a. Market Structure

40. In the United States, there are six mobile telephone operators that analysts typically describe as nationwide: AT&T Wireless, Sprint PCS,[141] Verizon Wireless, LLC ("Verizon Wireless"),[142] T-Mobile,[143] Cingular Wireless, LLC ("Cingular Wireless" or "Cingular"),[144] and Nextel. When an operator is described as being "nationwide," it does not necessarily mean that the operator's license areas, service areas, or pricing plans cover the entire land area of the United States. The six mobile telephony carriers that analyst reports typically describe as nationwide all offer service in at least some portion of the western, midwestern, and eastern United States. In addition, each of the six national operators has networks covering at least 200 million people, while the next largest provider covers less than 60 million people.[145] In addition to the nationwide operators, there are a number of large regional players, including ALLTEL Corp. ("ALLTEL"), Western Wireless Corp. ("Western Wireless"), United States Cellular Corp. ("US Cellular"), and Dobson.

41. Since the end of 1999, carriers have been building nationwide footprints[146] through various forms of transactions.[147] One of the driving forces behind many of these transactions has been the desire of large regional carriers to enhance their ability to compete with existing nationwide operators that offer attractive nationwide pricing plans.[148] Also, as the Commission has previously concluded, operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints.[149] More recently, national operators have sought to fill in gaps in their coverage

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[141] Sprint PCS is a division of Sprint Corp. ("Sprint"). *See* Sprint Corp., SEC Form 10-K, Mar. 4, 2002, at 3.

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

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

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

[145] Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Jan. 22, 2003, at 15 ("*Wireless 411*").

[146] 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.

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

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

[149] *See Seventh Report*, at 12997. However, as we note in Section II.C.1.b(ix), Market Entry, *infra*, slightly less than 50 percent of the geographic area of the country still is served by two or fewer carriers. Based in part on that statistic, in the *Rural NOI*, the Commission asked whether the use of small geographic licensing areas stimulates competition in the provision of wireless services to rural populations. It also asked if there was any evidence that smaller geographic areas will result in more rapid deployment of services and whether rural carriers are better positioned to serve the needs of rural America than nationwide carriers. *Rural NOI*, at ¶ 19.

areas,[150] as well as to increase the capacity of their existing networks. Since the writing of the *Seventh Report*, a number of transactions between market participants have been announced. We discuss the transactions involving the largest impact, either through the exchange of subscribers or spectrum licenses, on the structure of the market below. In addition, we discuss some of the carriers that have declared bankruptcy and/or announced other restructuring plans during the past year.

(a) Sales and Swaps

42. *Verizon Wireless/Northcoast Communications* – On December 19, 2002, Verizon Wireless announced that it had signed an agreement with Northcoast Communications, LLC ("Northcoast") to purchase 50 of Northcoast's 56 PCS licenses, as well as related network assets, for approximately $750 million in cash.[151] The fifty 10-megahertz licenses cover roughly 47 million people in parts of the Midwest and East Coast, including New York and Boston.[152] Verizon Wireless stated that the additional spectrum would help it to increase capacity on its network.[153] The deal did not include the Cleveland market, where Northcoast is currently providing service under the brand name "Northcoast PCS."[154] The Wireless Telecommunications Bureau granted consent to the transaction on April 8, 2003.[155]

43. *Triton PCS/Lafayette Communications* – During 2002, Triton PCS announced agreements to acquire substantially all of the spectrum licenses of its affiliate, Lafayette Communications ("Lafayette").[156] Triton PCS completed the acquisition of nine Lafayette licenses in the third quarter of 2002, paid for with the extinguishment of approximately $22 million in debt that Lafayette owed to Triton PCS.[157] Triton PCS said that the acquisition was undertaken to meet the spectrum needs of its

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

[151] *Verizon Wireless to Purchase From Northcoast Communications Spectrum Licenses Covering 50 U.S. Market*, News Release, Verizon Wireless, Dec. 19, 2002.

[152] *Id.*

[153] *Id.*

[154] *See* Northcoast, *Coverage Area* (visited Jun. 23, 2003) <http://www.northcoastpcs.com/NewFiles/Coverage%20Area.html>. Of the other five licenses, one was already being transferred to Triton PCS, Inc. ("Triton PCS") (*see* Application #0000967526, submitted July 7, 2002); the other four licenses were "closed" licenses from Auction 35, and as such Verizon Wireless was not eligible at that time to purchase them, if the company did want them (callsigns WPTS936, WPTS938, WPTS939, and WPTS941). *See* FCC, *Auction 35: C and F Block Broadband PCS Fact Sheet* (visited Mar. 17, 2003) <http://wireless.fcc.gov/auctions/35/factsheet.html>.

[155] Applications of Northcoast Communications, LLC and Cellco Partnership d/b/a Verizon Wireless For Consent to Assignment of Licenses, *Memorandum Opinion and Order*, DA 03-1102 (rel. Apr. 8, 2003).

[156] Triton PCS holds a 39 percent interest in Lafayette. Triton PCS, Inc., SEC Form 10-K, Mar. 22, 2002, at 9.

[157] *Triton PCS Third-Quarter EBITDA Rises to a Record $50.5 Million EBITDA Margin Soars to 27.1%*, News Release, Triton PCS, Oct. 23, 2002; Triton PCS, Inc., SEC Form 10-K, Mar. 25, 2003, at 6. The Commission granted consent to the license transfers in September 2002. Wireless Telecommunications Bureau Grants Consent To Assign C, E And F Block Broadband PCS Licenses, *Public Notice*, DA 02-2313 (rel. Sept. 18, 2002); Wireless Telecommunications Bureau Assignment of Authorization and Transfer of Control Applications Action, *Public Notice*, DOC-226335 (rel. Sept 18, 2002).

current network overlay of GSM/GPRS technology.[158] In the fourth quarter of 2002, Triton PCS entered into agreements with Lafayette for the acquisition of most of Lafayette's remaining spectrum licenses for approximately $127 million.[159] The Wireless Telecommunications Bureau granted consent to the transactions on April 30, 2003.[160] During 2001, Lafayette had acquired PCS licenses covering a population of approximately 6.3 million people in areas of Georgia, South Carolina, Tennessee, and Virginia.[161]

44. *AT&T Wireless/US Cellular* – On March 10, 2003, AT&T Wireless and US Cellular announced that they had signed an agreement to swap licenses and assets across 15 states and covering more than 18 million people.[162] In this transaction, US Cellular is acquiring PCS licenses (but no networks) in 13 states in the Midwest and Northeast covering 16.6 million people, as well as $31 million in cash.[163] AT&T Wireless is acquiring cellular licenses in Florida and Georgia, covering about 1.5 million people, as well as network facilities and 141,000 customers.[164] The acquisition fills a gap in AT&T Wireless's network[165] and may reduce the company's roaming expenses in Florida.[166] The deal, pending regulatory approval, is expected to close in the second half of 2003.[167]

(b) Joint Ventures

45. *Cingular Wireless/AT&T Wireless* – As discussed in the *Seventh Report*, in January 2002, Cingular Wireless and AT&T Wireless announced the formation of an infrastructure joint venture to build out a GSM/GPRS network along 3,000 miles of interstate highways predominantly in western and

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[158] Triton PCS, Inc.; SEC Form 10-K, Mar. 25, 2003, at 35.

[159] *Id.*

[160] Wireless Telecommunications Bureau Grants Consent to Assign C Block Broadband PCS Licenses, *Public Notice*, DA 03-1451 (rel. Apr. 30, 2003).

[161] Triton PCS, Inc., SEC Form 10-K, Mar. 22, 2002, at 9.

[162] *AT&T Wireless, U.S. Cellular Swap Wireless Licenses, Markets*, News Release, AT&T Wireless, Mar. 10, 2003.

[163] Colette Fleming *et al.*, *US Cellular and AT&T Wireless Swap Properties*, UBS Warburg, Equity Research, Mar. 11, 2003, at 2.

[164] *Id.*

[165] *AT&T Wireless, U.S. Cellular Swap Wireless Licenses, Markets*, News Release, AT&T Wireless, Mar. 10, 2003.

[166] "[US Cellular] management said that the Florida markets involved in this transaction have [AT&T Wireless] markets surrounding it and that [AT&T Wireless] was a large contributor to the properties' revenues. [US Cellular] also said that the level of roaming in these markets was above the company average of roughly 10% -12%." Colette Fleming *et al.*, *US Cellular and AT&T Wireless Swap Properties*, UBS Warburg, Equity Research, Mar. 11, 2003, at 2.

[167] *AT&T Wireless, U.S. Cellular Swap Wireless Licenses, Markets*, News Release, AT&T Wireless, Mar. 10, 2003.

midwestern states.[168] The companies have since expanded the venture to include highways in New England, increasing the coverage of the joint venture to more than 4,000 miles of roads.[169] The companies also recently announced a new agreement to reduce roaming costs on each other's networks.[170]

46. *AT&T Wireless/Sprint PCS* – In January 2003, AT&T Wireless and Sprint PCS signed an agreement through which they will cooperate in the construction of new wireless towers.[171] Under the terms of the agreement, the companies will share information about their current tower inventories and future construction plans.[172] This includes identifying areas of overlap; determining which company will build and maintain the tower; and deciding which will co-locate its network facilities on it.[173] The companies claim that the arrangement will enable them to reduce the number of towers needed and the associated capital expenditures, thus enhancing their wireless footprints faster and at lower cost.[174]

47. *Cingular Wireless/T-Mobile* – As mentioned in the *Seventh Report*, Cingular Wireless and T-Mobile (then known as VoiceStream) announced an infrastructure sharing joint venture in October 2001 whereby the companies would share their existing GSM networks in California, Nevada, and New York.[175] Since then, in July 2002, T-Mobile launched service in California and Nevada (where Cingular already offered service), while Cingular launched service in New York City (where T-Mobile already offered service).[176]

(c) Restructurings

48. *Leap Bankruptcy* – On April 13, 2003, Leap Wireless International, Inc. ("Leap")[177] filed a voluntary petition for reorganization under Chapter 11 of the U.S. Bankruptcy Code in the United States

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[168] *See Seventh Report*, at 13001. The Wireless Telecommunications Bureau granted consent to the transaction on February 12, 2003. Wireless Telecommunications Bureau Grants Consent for the Full and Partial Assignment and Transfer of Control of Licenses to Implement GSM Corridor, LLC Joint Venture, *Public Notice*, DA 03-418 (rel. Feb. 12, 2003).

[169] *AT&T Wireless and Cingular Wireless Complete Joint Venture*, News Release, AT&T Wireless, Mar. 13, 2003.

[170] *AT&T Wireless and Cingular Wireless Strike Accord Designed To Lower Costs, Improve Quality and Encourage Expansion Of GSM/GPRS Coverage Nationwide*, News Release, AT&T Wireless, Mar. 17, 2003.

[171] *AT&T Wireless and Sprint to Cooperate in the Construction of New Wireless Towers*, News Release, AT&T Wireless, Jan. 28, 2003.

[172] *Id.*

[173] *Id.*

[174] *Id.*

[175] *See Seventh Report*, at 13001.

[176] *T-Mobile Launches Wireless Service in California and Nevada*, News Release, T-Mobile, July 18, 2002; *Cingular Wireless Debuts in New York City*, News Release, Cingular, July 11, 2002.

[177] *See* Section II.C.1.d(ii), Wireless Alternatives, *infra*, for a discussion of Leap's service offerings.

Bankruptcy Court for the Southern District of California.[178] Based on Leap's fiscal 2002 results, the company's net loss for 2002 was $664.8 million on revenues of $618.5 million, with debt of almost $2.5 billion.[179] The company stated that daily operations will continue during reorganization, and that it does not expect to implement any organization changes or dismiss employees as a result of the filing.[180] The company also expects that, under any plan of reorganization agreed to with its creditors, there will be little or no value left in the company for common stockholders.[181] Leap's stock was delisted from the NASDAQ stock exchange in December 2002.[182]

49. *Ntelos Bankruptcy* – Ntelos, Inc. ("Ntelos") filed for Chapter 11 bankruptcy protection in the U.S Bankruptcy Court for the Eastern District of Virginia on March 4, 2003.[183] Ntelos, which had 266,000 wireless customers at the end of 2002 in Virginia, West Virginia, Kentucky, Tennessee, and North Carolina, had missed interest payments of more than $24 million on loans from commercial debt holders in February 2003.[184] Under the terms of its loan agreements, Ntelos had a 30-day grace period before it was considered to be in default.[185] The company does not expect the bankruptcy filing to affect its operations.[186]

50. *iPCS Bankruptcy* – On February 24, 2003, Sprint PCS affiliate AirGate PCS, Inc. ("AirGate") announced that its wholly-owned subsidiary, iPCS Inc. ("iPCS") filed a Chapter 11 bankruptcy petition in the United States Bankruptcy Court for the Northern District of Georgia.[187] At the time of its acquisition by AirGate in November 2001,[188] iPCS had licenses covering more than 7.4 million people in Illinois, Michigan, Iowa, and eastern Nebraska, and served roughly 30,000

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[178] *Leap Moves to Reorganize Capital Structure*, News Release, Leap, Apr. 14, 2003. On May 23, 2003, Leap filed its amended Plan of Reorganization with the bankruptcy court.

[179] Leap Wireless International, Inc., SEC Form 10-K/A, Apr. 16, 2003, at 56-57. Debt level is as of December 30, 2002.

[180] *Leap Moves to Reorganize Capital Structure*, News Release, Leap, Apr. 14, 2003.

[181] *Id.*

[182] *Leap Files for Chapter 11 Bankruptcy*, SAN DIEGO DAILY, Apr. 14, 2003; Mike Dano, *Rollercoaster Continues for Carriers*, RCR WIRELESS NEWS, Dec. 16, 2002, at 1.

[183] *NTELOS Takes Another Step Toward Comprehensive Financial Restructuring Plan*, News Release, Ntelos, Mar. 4, 2003.

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

[185] *Id.*

[186] *NTELOS Takes Another Step Toward Comprehensive Financial Restructuring Plan*, News Release, Ntelos, Mar. 4, 2003.

[187] *AirGate PCS Subsidiary iPCS, Inc. Files Chapter 11 Reorganization Proceeding*, News Release, AirGate, Feb. 24, 2003.

[188] *See Seventh Report*, at 12999.

customers.[189]

51. *NextWave Telecommunications Inc. and NextWave Power Partners, Inc.* ("NextWave") – NextWave, a wireless carrier with 95 C, D, E and F block PCS licenses covering 174 million POPs, recently announced that it will move forward with its bankruptcy reorganization efforts.[190]

(d) Withdrawn IPO

52. On January 29, 2003, Verizon announced that Verizon Wireless had withdrawn its registration for an initial public offering ("IPO").[191] Verizon Wireless filed the initial registration statement on August 24, 2000.[192] Verizon said that the IPO was no longer needed because of strong cash flow at Verizon Wireless and its lack of significant funding requirements.[193]

(e) Affiliations

53. Three of the nationwide operators also have extended their coverage through contractual affiliations with smaller carriers. These affiliations create a "family" of operating companies with much closer relationships than those formed by traditional roaming agreements.[194] 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.[195]

54. *AT&T Wireless* – The AT&T Wireless family consists of AT&T Wireless, as well as its affiliations with two companies: Triton PCS and Edge Wireless, LLC ("Edge").[196] In the case of Triton

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[189] *AirGate PCS, Inc. Announces Stockholder Approval of Merger With iPCS, Inc.*, News Release, AirGate, Nov. 27, 2001; *AirGate PCS, Inc. Completes Merger With iPCS, Inc.; Combined Company Guidance Provided for First Fiscal Quarter of 2002*, News Release, AirGate, Nov. 30, 2001.

[190] Mary Greczyn, *Nextwave Seeks Court Approval for Partnership to Buy Spectrum*, COMMUNICATIONS DAILY, Jun. 2, 2003, at 4; *Cingular Could Be First at Nextwave Spectrum Trough*, WIRELESS DATA NEWS, Jun. 4, 2003.

[191] *Verizon Communications Reports Strong Yearly Operational Growth and Gives Outlook for 2003*, News Release, Verizon, Jan. 29, 2003.

[192] *See* Verizon Wireless, LLC, SEC Form S-1, filed Aug. 24, 2000.

[193] *Verizon Communications Reports Strong Yearly Operational Growth and Gives Outlook for 2003*, News Release, Verizon, Jan. 29, 2003.

[194] *See* Section II.C.1.c(ii), Roaming, *infra*.

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

[196] In addition, AT&T Wireless has close relationships with a number of other operators. AT&T Wireless and Dobson own equal interests in a joint venture, ACC Acquisitions, LLC ("ACC"), which provides service primarily in

PCS, AT&T Wireless sold portions of some of its broadband PCS licenses to the company in exchange for a minority ownership interest.[197] While Triton PCS is marketed under the brand name SunCom[198] and Edge is marketed under its own name, both companies provide service as a "Member of the AT&T Wireless Network." These affiliates, like AT&T Wireless, have committed to upgrading their TDMA networks to GSM/GPRS.[199]

55. *Nextel* – The Nextel family consists of Nextel and Nextel Partners, Inc. ("Nextel Partners"). In an arrangement similar to that of AT&T Wireless with its affiliates,[200] in 1999, Nextel sold some of its SMR licenses to Nextel Partners in exchange for a minority ownership interest in the company.[201] Nextel Partners is building out an iDEN network compatible with Nextel's, and Nextel assists Nextel Partners in obtaining terms similar to those Nextel receives from vendors for equipment and services.[202] Both Nextel and Nextel Partners market their services under the Nextel brand name.

56. *Sprint PCS* – The Sprint PCS family consists of Sprint PCS and 10 affiliates.[203] Each of the affiliates has an agreement with Sprint PCS to use the latter's PCS licenses to deploy CDMA technology and Sprint PCS-branded service in specific areas of the country.[204] In return, Sprint PCS receives 8

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rural and suburban areas of the midwestern and eastern United States. Dobson Communications Corporation, SEC Form 10-K, Apr. 1, 2002, at 72. Dobson operates the ACC markets under the brand name Cellular One. Dobson Communications Corporation, SEC Form 10-K, Apr. 1, 2002, at 3, 8. AT&T Wireless owns approximately 12 percent of Dobson. On December 2002, as part of a license swap with Dobson, AT&T Wireless agreed to transfer to Dobson its shares of Dobson Series AA preferred stock, which AT&T Wireless Services purchased in February 2001. Without the preferred stock, AT&T Wireless's ownership in Dobson will drop from approximately 12.7 percent to 5.0 percent. AT&T Wireless Services, Inc., SEC Form 10-K, filed Mar. 25, 2003, at 108, 112. Cincinnati Bell Wireless, LLC ("Cincinnati Bell Wireless") is a joint venture of Broadwing, Inc. ("Broadwing") and AT&T Wireless, in which AT&T Wireless owns 19.9 percent and Broadwing owns the remaining 80.1 percent. Broadwing, Inc., SEC Form 10-K, Mar. 31, 2003, at 6. Cincinnati Bell Wireless services are sold under the Cincinnati Bell Wireless brand name. AT&T Wireless also has interests in a number of other broadband PCS licensee holders, including Cascade Wireless, LLC (85 percent), Lewis & Clark Communications, LLC (49.9 percent), and Alaska Native Wireless, LLC (38.2 percent). AT&T Wireless, FCC Form 602 (filed Mar. 10, 2003).

[197] AT&T Wireless owns 15.7 percent of Triton PCS and 40 percent of Edge. AT&T Wireless, FCC Form 602 (filed Mar. 10, 2003).

[198] Suncom, *Suncom Fact Sheet* (visited Mar. 19, 2003) <http://www.suncom.com/pr_news/index.html>.

[199] *Triton PCS First-Quarter EBITDA More Than Triples to $36 Million; EBITDA Margin Rises to 23.7%; Revenue Increases 40% While Churn Declines to 1.88*, News Release, Triton PCS, May 8, 2002; Sue Marek, *Creating Rural E911 Solutions*, WIRELESS WEEK, Jun. 3, 2002, at 38.

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

[201] Nextel Partners, Inc., SEC Form 10-K, Mar. 22, 2002, at 4. Nextel owns 32 percent of Nextel Partners. Nextel, FCC Form 602 (filed Jan. 1, 2003).

[202] Nextel Partners, Inc., SEC Form 10-K, Mar. 22, 2002, at 3.

[203] Five are public companies and five are privately-held. Cannon Carr *et al.*, *Avoiding the Hotel California: An Equity /High Yield Wireless Weekly*, CIBC World Markets, Apr. 7, 2003, at 4.

[204] *See, e.g.*, US Unwired Inc., SEC Form 4249(B)(1), May 17, 2000, at 7. In addition, Sprint PCS affiliate Horizon PCS has an agreement with Ntelos where Ntelos committed to build and maintain a network in certain

percent of the affiliates' local service revenue.[205] In addition, Sprint PCS performs back-office tasks at cost for most of its affiliates, giving them the benefits of economies of scale for billing and customer service.[206] Sprint PCS affiliates now provide service to more than 2.5 million subscribers.[207]

b. Market Performance

57. Using the various information sources described in the introduction – 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. Some of the key metrics reported by mobile telephone operators, such as subscriber growth, average monthly usage per subscriber, and average revenue per subscriber, while not individually indicative of competition *per se*, demonstrate the increased demand for and reliance placed on mobile telephony services over the past year. Moreover, it is the totality of the circumstances – including prices, the number of competitors, investment levels, and churn rates, as well as the other metrics listed above – that shows the extent of competition in the growing CMRS industry. Continued downward price trends, the continued expansion of mobile networks into new and existing markets, high rates of investment, and churn rates of about 30 percent, when considered together with the other metrics, demonstrate a high level of competition for mobile telephone consumers. We examine these different metrics because each one highlights a different aspect of the industry, and collectively provide a fuller picture of the state of competition.

(i) Subscriber Growth

58. In the *Seventh Report*, in an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, the Commission began analyzing information filed directly with the FCC. This information, the NRUF data,[208] tracks phone number usage information for the United States.[209] All

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markets and provide service at wholesale rates to Horizon PCS. *See* Ric Prentiss, *Ntelos*, Raymond James & Associates, Equity Research, Dec. 27, 2001, at 19-20. In March 2002, Ntelos CEO James Quarforth characterized the arrangement as a "network-sharing agreement." Sue Marek, *Auction Winners Turn Spectrum Into Cash*, WIRELESS WEEK, Mar. 18, 2002, at 1.

[205] Sprint PCS said it received $160 million in affiliate fees during 2002. Linda J. Mutschler *et al.*, *Sprint PCS*, Merrill Lynch, Equity Research, Feb. 6, 2003, at 3.

[206] Ric Prentiss, *Sprint PCS*, Raymond James, Equity Research, Feb. 19, 2002, at 4. Sprint PCS says it received $260 million in such payments in 2002. Linda J. Mutschler *et al.*, *Sprint PCS*, Merrill Lynch, Equity Research, Feb. 6, 2003, at 3.

[207] *Sprint Reports Fourth Quarter and Full-Year 2002 Results*, News Release, Sprint PCS, Feb. 15, 2003 (data from accompanying related tables, *Sprint Corporation PCS Group: Net Customer Additions* (visited Mar. 19, 2003) <http://www.sprint.com/sprint/ir/fn/qe/4q02.pdf>).

[208] Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC requires mobile wireless carriers with over 10,000 facility-based subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. In their December 31, 2002 filings, operators reported that they served 136 million subscribers. *See* Appendix D, Table 2, at D-3. However, the Commission recognizes that its reporting rules result in some level of undercount of total industry subscribers since it does not count subscribers served by mobile telephony providers in states where the provider has fewer than 10,000 customers. *See* Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743 (2000).

mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end-users, thereby permitting the Commission to make more accurate estimates regarding subscribership.[210] In previous years, for purposes of this report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.[211] While the Commission, for purposes of this report, now uses NRUF data as the basis for its estimate of mobile telephone subscribership, we continue to report the CTIA data as well for comparison.[212]

59. As of December 2002, we estimate that there were 141.8 million mobile telephone subscribers,[213] which translates into a nationwide penetration rate of roughly 49 percent.[214] While this increase of 13.3 million subscribers[215] from the estimate of 128.5 million in 2001 is significant, it is only

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

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

[211] *See* CTIA, *Wireless Industry Indices: Semi-Annual Data Survey Results* (results through December 2002) ("*Dec 2002 CTIA Survey*"). The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. *CTIA Comments*, at 3; *see also*, *Dec 2002 CTIA Survey*, at 17-21.

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

[213] FCC, based on preliminary year-end 2002 filings for Numbering Resource Utilization in the United States.

[214] The nationwide penetration rate is calculated by dividing total mobile telephone subscribers by the total U.S. population. According to the Bureau of the Census, the combined population of the 50 states, the District of Columbia, and Puerto Rico as of July 1, 2002 was estimated to be 292.2 million. *See* U.S. Census Bureau, *Population Estimates* (visited Mar. 18, 2003) <http://eire.census.gov/popest/estimates.php >.

[215] The number of subscribers refer to the number of separate wireless accounts. A particular individual may have more than one wireless account.

a 10 percent increase from the previous year and continues the leveling off of wireless growth the Commission noted in the *Seventh Report*.[216]

60. CTIA's estimate for year-end 2002 was 140.8 million subscribers, a 10 percent increase over its estimate of 128.4 million subscribers as of year-end 2001.[217] CTIA's absolute increase of 12.4 million subscribers represents the smallest 12-month increase in subscribership in the last five years, and the 10 percent increase was the smallest growth rate in subscribership since the survey began.[218] The large absolute number of new subscribers indicates the continued demand for mobile wireless service. Analysts believe that one reason for the slowdown in subscriber additions may be the industry's current focus on profitability rather than expansion of its subscriber base or revenue growth.[219]

61. Digital subscribers made up approximately 88 percent of all wireless subscribers at the end of 2002, up from 80 percent at the end of 2001.[220] During 2002, the number of customers subscribing to digital services climbed 21 percent, from approximately 102 million to 125 million.[221] Approximately 17 million mobile telephony subscribers are analog only, a drop of 34 percent from 2001.[222]

(ii) Regional Penetration Rates

62. NRUF data is collected on a small area basis and thus allows the Commission to compare the

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[216] *See Seventh Report*, at 13005. The difficulty in acquiring new subscribers can be seen in that two nationwide operators, both for the first time, had quarters in 2002 in which they experienced net losses in subscribers. COMMUNICATIONS DAILY, Oct. 29, 2002, at 5. In the third quarter, Sprint PCS lost 78,000 customers, while Cingular lost 107,000 customers in the third quarter and an additional 151,000 customers in the fourth quarter. Both companies still had positive net subscriber growth for the year. Luiz Carvalho *et al.*, *Wireless Tracker: Results Speak the Loudest*, Morgan Stanley, Equity Research, Mar. 17, 2003, at 25.

[217] *See* Appendix D, Table 1, at D-2.

[218] *Id.*

[219] *See, e.g.*, Luiz Carvalho *et al.*, *3Q02 Preview: Subs Slow, Cash Grows*, Morgan Stanley, Equity Research, Oct. 9, 2002, at 3 ("top line growth of the industry is slowing significantly as the industry focuses more on profitability than on revenue or subscriber growth"). *See also*, Section II.C.1.b(vi), Capital Expenditures, *infra*. One analyst argues subscriber growth is slowing due to the high cost of acquiring new customers (cost per gross addition, or "CPGA"): "[U]ntil operators can lower their cost to add a new subscriber, it will not be profitable for the operators to go after the lower ARPU or high credit risk customers. As the United States nears 50% penetration, it could easily be argued that the incremental subscriber is probably less valuable than the customers that already have wireless service." Colette Fleming *et al.*, *3Q02 Wireless 411 – Outlook*, UBS Warburg, Equity Research, Jan. 23, 2003, at 1.

[220] Linda Mutschler *et al.*, *The US Wireless Matrix*, Merrill Lynch, Equity Research, Mar. 19, 2003, at 15 ("*ML Matrix*"). CTIA found a similar rate: Almost 89 percent of subscribers of responding carriers in its YE2002 survey were digital (CTIA does not estimate the digital percentage for its total estimate of subscribers). CTIA, *Digital Migration Keeps a Steady Pace* (visited Mar. 19, 2003) <http://www.wow-com.com/images/survey/2003/752x571/Digital_Migration_2002_Slide_9.gif>.

[221] Based on *ML Matrix* digital penetration rates.

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

spread of mobile telephone subscribership across different areas within the United States.[223] 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.[224] 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.[225] Thus, an EA would seem to capture the market where the average person would use his or her mobile phone most 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.[226] 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).[227]

63. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA population density, can be seen in Appendix D, Table 3.[228] The rates range from a high of 62 percent in the Atlanta, GA-AL-NC (EA 40) and the Fort Myers-Cape Coral, FL (EA 32) EAs, to a low of 11 percent in the Northern Michigan, MI EA (EA 58). Forty EAs, with a combined population of over 170 million, have penetration rates of over 50 percent. The Anchorage, AK EA (EA 171), with the lowest population

[223] NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 20,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

[224] There are 172 EAs, each of which is an aggregation of counties. *See* Kenneth P. Johnson, *Redefinition of the BEA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75. 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>.

[225] Kenneth P. Johnson, *Redefinition of the BEA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75.

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

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

[228] *See also,* Appendix F, Map 4, at F-5.

density, had a penetration rate of 46 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 56 percent. As previously stated based on an analysis of NRUF data, the national penetration rate is 49 percent.

(iii) Minutes-of-Use

64. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones. Average minutes-of-use per subscriber per month ("MOUs") continued a rapid rise in 2002, to 492 minutes, or more than 8 hours for the average subscriber of a nationwide operator in the last quarter of the year.[229] Increasing MOUs most likely are a result of the decreasing prices and the wider acceptance of and reliance upon wireless service.[230]

65. According to CTIA, MOUs averaged 427 between June and December 2002, an increase of 12 percent from 380 average MOUs during the same period in 2001, and an increase of 67 percent from an average of 255 MOUs from the same period in 2000.[231] Other analysts also report higher MOUs in 2002. Paul Kagan and Associates estimated MOUs of 509 in mid-2002, an increase of 21 percent from 422 in mid-2001.[232] J.D. Power and Associates estimated 541 MOUs, an increase of 28 percent from 422 a year earlier.[233]

66. Operators with all-digital networks tended to have the highest MOUs, while regional operators, Verizon Wireless, and Cingular, which provide service to relatively large numbers of analog subscribers, had relatively lower levels.[234] One analyst claims that this trend is due to averaging of much lower-usage analog subscribers in the latters' subscriber bases.[235]

(iv) Average Revenue Per Unit

67. One financial metric widely used in analyzing the mobile telephone sector is average monthly revenue per subscriber (often referred to as average revenue per unit, or "ARPU"). CTIA's estimate of ARPU decreased almost continuously between December 1988 and December 1998, when it

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[229] Luiz Carvalho *et al.*, *Wireless Pricing: Better Days Ahead*, Morgan Stanley, Equity Research, Mar. 3, 2003, at 7.

[230] *See also*, Linda Mutschler *et al.*, *The Next Generation VII*, Merrill Lynch, Equity Research, Feb. 21, 2003, at 28-29, 38-42 ("*NextGen VII*").

[231] *Dec 2002 CTIA Survey*, at 208. CTIA aggregated all of the carriers' MOUs from July 1 through December 31, then divided by the average number of subscribers, and then divided by six.

[232] Paul Kagan Associates, Inc., *Average Subscriber Talks 500 Minutes/Month*, WIRELESS MARKET STATS, Sept. 25, 2002, at 8 (weighted average, based on carriers' reported MOUs, included Canadian operators).

[233] Dennis K. Berman, *We May Be Reaching Limit For Yakking on Our Phones*, WALL STREET JOURNAL ONLINE, Dec. 23, 2002 (citing J.D. Power and Associates); *Wireless Phone Penetration Among U.S. Households Climbs Above 50 Percent As More First-Time Subscribers Enter the Marketplace*, News Release, J.D. Power and Associates, Sept. 26, 2001 (based on survey responses from 14,492 households in 25 of the largest U.S. markets).

[234] *Wireless 411*, at 56.

[235] *Id.*, at 52.

reached a low of $39.43.[236] However, since 1999, ARPU has been increasing, rising to $48.40 in December 2002, a 23 percent increase during the last four years, but only a rise of 2 percent from $47.37 in December 2001. This trend is evident even though per-minute prices declined throughout this period.[237] The recent ARPU increases might be due to a variety of factors, including increased usage offsetting per-minute price declines, as well as the adoption by wireless consumers of higher-priced calling plans.[238]

(v) Churn

68. Churn refers to the number of customers an operator loses over a given period of time. Mobile telephone operators usually express churn in terms of an average percent churn per month. For example, an operator might report an average monthly churn of 2 percent in a given fiscal quarter. In other words, on average, the operator lost 2 percent of its customers in each of the quarter's three months. At this rate, the operator would lose approximately 24 percent of its customers in a single year.[239] Most carriers report churn rates between 1.5 percent and 3 percent per month.[240] At current rates, more than 30 percent of subscribers change service providers each year.[241] Average monthly churn rates for mobile telephone service have remained fairly constant over the past three years.[242]

69. Consistent with findings in previous reports, customers indicated cost and network quality as the main reasons for changing providers.[243] A survey conducted in 2002 by the Yankee Group research firm found that 26 percent of wireless subscribers claimed pricing played the largest role in whether they

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[236] *See* Appendix D, Table 1, at D-2. There are different ways of calculating ARPU. The measure used here, CTIA's "average local monthly bill," does not include toll or roaming revenues (CTIA calls it "the equivalent of 'local ARPU'"). *Dec 2002 CTIA Survey*, at 184. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, *see Dec 2002 CTIA Survey*, at 185. *See also*, Linda J. Mutschler *et al.*, *Wireless Services: What Is Included in ARPU?*, Merrill Lynch, Equity Research, Jan. 24, 2003, for a discussion of what nationwide operators include in their estimates of ARPU. For most nationwide carriers, reported ARPU consists of roughly 70 to 80 percent monthly access fees, with overage and other fees (such as late fees, roaming, data/text messaging, long distance, and various regulatory fees) making up the rest.

[237] *See* Section II.C.1.c, Pricing Data and Trends, *infra*.

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

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

[240] Paul Kagan Associates, Inc., *Churn Up For Four of Six National Carriers*, WIRELESS MARKET STATS, Dec. 12, 2002, at 4. In the third quarter of 2002, churn increased for three of the nationwide carriers, as Sprint PCS dealt with non-paying Clear Pay subscribers, and AT&T Wireless and Cingular disconnected WorldCom subscribers from their bases. Luiz Carvalho *et al.*, *Wireless Tracker: Cash Flow Matters Most*, Morgan Stanley, Equity Research, Dec. 11, 2002, at 7. *See* Section II.C.2, Resellers, *infra*.

[241] Paul Kagan Associates, Inc., *Churn Up For Four of Six National Carriers*, WIRELESS MARKET STATS, Dec. 12, 2002, at 4 (average includes Canadian operators).

[242] Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Jun. 2, 2003, at 28.

[243] *See Sixth Report*, at 13372-73; *Seventh Report*, at 13007.

would switch carriers, while 20 percent felt improved coverage was the most important issue.[244] Phone upgrade programs came in third with 14 percent, and loyalty programs came in fourth with 13 percent of survey respondents.[245] One Yankee Group analyst claimed that it only took a 10 to 15 percent price difference to lure wireless subscribers to another carrier.[246]

(vi) Capital Expenditures

70. Capital expenditures, alternatively called "capital spending" or abbreviated to "capex," is the amount of money spent during a particular period to acquire or improve long-term assets such as property, plant, or equipment.[247] In the mobile telephone industry, capex consists primarily of spending to expand and improve the geographic coverage of networks, increase the capacity of existing networks so they can serve more customers, and improve the capabilities of networks (by allowing higher data transmission speeds, for example).[248] One analyst estimated that the wireless industry spent roughly $25 billion on capex in 2002, a decline of 7 percent from the $27 billion spent in 2001, but still 14 percent more than the $22.3 billion spent in 2000, and almost twice as much, $10 billion more, than was spent in 1999.[249] In fact, in 2002, carriers spent more on capex than in any other year with the exception of 2001.[250] As one analyst noted, "carriers are still investing heavily in their networks."[251] The analyst attributed the recent slowdown in capex spending to smaller subscriber growth, near completion of network expansions and upgrades, and lower network equipment prices.[252] Another analyst attributed the

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[244] Dan Meyer, *More Satisfied Users, But Customer Care Remains Lead Complaint*, RCR WIRELESS NEWS, Jun. 10, 2002, at 18 (citing Yankee Group).

[245] *Id.*

[246] Jay Lyman, *Switching Cell Phone Providers – Why Bother?*, WIRELESS NEWSFACTOR, Oct. 15, 2002 (citing Roger Entner of Yankee Group).

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

[248] Verizon Wireless says that capacity capex now represents more than 50 percent of the company's total capex. Luiz Carvalho *et al.*, *Wireless Capex Conference Supports Thesis*, Morgan Stanley, Equity Research, Feb. 4, 2003, at 3. Sprint PCS also finds usage growth to be the main driver of capex. Luiz Carvalho *et al.*, *Wireless Capex Conference Supports Thesis*, Morgan Stanley, Equity Research, Feb. 4, 2003, at 2.

[249] Simon Flannery, Luiz Carvalho *et al.*, *US Telecom Team Quarterly Results Preview and '03 Outlook*, Morgan Stanley, Equity Research – Industry Report, Jan. 13, 2003, at 19; Ric Prentiss *et al.*, *4Q02 Wireless Preview: Holiday Punch Has Indeed Gone Flat*, Raymond James & Associates, Equity Research, Jan. 21, 2003, at 2. Since 1996, capital spending on wireless networks has grown at nearly three times the rate of growth of spending on wireline. Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet, 108 Cong. (Feb. 5, 2003) (statement of Blake Bath, Managing Partner, Lehman Brothers).

[250] Ric Prentiss *et al.*, *4Q02 Wireless Preview: Holiday Punch Has Indeed Gone Flat*, Raymond James & Associates, Equity Research, Jan. 21, 2003, at 2.

[251] Luiz Carvalho *et al.*, *Wireless Tracker: Cash Flow Matters Most*, Morgan Stanley, Equity Research, Dec. 11, 2002, at 6.

[252] *Id.*

carriers' recent focus on profitability as contributing to the decline in capital spending.[253]

(vii) Technology Deployment

71. Of the six nationwide mobile telephone operators, Cingular, T-Mobile, and AT&T Wireless use TDMA/GSM as their 2G digital technology, Sprint PCS and Verizon Wireless use CDMA, and Nextel uses iDEN.[254]

72. U.S. mobile carriers have continued to deploy next generation network technologies over the past year.[255] At the writing of the *Seventh Report*, T-Mobile had deployed GPRS across its entire network, AT&T Wireless and Cingular had deployed GPRS in portions of their respective networks, and Verizon Wireless had built out 1xRTT across portions of its network.[256] During the past year, AT&T Wireless, Cingular, and Verizon Wireless have expanded their next-generation network deployments into additional markets. Furthermore, Sprint PCS, Monet Mobile Networks ("Monet Mobile"),[257] Western Wireless, US Cellular, and Dobson initiated service over upgraded next-generation networks during 2002.[258]

73. During 2002, AT&T Wireless expanded its GSM/GPRS network from 16 cities covering 73 million POPs, or 26 percent of the U.S. population, to areas covering 181 million POPs, or 63 percent of the U.S. population.[259] AT&T Wireless expects to expand its GSM/GPRS network to areas covering 74 percent of the U.S. population by the end of 2003.[260] The company has also been installing EDGE

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[253] *NextGen VII*, at 49. *See also*, Reinhardt Krause, *AT&T Wireless Says It's Slashing Capital Spending By 40%*, INVESTOR'S BUSINESS DAILY, Jan. 29, 2003 ("By cutting capital spending, [AT&T Wireless] expects to become free cash flow positive in 2003").

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

[255] *See* Section II.C.1.b(x), Quality of Service, *infra*, for a discussion of the relationship between technology deployment and service quality.

[256] *See Seventh Report*, at 13042-13044.

[257] *See* Section II.C.3.c, CMRS Networks: Data-Only, *infra*, for a discussion of Monet Mobile's data only service offered over its 1xEV-DO network.

[258] Among the other major carriers, Nextel has overlaid its iDEN network with a packet network in order to offer data services but has not committed to deploying one of the two major next-generation technology migration paths. *See* Nextel Communications, Inc., SEC Form 10-K, Mar. 27, 2003, at 2, 6. Furthermore, ALLTEL is planning to upgrade its CDMA network to 1xRTT, but has not yet launched service using the technology. *See* Dan Meyer, *Regional Players to Use Customer Service to Outshine in Data Sell*, RCR WIRELESS NEWS, Oct. 14, 2002, at 8.

[259] *See Seventh Report*, at 13043, note 400; AT&T Wireless Services, Inc., SEC Form 10-K, Mar. 25, 2003, at 3.

[260] AT&T Wireless Services, Inc., SEC Form 10-K, Mar. 25, 2003, at 3.

equipment and expects to launch service using EDGE technology across its entire GSM/GPRS footprint by the end of 2003.[261] Furthermore, AT&T Wireless announced in December 2002 that it plans to launch WCDMA in four U.S. markets – San Francisco, San Diego, Seattle, and Dallas – covering approximately 8 million POPs by the end of 2004.[262]

74. During 2002, Cingular Wireless expanded its GSM/GPRS coverage to portions of California, Connecticut, New York, and New Jersey, and, as of the end of 2002, its GSM/GPRS network was available to 50 percent of the company's covered POPs.[263] The company plans to deploy GSM/GPRS to 90 percent of its POPs during 2003 and to the remaining 10 percent during 2004.[264] Cingular expects to launch service over EDGE networks in selected markets during the third quarter of 2003 and to continue deploying EDGE during 2004.[265]

75. At the writing of the *Seventh Report*, Verizon Wireless had upgraded approximately 20 percent of its network coverage area to 1xRTT[266] but has since completed 1xRTT upgrades in a total of 900 towns and cities.[267] Verizon Wireless also announced in March 2003 that it expects to launch service over 1xEV-DO networks in Washington, D.C. and San Diego during the third quarter of 2003.[268]

76. In August 2002, Sprint PCS began offering service using 1xRTT technology, which the carrier deployed across its entire network footprint.[269] Sprint PCS reportedly does not expect to build out 1xEV-DO technology but instead plans to wait until 1xEV-DV is available for commercial deployment,

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[261] *Id.*

[262] *AT&T Wireless, NTT DoCoMo Outline Plans for Targeted Rollout of W-CDMA Services*, BUSINESS WIRE, Dec. 25, 2003. AT&T Wireless had previously announced that it planned to launch service over WCDMA networks in 13 U.S. cities during 2004. *Id. See also* AT&T Wireless Services, Inc., SEC Form 10-K, Mar. 25, 2003, at 4.

[263] Cingular Wireless, *Wireless Internet Availability* (visited Apr. 1, 2003) <http://www.cingularwirelses.com/beyond_voice/wi_availability>; Cingular Wireless, LLC, SEC Form 10-K, Mar. 11, 2003, at 10; Sue Marek, *Cingular Gets Back to Basics*, WIRELESS WEEK, Mar. 1, 2003, at 12.

[264] Cingular Wireless, LLC, SEC Form 10-K, Mar. 11, 2003, at 10.

[265] Sue Marek, *Cingular Gets Back to Basics*, WIRELESS WEEK, Mar. 1, 2003, at 12; *Wireless Carriers in Americas Already Receiving Benefits of GSM/GPRS Technology*, PR NEWSWIRE, Feb. 18, 2003. Cingular Wireless has not established a timeline for installing WCDMA. In fact, the company has stated that it will need more spectrum to deploy WCDMA. *See* Kelly Carroll, *Cingular Backs Away From Wideband CDMA*, TELEPHONY, Nov. 5, 2001; Frank Marsala, *Implications of Cingular's Technology Announcement*, ROBERTSON STEPHENS, Oct. 31, 2001; Kelly Carroll, *Cingular Attaches Billions To Its EDGE Commitment*, TELEPHONY, Dec. 10, 2001; Kelly Carroll, *An Alternate Reality For 3G Wireless*, TELEPHONY, Oct. 15, 2001.

[266] This portion of its network covered the Northeast, the San Francisco Bay Area, and Salt Lake City. *See Seventh Report*, at 13042.

[267] *Verizon Wireless Expands Express Network in Spokane, Washington and Northern Idaho*, News Release, Verizon Wireless, Mar. 31, 2003; *CDG Comments*, at 3-4.

[268] Dan O'Shea, *CTIA: Just Do It? Verizon Does*, TELEPHONY, Mar. 18, 2003; Dan Meyer, *Verizon to Deploy DO, Carriers Talk PTT, Wi-Fi*, RCR WIRELESS NEWS, Mar. 24, 2003, at 1.

[269] *Sprint Introduces Clarity You Can See and Hear with Nationwide Availability of PCS Vision*, News Release, Sprint PCS, Aug. 8, 2002; *CDG Comments*, at 3-4.

possibly in 2005.[270] On the other hand, one of Sprint PCS's affiliates, UbiquiTel, is running a trial of 1xEV-DO in Boise, ID and is expected to offer service over the network commercially in the future.[271]

77. Western Wireless, which has used TDMA as its 2G technology, chose to upgrade its network to 1xRTT, and has launched service using 1xRTT technology in Terry, MT[272] and is running trials of 1xRTT service in Billings, MT and Midland, TX.[273] In the fourth quarter of 2002, US Cellular upgraded its Chicago-area network to CDMA 1xRTT.[274] Dobson is in the process of overlaying its TDMA network and that of its 50 percent owned subsidiary, American Cellular, with GSM/GPRS technology.[275] During the first quarter of 2003, American Cellular began offering GSM/GPRS roaming service to Cingular customers over its New York network, and Dobson expects to begin offering GSM/GPRS service on a roaming basis and for its own subscribers in select markets by the end of 2003.[276] Dobson expects to complete these upgrades across its entire network during 2004.[277]

(viii) Coverage by Technology Type

78. To date, 278 million people, or 97 percent of the total U.S. population, live in counties where operators offer digital mobile telephone service, using CDMA, TDMA/GSM, or iDEN (including their respective next generation technologies), or some combination of the three.[278] These counties make up 71 percent of the total land area of the United States. To estimate the current levels of deployment of the three main digital mobile telephone technologies individually, we have prepared maps of each technology, which combine the network coverage of all of the relevant operators.[279] We have also

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[270] Lynnette Luna, *Evolved CDMA Finds Its Legs in Small-Town America*, TELEPHONY, Dec. 2, 2002, at 42; Sue Marek, *U.S. Spotlight Shines on EV-DO*, WIRELESS WEEK, Apr. 15, 2003, at 26.

[271] Brad Smith, *Monet Makes Its Mark*, WIRELESS WEEK, Mar. 15, 2003, at 16; Lynnette Luna, *Evolved CDMA Finds Its Legs in Small-Town America*, TELEPHONY, Dec. 2, 2002, at 42.

[272] Kelly Carroll, *No-Name Town Gets High-Speed Access; Western Wireless Brings Mobile Internet to Rural Montana*, TELEPHONY, July 9, 2001; Chris Goldman, *Home on the Web – Western Wireless Brings 1X Data Service to a Small Montana Community*, WIRELESS REVIEW, Nov. 15, 2001.

[273] Western Wireless Corporation, SEC Form 10-K, Mar. 27, 2003, at 4.

[274] *U.S. Cellular Reports Fourth Quarter Results, Surpasses 4 Million Customer Mark*, News Release, US Cellular, Feb. 5, 2003. US Cellular acquired PrimeCo Communications LLC and its Chicago-area CDMA network and subscribers in 2002. *See Seventh Report*, at 13000.

[275] *Q3 2002 Dobson Communications Corporation Earnings Conference Call – Final*, FD (FAIR DISCLOSURE) WIRE, Nov. 15, 2002 (quoting Everett Dobson, President, CEO and Chairman of Dobson Communications).

[276] *Q1 2003 Dobson Communications Corporation Earnings Conference Call – Final*, FD (FAIR DISCLOSURE) WIRE, May 6, 2003 (citing Doug Stephens, COO of Dobson).

[277] *Id.* (citing Bruce Knooihuizen, Executive Vice President of Dobson).

[278] The broadband PCS-based and digital SMR-based coverage is estimated using counties, and the cellular-based coverage is estimated using CMAs. The caveats mentioned in Section I.B, Sources of Information, *supra*, and Section II.C.1.b(ix), Market Entry, *infra*, apply to this analysis as well.

[279] *See* Appendix F, Maps 5-8, at F-6 – F-9.

prepared maps showing the extent of next generation network technology deployment.[280]

79. CDMA has been launched in at least some portion of counties containing 260 million people, or roughly 91 percent of the U.S. population, while TDMA/GSM has been launched in at least some portion of counties containing 265 million people, or almost 93 percent of the U.S. population.[281] To date, digital SMR operators have launched iDEN-based service in at least some portion of counties containing over 248 million people, or approximately 97 percent of the U.S. population.[282]

80. CDMA 1xRTT/1xEVDO has been launched in at least some portion of counties containing 260 million people, or roughly 91 percent of the U.S. population, while GPRS has been launched in at least some portion of counties containing 227 million people, or almost 80 percent of the U.S. population.[283]

(ix) Market Entry

81. 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 with the Commission in proceedings or with applications.[284]

82. 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.[285] Therefore, this analysis overstates the total coverage in terms of both geographic

[280] *See* Appendix F, Map 9, at F-10.

[281] *See* Appendix D, Table 7, at D-10.

[282] *Id.*

[283] *Id.*

[284] The Commission has buildout rules for geographic area licenses, although they do not require operators to deploy networks such that the entire geographic area of a specific license receives coverage. For example, the construction requirements for 30 megahertz broadband PCS licenses state that an operator's network must serve an area containing at least one-third of the license area's population within five years of the license being granted and two-thirds of the population within 10 years. *See* 47 C.F.R. § 24.203(a). Similarly, the construction requirements for 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.

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

areas and populations covered.

83. On the other hand, this county-by-county analysis reflects a significant improvement in accuracy. In past editions of this report, 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 deployments. Moreover, while the newer broadband PCS and digital SMR entrants have less complete networks, the original cellular licenses have extensive networks that provide almost complete coverage of the entire land mass of the continental United States.[286] 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.[287]

84. To date, 270 million people, or 95 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.[288] However, these counties make up only 52 percent of the total land area of the United States, reflecting the nation's uneven population distribution.[289] Over 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, while 72 million people, or about 25 percent of the population, live in counties with seven or more mobile telephone operators competing to offer service. While the growth in the percentage of U.S. population living in counties with three or more, four or more, five or more, and seven or more providers has slowed, the percentage of the population living in counties with six or more providers has grown 34 percent over the last year, up from a 14 percent growth rate between the *Sixth* and *Seventh Reports*.[290] More than 200 million people, or 71 percent of the population, can now choose from among six or more different mobile telephone operators providing service somewhere in their counties.[291]

(x) Quality of Service

85. Another variable that we examine as part of our assessment of the level of CMRS

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[286] *See* Appendix F, Maps 2-3, at F-3 – F-4. CTIA states – based on its analysis of a publicly-available software, GeoComm's Wireless Sourcedisk – that cellular service is available in zipcodes in which roughly 99 percent of the U.S. population lives. *CTIA Comments*, at 6.

[287] *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 systems operators were given a five-year period during which to expand their systems within the CMAs in which they were licensees. *Id.*

[288] *See* Appendix D, Table 5, at D-9. In this analysis, we include T-Mobile in California and Nevada, and Cingular in the New York City metro area, as competitors.

[289] *Id.* We note that the land area of these counties, 1.9 million square miles, is roughly 60 percent larger than the combined land area of the 15 members of the European Union (1.2 million square miles).

[290] *See* Appendix D, Table 10, at D-11.

[291] *Id.*

competition is the quality of service that customers experience.[292] In addition to competing on price, in a competitive market, firms also compete on the basis of service quality. Evidence from the CMRS marketplace shows that carriers compete in terms of services quality.[293] As discussed below, market forces have also created an incentive for numerous third parties to provide information to consumers seeking information on the quality of individual carriers' services.

86. Sections II.C.1.b(vii), Technology Deployment and II.C.1.b(ix), Market Entry, *supra*, as well as similar sections in previous reports, discuss upgrades that carriers have made to their networks that have improved service quality.[294] For instance, carriers' aggressive rollout of digital technology has enabled better voice quality and additional calling features for consumers, as well as higher capacity for operators, thereby allowing more customers to access the network and use their phones at the same time.[295] Industry analysts emphasize that carriers are still working to upgrade their networks and that their future capital expenditures will be "largely related to capacity increases and network quality improvements."[296] Another analyst stated that "carriers are still spending heavily in improving the quality of their networks."[297] In a report released in April 2003, the General Accounting Office ("GAO")

[292] Service quality can refer to many different factors in providing service to a customer. The various components of service quality include: network access, call maintenance and completion, applications, voice quality, data integrity and throughput, billing, and customer care. For purposes of this report, we are limiting our discussion of "service quality" or "call quality" to network access, call maintenance and completion, and voice quality. We also note that the reliability of a particular wireless call or application may involve the reliability of the wireline network as well as the reliability of the wireless connection. Furthermore, the type of handset a subscriber uses can also affect his or her network access and voice quality.

[293] *See* Section II.C.1.b(v), Churn, *supra*.

[294] In the *NOI*, the Commission requested additional information on service quality and sought comment on the relationship between service quality and competition. While the Commission received little information from commenters on this issue, both Dobson and NTCA stated that rural customers have access to the same, high level of service quality that is available to consumers in urban areas. NTCA stated, "Even if rural customers are not served by multiple carriers, they will still demand access to the same services being provided to urban customers. ... [M]any rural customers have access to the same state-of-the-art wireless technologies available to their urban counterparts. .... Consumers in rural America are receiving superior wireless service from ... NTCA members." National Telecommunications Cooperative Association, *NOI Comments*, at 3, 4 (filed Jan. 27, 3003) ("*NTCA Comments*"). Dobson stated, "[R]ural carriers ... are not lagging behind in providing digital networks and additional services to their customers." *Dobson Comments*, at 5.

[295] Steven R. Yanis *et al*, *Wireless World – The Mobile Telephone Industry*, Banc of America Securities, Equity Research, April 2002, at 249.

[296] *Wireless 411*, at 6. UBS Warburg also stated, "Carriers are also increasingly spending capex dollars on advanced technologies to improve capacity as subscriber usage increases. For example, in a December 2002 news release, Cingular noted that it has also boosted its network capacity by installing Adaptive Multi-Rate ("AMR") speech channels. Cingular believes AMR translates into higher spectral efficiency, allowing the company to carry more calls per base station. In the release, Cingular said that, 'As a result (of implementing AMR), network capacity is expected to double and service quality will improve.' CDMA carriers such as Verizon Wireless and Sprint PCS also invested in capacity-enhancing technologies. In addition to their moves to cdma2000 1XRTT, ... CDMA carriers invest in such items as smart antennae, which can increase capacity by using multiple antennas to provide more accurate directional targeting." *Id.*, at 80.

[297] Luiz Carvalho, *Wireless Tracker: Results Speak the Loudest*, Morgan Stanley, Equity Research, Mar. 17, 2003, at 8.

reported that many mobile telephone carriers strive for a 98 percent call-completion rate, meaning dialed calls would go through and not be dropped before they were completed at least 98 percent of the time on average.[298]

87. In addition to the digital and next generation network upgrades that carriers are making in order to improve call quality and network capacity, some carriers have focused their marketing campaigns on distinguishing their products on the basis of quality, instead of on other factors such as price or the availability of advanced features. Verizon Wireless's "Can You Hear Me Now?" advertising campaign, for example, has attempted to emphasize the carrier's network availability and reliability. Analysts indicate that these types of efforts have been beneficial for carriers, as those who have emphasized service quality have at times been more successful in gaining subscribers than those with a negative quality perception. For example, one analyst reported that Verizon Wireless "has been able to post strong subscriber figures largely as a result of the popularity of its America's Choice pricing plans ... and its 'Can You Hear Me Now?' advertising campaign, which highlighted the quality of the company's national network."[299] Another analyst stated in February 2003 that it believed the company would "continue to invest in its network so as to continue to leverage customer perception of a quality and coverage advantage."[300] This analyst also forecast that T-Mobile would see successful sales during the 2002 holiday season due to a variety of factors, including "improved network quality in selected markets."[301] On the other hand, analysts have noted that a negative impression of a carrier's service quality can be detrimental to its market share.[302]

88. In addition to the information presented above on carriers' network upgrades and quality-focused marketing efforts, other data suggests that most consumers are content with the level of mobile telephone service quality that they currently receive. Based on a survey it conducted in November 2002, GAO estimated that "about 83 percent of mobile telephone consumers were satisfied with their call quality."[303] GAO also estimated that "about 47 percent of adult mobile phone users believed their call

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[298] *FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services*, General Accounting Office, GAO-03-501, Apr., 2003, at 23 ("*GAO Report*").

[299] *Wireless 411*, at 27.

[300] *NextGen VII*, at 59.

[301] Linda J. Mutschler, *Wireless Store Visits*, Merrill Lynch, Equity Research, Dec. 13, 2002, at 4.

[302] *Id.*, at 6 ("[T]he main reasons for [Sprint] PCS's declining market share position have been issues with customer care and dropped/blocked calls"). Another analyst reported that Western Wireless experienced an increased churn rate in the second quarter of 2001 "as a result of poor network quality." The analyst added, "Minutes of use surged on the company's network, and Western, at the time, had ... old analog equipment and had not migrated subscribers quickly enough to digital technology to alleviate the network congestion." Steven R. Yanis *et al*, *Wireless World – The Mobile Telephone Industry*, Banc of America Securities, Equity Research, April 2002, at 235.

[303] *GAO Report*, at 27. To conduct its survey, GAO "contracted with an international market research firm to administer 26 questions as part of a nationwide, multipurpose, Random Digit Dialing telephone survey of adults conducted between November 8 and 10, 2002. ... Five hundred fifty-two of the 1,027 survey respondents had mobile phones and answered at least some of the 25 questions in addition to the preliminary screener question." GAO estimates "that for the survey questions that applied to all of the respondents who used mobile phones (417 or more) the 95 percent confidence intervals [yield margins of error of] plus or minus 8 percentage points." GAO explained possible nonsampling errors with the survey's methodology: "As with any survey, differences in the wording of questions, the sources of information available to respondents, and the types of people who do not respond may have

quality was improving, while about 5 percent believed that their call quality was getting worse."[304] GAO also reported that "[d]espite the many mobile phone customers who appeared to be satisfied with their overall call quality, a number of survey respondents reported that they were experiencing specific problems."[305] For example, "about one-third of customers could not complete 10 percent or more of their calls because they were in a cell where the carrier did not provide service."[306] About 12 percent reported that such a problem occurred at least one-third of the time.[307] In addition, just over 20 percent of respondents reported problems "getting a call through because [of a] fast busy signal or a message that says the call failed" or problems "with a call being cut off or dropped" at least 10 percent of the time.[308] When examining consumer opinions, it is important to keep in mind that consumer perceptions of service quality can change independently of actual changes in network performance, as consumers' expectations evolve.

89. It is also apparent that wireless consumers are demanding more information about mobile carriers' individual service quality levels, and that numerous third parties have been responding to this demand by compiling and reporting such information.[309] There are considerable sources of information available to consumers, including publications such as *Consumer Reports*, trade associations, marketing and consulting firms, and several web sites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area.[310]

c. Pricing Data and Trends

90. As for the last few years, equity analysts and other industry observers continue to describe wireless price competition in the United States as "intense," "fierce," and "ultra-competitive."[311] While

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led to errors that we could not assess." *Id.*, at 40. Consumers Union also reported that "[i]n a survey conducted of 22,000 visitors to Consumer Reports' web site regarding wireless telephone quality of service and customer satisfaction, approximately one-third of respondents said they were unhappy with the quality of their cellular service." No additional information about the survey or its methodology is available. Consumers Union, Notice of *Ex Parte* presentation in Docket No. 02-379, Jun. 16, 2003.

[304] *GAO Report*, at 27-28. The remaining 48 percent "believed that call quality had not changed since they acquired their phones." *Id.*

[305] *Id.*, at 28.

[306] *Id.*, at 28.

[307] *Id.*, at 42.

[308] *Id.*, at 42.

[309] *See* FCC, *What You Should Know About Wireless Phone Service*, at 8, *available at* <http://www.fcc.gov/cgb/wirelessphone.pdf>.

[310] *Id.*; *Complete Cell Phone Guide*, CONSUMER REPORTS, Feb. 2003, at 11-27.

[311] Colette Fleming *et al.*, *3Q02 Wireless 411 – Outlook*, UBS Warburg, Equity Research, Jan. 23, 2003, at 1; Paul Marsch *et al.*, *Deutsche Telekom*, Morgan Stanley, Equity Research, Oct. 17, 2002, at 2 ("the ultra-competitive US wireless market"); Cannon Carr *et al.*, *Avoiding the Hotel California: An Equity /High Yield Wireless Weekly*, CIBC World Markets, Dec. 23, 2002, at 2 ("fierce price competition"). In fact, many equity analysts view the intense price competition as a problem, at least from an investor's perspective. *See, e.g.*, Linda J. Mutschler *et al.*, *Wireless Preview: What About 3Q02?*, Merrill Lynch, Equity Research, Oct. 8, 2002, at 5 ("the continuing pricing

it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner,[312] these claims are supported by a number of reports and other available data indicating that the cost of mobile telephony service continues to fall. One journalist opined in October 2002 that "there has never been a cheaper time to sign up for cellphone service."[313]

91. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities declined roughly 2.9 percent in 2002.[314] The average cost of monthly service[315] – which was calculated across four typical usage plans (50, 200, 500 and 800 minutes) – dropped from $36.77 in December 2001 to $35.70 in December 2002.[316] Costs dropped the most in Tampa (-7.0 percent), Chicago (-6.0 percent), St. Louis (-5.4 percent), Detroit (-4.6 percent) and Pittsburgh (-4.4 percent), while prices increased 1.6 percent in Portland and 0.6 percent in Denver.[317] As mentioned in the *Seventh Report*, Econ One compared usage plans of 30, 150, 300, and 600 minutes during 2001 and found the greatest price decline was for 600 minutes of airtime; furthermore, usage levels of 150 and 300 minutes saw more modest reductions, while the monthly cost of 30 minutes of airtime increased 5.9 percent.[318]

92. Another source of price information is the cellular telephone services component of the Consumer Price Index ("Cellular CPI") produced by the United States Department of Labor's Bureau of Labor Statistics ("BLS").[319] Cellular CPI data is published on a national basis only.[320] From 2001 to

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pressure is worrisome, and, in our view, could disrupt the stable ARPU trend that we have seen up to this point"); and Cannon Carr and Gregor Dannacher, *Can Wireline Cannibalization Save Wireless ARPUs in 2003?*, CIBC World Markets, Dec. 11, 2002, at 5 ("Pricing Trends Worrisome, But Volumes Have Made Up For It").

[312] *See Fourth Report*, at 10164-10165.

[313] Jane Spencer, *Price Cuts by Cellphone Firms Add Up to Consumer Savings*, WALL STREET JOURNAL, Oct. 1, 2002.

[314] *Econ One Survey: Wireless Costs Continue to Fall*, News Release, Econ One, Jan. 9, 2003. The survey is based on an analysis of pricing plan data collected from carriers' websites. *Transcript*, at 78.

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

[316] *Econ One Survey: Wireless Costs Continue to Fall*, News Release, Econ One, Jan. 9, 2003. The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used.

[317] *Id.* We would need additional data to determine whether prices are different in urban versus rural areas. For a discussion of Econ One's 2001 study comparing prices in urban and rural areas, *see* Section II.C.1.e(ii), Rural Rollout, *infra*, and *Seventh Report*, at 13023.

[318] *See Seventh Report*, at 13013. Econ One did not provide similar data for 2002.

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

2002, the annual Cellular CPI decreased by 1.0 percent while the overall CPI increased by 1.6 percent. The Cellular CPI has declined almost 33 percent since 1997 when BLS began tracking it.

93. As a third pricing indicator, some analysts believe average revenue per minute ("RPM") is a good proxy for mobile pricing.[321] This is calculated by dividing a carrier's estimate of ARPU by its estimate of MOUs, yielding the revenue per minute that the carrier is receiving.[322] Using its estimates of industry-wide ARPU and MOUs, CTIA's survey indicates that RPM fell 9 percent between December 2001 and December 2002. Since 1994, RPM has fallen from $0.47 in December 1994 to $0.11 in December 2002, a decline of 76 percent.[323]

(i) Developments in Pricing Plans

94. The continued rollout of differentiated pricing plans also indicates a competitive marketplace. In the mobile telephone sector, we observe independent pricing behavior, in the form of continued experimentation with varying pricing levels and structures, for varying service packages, with various available handsets and policies on handset pricing. AT&T Wireless's Digital One Rate ("DOR") plan, introduced in May 1998, is one notable example of an independent pricing action that altered the market and benefited consumers.[324] Today all of the nationwide operators offer some version of DOR pricing plan which customers can purchase a bucket of MOUs to use on a nationwide or nearly nationwide network without incurring roaming or long distance charges.

95. Another trend in mobile telephone pricing has been the introduction of on-network, or "on-net," national pricing plans. These plans are similar to DOR plans, with the exception that subscribers incur roaming charges when they use their phones off the carrier's network ("off-net"). Such plans are usually cheaper, or include more minutes, than the initial type of DOR plans.[325] The advantage of the on-net plan to the carrier, of course, is that it allows a carrier to recover the cost of its subscribers roaming onto other carriers' networks, an expense which the carrier would otherwise bear with a DOR pricing

include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

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

[321] *See Seventh Report*, at 13013.

[322] Note that this version of ARPU is CTIA's "average monthly local bill" and does not include toll or roaming revenues where they are not priced into a calling plan. *See* note 236, *supra*.

[323] *See* Appendix D, Table 9, at D-11.

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

[325] For a comparison of Verizon Wireless' America Choice and National SingleRate (*i.e.*, its DOR plan), *see* Verizon Wireless's website, at www.verizonwireless.com.

plan.[326] Sprint PCS, which permits off-net roaming, has allowed free on-net national roaming with its pricing plans for many years. In January 2002, Verizon Wireless began to offer its own on-net national plans, under the name "America's Choice."[327] Verizon Wireless was soon followed by AT&T Wireless's "National Network" plans in April,[328] and then Cingular's "Preferred Nation" plans in September.[329] We believe that such pricing plans, broadly similar across operators, are the results of competitive market forces and competitive conduct.

(ii) Roaming

96. All mobile calling plans specify a calling area – such as a particular metropolitan area, a state, a region, the carrier's entire network, or the entire United States – within which the subscriber can make a call without incurring additional charges. When a subscriber exits this area, or "roams," he or she incurs additional charges for each minute of use. Sometimes these roaming charges go directly to the subscriber's carrier, and sometimes the charges are used to pay a carrier other than the subscriber's, on whose network the subscriber was roaming.[330] This source of revenue is particularly important to many rural and smaller carriers.[331]

97. CTIA reported that roaming revenues for the mobile telephony industry were virtually unchanged over the past year, from $3.94 billion in 2001 to $3.90 billion in 2002.[332] Roaming revenues as a percentage of total service revenue continued to decline, however, from 6.1 percent reported in 2001 to 5.1 percent in 2002.[333] CTIA attributes this decline to the growth of DOR plans and the extended calling areas established by many of the larger carriers.[334] It may also be the result of declining per-minute roaming rates.[335]

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[326] For a comparison of on-net and off-net plans, see Linda Mutschler *et al.*, *Wireless Pricing: What Are They Thinking,*, Merrill Lynch, Equity Research, Aug. 1, 2002.

[327] *Verizon Wireless New National Rate Plan Provides Superior Value To Frequent-Calling Travelers*, News Release, Verizon Wireless, Jan. 31, 2002.

[328] Linda Mutschler *et al.*, *Wireless Pricing: A Look at Recent Pricing Trends – and Potential Implications*, Merrill Lynch, Equity Research, Apr. 29, 2002, at 3.

[329] Linda Mutschler *et al.*, *Wireless Pricing: Cingular Starts On-Net Roaming National Plans*, Merrill Lynch, Equity Research, Sept. 5, 2002, at 1. Neither T-Mobile's on-net national plans nor any of Nextel plans allow off-net roaming. *See* Linda Mutschler *et al.*, *Wireless Pricing Nextel Introduces New Plans*, Merrill Lynch, Equity Research, Nov. 8, 2002, at 2.

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

[331] *See Wireless 411*, at 47 (Table 20: Roaming Revenues as a Percentage of Total Service Revenues).

[332] *See* Appendix D, Table 1, at D-2.

[333] *Id.*

[334] *Dec 2002 CTIA Survey*, at 75.

[335] A number of nationwide carriers have been able to negotiate lower roaming rates with their affiliates and other smaller carriers, as well as among themselves. *See, e.g.*, Linda J. Mutschler *et al.*, *Sprint PCS*, Merrill Lynch,

(iii) Prepaid Service

98. In the United States, most mobile telephony subscribers pay their phone bills after they have incurred charges (known as postpaid service). Prepaid service, in contrast, requires customers to pay for a fixed amount of minutes prior to making calls. Although prepaid plans are considered a good way to increase penetration rates,[336] they typically produce lower ARPUs and higher churn rates in comparison to postpaid subscribers.[337] One provider of "prepaid platform services" states that prepaid subscribers use an average of 97 minutes a month, compared to almost 500 for the average subscriber of a nationwide carrier.[338]

99. Analysts estimate that 5 to 7 percent of U.S. wireless phone users subscribed to prepaid plans in 2002, a slight drop from what the Commission found in the *Seventh Report*.[339] At the end of 2002, Verizon Wireless's subscriber base was approximately 6 percent prepaid, AT&T Wireless's was 6.5 percent, and Cingular Wireless's was 6 percent. T-Mobile had the highest percentage of prepaid subscribers of the major carriers, 14 percent, but that was half its rate from a year earlier.[340]

100. In addition to or in place of traditional prepaid offerings, a number of carriers have introduced prepaid plans that maintain financial ties to the prepaid customer to help reduce churn, including Sprint PCS's ClearPay,[341] T-Mobile's SmartAccess, and AT&T's GoPhone programs.[342] Moreover, Sprint PCS and Nextel have partnered with third-party resellers to market prepaid offerings

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Equity Research, Feb. 6, 2003, at 4; *Dobson Reports Slightly Higher Revenues*, RCR WIRELESS NEWS, Nov. 18, 2002, at 1; Western Wireless Corporation, SEC Form 10-K405, filed Mar. 29, 2002, at 4. *See also*, Section I.A.1.a(i)(b), Joint Ventures, *supra*.

[336] *See, e.g.*, Paul Wuh *et al.*, *Week in Wireless*, Goldman Sachs, Equity Research, Jun. 7, 2002, at 2. Prepaid programs are considered to have been the primary driver of the rapid penetration gains in Europe over the past couple of years. Linda J. Mutschler *et al.*, *The Next Generation VI: Wireless in the US*, United States Telecom Services-Wireless/Cellular, Merrill Lynch, Mar. 8, 2002, at 16.

[337] *See Seventh Report*, at 13015.

[338] Paul Kagan Associates, Inc., *Will 2003 Be The Year of Profitable Prepaid*, WIRELESS MARKET STATS, Jan. 21, 2003, at 3 (citing the Boston Communications Group, Inc.); *see* Section II.C.1.b(iii), Minutes-of-Use, *supra*.

[339] Paul Kagan Associates, Inc., *Will 2003 Be The Year of Profitable Prepaid*, WIRELESS MARKET STATS, Jan. 21, 2003, at 3 (6 percent of the nationwide carriers' subscribers are prepaid); *NextGen VII*, at 27 (5 percent); Dan Meyer, *Carriers Take a Second Look at Prepaid*, RCR WIRELESS NEWS, Feb. 24, 2003, at 7 (7 percent, citing wireless industry consulting firm Fasttrack Wireless Inc.). *See also*, *Seventh Report*, at 13015.

[340] Linda Mutschler *et al.*, *Wireless Store Visits: First Quarter Subscriber Growth Looking Solid*, Merrill Lynch, Equity Research, Mar. 31, 2003, at 4.

[341] For a discussion of the ClearPay program, see *Seventh Report*, at 13015-16.

[342] Dan Meyer, *Carriers Take a Second Look at Prepaid*, RCR WIRELESS NEWS, Feb. 24, 2003, at 7. For example, AT&T Wireless's GoPhone customers, though not required to sign a contract or provide a deposit, are automatically charged a set fee each month to a credit card, debit card, or bank account. *AT&T Wireless Introduces GoPhone*, News Release, AT&T Wireless, May 5, 2003.

aimed at the youth portion of the population.[343]

d. Wireless/Wireline Competition

101. Once solely a business tool, wireless phones are now a mass-market consumer device.[344] The overall wireless penetration rate (defined as the number of wireless subscribers divided by the total U.S. population) in the United States is now at 49 percent.[345] Industry survey firm Telephia estimated that 53 percent of the total population in 44 major metropolitan areas subscribed to wireless service at the end of 2002, with some areas much higher, including Greenville, SC (71 percent), St. Louis (69 percent), Raleigh, NC (65 percent), Orlando (65 percent), Atlanta (64 percent), Washington DC (64 percent) and Boston (63 percent).[346] In addition, one study found that 56 percent of households in the 27 largest U.S. markets use wireless phone service.[347] Merrill Lynch estimated that, as of June 2002, more than 55 percent of Americans between the ages of 15 and 59 had wireless phones, including 71 percent between the ages of 20 and 34, 69 percent between 35 and 39, 68 percent between 40 and 44, and 65 percent between 45 and 49.[348]

(i) Wireless Substitution

102. While specific data is largely unavailable, it appears that only a small percent of wireless customers use their wireless phones as their only phone, and that relatively few wireless customers have "cut the cord" in the sense of canceling their subscription to wireline telephone service.[349] There is much evidence, however, that consumers are substituting wireless service for traditional wireline communications. At a recent Congressional hearing on the health of the telecommunications industry, for example, Blake Bath, managing director of Lehman Brothers, pointed out that while in 1996 wireless made up 5 percent of the sector's revenues, it now accounts for 30 percent.[350] Robert Crandall of the

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[343] *See* Section II.C.2, Resellers, *infra*.

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

[345] *See* note 214, *supra*.

[346] *U.S. Mobile Phone Penetration Reaches 53% of Total Population in December 2002*, News Release, Telephia, Feb. 11, 2003.

[347] *Wireless Phone Penetration Among U.S. Households Slows Down as Fewer First-Time Subscribers Enter the Marketplace*, News Release, J.D. Power and Associates, Sept. 25, 2002.

[348] Linda Mutschler *et al.*, *Initiation Report: From Top to Bottom Line - Part I*, Merrill Lynch, Equity Research, Sept. 19, 2002, at 19. In addition, there is some evidence that wireless penetration is inversely related to household income. According to a 2001 survey conducted by the Energy Information Administration (EIA), a statistical agency of the U.S. Department of Energy, the percent of housing units having cell phones increases with household income: household income less than $15,000 (23 percent of households with cell phones); $15,000 – $29,999 (38 percent); $30,000 – $49,999 (54 percent); $50,000 – $74,999 (71 percent); $75,000 or more (82 percent). Energy Information Administration, *2001 Residential Energy Consumption Survey* (visited May 19, 2003) <http://www.eia.doe.gov/emeu/recs/appliances/appliances.html>.

[349] *See Seventh Report*, at 13017.

[350] *Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet*, 108th Cong. (Feb. 5, 2003) (statement of Blake Bath, Managing Partner, Lehman Brothers).

Brookings Institute, also speaking at the hearing, claimed that wireless "has siphoned enormous amounts of traffic from the wireline network."[351] One analyst estimates that wireless has now displaced about 30 percent of total wireline minutes.[352] For the average household, wireless represents 27 percent of total telecommunications expenditures.[353]

103. The long distance, local, and the payphone segments of wireline telecommunications have all been losing business to wireless substitution. Long distance volumes and revenues are down at AT&T, MCI, and Sprint as customers shift to wireless services to make their calls.[354] Verizon, SBC, and BellSouth saw business and consumer access lines fall 3.6, 4.1, and 3.2 percent, respectively, in 2002, for a total decrease of 5.5 million lines, with wireless substitution being a significant factor.[355] Similarly, the number of payphones has declined from 2.7 million in the mid-1990s to about 1.9 million today, in large part due to wireless phones.[356] Even the prepaid calling card business is suffering, as consumers are now "utilizing their wireless phones for the same reasons they once used prepaid phone cards."[357]

104. Certainly, this is due to the declining cost and widespread use of wireless service. In fact, a number of analysts argue that wireless service is cheaper than wireline. According to Blake Bath, "[w]ireless pricing is currently below that of wireline."[358] Merrill Lynch claims that, for many wireless customers making a long distance call in the evening "using a wireless phone would actually be cheaper than using the fixed line phone in most cases."[359] UBS Warburg agrees:

> Why use a pay phone, a calling card, or a hotel phone when prices are

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[351] *Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet*, 108th Cong. (Feb. 5, 2003) (statement of Robert Crandall, Senior Fellow, The Brookings Institute).

[352] Cannon Carr and Gregor Dannacher, *Can Wireline Cannibalization Save Wireless ARPU in 2003?*, CIBC World Markets, Dec. 11, 2002, at 8. According to the CEO of Verizon, Ivan Seidenberg, wireless accounts for 30 percent of all voice minutes. Jeffrey Bartash, *Verizon CEO Urges Regulatory Relief*, CBS.MARKETWATCH.COM, Sept. 19, 2002.

[353] Based on a survey of the telecommunications bills of 32,000 households for the third quarter of 2002. *TNS Telecoms Data ranks Verizon the Third Largest Long Distance Provider in the U.S., Surpassing Sprint*, News Release, TNS Telecoms, Jan. 7, 2003. The breakdown: Local (26 percent); Local Toll (2 percent); Long Distance (8 percent); Wireless (27 percent); Cable/Satellite (27 percent); Internet (11 percent). *Id.*

[354] Sarah Z. Sleeper, *Who Needs Home Telephones? More Users Going All Wireless and That's Cutting Into Revenue For Local Bells and Long-Distance Firms*, INVESTOR'S BUSINESS DAILY, Aug. 8, 2002, at 1.

[355] Reinhardt Krause, *Local Bells Losing Second Lines as Users Go Broadband, Wireless*, INVESTOR'S BUSINESS DAILY, Feb. 11, 2003, at A01.

[356] Yuki Noguchi, *Requiem for the Payphone: As Cell Phone Use Increases, an Icon gradually Dies*, WASHINGTON POST, Dec. 30, 2002, at E1.

[357] *Wireless Threatens Growth for U.S. Prepaid Calling Cards*, News Release, IDC, Dec. 23, 2002.

[358] *Health of the Telecommunications Sector: A Perspective from Investors and Economists, before the House Subcommittee on Telecommunications and the Internet*, 108th Cong. (Feb. 5, 2003) (statement of Blake Bath, Managing Partner, Lehman Brothers).

[359] *NextGen VII*, at 40.

> generally higher on a per-minute basis relative to wireless? Also, given that a large number of night and weekend minutes are now regularly included in wireless pricing schemes . . ., it is often cheaper to use your wireless phone while in your home.[360]

(ii) Wireless Alternatives

105. An increasing number of mobile wireless carriers offer service plans designed to compete directly with wireline local telephone service. The largest of such providers, Leap, under its "Cricket" brand, offers mobile telephone service in 40 markets in 20 states.[361] At the end of the third quarter of 2002, Leap had roughly 1.5 million customers.[362] Leap's service allows subscribers to make unlimited local calls and receive calls from anywhere for about $30 per month.[363] Leap claims that 26 percent of its customers do not have a wireline phone at home.[364] As discussed above, Leap states that its bankruptcy filing will not interrupt its operations or result in employee layoffs.[365]

106. Other companies offering unlimited local calling plans include: Triton PCS in Virginia, North Carolina, South Carolina, Georgia, and Tennessee (with more than 200,000 subscribers to its unlimited calling plan);[366] Qwest in Arizona, Colorado, Idaho, Minnesota, Montana, Nebraska, New Mexico, Utah, and Wyoming;[367] ALLTEL in Arizona, New Mexico, North Carolina, Nebraska, and Arkansas;[368] MetroPCS in California, Florida, and Georgia;[369] Northcoast PCS in Ohio;[370] First Cellular of Southern Illinois in Illinois;[371] Kiwi PCS in North Carolina;[372] Rural Cellular in Vermont, New

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[360] *Wireless 411*, at 54.

[361] *Leap Reports Results for Third Fiscal Quarter of 2002*, News Release, Leap, Nov. 13, 2002.

[362] *Id.*

[363] The monthly fee, paid in advance, varies slightly by service area. *See also, Seventh Report*, at 13018, note 225.

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

[365] *See* Section I.A.1.a(i)(c), Restructurings, *supra*.

[366] SunCom, *SunCom UnPlan "FREE" Zones* (visited Mar. 28, 2003) <http://www.suncom.com/maps/suncom_unplan_maps.html>; Linda Mutschler *et al.*, *Triton PCS Holdings, Inc.*, Merrill Lynch, Equity Research, Mar. 12, 2003, at 2.

[367] Qwest, *Q by Qwest* (visited Apr. 9, 2003) <http://www.qwestwireless.com/qxq/coverage/>.

[368] Conversation with ALLTEL sales representative, Mar. 26, 2003.

[369] *See* MetroPCS, *Service & Phone* (visited Apr. 9, 2003) <http://www.metropcs.com/coverage.shtml>.

[370] *See* Northcoast PCS, *Service Plans* (visited Apr. 9, 2003) <http://www.Northcoastpcs.com/NewFiles/Service%20Plans.html>.

[371] *See* First Cellular, *Southern Illinois Unlimited* (visited Apr. 9, 2003) <http://www.firstcellular.com/wireless_clear_connect_d.htm>.

[372] *See* Kiwi PCS, *Welcome!* (visited Apr. 9, 2003) <http://www.kiwipcs.com >.

Hampshire, New York, Kansas, Minnesota, Maine, North Dakota, and South Dakota;[373] and Ntelos in Virginia.[374] In addition, for around $40-$60 per month, many carriers offer regional or national calling plans with 500 or more "anytime" minutes and over 3000 night and weekend minutes.[375]

e. Geographical Comparisons: Urban vs. Rural

107. Since the release of the *Sixth Report*, the Commission has attempted to obtain a better understanding of the state of competition below the national level, in particular in rural areas. The primary difficulty for the Commission in this task is the lack of data specific to rural markets. At its Public Forum held in February 2002, the Wireless Telecommunications Bureau asked participants to address this issue.[376] The Commission continued this inquiry in its *NOI*, where the Commission invited comments on a range of rural issues. In our analysis below, we have attempted to incorporate commenters' suggestions.

(i) Definition of Rural

108. As the Department of Education stated in 1994, "few issues bedevil analysts and planners . . . more than the question of what actually constitutes 'rural.'"[377] The difficulties that this question brings are evidenced by the fact that within the federal government, the term rural has been defined in many different ways. The variety of definitions reflects the numerous purposes for which the definitions are used throughout the federal government.[378]

109. The Commission does not have a statutory definition of what constitutes a rural area. The Commission has used RSAs as a proxy for rural areas for certain purposes, such as the current cellular cross-interest rule and the former CMRS spectrum cap, stating that "other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas."[379] In its *NOI*, the Commission asked the public to comment on how it should define rural for purposes of this report.[380]

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[373] *See* Rural Cellular, *Welcome To Rural Cellular Corporation* (visited Apr. 9, 2003) <http://www.ruralcellular.com/>.

[374] *See* Ntelos, *nTown* (visited Apr. 9, 2003) <http://www.ntelos.com/P/pdr_ntown.html>.

[375] For a sampling of pricing plans, *see* Linda Mutschler *et al.*, *Wireless Pricing: What Are They Thinking,*, Merrill Lynch, Equity Research, Aug. 1, 2002; Colette Fleming *et al.*, *AT&T Wireless Group, Inc.*, UBS Warburg, Equity Research, Feb. 12, 2003.

[376] *See Public Forum Presentations* <http://wireless.fcc.gov/cmrs-crforum.html#pres>.

[377] Joyce D. Stern, *The Condition of Education in Rural Schools,* U.S. Department of Education (Jun 1994) [*cited in* National Center for Education Statistics, *Urban\Rural Classification Systems* (visited Apr. 4, 2002) <http://nces.ed.gov/surveys/ruraled/definitions.asp>].

[378] *See Seventh Report*, at 13021.

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

[380] *NOI*, at 24937.

110. A number of commenters advocated the continued use of population density to define rural. Fred Williamson and Associates ("FWA"), representing a consortium of small wireline telcos in Oklahoma and Kansas, stated that "[p]opulation density is usually utilized to define ruralness."[381] The South Dakota Telecommunications Association ("SDTA") agreed that population density is the best way to define ruralness, but advocated 25 persons per square mile as the proper breakpoint, rather than the 100 persons per square mile the Commission used in the *Seventh Report*.[382] The Rural Telecommunications Group ("RTG") said that the Commission should continue to use population density as its "predominant factor," although it supported the Commission's current use of a range of measures.[383] Moreover, RTG said that it was "premature" for the Commission to develop a comprehensive definition of rural due to the lack of sub-national data.[384] NTCA advocated the use of RSAs, for "consistency and practicality."[385] As in the Public Forum, some *NOI* commenters questioned whether the urban/rural distinction is currently meaningful in the context of mobile telephony.[386]

(ii) Rural Rollout

111. In consideration of commenters' suggestions and given our existing data, we continue to believe that our analysis of market entry data using a variety of criteria – EA nodal versus EA non-nodal counties,[387] CMAs, and population density – is, at the moment, the best way to gain some insight into the competitive differences within the different geographic areas of the United States.[388] However, we also continue to explore additional methods for analyzing rural rollout. For example, in this report we have examined an alternative population density breakpoint for the rural versus urban split at the suggestion of commenters.

EA Nodal vs. Non-Nodal Counties

112. Each EA consists of one or more counties that are "Economic Nodes" and the surrounding counties that are economically related to it.[389] An EA may have more than one economic node. The counties that are economic nodes are metropolitan areas or similar areas that serve as the EA's center(s)

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[381] Fred Williamson and Associates, *NOI Comments*, at 5 (filed Jan. 27, 2003) ("*FWA Comments*").

[382] *SDTA Reply Comments*, at 4.

[383] Rural Telecommunications Group, *NOI Comments*, at 4-5 (filed Jan. 27, 2003) ("*RTG Comments*").

[384] *RTG Comments*, at 4-5.

[385] *NTCA Comments*, at 6.

[386] *See Seventh Report*, at 13021-2; *Dobson Comments*, at 4 ("the status of competition should be assessed market-by-market, and not according to an arbitrary definition of 'rural' and an artificial distinction between rural and urban markets").

[387] *See* discussion in Rural Rollout, *infra*.

[388] FWA found that the Commission's findings with regards to the number of wireless competitors in rural areas in the *Seventh Report* tracked well with the level of competition found in the exchanges of the telcos that FWA represents. *FWA Comments*, at note 1.

[389] *See* Section II.C.1.b(ii), Regional Penetration Rates, *supra*.

of economic activity.[390] As a proxy for urban and rural geographic areas, we have looked at counties that make up economic nodes, i.e. nodal counties, versus those counties that do not make up economic nodes, i.e. non-nodal counties. In comparing those two sets of counties, we find the non-nodal counties have an average of 3.2 mobile competitors, while the nodal counties have an average of 5.7 competitors.

MSAs vs. RSAs

113. In comparing competitive entry in counties that make up RSAs compared to counties that make up MSAs, we find that RSA counties have an average of 3.3 mobile competitors, while MSAs have an average of 5.7 competitors.

Population Density

114. In comparing competitive entry in counties with population densities of 100 persons per square mile or less to those with densities greater than 100, we find that the less densely populated counties have an average of 3.3 mobile competitors, while the more densely populated counties have an average of 5.6 competitors.

115. If, as one commenter suggested, we use 25 persons per square mile as the breakpoint, we find that the less densely populated counties have an average of 2.7 mobile competitors, while the more densely populated counties have an average of 4.5 competitors. However, we note that only 14 million people live in counties with 25 persons per square mile or less, while 61 million people live in counties with 100 persons per square mile or less.[391] The 2000 Census found that 59 million persons were "rural."[392] Thus, counties with population densities of 25 persons per square mile appear to contain only a small subset of the rural population.

116. Consistent with the Commission's findings in the *Seventh Report*, these three exercises of defining urban versus rural (EA Nodal vs. Non-Nodal Counties / MSAs vs. RSAs / Population Density) continue to provide remarkably similar estimates of the average number of competitors in urban versus rural markets.[393] On average, rural markets have slightly more than three providers, while urban markets have between five and six providers. Even using a narrow definition of rural markets, we find that customers have access to between 2 and 3 competitors.

117. Some participants and commenters have argued that the total number of carriers serving an

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[390] Of the 3,141 counties in the nation in 1995, 836 were counties that made up the 310 metropolitan areas as defined by the Office of Management and Budget in June 1993. The 310 metropolitan areas consisted of 240 metropolitan statistical areas, 59 primary metropolitan statistical areas (PMSAs), and 11 New England county metropolitan areas (NECMAs). In parts of the United States remote from metropolitan areas, 38 non-metropolitan counties were each identified as a node. Kenneth P. Johnson, *Redefinition of the BEA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75.

[391] FCC internal analysis.

[392] U.S. Census Bureau, *American Factfinder*, Census 2000 Summary File 3 (SF 3) – Sample Data (P5 – Urban and Rural) <http://factfinder.census.gov/>.

[393] The Rural Utilities Service, which offers government subsidized loans to carriers serving rural areas, will not approve loans to more than one applicant to provide telephone or broadband service within the same rural community. 7 C.F.R. § 1735.51(c); 60 Fed. Reg. 4690 (Jan. 30, 2003).

area is not the best measure of the level of competition in that area because only one or two carriers may be economically sustainable in that area.[394] For example, RTG stated, "the Commission must ... seriously consider the possibility that there may be areas that are so remote and the cost to provide coverage so high that only one service provider may be economically viable."[395]

118. Furthermore, FWA claimed that "there is sufficient competition among wireless providers in ILEC service areas."[396] Dobson said that "[r]ural CMRS carriers face significant competitive pressures,"[397] and argued that the best measure of competition is not the number of competitors in a market, but rather the pressure carriers feel to offer services and products at competitive prices to customers.[398] NTCA said that "many rural customers have access to the same state-of-the-art wireless technologies available to their urban counterparts." The most recently released data provided by Econ One, which was also included in the *Seventh Report*, showed that the average price of mobile telephone service in rural areas appears to be very similar to the average price in urban areas.[399] 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.[400]

119. Moreover, some commenters claim that rural areas are experiencing a significant level of wireless substitution for wireline service. In a survey of its wireless subscribers within its RSAs, Western Wireless found that 23 percent of respondents considered their wireless phone to be their primary phone.[401] FWA reports that the telcos it represents are experiencing access line declines, in part due to customers utilizing wireless service as the primary residential service.[402] FWA also reports that the toll revenues of its clients are declining, in some cases as much as 30 percent, due to customers' use of wireless instead of wireline toll services.[403]

Conclusion

120. Based on our rollout analysis and information provided by commenters and participants at

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

395 *RTG Comments*, at 6.

396 *FWA Reply Comments*, at 2.

397 *Dobson Comments*, at 2.

398 *Id.*, at 6.

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

400 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.

401 Western Wireless Corporation, *NOI Comments*, at 5 (filed Feb. 3, 2003).

402 *FWA Comments*, at 7.

403 *Id.*

the Public Forum, we conclude that CMRS providers are competing effectively in rural areas. 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. On the contrary, 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.[404]

121. We note, however, that in 2001, the Commission retained the cellular cross-interest rule in RSAs to ensure that mergers and acquisitions do not diminish competition, concluding that "it appears that a combination of interests in cellular licensees in rural areas would more likely result in a significant reduction in competition."[405] Nevertheless, the Commission recognized that there may be RSAs in which such cross interests would not create a significant likelihood of substantial competitive harm, and created a waiver process.[406]

2. Resellers

122. Resellers offer service to consumers by purchasing airtime at wholesale rates from facilities-based providers and reselling it at retail prices.[407] According to information provided to the FCC in its ongoing local competition and broadband data gathering program, the resale sector accounts for approximately 5 percent of all mobile telephone subscribers.[408] With the exception of Tracfone Wireless Inc., which serves more than 2 million customers with prepaid offerings,[409] there appear to be few large resellers of wireless service.[410] As reported in the *Seventh Report*, WorldCom, which at one time claimed to be the largest reseller of postpaid wireless services in the United States with nearly 2 million customers,[411] exited the resale business in 2002.[412]

123. Two nationwide operators have partnered with third party resellers to market prepaid

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

[405] *Spectrum Cap Order*, at 22708-22709. *See also, Rural NOI*, at 25561.

[406] *Spectrum Cap Order*, at 22709-22710. *See also, Rural NOI*, at 25561.

[407] Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996).

[408] *See* Appendix D, Table 2, at D-3.

[409] Dan Meyer, *Carriers Take a Second Look at Prepaid*, RCR WIRELESS NEWS, Feb. 24, 2003, at 7; Bill Menezes, *Box Phones Expand Inroads to Middle America*, WIRELESS WEEK, Feb. 15, 2003, at 22. In 2001, General Motor Corp. claimed that its telematics system OnStar was the country's largest reseller of "cellular service." *See Seventh Report*, at 13025, note 269. *See also*, Section II.C.3.g, Telemetry and Telematics, *infra*.

[410] Verizon Wireless reported that of as of June 30, 2002, approximately 1.4 million of its 30.3 subscribers purchased service through 80 different resellers, with only 22 percent being through WorldCom. Verizon Wireless, LLC, SEC Form S-4, at 13, 59 (filed Oct. 9, 2002).

[411] WorldCom, Inc., Petition Pursuant to 47 U.S.C. Sec.160 For Forbearance From the Commercial Mobile Radio Service Number Portability Obligation, WT Docket No. 01-184, *Comments*, at 1 (filed Sept. 21, 2001).

[412] *See Seventh Report*, at 13025.

offerings aimed at the youth portion of the population. Virgin Mobile USA ("Virgin Mobile"), a joint venture between Sprint PCS and Richard Branson's Virgin Group, LLC, was launched in July 2002, targeting its prepaid offerings at the youth market.[413] The venture has gained more than 350,000 subscribers through January 31, 2003.[414] Similarly, Nextel, in conjunction with an Australia-based company, is offering a prepaid service targeted at the teenage market.[415] The service, under the "Boost Mobile" brand name, is available in California and Nevada.[416]

3. Mobile Data

a. Introduction

124. 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. While mobile data constituted only 1.7 percent of mobile telephone carriers' total ARPU and revenue during 2002, the consumer adoption of various data products is growing.[417] One analyst estimates there were 11.9 million mobile telephone users who subscribed to some type of mobile data service at the end of 2002, up from 7.6 million at the end of 2001.[418] The estimated number of data-only mobile users grew from 1.1 million at the end 2001 to 2.3 million at the end of 2002.[419] Another analyst estimates that 20 percent of all mobile telephone subscribers used text messaging services during the fourth quarter of 2002.[420]

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[413] *See* Virgin Mobile USA, LLC, *NOI Response*, at 2 (filed Feb. 5, 2003) ("*Virgin Mobile Comments*"); *Virgin Mobile USA and MTV Networks to Blow the Roof Off Cellular Content,* News Release, Virgin Mobile, July 24, 2002. For a detailed discussion of the venture, *see Seventh Report*, at 13026.

[414] *Virgin Mobile USA Off to Strong Start*, News Release, Virgin Mobile, Feb. 5, 2003. *See also, Virgin Mobile Comments.*

[415] *Boost Mobile to Launch Wireless Phone Service to Youth Market; September Launch in California and Nevada Test Markets; Differentiated Service to Run on Nextel National Network*, News Release, Nextel, Aug. 15, 2002.

[416] *Boost Mobile And Roxy/Quicksilver Extend Brand Reach With New Roxy Wireless Phone*, News Release, Boost Mobile, Nov. 19, 2002.

[417] *Morgan Stanley Wireless Data Report*, at 3.

[418] *Id.* In the *Seventh Report*, the Commission stated, based on data reported by Kagan and Yankee Group, that there were approximately 8 to 10 million users of mobile Internet services on all devices at the end of 2001. *See Seventh Report*, at 13038.

[419] *Morgan Stanley Wireless Data Report*, at 3. Cingular Wireless reported it had 5 million customers "actively using" its mobile data services as of the end of 2002, up from 2 million data customers at the end of 2001. Approximately 4.2 million of the 5 million were accessing data services over Cingular's cellular/PCS networks, and the rest were served by its Mobitex network. Cingular Wireless, LLC, SEC Form 10-K, Mar. 11, 2003, at 3, 5.

[420] *Young Adults Set to Upgrade Phones, Drive Usage of Mobile Messaging Applications in New Year*, News Release, Telephia and Harris Interactive, Dec. 17, 2002. *See* Section II.C.3.d(ii), Text Messaging, *infra*, for a discussion of text messaging.

125. As discussed above, carriers have continued to upgrade their networks over the past year with next generation technologies that allow for faster mobile Internet access at speeds ranging from 30 to 70 kbps.[421] As of March 2003, 265 million people, or 93 percent of the U.S. population lived in counties where GPRS, 1xRTT, and or 1xEV-DO networks had been deployed.[422]

126. While the sections above discuss the spectrum bands, networks, trends, and metrics related to mobile telephone carriers,[423] this section focuses solely on mobile data services. Sections II.C.3.b and II.C.3.c, *infra*, first provide an overview of the spectrum bands and networks that are used to provide data-only commercial mobile services.[424] Section II.C.3.d then describes each of the individual non-voice CMRS services, including details on what each service entails, pricing information, and available data on usage, subscribership, and ARPU.[425] This is followed by a discussion of the major types of mobile data devices and device features.[426] The mobile data section concludes with an overview of Wi-Fi technology and deployment, and significant developments related to the telemetry and telematics sectors.[427]

127. As mentioned above, in the *NOI* the Commission requested information from commenters on mobile data, including details on the nature of individual mobile data services, on mobile data service availability and pricing, and on Wi-Fi deployment.[428] The mobile data-related information received in the comments consisted of information on next generation networks that various providers use and plan to use to offer mobile data services at higher data transfer speeds.[429] While many of the other issues raised in the *NOI* were not directly addressed in the comments, we have been able to gather information on mobile data services, deployment, and pricing from several publicly-available sources, including providers' web sites and news releases, company SEC filings, newspaper and periodical articles, NRUF data, and reports by securities analysts and other research and consulting firms. Given the various sources we have used to examine this segment of the CMRS industry, we believe the multitude of mobile data services, service providers, pricing plans, and devices available to consumers provides evidence that competition for the provision of mobile data products is developing successfully. The numerous, new mobile data products also represent service innovations that CMRS providers are offering in order to compete with each other; hence, the existence of these service offerings provides further evidence that the CMRS industry is competitive.

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[421] *See* Section II.C.1.b(vii), Technology Deployment, *supra*.

[422] *See* Section II.C.1.b(viii), Coverage by Technology Type, *supra*.

[423] *See* Sections II.A, Spectrum Allocation; II.B, Network Overview; and II.C.1, Mobile Telephony Overview and Analysis, *supra*.

[424] *See* Sections II.C.3.b, CMRS Spectrum: Data-Only; and II.C.3.c, CMRS Networks: Data-Only, *infra*.

[425] *See* Section II.C.3.d, Services, Content, and Applications, *infra*.

[426] *See* Section II.C.3.e, Devices, *infra*.

[427] *See* Sections II.C.3.f, Wi-Fi, and II.C.3.g, Telemetry and Telematics, *infra*.

[428] *NOI*, at 24942-24948.

[429] *3G Americas Comments*; *CDG Comments*. This information is discussed in Section II.B.2, Network Technology, *supra*.