2225 | 53.70 |
| 108 | Wausau, WI | 250,248 | 487,723 | 51% | 2177 | 45% | 2314 | 34.13 |
| 48 | Charleston, WV-KY-OH | 602,908 | 1,199,373 | 50% | 2590 | 44% | 2323 | 85.35 |
| 145 | Great Falls, MT | 83,336 | 166,564 | 50% | 4409 | 44% | 4290 | 4.23 |
| 52 | Wheeling, WV-OH | 158,946 | 327,645 | 49% | 4158 | 42% | 4188 | 124.54 |
| 105 | La Crosse, WI-MN | 118,583 | 241,903 | 49% | 4008 | 44% | 4045 | 53.67 |
| 54 | Erie, PA | 251,423 | 519,348 | 48% | 4255 | 44% | 4049 | 116.41 |
| 168 | Pendleton, OR-WA | 96,098 | 200,681 | 48% | 2861 | 43% | 3327 | 8.67 |
| 76 | Greenville, MS | 119,346 | 252,280 | 47% | 3249 | 40% | 3411 | 40.96 |
| 129 | San Angelo, TX | 89,637 | 202,679 | 44% | 3167 | 37% | 2871 | 10.05 |
| 58 | Northern Michigan, MI | 110,176 | 269,986 | 41% | 4437 | 38% | 4563 | 28.53 |
| 114 | Aberdeen, SD | * | 82,608 | * | * | * | * | 5.39 |

* Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on preliminary year-end 2005 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 2004 | | | Year-End 2005 | | |
|---------------|--------------------------|--------|---------------|--------------------------|--------|
| | Operator | Total | | Operator | Total |
| 1 | Cingular Wireless | 49,109 | | Cingular Wireless | 54,144 |
| 2 | Verizon Wireless | 43,816 | | Verizon Wireless | 51,337 |
| 3 | Sprint PCS | 21,507 | | Sprint Nextel (3) (4) | 44,815 |
| 4 | T-Mobile | 17,314 | | T-Mobile | 21,690 |
| 5 | Nextel | 16,247 | | Alltel (5) | 10,662 |
| 6 | Alltel | 8,626 | | US Cellular | 4,945 |
| 7 | US Cellular | 4,945 | | Nextel Partners (4) | 2,018 |
| 8 | Dobson Comm. | 1,609 | | MetroPCS (6) | 2,000 |
| 9 | Nextel Partners | 1,602 | | Leap | 1,668 |
| 10 | Leap | 1,569 | | Dobson Comm. | 1,543 |
| 11 | MetroPCS | 1,500 | | Centennial (7) | 1,338 |
| 12 | Western Wireless | 1,395 | | Alamosa PCS (4) (8) | 1,000 |
| 13 | Centennial (1) | 1,108 | | Suncom | 966 |
| 14 | Suncom | 951 | | Rural Cellular | 706 |
| 15 | Alamosa PCS | 915 | | Cellular South | 500 |
| 16 | Qwest (2) | 754 | | Cincinnati Bell Wireless | 496 |
| 17 | Rural Cellular | 730 | | iPCS (9) | 495 |
| 18 | Cincinnati Bell Wireless | 481 | | Ubiquitel (4) | 448 |
| 19 | US Unwired | 469 | | Midwest Wireless (5) | 440 |
| 20 | Cellular South | 400 | | Ntelos | 336 |
| 21 | AirGate PCS | 400 | | SouthernLINC | 260 |
| 22 | Midwest Wireless | 400 | | Shenendoah Telecomm. | 162 |
| 23 | Ubiquitel | 497 | | Bluegrass Cellular | 130 |
| 24 | SouthernLINC | 260 | | Alaska Commun. | 113 |
| 25 | iPCS | 249 | | Surewest Wireless | 54 |

Sources: For 2004, *see Tenth Report*, at 15993. For 2005, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. Midwest Wireless, Company Facts (visited Apr. 20, 2006) <<http://www.midwestwireless.com/Home/AboutUs/CompanyFacts.htm>> (Midwest Wireless); B. Parmley, *Bluegrass Cellular Launches Wireless Service in Somerset and Announces New Sales Staff*, Somerset Commonwealth Journal, Apr. 2, 2006, at D1 (Bluegrass Cellular); Cellular South Comments; SouthernLINC, *Frequently Asked Questions* (visited June 15, 2005) <<http://www.solinc.com/faqs.asp>> (Southern LINC); *MetroPCS Reaches Two Million Customers on Four Year Anniversary of Service*, News Release, MetroPCS, Feb. 7, 2006 (MetroPCS).

Notes

- (1) As of Nov. 30, 2003, includes Puerto Rico, the US Virgin Islands, and the Dominican Republic.
- (2) In the second quarter of 2004, existing Qwest subscribers began transitioning to Sprint PCS's network as Qwest exited the facilities-based provision of wireless service. Sprint expected this transfer to be substantively complete by the end of the first quarter of 2005. Sprint, SEC Form 10K, filed Apr. 29, 2005, at 4. *See also Ninth Report*, at 20627-20628.
- (3) On August 12, 2005, Sprint PCS completed its merger with Nextel. This total includes Direct Post-Paid Subscribers (36.977 million), Direct Pre-Paid Subscribers (Boost subsidiary, with 2.684 million) and Wholesale Subscribers (5.154 million).
- (4) In 2005, Sprint Nextel acquired three affiliates - US Unwired, Gulf Coast, and IWO. Sprint Nextel completed its acquisition of Alamosa on Feb. 1, 2006 and its acquisition of Nextel Partners on June 26, 2006. Sprint Nextel has also agreed to acquire UbiquiTel.
- (5) On August 1, 2005, Alltel completed its acquisition of Western Wireless. On November 18, 2005, Alltel announced an agreement to purchase Midwest Wireless.
- (6) As of February 2006.
- (7) As of Nov. 30, 2004, includes Puerto Rico, the US Virgin Islands, and the Dominican Republic.
- (8) On Feb. 15, 2005, Alamosa completed its acquisition of AirGate PCS.
- (9) On July 1, 2005, iPCS completed its merger with Horizon PCS, another Sprint PCS affiliate. Horizon PCS reported 189,000 subscribers as of Dec. 31, 2004.

Table 5: NRUF-Estimated Mobile Telephone Subscribers

| | Subscribers (millions) | Increase from previous year (millions) | Penetration Rate |
|------|---------------------------|--|---------------------|
| 2001 | 128.5 | n/a | 45 % |
| 2002 | 141.8 | 13.3 | 49 % |
| 2003 | 160.6 | 18.8 | 54 % |
| 2004 | 184.7 | 24.1 | 62 % |
| 2005 | 213.0 | 28.3 | 71 % |

**Table 6: 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 | 2674 | 279699484 | 98.0% | 2,468,670 | 68.4% |
| 4 or More | 2097 | 267640610 | 93.8% | 1,839,104 | 51.0% |
| 5 or More | 1167 | 145030235 | 50.8% | 965,569 | 26.8% |
| 6 or More | 414 | 50092268 | 17.6% | 292,820 | 8.1% |
| 7 or More | 66 | 6706603 | 2.4% | 42,059 | 1.2% |

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

- (1) POPs from the 2000 Census;
- (2) United States and Puerto Rico

Table 7: Mobile Telephone Digital Coverage

| Technology | POPs in Covered Counties (1) | % of Total POPs (2) | Square Miles Contained in Those Counties | % of Total Square Miles |
|---------------|------------------------------|---------------------|--|-------------------------|
| CDMA | 283,583,958 | 99.4% | 3,322,475 | 92.2% |
| TDMA / GSM | 279,589,296 | 98.0% | 3,004,001 | 83.3% |
| iDEN | 267,610,225 | 93.8% | 1,887,718 | 52.3% |
| Total Digital | 285,230,516 | 100.0% | 3,606,933 | 100.0% |

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").

- (1) POPs from the 2000 Census
- (2) United States and Puerto Rico

Table 8: Mobile Telephone NextGen Coverage

| Technology | POPs in Covered Counties (1) | % of Total POPs (2) | Square Miles Contained in Those Counties | % of Total Square Miles |
|----------------------------------|------------------------------|---------------------|--|-------------------------|
| CDMA Path (1xRTT/EVDO) | 282,726,629 | 99.1% | 2,818,949 | 78.2% |
| GSM Path (GPRS/EDGE/WCDMA/HSDPA) | 269,022,781 | 94.3% | 1,893,335 | 52.5% |
| WCDMA/HSDPA | 57,524,389 | 20.2% | 82,159 | 2.3% |
| EVDO | 178,642,051 | 62.6% | 478,792 | 13.3% |

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

- (1) POPs from the 2000 Census
- (2) United States and Puerto Rico

Table 9: 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 |
| Dec 1997 | 100 | | 100 | | 100 | | 100 | | 100 | |
| 1998 | 101.6 | | 95.1 | | 100.7 | | 101.6 | | 100.5 | |
| 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% |
| 2004 | 117.7 | 2.7% | 66.2 | -0.9% | 95.8 | -2.5% | 125.1 | 1.5% | 70.9 | -8.9% |
| 2005 | 121.7 | 3.4% | 65 | -1.8% | 94.9 | -0.9% | 128.5 | 2.7% | 67.5 | -4.8% |
| | | | | | | | | | | |
| Dec 1997 to 2005 | | 21.7% | | -35.0% | | -5.1% | | 28.5% | | -32.5% |

Source: Bureau of Labor Statistics.

Table 10: 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% |
| 2004 | \$50.64 | 584 | \$0.09 | -12% |
| 2005 | \$49.98 | 740 | \$0.07 | -22% |

Note: Data covers the last six months of each year.

Source: See Appendix A, Table 1, at 87 (ARPU); Dec 2005 CTIA Survey, at 217-218 (minutes of use).

Table 11: Market Entry Over Time

| | Percent of Total US POPs Covered | | | | | | |
|---|----------------------------------|-----------------|-----------------|------------------|-------------------|-----------------|-----------------|
| Total Number of Providers in a County | 11th Report | Tenth Report | Ninth Report | Eighth Report | Seventh Report | Sixth Report | Fifth Report |
| 3 or more | 98.0% | 96.9% | 96.8% | 94.7% | 94.1% | 90.8% | 87.8% |
| 4 or more | 93.8% | 93.2% | 93.0% | 89.3% | 88.7% | 84.4% | 79.8% |
| 5 or more | 50.8% | 87.3% | 87.5% | 82.6% | 80.4% | 75.1% | 68.5% |
| 6 or more | 17.6% | 41.3% | 75.8% | 71.1% | 53.1% | 46.7% | 34.6% |
| 7 or more | 2.4% | 12.6% | 29.5% | 25.4% | 21.2% | 11.9% | 4.4% |

Source: FCC estimates

**Table 12: Mobile Market Structure and Performance
in Selected Countries**

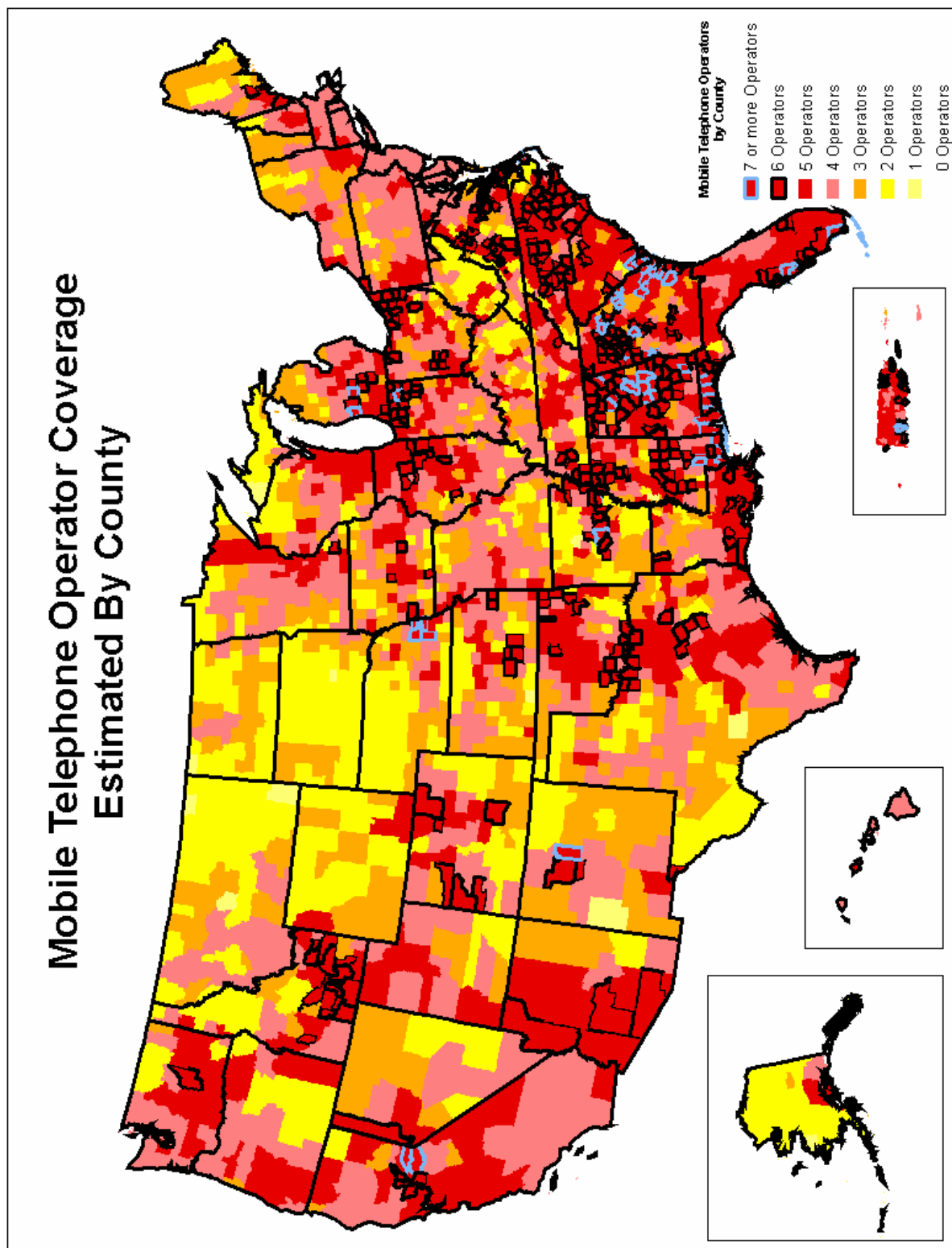
| Country | Number of Players | Penetration (%) | MOUs | Revenue per Minute (\$) | Data (% of ARPU) |
|---------------------------|----------------------|-----------------|------|----------------------------|---------------------|
| Mobile Party Pays | | | | | |
| USA | 4+ | 70 | 798 | 0.07 | 10 |
| Canada | 3 | 53 | 403 | 0.11 | 9 |
| Hong Kong | 5 | 106 | 395 | 0.04 | 15 |
| Singapore | 3 | 98 | 313 | 0.08 | 20 |
| Calling Party Pays | | | | | |
| UK | 5 | 113 | 146 | 0.21 | 22 |
| Germany | 4 | 97 | 81 | 0.28 | 18 |
| Italy | 4 | 123 | 126 | 0.21 | 16 |
| Sweden | 4 | 114 | 141 | 0.17 | 7 |
| France | 3 | 79 | 235 | 0.17 | 14 |
| Spain | 3 | 108 | 150 | 0.22 | 14 |
| Finland | 3 | 101 | 279 | 0.11 | 14 |
| Japan | 3 | 74 | 147 | 0.27 | 26 |
| South Korea | 3 | 79 | 322 | 0.10 | 18 |
| Australia | 4 | 95 | 178 | 0.17 | 15 |

Sources: *Interactive Global Wireless Matrix 4Q05*, Merrill Lynch, Telecom Services Research. In markets where calling party pays is used, figures for minutes of use (MOUs) may be somewhat understated, and the revenue figures used to calculate ARPU somewhat overstated, relative to markets where mobile party pays is used. Consequently, figures for revenue per minute (ARPU divided by MOUs) probably overstate the difference between revenue per minute in the United States (along with other mobile party pays markets) and calling party pays markets. See Section VI.D, International Comparisons, *supra*.

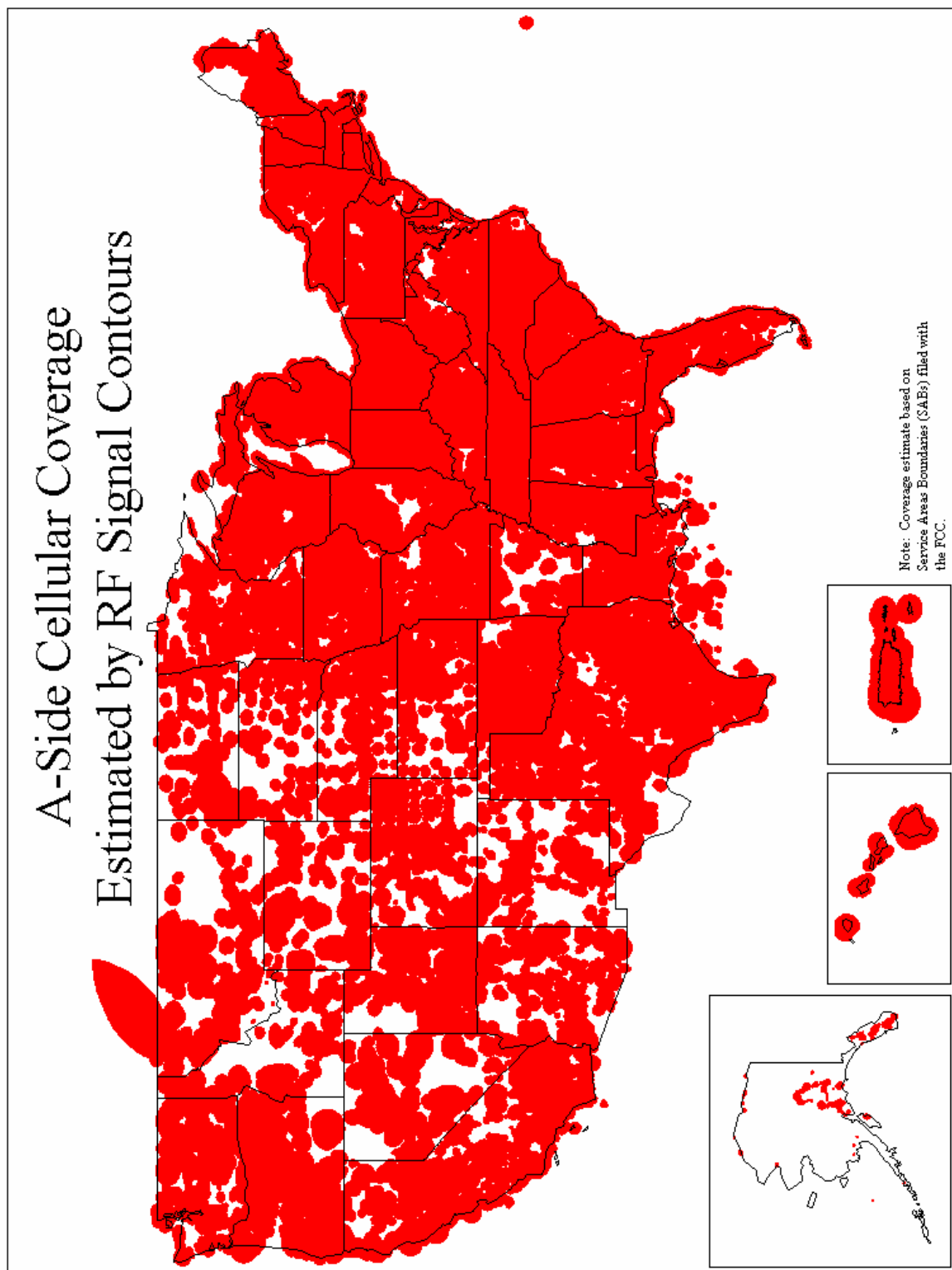
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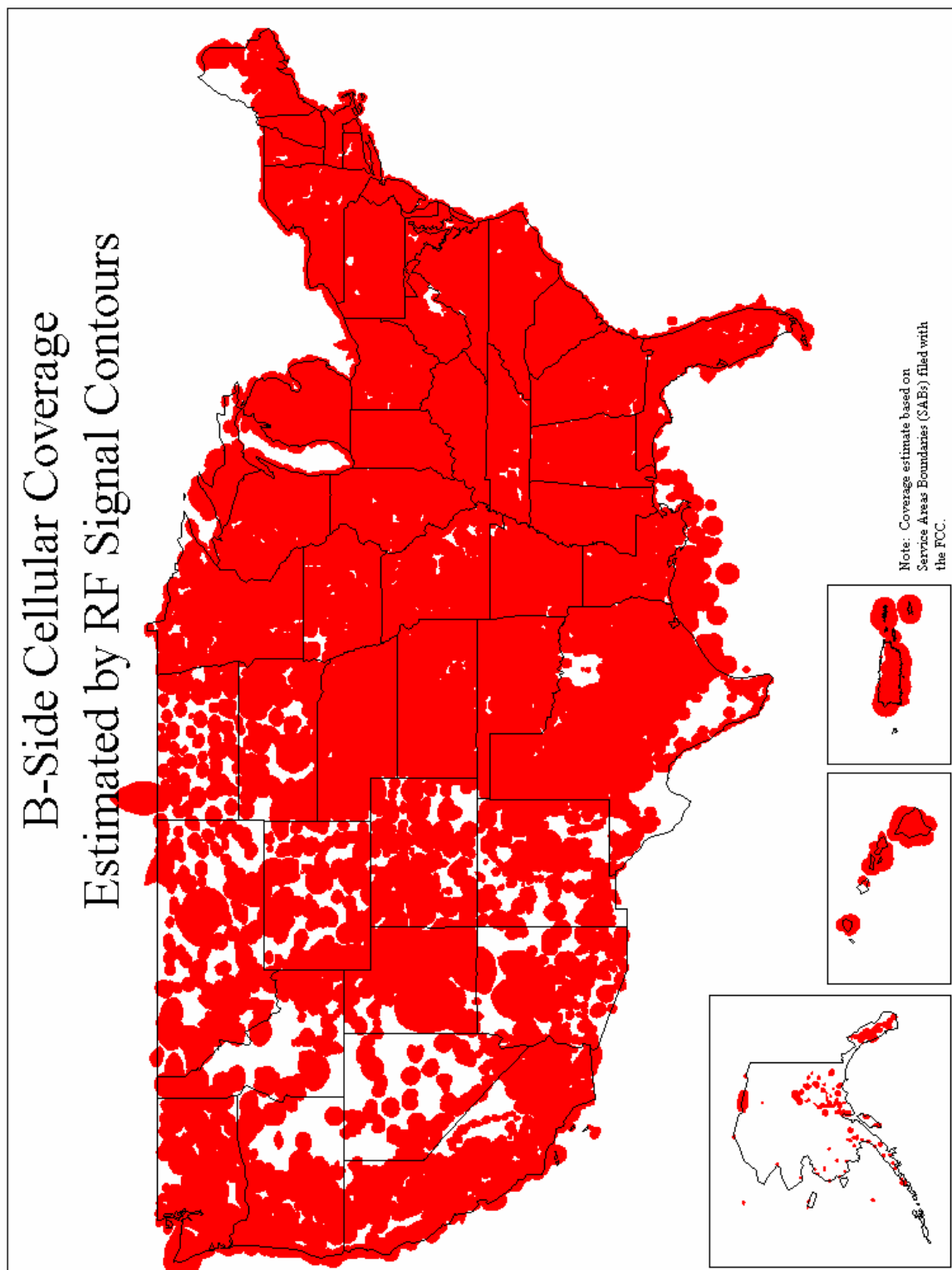
Map 1



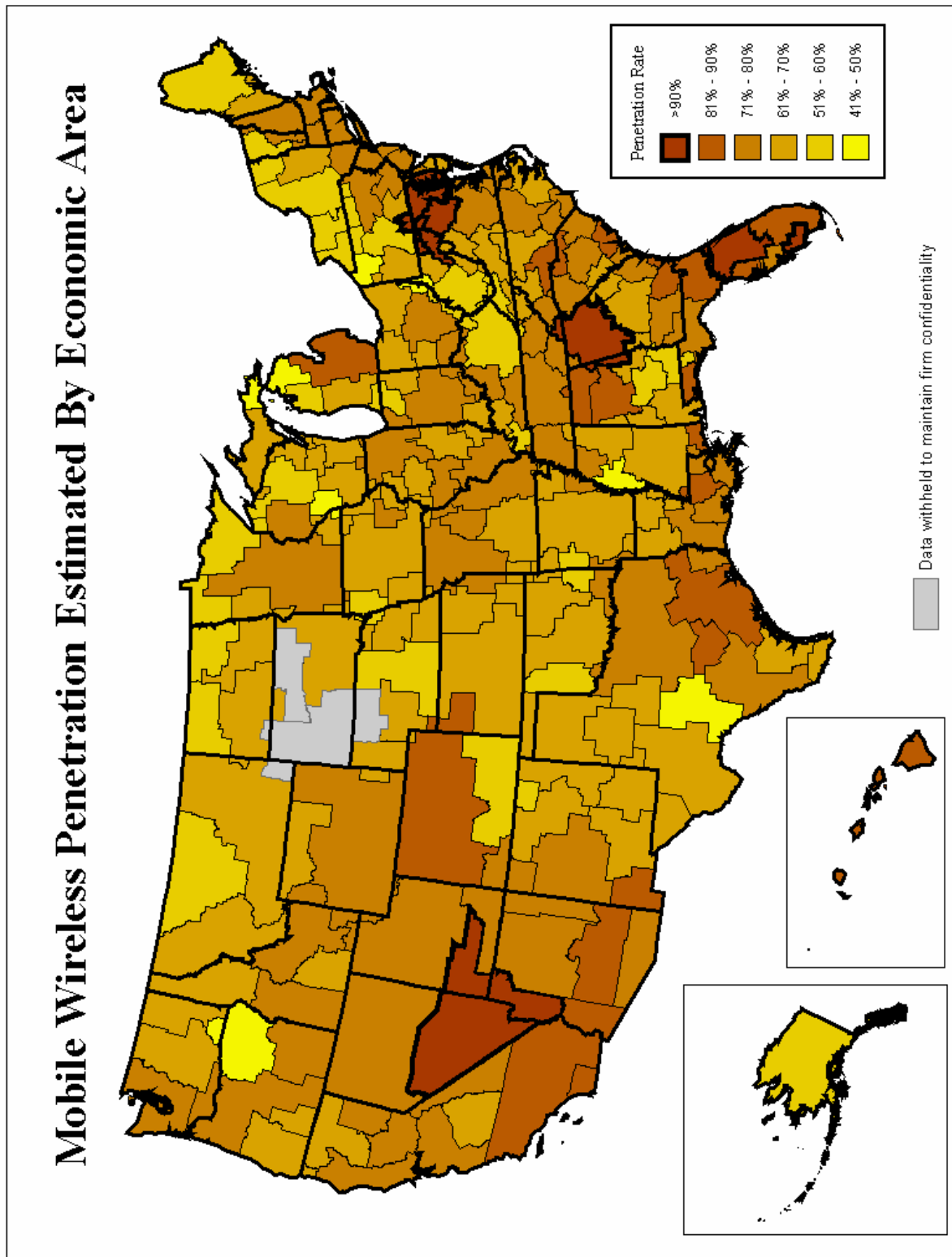
Map 2



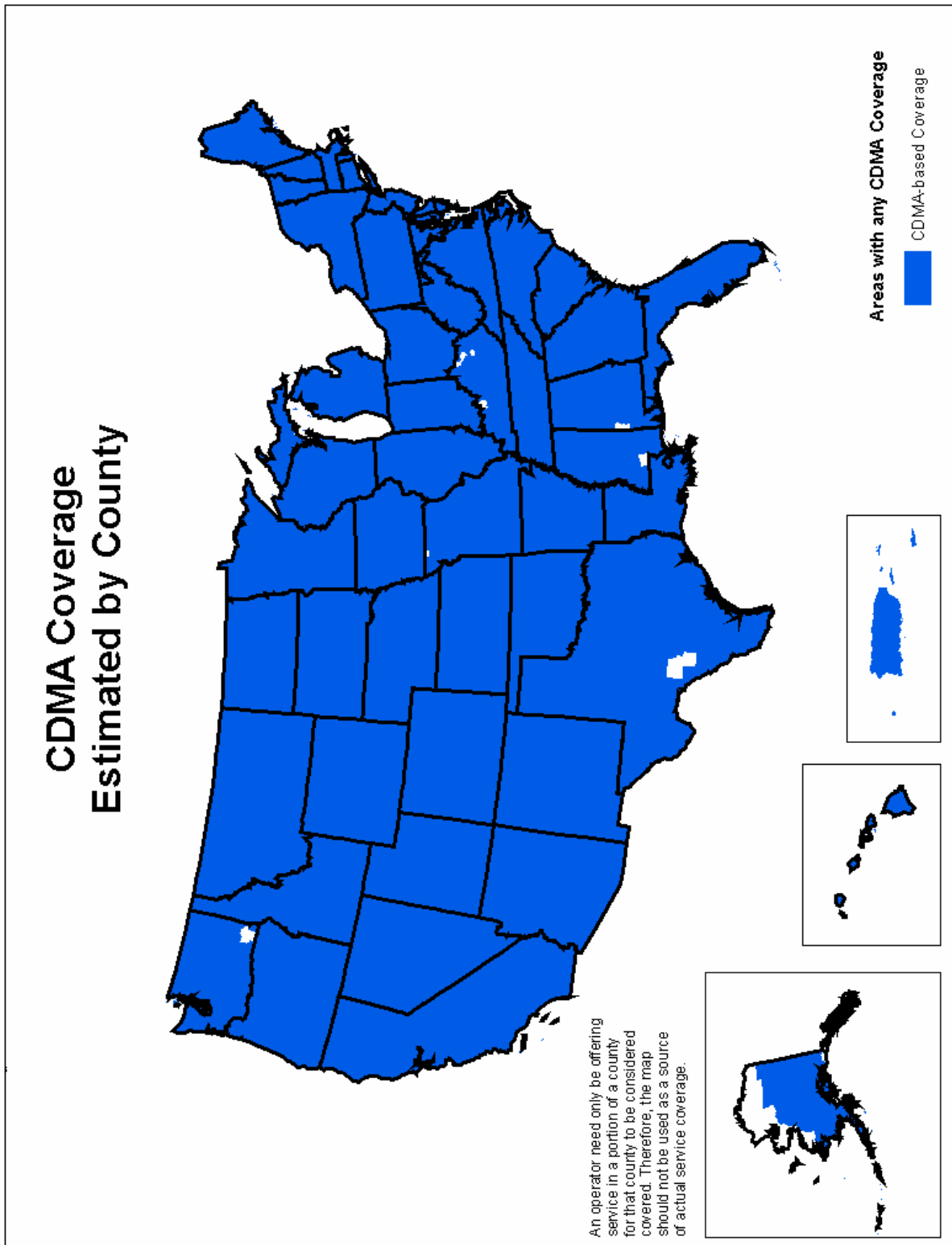
Map 3



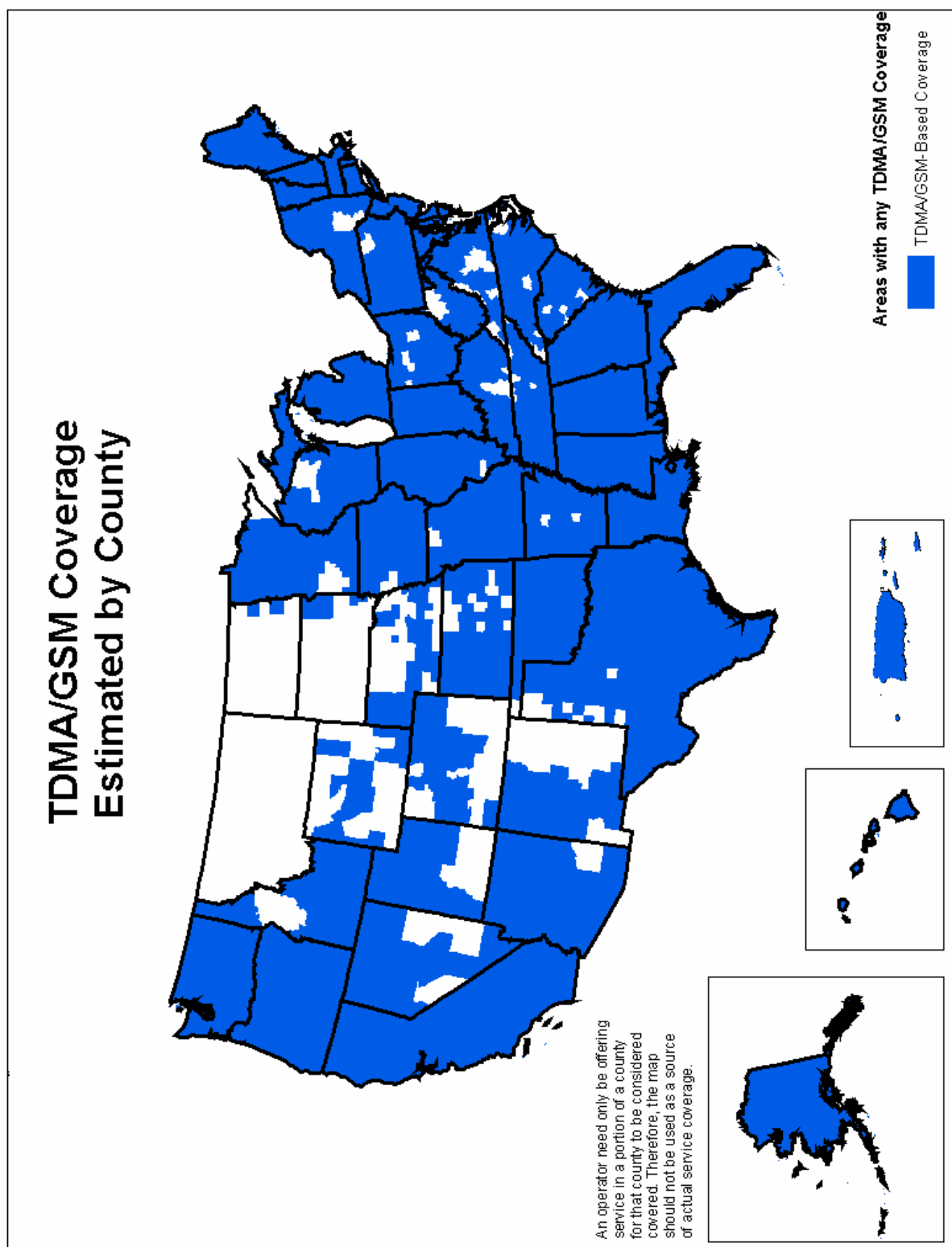
Map 4



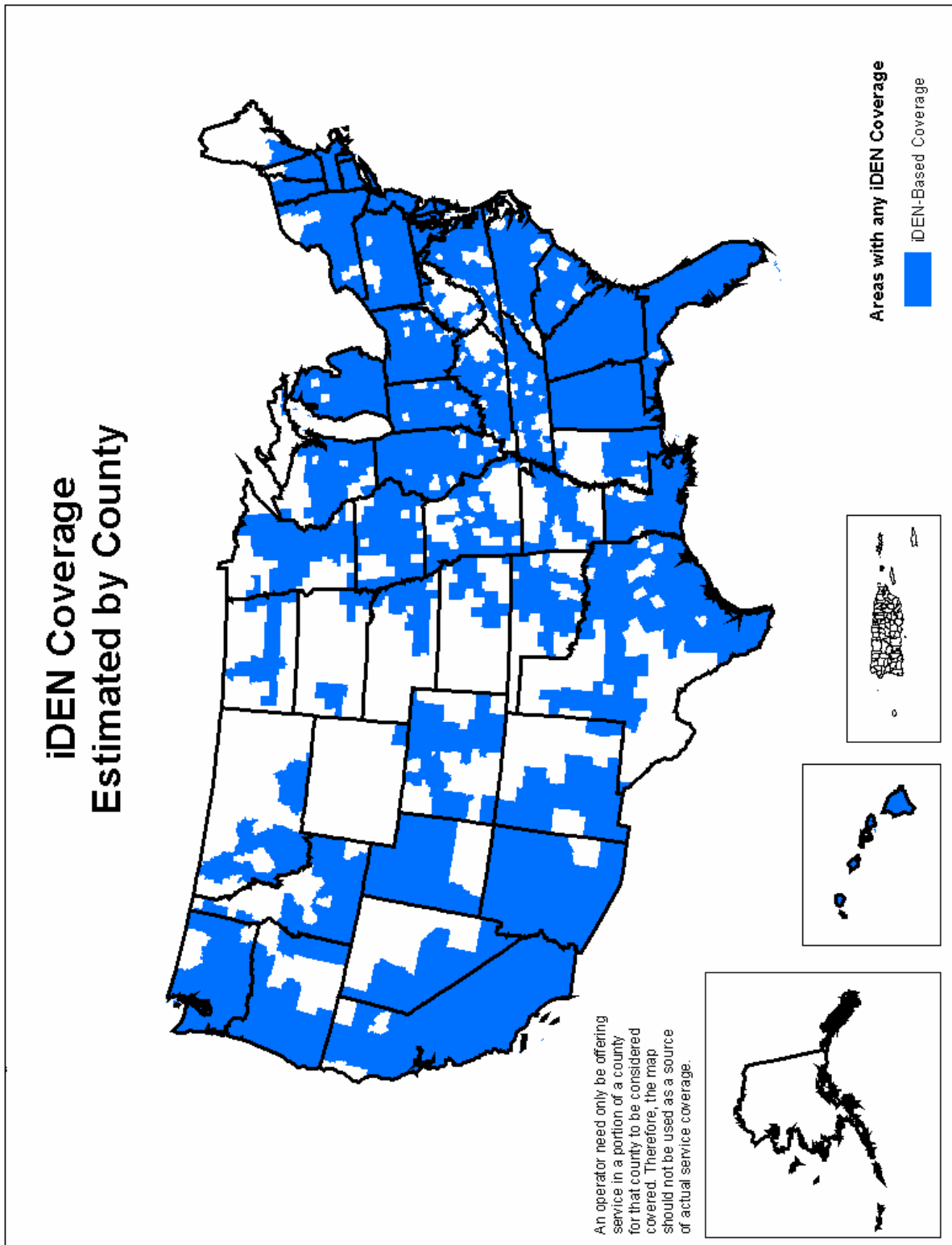
Map 5



Map 6



Map 7



Map 8

Next Generation Network Rollout in the United States
Estimated by County

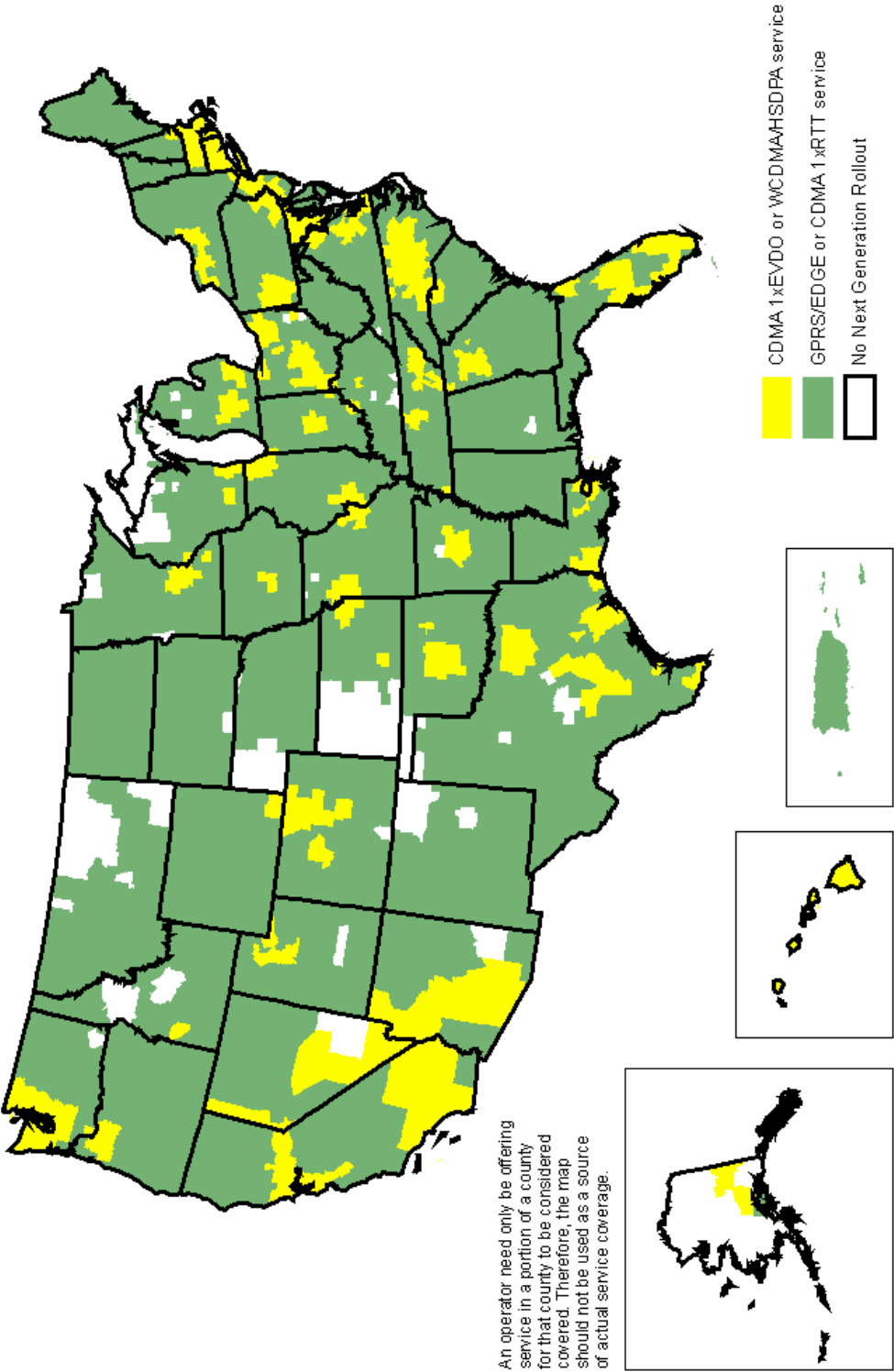
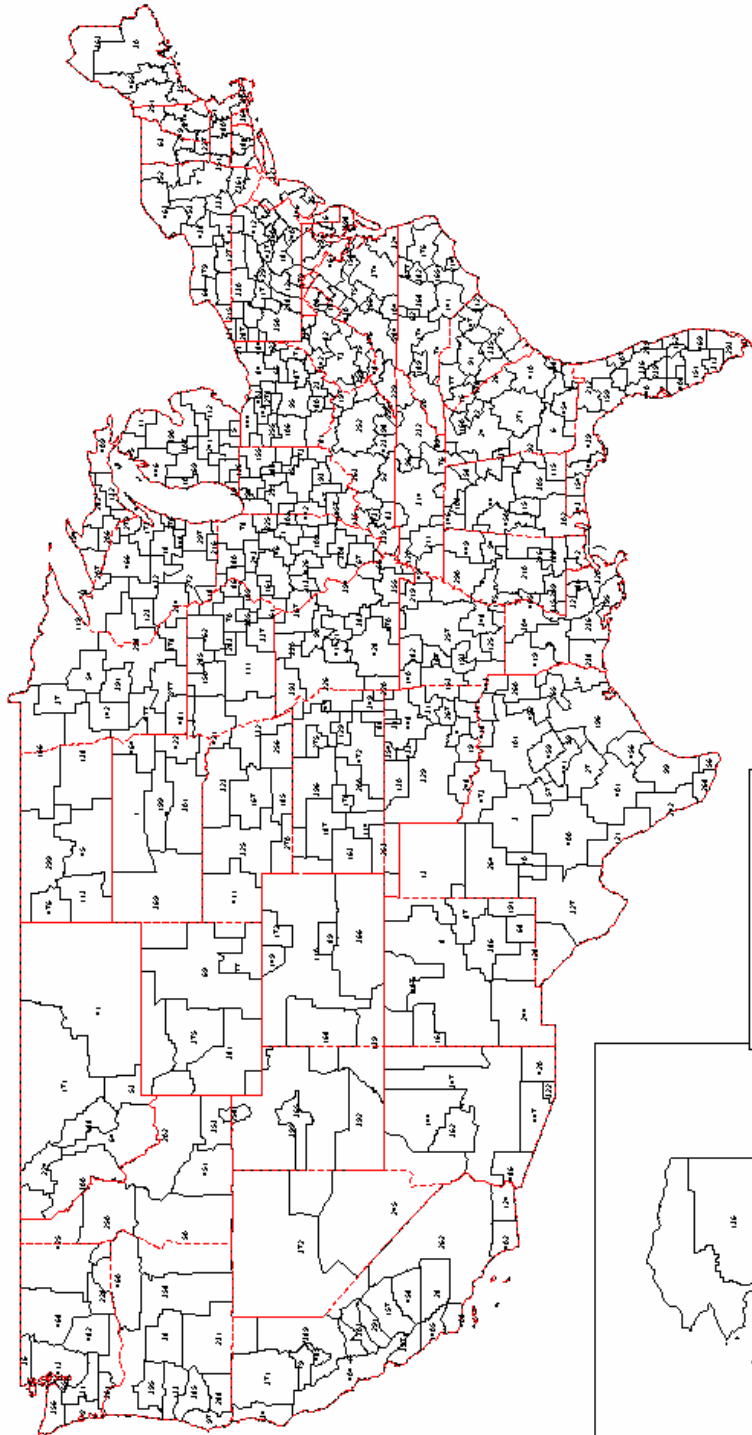


Table 1: Geographic Licensing Schemes

| 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 | |

Map 9

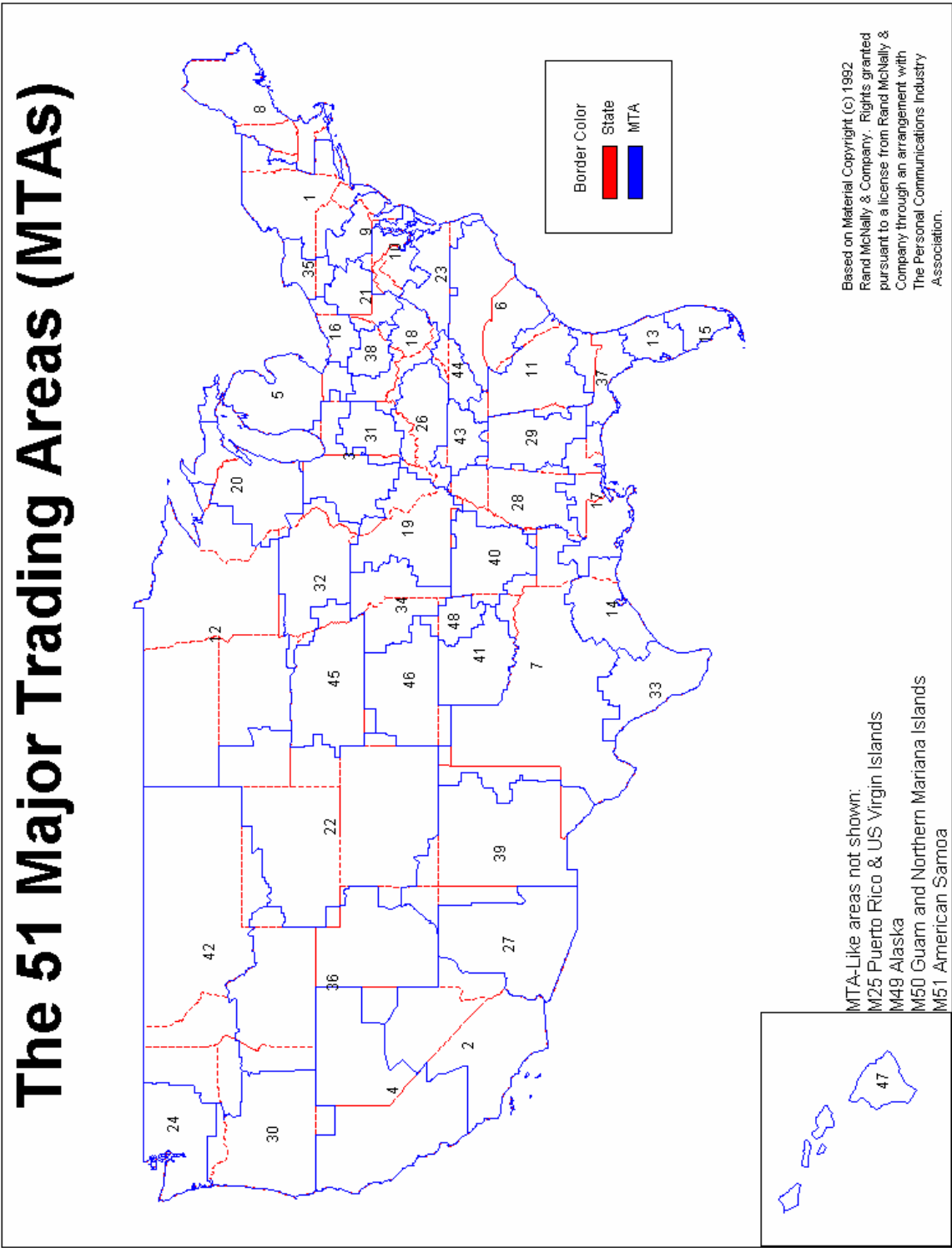
The 493 Basic Trading Areas (BTAs)



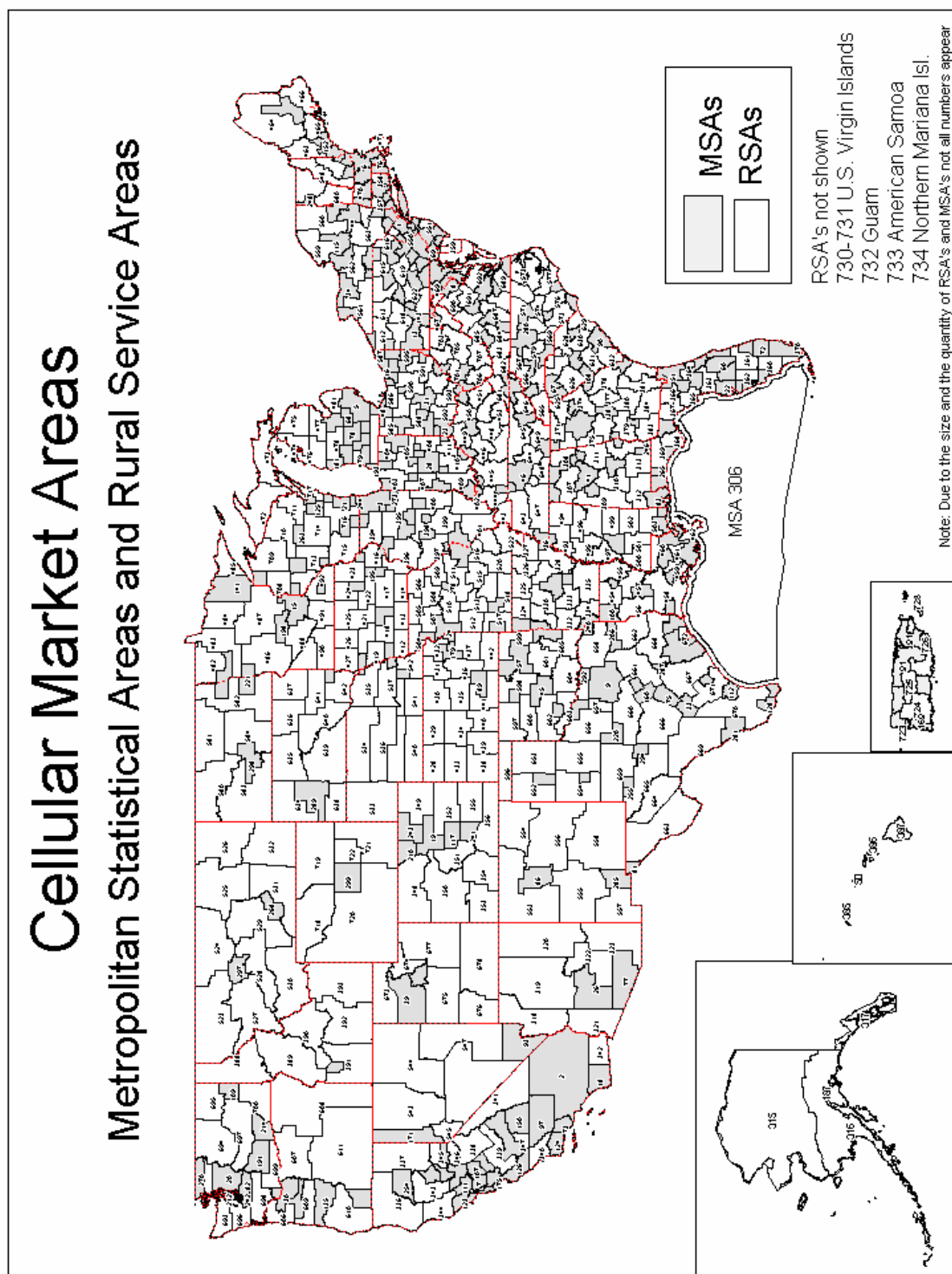
BTA-Like areas not shown:
 B488 San Juan, PR
 B489 Mayaguez, PR
 B490 Guam
 B491 US Virgin Islands
 B492 American Samoa
 B493 Northern Mariana Islands

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Map 10

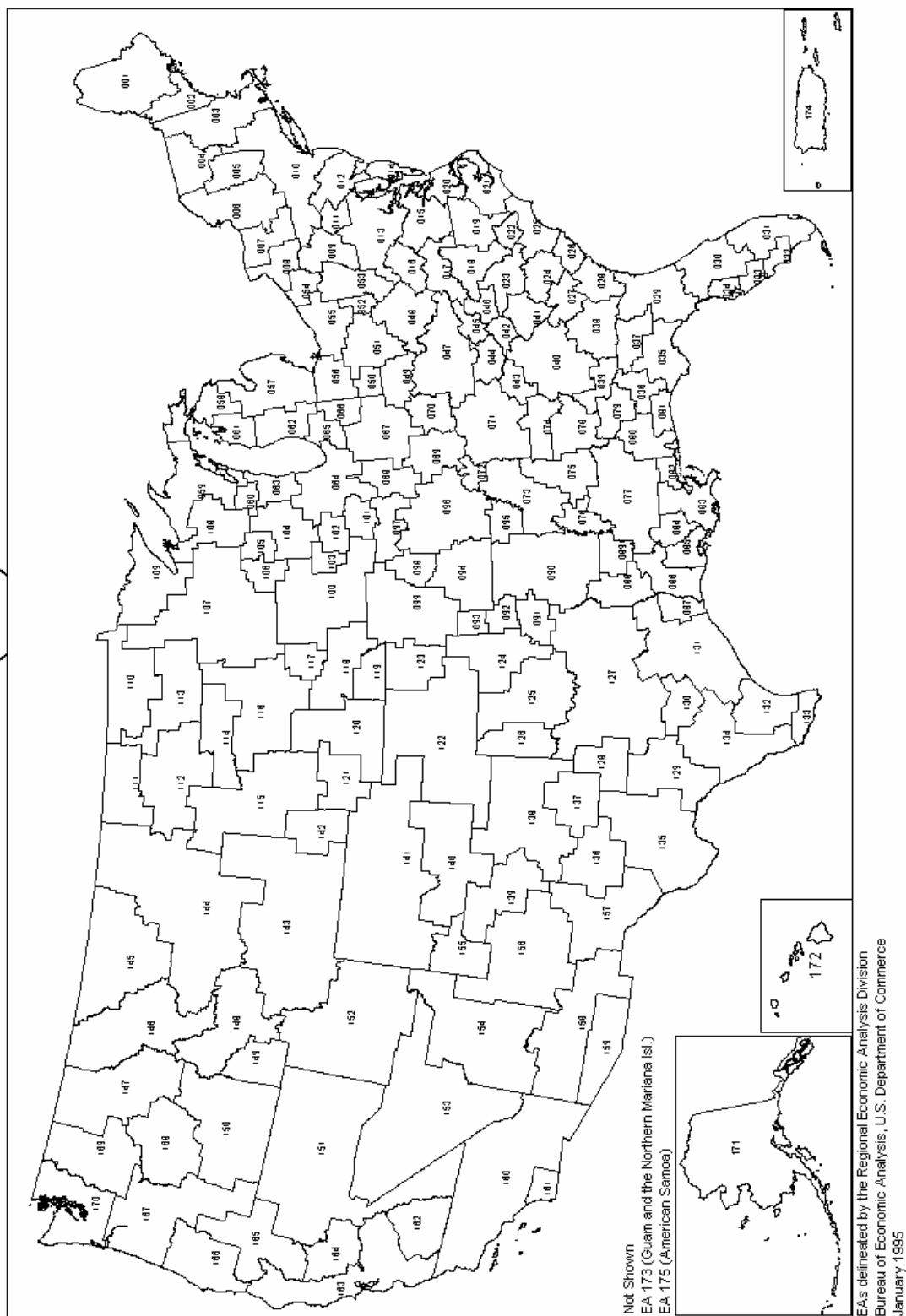


Cellular Market Areas



Map 12

Economic Areas (EAs)



APPENDIX C**List of Commenters**Comments

Cellular South, Inc.

CTIA – The Wireless Association

Leap Wireless International, Inc.

Mobile Satellite Ventures Subsidiary LLC

National Telecommunications Cooperative Association (“NTCA”)

RSA 1 Limited Partnership dba Cellular 29 Plus & Iowa RSA 2 Limited Partnership (“Cellular 29”)

Southern Communications Services, Inc. dba SouthernLINC Wireless

Texas RSA 7B3, Inc dba People Wireless (“People Wireless”)

Replies to Comments

Cingular Wireless LLC

National Telecommunications Cooperative Association

Rural Telecommunications Group, Inc. (“RTG”)

T-Mobile USA, Inc. (“T-Mobile”)

Virgin Mobile, USA, LLC (“Virgin Mobil”)

STATEMENT OF CHAIRMAN KEVIN J. MARTIN

Re: 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, FCC 06-142

This year's Competition Report demonstrates that the competitive marketplace for wireless services is continuing to bring consumers more choice, better services, and lower prices. The number of minutes of use went up 27 percent in 2005 and the price paid by consumers for each of those minutes went down by 27 percent. Ninety-eight percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service, which is higher than in any previous year. Wireless subscribership has grown with usage. Approximately 28 million additional wireless subscribers signed up in 2005, bringing the total to 213 million subscribers and increasing the nationwide penetration rate to 71 percent.

In addition, new and innovative wireless broadband services are being deployed throughout the country on a competitive basis. Nationwide and regional carriers have deployed EV-DO, a technology that is available to nearly two-thirds of the U.S. population. In response to these EV-DO deployments, a nationwide carrier has launched a rival wireless broadband network using a technology called HSDPA. These developments are only the beginning – I expect deployment of innovative wireless broadband networks will accelerate now that the Commission has completed its auction of spectrum for advanced wireless services.

Competition among mobile telephone carriers has lowered the price consumers pay for mobile telephone service, stimulating rapid subscriber growth and greater usage of mobile phones. Competition has also encouraged mobile telephone carriers to improve service quality and to begin deploying significantly faster broadband technologies on their networks. These results demonstrate how a competitive marketplace – rather than economic regulation – provides the greatest benefits to the American consumer.

**CONCURRING STATEMENT OF
COMMISSIONER MICHAEL J. COPPS**

Re: 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, Eleventh Report.

As in previous years, I concur in this year's CMRS Competition Report. I want to begin by repeating my observation that the quality of our reports is improving and by thanking the Bureau staff for their hard work in producing the item we release today. I am pleased the Commission is devoting more resources to fulfilling Congress's mandate that we review and analyze the competitive conditions for commercial mobile services.

I only concur because we still have a long way to go to meet the mandate of Congress to analyze whether there is "effective competition" in the mobile services market. As in years past, we do not provide an adequate definition of the term. The need for a clearly-stated, objectively-measurable definition of "effective competition" gets more compelling every year. Today's report is the first to incorporate data reflecting the move from five to four national carriers (brought about by the Sprint-Nextel merger). Our conclusion that competition remains effective post-merger would be more credible if we had defined that term ahead of time and *then* assessed whether current competition data meets our definition. Instead, we come at the problem backwards—gathering some data throughout the year and, when report time rolls around, letting the data drive us to an undefined conclusion that competition is present. Not only does this *ad hoc* process lack methodological discipline, but it leaves consumers, industry, and Congress with no clear idea of how this Commission will react to further changes in the market.

I also believe that any credible definition of "effective competition" must take account of the effects arising out of the cross-ownership of wireless and wireline companies. In this era of convergence, we often hear that new technologies will bring competition to markets currently dominated by incumbents. But what about when the same company or companies dominate both the new and the old markets? Will a parent company really allow a subsidiary to introduce products that cannibalize existing revenue streams? I expect that this issue will become increasingly important in the wireless industry—especially with the next generation of broadband services—and I hope that future CMRS reports will take account of it.

I am also concerned about our cursory examination of whether wireless customers have access to product information that allows them to make suitable buying decisions. This, too, is part of competition. So many consumers who I meet have complaints about their wireless bills. It is instructive that a number of states have taken steps, or are considering doing so, to address this problem legislatively. Moreover, we continue to receive a significant (albeit declining) number of consumer complaints each quarter, around half of which concern billing and rate issues. All this indicates that further investigation is warranted, and I hope next year's report addresses this particular question in greater depth.

Finally, we really need to develop new methods to measure coverage in rural areas. As today's report acknowledges, one important flaw in our present methodology is the assumption

that if one part of a county (such as an interstate highway) receives coverage, then every part of the county receives coverage. Though gathering more granular data may be difficult, I think we need to investigate whether a sampling methodology may be appropriate. The present method distorts reality.

So that's the path I'd like to see us embark on for the next report. Nothing that I have said should detract from the good stories that our mobile industry has to report, including growing subscribership and dramatically increasing minutes of use. We need to monitor and study all these developments accurately and in their many ramifications in order to make sure that consumers can reap maximum benefits from the successes of this dynamic industry.

**STATEMENT OF
COMMISSIONER DEBORAH TAYLOR TATE**

Re: 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, Eleventh Report

Congress requires the Commission to report annually on the state of competition in Commercial Mobile Radio Services (CMRS), and I believe that today's report shows a healthy and competitive wireless industry. Wireless technology has become a vital part of the world economy. According to CTIA, in the first six months of 2006 alone, more than \$10 billion dollars was invested in the wireless industry. U.S. consumers have adopted wireless technologies at a breathtaking pace. As today's report indicates, as of December 2005, there were approximately 213 million mobile telephone subscribers, which translates into a nationwide penetration rate of approximately 71 percent.

Wireless telephones are becoming even more versatile. For instance, several companies have recently partnered with cellular carriers to provide news, sports, and entertainment television clips to your cell phone. Others have announced special phone services for kids so that parents can track their child's location. Consumers continue to increase their use of mobile telephones for voice and data services. The average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to 740 minutes per month in the second half of 2005, an increase of more than 120 minutes from a year earlier.

I also am particularly pleased that this report highlights the growth of broadband data services provided by wireless providers. With the recently auctioned advanced wireless spectrum, I know that this trend will only compound. I am also intrigued by the developments in creating mesh broadband networks using unlicensed portions of the spectrum. It is important to see that wireless broadband continues to develop in order to present an additional viable option to consumers, not only in core "lead" markets, but across the entire nation.

Finally, I would like to provide some feedback to the wireless industry. My colleagues and I are keenly aware of how important communications technologies are when public safety or homeland security concerns become paramount. I commend the wireless industry for the role it has played regarding public safety and encourage CMRS carriers' to continue to work with federal and state entities on these critical matters. Moreover, I am pleased that wireless informal complaints have decreased from 4,616 in the first quarter of 2006 to 4,050 in the second quarter of 2006, but encourage that more consumer friendly policies be examined. As an FCC Commissioner, I encourage the wireless industry to continue to innovate and create the next great new product. In particular, I hope the industry continues to play a role in the deployment of broadband to more consumers. Wireless providers will be critical to getting broadband out to that last, most difficult mile.

**STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL**

Re: 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, Eleventh Report, WT Docket No. 06-17

First, many thanks to the staff of the Wireless Telecommunications Bureau for this fine effort. This report and analysis is thoughtful and comprehensive, and I appreciate your careful attention and hard work.

With respect to the substance, I am particularly pleased to see so many positive developments in the wireless sector. Over the last 13 years, wireless subscriber growth has grown exponentially and competition among numerous providers has flourished. Ninety-eight percent of the total U.S. population continues to live in counties where three or more different operators compete to offer wireless service, while nearly 94 percent of the U.S. population continues to live in counties with four or more different operators competing to offer service. Consumers have benefited from this competition – new services abound and prices have declined.

The overall wireless penetration rate in our country is now at 71 percent – and our report notes one analyst's view that just about everyone between the ages of 20 and 49 has a wireless phone. Moreover, innovative broadband services using advanced technologies allow customers to use new multimedia phones to watch TV, download songs, receive information and access content, such as sports, news and weather, at broadband speeds. Mobile phones are providing consumers with a personal computer-type broadband experience. Additionally, I applaud the competitive wireless industry for beginning to invest the necessary capital that permits consumers the flexibility to pull the content of their choice at the time and place of their choice.

At the same time, prices are decreasing. Our report estimates that revenue per minute (RPM) declined 22 percent last year alone. RPM currently stands at \$0.07, as compared with \$0.47 in December 1994 – a decline of 86 percent. This is great news for consumers.

I am delighted that the trend is positive, and I will continue to watch with great interest future developments in the wireless industry.