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

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In the Matter of)
)
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

EIGHTH REPORT

Adopted: June 26, 2003

Released: July 14, 2003

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

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I. INTRODUCTION

A. Background

1. In 1993, Congress created the statutory classification of Commercial Mobile Services¹ to promote the consistent regulation of mobile radio services that are similar in nature.² At the same time, Congress established the promotion of competition as a fundamental goal for CMRS policy formation and regulation. To measure progress toward this goal, Congress required the Federal Communications Commission (“FCC” or “Commission”) to submit annual reports that analyze competitive conditions in the industry.³ This report is the eighth of the Commission’s annual reports⁴ on the state of CMRS competition.⁵

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

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

³ 47 U.S.C. § 332(c)(1)(C).

⁴ See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *First Report*, 10 FCC Rcd 8844 (1995) (“*First Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Second Report*, 12 FCC Rcd 11266 (1997) (“*Second Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, 13 FCC Rcd 19746 (1998) (“*Third Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145 (1999) (“*Fourth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fifth Report*, 15 FCC Rcd 17660 (2000) (“*Fifth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Sixth Report*, 16 FCC Rcd 13350 (2001) (“*Sixth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Seventh Report*, 17 FCC Rcd 12985 (2002) (“*Seventh Report*”). The reports can also be found on the FCC’s website at <<http://wireless.fcc.gov/cmrs-crforum.html>>.

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

2. Since the release of the *Seventh Report*, the Commission has expanded its efforts to improve the quality and granularity of the data used to examine competition in the CMRS industry. In December 2002, the Commission released a Notice of Inquiry (“*NOI*”) seeking data and information on the status of competition in the CMRS industry.⁶ The questions asked in the *NOI* and the comments received are discussed in detail below.⁷

3. 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

4. With the *Eighth Report*, we continue to comply with each of the four statutory requirements for analyzing competitive market conditions with respect to commercial mobile services. First, Section II.C.1.b(ix), *infra*, identifies the number of CMRS competitors. Second, Section I.C, *infra*, discusses the Commission’s analysis of effective competition. Like previous reports, this report addresses the third issue of whether any competitor has a dominant market share in two main ways. First, the report provides data on the total number of subscribers served by the 25 largest carriers, which can be used to derive subscribership market share figures for such carriers on a nationwide basis.⁹ Second, the report includes measures of competition, such as churn,¹⁰ service quality, pricing, and market entry, which provide evidence that no single carrier is able to act anti-competitively in the marketplace.¹¹ These figures indicate that while there are several large, established carriers in the CMRS industry, they have no guarantee of maintaining their market share, and they are faced with consumers that would readily leave carriers that attempted to raise prices or diminish service quality. Furthermore, in exercising its forbearance authority, the Commission has routinely acknowledged that it has chosen not to regulate CMRS providers as dominant carriers.¹²

⁶ 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) (“*NOI*”).

⁷ See Section I.B, Sources of Information, *infra*.

⁸ 47 U.S.C. § 332 (c)(1)(C).

⁹ See Appendix D, Table 4, at D-8.

¹⁰ “Churn” refers to the number of customers an operator loses over a given period of time. See Section II.C.1.b(v), Churn, *infra*.

¹¹ See Sections II.C.1.b(v), Churn; II.C.1.c, Pricing Data and Trends; and II.C.1.b(ix), Market Entry, *infra*. See *Seventh Report*, at 13007-13016.

¹² Implementation of Sections 3(n) and 332 of the Communications Act, GN Docket No. 93-252, *Second Report and Order*, 9 FCC Rcd 1411, 1478 (1994); see also, 2000 Biennial Regulatory Review, *Report and Order*, 16 FCC Rcd 10647, 10653 (2001) (Commission determined that its forbearance analysis regarding the public

5. In addressing the final statutory requirement to provide a statement of whether additional providers would likely enhance competition, we conclude that the market, as it is currently structured, is competitive,¹³ and we include, as has been done in previous reports, an analysis of how entry by new competitors has enhanced competition.¹⁴ Nevertheless, we continue to examine ways to eliminate barriers to spectrum access in order to encourage entry for new competitors.

B. Sources of Information

6. As mentioned above, the Commission issued an *NOI* in December 2002 seeking data and information on the status of competition in the CMRS industry for this report.¹⁵ The Commission requested data based on several metrics, including service availability, subscribership, average revenue per unit (“ARPU”), usage, churn, and pricing.¹⁶ For each of these metrics, it requested data on both national and sub-national levels, for different demographic groups, and broken down by urban and rural areas.¹⁷ The *NOI* also sought comment on the extent to which these various metrics contribute to an analysis of CMRS competition.¹⁸ In order to enhance our analysis of CMRS service availability and competition, the Commission asked service providers to submit their coverage maps in an electronic, mapable format and to distinguish between the areas where they offer coverage to subscribers and the areas where they market service to new customers.¹⁹ The *NOI* also requested input on whether there is meaningful competition in rural areas and on how the Commission should define “rural” for purposes of its analysis of CMRS competition.²⁰ Furthermore, the *NOI* asked for information on service quality, cost of capital, wireless-wireline competition, mobile telephone service resellers, and satellite providers, as well as mobile data services, service availability, and pricing.²¹

7. Parties that submitted comments in response to the *NOI* included regional and national

interest need for complete detariffing of international interexchange services by non-dominant carriers is applicable to CMRS providers of international interexchange services); Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *Report and Order*, 15 FCC Rcd 13523 (2001) (In declining to adopt interconnection rule, the Commission acknowledged that it has not regulated CMRS providers as dominant carriers.).

¹³ See Section I.C, Status of Competition, *infra*.

¹⁴ See *Seventh Report*, at 13095; *Sixth Report*, at 13456; *Fifth Report*, at 17757-17758.

¹⁵ See Section I.A, Background, *supra*.

¹⁶ *NOI*, at 24927-24936.

¹⁷ *Id.*, at 24927-24940.

¹⁸ *Id.*, at 24926.

¹⁹ *Id.*, at 24927-24930.

²⁰ *Id.*, at 24936-24937. See also, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, WT Docket No. 02-381, *Notice of Inquiry*, 17 FCC Rcd 25554 (2002) (“*Rural NOI*”) (Commission sought comment on whether and how it could modify its policies to promote the further development and deployment of spectrum-based services in rural areas).

²¹ *NOI*, at 24926, 24940-24941, 24942-24948.

wireless operators, rural telephone companies, industry trade groups, technology advocacy consortiums, and resellers.²² Many commenters stated that the CMRS marketplace is competitive and cited the data presented in previous reports as evidence of that assertion.²³ These commenters also noted that the publicly-available data on the industry that is included in our reports is sufficient for analyzing CMRS competition.²⁴ Furthermore, many commenters addressed the issue of the extent of competition in rural areas, and offered suggestions on how to analyze data more effectively and how to define rural for purposes of this report; such statements and suggestions have been integrated into the *Eighth Report* below.²⁵ Other commenters provided input on the extent to which mobile satellite providers and mobile telephone resellers compete in the CMRS industry, and some parties submitted information on networks that providers use and plan to use to offer high-speed mobile data services.²⁶ On the other hand, many of the questions posed in the *NOI* were not directly addressed in the comments. For example, the Commission did not receive from commenters any new data on subscribership, ARPU, usage, churn, or pricing on a national or sub-national level, or broken down by demographic groups or urban/rural areas. In addition, service providers did not submit maps of their coverage areas or distinguish between areas where they provide coverage and areas where they market service.

8. Prior to the *Seventh Report*, the Commission based its analysis of competition in the CMRS industry solely on numerous publicly-available sources of data on the industry. These sources included: company filings with the Securities and Exchange Commission (“SEC”), data compiled and released by trade associations and by other government agencies, reports by securities analysts and other research companies and consultants, company news releases and web sites, newspaper and periodical articles, and the Commission’s Universal Licensing System (“ULS”) database. In the *Seventh Report*, the Commission added two new sources of information: the Numbering Resource Utilization / Forecast (“NRUF”) database, described below, and information submitted at a Public Forum held in February 2002. The Public Forum was held in order to examine ways in which to better gather and analyze data for its reports, in particular data regarding the development of competition in rural and underserved areas.²⁷ And for the *Eighth Report*, we have included the relevant information submitted in response to

²² See Appendix G for a list of parties that filed comments in response to the *NOI*.

²³ See Cellular Telecommunications & Internet Association, *NOI Comments*, at ii, 4-5 (filed Jan. 27, 2003) (“*CTIA Comments*”); Dobson Communications Corporation, *NOI Comments*, at 3 (filed Jan. 27, 2003) (“*Dobson Comments*”); T-Mobile USA, Inc., *NOI Reply Comments*, at 1-2 (filed Feb. 11, 2003) (“*T-Mobile Reply Comments*”); South Dakota Telecommunications Association, *NOI Reply Comments*, at 5 (filed Feb. 11, 2003) (“*SDTA Reply Comments*”).

²⁴ See *CTIA Comments*, at ii, 4-5; *Dobson Comments*, at 3; *T-Mobile Reply Comments*, at 1-2; *SDTA Reply Comments*, at 5.

²⁵ See Section II.C.1.e, Geographical Comparisons: Urban vs. Rural, *infra*.

²⁶ Information from these comments is included in the report in the following sections: II.C.4, Satellite Operators; II.C.2, Resellers; II.C.3, Mobile Data; and II.B.2, Network Technology, *infra*.

²⁷ See Wireless Telecommunications Bureau Announces Agenda and Speakers For Public Forum For The 7th Annual Commercial Mobile Radio Services Competition Report, *Public Notice*, DA 02-422 (rel. Feb. 25, 2002). See FCC, *Commercial Mobile Radio Services (CMRS) Competition Report Public Forum*, <<http://wireless.fcc.gov/cmrs-crforum.html>> for access to participants’ presentations and forum transcript. The direct link to the forum transcript is <<http://wireless.fcc.gov/services/cmrs/presentations/020228.pdf>> (“*Transcript*”). Forum participants not only provided additional data, including data on the average price of mobile telephone service in rural areas, but also presented suggestions on how to analyze data more effectively. Research organizations and agencies offered insight into the methodologies they use to gather and analyze data, and the

the *NOI*. 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 sub-national markets and in rural areas. However, the additional sources included in the *Seventh* and *Eighth Reports* – the NRUF data and the information submitted at the Public Forum and in response to the *NOI* – have enabled us to conduct a more granular analysis of competition on a sub-national level and on an urban/rural basis.

9. In order to further uphold the integrity of our data on CMRS competition, we include, in many places, multiple data sources to report on the same metric or depict the same trend. For example, this report and previous reports have included data from three separate sources – the U.S. Department of Commerce Bureau of Labor Statistics (“BLS”); economic research and consulting firm, Econ One; and the Cellular Telecommunications and Internet Association (“CTIA”) – on the average price of mobile telephone service, all of which have shown the price of service declining.²⁸ 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.²⁹ Furthermore, other carrier-reported data included in the report, such as coverage maps, are subject to contractual obligations with customers. Because all carrier-reported data is compiled by the carriers themselves and typically released in the aggregate to protect confidentiality, we are unable to have in-depth knowledge of the minutia of such data. However, we believe it is appropriate to use these sources in our analysis of CMRS competition for the reasons stated above.

10. As mentioned above, the *Seventh Report* integrated a new source of data submitted directly to the FCC, the NRUF database.³⁰ 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 which of their phone numbers have been assigned to end users, thereby permitting the Commission to make an accurate estimate of the total number of mobile subscribers. As in the *Seventh Report*, we continue to use the NRUF data to determine the total number of mobile

wireless carriers offered anecdotes on the competitive pressures that their companies face. The Commission incorporated these data, suggestions, and insights into the *Seventh Report*. For instance, the *Seventh Report* included an analysis of the average number of providers operating in urban versus rural areas, using three different proxies for urban and rural geographic areas: Metropolitan Statistical Area (“MSA”) and Rural Service Area (“RSA”) counties, Economic Area (“EA”) nodal and non-nodal counties, and counties with population densities above and below 100 persons per square mile. See *Seventh Report*, at 13022-23. For a description of nodal counties, see note 33. As stated in the *Seventh Report*, the Commission does not have a statutory definition of what constitutes a rural area. However, it analyzed market entry using these three criteria in order to gain insight into the competitive differences within different geographic areas of the United States. See *Seventh Report*, at 13022. Section II.C.1.e, Geographical Comparisons: Urban vs. Rural, *infra*, includes the same type of analysis for this year’s report.

²⁸ See Section II.C.1.c, Pricing Data and Trends, *infra*.

²⁹ For example, see note 211, *infra*, for a discussion of data reported by CTIA.

³⁰ See Section II.C.1.b(i), Subscriber Growth, *infra*, for a further discussion of NRUF data.

telephone subscribers and paging subscribers.³¹ In addition, because we collect NRUF data on a small, rate center area basis,³² we can use this information to estimate mobile telephone subscribership levels and penetration rates on a regional basis in addition to a national basis. In the *Seventh Report*, the Commission therefore began reporting mobile telephone penetration rates on an EA basis and continues to report them in this manner in this report.³³

11. 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.³⁴ 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-BTA³⁵ 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.³⁶ It has derived from this data the number of competitors operating in every U.S. county and hence the percentage of the U.S. population living in

³¹ See Sections II.C.1.b(i), Subscriber Growth and II.C.3.d(i), Paging, *infra*, for a detailed discussion. See *Seventh Report*, at 13005, 13049.

³² Rate centers are the geographic areas used by local exchange carriers as the primary basis for the determination of toll rates. See Harry Newton, *NEWTON’S TELECOM DICTIONARY: 16TH EXPANDED & UPDATED EDITION*, CMP Books, July 2000, at 732.

³³ See Section II.C.1.b(ii), Regional Penetration Rates, *infra*. EAs, which are defined by the Department of Commerce’s Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephony penetration rates for two reasons. First, the defining aspect of mobile telephony is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far as possible, the place of work and the place of residence of its labor force. Thus, an EA would seem to capture the market where the average person would use his or her mobile phone much of the time – around work, around home, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas. In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber’s place of residence (but generally still in the same EA). See *Seventh Report*, at 13005.

³⁴ See Sections II.C.1.b(ix), Market Entry and II.C.1.b(viii), Coverage by Technology Type, *infra*.

³⁵ 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.

³⁶ BTAs can be sub-divided into counties. The United States is made up of approximately 3,200 counties versus 493 BTAs.

areas with a certain number of competitors.³⁷ This data has also been used to derive the percentage of the U.S. population living in counties with digital coverage. As mentioned in previous reports, there are several important caveats to note when considering the data. First, to be considered as “covering” a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of that county. Third, the figures for POPs³⁸ and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage. Therefore, our analysis overstates to some unknown and unavoidable degree the total coverage in terms of both geographic areas and population covered. On the other hand, we believe our analysis to be the most accurate in the industry today given the coverage data that is publicly available.

C. Status of Competition

12. Using the various information sources described above – the publicly-available sources used in several previous reports, the NRUF database, as well as the data and statements provided at the Public Forum and in the *NOI* comments – we have been able to examine in this report several structural and performance measures of competition in the CMRS industry. These measures include the nature and number of market participants, the geographic extent of service deployment, technological improvements and upgrades, price competition, investment, usage patterns, churn, subscriber growth, and product innovations, among other things. After analyzing these various measures, we conclude that there is effective competition in the CMRS marketplace.

13. Regarding rural areas specifically, we also conclude that CMRS providers are competing effectively in such areas. Moreover, while it appears that, on average, a smaller number of operators are serving rural areas than urban areas, this difference does not necessarily indicate that effective CMRS competition does not exist in rural areas.³⁹ On the contrary, as discussed in more detail below, data and statements presented by Public Forum participants and *NOI* commenters provide evidence that, despite the differing structure of rural markets, effective CMRS competition does exist in rural areas.⁴⁰ Wireless carriers serving rural areas describe the competition as “real,”⁴¹ “significant”⁴² and “sufficient.”⁴³ The most recently released data provided by Econ One, which was also included in the *Seventh Report*,

³⁷ 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/>>.

³⁸ 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.

³⁹ See Section II.C.1.e, Geographical Comparisons: Urban vs. Rural, *infra*; *Seventh Report*, at 13024.

⁴⁰ See Section II.C.1.e, Geographical Comparisons: Urban vs. Rural, *infra*. See also, *Rural NOI*, at ¶ 25 (“[I]t may be economically inefficient, and thus harmful to consumers, to require for each wireless service the same number of competitors in urban and rural areas. This appears to be true, for example, with regard to mobile telephony.”)

⁴¹ See *Seventh Report*, at 13024.

⁴² *Dobson Comments*, at 2.

⁴³ Fred Williamson and Associates, *NOI Reply Comments*, at 2 (filed Feb. 11, 2003) (“*FWA Reply Comments*”).

showed that the average price of mobile telephone service in rural areas appears to be very similar to the average price in urban areas.⁴⁴ Indeed, at least one *NOI* commenter noted that nationwide and urban price trends have acted to constrain prices in rural areas, even where the total number of operators may be lower.⁴⁵ Furthermore, in addition to competing with each other, CMRS carriers in rural areas may also provide competition to incumbent local exchange carriers. One commenter that provides mobile telephone services in rural areas stated that it “competes with wireline telephone companies as well as wireless companies” and that “[c]onsumers are enjoying a facilities-based competitive alternative to the local service formerly offered on a monopoly basis by the ILECs.”⁴⁶ In rural areas where wireless networks may be an efficient technology for providing any type of telephone service, additional CMRS providers may enhance not only CMRS competition but wireline competition as well, benefiting consumers by increasing customer choice, offering innovative services, and introducing new technologies.

14. In preparation for its ninth annual report and analysis of CMRS competition, the Commission will be issuing another Notice of Inquiry seeking additional and updated data from the public on the state of CMRS competition, particularly in rural areas and on a sub-national level. With this next Notice, we hope to build on the information employed in this year’s report and to obtain a wider range of facts and opinions from the public comments in order to assist in our analysis. We also plan to explore other avenues for data collection, such as contract research, for the next report.⁴⁷ In addition, for the next report, we will continue efforts to improve our approaches to collecting and evaluating the various types of data and information that are available in order to assess the status of competition in the CMRS industry. In particular, we plan to seek comment on the interrelationship among dimensions of industry structure, indicators of operator conduct, and other relevant measures of market conditions.

D. Structure of Report

15. As stated in previous reports, mobile voice and mobile data⁴⁸ services are no longer clearly delineated in the marketplace. 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 these services together in the *Eighth Report* in a larger, more cohesive section on the CMRS

⁴⁴ See *Seventh Report*, at 13022-13024.

⁴⁵ Dobson Communications Corporation (“Dobson”) stated, “Clearly, if price is an indicator of the level of competition, the price reductions spawned by wireless competition in urban markets have come to rural areas.” *Dobson Comments*, at 3. Dobson also explained at the Public Forum that “small market carriers . . . are subject to the same competitive pressures of large market carriers. Because of national advertising and the Internet, consumers all over the country are educated about nationwide rate plans and services enabled by digital technology.” *Transcript*, at 115.

⁴⁶ Western Wireless Corporation, *NOI Comments*, at 6 (filed Feb. 3, 2003).

⁴⁷ The scale and scope of such collection efforts will be dependent upon the availability of funding and the discretion of the Commission.

⁴⁸ For purposes of this report, mobile data service is considered to be the delivery of non-voice information to a mobile device. Two-way mobile data services include not only the ability to receive non-voice information on an end-user device but to send it from an end-user device to another mobile or landline device using wireless technology.

industry as a whole (Section II.C). This section includes a sub-section discussing the market structure and performance metrics and analyses related to mobile telephone operators,⁴⁹ many of which are now relevant to both mobile voice and mobile data services.⁵⁰ Section II.C includes another sub-section discussing individual mobile data services, devices, and related developments.⁵¹ This sub-section also provides information on those mobile data providers that offer only mobile data services, instead of both voice and data services, in many cases on networks distinct from those traditionally used to provide mobile voice.

16. The *Eighth Report* also provides an overview, for background purposes, of the spectrum and networks that mobile telephone operators currently use to offer both voice and data services, prior to the discussion of CMRS industry developments.⁵²

E. Industry Development

17. During 2002, the CMRS industry continued to experience increased service availability, lower prices for consumers, innovation, and a wider variety of service offerings.⁵³ The mobile telephony sector of CMRS has shown significant growth in spite of the difficult general economic environment, and mobile data services have begun to play a more significant role in the CMRS industry. In the 12 months ending December 2002, the mobile telephony sector generated over \$76 billion in revenues,⁵⁴ increased subscribership from 128.5 million to 141.8 million,⁵⁵ and produced a nationwide penetration rate of roughly 49 percent.⁵⁶ One analyst estimates that 11.9 million, or 8 percent, of the 141.8 mobile telephone subscribers at the end of 2002 subscribed to some type of mobile Internet service.⁵⁷ An additional 2.3 million consumers subscribed to mobile Internet services on data-only mobile devices at the end of 2002.⁵⁸

18. To date, 270 million people, or 95 percent of the total U.S. population, live in counties with

⁴⁹ For purposes of this report, the Commission defines mobile telephone operators as carriers that provide mobile voice and, in most cases, mobile data services using cellular, broadband PCS, and SMR spectrum.

⁵⁰ See Section II.C.1, Mobile Telephony Overview and Analysis, *infra*.

⁵¹ See Section II.C.3, Mobile Data, *infra*.

⁵² See Sections II.A, Spectrum Allocation and II.B, Network Overview, *infra*.

⁵³ "Increased service availability" refers to the increase in the population living in counties served by 3 or more, 4 or more, 5 or more, 6 or more, and 7 or more CMRS providers. See Section II.C.1.b(ix), Market Entry, *infra*.

⁵⁴ See Appendix D, Table 1, at D-2.

⁵⁵ See Section II.C.1.b(i), Subscriber Growth, *infra*.

⁵⁶ *Id.*

⁵⁷ Luiz Carvalho *et al.*, *A Look at Wireless Data: Don't Short SMS*, Morgan Stanley, Equity Research – Wireless Telecom Services, Mar. 2, 2003, at 3 ("*Morgan Stanley Wireless Data Report*"). See Section II.C.3.a, Mobile Data Introduction, *infra*, for a further discussion.

⁵⁸ See Section II.C.3.a, Mobile Data Introduction, *infra*.

access to three or more different operators (cellular, broadband PCS, and/or digital SMR providers) offering mobile telephone service, a slight increase from what the Commission found in the *Seventh Report*.⁵⁹ More than 236 million people, or 83 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service.⁶⁰ Mobile telephone carriers continued to upgrade their networks with next generation technologies that allow them to offer mobile data services at higher data transfer speeds typically ranging from 30 to 70 kilobits per second (“kbps”), with maximum data rates of up to 144 kbps for some carriers. As of March 2003, operators were offering services over these next generation networks in at least some portion of U.S. counties containing 265 million people, or 93 percent of the U.S. population.⁶¹ Furthermore, the average price of mobile telephone service has declined during the year since the *Seventh Report*, continuing the trend of the last several years.⁶² At the same time, one survey indicates that the average revenue per minute of mobile telephone use fell 9 percent between 2001 and 2002.⁶³

19. Mobile data providers, which include both mobile telephone carriers and companies that offer data-only mobile services, began offering a variety of new services to consumers during the past year, including downloadable ring tones and graphics, multimedia messaging services (“MMS”),⁶⁴ and interactive gaming.⁶⁵ In addition, the more established mobile data services, such as text messaging and e-mail, continued to grow in popularity.⁶⁶ It is estimated that 20 percent of all mobile telephone subscribers used text messaging services during the fourth quarter of 2002.⁶⁷ Furthermore, while the use of paging devices has declined substantially over the past four years, we estimate there were 14.1 million paging units in service at the end of 2002.⁶⁸

⁵⁹ See Appendix D, Table 5, at D-9; *Seventh Report*, at 13094.

⁶⁰ See Appendix D, Table 5, at D-9.

⁶¹ See Section II.C.1.b(viii), Coverage by Technology Type, *infra*.

⁶² See Section II.C.1.c, Pricing Data and Trends, *infra*, for a detailed discussion of price competition.

⁶³ *Id.*

⁶⁴ Services involving the exchange of photo, video, animation, and audio files using a mobile phone are often collectively called MMS because customers are using another medium instead of or in addition to text to communicate or convey a message.

⁶⁵ See Section II.C.3.d, Services, Content, and Applications, *infra*.

⁶⁶ *Id.*

⁶⁷ See Section II.C.3.d(ii), Text Messaging, *infra*.

⁶⁸ See Section II.C.3.d(i), Paging, *infra*.

II. DISCUSSION AND ANALYSIS

A. Spectrum Allocation

1. Current Allocation/Licensing

20. Currently, mobile telephone operators primarily use three types of spectrum licenses to provide mobile voice and, in most cases, mobile data services:⁶⁹ cellular, broadband PCS, and SMR.⁷⁰ This information is provided as a basis for understanding the formation of the current industry structure. However, we continue to take steps to increase spectrum flexibility and availability.⁷¹

21. 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 MSAs, 428 RSAs, and a market for the Gulf of Mexico.⁷² 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.⁷³

22. Broadband PCS – Broadband PCS is similar to cellular service, except that broadband PCS systems operate in different spectrum bands and have been designed from the beginning to use a digital format. Broadband PCS licenses have been assigned through auction, beginning in 1995.⁷⁴ The most

⁶⁹ See Section II.C.1, Mobile Telephony Overview and Analysis, for a discussion of mobile voice services; and Section II.C.3, Mobile Data, for a discussion of mobile data services.

⁷⁰ See Appendix F, Table 1 and Maps 11-14, at F-12 – F-16, for descriptions and maps of various geographical licensing schemes employed by the Commission.

⁷¹ See, e.g., Promoting Efficient Use of Spectrum Through Elimination of Barriers to The Development of Secondary Markets, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 03-113 (adopted May 15, 2003).

⁷² 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/>>.

⁷³ See Section II.C.1.b(i), Subscriber Growth, *infra*.

⁷⁴ 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

recent broadband PCS auction was completed in 2001.⁷⁵ The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephony, divided originally into three blocks of 30 megahertz each (blocks A, B, and C) and three blocks of 10 megahertz each (blocks D, E, and F).⁷⁶ Two of the 30 megahertz blocks (A and B blocks) are assigned on the basis of 51 Major Trading Areas (“MTAs”).⁷⁷ One of the 30 megahertz blocks (C block) and all three of the 10 megahertz blocks are assigned on the basis of 493 BTAs.⁷⁸

23. 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.⁷⁹ The Commission has since licensed additional SMR spectrum through auctions.⁸⁰ 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

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.

⁷⁵ See *Sixth Report*, at 13368. See also, *Disposition of Down Payment and Pending Applications By Certain Winning Bidders in Auction No. 35; Requests for Refunds of Down Payments Made In Auction No. 35, Order and Order on Reconsideration*, 17 FCC Rcd 23354 (2002); and *Federal Communications Commission v. NextWave Personal Communications, et al.*, 537 U.S. 293 (2003).

⁷⁶ The Commission’s broadband PCS allocation includes 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS.

⁷⁷ 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 35 for a description of BTAs.

⁷⁸ In June 1998, broadband PCS C block licensees were permitted to elect to disaggregate their licenses and return 15 megahertz of C block spectrum to the Commission. As a result, a number of licensees elected to disaggregate some or all of their licenses, creating some BTAs with seven broadband PCS spectrum licenses. See *Amendment of the Commission’s Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, Second Report and Order and Further Notice of Proposed Rule Making*, 12 FCC Rcd 16436 (1997); *Amendment of the Commission’s Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, Order on Reconsideration of the Second Report and Order*, 13 FCC Rcd 8345 (1998). In August 2000, the Commission decided to reconfigure each 30 megahertz C block license available for auction, beginning with Auction No. 35, into three 10 megahertz licenses. *Amendment of the Commission’s Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, Sixth Report and Order and Order on Reconsideration*, 15 FCC Rcd 16266, 16267 (2000).

⁷⁹ 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”).

⁸⁰ The Commission has held multiple auctions for SMR licenses. *FCC, FCC Auctions* (visited Mar. 7, 2002) <<http://wireless.fcc.gov/auctions/>>.

well as other services.⁸¹ While Commission policy permits flexible use of this spectrum, including the provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,⁸² the primary use for SMR traditionally has been dispatch services.⁸³ Dispatch differs from mobile voice communications offered by PCS and cellular carriers in that it allows both one-to-one and one-to-many communication (including real-time conferencing with groups), and it generally does not operate through interconnection with the public switched telephone network.⁸⁴ SMR systems have also had the ability to offer interconnected service, but until the development of digital technologies, analog SMR systems had limited capacity to provide mobile telephony. In recent years, however, the nature of SMR service has evolved significantly. SMR providers such as Nextel Communications, Inc. (“Nextel”) and Southern LINC, a unit of energy concern Southern Company, have used digital technologies to increase spectral efficiency and to become more significant competitors in mobile telephony, while also providing dispatch functionality (also known as “push-to-talk”) as a part of their service offerings.⁸⁵ Furthermore, in

⁸¹ 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 MHz 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.

⁸² *Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium*, Policy Statement, 14 FCC Rcd 19868 (1999); see also Applications of Various Subsidiaries and Affiliates of Geotek Communications, Inc., Debtor-In-Possession, Assignors, and Wilmington Trust Company or Hughes Electric Corporation, Assignees, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Memorandum Opinion and Order*, 15 FCC Rcd 790, 802 (2000).

⁸³ Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units (e.g., between a taxicab dispatch office and a taxi) or between two or more mobile units (e.g., between a car and a truck). See *Fifth Report*, at 17727-17728, for a detailed discussion. A number of providers continue to provide both commercial and private dispatch services at 800 MHz, 900 MHz, 220 MHz, 217-219 MHz, and 450-470 MHz. See Applications of Motorola, Inc.; Motorola SMR, Inc.; and Motorola Communications and Electronics, Inc. Assignors; and FCI 900, Inc., Assignee, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Order*, 16 FCC Rcd 8451 (2001) (“*Motorola Order*”). Dispatch and SMR are often used interchangeably, although SMR refers to specific spectrum ranges.

⁸⁴ See The Strategis Group, *THE STATE OF THE SMR INDUSTRY: NEXTEL AND DISPATCH COMMUNICATIONS* (Sept. 2000), at 57; The Strategis Group, *U.S. DISPATCH MARKETS* (Jan. 2000), at 1. See also *Motorola Order*, at 8457.

⁸⁵ According to Nextel, “[We are] referred to as an ‘SMR provider’ . . . , although [our] services compete directly with and are regulated virtually identically to those of cellular and PCS providers.” Nextel, Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Comments*, at note 4 (filed Jan. 5, 2001). However, in comparison with cellular and broadband PCS providers, digital SMR providers are more focused on the business than the individual consumer market. See, e.g., Nextel Communications, Inc., SEC Form 10-Q, Nov. 14, 2000, at 16.

apparent response to the dispatch functionality of SMR services, cellular and broadband PCS carriers have recently begun to offer dispatch-like options (*e.g.*, group calling and conferencing) as part of their service offerings, particularly for businesses.⁸⁶ Some cellular and broadband PCS carriers have said that they plan to offer push-to-talk functionality on their networks in 2003.⁸⁷ SMR spectrum is also used for certain data-only networks.⁸⁸

24. Available Licenses – In every geographical area of the country, the Commission initially authorized up to eight different mobile telephony licenses (two cellular and six broadband PCS), not including additional digital SMR licenses.⁸⁹ Moreover, under Commission rules, broadband PCS, cellular, and auctioned SMR licensees may, with Commission approval, disaggregate (divide the spectrum into smaller amounts of bandwidth) or partition (divide the license into smaller geographical areas) their licenses, or both, to other entities.⁹⁰ Many licensees hold more than one license in a particular market. While no longer in operation, the Commission's CMRS spectrum cap molded the current distribution of spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR⁹¹ spectrum in an MSA, or more than 55 megahertz in an RSA.⁹² In November 2001, however, the Commission raised the spectrum cap to 55 megahertz in all markets, and decided to eliminate the restriction entirely effective January 1, 2003.⁹³ In addition, the Commission restricts an entity from having certain cross-interests in cellular licenses on both blocks within an RSA.⁹⁴

2. 700 MHz Bands

25. One of the Commission's primary goals in recent years has been to establish service rules in

⁸⁶ *Id.*, at 8462-8463.

⁸⁷ Yukari Iwatani, *Wireless Companies Turn to Walkie-Talkie Technology*, REUTERS, Mar. 6, 2003; Elizabeth V. Mooney, *Carriers Up On Cash Flow, Push-To-Talk*, RCR WIRELESS NEWS, Feb. 24, 2003, at 12.

⁸⁸ See Section II.C.3.c, CMRS Networks: Data-Only, *infra*.

⁸⁹ Some areas may have fewer than eight active licenses because certain auction winners or licensees have defaulted on payments to the Commission, because some licensees did not meet their buildout requirements, because some licensees returned their licenses, or because some licenses remained unsold in an auction.

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

⁹¹ No more than 10 megahertz of SMR spectrum was attributable to an entity under the cap. 47 C.F.R. § 20.6(b).

⁹² 47 C.F.R. § 20.6(a).

⁹³ 2000 Biennial Regulatory Review Spectrum Aggregation Limits For Commercial Mobile Radio Services, *Report and Order*, 16 FCC Rcd 22668 (2001), *petitions for reconsideration pending* ("Spectrum Cap Order"). The increase to 55 megahertz took effect February 13, 2002. See 67 Fed. Reg. 1626 (Jan. 14, 2002). All license transfers are still subject to review by the Commission to determine whether they are in the public interest. *Spectrum Cap Order*, at 22670-22671.

⁹⁴ *Spectrum Cap Order*, at 22669-22670.

new and reallocated spectrum bands that will promote innovative services and encourage the flexible and efficient use of the spectrum resource.⁹⁵ In recent years the Commission has addressed its statutory directives under Section 309(j) of the Communications Act by addressing the growing complexities of spectrum management using approaches consistent with general market-based principles. One example of this is the 700 MHz spectrum that is being reclaimed from use by broadcast services in connection with the transition of the analog television service to digital television. The reclamation of television spectrum has been addressed in two parts, primarily as a result of different statutory requirements applicable to the two bands and differing degrees of incumbency in the two bands.⁹⁶ These two bands are the 698-746 MHz (known as the “Lower 700 MHz”) band and the 746-806 MHz (or “Upper 700 MHz”) band. The Upper 700 MHz Band is currently used by TV stations on Channels 60-69 and comprises 60 megahertz, while the Lower 700 MHz Band, which is used by TV stations on Channels 52-59, comprises 48 megahertz of spectrum.⁹⁷

26. Seventy-eight megahertz of the total 108 megahertz of Upper and Lower 700 MHz spectrum will generally be open to a broad range of flexible uses.⁹⁸ Pursuant to statutory mandate, licenses for this spectrum will be assigned through competitive bidding.⁹⁹ These bands have many permissible uses: winning bidders may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.¹⁰⁰ The Commission expects that many of the new technologies to be developed and deployed in this band will support advanced wireless applications.¹⁰¹ However, much of the Upper and Lower 700 MHz spectrum is currently encumbered by television broadcasters, and may remain so until the end of period when broadcasters convert from analog to digital transmission systems.¹⁰² That period is defined by statute.¹⁰³ Nevertheless, there may be some portions of these bands that are not so

⁹⁵ See, e.g., 47 U.S.C. § 309(j)(3)(D) (Commission to promote efficient and intensive use of the electromagnetic spectrum).

⁹⁶ Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Notice of Proposed Rulemaking*, 16 FCC Rcd 7278, 7282 (2001).

⁹⁷ The Commission has allocated 24 megahertz of the Upper 700 MHz band for use by public safety entities, pursuant to Section 337(a) of the Communications Act. 47 U.S.C. § 337(a).

⁹⁸ See Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Report and Order*, 17 FCC Rcd 1022 (2002) (“*Lower 700 MHz Report and Order*”); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Third Report and Order*, 16 FCC Rcd 2703 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20845 (2000); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000) (“*Upper 700 MHz Second Report and Order*”).

⁹⁹ See *Lower 700 MHz Report and Order*, at 1024; *Upper 700 MHz Second Report and Order*, at 5301-2.

¹⁰⁰ *Id.*

¹⁰¹ *Lower 700 MHz Report and Order*, at 1032.

¹⁰² *Id.*, at 1028.

¹⁰³ See 47 U.S.C. § 309(j)(14)(A)-(B).

encumbered and are available for immediate use by new entrants.

27. The Balanced Budget Act of 1997 and subsequent legislation initially directed the Commission to license these reclaimed spectrum bands well in advance of the end of the DTV transition period.¹⁰⁴ Pursuant to statutory deadlines established in that legislation, the Commission announced that it would conduct auctions of the Upper 700 MHz band (Auction No. 31) and Lower 700 MHz band (Auction No. 44) starting on June 19, 2002.¹⁰⁵ In response to concerns over this schedule and questions about whether the statutory auction deadlines that had been enacted in that legislation were “consistent with sound telecommunications policy and spectrum management principles,” Congress passed, and the President signed into law, the Auction Reform Act of 2002.¹⁰⁶ The Auction Reform Act eliminated these statutory deadlines. Further, the Auction Reform Act provided the Commission with discretion to “determine the timing of and deadlines for the conduct of competitive bidding under [Section 309(j) of the Communications Act of 1934, as amended], including the timing of, and deadlines for, qualifying for bidding; conducting auctions; collecting, depositing, and reporting revenues; and completing licensing processes and assigning licenses.”¹⁰⁷

28. The Auction Reform Act ordered the Commission to delay the A, B, and E block portion of Auction No. 44 (Lower 700 MHz) and the entire Auction No. 31 (Upper 700 MHz), yet it also directed the Commission to proceed with an auction of the C and D blocks starting “no earlier than August 19, 2002, and no later than September 19, 2002.”¹⁰⁸ On September 18, 2002, the initial auction of Lower 700 MHz C and D block licenses (Auction No. 44) closed, raising \$88.7 million in net bids.¹⁰⁹ The Commission offered 740 licenses: one 12 megahertz license in 734 CMAs, and one 6 megahertz license in 6 Economic Area Groupings (“EAG”).¹¹⁰ The Commission selected CMAs as the license areas in part to address the needs of small, regional, and rural carriers.¹¹¹ A total of 102 bidders won 484 licenses;¹¹²

¹⁰⁴ Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 § 3003 (1997) (adding new Section 309(j)(14) to the Communications Act of 1934, as amended); § 3007 (uncodified; reproduced at 47 U.S.C. § 309(j) note 3); Consolidated Appropriations Act, 2000, Pub. L. No. 106-113, 113 Stat. 2502, App. E, § 213, 145 Cong. Rec. H12493-94 (Nov. 17, 1999) (“Consolidated Appropriations Act”); 47 U.S.C. § 309(j)(14)(C)(ii).

¹⁰⁵ Later, on May 24, 2002, the Commission announced that Auction No. 31 was postponed until January, 2003. Auction of Licenses in the 747-762 and 777-792 MHz Band (Auction No. 31) Postponed Until January 14, 2003; Auction of Licenses in the 698-746 MHz Band (Auction No. 44) Will Proceed As Scheduled, *Public Notice*, FCC 02-158, Report No. AUC-02-31-F (Auction No. 31) and AUC-02-44-D (Auction No. 44) (rel. May 24, 2002).

¹⁰⁶ Auction Reform Act of 2002, Pub. L. No. 107-195, 116 Stat. 715 (“Auction Reform Act”).

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

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

¹⁰⁹ FCC, Auction 44: Lower 700 MHz Band, *Factsheet* (visited Mar. 11, 2003) <<http://wireless.fcc.gov/auctions/44/factsheet.html>>.

¹¹⁰ *Id.*

¹¹¹ *Lower 700 MHz Report and Order*, at 1061-1062.

¹¹² FCC, Auction 44: Lower 700 MHz Band, *Factsheet* (visited Mar. 11, 2003) <<http://wireless.fcc.gov/auctions/44/factsheet.html>>.

47 of the winning bidders were rural telcos, and they won 136 licenses.¹¹³

29. On March 4, 2003, the Commission announced that it would reaucton the licenses that did not have winning bidders in auction 44.¹¹⁴ On June 13, 2003, the Federal Communications Commission completed the auction of 256 licenses in the Lower 700 MHz band C and D blocks (Auction No. 49), raising (in net high bids) a total of \$56.8 million.¹¹⁵ In that auction, 35 winning bidders won a total of 251 licenses.¹¹⁶

30. As required by the Auction Reform Act, we have prepared a report announcing when we intend to reschedule the remaining 700 MHz band auctions, and submitted the report to Congress on June 19, 2003.¹¹⁷

3. Future Allocation/Licensing

31. As discussed in the *Seventh Report*, U.S. mobile carriers have the flexibility to deploy technologies, including those commonly called Third Generation or “3G,” that will allow them to offer high-speed mobile data services using their existing CMRS spectrum.¹¹⁸ Nevertheless, the Commission has continued its efforts over the past year to allocate and license additional spectrum suitable for offering advanced wireless services. Since the publication of the *Seventh Report*, the Commission, in conjunction with the National Telecommunications and Information Administration (“NTIA”), allocated 90 megahertz of spectrum that can be used to offer advanced wireless, including 3G, services: 1710-1755 MHz, which is currently used by the Department of Defense, and 2110-2155 MHz, which is currently used by private and common carrier fixed microwave licensees and by Multipoint Distribution Service (“MDS”) licensees.¹¹⁹ In November 2002, the Commission released a *Notice of Proposed Rulemaking* seeking comment on service rules for offering advanced wireless services in these bands, including provisions for licensing, operational and technical rules, and for competitive bidding.¹²⁰ On February 10, 2003, we released an order reallocating 30 megahertz of spectrum from the Mobile Satellite Service in the 2 GHz band (“2 GHz MSS”) to fixed and mobile services that can be used to provide a variety of advanced wireless services. With this action, we preserved 40 megahertz of spectrum in the 2 GHz band

¹¹³ Based on data available at the Commission’s Auction Form 175 database, available at <<http://auctionfiling.fcc.gov/form175/index.htm>> (last visited Mar. 12, 2002) (“*Form 175 Database*”).

¹¹⁴ Auction of Licenses in the Lower 700 MHz Band Scheduled for May 28, 2003, *Public Notice*, DA 03-567 (rel. Mar. 4, 2003).

¹¹⁵ Lower 700 MHz Band Auction Closes, *Public Notice*, DA 03-1978 (rel. Jun. 18, 2003).

¹¹⁶ *Id.*

¹¹⁷ Auction Reform Act of 2002, *Report To Congress*, FCC 03-138 (rel. Jun. 19, 2003).

¹¹⁸ See *Seventh Report*, at 13040. See Section II.B.2, Network Technology, *infra*, for a discussion of next-generation network technologies.

¹¹⁹ Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, *Second Report and Order*, 17 FCC Rcd 23193 (2002).

¹²⁰ Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 17 FCC Rcd 24135 (2002).

for MSS.¹²¹

32. In addition, the Commission in May 2002 implemented service rules for 27 megahertz of spectrum in seven different bands that had been reallocated for non-government use.¹²² The Commission determined that four of these bands – 1390-1392 MHz, 1392-1395/1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz – would be open to flexible use and licensed by competitive bidding, while the remaining three would be licensed for telemetry services on a frequency coordinated site-by-site basis.¹²³ In April 2003, the Commission auctioned the 1670-1675 MHz band as a single, nationwide license, and the license was purchased by OP Corporation for \$12.6 million.¹²⁴

B. Network Overview

33. As mentioned above, many mobile telephony carriers use not only the same spectrum bands but also the same network design and technologies to offer both voice and data services. While different carriers have chosen different technology migration paths, which are described below,¹²⁵ all are in the process of upgrading their networks in order to improve capacity, increase their advanced service offerings, and/or provide compatibility for their roaming partners' customers. Furthermore, many carriers have continued to expand their networks in order to increase their competitiveness with more established operators.

1. Network Design

34. Cellular, PCS, and digital SMR networks use the same basic design. All use a series of low-power transmitters to serve relatively small areas ("cells"), and all employ frequency reuse to maximize spectrum efficiency.¹²⁶ In the past, cellular and SMR networks used an analog technology, while PCS networks were designed from the start to use a digital format. Digital technology provides better sound quality and increased spectral efficiency than analog technology. Competitive forces combined with

¹²¹ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223 (2003), *recon. pending*.

¹²² Amendments to Parts 1, 2, 27 and 90 of the Commission's Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands, WT Docket No. 02-8, *Report and Order*, 17 FCC Rcd 9980 (2002).

¹²³ *Id.*, at 9983.

¹²⁴ 1670-1675 MHz Band Auction Closes, *Public Notice*, DA 03-1472 (rel. May 2, 2003).

¹²⁵ See Section II.B.2, Network Technology, *infra*.

¹²⁶ PCS, digital SMR, and cellular networks are all "cellular" systems, since all divide service regions into many small areas called "cells." Cells can be as small as an individual building or as large as 20 miles across. Each cell is equipped with its own radio transmitter/receiver antenna. Service regions are divided into cells so that individual radio frequencies may be used over and over again in different cells ("frequency reuse"), allowing for more calls in the system. When a person makes a call on a wireless phone, the message is transmitted to the nearest antenna, which connects with the local wireline phone network or another wireless operator. When a person is using a wireless phone and approaches the boundary of one cell, the wireless network senses that the signal is becoming weak and automatically hands off the call to the antenna in the next cell. See *Sixth Report*, at 13361, note 55.

increased capacity have induced companies to offer calling plans with large buckets of relatively inexpensive minutes, free enhanced services such as voicemail and caller ID, and wireless data and mobile Internet offerings.¹²⁷ From a customer's perspective, digital service in the cellular band or SMR bands is virtually identical to digital service in the PCS band. Digital technology is now dominant in the mobile telephone sector, with approximately 88 percent of all wireless subscribers using digital service.¹²⁸

2. Network Technology

35. The four main digital technologies used in the United States are: Code Division Multiple Access ("CDMA"), Global System for Mobile Communications ("GSM"), integrated Digital Enhanced Network ("iDEN"), and Time Division Multiple Access ("TDMA"). These four technologies are commonly referred to as Second Generation, or "2G," because they succeeded the first generation of analog cellular technology, Advanced Mobile Phone Systems ("AMPS").¹²⁹ As discussed in the *Seventh Report*, as a result of industry developments, this report no longer distinguishes between TDMA and GSM networks in its analysis of digital coverage, but considers the two as one migration path towards more advanced digital capabilities. We recognize that TDMA as currently deployed will continue to be used by millions of subscribers for a number of years.¹³⁰

36. Beyond the 2G digital technologies, mobile telephone carriers have been deploying next-generation network technologies¹³¹ that allow them to offer mobile data services at higher data transfer speeds and, in some cases, increase voice capacity. TDMA/GSM carriers are deploying General Packet Radio Service ("GPRS" or "GSM/GPRS"), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.¹³² GPRS's maximum data throughput rate is 115 kbps, but customers typically experience download speeds ranging from 30 to 60 kbps.¹³³

¹²⁷ See *Sixth Report*, at 13361.

¹²⁸ See Section II.C.1.b(i), *Subscriber Growth*, *infra*.

¹²⁹ See note 254 for a discussion of the cellular analog requirement and its sunset.

¹³⁰ See *Seventh Report*, at 13011.

¹³¹ For purposes of this report, all of the network technologies beyond 2G that carriers have deployed, as well as those that they plan to deploy in the future, are generally referred to as "next-generation network technologies." The International Telecommunication Union ("ITU") has defined 3G network technologies as those that can offer maximum data transfer speeds of 2 megabits per second ("Mbps") from a fixed location, 384 kbps at pedestrian speeds, and 144 kbps at traveling speeds of 100 kilometers per hour. See *Fifth Report*, at 17695. There is ambiguity among other industry players, however, as to which network technologies constitute 3G and which constitute interim technologies, often labeled "2.5G." See *Seventh Report*, at 13038. Therefore, the *Eighth Report* uses a more general label to describe all of the technologies beyond 2G.

¹³² See *Seventh Report*, at 12990. This upgrade is also labeled GSM/GPRS because many TDMA/GSM carriers are upgrading their TDMA markets with GSM and GPRS simultaneously.

¹³³ *Id.*, at 13042-13043. T-Mobile USA, Inc. ("T-Mobile") advertises GPRS speeds of 56 kbps but also reports that its average GPRS user gets speeds around 40 kbps. AT&T Wireless Services, Inc. ("AT&T Wireless") reports that, during times of high usage, its GPRS users can download data at 20 to 30 kbps. 3G Americas states that GPRS's average, customer-experienced throughput is 30 to 40 kbps. See T-Mobile, *T-Mobile Internet Overview* (visited Jan. 24, 2003) <http://www.t-mobile.com/tmobile_internet/>; *U.S. Carriers' New Wireless Networks Said to*

After rolling out GPRS, most U.S. TDMA/GSM carriers plan to deploy Enhanced Data Rates for GSM Evolution ("EDGE") and eventually Wideband CDMA ("WCDMA," also known as Universal Mobile Telecommunications System, or "UMTS").¹³⁴ EDGE and WCDMA are expected to raise peak network speeds to 384-473 kbps and 2-2.4 Mbps, respectively.¹³⁵

37. Many CDMA carriers have been upgrading their networks to CDMA2000 1xRTT (also referred to as "CDMA2000 1X" or "1xRTT"), a technology that doubles voice capacity and allows maximum data throughput rates of 144 kbps.¹³⁶ Actual download speeds range from 30 to 70 kbps.¹³⁷ The next step in the CDMA migration beyond 1xRTT is CDMA2000 1X EV-DO (evolution-data only, "EV-DO") or 1X EV-DV (evolution data and voice, "EV-DV"), which allow maximum data throughput speeds of 2.4 and 3.09 Mbps,¹³⁸ respectively, and actual speeds ranging from 300 to 700 kbps.¹³⁹

C. CMRS Industry

I. Mobile Telephony Overview and Analysis

38. 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 above, providers using cellular radiotelephone, broadband PCS, and SMR licenses dominate this sector.¹⁴⁰ Because these licensees offer mobile telephone services that are essentially interchangeable from the perspective of most consumers, they are discussed in this report as a cohesive industry sector.

39. The discussion below describes the mobile telephone sector as a whole and includes sections on market structure, market performance, pricing, wireless-wireline competition, and urban-rural comparisons. This is followed by discussions of resellers, mobile data services, and mobile telephone satellite providers, as well as international comparisons.

Barely Match Dial-Up Speeds, CTIA Daily News, Dec. 6, 2002 (citing ZDNET NEWS); 3G Americas LLC, *NOI Comments*, at 7 (filed Jan. 27, 2003) ("*3G Americas Comments*").

¹³⁴ See Section II.C.1.b(vii), Technology Deployment, *infra*.

¹³⁵ *3G Americas Comments*, at 7. See *Seventh Report*, at 13044.

¹³⁶ See *Seventh Report*, at 12990.

¹³⁷ *Id.*, at 13042-13043. 3G Americas reports that 1xRTT's customer-experienced data rate is 30 to 70 kbps. *3G Americas Comments*, at 7. Sprint PCS reports its mobile data customers using its 1xRTT network get average speeds of 50-70 kbps. Sprint Corp., SEC Form 10-K, Mar. 7, 2003, at 4.

¹³⁸ See *Seventh Report*, at 12990; CDMA Development Group, Inc., *NOI Comments*, at 6 (filed Jan. 27, 2003) ("*CDG Comments*"). CDMA2000 1xEV-DV provides a simultaneous voice and data upgrade and allows maximum data transfer speeds of 3.09 Mbps. *CDG Comments*, at 6.

¹³⁹ *Monet Launches 1x EV-DO Service*, News Release, Monet Mobile Networks, Nov. 4, 2002.

¹⁴⁰ See 47 C.F.R. §§ 22.900, 24.200, 90.601.