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

Adopted: September 26, 2006 **Released: September 29, 2006**

By the Commission Chairman Martin, Commissioners Tate and McDowell issuing separate statements, Commissioner Copps concurring and issuing a statement

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I EXECUTIVE SUMMARY

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

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

[1] *See* Section IV A 2, Prepaid Service, *infra*

[2] *See* Section VI D, International Comparisons, *infra*

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 Services[3] to promote the consistent regulation of mobile radio services that are similar in nature [4] 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 reports[6] on the state of CMRS

[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)

[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 (continued)

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]

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

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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)

[9] *Ninth Report*, at 20602-20603 and 20607

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

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

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

[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 Lyrix Wireless, *PN Comments*, at 3-4 (filed Feb 17, 2006)

("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 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

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[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*

[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 (continued)

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 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-BTA[26] 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

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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

[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/>

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 POPs[29] 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

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

[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

[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

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

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-Band[38] 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 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]

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[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

[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)

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 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

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[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

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, independent[54] 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 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

[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&currentView=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

[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, *Datatimes*, CIBC World Markets, Dec 16, 2005

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 NASCAR™ spectators called FanView The FanView service delivers live race and audio from in-car cameras, as well as race statistics and replay functions, to 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

(Continued from previous page)

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

[62] Tim Horan, *Datatimes*, 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*

[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

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") 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

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[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

[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

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 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 publicly[77] with the Commission in proceedings or with applications [78]

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[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

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 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]

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

[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

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]

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

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[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 other hand, if there are still only four carriers but the top carrier has a 40 percent market share while each of the remaining three carriers has 20 percent, the value of HHI would increase from 2500 to 2800 [$(40)^2 + (20)^2$ x 3]

[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

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

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, coverings 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 –

[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*")

have five national 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 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

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[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*

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 footprints[105] 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, 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

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[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

[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

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 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

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[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 Prentis 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 , Enterpise 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 Prentis 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

[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*

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 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

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[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

[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

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 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

[125] *Ninth Report*, at 20631

[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*

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 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

[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 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 (continued)