

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

In the Matter of
Implementation of Section 6002(b) of the
Omnibus Budget Reconciliation Act of 1993
Annual Report and Analysis of Competitive
Market Conditions With Respect to Commercial
Mobile Services
WT Docket No. 08-27
(Terminated)

THIRTEENTH REPORT

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By the Acting Chief, Wireless Telecommunications Bureau:

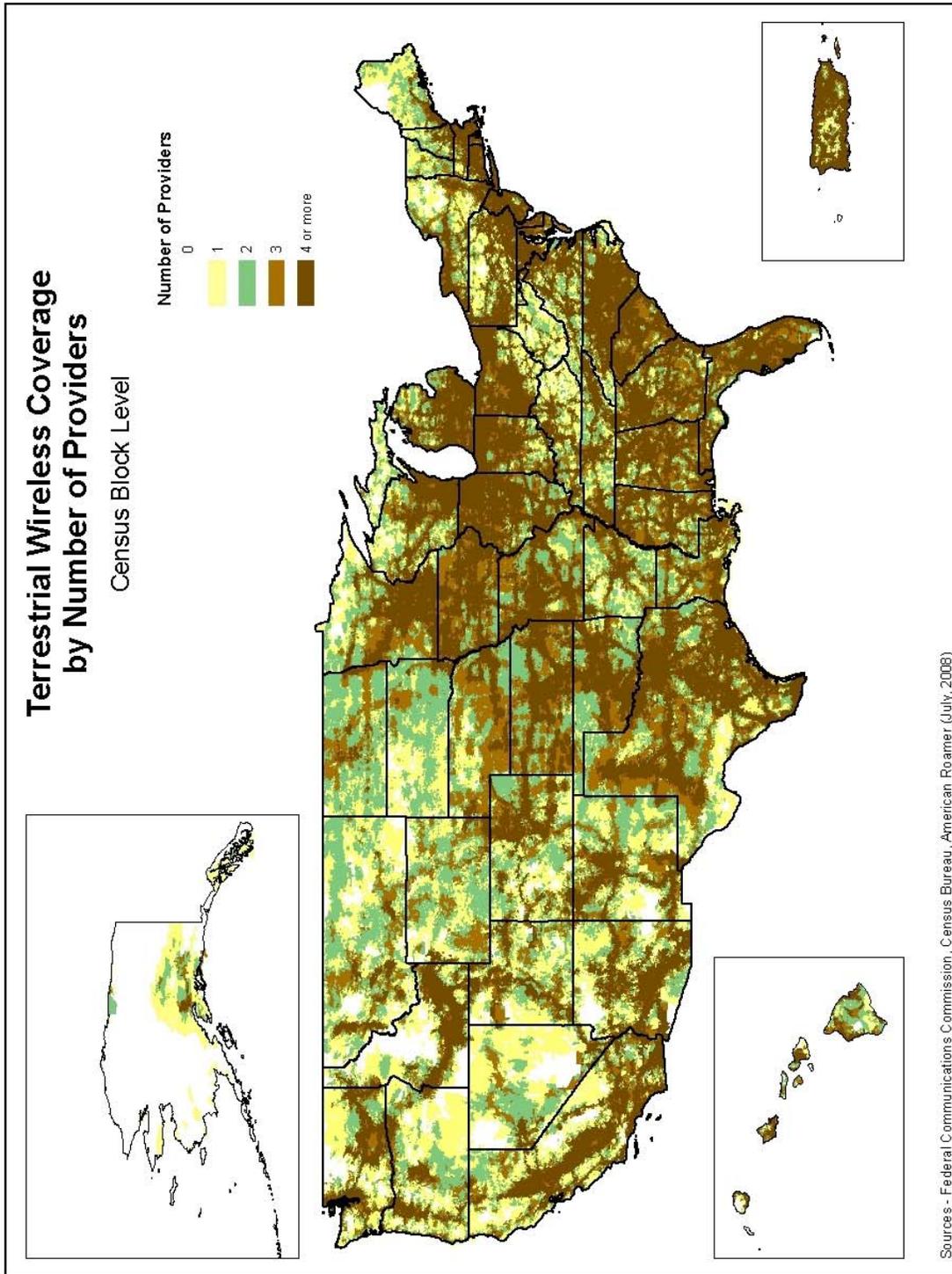
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Map 1: Mobile Telephone Competitors



## I. EXECUTIVE SUMMARY

1. This is the thirteenth annual report (“*Thirteenth Report*” or “*Report*”) to Congress on the state of competition in the Commercial Mobile Radio Services (“CMRS”) marketplace. The *Thirteenth Report* finds that U.S. consumers continue to reap significant benefits – including low prices, new technologies, improved service quality, and choice among providers – from competition in the CMRS marketplace, both terrestrial and satellite CMRS.<sup>1</sup> The metrics below indicate that there is effective competition in the CMRS market and demonstrate the increasingly significant role that wireless services play in the lives of American consumers. In particular, these metrics indicate that wireless technology is increasingly being used to provide a range of mobile broadband services.

2. The *Thirteenth Report* is based, in part, on data available through a contract with American Roamer, which provide the detailed boundaries of the network coverage areas of every operational mobile telephone carrier in the United States. Using these maps, we have been able to estimate the percentage of the U.S. population covered by a certain number of providers and the percentage of the population covered by different types of network technologies, including mobile broadband technologies. We base these estimates on census blocks (of which there are over 8 million in the United States), allowing for a significantly more accurate and granular assessment of competition in the United States than previous analyses done on a county-by-county basis.

### Number of Providers & Network Deployment

Approximately 99.6 percent of the total U.S. population, have one or more different operators (cellular, PCS, and/or SMR) offering mobile telephone service in the census blocks in which they live.

Approximately 98.5 percent of the U.S. population living in rural census blocks, or about 60 million people, have one or more different operators offering mobile telephone service in the census blocks within the rural counties in which they live.

More than 95 percent of the U.S. population lives in census blocks with at least three mobile telephone operators competing to offer service, and more than 60 percent of the population lives in census blocks with at least five competing operators.

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<sup>1</sup> Unless specifically noted, discussions of mobile telephone, wireless, and CMRS services, providers, subscribers, and other metrics in the *Thirteenth Report* refer to and include only terrestrial, rather than both terrestrial and satellite, services.

<b>Estimated Mobile Telephone Rollouts by Census Block</b>					
Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total U.S. POPs	Square Miles Contained in Those Blocks	% of Total U.S. Square Miles
1 or More	8,052,071	284,153,539	99.6%	2,831,266	74.5%
2 or More	7,627,040	280,987,512	98.5%	2,244,435	59.1%
3 or More	6,773,535	272,475,210	95.5%	1,548,924	40.8%
4 or More	5,755,825	258,167,149	90.5%	985,650	25.9%
5 or More	3,938,715	185,164,711	64.9%	532,606	14.0%
6 or More	1,596,405	70,238,178	24.6%	198,965	5.2%
7 or More	302,022	12,576,363	4.4%	39,004	1.0%

\*Based on Census 2000.

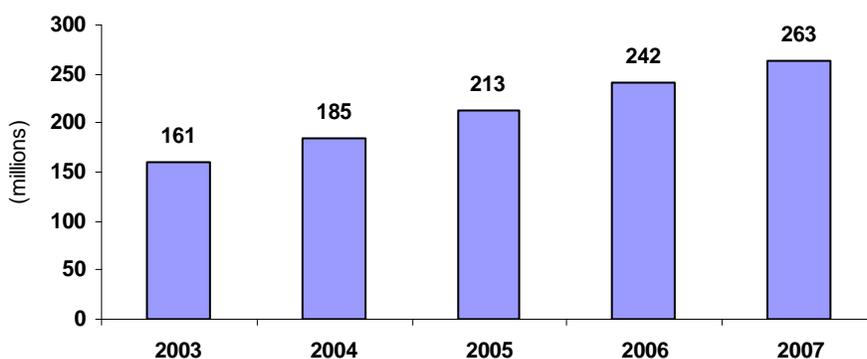
An analysis of service provision by census block, including and excluding federal land, shows similar population coverage. By comparison, an examination of geographic coverage shows a higher percentage of geographic coverage when excluding federal lands. For example, approximately 75 percent of the total United States land area is covered by one or more providers, compared to approximately 84 percent of the land area when excluding federal land.

Average concentration in the U.S. mobile telephone market, as measured by the Herfindahl-Hirschman Index (“HHI”), was unchanged at 2674 at the end of 2007. No single competitor has a dominant share of the market.

In addition to facilities-based mobile telephone operators, the CMRS industry also includes mobile telephone resellers and Mobile Virtual Network Operators (“MVNOs”), mobile satellite service providers, and various broadband and narrowband data service providers.

## Subscribers

### Mobile Telephone Subscribers



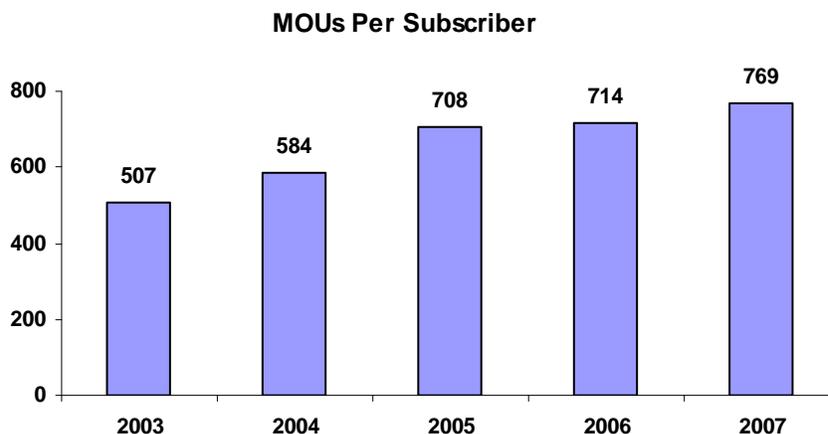
At the end of 2007, there were 263 million mobile telephone subscribers in the United States, up from 241.8 million at the end of 2006.

The additional 21.2 million subscribers represent an increase of almost nine percent in 2007.

The nationwide mobile penetration rate at year end 2007 rose to approximately 86 percent of

the approximately 305.6 million people in the United States.

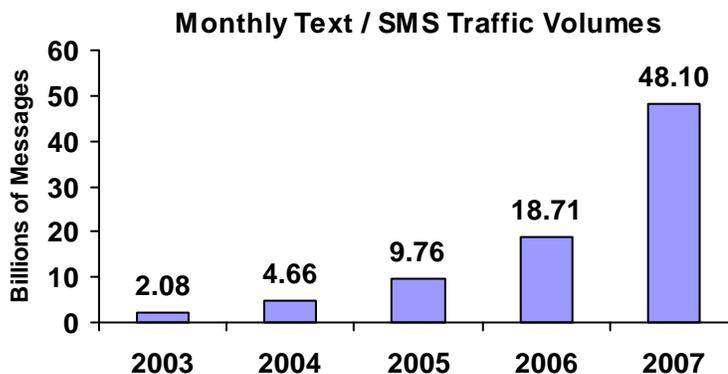
## Usage



### 1. Voice:

Average minutes-of-use per subscriber per month (“MOUs”) rose to about 769 minutes in the second half of 2007, up from 714 minutes in the same period of 2006.

### 2. Text Messaging:



The monthly volume of text messaging traffic grew to 48.1 billion messages during December 2007, up from 18.7 billion messages during December 2006, 9.8 billion messages during December 2005 and 4.7 billion messages during December 2004.

We estimate that the average number of text messages sent per subscriber was 182.9 per month using December, 2007 text messaging traffic data. For December 2006, the average number of text messages sent per subscriber was 77.3 per month. The additional 105 text messages per subscriber in December

2007 represents an increase of almost 120 percent compared to December 2006.<sup>2</sup>

3. *Multimedia Messaging:*

The volume of photo messaging and other types of multimedia messaging traffic more than doubled in the past year, rising from 2.7 billion messages in 2006 to 6.1 billion messages in 2007.

4. *Mobile Web Services:*

An estimated 13 percent of U.S. mobile telephone subscribers accessed news and information via a mobile Web browser in January 2008, and rates were much higher among “smartphone” users (58 percent) and iPhone users (nearly 85 percent).

“Smartphone” users spend an average of more than four and one-half hours per month browsing the mobile Web in the United States.

## Prices

**Average Revenue Per Minute**



On average U.S. mobile subscribers paid about \$0.06 per minute for mobile voice calls in December 2007 based on an estimate of average revenue per minute (“RPM”).

RPM declined by one cent from \$0.07 in 2006 to \$0.06 in 2007, continuing the price trend since 1994.

The *Thirteenth Report* includes an analysis “Voice RPM,” which excludes the portion of Average Revenue Per Unit (“ARPU”) generated by data services. As the overall RPM declined during 2007, voice RPM also dropped from \$0.06 in 2006 to \$0.05 in 2007.

The percentage of the major U.S. operators’ customers who subscribe to prepaid plans rose from 15 percent at the end of 2006 to roughly 17 percent at the end of 2007.

<sup>2</sup> See *infra* note 587.

## New Technologies and Services

During 2006 and 2007, wireless providers have continued to deploy mobile broadband networks, such as CDMA EV-DO and WCDMA/HSDPA, which allow typical downstream data transfer speeds of 400-800 kbps.

- Approximately 92 percent of the U.S. population lives in census blocks with at least one mobile broadband provider.
- The two nationwide CDMA operators and a large regional CDMA provider are upgrading their EV-DO networks with EV-DO Revision A (“Rev. A”), which increases average downstream speeds to 600 kbps-1.4 Mbps and significantly improves average uplink speeds to 350-800 kbps.
- One nationwide GSM operator launched its WCDMA/HSDPA network in May 2008, and the other nationwide GSM operator is upgrading its WCDMA/HSDPA network with HSUPA, which enables average upload speeds of 500-800 kbps.
- EV-DO/EV-DO Rev. A networks cover 92.2 percent of the U.S. population, based on census blocks, and WCDMA/HSDPA networks cover 53.8 percent.
- As of December 31, 2006, 21.9 million mobile wireless devices capable of accessing the Internet at broadband speeds were in use in the United States, versus 3.1 million at the end of 2005.

New and innovative mobile services and devices launched during the past year include:

- A mobile TV service launched by AT&T using Qualcomm’s MediaFLO network rivals a service already offered by Verizon Wireless using the same network.
- The Apple 3G iPhone, launched by AT&T in July 2008, runs on the provider’s WCDMA/HSDPA network, which allows it to navigate the Internet at much faster speeds than the original iPhone launched in June 2007.
- The App Store, opened the same day as the launch of the 3G iPhone, is an online software clearinghouse that sells third-party applications and content developed for the iPhone using a software development kit released by Apple.
- Google and T-Mobile unveiled the T-Mobile G1 in September 2008 – one month after the Commission approved the first Android-based phone.

## Auctions & New Entry

The FCC’s 700 MHz band Auction (Auction 73) was the largest auction in FCC history and closed on March 18, 2008, with approximately \$19.0 billion in net winning bids, exceeding Congressional estimates.

The 700 MHz band Auction provided small businesses, new entrants, rural providers, and existing nationwide wireless providers with access to additional spectrum enabling them to deploy the next generation of wireless networks.

The 700 MHz band Auction advances open platform policies by requiring that licensees of one-third of the spectrum allow users to choose their own wireless devices and software.

**Churn**

Most mobile telephone providers report churn rates between 1.5 percent and 3.0 percent per month.

Approximately 13.3 million wireless subscribers ported their phone number to another wireless carrier during 2007, about 30 percent higher than the 10.3 million subscribers who ported their phone numbers during 2006.

**Service Quality**

The J.D. Power and Associates 2008 Wireless Call Quality Performance Study (Volume 2), released in September 2008, found that the overall number of reported wireless call quality problems is 15 problems per 100 calls, unchanged from the same reporting period in 2007; these are the lowest levels in the history of the study.

**International Comparisons**

In 2007, the U.S. mobile penetration rate surpassed that in Japan for the first time.

U.S. mobile subscribers lead the world in average voice usage by a wide margin, with Western European subscribers averaging 161 minutes and Japanese subscribers averaging 138 minutes, compared to an average of over 700 minutes in the U.S.

Mobile calls were significantly less expensive on a per minute basis in the United States than in Western Europe (where RPM averaged \$0.20 in the last quarter of 2007) and Japan (\$0.26).

Mobile Internet penetration is higher in the United States (15.6 percent of wireless subscribers) than in Western European countries such as the United Kingdom (13 percent), Italy (12 percent), France (9.6 percent) and Germany (7.4 percent).

**Wireless-Wireline Competition**

During the second half of 2007, 14.5 percent of U.S. adults lived in households with only wireless phones, up from 11.8 percent in the second half of 2006, 7.8 percent in the second half of 2005, and more than quadruple the percentage (3.5 percent) in the second half of 2003.

In the same period, one in three adults aged 18-24 years (31 percent) lived in households with only wireless telephones, and 34.5 percent of adults aged 25-29 years lived in wireless-only households.

**Wireless-Wireline Convergence**

Both T-Mobile and Sprint Nextel now offer, on a nationwide basis, add-on services using Wi-Fi and femtocell technology, respectively, for their mobile customers. These add-on services improve indoor coverage and allow consumers to avoid using their monthly cellular airtime minutes while at home or in their offices. For those T-Mobile customers who want to use their wireline number at home, T-Mobile now offers a \$10 monthly add-on plan for home service.

## Mobile Satellite Services

At the end of 2007, there were over 1.1 million mobile satellite service (“MSS”) subscribers in the United States, a 23 percent increase over year-end 2006.

Currently, there are five MSS operators that provide voice and/or data service in the U.S. The voice providers include Globalstar, Inmarsat, Iridium and MSV. In addition, Orbcomm provides data-only services.

Two additional companies planning to use the 2 GHz spectrum, ICO Global Communications (“ICO”) and TerreStar Networks, Inc. (“TerreStar”), are developing their systems. ICO launched its G1 satellite from Cape Canaveral in April, 2008, and TerreStar expects that the launch of its geostationary spacecraft will occur in the second quarter of 2009.

MSS providers are introducing innovative pricing plans such as Globalstar’s “Unlimited Royalty” rate plan with a \$39.99 per month charge, which will be reduced at the completion of each calendar year, falling to \$19.99 in 2009. In 2007, Iridium also introduced a new pricing plan, offering a prepaid airtime packages for six months of service for a low as 30 to 40 cents per minute.

In 2003, the Commission permitted MSS licensees to provide an Ancillary Terrestrial Component (“ATC”) to their satellite systems to assist their signals when not in line-of-sight. The satellite industry is optimistic about the potential positive effects of the ATC order.

The satellite industry states that MSS/ATC providers will offer user equipment that resembles traditional mobile consumer devices, and that they will be able to take better advantage of economies of scale for equipment, thereby making it possible for them to offer high quality voice, broadband, and other services to their subscribers at prices that more closely approximate those of cellular and PCS operators.

## II. INTRODUCTION

### A. Background

3. In 1993, Congress created the statutory classification of Commercial Mobile Radio Services<sup>3</sup> to promote the consistent regulation of mobile radio services that are similar in nature.<sup>4</sup> At the

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<sup>3</sup> Commercial Mobile Services came to be known as the Commercial Mobile Radio Services, or “CMRS.” CMRS includes a large number of terrestrial services and some mobile satellite services. *See* 47 C.F.R. § 20.9(10).

<sup>4</sup> The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b), amending the Communications Act of 1934 and codified at 47 U.S.C. § 332(c). As in the past, this *Report* bases its analysis on a consumer-oriented view of wireless services by focusing on specific product categories, regardless of their regulatory classification. In some cases, this includes an analysis of offerings outside the umbrella of “services” specifically designated by the Commission as CMRS. However, because providers of these other services can compete with CMRS providers, the Commission has indicated that it is important to consider them in the analysis. As the Commission said, paraphrasing the Department of Justice/Federal Trade Commission guidelines on merger review, “When one product is a reasonable substitute for the other in the eyes of consumers, it is to be included in the relevant product market even though the products themselves are not identical.” Application of Echostar Communications Corporation, General Motors Corporation, and Hughes Electronics Corporation (Transferors) and Echostar Communications Corporation (Transferee), *Hearing Designation Order*, 17 FCC Rcd 20559, 20606, ¶ 106 (2002).

same time, Congress established the promotion of competition as a fundamental goal for CMRS policy formation and regulation. To measure progress toward this goal, Congress required the Commission to submit annual reports that analyze competitive conditions in the industry.<sup>5</sup> This *Report* is the thirteenth of the annual reports<sup>6</sup> on the state of CMRS competition. The *Report* is retrospective, focusing on conditions prevailing in the CMRS marketplace as of the end of the 2007 calendar year and major events in the 2008 calendar year.

4. This *Report*, like the previous reports, discusses CMRS as a whole because Congress called on the Commission to report on “competitive market conditions with respect to commercial mobile services.”<sup>7</sup> In particular, the statute requiring the annual report on CMRS competition states:

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

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<sup>5</sup> 47 U.S.C. § 332(c)(1)(C).

<sup>6</sup> See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *First Report*, 10 FCC Rcd 8844 (1995) (“*First Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Second Report*, 12 FCC Rcd 11266 (1997) (“*Second Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, 13 FCC Rcd 19746 (1998) (“*Third Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145 (1999) (“*Fourth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fifth Report*, 15 FCC Rcd 17660 (2000) (“*Fifth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Sixth Report*, 16 FCC Rcd 13350 (2001) (“*Sixth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Seventh Report*, 17 FCC Rcd 12985 (2002) (“*Seventh Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eighth Report*, 18 FCC Rcd 14783 (2003) (“*Eighth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Ninth Report*, 19 FCC Rcd 20597 (2004) (“*Ninth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Tenth Report*, 20 FCC Rcd 15908 (2005) (“*Tenth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eleventh Report*, 21 FCC Rcd 10947 (2006) (“*Eleventh Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Twelfth Report*, 23 FCC Rcd 2241 (2008) (“*Twelfth Report*”). The reports can also be found on the FCC’s web site, [http://wireless.fcc.gov/index.htm?job=cmrs\\_reports](http://wireless.fcc.gov/index.htm?job=cmrs_reports) (last visited Sept. 16, 2008).

<sup>7</sup> 47 U.S.C. § 332(c)(1)(C). As noted in previous *Reports*, any individual proceeding in which the Commission defines relevant product and geographic markets, such as an application for approval of a license transfer, may present facts pointing to narrower or broader markets than any used, suggested, or implied in this *Report*. See, e.g., *Twelfth Report*, 23 FCC Rcd at 2252, n. 5.

those services would be likely to enhance competition.<sup>8</sup>

5. In this *Thirteenth Report*, we comply with each of the four statutory requirements for analyzing competitive market conditions with respect to commercial mobile services. As did previous reports, we base our analysis of competitive market conditions on a range of standard indicators commonly used for the assessment of effective competition. All *Reports* since the *Ninth Report* have organized the presentation of the various indicators based on a framework that groups such indicators into four distinct categories: (A) Market Structure, (B) Provider Conduct, (C) Consumer Behavior, and (D) Market Performance (“Structure-Conduct-Performance framework”).<sup>9</sup> This framework provides a systematic approach to addressing the four statutory requirements. For example, Section III on market structure identifies the number of competitors in various commercial mobile services, and it also uses subscriber market shares to measure concentration in the market for mobile telephone services. In addition, Section III tracks the entry of additional providers or classes of providers in commercial mobile services, and more generally provides an analysis of the conditions affecting the ability of additional providers or classes of providers to enter the market for commercial mobile services. As stated in earlier reports, the framework proceeds from the premise that indicators of market structure such as the number of competitors and their market shares are not, by themselves, a sufficient basis for determining whether there is effective competition, and whether any of the competitors have a dominant share of the market for commercial mobile services. Rather, we make these determinations based on an analysis of both the structural and the behavioral characteristics of the CMRS marketplace.

#### **B. Structure of the Report**

6. As noted above, the structure of the *Thirteenth Report* follows the Structure-Conduct-Performance framework. The section on market performance evaluates the outcomes of competitive conditions in the CMRS industry from the consumer’s point of view, focusing on the benefits to consumers of competition, such as lower prices, higher consumption and better quality. In contrast, the sections on market structure, provider conduct, and consumer behavior examine the various structural and behavioral determinants of such market outcomes.

7. In using this framework to analyze competitive market conditions with respect to CMRS, we have integrated the discussion and analysis of mobile voice, mobile broadband and other mobile data services within each of the four categories of indicators. Many mobile voice operators also offer mobile broadband services and other mobile data services using the same spectrum, network facilities, and customer equipment. Furthermore, many U.S. mobile providers have integrated the marketing of mobile voice, mobile broadband and other mobile data services. For these reasons, we find it reasonable to analyze competitive conditions with respect to these services together.

8. Previous reports also identified, and distinguished from such integrated mobile operators, mobile data providers that offer only mobile data services, instead of both voice and data services, including those providers that offer such data-only services on networks distinct from those traditionally used to provide mobile voice. Such providers were termed “data-only providers.” Consistent with the *Twelfth Report*, in this *Report* we have divided the providers formerly included in this category into two separate groups: broadband data providers and narrowband data providers. The first group comprises providers other than mobile telephone operators that offer portable or mobile wireless broadband Internet access and other broadband services. The second group encompasses providers that offer messaging and other narrowband mobile data services to enterprise customers, such as paging and telemetry services. In addition, we identify mobile video providers, which operate networks dedicated to delivering one-way,

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<sup>8</sup> 47 U.S.C. § 332 (c)(1)(C).

<sup>9</sup> *Ninth Report*, 19 FCC Rcd at 20602-20603, ¶ 8 & 20607, ¶ 17.

IP-based, broadcast or multicast video programming to mobile telephone customers.

9. As in previous reports, the *Thirteenth Report* includes an analysis of wireless-to-wireline competition. Since such “intermodal” competition is distinct from “intra-modal” competition among the various wireless providers, we have placed our analysis of wireless-to-wireline competition in a separate section on intermodal issues (Section VII), following the sections on market structure, provider conduct, consumer behavior, and market performance within the CMRS industry. In addition to the analysis of wireless-to-wireline competition, Section VII also provides a brief discussion of Wireless Local Area Networks and Wireless-Wireline Convergence. Although both CMRS and WLAN services are wireless services, WLAN services are based on a different wireless technology and spectrum model than CMRS. Moreover, they have the potential to act as a substitute as well as a complement to data services offered over mobile telephone networks.

10. Prior to the *Twelfth Report*, the discussion and analysis of the terrestrial mobile services sector and the mobile satellite services sector were integrated within each of the four categories of indicators in previous reports. By contrast, for the *Thirteenth Report*, as in the *Twelfth Report*, we have provided a more detailed discussion and analysis of the mobile satellite services sector and placed it in a separate section (Section VIII) of this *Report*.

11. The *Twelfth Report* further refined the analysis of competition in the mobile telephone sector by compiling a list of census blocks with a certain level of coverage by mobile telephone providers.<sup>10</sup> It included in the Commission’s analysis of service provision on a county-by-county basis to allow comparisons with previous *Annual Competition Reports*.<sup>11</sup> In this *Report*, however, we report only on a census block basis. We no longer report service on a county-by-county basis because a census block analysis provides a more accurate and granular assessment of wireless competition in the United States.<sup>12</sup> This transition is similar to when the *Reports* moved to a county analysis from a BTA analysis.<sup>13</sup>

### III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE

12. The analysis in this section covers two distinct aspects of mobile telecommunications market structure. The first is the current level of horizontal concentration as measured by the number of providers competing in the various mobile service markets and their respective market shares. The second is the ease or difficulty of entry into the various mobile service markets, with particular emphasis on the way spectrum allocation and availability affect entry conditions and barriers to entry.

13. Section III.A provides an overview of the various types of CMRS providers. Section III.B provides an analysis of the current level of horizontal concentration in the mobile telephone sector. Section III.C examines recent or impending transactions that affect, or have the potential to affect, the level of horizontal concentration. Section III.D examines entry conditions and provides an overview of the different frequency bands that can be used to provide CMRS. The final Section, III.E, addresses the structure of rural mobile telecommunications markets in the United States.

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<sup>10</sup> *Twelfth Report*, 23 FCC Rcd at 2261, ¶ 35. This analysis was performed through a contract with American Roamer, an independent consulting firm that tracks service provision for mobile voice and mobile data services.

<sup>11</sup> *Id.* at 2264, ¶ 42.

<sup>12</sup> *Id.* at 2245, ¶ 2. Moreover, as stated in the *Twelfth Report* that “the percentage of the population covered by a given number of competitors resulting from the use of a census block analysis is similar to the figure provided by a county analysis, with the absolute difference being less than a few percentage points in all cases. However, we find that there are large differences in the percentage of the geographic area covered.” *Id.* at 2266, ¶ 48.

<sup>13</sup> *See Fifth Report*, 15 FCC Rcd at 17676-77.

## A. Overview of Service Providers

### 1. Facilities-Based Mobile Telephone Providers

14. As of year-end 2007, there were four mobile telephone operators in the United States that analysts typically describe as “nationwide”: AT&T Inc. (“AT&T”) (formerly known as Cingular Wireless),<sup>14</sup> Sprint Nextel Corp. (“Sprint Nextel”),<sup>15</sup> T-Mobile USA (“T-Mobile”),<sup>16</sup> and Verizon Wireless, LLC (“Verizon Wireless”).<sup>17</sup> When an operator is described as being nationwide, it does not necessarily mean that the operator’s license areas, service areas, or pricing plans cover the entire land area of the United States. The four mobile telephone carriers that analyst reports typically describe as nationwide all offer facilities-based service in at least some portion of the western, mid-western, and eastern United States. A map of the combined coverage areas of these four operators can be found in Appendix B. In addition, each of the four national operators has networks covering at least 235 million people (out of 305.6 million).<sup>18</sup> In addition to the nationwide operators, there are a number of large regional players, including: Leap Wireless (“Leap”), which covered 85 million POPs; United States Cellular Corp. (“US Cellular”), which covered 82.3 million POPs; Alltel Corp. (“Alltel”), which covered 79.8 million POPs; and Metro PCS (“MetroPCS”), which covered 66.8 million POPs.<sup>19</sup> Moreover, many regional and smaller providers are able to offer pricing plans with nationwide coverage through roaming agreements with other providers.

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<sup>14</sup> Cingular Wireless had been a joint venture of AT&T and BellSouth Corporation (“BellSouth”). On December 29, 2006, AT&T merged with BellSouth. With the BellSouth acquisition, AT&T thereby acquired BellSouth’s 40 percent economic interest in AT&T Mobility LLC (“AT&T Mobility”), formerly Cingular Wireless LLC, resulting in 100 percent ownership of AT&T Mobility. In 2007, AT&T began rebranding its wireless operations from Cingular to AT&T. AT&T, Inc., SEC Form 10-K, Feb. 26, 2007, at 1.

<sup>15</sup> Sprint Nextel was created by the merger of Sprint Corp. (“Sprint”) and Nextel Communications, Inc. (“Nextel”). See *Tenth Report*, 20 FCC Rcd at 15931, ¶ 60.

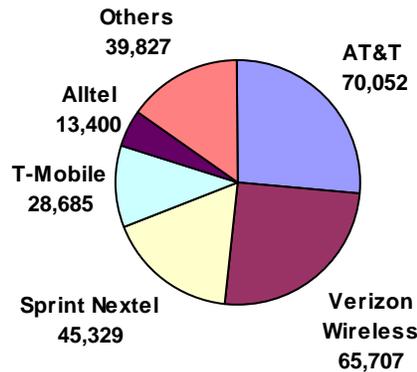
<sup>16</sup> T-Mobile USA is a wholly-owned subsidiary of Deutsche Telekom AG (“Deutsche Telekom”).

<sup>17</sup> 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, Feb. 28, 2008, at 7.

<sup>18</sup> As a general matter, we use the most recent relevant data available. For purposes of calculating numbers on broader geographic bases, such as nationally and for Economic Areas, we use U.S. Census Bureau estimates as of July 1, 2007. See *infra* note 555. For purposes of calculating the extent of service provision using census blocks, we use 2000 Census population figures because that is the Census Bureau’s most recent data about population at the census block level.

<sup>19</sup> John C. Hodulik, *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Mar. 18, 2008, at 16 (“4Q07 Wireless 411”).

**Chart 1: YE2007 Mobile Telephone Subscribers by Company**  
 (in thousands, not representative of market share in any particular market)<sup>20</sup>



15. Because the four nationwide mobile telephone operators, as well as the large regional and numerous other smaller operators, have different geographic footprints, they do not all compete head-to-head in each and every region and locality of the country. As a result, we define the scope of geographic markets on a regional or local basis. For example, Section III.B.2 below identifies the number of mobile telephone competitors on a census block basis.

16. Facilities-based mobile telephone providers currently offer circuit-switched commercial mobile voice services that are interconnected with the PSTN. In addition, many of these providers offer a range of mobile data services and applications, as described in Section IV.B.6, Mobile Data Services and Applications, *infra*. Some of these services and applications connect to the PSTN, while many rely on IP-based, packet-switched networks. Furthermore, the broadband data, narrowband data, and mobile video providers described below offer additional mobile data services and applications, some of which compete with and some of which complement those offered by mobile telephone operators.

## 2. Resale/MVNO Providers

17. Resellers purchase airtime from facilities-based providers and resell service to the public for profit.<sup>21</sup> Many resellers today are often referred to as Mobile Virtual Network Operators (“MVNOs”). One commenter argued:

More than 40 MVNOs compete to serve consumers, offering personalized and differentiated products and services, including tailored handsets and applications. These MVNOs target specific demographic and specialized interest groups by appealing to various lifestyles, including

<sup>20</sup> This includes companies with publicly-available subscriber counts. See Appendix A, Table A-4: Top 20 Mobile Telephone Operators by Subscribers. Total subscribers based on Table A-4.

<sup>21</sup> Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996).

the young, the elderly, differing ethnicities, the hip and trendy to user-friendly and affordable.<sup>22</sup>

MVNOs distinguish themselves via content, but like facilities-based providers, they experiment with a number of business models, such as pre-paid and unlimited plans. According to information provided to the Commission in its ongoing local competition and broadband data gathering program, the resale sector accounted for 7 percent of all mobile telephone subscribers, or 18.4 million subscribers, at the end of December 2007.<sup>23</sup> Similarly, one analyst estimated that there were 18.2 million wireless subscribers receiving service from a resale provider at the end of 2007, up from 15.1 million customers at the end of 2006.<sup>24</sup>

18. One analyst estimated that there were about 55 MVNOs operating as of May 2008.<sup>25</sup> TracFone Wireless Inc., which serves more than 10 million customers with prepaid offerings,<sup>26</sup> is the largest reseller of wireless service. Virgin Mobile USA (“Virgin Mobile”), a joint venture between Sprint Nextel and Richard Branson’s Virgin Group, LLC, which targets its prepaid offerings at the youth market, now serves almost 4.99 million subscribers.<sup>27</sup> As stated in the *Twelfth Report*, other MVNOs include: Airlink Mobile, AirVoice Wireless, Azteca Mobile, Beyond Wireless/Cbeyond, ConsumerCellular, DEXA Wireless, Excel Wireless, Firefly Mobile, GSR Mobile, kajeet, Jitterbug, LetsTalk.com Liberty Wireless, Omni Prepaid, PowerNet Mobile, Primus Mobile, Qwest, STI Mobile, TuYo Mobile, Working Assets Wireless, 7-Eleven Speak Out, and 9278 Mobile.<sup>28</sup> As discussed in the *Twelfth Report*, many of these companies are targeting specific demographic groups or “micro-niches” of users, such as Cancer Survivors Mobile (support for those affected by the disease).<sup>29</sup>

19. While a number of MVNOs are flourishing, the *Twelfth Report* also found that certain MVNOs had been unsuccessful in competing in the CMRS industry.<sup>30</sup> In particular, it noted that Mobile ESPN, Amp’d Mobile, and Disney Mobile had each ceased offering MVNO service in 2007.<sup>31</sup> In 2008, Hispanic-focused Movida filed for Chapter 11 bankruptcy.<sup>32</sup> It also has been reported that Sonopia,

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<sup>22</sup> CTIA-The Wireless Association® Comments, at 15-16 (filed Mar. 26, 2008) (“*CTIA 2008 Comments*”).

<sup>23</sup> See Appendix A, Table A-2, *infra*. Number of resale subscribers calculated from information in table.

<sup>24</sup> *4Q07 Wireless 411*, Table 2: End-of-Period Subscribers, at 5 (estimating the total wholesale number by the four nationwide service operators).

<sup>25</sup> See Paul Davidson, *Many Wireless Resellers Going Under*, USA TODAY, May 8, 2008 (“*ManyWireless Resellers Going Under*”).

<sup>26</sup> TracFone Nationwide Prepaid Wireless – About Us, available at <http://www.tracfone.com> (hyperlink “About Us”) (last visited Dec. 15, 2008).

<sup>27</sup> *Virgin Mobile USA Reports Results For The Second Quarter And First Six Months Of 2008*, News Release, Virgin Mobile USA, at 3, Aug. 13, 2008. Sprint Nextel also targets the teenage market through a subsidiary with its iDEN-based push-to-talk product, using an alternative prepaid brand, “Boost Mobile.” See *Ninth Report*, 19 FCC Rcd at 20615, ¶ 40 for more history on the venture. Boost Mobile had 4 million customers at the end of 2006. *Investor Quarterly Update: Fourth Quarter 2006 Results*, News Release, Sprint Nextel, Feb. 28, 2007.

<sup>28</sup> See *Twelfth Report*, 23 FCC Rcd at 2257, ¶ 22 (citing *CTIA 2007 NOI Comments*, at 13).

<sup>29</sup> *Id.* at 2257, ¶¶ 22-23. As noted in the *Twelfth Report*, most of the niches-targeting MVNOs use the service as a self-sustaining way to promote themselves or their causes and keep members or customers engaged.

<sup>30</sup> *Id.* at 2258, ¶ 24.

<sup>31</sup> *Id.*

<sup>32</sup> See *Many Wireless Resellers Going Under*, note 25, *supra*.

which helps clubs and organizations set up their own mobile services, is shutting down.<sup>33</sup> In addition, in June 2008, Virgin Mobile acquired Helio. One report notes that the failure of certain individual resellers is due to (1) fresh competition from the major carriers,<sup>34</sup> (2) lack of distinctive service,<sup>35</sup> (3) low volumes,<sup>36</sup> and (4) operational blunders.<sup>37</sup>

### 3. Broadband Data Providers

20. In addition to the voice and data services offered by mobile telephone providers, other providers offer mobile or portable wireless broadband services using Broadband Radio Service/Educational Broadband Service (“BRS/EBS”) in the 2.5 GHz band or Wireless Communications Systems (“WCS”) spectrum in the 2.3 GHz band.

21. There are two significant licensees in the BRS/EBS band: Clearwire Corporation (“Clearwire”) and Sprint Nextel. Clearwire offers portable wireless high-speed Internet access and Voice-over-Internet Protocol (“VoIP”) services to consumers using spectrum in the 2.5 GHz BRS/EBS band.<sup>38</sup> As of December 31, 2007, Clearwire’s U.S. network covered 46 markets and approximately 13.6 million people,<sup>39</sup> and it had approximately 350,000 wireless broadband Internet subscribers.<sup>40</sup> Sprint Nextel currently uses the 2.5 GHz band to offer residential and small business customers fixed wireless Internet access services, using “first generation” line of sight technology.<sup>41</sup> Sprint Nextel offers this service in 14 markets and has approximately 16, 500 subscribers.<sup>42</sup> As part of the merger commitments made by Sprint and Nextel in 2005 to close their merger, Sprint Nextel must build a network using the 2.5 GHz band to reach 15 million people in the first four years, and it also must reach an additional 15 million people within six years of the Commission’s Order approving the merger.<sup>43</sup>

22. Both Clearwire and Sprint Nextel are planning to deploy a next generation broadband wireless network for the 2.5 GHz band using the Worldwide Inter-Operability for Microwave Access (“WiMAX”) technology. On May 7, 2008, Clearwire and Sprint Nextel announced that they had entered into an agreement to combine their 2.5 GHz wireless broadband businesses to form a new wireless

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<sup>33</sup> *Id.*

<sup>34</sup> *Id.* (citing Chris Collins of Entner and Yankee Group).

<sup>35</sup> *Id.*

<sup>36</sup> *Id.* (citing Ovum analyst Raymond Yu).

<sup>37</sup> *Id.* (citing Paul Greene, CEO of APC Wireless).

<sup>38</sup> For a description of the technology used by the broadband data providers discussed in this section, see Section IV.B.1.e, Broadband Data Networks and Technology Deployment, *infra*.

<sup>39</sup> Clearwire Corp., SEC Form 10-K, Mar. 13, 2008, at 3.

<sup>40</sup> *Id.* at 7.

<sup>41</sup> Sprint Nextel Corp., SEC Form 10-K, Mar. 1, 2008, at 11-12.

<sup>42</sup> *Id.*

<sup>43</sup> See Letter from Lawrence R. Krevor, Nextel Communications, Inc., and Vonya B. McCann, Sprint Corporation, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 05-63 (Aug. 2, 2005); see also Applications of Nextel Communications, Inc. and Sprint Corporation For Consent to Transfer Control of Licenses and Authorizations, *Memorandum Opinion and Order*, 20 FCC Rcd 13967, 13422, ¶ 151 & 1343, ¶ 192 (2005).

communications company, which also will be named Clearwire.<sup>44</sup> The company “will be focused on expediting the deployment of the first nationwide mobile WiMAX network to provide a true mobile broadband experience for consumers, small businesses, medium and large enterprises, public safety organizations and educational institutions.”<sup>45</sup> The company plans to cover up to 140 million people in the United States in thirty-six months; permit consumers to use any lawful device that they want so long as it is compatible with its WiMAX network; permit consumers to download and use any software applications, content, or services they desire, subject only to reasonable management practices and law enforcement and public safety considerations; and, offer non-exclusive wholesale access to its network.<sup>46</sup> The Commission approved the Sprint Nextel/Clearwire transaction on November 4, 2008,<sup>47</sup> and the companies closed on November 28, 2008.<sup>48</sup>

23. AT&T is a significant licensee in the WCS band, and it is using its WCS spectrum licenses to offer fixed wireless broadband Internet access service in eight U.S. markets, including Juneau, Alaska, where the company has deployed WiMAX technology.<sup>49</sup> As part of the merger commitments made by the company in conjunction with its acquisition of BellSouth, AT&T plans to offer mobile or fixed wireless broadband service to 25 percent of the population covered by its WCS licenses (not including Alaska) by July 21, 2010.<sup>50</sup>

#### 4. Mobile Video Providers

24. Certain wireless licensees have been developing and launching networks dedicated to delivering one-way, IP-based, broadcast or multicast video programming to mobile telephone customers. Because these networks are unidirectional (downlink only), the video services are sold to end users through mobile telephone operators and rely on the mobile telephone operators’ networks for any uplink communications. Additionally, as currently offered, subscribers must use a device that is compatible with the mobile television network in order to receive programming.

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<sup>44</sup> *Sprint And Clearwire To Combine WiMAX Businesses, Creating A New Mobile Broadband Company*, News Release, Sprint Nextel and Clearwire Corp. (May 7, 2008). See also Section III.D, Entry Conditions and Potential Barriers to Entry, *infra*, for further discussion of the Sprint Nextel/Clearwire transaction.

<sup>45</sup> *Id.* See Section IV.B.1.e, Broadband Data Networks and Technology Deployment, *infra*, for further discussion of the WiMAX technology.

<sup>46</sup> Sprint Nextel/Clearwire Description of the Transaction and Public Interest Statement, ULS File No. 0003462540, WT Docket No. 08-94, at 1-2 & 20 (amended Jun. 24, 2008).

<sup>47</sup> Sprint Nextel Corp. and Clearwire Corp., Applications for Consent to Transfer Control of Licenses, Leases, and Authorizations, WT Docket No. 08-94, *Memorandum Opinion and Order*, FCC 08-259, at ¶ 128 (rel. Nov. 7, 2008) (“*Sprint Nextel/Clearwire Order*”).

<sup>48</sup> *Clearwire Completes Landmark Transaction with Sprint Nextel to Combine 4G Mobile WiMAX Businesses; Clearwire Receives \$3.2 Billion Cash Investment from Comcast, Intel, Time Warner Cable, Google and Bright House Networks*, News Release, Clearwire Corp. (Nov. 28, 2008).

<sup>49</sup> *AT&T Alascom Delivers New Broadband Internet Choice for Juneau*, News Release, AT&T, Aug. 6, 2007; Kelly Hill, *Big Players Have Big Plans for WiMAX*, RCR WIRELESS NEWS, Oct. 24, 2007 (citing AT&T spokeswoman Jenny Parker). The company has conducted trials or limited deployments of WiMAX or other fixed wireless broadband technologies in a total of 22 markets. *Id.*

<sup>50</sup> Notice of Written Ex Parte Communication by Joan Marsh, AT&T, “Revised Merger Commitments,” Review of AT&T Inc. and BellSouth Corp. Application for Consent to Transfer of Control, WC Docket No. 06-74, Jan. 4, 2007, at 10. AT&T also agreed to divest its 2.5 GHz BRS/EBS spectrum, and in May 2007, Clearwire completed the acquisition of this spectrum. *Clearwire Completes Acquisition of AT&T Mobile WiMAX Spectrum*, News Release, Clearwire, May 31, 2007.

25. Qualcomm Incorporated's MediaFLO service uses Lower 700 MHz spectrum and video multicasting technology to provide linear video programming, in which the same program content being aired on cable and broadcast television networks is aired on the mobile video network, as well as programming from channels exclusive to MediaFLO.<sup>51</sup> MediaFLO's mobile TV service is available to AT&T customers as AT&T Mobile TV and to Verizon Wireless customers as V CAST Mobile TV.<sup>52</sup> AT&T Mobile TV and VCAST Mobile TV feature an extensive lineup of primetime news, entertainment and children's content from the leading entertainment brands.<sup>53</sup> All programs are available to AT&T and Verizon Wireless subscribers in 58 major metropolitan areas nationwide, including Atlanta, Chicago, Dallas, Las Vegas, Los Angeles, New York, San Diego, Seattle, and Washington, D.C.<sup>54</sup>

26. While MediaFLO is not releasing subscriber counts, competitor MobiTV claims to have 4 million subscribers through wireless carriers, including Sprint Nextel, AT&T and Alltel.<sup>55</sup> Instead of using its own dedicated spectrum, MobiTV transmits over carriers' networks to offer news and entertainment, depending on the carrier and plan selected.<sup>56</sup>

### 5. Narrowband Data Providers

27. Several wireless data providers offer messaging and other narrowband mobile data services to enterprise customers using paging and narrowband PCS networks and spectrum. For instance, USA Mobility is the largest U.S. paging company and offers traditional paging and two-way messaging, among other wireless services, to business customers.<sup>57</sup> In addition, Space Data Corp. ("Space Data") provides commercial telemetry services across the south-central United States to energy companies and other industrial companies.<sup>58</sup>

### 6. Mobile Satellite Providers

28. As discussed in detail in Section VIII of this *Report*, the commercial MSS industry in the United States is currently comprised of five service providers operating in MSS-designated frequency bands, with satellite platforms of differing orbital configurations, and offering multiple products including voice and data services in fixed and mobile environments to a variety of terminal types. The five MSS providers are Globalstar, Inmarsat plc ("Inmarsat"), Iridium Satellite LLC ("Iridium"), MSV, and Orbcomm Inc. ("Orbcomm").

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<sup>51</sup> *Verizon Wireless Lifts Curtain on V CAST Mobile TV; True Broadcast Quality, the Best of TV*, News Release, Verizon Wireless, Jan. 7, 2007. The linear programming available on MediaFLO will have a slight delay and, in some cases, different commercials from the programming being aired on the television networks.

<sup>52</sup> *MediaFLO USA Brings Expanded Live News Coverage to AT&T and Verizon Wireless Phones With Addition of NBC Universal's CNBC, and MSNBC, Fox News Channels*, Company Press Release, Aug. 25, 2008.

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> Tim Doyle, *MobiTV Asserts Lead Over MediaFLO*, SNL Interactive, Aug. 16, 2008.

<sup>56</sup> *MobiTV, Leading The Industry In Hosted Content Delivery Solutions*, available at <http://www.MobiTV.com/technology> (last visited Dec. 16, 2008).

<sup>57</sup> USA Mobility, *Wireless Messaging – Products and Services*, available at <http://www.usamobility.com/products/messaging/> (last visited Dec. 16, 2008); *Tenth Report*, 20 FCC Rcd at 15923, ¶ 33.

<sup>58</sup> Space Data Corp., *Overview of SkySite Network*, available at <http://www.spacedata.net/technology.htm> and <http://www.spacedata.net/company.html> (last visited Dec. 15, 2008); *Tenth Report*, at 15923, ¶ 34.

## B. Horizontal Concentration

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

### 1. Market Definition

#### a. Product Market

30. The mobile telephone industry currently provides an array of mobile voice and data services, ranging from conventional interconnected mobile voice service to text and photo messaging services to high-speed mobile Internet access services provided over mobile wireless broadband networks. As already noted above, many providers of mobile voice service also offer mobile broadband services and other mobile data services using the same spectrum, network facilities, and customer equipment, and many mobile telephone providers have integrated the marketing of mobile voice, mobile broadband and other mobile data services. Although available mobile data service offerings include standalone mobile Internet access services for customers who typically access the Internet through laptop computers and who connect to wireless networks primarily or exclusively for data, rather than voice use, cellphone customers who use their handsets for data services typically purchase mobile voice and mobile data services bundled together in various ways. Initially, handset-based mobile data applications were marketed primarily as an add-on to mobile voice service.<sup>59</sup> Although the add-on approach to mobile data services continues to predominate, in recent years mobile telephone providers have introduced a growing number of pricing plans that directly bundle mobile voice service and mobile broadband and other data services together in a single monthly service package.<sup>60</sup> In addition to the ongoing shift from add-on mobile data services to direct bundling of mobile voice and data services, the mobile telephone industry is in the process of transitioning from the provision of interconnected mobile voice services and mobile data services over legacy mobile wireless networks to the provision of mobile voice and data services over mobile wireless broadband networks.

31. As discussed below, these industry characteristics and developments have implications for the definition of the product market. When these implications are taken into account, measuring concentration based on separate, narrowly defined markets for mobile voice services and mobile data services may give a misleading picture of the status of competition in the mobile telephone sector. Therefore, this section analyzes and measures concentration in the markets for mobile voice services and mobile data services, including mobile voice and data services provided over mobile wireless broadband networks (mobile broadband services), under the combined product market for mobile telephony/broadband services.

32. The justification for using the combined product market for mobile telephony/broadband services is not based strictly on the principle of demand substitutability. As noted in the *Twelfth Report* and previous reports, the basic economic principle for defining the scope of the relevant product market is to include two mobile services in the same product market if they are essentially interchangeable from the

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<sup>59</sup> See *Twelfth Report*, 23 FCC Rcd at 2311, ¶ 169.

<sup>60</sup> See Section IV.A.1, Developments in Mobile Telephone Pricing Plans, and Section IV.A.3, Mobile Broadband and Other Data Service Pricing, *infra*.

perspective of most consumers – that is, if consumers view them as close substitutes.<sup>61</sup> In measuring concentration for mobile voice and data services in a combined product market for mobile telephony/broadband services, this *Report* generally does not consider mobile voice service and most mobile data services to be close substitutes. In addition, although it is reasonable to assume that mobile voice services provided by different operators offer the same basic voice call functionality and are indistinguishable to consumers regardless of the network technology these operators use,<sup>62</sup> it is clear that there are perceptible differences in the user experience when certain advanced mobile data services are provided over mobile wireless broadband networks. For example, the higher data speeds on mobile wireless broadband networks allow users to navigate the Internet and load Web pages much faster than on networks using older mobile wireless technologies, and greatly enhance the viewing quality of video streamed onto mobile devices by increasing the rate at which frames are shown.<sup>63</sup>

33. As mentioned above, this section measures concentration in the markets for mobile voice services and mobile data services under the combined product market for mobile telephony/broadband services for several reasons. One reason involves the numbering data used in this *Report* to estimate the subscriber market shares of mobile telephone operators.<sup>64</sup> As documented in a subsequent section of this *Report*, less than 60 percent of U.S. mobile telephone subscribers use some form of mobile data service even on a sporadic basis, and a minority of subscribers use advanced data services such as mobile Internet access and mobile broadband.<sup>65</sup> However, the numbering data provide an estimate of mobile telephone subscribers in general, without regard to whether subscribers use mobile broadband and other data services as well as mobile voice services. As a result, the data do not provide a way of distinguishing mobile telephone subscribers who still use their handsets primarily or exclusively for voice calls from those who also subscribe to, and actively use, mobile data services, or the smaller subset of subscribers who have already migrated to mobile broadband networks and devices.

34. Beyond the issue of data limitations, certain economic considerations suggest that use of the combined market for mobile telephony/broadband services can provide a reasonable approximation of concentration in the markets for mobile voice and mobile data services. As noted above, mobile telephone providers produce mobile voice and data services jointly, and cellphone users tend to purchase them in bundles. Bundling may give rise to a complementary relationship between the demand for mobile voice service and the demand for mobile broadband and other data services.<sup>66</sup> The existence of complementarities between mobile voice and data services may increase the cost to the consumer of

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<sup>61</sup> See *Twelfth Report*, 23 FCC Rcd at 2253 ¶ 13. Under the standard test for defining the boundaries of a product market, two services are considered to be close substitutes if consumers respond to an increase in the price for one service by switching to the alternative service. Jordi Gual, *Market Definition in the Telecoms Industry*, Working Paper No. 517, IESE Business School – University of Navarra, Sept. 2003, at 2-3 (“*Market Definition in the Telecoms Industry*”).

<sup>62</sup> But see Section VI.C, Network Quality, *infra* (discussing a J.D. Power and Associates wireless call quality performance study finding that the rate of reported call quality problems is lower for customers using certain network technologies than for customers using alternative technologies, and also for customers using certain next-generation mobile devices than for customers using earlier-generation devices).

<sup>63</sup> See *Eleventh Report*, 21 FCC Rcd at 2311, ¶ 170.

<sup>64</sup> See Section III.B.3, Concentration Measures for Mobile Telephone Services, *infra*.

<sup>65</sup> See Section VI.B.1.b, Mobile Broadband and Other Data, *infra*.

<sup>66</sup> Jordi Gual, *Market Definition in the Telecoms Industry*, Working Paper No. 517, IESE Business School – University of Navarra, Sept. 2003, at 16-19 (“*Market Definition in the Telecoms Industry*”).

switching in response to an increase in the price for an individual mobile service.<sup>67</sup> At the same time, when complementary services are produced jointly, a high mark-up of price over cost for an individual mobile service may be a misleading indicator of market power.<sup>68</sup> Complementarities in demand arising from the bundling of mobile voice and data services, in conjunction with the joint production of mobile voice and data services on the supply side, may therefore justify the definition of the product market broadly at the level of bundles of mobile services, rather than narrowly and separately at the level of individual mobile services.<sup>69</sup>

### **b. Geographic Market**

35. The basic economic principle for defining the scope of the relevant geographic market is to include customers facing the choice of similar competitive alternatives in the same geographic market. Because U.S. mobile telephone providers have different-sized geographic footprints, any individual mobile provider does not compete with all other mobile providers in each and every part of the country. This suggests that the relevant geographic market for mobile telephone services is narrower than the entire nation. An attempt to measure concentration in mobile telephone services at the national level would understate the actual level of market concentration because the underlying geographic market definition would be too broad.

36. At the same time, defining the appropriate regional or local geographic market for mobile telephone services is a highly complex exercise due to various factors, including (1) the relatively large number of licensed providers; (2) the variety of geographic schemes used to license different spectrum bands; (3) the wide variation in providers' geographic footprints; and (4) the difficulty of collecting accurate information on the geographic coverage each mobile operator provides in its license areas. To simplify the measurement task, in this *Report* we base our analysis of market concentration on uniform geographic areas that may be broader or narrower than the relevant geographic market. In particular, we estimate the number of competitors per market based on census blocks, and we provide concentration measures at the level of Economic Areas ("EAs"). We use EAs as the geographic unit for measuring the level of concentration in mobile telephone markets because an EA captures the area in which the average person shops for and purchases a mobile phone, most of the time.<sup>70</sup>

## **2. Number of Mobile Telephone Competitors**

### **a. Census Block Analysis**

37. As previously discussed, in this *Report* we analyze competition in the mobile telephone sector by compiling a list of census blocks with some level of coverage by mobile telephone providers. This analysis is performed through a contract with American Roamer, an independent consulting firm that

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<sup>67</sup> *Id.* at 17 (arguing that the cost of switching increases because the existence of complementarities with other mobile telecommunications services reduces the own-price elasticity for an individual mobile service, so that an increase in the price for this individual service will not reduce demand significantly if the prices of complementary services do not change).

<sup>68</sup> *Id.* at 18 (arguing that firms producing a collection of goods in the presence of fixed costs will optimally charge higher mark-ups for those services that face more inelastic demand, and therefore a high mark-up in an individual service need not reflect an overall high level of market power).

<sup>69</sup> *Id.* at 19.

<sup>70</sup> See *infra* note 87 for a discussion of the reasons why we use EAs for measuring the level of concentration in mobile telephone markets, including for example, protecting confidential information we maintain. See also Section VI.B.4, Sub-National Penetration Rates, *infra*.

tracks service provision for mobile voice and mobile data services.<sup>71</sup> Under the American Roamer contract, in this *Report* we are able to estimate the extent to which each facilities-based provider operates in the more than 8 million census blocks, compared to just the roughly 3,200 counties in previous reports.<sup>72</sup> Moreover, a census block is the smallest geographic entity for which the Census Bureau tabulates decennial census data.<sup>73</sup>

38. By utilizing such a small area to analyze coverage, the census block method addresses the issue of the over-counting of population and geographic area inherent in a county-by-county analysis.<sup>74</sup> Many census blocks cover areas as small as an individual city block, and generally contain significantly fewer than 3,000 people.<sup>75</sup> The map below shows mobile telephone competition throughout the United States. More detailed regional maps are available in Appendix B.

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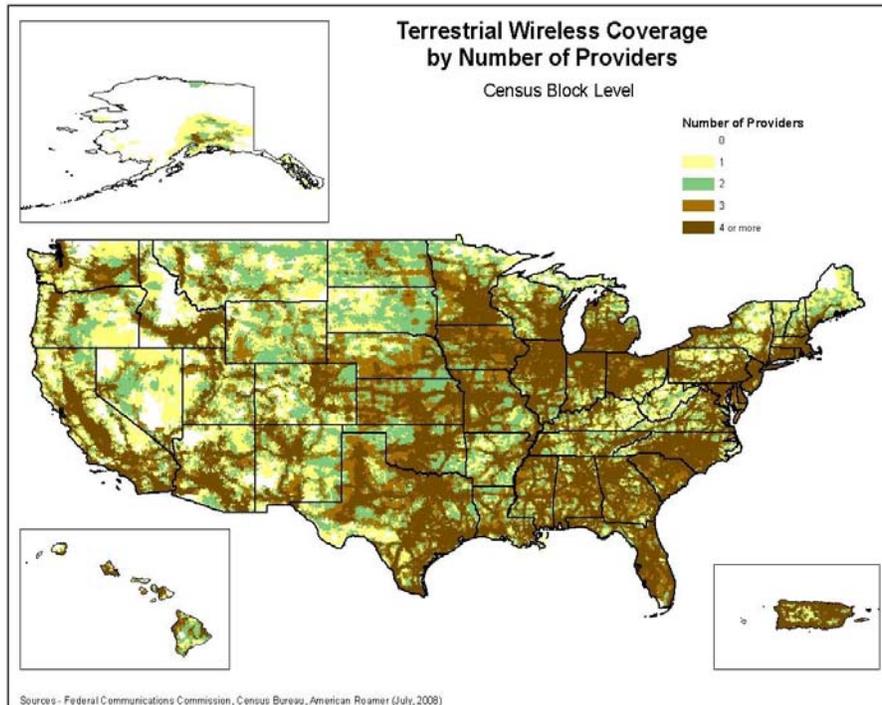
<sup>71</sup> See American Roamer, available at <http://www.americanroamer.com> (last visited Dec. 16, 2008). American Roamer began in 1985 as the original vendor of custom printed roaming guides for cellular carriers, but has since evolved into a provider of data and mapping for the wireless industry in North America. American Roamer's product is unique in that it includes detailed coverage polygons of every operational terrestrial mobile telephone voice carrier in the United States, regardless of spectrum bands. In addition to public sources, American Roamer works directly with many carriers to develop its coverage maps.

<sup>72</sup> There are roughly 30,000 5-digit area ZIP code areas in the United States. U.S. ZIP Code Areas 2004, Geographic Data Technology, Inc., ESRI.

<sup>73</sup> U.S. Census Bureau, *Glossary Of Basic Geographic And Related Terms - Census 2000*, available at <http://www.census.gov/geo/www/tiger/glossary.html#glossary> (last visited Dec. 15, 2008). Many blocks correspond to individual city blocks bounded by streets, but blocks – especially in rural areas – may include many square miles and may have some boundaries that are not streets. The Census Bureau established blocks covering the entire nation for the first time in 1990. Previous censuses back to 1940 had blocks established only for part of the nation. Over 8 million blocks are identified for Census 2000. U.S. Census Bureau, *Question & Answer Center*, available at <http://www.census.gov> (last visited Oct. 2, 2008). The mean size of a census block is .0460 square miles, and its median size is 0.016 square miles with a range of 0.0000001 to 8,081 square miles; its mean population is 34.3 people, while its median population is 8.0 people, with a range of 0 to 23,373 people. FCC analysis based on Census 2000 “Summary File 1 (SF 1),” U.S. Census Bureau, *United States Census 2000*, available at <http://www.census.gov/Press-Release/www/2001/sumfile1.html> (last visited Dec. 15, 2008).

<sup>74</sup> For example, county populations can reach up to one million people, as in the county of Los Angeles.

<sup>75</sup> The next level above census blocks in the geographic hierarchy, census block groups - which are clusters of census blocks – generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. U.S. Census Bureau, *Appendix A: Census 2000 Geographic Terms and Concepts*, Reference Resources for Understanding Census Bureau Geography, available at <http://www.census.gov/geo/www/tiger/glossry2.pdf>, at A8, (last visited Dec. 15, 2008).

Map 2: Mobile Telephone Competitors<sup>76</sup>

39. According to our analysis of American Roamer's July 2008 coverage data of mobile telephone providers, approximately 284 million people, or 99.6 percent of the total U.S. population, have one or more different operators (cellular, PCS, and/or digital SMR) offering mobile telephone service in the census blocks in which they live. These blocks make up approximately 75 percent of the total land area of the United States (including Alaska), reflecting the nation's uneven population distribution.<sup>77</sup> As one analyst noted, "U.S. carriers have a much more challenging environment in which to build networks. Population density is a mere 50 POPs per square mile compared to an average of 290 per mile in Europe and 370-400 per mile in major European markets like the U.K. and Germany."<sup>78</sup> Based on our definition of rural, approximately 61 million people, or 21 percent of the U.S. population,<sup>79</sup> live in rural counties. These counties comprise 3.1 million square miles, or 86 percent of the geographic area of the U.S.<sup>80</sup> In sum, approximately 79 percent of the U.S. population lives on 14 percent of the land, while 21 percent live on the remaining 86 percent of the land.

<sup>76</sup> A larger version of this map may be found in Appendix B.

<sup>77</sup> *Id.* Alaska is approximately 572,000 square miles (land area), while the entire United States is 3,537,000 square miles (land area). U.S. Census Bureau, *State & County QuickFacts*, available at <http://quickfacts.census.gov/qfd/states/02000.html> (last visited Dec. 15, 2008).

<sup>78</sup> Timothy Horan, *et al.*, *U.S. Wireless On Track To Deliver Solid Financial Results*, CIBC World Markets, Equity Research, Sept. 21, 2006, at 21.

<sup>79</sup> Including the populations of Puerto Rico and the Virgin Islands.

<sup>80</sup> Including the populations of Puerto Rico and the Virgin Islands.

40. The following table contains more detailed findings regarding population and geographic coverage.

**Table 1: Estimated Mobile Telephone Rollouts  
by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total U.S. POPs	Square Miles Contained in Those Blocks	% of Total U.S. Square Miles
Total for U.S.	8,262,363	285,230,516	100%	3,799,408	100%
1 or More	8,052,071	284,153,539	99.6%	2,831,266	74.5%
2 or More	7,627,040	280,987,512	98.5%	2,244,435	59.1%
3 or More	6,773,535	272,475,210	95.5%	1,548,924	40.8%
4 or More	5,755,825	258,167,149	90.5%	985,650	25.9%
5 or More	3,938,715	185,164,711	64.9%	532,606	14.0%
6 or More	1,596,405	70,238,178	24.6%	198,965	5.2%
7 or More	302,022	12,576,363	4.4%	39,004	1.0%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2008.

Notes: POPs are from the 2000 Census, and square miles include the United States and Puerto Rico.

41. As seen in Table 1, approximately 272 million people, or 95.5 percent of the total U.S. population, have three or more different operators offering mobile telephone service in the census blocks in which they live, while approximately 258 million people, or 90.5 percent of the U.S. population, live in census blocks with four or more mobile telephone operators competing to offer service.

42. In order to give some additional perspective on geographic coverage, we also have analyzed service provision by census block excluding lands owned or administered by the Federal Government. As the Commission has recognized, “[i]n many locations, covering certain government land may be impractical, because these lands are subject to restrictions that prevent a licensee from providing service or make provision of service extremely difficult. We also note that government lands often include only very small portions of the population in a license area.”<sup>81</sup> The land area of the United States is approximately 3.6 million square miles, while the area of Federal lands is approximately 1.0 million square miles, or 28 percent of the total land area of the United States.<sup>82</sup> A map of showing Federal lands, with American Indian Reservations and Alaska Native Village Statistical Areas, can be found in Appendix B.

<sup>81</sup> Service Rules for the 698-746, 747-762 and 777-792 MHz Bands; Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems; Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones; Biennial Regulatory Review -- Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services; Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; and Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010, *Second Report and Order*, 22 FCC Rcd 15289, 15350, ¶ 160 (2007) (“700 MHz Second Report and Order”).

<sup>82</sup> The land area of the State of Alaska is 663,267 square miles, while the area of Federal lands is 414,364 square miles, or 62% of the total land area of the State of Alaska.

**Table 2: Estimated Mobile Telephone Rollouts Excluding Federal Land<sup>83</sup>  
by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total U.S. POPs Excl. Those on Federal Land	Square Miles Contained in Those Blocks	% of Total U.S. Square Miles Excl. Federal Land
Total for U.S.	7,794,199	280,371,248	100%	2,652,534	100%
1 or More	7,658,969	279,481,965	99.7%	2,236,150	84.3%
2 or More	7,326,666	276,653,846	98.7%	1,893,767	71.4%
3 or More	6,574,580	268,713,465	95.8%	1,369,514	51.6%
4 or More	5,624,592	254,940,976	90.9%	898,938	33.9%
5 or More	3,870,194	183,055,407	65.3%	493,988	18.6%
6 or More	1,570,686	69,266,255	24.7%	185,648	7.0%
7 or More	298,943	12,433,378	4.4%	36,743	1.4%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2008.

Notes: POPs are from the 2000 Census, and square miles include the United States and Puerto Rico.

43. An analysis of service provision by census block, including and excluding federal land, shows similar population coverage. By comparison, an examination of geographic coverage shows a higher percentage of geographic coverage when excluding federal lands. For example, approximately 41 percent of the total United States land area is covered by three or more providers, compared to approximately 52 percent of the land area when excluding federal land. In addition, approximately 26 percent of the total United States land area has access to four or more providers compared to approximately 34 percent, when excluding federal land.

### 3. Concentration Measures for Mobile Telephone Services

44. In this section we use the Herfindahl-Hirschman Index (“HHI”) to measure the level of market concentration with respect to the provision of mobile telephone services.<sup>84</sup> The value of the HHI reflects both the number of market competitors and the distribution of their market shares. In general, the value of the HHI declines as the number of firms increases, and it increases with rising inequality among any given number of firms.<sup>85</sup>

<sup>83</sup> In this analysis, federal lands consist of lands owned or administered by the Federal Government, including the Bureau of Land Management, the Bureau of Reclamation, the U.S. Department of Agriculture Forest Service, the Department of Defense, the U.S. Fish and Wildlife Service, the National Park Service, the Tennessee Valley Authority, and other agencies. Only areas of one square mile (640 acres) or more are included. *See* Federal Lands of the United States, *available at* <http://www.nationalatlas.gov/mld/fedlanp.html> (last visited Dec. 16, 2008).

<sup>84</sup> The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. When a single firm is the sole supplier in the relevant market (a pure monopoly), the HHI attains its maximum value of 10,000 (100 x 100). If there are ten providers, each with ten percent of the market, the value of HHI would be 1,000 [(10)<sup>2</sup> x 10]. As the structure of a market becomes progressively more atomistic, the value of HHI approaches 0.

<sup>85</sup> For example, if four carriers are identified as participants in the relevant product and geographic market and each carrier accounts for 25 percent of total sales, the value of HHI would be 2500 [(25)<sup>2</sup> x 4]. If the number of carriers increases to five, each with a 20 percent market share, the value of HHI would decline to 2000 [(20)<sup>2</sup> x 5]. On the (continued....)

45. We calculate each mobile carrier's market share based on the number of subscribers served by each carrier in an EA. The number of subscribers served by each carrier is determined based on the Commission's Numbering Resource Utilization/Forecast ("NRUF") data, which track phone number usage information for the United States.<sup>86</sup> As noted previously, we use EAs as the geographic unit for measuring the level of concentration in mobile telephone markets because an EA captures the area in which the average person shops for and purchases a mobile phone, most of the time.<sup>87</sup> We emphasize that, in using the EA to calculate market shares for the purposes of this *Report*, we are not concluding that the EA is the relevant geographic market for other purposes.<sup>88</sup>

46. Based on NRUF data as of December 2007, the average value of the HHIs weighted by EA population is 2674.<sup>89</sup> In light of our estimate that the average value of the HHIs weighted by EA population was also 2674 as of December 2006, we find there was virtually no change in average concentration in 2007.<sup>90</sup> As a benchmark for comparison, the value of HHI for a hypothetical market in which there are four carriers with equal market shares is 2500. The value of HHI for individual EAs ranges from a low of 1795 in EA 28 (covering parts of South Carolina and Georgia, including Savannah) to a high of 6272 in EA 121 (covering parts of Nebraska and Colorado).

(Continued from previous page) \_\_\_\_\_

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

<sup>86</sup> The methodology used to compile NRUF data is described in Section VI.B.4, Sub-National Penetration Rates, *infra*.

<sup>87</sup> See VI.B.4, Sub-National Penetration Rates, *infra*. Although the Commission typically uses 734 CMAs to calculate HHIs when it evaluates the competitive consequences of certain transactions, we use 176 EAs to calculate HHIs in this Report. We use EAs in this Report in part to better compare market concentration in the U.S. with market concentration in foreign markets. The average EA population is less than 2 million, although smaller when compared to certain foreign markets, EAs provide a much more useful comparison than smaller geographic areas like CMAs. Further, to use smaller geographic areas like CMAs may also compromise the confidential information found in the NRUF data. However, the methodology used to calculate the HHIs for EAs also has its own limitations. The methodology gives equal weight to a mobile carrier that reports assigned numbers in one county as it does to a carrier that reports assigned numbers in all counties, or at least more than one county, within the EA. In effect, the methodology is based on the implicit assumption that the EA is the relevant geographic market, so that each carrier with assigned numbers in the EA is competing head to head with all other carriers operating in the EA. However, to the extent that carriers have different coverage areas that do not overlap, not all carriers with assigned numbers in an EA are in fact direct competitors. The implication is that the HHIs for EAs will tend to understate systematically the actual level of market concentration because the underlying geographic market definition is overly broad. On the other hand, there may be factors that would cause the relevant geographic market to be broader.

<sup>88</sup> For instance, in the Commission's review of the transfers and assignments of mobile wireless licenses, it has typically used CMAs as the relevant geographic market for calculating HHIs.

<sup>89</sup> See Appendix A, Table A-3, *infra*. The simple mean (not weighted by population) is 3073.

<sup>90</sup> See *Twelfth Report*, 23 FCC Rcd at 2267, ¶ 52.

**Table 3: Trends in Mobile Telephone Market Concentration**

	Herfindahl-Hirschman Index		
	<i>Thirteenth Report</i>	<i>Twelfth Report</i>	<i>Eleventh Report</i>
Year	2007	2006	2005
Average	2674	2674	2706
High	6272	6551	9042
Low	1795	1609	1605

Source: Federal Communications Commission Estimates

47. In interpreting these HHIs, it is important to note that the number of competitors a market can support depends on two key factors: (1) the size of the market; and (2) the minimum efficient scale (MES) of production, which is defined as the level of output at which economies of scale are fully exploited. In industries where economies of scale are significant and the MES is large relative to the demand for the relevant product or service, the market has room for only a small number of firms operating at the lowest possible cost.

48. In light of the impact of scale economies and demand in determining the level of market concentration, it is noteworthy that the estimated values of HHIs for EAs tend to increase as the EA population declines. In other words, consistent with the theoretical considerations noted above, market concentration tends to be higher in EAs with a smaller potential subscriber base. For example, the EA with the highest HHI value (EA 121) is also the least populated EA. However, apart from differences in population size, EAs also vary significantly with regard to other important determinants of market demand and cost, including factors such as per capita income, population density, urbanization, the age distribution of the population, and the size and composition of the business sector.<sup>91</sup> A regression analysis of data at the EA level indicates that, consistent with economic theory, concentration in the mobile telephone market (measured by HHI) declines with increases in market size, population density, per capita income and percentage of the population living in urban areas.<sup>92</sup>

#### 4. International Comparison of Mobile Market Concentration

49. A cross-country comparison of national-level HHIs from Merrill Lynch shows that the United States has the least concentrated mobile telephone market among comparable countries in Western Europe and the Asia Pacific region.<sup>93</sup> However, the Merrill Lynch estimate of HHI for the United States (2180) tends to understate concentration in the U.S. mobile market because it is calculated based on the assumption that there is a single nationwide geographic market, and the market participants include the four nationwide providers plus a fifth provider whose subscriber market share is a residual reflecting the subscribers of all the remaining regional and local providers. On the other hand, estimates of HHI for the

<sup>91</sup> The average cost of serving a given market tends to decline with higher population density and urbanization because high concentrations of subscribers make it easier for operators to provide adequate coverage with less infrastructure deployment. See Eugence C. Signorini, *Wireless Coverage in the United States: Leaving a Lot to Be Desired*, THE YANKEE GROUP REPORT, Vol. 1, No. 11, Aug. 2000, at 8.

<sup>92</sup> Federal Communications Commission analysis, September 2008.

<sup>93</sup> Merrill Lynch, *Interactive Global Wireless Matrix 4Q07*.

United States at the EA level may tend to overstate concentration in the U.S. mobile market relative to foreign mobile markets because the size of the market as measured by total population is, on average, much lower in the EAs than in the foreign countries included in this *Report's* cross-country comparison.<sup>94</sup> Nevertheless, even if we rely on the average value of the HHIs weighted by EA population reported above (2674) for the purpose of conducting a cross-country comparison of mobile market concentration, we find that, on average, concentration is lower in the U.S. mobile telephone market than in comparable mobile markets in Western Europe and the Asia Pacific region with the exception of the mobile market in the United Kingdom (2260).

**Table 4: Mobile Market Structure in Selected Countries**

Country	HHI	Number of Competitors	Top 2 Share (%)
USA	2180	4+	53.2
Australia	3230	4	74.8
Canada	3110	3	68.1
Finland	3580	3	79.0
France	3400	3	78.3
Germany	2990	4	71.9
Italy	3130	4	73.9
Japan	3630	3	78.4
Sweden	3420	4	76.4
UK	2260	5	49.7

Source: *Interactive Global Wireless Matrix 4Q07*.

50. The relatively low level of concentration in the UK mobile market reflects the presence of five national operators and the roughly equal market shares of the top four operators.<sup>95</sup> The higher levels of concentration in the other Western European countries and Japan reflect two factors. One is the smaller number of competitors per market, with four national operators in Germany, Italy and Sweden and three national operators in France, Finland and Japan. Second, each market tends to be dominated by the top two competitors, which have a combined market share ranging from nearly 72 percent in Germany to approximately 78-79 percent in France, Finland and Japan.<sup>96</sup>

### C. Consolidation and Exit

51. Consolidation and exit of service providers, whether through secondary market transactions or bankruptcy, may affect the structure of the mobile telecommunications market. A reduction in the number of competing service providers due to consolidation or exit may increase the

<sup>94</sup> Using Merrill Lynch estimates of population in the foreign countries included in the cross-country comparison, we estimate that the average population in the foreign countries is about 51 million, while the average population in the EAs is only about 1.75 million.

<sup>95</sup> Merrill Lynch, *Interactive Global Wireless Matrix 4Q07*.

<sup>96</sup> *Id.*

market power of any given service provider, which in turn could lead to higher prices, fewer services, and/or less innovation. However, consolidation does not always negatively impact consumers. Consolidation in the mobile telecommunications market may enable providers to achieve economies of scale and increased efficiencies compared to smaller operators.<sup>97</sup> If the cost savings generated by consolidation give the newly enlarged provider the ability and the incentive to compete more aggressively, consolidation could result in lower prices and new and innovative services for consumers.<sup>98</sup> Moreover, it is unlikely that competitive harm will result from consolidation among service providers licensed to operate in separate geographic markets, as such consolidation does not result in the merger of direct competitors.

52. As previously noted, currently four nationwide facilities-based mobile telephone providers operate in the United States.<sup>99</sup> In many cases, these carriers built nationwide footprints<sup>100</sup> through various forms of transactions.<sup>101</sup> Many nationwide operators continue to seek to fill in gaps in their coverage areas, as well as to increase the capacity of their existing networks.<sup>102</sup> As the Commission has previously concluded, operators with larger footprints can achieve economies of scale and increased efficiencies compared to operators with smaller footprints.<sup>103</sup> Since the writing of the *Twelfth Report*, a number of transactions between market participants have been completed or announced. The largest of these transactions are discussed below.

53. *AT&T/Dobson*: Following the Commission's approval,<sup>104</sup> in November 2007 AT&T acquired Dobson Communications Corporation ("Dobson").<sup>105</sup> In June 2007, AT&T announced that it would acquire Dobson for approximately \$2.8 billion in cash.<sup>106</sup> Dobson, with 1.7 million subscribers, marketed wireless service under the Cellular One brand name.<sup>107</sup> Dobson's GSM network covers rural and suburban areas in Alaska, Arizona, Illinois, Kansas, Kentucky, Maryland, Michigan, Minnesota,

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<sup>97</sup> See Section III.B.3, Concentration Measures for Mobile Telephone Services, *supra*, and Section III.D.2, Non-Regulatory Barriers to Entry, *infra*, for a fuller discussion of how economies of scale may affect market structure.

<sup>98</sup> See Jonathan B. Baker, *Developments in Antitrust Economics*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol. 13, No. 1, Winter 1999, at 182.

<sup>99</sup> See Section III.A.1, Facilities-Based Mobile Telephone Providers, *supra*.

<sup>100</sup> 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.

<sup>101</sup> The Commission must consent to the transfer of control or assignment of all non pro-forma spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

<sup>102</sup> See, e.g., Section III.D.1.c(iv), 700 MHz Band, *supra*.

<sup>103</sup> See *Seventh Report*, 17 FCC Rcd at 12997. One study found bigger companies get better equipment prices because of their size. Shawn Young, *As Wireless Firms Grow, So Can Costs*, WALL STREET JOURNAL, Apr. 29, 2004, at B4. However, the study also found that the cost of signing up new customers increases as wireless companies get bigger.

<sup>104</sup> Applications of AT&T Inc. and Dobson Communications Corporation For Consent to Transfer Control of Licenses and Authorizations, *Memorandum Opinion and Order*, 22 FCC Rcd 20295, 20296 ¶ 2 (2007) ("*AT&T-Dobson Order*").

<sup>105</sup> AT&T, *AT&T Inc. 2007 Annual Report*, at 30, available at [http://www.att.com/Investor/ATT\\_Annual/downloads/07\\_ATTar\\_FullFinalAR.pdf](http://www.att.com/Investor/ATT_Annual/downloads/07_ATTar_FullFinalAR.pdf) (last visited Dec. 15, 2008).

<sup>106</sup> *AT&T to Acquire Dobson Communications, Expand Wireless Coverage*, News Release, Dobson, June 29, 2007.

<sup>107</sup> *Id.*

Missouri, New York, Ohio, Oklahoma, Pennsylvania, Texas, Virginia, West Virginia, and Wisconsin.<sup>108</sup> Through the acquisition, AT&T expects to realize significant annual savings in reduced roaming expenses, as well as cost savings for the combined companies in areas such as overhead and operations.<sup>109</sup>

54. The Commission consented to the merger with conditions on November 15, 2007.<sup>110</sup> Specifically, the Commission concluded that the companies had demonstrated that the merger was generally in the public interest.<sup>111</sup> But the Commission also found that the merger did have the potential to cause competitive harm in four markets. Accordingly, divestiture of the licenses and related operational and network assets was required in those markets.<sup>112</sup>

55. *AT&T/Aloha*: Following the Commission's approval,<sup>113</sup> AT&T announced on February 13, 2008, that it completed its acquisition of spectrum licenses in the 700 MHz band covering 196 million people in 281 license areas from a subsidiary of Aloha Partners.<sup>114</sup> Previously, AT&T announced that it agreed to pay approximately \$2.5 billion in cash for the licenses.<sup>115</sup> According to AT&T, Aloha's spectrum covers 72 of the top 100 major metropolitan areas and all of the top 10 markets in the U.S.<sup>116</sup> In addition, AT&T believes that the transaction will enhance AT&T's spectrum position by adding 12 megahertz of spectrum covering 196 million people in 281 markets.<sup>117</sup> According to Forrest Miller, group president-corporate strategy and development, "The addition of Aloha's spectrum will facilitate AT&T's ability to continue to meet increasing customer demand for mobile services."

56. *T-Mobile/Suncom*: Following the Commission's approval,<sup>118</sup> T-Mobile announced on February 22, 2008, that it completed its acquisition of SunCom Wireless Holdings, Inc. ("SunCom"), adding 1.1 million customers in North Carolina, South Carolina, Tennessee, Georgia, Puerto Rico, and the U.S. Virgin Islands.<sup>119</sup> Previously, T-Mobile had announced that it agreed to pay approximately \$2.4 billion in cash and assumed debt for SunCom.<sup>120</sup> According to T-Mobile, the company expects to realize

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<sup>108</sup> *Id.*

<sup>109</sup> *Id.*

<sup>110</sup> *AT&T-Dobson Order* ¶ 3.

<sup>111</sup> *Id.*

<sup>112</sup> *Id.* ¶ 88.

<sup>113</sup> Application of Aloha Spectrum Holdings Company LLC (Assignor) and AT&T Mobility II LLC (Assignee) Seeking FCC Consent For Assignment of Licenses and Authorizations, *Memorandum Opinion and Order*, 23 FCC Rcd 2234, 2337 ¶ 13 (2008).

<sup>114</sup> *AT&T Completes Acquisition of Wireless Spectrum from Aloha Partners; Acquisition to Enhance AT&T's Ability to Meet Customer Demand for Mobile Services*, News Release, AT&T, Feb. 13, 2008.

<sup>115</sup> *AT&T Acquires Wireless Spectrum from Aloha Partners*, News Release, AT&T, Oct. 9, 2007.

<sup>116</sup> *AT&T Completes Acquisition of Wireless Spectrum from Aloha Partners; Acquisition to Enhance AT&T's Ability to Meet Customer Demand for Mobile Services*, News Release, AT&T, Feb. 13, 2008.

<sup>117</sup> *Id.*

<sup>118</sup> Applications of T-Mobile USA, Inc. and SunCom Wireless Holdings, Inc. For Consent to Transfer Control of Licenses and Authorizations and Petition for Declaratory Ruling that the Transaction is Consistent with Section 310(b)(4) of the Communications Act, *Memorandum Opinion and Order*, 23 FCC Rcd 2515, 2526 ¶ 27 (2008).

<sup>119</sup> *T-Mobile USA Completes Acquisition of SunCom Wireless*, News Release, T-Mobile, Feb. 22, 2008.

<sup>120</sup> *T-Mobile Agrees to Acquire SunCom Wireless to Expand Network and Industry-Leading Customer Service to the Southeastern United States, Puerto Rico and U.S. Virgin Islands*, News Release, T-Mobile, Sept. 17, 2007.

synergies with a net present value of approximately \$1 billion through reduced roaming and operating expenses.<sup>121</sup> The company also expects further upside growth opportunities through the addition of new markets.<sup>122</sup>

57. *Verizon Wireless/Rural Cellular*: Following the Commission's approval,<sup>123</sup> Verizon Wireless announced on August 7, 2008, that it acquired Rural Cellular Corporation ("Rural Cellular") for approximately \$2.66 billion in cash and assumed debt.<sup>124</sup> According to Verizon Wireless, the transaction increases Verizon Wireless's licensed coverage area by 4.7 million people, and Verizon Wireless is acquiring licenses that cover markets in Maine, New Hampshire, Massachusetts, Alabama, Mississippi, Minnesota, North Dakota, South Dakota, Wisconsin, Idaho, Washington, and Oregon.<sup>125</sup> Rural Cellular had used both CDMA and GSM technology separately across its markets.<sup>126</sup> Verizon Wireless notes that it plans to deploy CDMA technology in Rural Cellular's existing GSM markets and convert the GSM customers to CDMA service, while simultaneously maintaining Rural Cellular's existing GSM networks to provide roaming services to other GSM customers.<sup>127</sup> Verizon Wireless expects to realize more than \$1 billion in cost savings through reduced roaming and operations expenses.<sup>128</sup>

58. The Commission consented to the merger with conditions on July 31, 2008.<sup>129</sup> Specifically, the Commission concluded that the companies had demonstrated that the merger was generally in the public interest.<sup>130</sup> However, the Commission also found that the merger did have the potential to cause competitive harm in six markets. Accordingly, it required divestiture of the licenses and related operational and network assets in those markets.<sup>131</sup>

59. *Sprint Nextel/Clearwire*: Sprint Nextel and Clearwire Corporation announced on May 7, 2008 that they agreed to combine their "next-generation wireless broadband businesses" to form a new wireless communications company, which will use the name Clearwire.<sup>132</sup> According to Sprint Nextel, the new company will focus on expediting the deployment of the first nationwide mobile WiMAX

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<sup>121</sup> *Id.*

<sup>122</sup> *Id.*

<sup>123</sup> Applications of Cellco Partnership d/b/a Verizon Wireless and Rural Cellular Corporation, for Consent to Transfer Control of Licenses, Authorizations, and Spectrum Manager Leases, and Petitions for Declaratory Ruling that the Transaction is Consistent with Section 310(b)(4) of the Communications Act, WT Docket No. 07-208, *Memorandum Opinion and Order and Declaratory Ruling*, FCC 08-181, ¶ 3 (2008) ("*Verizon-RCC Order*").

<sup>124</sup> *Verizon Wireless Completes Purchase Of Rural Cellular; Acquisition Will Expand Nation's Most Reliable Wireless Network to Many Rural Markets*, News Release, Verizon Wireless, Aug. 7, 2008.

<sup>125</sup> *Id.*

<sup>126</sup> *Verizon Wireless to Acquire Rural Cellular Corporation, Expand the Nation's Most Reliable Wireless Network*, News Release, Verizon Wireless, July 30, 2007.

<sup>127</sup> *Verizon Wireless Completes Purchase Of Rural Cellular; Acquisition Will Expand Nation's Most Reliable Wireless Network to Many Rural Markets*, News Release, Verizon Wireless, Aug. 7, 2008.

<sup>128</sup> *Id.*

<sup>129</sup> *Verizon-RCC Order* ¶ 3.

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

<sup>132</sup> *Sprint and Clearwire to Combine WiMAX Businesses, Creating a New Mobile Broadband Company*, News Release, Sprint Nextel, May 7, 2008.

network, and the speed and manner in which customers access the Internet will be improved.<sup>133</sup> Sprint Nextel and Clearwire also announced that Intel Corporation, Google Inc., Comcast Corporation, Time Warner Cable Inc., and Bright House Networks have collectively agreed to invest \$3.2 billion into the new company.<sup>134</sup> This investment was based on a target price of \$20.00 per share of Clearwire's common stock, subject to a post-closing adjustment.<sup>135</sup> In addition, Trilogy Equity Partners, led by John Stanton, will invest directly in the new Clearwire's common stock.<sup>136</sup> Sprint Nextel states that the new Clearwire expects to offer mobile wireless Internet services on new devices that will use integrated WiMAX chipsets and an open architecture.<sup>137</sup> On June 24, 2008, the Commission placed their applications on Public Notice for comment.<sup>138</sup>

60. The Commission approved the Sprint Nextel/Clearwire transaction on November 4, 2008.<sup>139</sup> The Commission conditioned its approval of the transaction on Sprint Nextel's compliance with a voluntary commitment to phase out its requests for federal high-cost universal service support over a five-year transition period and with a voluntary commitment to use counties for measuring compliance with the Commission's wireless E911 location accuracy rules governing handset-based technologies.<sup>140</sup> The companies closed their transaction on November 28, 2008.<sup>141</sup>

61. *Verizon Wireless/Alltel*: Verizon Wireless announced on June 5, 2008, that it agreed to acquire the equity of Alltel for approximately \$5.9 billion, and that based on Alltel's projected net debt at closing of \$22.2 billion, the aggregate value of the transaction is \$28.1 billion.<sup>142</sup> Alltel serves more than 13 million customers in markets in 34 states, including 57 primarily rural markets that Verizon Wireless does not serve.<sup>143</sup> Verizon Wireless claims that it expects to realize synergies with a net present value, after integration costs, of more than \$9 billion driven by reduced capital and operating expense savings.<sup>144</sup> Verizon Wireless believes that the synergies of the merger will generate incremental cost savings of \$1 billion in the second year after closing.<sup>145</sup> According to Lowell McAdam, Verizon Wireless president and chief executive officer, the transaction "will create an enhanced platform of network coverage, spectrum and customer care to better serve the growing needs of both Alltel and Verizon Wireless customers for

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<sup>133</sup> *Id.*

<sup>134</sup> *Id.*

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> Sprint Nextel, Corporation and Clearwire Corporation Seek FCC Consent to Transfer Control of Licenses and Authorizations, *Public Notice*, WT Docket No. 08-94, DA 08-1477, (rel. June 24, 2008).

<sup>139</sup> See *Sprint Nextel/Clearwire Order*, FCC 08-259 at ¶ 128.

<sup>140</sup> *Id.* at ¶¶ 108 & 112.

<sup>141</sup> *Clearwire Completes Landmark Transaction with Sprint Nextel to Combine 4G Mobile WiMAX Businesses; Clearwire Receives \$3.2 Billion Cash Investment from Comcast, Intel, Time Warner Cable, Google and Bright House Networks*, News Release, Clearwire Corp. (Nov. 28, 2008).

<sup>142</sup> *Verizon Wireless To Acquire Alltel; Will Expand Nation's Most Reliable Wireless Network*, News Release, Verizon Wireless, June 5, 2008.

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> *Id.*

reliable basic and advanced broadband wireless services.”<sup>146</sup> Verizon Wireless and Alltel filed a series of applications to seek Commission approval of their transaction. On June 25, 2008, the Commission placed their applications on Public Notice for comment.<sup>147</sup>

62. The Commission approved the Verizon Wireless/Alltel transaction on November 4, 2008.<sup>148</sup> The Commission conditioned its approval of the transaction on the companies divesting the licenses and related operational and network assets in five markets where the Commission found potential for competitive harm.<sup>149</sup> The Commission also conditioned the transaction on the companies’ voluntary commitment to divest the licenses and related operational and network assets in 100 markets and on Verizon Wireless’s voluntary commitments on roaming.<sup>150</sup> Finally, the Commission conditioned its approval of the transaction on Verizon Wireless’s compliance with a voluntary commitment to phase out its requests for federal high-cost universal service support over a five-year transition period and with a voluntary commitment to use counties for measuring compliance with the Commission’s wireless E911 location accuracy rules governing handset-based technologies.<sup>151</sup> The companies closed their transaction on January 9, 2009.<sup>152</sup>

#### **D. Entry Conditions and Potential Barriers to Entry**

63. Market concentration is necessary, but not sufficient, for unilateral or coordinated anti-competitive behavior to occur. If entry into a market is easy, then entry or the threat of entry may prevent incumbent operators from exercising market power, either collectively or unilaterally, even in highly concentrated markets.<sup>153</sup> The ease or difficulty of entry generally depends on the nature and significance of entry barriers. Barriers to entry in the mobile telecommunications market may include government regulation of access to spectrum and various non-regulatory entry barriers such as economies of scale. In the following sections, we first address access to spectrum, and then we discuss potential non-regulatory barriers to entry.

##### **1. Spectrum Access**

64. In this section, we first discuss the impact of the Commission’s spectrum management policies on entry conditions in the mobile telecommunications market. We then provide an analysis of the outcomes of recent auctions. Finally, we identify and discuss the various spectrum bands that can be

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<sup>146</sup> *Id.*

<sup>147</sup> Verizon Wireless and Atlantis Holdings LLC Seek FCC Consent to Transfer Licenses, Spectrum Manager and *De Facto* Transfer Leasing Arrangements, and Authorizations, and Request a Declaratory Ruling on Foreign Ownership, *Public Notice*, WT Docket No. 08-95, DA 08-1481, (rel. June 25, 2008).

<sup>148</sup> Applications of Cellco Partnership d/b/a Verizon Wireless and Atlantis Holdings LLC For Consent to Transfer Control of Licenses, Authorizations, and Spectrum Manager and *De Facto* Transfer Leasing Arrangements and Petition for Declaratory Ruling that the Transaction is Consistent with Section 310(b)(4) of the Communications Act, WT Docket No. 08-95, *Memorandum Opinion and Order*, FCC 08-258, ¶ 233 (rel. Nov. 10, 2008) (“*Verizon Wireless/Alltel Order*”).

<sup>149</sup> *Id.* at ¶¶ 100-106.

<sup>150</sup> *See id.* at ¶¶ 157 & 233, 178-181.

<sup>151</sup> *Id.* at ¶¶ 197 & 201.

<sup>152</sup> *Verizon Wireless Completes Purchase of Alltel; Creates Nation’s Largest Wireless Carrier*, News Release, Verizon Wireless, Jan. 9, 2009.

<sup>153</sup> *See DOJ/FTC Guidelines* at §3.0; *see also* Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3<sup>rd</sup> ed.), Addison, Wesley, Longman, Inc., 1999, at 77.

used for the provision of CMRS.

**a. Spectrum Policy and Entry Conditions**

65. Government control of spectrum allocation and assignment has the potential to create a barrier to entry into markets for mobile communications services by limiting the amount of spectrum allocated to CMRS and by requiring providers to obtain a government-issued license in order to use such spectrum for the provision of CMRS.<sup>154</sup> However, the Commission has reduced any potential entry-limiting effects of government-controlled spectrum allocation and assignment through various policies. First, as discussed in greater detail below, the Commission has progressively increased the amount of spectrum available for the provision of CMRS. For example, beginning in the mid-1990s, the allocation of 120 megahertz of spectrum to broadband PCS and the assignment of broadband PCS spectrum licenses through auction ended the cellular duopoly by facilitating the entry of new mobile telephone service providers. More recently, the auction of licenses for spectrum allocated to AWS in 2006 raised the total amount of spectrum made available for CMRS by an additional 90 megahertz, and the auction of 700 MHz band licenses in 2008 added another 62 megahertz to the amount of spectrum made available for CMRS.<sup>155</sup> Moreover, the current transition of the BRS/EBS spectrum band has further increased the amount of spectrum available for CMRS. The impact of the recent 700 MHz band auction on spectrum-related entry barriers is analyzed in the following section.

66. Second, the Commission has progressively implemented a more flexible, market-oriented model of spectrum allocation and assignment for spectrum used to provide commercial mobile services. For example, initially spectrum policy restricted the use of cellular spectrum to analog service and created an absolute barrier to entry by limiting the number of cellular entrants to two in each local market. In contrast, current policy allows market forces to play a greater role in determining the number of entrants in each local market for mobile telephone service, and affords licensees greater flexibility to decide which services to offer and what technologies to deploy on spectrum used for the provision of CMRS. For example, licensees have the flexibility to deploy next-generation wireless technologies that allow them to offer high-speed mobile data services using their existing CMRS spectrum.<sup>156</sup>

67. Finally, subject to the Commission's approval, CMRS licensees may buy and sell licenses, in whole or in part, on the secondary market. As noted in the *Ninth Report*, beginning in 2003 the Commission implemented its secondary markets policies which permit CMRS licensees to lease all or a portion of their spectrum usage rights for any length of time within the license term, and over any geographic area encompassed by the license.<sup>157</sup> The cumulative effect of these flexible, market-oriented spectrum policies has been to help reduce any entry barriers that may arise from government regulation of spectrum.

**b. Recent Spectrum Auctions**

68. The results of the recent auctions indicate that the Commission's spectrum allocation and assignment policies have helped minimize spectrum-related entry barriers. The largest auction conducted

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<sup>154</sup> See, e.g., Thomas W. Hazlett, *The Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's "Big Joke"*, Working Paper 01-01, AEI-Brookings Joint Center for Regulatory Studies, Jan. 2001; *Spectrum Framework Review: Implementation Plan*, Consultation Document, Office of Communications, Jan. 13, 2005, at 77 and 81-82.

<sup>155</sup> Portions of the lower 700 MHz band were auctioned previously in Auctions 44, 49, and 60. See *Tenth Report*, 20 FCC Rcd at 15940, ¶ 80.

<sup>156</sup> 47 C.F.R. § 24.3.

<sup>157</sup> *Ninth Report*, 19 FCC Rcd at 20631, ¶ 84.

since the release of the *Twelfth Report* was the Commission's auction of 700 MHz band licenses (Auction 73) that closed on March 18, 2008.<sup>158</sup> As a result of this auction, a diverse mix of new entrants and small regional and rural providers as well as nationwide providers succeeded in acquiring access to spectrum needed to deploy the next generation of wireless networks.<sup>159</sup> New entrant Frontier Wireless LLC, which is owned by Dish Network, won 168 licenses to establish a near nationwide footprint. More generally, 72 of the 101 winning bidders were new entrants who won a total of 675 licenses. In addition, small and rural providers won spectrum that almost covers the entire United States. Nationwide providers AT&T and Verizon Wireless also acquired spectrum licenses in this auction. Moreover, Verizon Wireless submitted the winning bids for seven of the twelve licenses in a block of spectrum (the C Block) that is subject to new open platform conditions which require that C Block licensees "allow customers, device manufacturers, third-party application developers, and others to use or develop the devices and applications of their choosing in C Block networks, so long as they meet all applicable regulatory requirements and comply with reasonable conditions related to management of the wireless network (*i.e.*, do not cause harm to the network)."<sup>160</sup> In addition, C Block licensees "may not block, degrade, or interfere with the ability of end users to download and utilize applications of their choosing on the licensee's C Block network, subject to reasonable network management."<sup>161</sup> Nevertheless, 69 percent of the licenses were won by bidders other than the nationwide wireless incumbents, and a bidder other than a nationwide incumbent provider won a license in every market. In considering the results from Auction 66 described in the *Twelfth Report*<sup>162</sup> and the results from Auction 73 described above, we find that the results of both auctions support the notion that the Commission's spectrum allocation and assignment policies do not create an effective barrier to entry into the U.S. mobile telecommunications market.

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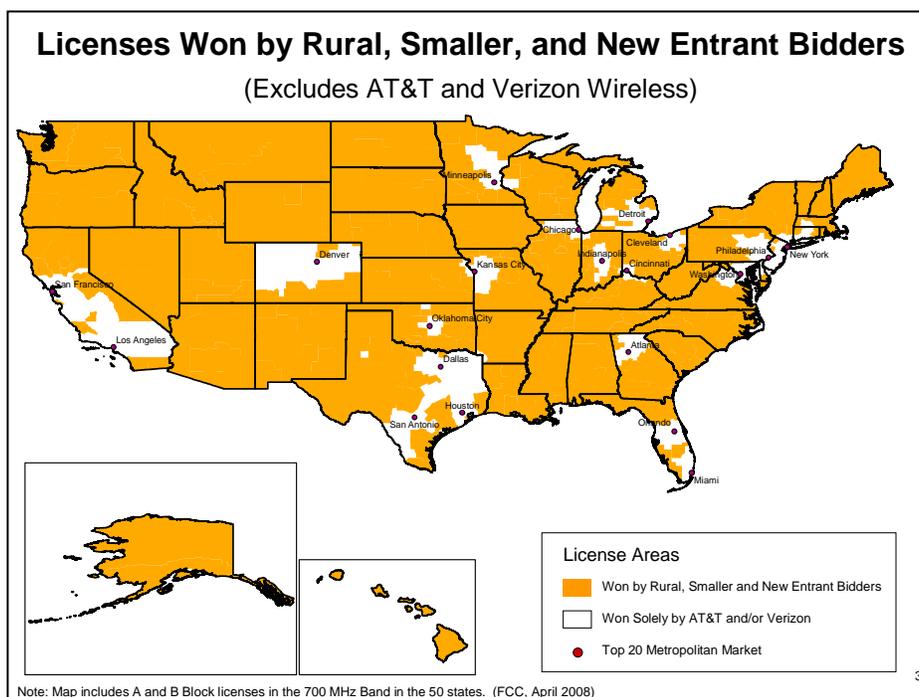
<sup>158</sup> Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73, *Public Notice*, Report No. AUC-08-73-I (Auction 73), DA 08-595 (rel. Mar. 20, 2008) ("*Auction 73 Closes Public Notice*").

<sup>159</sup> In total, 101 bidders won 1,090 licenses. While Auction 73 did not produce a successful bidder for the D Block of spectrum that was part of the Public Safety/Private Partnership, the Commission has issued *Further Notices of Proposed Rulemaking* reflecting its commitment to finding a solution that will facilitate a nationwide interoperable broadband network for public safety. The future auction of the D Block is discussed in Section III.D.1.c(iv), 700 MHz Band, *infra*.

<sup>160</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15360, ¶ 206.

<sup>161</sup> *Id.*

<sup>162</sup> See *Twelfth Report*, 23 FCC Rcd at 2274, ¶ 75.

**Map 3: 700 MHz Band Licenses Won by Rural, Smaller and New Entrant Bidders**

Source: Federal Communications Commission

### c. Spectrum Bands Potentially Available for Terrestrial CMRS

69. Currently, mobile telephone operators primarily use three types of spectrum licenses to provide mobile voice and, in most cases, mobile data services: cellular, broadband PCS, and SMR.<sup>163</sup> Initially, the Commission authorized up to eight different mobile telephone licenses (two cellular and six broadband PCS) in every geographical area of the country.<sup>164</sup> In addition, there are other bands – including, 700 MHz, 1710-1755/2110-2155 MHz (AWS-1), 2500-2690 MHz (BRS/EBS), 2.3 GHz (WCS), 1670-1675 MHz, and 901-902 MHz (Narrowband PCS) – that are licensed under the Commission’s flexible Part 27 or Part 24 rules and can be used to provide CMRS services.<sup>165</sup> Under

<sup>163</sup> See Appendix B, Table B-1, and Maps B-45 to B-49, *infra*, for descriptions and maps of various geographical licensing schemes employed by the Commission.

<sup>164</sup> As a result of partitioning and disaggregation, there often are more than eight cellular and broadband PCS licenses in a market. However, in a few areas, there may be fewer than eight active licenses because certain auction winners or licensees have defaulted on payments to the Commission, because some licensees did not meet their buildout requirements, some licensees returned their licenses, or some licenses remained unsold in an auction.

<sup>165</sup> The discussion in this *Report* is to be distinguished from the identification of the relevant spectrum input markets in the context of Commission review of individual wireless license transfers and assignments. For example, in wireless transactions, the Commission includes, in its evaluation of potential competitive harm, spectrum in particular bands that is “suitable” for the provision of services in a relevant product market. See *Applications of AT&T Inc. and Dobson Communications Corporation, Memorandum Opinion and Sprint Nextel/Clearwire Order*, FCC 07-19608-259, at 17 ¶ 26 (rel. Nov. 19, 2007) ¶ 53; *Verizon Wireless/Alltel Order*, FCC 08-258, at ¶ 53 (continued....)

Commission rules, many licensees may disaggregate (divide the spectrum into smaller amounts of bandwidth) or partition (divide the license into smaller geographical areas) their licenses, or both, to other entities.<sup>166</sup> Many licensees hold more than one license in a particular market.<sup>167</sup> We discuss in more detail below spectrum bands potentially available for terrestrial CMRS. Band plan diagrams for each spectrum band depict where the frequencies are located. Spectrum described in this section may be used for a variety of CMRS products including narrowband data services as well as mobile telephony, broadband data and mobile video services. In addition to the 643 megahertz of terrestrial spectrum described in this section, there is an additional 157.7 megahertz of mobile satellite spectrum available for CMRS voice and data services.

(Continued from previous page) \_\_\_\_\_

(“[S]uitability is determined by whether the spectrum is capable of supporting mobile service given its physical properties and the state of equipment technology, whether the spectrum is licensed with a mobile allocation and corresponding service rules, and whether the spectrum is committed to another use that effectively precludes its uses for mobile telephony/broadband service.”)

<sup>166</sup> 47 C.F.R. §§ 27.15.

<sup>167</sup> While no longer in operation, at one time the Commission’s CMRS spectrum cap restricted the distribution of certain spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR spectrum in an MSA, or more than 55 megahertz in an RSA. In November 2001, however, the Commission decided to raise the spectrum cap to 55 megahertz in all markets effective February 13, 2002, and to eliminate the restriction entirely effective January 1, 2003. *See* 67 Fed. Reg. 1626 (Jan. 14, 2002).

**Table 5: Spectrum Bands Potentially Available for Terrestrial CMRS**

Spectrum Band	Megahertz
Cellular	50
SMR*	14
Broadband PCS	120
1910-15/1990-95 MHz**	10
700 MHz	84
AWS-1	90
AWS – II & III***	40
BRS/EBS****	194
WCS	30
1670-1675 MHz	5
Narrowband Spectrum	6
Total	643

\* Post 800 MHz Band Reconfiguration ESMR spectrum at 817-824 MHz and 862-869 MHz.

\*\* Held by Sprint Nextel as a result of the 800 MHz Band Reconfiguration.

\*\*\* These bands have been designated for AWS.

\*\*\*\* BRS/EBS spectrum is calculated based on the post-transition band plan described in 47 C.F.R. §27.5(i)(2). EBS licenses must be held by educational institutions; however, EBS licensees can lease a significant portion of their spectrum to commercial operators.

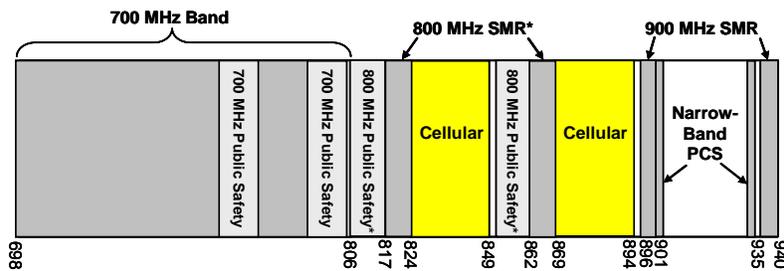
### (i) Cellular

70. The Commission began licensing commercial cellular providers in 1982 and completed licensing the majority of operators by 1991. The Commission divided the United States and its possessions into 734 cellular market areas (“CMAs”), including 305 Metropolitan Statistical Areas (“MSAs”), 428 Rural Service Areas (“RSAs”), and a market for the Gulf of Mexico.<sup>168</sup> Two cellular systems were licensed in each market area. The Commission designated 50 megahertz of spectrum in the 800 MHz frequency band for the two competing cellular systems in each market (25 megahertz for each system). Initially, cellular systems offered service using analog technology, but today most of the service offered using cellular spectrum is digital.<sup>169</sup>

<sup>168</sup> Under the original cellular licensing rules, one of the two cellular channel blocks in each market (the B block) was awarded to a local wireline carrier, while the other block (the A block) was awarded competitively to a carrier other than a local wireline incumbent. After awarding the first 30 MSA licenses pursuant to comparative hearing rules, the Commission adopted rules in 1984 and 1986 to award the remaining cellular MSA and RSA licenses through lotteries. By 1991, lotteries had been held for every MSA and RSA, and licenses were awarded to the lottery winners in most instances. In some RSA markets, however, the initial lottery winner was disqualified from receiving the license because of a successful petition to deny or other Commission action. Implementation of Competitive Bidding Rules to License Certain Rural Service Areas, *Report and Order*, 17 FCC Rcd 1960, 1961-62 (2002). In 1997, the Commission auctioned cellular spectrum in areas unbuilt by the original cellular licensees. See FCC, *Auction 12: Cellular Unserved*, <http://wireless.fcc.gov/auctions/12> (last visited Oct. 2, 2008). In 2002, the Commission auctioned three RSA licenses where the initial lottery winner had been disqualified. See FCC, *Auction 45: Cellular RSA*, <http://wireless.fcc.gov/auctions/45> (last visited Oct. 2, 2008).

<sup>169</sup> See Section VI.B.1, Subscriber Growth, *infra*.

## 698-940 MHz: Cellular Spectrum



## (ii) Broadband PCS

71. Broadband PCS is similar to cellular service, except that broadband PCS systems operate in different spectrum bands and have been designed from the beginning to use a digital format. Broadband PCS licenses have been assigned through auction, beginning in 1995.<sup>170</sup> The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephone services, divided originally into three blocks of 30 megahertz each (blocks A, B, and C) and three blocks of 10 megahertz each (blocks D, E, and F).<sup>171</sup> Two of the 30 megahertz blocks (A and B blocks) are assigned on the basis of 51 Major Trading Areas (“MTAs”).<sup>172</sup> One of the 30 megahertz blocks (C block)<sup>173</sup> and all three of the 10 megahertz blocks are assigned on the basis of 493 Basic Trading Areas (“BTAs”).<sup>174</sup>

<sup>170</sup> The first auction was for two license blocks of 30 megahertz each. FCC Grants 99 Licenses for Broadband Personal Communications Services in Major Trading Areas, *News Release*, FCC, June 23, 1995. The Commission has since had numerous additional broadband PCS auctions. See FCC, *Auctions Home*, <http://wireless.fcc.gov/auctions/> (last visited Oct. 2, 2008). Three licenses were also awarded as part of a pioneer preference program in 1994. Three Pioneer Preference PCS Applications Granted, *News Release*, FCC, Dec. 14, 1994.

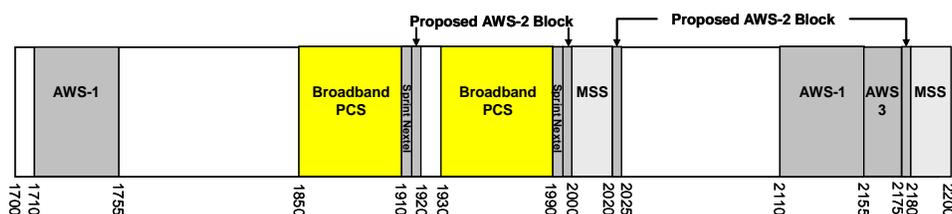
<sup>171</sup> Initially, the Commission’s broadband PCS allocation included 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS. Ten megahertz has since been allocated on a nationwide basis to Sprint Nextel. See *Improving Public Safety Communications in the 800 MHz Band, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order*, 19 FCC Rcd. 14969, 15083 (2004).

<sup>172</sup> Major Trading Areas are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with the FCC. Rand McNally’s MTA specification contains 47 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission has added three MTA-like areas: Guam and the Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands, and American Samoa. In addition, Alaska was separated from the Seattle MTA into its own MTA-like area. MTAs are combinations of two or more Basic Trading Areas.

<sup>173</sup> The Commission also has reconfigured returned C block licenses. See *Tenth Report*, 20 FCC Rcd at 15935, ¶ 71, n.150.

<sup>174</sup> Basic Trading Areas (“BTAs”) are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an agreement with the FCC. BTAs are geographic areas drawn based on the counties in which residents of a given BTA make the bulk of their shopping goods purchases. Rand McNally’s BTA specification contains 487 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission added additional BTA-like areas for: American Samoa; Guam; Northern Mariana Islands; San Juan, Puerto Rico; Mayagüez/Aguadilla-Ponce, Puerto Rico; and the U.S. Virgin Islands.

## 1700-2200 MHz: Broadband PCS Spectrum



## (iii) SMR

72. The Commission first established SMR in 1979 to provide for land mobile communications on a commercial basis. The Commission initially licensed spectrum in the 800 and 900 MHz bands for this service, in non-contiguous bands, on a site-by-site basis.<sup>175</sup> The Commission has since licensed additional SMR spectrum through auctions.<sup>176</sup> In total, the Commission has licensed 19 megahertz of SMR spectrum, plus an additional 7.5 megahertz of spectrum that is available for SMR as well as other services.<sup>177</sup> While Commission policy permits flexible use of this spectrum, including the provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,<sup>178</sup> the primary use for SMR traditionally was dispatch services.<sup>179</sup> With the development of digital technologies that increased spectral efficiency, SMR providers such as Sprint Nextel (on its iDEN network) and SouthernLINC Wireless, a unit of the energy firm Southern Company, became more significant competitors in mobile telephony, while also maintaining dispatch functionality as a part of

<sup>175</sup> The “900 MHz” SMR band refers to spectrum allocated in the 896-901 and 935-940 MHz bands; the “800 MHz” band refers to spectrum allocated in the 806-824 and 851-869 MHz bands. See 47 C.F.R. § 90.603; see also 47 C.F.R. § 90.7 (defining “specialized mobile radio system”).

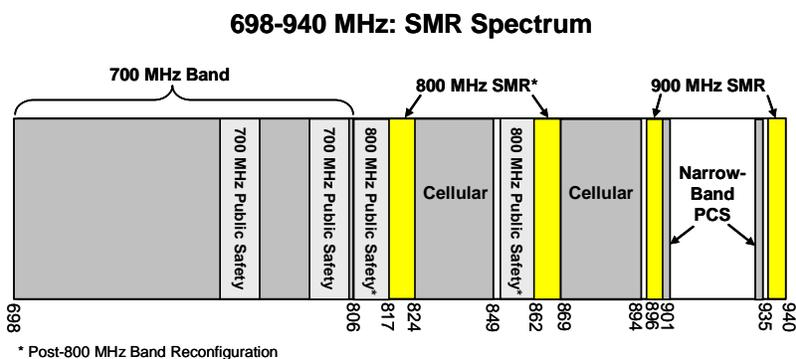
<sup>176</sup> The Commission has held multiple auctions for SMR licenses.

<sup>177</sup> There are five megahertz in the 900 MHz band (200 paired channels x 12.5 kHz/channel). See 47 C.F.R. § 90.617, Table 4B. There are 21.5 megahertz in the 800 MHz band: 14 megahertz in the 800 SMR Service (280 paired channels x 25 kHz/channel) and 7.5 megahertz in the 800 MHz General Category (150 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.615, Table 1 (SMR General Category) and 47 C.F.R. § 90.617, Table 4A (SMR Service). In 2000, the Commission amended its rules to allow Business and Industrial/Land Transportation licensees in the 800 MHz band to use their spectrum for CMRS operations under certain conditions. Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz; Petition for Rule Making of The American Mobile Telecommunications Association, *Report and Order and Further Notice of Proposed Rule Making*, 15 FCC Rcd 22709, 22760-61 (2000). This could make up to five megahertz of additional spectrum available for digital SMR providers: 2.5 megahertz in the Industrial/Land Transportation Category (50 paired channels x 25 kHz/channel) and 2.5 megahertz in the Business Category (50 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.617, Tables 2A and 3A. As discussed in Section III.D.1.c(iii)(a), 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange, *infra*, the configuration of the 800 MHz band is changing as a result of a new band plan adopted by the Commission.

<sup>178</sup> Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, *Policy Statement*, 14 FCC Rcd 19868 (1999); see also Applications of Various Subsidiaries and Affiliates of Geotek Communications, Inc., Debtor-In-Possession, Assignors, and Wilmington Trust Company or Hughes Electric Corporation, Assignees, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Memorandum Opinion and Order*, 15 FCC Rcd 790, 802 (2000).

<sup>179</sup> Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units (e.g., between a taxicab dispatch office and a taxi) or between two or more mobile units (e.g., between a car and a truck). See *Fifth Report*, 15 FCC Rcd at 17727-28, for a detailed discussion. Dispatch and SMR are often used interchangeably, although SMR refers to specific spectrum ranges.

their service offerings. Furthermore, in apparent response to the dispatch functionality of SMR services, many cellular and broadband PCS providers now offer push-to-talk (“PTT”) functionality on their networks, including Verizon Wireless, AT&T, and Alltel. SMR spectrum is also used for certain data-only networks.<sup>180</sup>



**(a) 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange**

73. On July 8, 2004, the Commission adopted a new band plan for the 800 MHz band to resolve the problem of interference to public safety radio systems operating in the band from CMRS providers operating systems on channels in close proximity to those utilized by public safety entities.<sup>181</sup> The new band plan addresses the root cause of the interference problem by separating generally incompatible technologies, with the costs of relocating 800 MHz incumbents to be paid by Sprint Nextel. To accomplish the reconfiguration, the Commission required Sprint Nextel to give up rights to certain of its licenses in the 800 MHz band and all of its licenses in the 700 MHz band. In exchange, the Commission modified Sprint Nextel’s licenses to provide the right to operate on two five-megahertz blocks in the 1.9 GHz band – specifically 1910-1915 MHz and 1990-1995 MHz – conditioned on Sprint Nextel fulfilling certain obligations specified in the Commission’s decision. As a new entrant in the 1.9 GHz band, Sprint Nextel is also obligated to fund the transition of incumbent users to comparable facilities. The Commission determined that the overall value of the 1.9 GHz spectrum is \$4.8 billion, less the cost of relocating incumbent users. In addition, the Commission decided to credit to Sprint Nextel the value of the spectrum rights that Sprint Nextel is relinquishing and the actual costs Sprint Nextel incurs to relocate all incumbents in the 800 MHz and 1.9 GHz bands. To the extent that the total of these combined credits is less than the assessed value of the 1.9 GHz spectrum rights, Sprint Nextel will make an anti-windfall payment equal to the difference to the United States Department of the Treasury at the conclusion of the relocation process.

74. Significant progress has been made reconfiguring licensees to the new 800 MHz band plan in non-border regions of the country. In addition, the Public Safety and Homeland Security Bureau released an order, on May 9, 2008, establishing a reconfigured 800 MHz band plan for U.S. licensees along the U.S. – Canada border.<sup>182</sup> Furthermore, the Commission, in conjunction with the State Department, is continuing to discuss a modified 800 MHz band plan with Mexico for U.S. licensees operating along the U.S.-Mexico border.

<sup>180</sup> See Section IV.B.1.f, Narrowband Data Networks and Technology Deployment, *infra*.

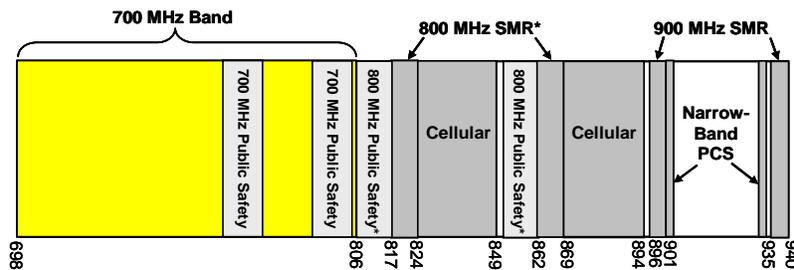
<sup>181</sup> FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio Systems, *News Release*, FCC, July 8, 2004.

<sup>182</sup> See generally Improving Public Safety Communications in the 800 MHz Band; New 800 MHz Band Plan for U.S. – Canada Border Regions, *Second Report and Order*, 23 FCC Rcd 7605 (2008).

**(iv) 700 MHz Band**

75. The 698-806 MHz band (the “700 MHz band”) is being reclaimed from use by broadcast services in connection with the transition of the analog television service to digital television (“DTV”).<sup>183</sup> The Digital Television Transition and Public Safety Act of 2005 (“DTV Act”)<sup>184</sup> set a firm deadline of February 17, 2009 for the 700 MHz band spectrum to be cleared of analog transmissions and made available for public safety and commercial services as part of the DTV transition. This spectrum is being made available for wireless services, including public safety and commercial services.<sup>185</sup> Although the DTV Act established a date certain for the DTV transition, portions of the 700 MHz band will remain encumbered by television broadcasters until the end of the transition.<sup>186</sup> Nevertheless, there are substantial portions of the band that are not so encumbered and are available for immediate use by new licensees.

76. The DTV Act also established two specific statutory deadlines for the auction of licenses for recovered spectrum in the 700 MHz band: (1) the auction was required to begin no later than January 28, 2008; and (2) the auction proceeds were required to be deposited in the Digital Television Transition and Public Safety Fund by June 30, 2008.<sup>187</sup> The Commission met both of these statutory deadlines.

**698-940 MHz: 700 MHz Band Spectrum**

77. Prior to holding the auction, the Commission revisited the rules governing the 700 MHz band in light of the DTV Act, recent developments in the market for commercial wireless communications, and the evolving needs of the public safety community for advanced broadband communications.<sup>188</sup> Specifically, in the *700 MHz Second Report and Order*, the Commission adopted a new band plan and revised certain of the service rules relating to both the commercial and public safety

<sup>183</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15291, ¶ 1.

<sup>184</sup> Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 4 (2006) (“DRA”). Title III of the DRA is the DTV Act.

<sup>185</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15291, ¶ 1 & 15295-96, ¶ 14.

<sup>186</sup> Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), *Report and Order*, 17 FCC Rcd 1022, 1028, ¶ 9 (2002) (“*Lower 700 MHz Report and Order*”).

<sup>187</sup> See DRA. Congress also extended the Commission’s auction authority to September 30, 2011. DTV Act § 3003(b).

<sup>188</sup> See *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands; Revision of the Commission’s Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems; and Section 68.4(a) of the Commission’s Rules Governing Hearing Aid-Compatible Telephones, Notice of Proposed Rule Making, Fourth Further Notice of Proposed Rule Making, and Second Further Notice of Proposed Rule Making*, 21 FCC Rcd 9345 (2006) (“*700 MHz Commercial Services Notice*”).

spectrum in the 700 MHz band.<sup>189</sup> The new band plan provided a balanced mix of geographic service area licenses and spectrum blocks sizes for the commercial spectrum to be auctioned.<sup>190</sup> Among other service rules, the Commission provided that licensees for one of the commercial blocks of spectrum in the 700 MHz band, the Upper 700 MHz C Block would be subject to an “Open Platform” condition.<sup>191</sup> Accordingly, licensees must “allow customers, device manufacturers, third-party application developers, and others to use or develop the devices and applications of their choosing in C Block networks, so long as they meet all applicable regulatory requirements and comply with reasonable conditions related to management of the wireless network (*i.e.*, do not cause harm to the network).”<sup>192</sup> In addition, C Block licensees “may not block, degrade, or interfere with the ability of end users to download and utilize applications of their choosing on the licensee’s C Block network, subject to reasonable network management.”<sup>193</sup> The Commission also took two steps to promote the rapid construction and deployment of a nationwide, interoperable broadband public safety network. First, in the public safety spectrum, the band plan established a spectrum block designated for broadband communications, the public safety broadband spectrum, and provided that the spectrum would be licensed on a nationwide basis to a non-profit entity (the Public Safety Broadband Licensee) representative of the public safety community in accordance with a specific selection process.<sup>194</sup> Second, the Commission established a block in the commercial spectrum, the Upper 700 MHz D Block (“D Block”), to be licensed on a nationwide basis to a single entity, and required the winning bidder for the D Block to enter into a public/private partnership with the Public Safety Broadband Licensee to enable the construction of a nationwide network operating over the spectrum associated with both licenses and providing broadband services to both commercial and public safety users.<sup>195</sup>

78. The auction of the 700 MHz Band licenses, designated Auction 73, closed on March 18, 2008.<sup>196</sup> The auction concluded with 1090 provisionally winning bids covering 1091 licenses and totaling \$19,592,420,000. While the bids for licenses associated with four of the five Upper 700 MHz Band blocks (the A, B, C, and E Blocks) exceeded the applicable reserve prices, bids for the fifth block (the D Block) license did not meet the reserve price and thus, there was no winning bid in Auction 73 for that license.<sup>197</sup>

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<sup>189</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15291-95, ¶¶ 1-13; Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 8064 (2007) (“*700 MHz Report and Order*”).

<sup>190</sup> The Commission changed the location of existing 700 MHz Guard Band licenses, provided for a 1-megahertz shift of the other commercial blocks in the Upper 700 MHz band and in the spectrum allocated to public safety, and reduced the size of the Guard Band B Block to make two additional megahertz of commercial spectrum available for auction. *700 MHz Second Report and Order*, 22 FCC Rcd at 15292-93, ¶ 3. In addition, the Commission afforded all Guard Band A Block licensees the same technical rules that apply to the adjacent commercial spectrum and the ability to deploy cellular architectures. *Id.* at 15294, ¶ 9.

<sup>191</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15361, ¶ 195.

<sup>192</sup> See *id.* at 15360, ¶ 206.

<sup>193</sup> *Id.*

<sup>194</sup> See *700 MHz Second Further Notice*, 23 FCC Rcd at 8052, ¶ 8.

<sup>195</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15295, ¶ 13.

<sup>196</sup> FCC, *Auction 73*, <http://wireless.fcc.gov/auctions/73> (last visited Sept. 18, 2008).

<sup>197</sup> Accordingly, Auction 73 raised a total of \$19,120,378,000 in winning bids and \$18,957,582,150 in net winning bids (reflecting bidders’ claimed bidding credit eligibility). *Auction of 700 MHz Band Licenses Closes*, *Public Notice*, 23 FCC Rcd 4572, 4572-73 ¶ 2 (2008).

79. The total 84 megahertz of commercial spectrum in the 700 MHz band will generally be available for a broad range of flexible uses.<sup>198</sup> This spectrum has many permissible uses: new licensees may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.<sup>199</sup> In addition, the Commission optimized the power rules in the remaining paired spectrum specifically for mobile use.<sup>200</sup> The Commission expects that many of the new technologies to be developed and deployed in this band will support advanced wireless applications.<sup>201</sup>

80. Because the auction of the D Block did not result in a winning bid, on May 14, 2008, the Commission issued the *Second Further Notice of Proposed Rulemaking* (“700 MHz Second Further Notice”), revisiting the rules governing the D Block licensee, the mandatory public/private partnership, and the Public Safety Broadband Licensee.<sup>202</sup> The Commission sought comment broadly on how it might modify those rules to achieve the goal of a nationwide, interoperable public safety network, whether it should continue to mandate a public/private partnership between the D Block licensee and Public Safety Broadband Licensee, and if so, under what terms and conditions.<sup>203</sup>

81. On September 25, 2008, the Commission adopted a *Third Further Notice of Proposed Rulemaking* (“700 MHz Third Further Notice”) that proposes licensing the D Block spectrum as part of a revised 700 MHz Public/Private Partnership, with modifications to the rules governing both the D Block and the Public Safety Broadband Licensee, in order to maximize the public safety and commercial benefits of a nationwide, interoperable broadband network in the 700 MHz band.<sup>204</sup> Among other modifications, the *700 MHz Third Further Notice* proposes to use the competitive bidding process to determine whether the D Block would be licensed to a single licensee on a nationwide basis or to regional licensees on the basis of 58 public safety regions. To ensure a uniform broadband technology nationwide, the *700 MHz Third Further Notice* proposes that in the event the D Block is licensed on a regional basis, the auction results also would determine which air interface technology, Long Term Evolution (LTE) or Worldwide Interoperability for Microwave Access (WiMAX), would be deployed across the nation by the D Block

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<sup>198</sup> See *Lower 700 MHz Report and Order*; Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, *Third Report and Order*, 16 FCC Rcd 2703 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20845 (2000); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, *Second Report and Order*, 15 FCC Rcd 5299 (2000) (“*Upper 700 MHz Second Report and Order*”); *700 MHz Second Report and Order*; *700 MHz Report and Order*. The eighty-two megahertz of spectrum does not include the reconfigured Guard Band B Block spectrum at 775-776/805-806 MHz. See *700 MHz Second Report and Order*, 22 FCC Rcd at 15294, ¶ 9, 15388-89, ¶¶ 266-69.

<sup>199</sup> See generally *id.*

<sup>200</sup> See *700 MHz Report and Order*, 22 FCC Rcd at 8067-68, ¶ 6.

<sup>201</sup> See, e.g., *Lower 700 MHz Report and Order*, 17 FCC Rcd at 1032, ¶ 20.

<sup>202</sup> See Service Rules for the 698-746, 747-762 and 777-792 Bands; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, *Second Further Notice of Proposed Rulemaking*, 23 FCC Rcd 8047 (2008) (*Second Further Notice*).

<sup>203</sup> *Id.* The Commission also indicated that, prior to adopting final rules, it would present for public comment a detailed proposal regarding specific proposed rules to address these issues. *Id.* at 8052, ¶ 7.

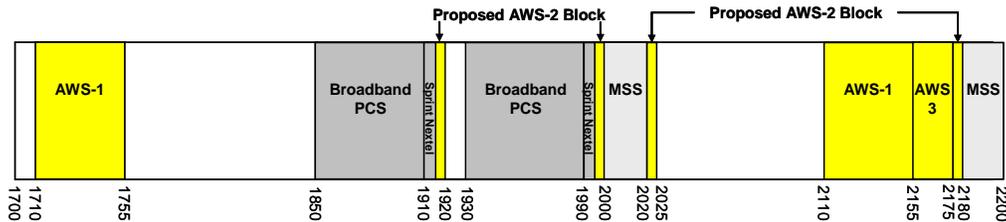
<sup>204</sup> See generally Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, PS Docket No. 06-229, *Third Further Notice of Proposed Rulemaking*, FCC 08-230 (rel. Sept. 25, 2008).

licensee(s).<sup>205</sup> To further its primary goal of promoting the widest possible population coverage by D Block license(s) subject to the public-private partnership conditions, the Commission tentatively concludes, as an initial matter, that it will not award any D Block licenses unless the total population covered by licenses with high bids meets or exceeds fifty percent of the U.S. population.<sup>206</sup>

(v) **Advanced Wireless Services**

82. To further the goal of promoting the deployment of advanced services, the Commission has made efforts to allocate and license additional spectrum suitable for offering AWS.<sup>207</sup> As noted in the *Eleventh Report*, in 2002 the Commission, together with the National Telecommunications and Information Administration (“NTIA”), allocated 90 megahertz of spectrum in the 1710-1755 MHz and 2110-2155 MHz bands that can be used to offer advanced wireless services, including 3G services.<sup>208</sup>

**1700-2200 MHz: Advanced Wireless Services Spectrum**



83. Subsequently, the Commission completed the process of establishing service rules for the 1710-1755 MHz and 2110-2155 MHz bands. This included a determination that the spectrum could be used for any wireless service that is consistent with the spectrum’s fixed and mobile allocations and would be licensed under the Commission’s flexible, market-oriented Part 27 rules,<sup>209</sup> and also a band plan that provided for a significant amount of the spectrum to be licensed on a small geographic basis to encourage the participation of small and rural providers in the AWS auction.<sup>210</sup> In 2006, the Commission established procedures for the auction of the 1710-1755 MHz and 2110-2155 MHz bands (Auction 66).<sup>211</sup>

84. In 2006, the Commission also established procedures by which AWS licensees could relocate existing incumbents in the 1710-1755 MHz and 2110-2155 MHz bands to other spectrum. The 1710-1755 MHz band includes incumbent federal government spectrum users, and NTIA is overseeing

<sup>205</sup> *Id.* at ¶ 4.

<sup>206</sup> *Id.* at ¶ 246.

<sup>207</sup> 47 C.F.R. § 24.3. Advanced Wireless Services (AWS) is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as Internet browsing, message services, and full-motion video) content.

<sup>208</sup> *Eleventh Report*, 21 FCC Rcd at 10977, ¶ 73. The Commercial Spectrum Enhancement Act, signed into law on December 23, 2004, establishes a Spectrum Relocation Fund to reimburse federal agencies operating on certain frequencies that have been reallocated to non-federal use, including the 1710-1755 MHz band, for the cost of relocating their operations. *See* Commercial Spectrum Enhancement Act, Pub. L. No. 108-494, 118 Stat. 3986, Title II (2004).

<sup>209</sup> *Eleventh Report*, 21 FCC Rcd at 10977-10978, ¶ 74; 47 C.F.R. Part 27.

<sup>210</sup> *Eleventh Report*, 21 FCC Rcd at 10978, ¶ 74.

<sup>211</sup> *See* Auction of Advanced Wireless Services Licenses Scheduled For June 29, 2006, *Public Notice*, 21 FCC Rcd 4562 (2006); Auction of Advanced Wireless Services Licenses Rescheduled for August 9, 2006, *Public Notice*, 21 FCC Rcd 5598 (2006).

the coordination with and relocation of these users under the coordination procedures released by the FCC and NTIA in April 2006.<sup>212</sup> The 2110-2155 MHz band includes fixed microwave service licensees and BRS licensees. For the band, the Commission established rules under which other new licensees benefiting from the relocation of an incumbent would share in the costs of the relocation.<sup>213</sup>

85. The Commission held Auction 66 in the third quarter of 2006.<sup>214</sup> Of the 1,122 licenses offered in Auction 66, 104 winning bidders won 1,087 licenses, with net bids of more than \$13.7 billion.<sup>215</sup> In April 2007, the Wireless Bureau announced that licensing had been completed for all of the licenses, with the exception of one license subject to a later deadline for the applicant to file a certification to qualify for a Tribal Land Bidding Credit.<sup>216</sup> That license has now been granted.<sup>217</sup> Accordingly, all of the Auction 66 licenses have been awarded.

86. The Commission also has taken significant steps toward licensing other bands of spectrum for use by AWS. In 2004, the Commission allocated an additional twenty megahertz of spectrum in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands (“AWS-2”).<sup>218</sup> The Commission additionally released the *AWS-2 Service Rules NPRM*, which sought comment on appropriate service rules for the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands, and also offered some tentative conclusions consistent with existing AWS service rules, such as allowing flexible use of this spectrum and licensing this spectrum under Part 27 of the Commission’s rules.

87. In 2005, the Commission designated yet another 20 MHz of spectrum for AWS, specifically the 2155-2175 MHz band (“AWS-3”), thus establishing 70 MHz of contiguous AWS spectrum in the 2.1 GHz band (from 2110 to 2180 MHz).<sup>219</sup> An application for exclusive use of the

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<sup>212</sup> See FCC and NTIA – Coordination Procedures in the 1710-1755 MHz Band, *Public Notice*, 21 FCC Rcd 4730 (2006).

<sup>213</sup> See Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems; and Services Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, *Ninth Report and Order and Order*, 21 FCC Rcd 4473 (2006).

<sup>214</sup> The auction started on August 9, 2006 and closed on September 18, 2006. See Auction of Advanced Wireless Services Closes: Winning Bidders Announced for Auction 66, Report AUC-06-66-F, *Public Notice*, 21 FCC Rcd 10521 (2006). In Auction 66, the Commission made available 1,122 AWS licenses in the 1710-1755 MHz and 2110-2155 MHz bands (“AWS-1”).

<sup>215</sup> *Id.*

<sup>216</sup> See Wireless Telecommunications Bureau Completes Review of Applications for Licenses for Advanced Wireless Services, *News Release*, FCC, Apr. 30, 2007.

<sup>217</sup> See Wireless Telecommunications Bureau Market-Based Applications Action, *Public Notice*, Report No. 3672 (rel. Dec. 19, 2007).

<sup>218</sup> Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, *Sixth Report and Order, Third Memorandum Opinion and Order and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720 (2004); Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands; Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, *Notice of Proposed Rulemaking*, 19 FCC Rcd 19263 (2004) (“AWS-2 Service Rules NPRM”).

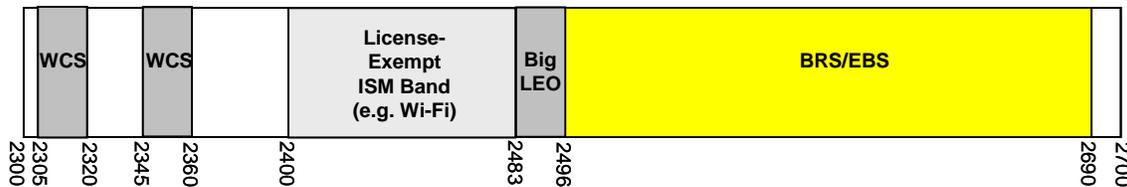
<sup>219</sup> See Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, *Eighth Report and Order, Fifth Notice of Proposed Rule Making and Order*, 20 FCC Rcd 15866 (2005).

spectrum in the 2155-2175 MHz band was filed in 2006, and was accepted for filing in January 2007.<sup>220</sup> Subsequently, six other applicants filed similar applications for use of this AWS-3 spectrum.<sup>221</sup> On August 31, 2007, the Commission released an Order dismissing these seven applications without prejudice and denying two Forbearance Petitions associated with two of the applications. In this Order, the Commission stated that the public interest is best served by first seeking public comment on how the band should be used and licensed.<sup>222</sup> On September 19, 2007, the Commission released a Notice of Proposed Rulemaking (NPRM), seeking comment on service rules for the AWS-3 spectrum.<sup>223</sup> On June 20, 2008, the Commission released a Further Notice of Proposed Rulemaking (FNPRM), seeking comment on the Commission's proposed AWS-3 rules, which include adding 5 megahertz of spectrum (2175-80 MHz) to the proposed AWS-3 band (2155-75 MHz). The FNPRM proposes to require licensees of that spectrum to provide – using up to 25 percent of its wireless network capacity – free, two-way broadband Internet service at engineered data rates of at least 768 kbps downstream.<sup>224</sup>

(vi) **Broadband Radio Service**

88. In July 2004, the Commission transformed the rules and policies governing the Multipoint Distribution Service (MDS) and the Instructional Television Fixed Service (ITFS) in the 2500-2690 MHz band by providing licensees with greater flexibility and establishing a more functional band plan.<sup>225</sup> As one part of this action, the Commission renamed the MDS service the “Broadband Radio Service” (BRS) and renamed the ITFS service the Educational Broadband Service (EBS).

**2300-2700 MHz: BRS/EBS Spectrum**



<sup>220</sup> See Application of M2Z Networks, Inc. for License and Authority to Provide a National Broadband Radio Service in the 2155-2175 MHz Band, WT Docket No. 07-16 (filed May 5, 2006) (M2Z Application); Wireless Telecommunications Bureau Announces that M2Z Networks, Inc.'s Application for License and Authority to Provide a National Broadband Radio Service in the 2155-2175 MHz Band is Accepted for Filing, *Public Notice*, 22 FCC Rcd 1955 (WTB 2007). See also Wireless Telecommunications Bureau Sets Pleading Cycle for Application by M2Z Networks, Inc. to be Licensed in the 2155-2175 MHz Band, *Public Notice*, 22 FCC Rcd 4442 (WTB 2007).

<sup>221</sup> Specifically, there were applications filed by Commnet Wireless, LLC; McElroy Electronics Corp.; NetfreeUS, LLC; NextWave Broadband, Inc.; and Open Range Communications, Inc.; each on Mar. 2, 2007; and by TowerStream Corporation on Mar. 15, 2007. See WT Docket No. 07-16.

<sup>222</sup> Applications for License and Authority to Operate in the 2155-2175 MHz Band; and Petitions for Forbearance Under 47 U.S.C. § 160, *Order*, 22 FCC Rcd 16563 (2007), *recons pending*.

<sup>223</sup> Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, *Notice of Proposed Rulemaking*, 22 FCC Rcd 17035 (2007).

<sup>224</sup> Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band; and Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands, *Further Notice of Proposed Rulemaking*, 23 FCC Rcd 9859 (2008).

<sup>225</sup> Amendment of Parts 1, 21, 73, 74, and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational, and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, 19 FCC Rcd 14165 (2004). The rules for this band were initially established in 1963 but have evolved significantly since that time.

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

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

91. In April 2006, the Commission continued its transformation of the rules governing BRS and EBS by revising the mechanism for transition from the existing band configuration to the new band plan.<sup>226</sup> BRS and EBS providers will have thirty months from the effective date of the new rules during which they may propose transition plans for relocating existing facilities of all other licensees within the same BTA to new spectrum assignments in the revised band plan. Plan proponents must notify all licensees in the BTA and file their plans with the Commission. As of September 2008, proponents had filed transition plans for 403 of the 493 BTAs, and they had completed the transition in 310 BTAs.<sup>227</sup>

92. The Commission also allowed licensees to transition themselves if no proponent came forward in a BTA by the deadline for filing transition plans. It also made other changes to the transition rules to facilitate transitions to the new band plan. With respect to lease agreements, the Commission held that EBS licensees are permitted to enter into excess capacity leases for a maximum of 30 years, but leases with terms of 15 years or longer must include a right to review the educational use requirements of the leases every five years starting at year 15.

93. In March 2008, the Commission set forth auction rules for unassigned BRS spectrum, and it sought further comment on how to license the available and unassigned "white spaces" in the EBS spectrum band.<sup>228</sup> The item also clarified that EBS leases executed before January 10, 2005 cannot run into perpetuity and are limited to 15 years. The Commission also reinstated a Gulf of Mexico service area for the BRS band in light of recent events, including Hurricanes Katrina and Rita, as well as recent oil

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<sup>226</sup> Amendment of Parts 1, 21, 73, 74, and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational, and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Order on Reconsideration and Fifth Memorandum Opinion and Order and Third Memorandum Opinion and Order and Second Report and Order*, 21 FCC Rcd 5606 (2006).

<sup>227</sup> See Initiation Plans and Post-Transition Notifications filed in WT Docket No. 06-136. See also Wireless Telecommunications Bureau Establishes Docket for the Filing of Initiation Plans, Post-Transition Notifications, and Self Transition Notices in the Transition of the 2500-2690 MHz Band, *Public Notice*, 21 FCC Rcd 7909 (2006).

<sup>228</sup> Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Third Order on Reconsideration and Sixth Memorandum Opinion and Order and Fourth Memorandum Opinion and Order and Second Further Notice of Proposed Rulemaking and Declaratory Ruling*, 23 FCC Rcd 5992 (2008).

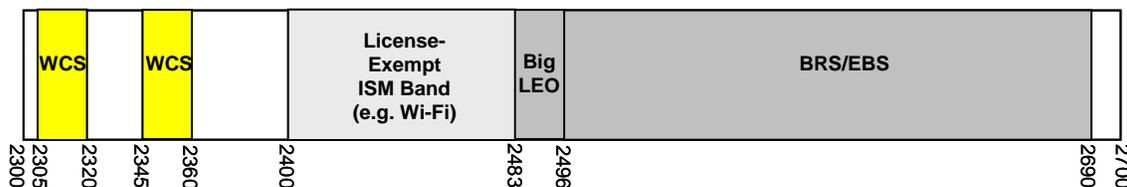
discoveries in the Gulf of Mexico. Finally, the Commission issued a Declaratory Ruling clarifying the “splitting-the-football” methodology that licensees should use to divide overlapping geographic service areas for licenses that expired and are later reinstated. This Ruling responded to filings by several parties seeking clarification of the “splitting-the-football” process and policies.

94. The changes made to the 2496-2690 MHz band, together with technological and business developments, is facilitating the development of a nationwide WiMAX network by Sprint Nextel and Clearwire that has the potential to compete with cable and DSL broadband providers. The 2496-2690 MHz band can speed the arrival of a wireless broadband pipe that will increase competition and consumer choice, make possible new services, and promote the availability of broadband for all Americans. This band also can play an important role in extending broadband service to rural and underserved areas. Moreover, the changes to this band have enabled BRS/EBS providers to use this spectrum in a more technologically and economically efficient manner.

#### (vii) Wireless Communications Service (WCS)

95. The Commission has licensed 30 megahertz of spectrum in the 2.3 GHz band, at 2305-2320 MHz and 2345-2360 MHz, for the Wireless Communications Service (“WCS”). The service rules governing WCS are flexible, and WCS licensees can use this spectrum to provide a variety of fixed or mobile wireless services. The WCS spectrum was auctioned in 1997 and licensed on a Major Economic Area (“MEA”) and Regional Economic Area Grouping (“REAG”) basis. In May 2006, the Wireless Telecommunications Bureau granted a request for an extension of time for certain WCS licensees to build out their licensed areas.<sup>229</sup> The Order permits these licensees an additional three years, until July 21, 2010, to demonstrate that they have satisfied the build out requirement (which is substantial service) in their licensed areas.<sup>230</sup> As described in Section III.A.3, at least one wireless provider has begun using WCS spectrum to deploy wireless broadband services.

#### 2300-2700 MHz: WCS Spectrum



96. The WCS spectrum is adjacent to and separated by the spectrum band for the Satellite Digital Audio Radio Service (“SDARS”), which is used by Sirius XM Radio Inc. to provide satellite radio service. On December 18, 2007, the Commission released a Notice of Proposed Rulemaking and Second Further Notice of Proposed Rulemaking seeking comment on appropriate rules and policies for licensing SDARS digital repeaters and considering changes to the rules governing WCS licenses.<sup>231</sup> In particular,

<sup>229</sup> Consolidated Request of the WCS Coalition For Limited Waiver of Construction Deadline for 132 WCS Licenses; Request of WCS Wireless, LLC for Limited Waiver of Construction Deadline for 16 WCS Licenses; and Request of Cellutec, Inc. for Limited Waiver Of Construction Deadlines for Stations KNLB242 and KNLB216 in Guam/Northern Mariana and American Samoa, *Order*, 21 FCC Rcd 14134, 14139-41, ¶¶ 9-13 (WTB 2006).

<sup>230</sup> *Id.*

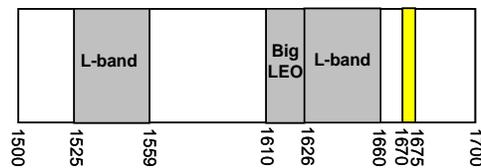
<sup>231</sup> See generally Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band; Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, *NPRM and Second Further NPRM*, FCC 07-215 (rel. Dec. 18, 2007).

the Commission sought to consider what changes may be necessary to facilitate the coexistence of SDARS and WCS licensees.

**(viii) 1670-1675 MHz**

97. In April 2003, the FCC auctioned five megahertz of unpaired spectrum in the 1670-1675 MHz band as a single, nationwide license. As with the other spectrum bands licensed under Part 27 of the Commission's rules, such as AWS and WCS, the service rules for the 1670-1675 MHz band are flexible, and licensees can use the spectrum to deploy a variety of fixed or mobile wireless services. The license was won at auction by Crown Castle. In July 2007, Crown Castle entered into a long-term agreement to lease the spectrum to a wholly-owned subsidiary of TVCC Holding Company, LLC ("TVCC Holding").<sup>232</sup> In late 2008, control of TVCC Holding was transferred, so that 13.13 percent was held by a company wholly owned by Rajendra Singh and the Singh family; 11.86 percent by Columbia Capital IV, LLC, subsidiaries; and 75 percent by Harbinger-related entities.<sup>233</sup>

**1500-1700 MHz: 1670-1675 MHz Spectrum**



**(ix) Narrowband Spectrum**

98. In addition to the spectrum that mobile telephone providers use to offer both voice and data CMRS services, two additional spectrum bands – paging and narrowband PCS – are used by licensees to offer CMRS services that consist only of data communications. Spectrum designated for commercial messaging/paging is spread across several non-contiguous bands: 35-36 MHz, 43-44 MHz, 152-159 MHz, 454-460 MHz, and 929-932 MHz.<sup>234</sup> Each license consists of between 20 and 50 kilohertz.<sup>235</sup> The Commission first allocated spectrum for paging in 1949 and licensed the spectrum on a site-by-site basis through the mid-1990s.<sup>236</sup> In 2000, the Commission began auctioning additional paging licenses on a geographic area basis using EAs and MEAs.<sup>237</sup> The Commission completed its third paging auction on May 28, 2003.<sup>238</sup>

<sup>232</sup> Long-Term *De Facto* Transfer Lease Application, File No. 0003108073 (filed July 17, 2008). *Crown Castle Announces Long-Term Modeo Spectrum Lease*, News Release, Crown Castle, July 23, 2007; ULS Lease ID L000002305.

<sup>233</sup> Transfer of Control of a Lessee Application, File No. 0003573463 (filed Sept. 10, 2008); TVCC Holding Company, LLC, Form 602, File No. 0003635816 (filed Nov. 3, 2008).

<sup>234</sup> FCC, *Paging (Lower) Bandplan*, available at <http://wireless.fcc.gov/auctions/data/bandplans/pagingLwrband.pdf> (last visited Dec. 15, 2008); FCC, *929 and 931 MHz Paging Bandplan*, available at <http://wireless.fcc.gov/auctions/data/bandplans/auc26bnd.pdf> (last visited Dec. 15, 2008).

<sup>235</sup> *Id.*

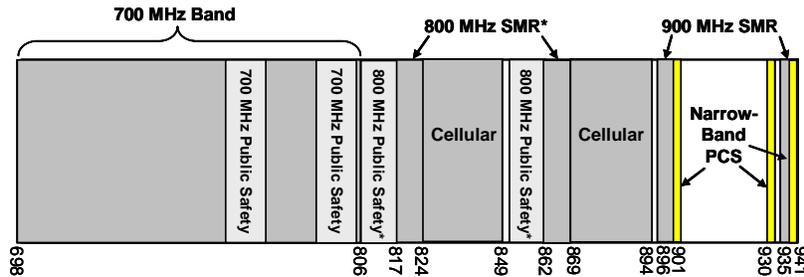
<sup>236</sup> Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Notice of Proposed Rulemaking*, 11 FCC Rcd 3108, 3109-10, ¶ 4 (1996).

<sup>237</sup> See 929 and 931 MHz Paging Auction Closes, *Public Notice*, 15 FCC Rcd 4858 (2000); *Seventh Report*, 17 FCC Rcd at 13050-51.

<sup>238</sup> Lower and Upper Paging Bands Auction Closes, *Public Notice*, 18 FCC Rcd 11154 (2003).

99. Narrowband PCS spectrum is located in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands and allows licensees to offer an array of two-way data services such as text messaging.<sup>239</sup> The Commission first auctioned narrowband PCS spectrum in 1994.<sup>240</sup> Licenses consist of between 50 and 200 kilohertz each and were auctioned on a nationwide, regional, and MTA basis.<sup>241</sup> The Commission completed its most recent auction of narrowband PCS licenses on September 25, 2003.<sup>242</sup>

### 698-941 MHz: Narrowband PCS Spectrum



## 2. Non-Regulatory Barriers to Entry

100. There are three basic types of potential non-regulatory entry barriers, each of which captures separate dimensions of the difficulty of entering an industry.<sup>243</sup> The first type consists of the impediment to entry erected by advertising expenditures. Unlike tangible capital, advertising can neither be resold nor otherwise transferred to prospective buyers; such expenditures are irrecoverable or sunk. While the incumbent has already incurred the sunk costs, the entrant has not. Therefore, the entrant has higher incremental cost and incremental risk associated with its decision to enter. The second type of entry barrier arises from economies of scale, which allow firms to lower the cost per unit of producing and distributing a product as the volume of output expands. The more extensive economies of scale are, the larger the minimum efficient scale is relative to the size of the market. Consequently, a nascent firm risks depressing market price by producing at optimal scale. The alternative is to produce at less than minimum cost. Either way, expected profitability is lowered, and entry is dissuaded. The third type of entry barrier, and closely related to the second, is the inability of new firms to borrow sums sufficient to finance efficient start-ups. The inability to borrow sufficiently increases with the larger absolute capital requirement needed to realize minimum cost.

101. All three types of entry barriers have the potential to afford incumbent carriers first-mover advantages over latecomers. Therefore, it is possible that the three types of entry barriers are

<sup>239</sup> Implementation of Section 309(j) of the Communications Act – Competitive Bidding Narrowband PCS, *Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 10 FCC Rcd 175 (1994).

<sup>240</sup> Announcing the High Bidders in the Auction of Ten Nationwide Narrowband PCS Licenses; Winning Bids Total \$617,006,674, *Public Notice*, PNWL 94-4 (rel. Aug. 2, 1994).

<sup>241</sup> *Id.*; Announcing the High Bidders in the Auction of 30 Regional Narrowband PCS Licenses; Winning Bids Total \$490,901,787, *Public Notice*, PNWL 94-27 (rel. Nov. 9, 1994).

<sup>242</sup> Regional Narrowband PCS Spectrum Auction Closes, *Public Notice*, 18 FCC Rcd 19689 (2003); Narrowband PCS Spectrum Auction Closes, *Public Notice*, 18 FCC Rcd 19751 (2003). See also *Ninth Report*, 19 FCC Rcd at 20636-37, ¶ 26.

<sup>243</sup> See William J. Baumol and Robert D. Willig, *Fixed Cost, Sunk Cost, Entry Barriers and Sustainability of Monopoly*, *QUARTERLY JOURNAL OF ECONOMICS*, Vol. 96, Aug. 1981, at 406-431; Joe S. Bain, *BARRIERS TO NEW COMPETITION*, 1956, at 55; William S. Comanor and Thomas A. Wilson, *Advertising Market Structure and Performance*, *THE REVIEW OF ECONOMICS AND STATISTICS*, Vol. 49, Nov. 1967, at 425.

significant in mobile telephone service. Telecommunications has historically been an industry characterized by large investments in network infrastructure and vast scale economies, suggesting the scale economy and capital requirement barriers are both high. Increasing advertising expenditures by mobile telephone providers as they seek to brand their products suggests that the product differentiation barrier in mobile telephone service is similarly high. Data provided in Section IV of this *Report* shows that advertising spending for wireless telephone services totaled \$4.1 billion in 2007, a 12 percent increase over 2006, and that the top five operators alone increased advertising spending in 2007 by an even higher 16 percent.<sup>244</sup>

## **E. Rural Markets**

### **1. Geographical Comparisons: Urban vs. Rural**

102. Since the release of the *Sixth Report*,<sup>245</sup> the Commission has attempted to obtain a better understanding of the state of competition below the national level, and particularly in rural areas. The Communications Act does not include a statutory definition of what constitutes a rural area.<sup>246</sup> The Commission used RSAs as a proxy for rural areas for certain purposes, such as the former cellular cross-interest rule and the former CMRS spectrum cap, stating that “other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas.”<sup>247</sup> Since its 2004 Report and Order concerning deployment of wireless services in rural areas, however, the Commission has adopted a “baseline” definition of rural as a county with a population density of 100 persons or fewer per square mile.<sup>248</sup> For this reason, we adopt this same definition to analyze service availability in rural areas in this *Report*.

103. By this definition, roughly 61 million people, or 21 percent of the U.S. population,<sup>249</sup> live in rural counties. These counties comprise 3.1 million square miles, or 86 percent of the geographic area of the United States.<sup>250</sup> The distribution of rural counties across the United States can be seen in the map below.

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<sup>244</sup> *Twelfth Report*, 23 FCC Rcd at 2308, ¶ 160. See Section IV.B.4, Advertising and Marketing, *infra*.

<sup>245</sup> *Sixth Report*, 16 FCC Rcd at 13350.

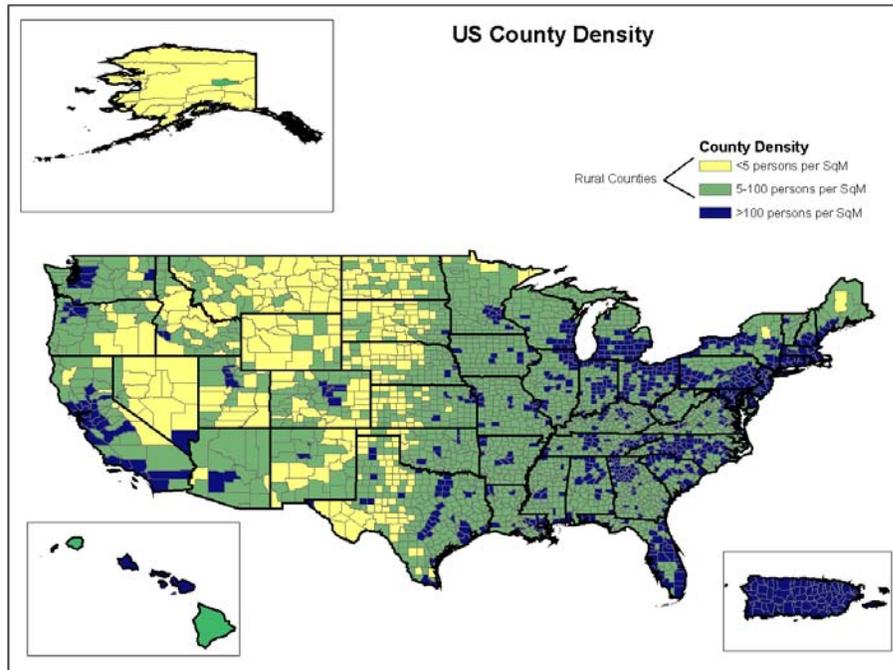
<sup>246</sup> The federal government has multiple ways of defining rural, reflecting the multiple purposes for which the definitions are used. *Eighth Report*, 18 FCC Rcd at 14834; Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, *Notice of Proposed Rulemaking*, 18 FCC Rcd 20802 (2003) (“*Rural NPRM*”), at 20808-11.

<sup>247</sup> 1998 Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd 9219, 9256, ¶ 84, n.203 (1999).

<sup>248</sup> Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, *Report and Order*, 19 FCC Rcd. 19078, at 19087-88 (2004) (“We recognize, however, that the application of a single, comprehensive definition for ‘rural area’ may not be appropriate for all purposes. . . . Rather than establish the 100 persons per square mile or less designation as a uniform definition to be applied in all cases, we instead believe that it is more appropriate to treat this definition as a presumption that will apply for current or future Commission wireless radio service rules, policies and analyses for which the term ‘rural area’ has not been expressly defined. By doing so, we maintain continuity with respect to existing definitions of ‘rural’ that have been tailored to apply to specific policies, while also providing a practical guideline.”).

<sup>249</sup> Including the populations of Puerto Rico and the Virgin Islands.

<sup>250</sup> Including the populations of Puerto Rico and the Virgin Islands.

Map 4: U.S. County Density<sup>251</sup>

## 2. Rural Competition

104. Using data provided by American Roamer, we find that 98.5 percent of the U.S. population living in rural counties have one or more different operators offering mobile telephone service in the census blocks in which they live, 94.2 percent live in census blocks with two or more mobile telephone operators competing to offer service, 82.1 percent live in census blocks with at least three competing mobile telephone operators, and 65.2 percent live in census blocks with at least four competing mobile telephone operators.<sup>252</sup> Based on the international comparison of mobile market concentration presented above, the competitive choices facing residents of rural counties in the United States compare favorably with those facing urban as well as rural residents of comparable foreign countries.<sup>253</sup> In particular, about 82 percent of U.S. consumers living in rural counties have at least as many mobile telephone competitors from which to choose as consumers living in countries with three competing mobile operators, including Japan, Finland, France and Canada, while about 65 percent of U.S. consumers living in rural counties have a choice of at least one more mobile competitor than consumers in these countries.

105. Providers based in rural areas seem to be providing many of the services that nationwide providers do. In the fall of 2007, the National Telecommunications Cooperative Association (“NTCA”) surveyed its members regarding their provision of wireless services.<sup>254</sup> According to the 2007 NTCA

<sup>251</sup> A larger version of this map may be found in Appendix B.

<sup>252</sup> FCC analysis, using American Roamer, July 2007, and Census 2000 population figures.

<sup>253</sup> See Table 4: Mobile Market Structure in Selected Countries, *supra*.

<sup>254</sup> See *NTCA 2007 Wireless Survey Report*, at 3 (Jan. 2008), attached to the Comments of the National Telecommunications Cooperative Association, WT Docket No. 08-27 (Mar., 26, 2008), also *available at* (continued....)

Wireless Survey, 77 percent of survey respondents are offering wireless service to customers.<sup>255</sup> Population density in most NTCA member service areas is extremely rural, between one and five persons per square mile.<sup>256</sup> Nevertheless, the survey indicates that competition is strong in rural areas, with member providers “facing competition from other carriers—the average respondent indicated that their company competes with between two and five other carriers.”<sup>257</sup> Survey respondents indicated that they have invested considerable resources for the provision of wireless service.<sup>258</sup> Of those members providing wireless service, 93 percent offer voicemail and caller ID, 97 percent family plans, 72 percent free long distance, 90 percent three-way calling, and 72 percent bonus night and weekend minutes, 66 percent unlimited local calling, and 41 percent voice activated dialing.<sup>259</sup> CTIA makes a similar finding, stating that “[c]arriers across the country, including those in rural markets continually deploy mobile data and broadband to bring new technologies at faster speeds to consumers.”<sup>260</sup>

106. In terms of the availability of licensed spectrum to entities other than the four nationwide service providers, we find first that, in 80 percent of rural counties (which include over 70 percent of rural population), more than 100 megahertz of spectrum (cellular / PCS / AWS / 700 MHz) is licensed to entities other than the four nationwide carriers and their affiliates.<sup>261</sup> By comparison, in urban counties, only 46 percent of counties, including just 21 percent of the population in urban counties, have more than 100 megahertz not licensed to the nationwide carriers and their affiliates.<sup>262</sup>

**Table 6: Spectrum Not Licensed to the Nationwide Carriers & Their Affiliates (Cellular / PCS / AWS / Lower 700 MHz)**

	Total Counties	<50 MHz	Percent	50-100 MHz	Percent	101-150 MHz	Percent	151-200 MHz	Percent	>200 MHz	Percent
<b>Rural</b>	2356	0	0%	471	20%	1355	58%	474	20%	56	2%
<b>Urban</b>	878	4	0%	473	54%	282	32%	112	13%	7	1%
<b>Total</b>	3234										
	Total Pops	<50 MHz	Percent	50-100 MHz	Percent	101-150 MHz	Percent	151-200 MHz	Percent	>200 MHz	Percent
<b>Rural</b>	60,836,650	0	0%	17,208,140	28%	34,494,276	57%	8,179,911	13%	954,323	2%
<b>Urban</b>	224,783,795	2,568,158	1%	173,485,258	77%	41,066,130	18%	6,967,151	3%	697,098	0%
<b>Total</b>	285,620,445										

**Map 5: Spectrum Not Licensed to the Nationwide Carriers & Their Affiliates**

(Continued from previous page) —————  
<http://www.ntca.org/images/stories/Documents/Advocacy/SurveyReports/2007ntcawirelessurveyreport.pdf> (last visited Dec. 15, 2008) (“2007 NTCA Wireless Survey”).

<sup>255</sup> *Id.* at 3.

<sup>256</sup> *Id.* at 4.

<sup>257</sup> *Id.* at 9.

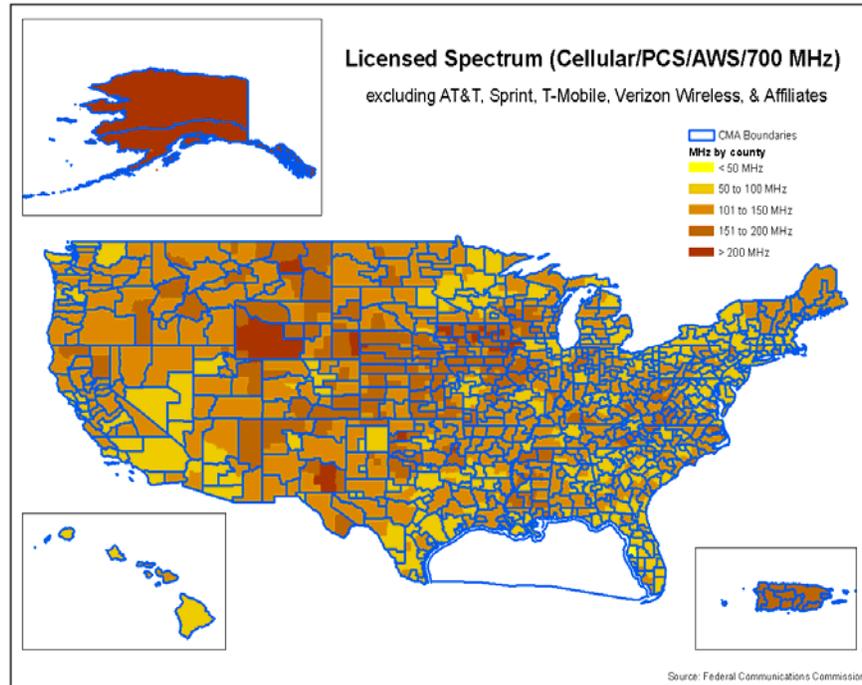
<sup>258</sup> *Id.* at 7.

<sup>259</sup> *Id.* at 10.

<sup>260</sup> *CTIA 2008 Comments*, at 11.

<sup>261</sup> FCC internal analysis.

<sup>262</sup> See Map B-34 in Appendix for a graphical representation of these data.

**(Cellular / PCS / AWS / 700 MHz)<sup>263</sup>**

107. We find as well that significant spectrum is potentially available, particularly in rural areas, through the secondary market. For this purpose, we regard licensed spectrum to be potentially available where a licensee has no mobile telephone subscribers based on the NRUF data within the EAs where the spectrum is located.<sup>264</sup> Based on this information, we find that 34 percent of rural counties (which include 26 percent of the rural population) have more than 100 megahertz of spectrum (cellular / PCS / AWS / 700 MHz) that is potentially available. We find as well that 96 percent of rural counties, including 91 percent of the rural population, have at least 50 megahertz that is not being utilized to provide mobile telephone service to customers in those areas.<sup>265</sup> By comparison, in urban counties, only 10 percent of counties, including just 3 percent of the population in urban counties, have more than 100 megahertz of potentially available spectrum, and 85 percent of urban counties, including 68 percent of urban population, have at least 50 megahertz.<sup>266</sup>

<sup>263</sup> A larger version of this map may be found in Appendix B.

<sup>264</sup> FCC internal analysis based on NRUF data. See Appendix B, Map B-35.

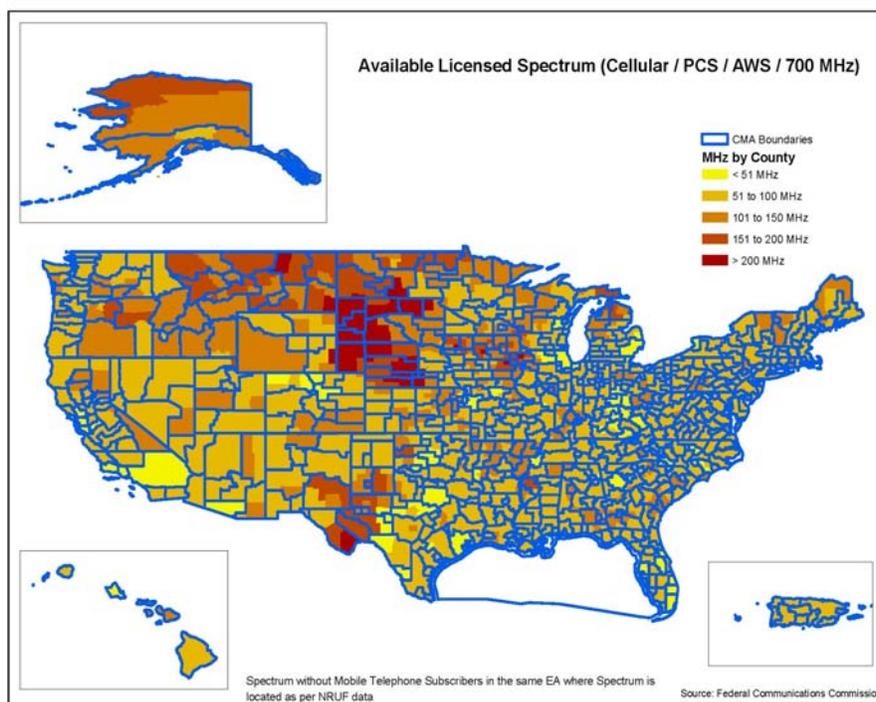
<sup>265</sup> FCC internal analysis based on NRUF data. See Appendix B, Map B-35.

<sup>266</sup> See Map B-35 in Appendix for a graphical representation of these data.

**Table 7: Available Licensed Spectrum  
(Cellular / PCS / AWS / Lower 700 MHz)**

	Total Counties	<50 MHz	Percent	50-100 MHz	Percent	101-150 MHz	Percent	151-200 MHz	Percent	>200 MHz	Percent
<b>Rural</b>	2356	97	4%	1452	62%	566	24%	167	7%	74	3%
<b>Urban</b>	878	132	15%	685	78%	57	6%	4	0%	0	0%
<b>Total</b>	3234										
	Total Pops	<50 MHz	Percent	50-100 MHz	Percent	101-150 MHz	Percent	151-200 MHz	Percent	>200 MHz	Percent
<b>Rural</b>	60,836,650	5,382,255	9%	39,983,738	66%	12,582,590	21%	2,160,946	4%	727,121	1%
<b>Urban</b>	224,783,795	72,816,451	32%	144,673,325	64%	6,641,564	3%	652,455	0%	0	0%
<b>Total</b>	285,620,445										

**Map 6: Available Licensed Spectrum (Cellular / PCS / AWS / 700 MHz)<sup>267</sup>**



108. Thus, it appears that significant spectrum is available in rural areas for the provision of new mobile wireless services to consumers.

**3. Conclusion**

109. Based on our analysis, and the information provided in the record, we conclude that CMRS providers are competing effectively in rural areas. We note that market structure is only a starting

<sup>267</sup> A larger version of this map may be found in Appendix B.

point for a broader analysis of the status of competition based on the totality of circumstances, including the pattern of provider conduct, consumer behavior, and market performance, as discussed more fully below. There is no evidence in the record to indicate that wireless providers in rural areas have the ability to raise prices above competitive levels or to alter other terms and conditions of service to the detriment of rural consumers.

#### IV. PROVIDER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET

110. A concentrated market, in conjunction with significant entry barriers, may lessen competition in the market for commercial mobile services in two distinct ways. First, it may increase the likelihood that a group of competing providers will successfully engage in coordinated interaction aimed at raising prices and lowering output. Second, it may enable an individual provider to profitably raise price and lower output unilaterally. However, neither coordinated interaction nor unilateral action to lessen competition is a necessary consequence of market concentration and entry barriers. For example, unilateral or coordinated action to lessen competition may be thwarted or undermined by the presence of one or more maverick providers who have the ability and incentive to expand sales by undercutting the prices of rivals, offering innovative service packages and engaging in aggressive advertising and promotional campaigns. The analysis of provider conduct thus focuses on whether incumbent carriers, given the prevailing market structure, engage in intense price and non-price rivalry or instead compete in a less aggressive manner.

##### A. Price Rivalry

###### 1. Developments in Mobile Telephone Pricing Plans

111. The continued rollout of differentiated pricing plans also indicates a competitive marketplace.<sup>268</sup> In the mobile telephone sector, we observe independent pricing behavior, in the form of continued experimentation with varying pricing levels and structures, for varying service packages, with various handsets and policies on handset pricing. Today, all of the nationwide operators, and many smaller operators, offer some version of a national rate pricing plan in which customers can purchase a bucket of minutes to use on a nationwide or nearly nationwide network without incurring roaming or long-distance charges. As noted in the *Tenth Report*, all the nationwide operators also offer some version of a family plan.<sup>269</sup> The *Twelfth Report* highlighted the experimentation by a number of operators with various types of “unlimited” calling options.<sup>270</sup> For example, some providers, including Alltel (“My Circle”) and T-Mobile (“myFaves”), allow subscribers unlimited free calling to and from a small number of designated numbers, regardless of wireline or wireless carrier,<sup>271</sup> while other providers offer plans that provide for free calls only to customers who use the same wireless provider (“on-net” mobile-to-mobile options).<sup>272</sup> In addition, in 2007 Sprint Nextel became the first nationwide carrier to begin offering unlimited calling plans, for a limited time, in select markets.<sup>273</sup> Finally, a number of smaller and regional

<sup>268</sup> See Section IV.B.6, Mobile Data Services and Applications, *infra*.

<sup>269</sup> See *Tenth Report*, 20 FCC Rcd at 15946, ¶ 98.

<sup>270</sup> See *Twelfth Report*, 23 FCC Rcd at 2292, ¶ 113.

<sup>271</sup> *Eleventh Report*, 21 FCC Rcd at 10984, ¶ 91. See also Allie Winter, *Verizon Wireless Apes Alltel’s My Circle With New Small Businesses Calling Plan*, RCR WIRELESS NEWS, June 11, 2008 (reporting that, in June 2008, Verizon Wireless also introduced a new plan for businesses, allowing unlimited calling between a Verizon Wireless number and up to five wireline numbers for \$5 per line).

<sup>272</sup> *Id.*

<sup>273</sup> See *Twelfth Report*, 23 FCC Rcd at 2292, ¶ 113. Sprint Nextel’s service consisted of unlimited wireless voice, text and data service to consumers in the Twin Cities, Philadelphia, San Francisco and Tampa, Florida for \$120 per month. For \$150 per month, consumers could add unlimited broadband access (via network cards). *Id.*

carriers, like Leap and MetroPCS, have been offering unlimited local calling plans for years.<sup>274</sup>

112. The major development since the release of the *Twelfth Report* is the introduction of unlimited national flat-rate calling plans across the four nationwide operators in the first quarter of 2008.<sup>275</sup> Verizon Wireless made the first move by offering an unlimited nationwide flat-rate calling plan in February 2008.<sup>276</sup> AT&T quickly responded with a similar offer, and T-Mobile followed soon after with a nationwide flat-rate calling plan that it differentiated by including unlimited voice bundled together with unlimited text messaging.<sup>277</sup> Similarly, the version of a nationwide flat-rate offering subsequently unveiled by Sprint Nextel includes unlimited voice, text messages, and various premium data services such as e-mail and Web surfing.<sup>278</sup> In addition, beginning in the second quarter of 2008, T-Mobile cut the price of additional lines on the shareable “family plan” version of its unlimited national calling plan by 50 percent.<sup>279</sup> As discussed below, at least two resale/MVNO providers also responded to the introduction of national flat-rate calling plans across the nationwide providers by offering prepaid versions of such plans.<sup>280</sup>

113. In addition to the developments discussed above, providers have initiated a series of changes in contractual arrangements for mobile telephone pricing plans over the past few years. Until recently, providers have generally required customers to sign a one- or two-year agreement in order to take advantage of the various types of calling plans discussed above. As a rule, providers have also required customers to pay early termination fees (“ETFs”) when they cancel their wireless service before the expiration of these agreements. Fixed-term service contracts and ETFs are part of a traditional industry business model in which providers use handset subsidies to offer consumers a discount on the upfront price of handsets and thereby promote the sale of mobile telephone services.<sup>281</sup> The recent changes to these arrangements involve the pro-rating of ETFs and the introduction of a month-to-month service option.

114. As noted in the *Twelfth Report*, Verizon Wireless became the first carrier to pro-rate

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<sup>274</sup> See Section VII.A.2, *Wireless Alternatives*, *infra*, and *Tenth Report*, at 15981, ¶ 199.

<sup>275</sup> David W. Barden, *et al.*, *Wireless Services and Handset Pricing Analysis*, Bank of America, Equity Research, June 19, 2008, at 3-4, 7 (“*Wireless Services and Handset Pricing Analysis*”).

<sup>276</sup> *Id.* at 7; Amol Sharma and Dionne Searcy, *For Big Talkers, Wireless Firms Offer Flat Rates: Plans from Verizon, Rivals Will Allow Unlimited Calling; Switching Without Penalties*, WALL STREET JOURNAL, Feb. 20, 2008, at D1; Matt Kapko, *It’s An Unlimited Industry Now . . . But What About Sprint Nextel*, RCR WIRELESS NEWS, Feb. 20, 2008; Roger Cheng, *Virgin Mobile to Join Flat Rate Phones Frenzy*, WALL STREET JOURNAL, June 24, 2008 (“*Flat Rate Phones Frenzy*”).

<sup>277</sup> *T-Mobile Offers Consumers Unlimited Calling and Messaging Plan*, News Release, T-Mobile, Feb. 19, 2008; *Flat Rate Phones Frenzy; Wireless Services and Handset Pricing Analysis*.

<sup>278</sup> Matt Kapko, *Sprint Nextel Goes All In, Announces ‘Simply Everything’ Unlimited Play*, RCR WIRELESS NEWS, Feb. 28, 2008; *Flat Rate Phones Frenzy; Wireless Services and Handset Pricing Analysis*.

<sup>279</sup> *Wireless Services and Handset Pricing Analysis*, at 11 (noting that T-Mobile lowered the price of its Family Time Unlimited plan from \$199.99 to \$149.99 for two parties sharing the plan, and additional lines can be added for \$49.99 each); COMMUNICATIONS DAILY, June 5, 2008, at 7. The plan includes unlimited text and instant messaging as well as unlimited voice.

<sup>280</sup> See Section IV.A.2, *Prepaid Service*, *infra*.

<sup>281</sup> See, e.g., *Wireless Services and Handset Pricing Analysis*, at 1, 13-19.

ETFs for new contract customers in November 2006,<sup>282</sup> and cited a report suggesting that Verizon Wireless's new ETF policy may put competitive pressure on other providers to follow suit.<sup>283</sup> AT&T implemented a new policy to pro-rate ETFs in late May 2008.<sup>284</sup> In November 2007, both Sprint Nextel and T-Mobile announced plans to implement pro-rated ETFs in 2008.<sup>285</sup> As of June 2008, T-Mobile pro-rates its ETFs for customers with 180 days or less remaining on their service contracts,<sup>286</sup> and as of November 2, 2008, Sprint Nextel altered its policy on ETFs beginning in month six of a customer's contract.<sup>287</sup> As of June 2008, AT&T, Verizon Wireless, Sprint Nextel, T-Mobile, and Alltel have each implemented various policies that allow customers the option of changing elements of their contracts without requiring a contract extension, and they each permit customers various periods of time to try their services so that if they are not fully satisfied they can change plans without penalties.<sup>288</sup>

115. In addition, since the release of the *Twelfth Report* one of the nationwide providers initiated a significant departure from the traditional business model. In September 2008, Verizon Wireless introduced a month-to-month option that allows customers to purchase the company's nationwide pricing plans without signing a one- to two-year contract.<sup>289</sup> Under this new month-to-month agreement, customers can either purchase new devices at the full retail price, or use their own devices provided they are compatible with Verizon Wireless's wireless network technology. In addition, customers can terminate their agreement at the end of any month without paying an ETF. Verizon Wireless's month-to-month agreement is available on all of the company's nationwide voice and data plans for both new and current contract customers, though current contract customers must fulfill the terms of their current contract before moving to a month-to-month agreement.

## 2. Prepaid Service

116. In the United States, most mobile telephone subscribers pay their phone bills after they have incurred charges, an approach known as postpaid service. Prepaid service, in contrast, requires customers to pay for a fixed amount of minutes prior to making calls. Although prepaid plans are considered a good way to increase penetration rates, they typically produce lower ARPUs and higher churn rates in comparison to postpaid service.<sup>290</sup> For these reasons, the industry generally has not heavily

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<sup>282</sup> *Twelfth Report*, 23 FCC Rcd at 2293, ¶ 115; *Verizon Wireless Expands the 'Worry-Free Wireless Guarantee' It Pioneered*, News Release, Verizon Wireless, Nov. 16, 2006. Verizon Wireless reduces its \$175 ETF by \$5 per month for each full month the customer retained Verizon Wireless's service.

<sup>283</sup> *Citing Negative Impact on Industry, Verizon Wireless to Pro-Rate ETFs*, TRDAILY, June 29, 2006.

<sup>284</sup> *AT&T Announces New Approach To Early Termination Fees: More Flexibility For Wireless Customers*, News Release, AT&T, Mar. 31, 2008. AT&T followed Verizon Wireless's lead and also reduces its \$175 ETF by \$5 per month for each full month the customer retained AT&T's service.

<sup>285</sup> *T-Mobile to Introduce More-Flexible Contract Terms for Customers*, News Release, T-Mobile, Nov. 7, 2007; *Sprint Announces New Programs to Deliver Better Customer Experience*, News Release, Sprint Nextel, Nov. 7, 2007.

<sup>286</sup> *See T-Mobile Offers Customers Additional Service Plan Flexibility*, News Release, T-Mobile (June 23, 2008), available at <http://www.fiercewireless.com/node/25144> (last visited Dec. 15, 2008).

<sup>287</sup> *Sprint Launches One of the Industry's Most Customer-Friendly Policies on Pro-Rated Early Termination Fees*, News Release, Sprint Nextel (Oct. 31, 2008).

<sup>288</sup> CTIA, *Written Ex Parte Communication*, WT Docket Nos. 05-194 & 08-27, June 11, 2008, at 2-4.

<sup>289</sup> *No Contract Required – New Month-To-Month Agreement Gives Verizon Wireless Customers Even More Freedom*, Press Release, Verizon Wireless, Sept. 22, 2008.

<sup>290</sup> *Twelfth Report*, 23 FCC Rcd at 2293-94, ¶ 116.

promoted prepaid offerings in the past.<sup>291</sup> However, the pool of unsubscribed customers qualified for postpaid plans has declined to the point where prepaid offerings, which do not require credit checks, seem more attractive to carriers.<sup>292</sup> In response, some carriers have introduced new prepaid plans, or entire brands.<sup>293</sup> In some cases, they are tailoring their offerings to suit segments of the market that do not want or cannot get a traditional cellular plan, particularly the youth market. In addition, many MVNOs offer prepaid plans rather than standard monthly billing.

117. The result of these efforts has been a significant rise in the percentage of wireless users who subscribe to prepaid plans.<sup>294</sup> According to one analyst, prepaid wireless subscribers accounted for roughly 17 percent of major U.S. operators' subscribers at the end of 2007,<sup>295</sup> versus 15 percent at the end of 2006.<sup>296</sup> Prepaid subscriber growth slowed last year; however, its growth is still three times higher than postpaid subscriber growth.<sup>297</sup>

118. Although prepaid service is generally targeted at different market segments than postpaid service, there is evidence of competitive interaction between the pricing of prepaid and postpaid service offerings. A recent example is the spread of unlimited national calling options from postpaid to prepaid service. In July 2008, MVNO Virgin Mobile responded to the introduction of unlimited national flat-rate calling plans across the nationwide facilities-based providers by unveiling a prepaid version of an unlimited national flat-rate calling plan, along with a variant that includes unlimited text messaging and emails for an additional flat monthly charge.<sup>298</sup> Whereas the nationwide facilities-based providers charge higher monthly fees for unlimited calling plans and require their customers to sign fixed-term contracts, customers who take advantage of Virgin's unlimited offering do not have to sign contracts and are free to leave at any time.<sup>299</sup> In August 2008, Net10, a prepaid service provider and subsidiary of Tracfone, followed by offering unlimited calling and text messaging for a flat monthly charge.<sup>300</sup>

### 3. Mobile Broadband and Other Data Service Pricing

119. During the past year providers continued to use a wide variety of options for pricing mobile data services provided over wireless broadband networks and slower legacy wireless networks. These options include subscription to a monthly data package, flat rate pricing for each use or download of an application, and pricing based on kilobytes consumed. The availability of the different pricing options varies by type of application as well as by provider, with providers frequently offering customers

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<sup>291</sup> *Id.*

<sup>292</sup> *Id.*

<sup>293</sup> *Id.*

<sup>294</sup> The percentage of total mobile telephone subscribers who use prepaid plans remains significantly lower in the United States than in most of Western Europe. See Table 16: Mobile Market Performance in Selected Countries, *infra*.

<sup>295</sup> See John C. Hodulik *et al.*, *US Wireless 411*, UBS Investment Research, UBS, Mar. 18, 2008, at 3 (“*US Wireless 411*”).

<sup>296</sup> See *Twelfth Report*, 23 FCC Rcd at 2294, ¶ 117.

<sup>297</sup> *US Wireless 411* at 3.

<sup>298</sup> *Virgin Mobile USA To Introduce Lowest-Priced Unlimited Nationwide Calling With No Roaming Or Long Distance Charges, No Activation Fees or Annual Contracts*, News Release, Virgin Mobile, June 24, 2008; *Flat Rate Phones Frenzy*, *supra* note 276.

<sup>299</sup> *Id.*

<sup>300</sup> Allie Winter, *Unlimited Calling Dribbles Into No-Contract Crowd*, RCR WIRELESS NEWS, Aug. 4, 2008.

a choice of pricing options for a particular application. In addition to allowing customers to purchase particular applications on a stand-alone or *a la carte* basis, carriers also offer certain applications bundled with monthly data packages for mobile phones. As in the past, mobile data pricing continues to be characterized by considerable complexity due to the diversity of pricing options.<sup>301</sup>

120. Providers offer a wide variety of data packages for a flat monthly charge. The specific content of such mobile data packages varies by provider, and individual providers typically offer multiple tiers of monthly data packages.<sup>302</sup> As noted in the *Twelfth Report*, providers price monthly data packages in two principal ways: based on a limited amount of usage per month or unlimited monthly data use.<sup>303</sup> For example, providers continue to offer messaging packages that include a set number of messages per month, as well as unlimited monthly messaging packages.<sup>304</sup> Data packages for mobile content such as Web browsing, e-mail, video and television typically allow unlimited access to all or some of the content included in the package.<sup>305</sup> In this regard, a notable development in the past year is the introduction of unlimited bundled service plans that combine unlimited nationwide calling with unlimited text messaging and unlimited use of certain other data services such as picture or video messaging, Web browsing, emailing, GPS navigation and mobile television.<sup>306</sup> These unlimited voice and messaging bundles were introduced as a competitive response to the prior launch of unlimited voice-only plans.<sup>307</sup>

121. Providers also allow mobile subscribers to use mobile data applications on a “pay-per-use” or “pay-as-you-go” basis, without subscribing to a monthly data package. The two most common pay-per-use pricing options currently in use are: (1) a flat fee for each use or download of an application;<sup>308</sup> and (2) a per-kilobyte fee.<sup>309</sup> Differentiated rates for pay-per-use and monthly data

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<sup>301</sup> *Twelfth Report*, 23 FCC Rcd at 2294-97, ¶¶ 118-123.

<sup>302</sup> See, e.g., AT&T Wireless, *Messaging and MEdia (TM) Bundles*, available at <http://www.wireless.att.com> (search “Messaging and Media (TM) Bundles”) (last visited Dec. 16, 2008); Sprint, *Data Service Packs*, available at <http://www.sprint.com> (search “Data Service Packs”) (last visited Dec. 16, 2008); Verizon Wireless, *Data Plans*, available at <http://www.verizonwireless.com> (hyperlink “Plans;” hyperlink “Voice and Email Plans” or “Internet Plans”) (last visited Dec. 15, 2008).

<sup>303</sup> *Twelfth Report*, 23 FCC Rcd at 2295, ¶ 120.

<sup>304</sup> See, e.g., See, e.g., AT&T Wireless, *Messaging and MEdia (TM) Bundles*, available at <http://www.wireless.att.com> (search “Messaging and Media (TM) Bundles”) (last visited Dec. 16, 2008); Sprint, *Data Service Packs*, available at <http://www.sprint.com> (search “Data Service Packs”) (last visited Dec. 16, 2008);

<sup>305</sup> See, e.g., AT&T Wireless, *Messaging and MEdia (TM) Bundles*, available at <http://www.wireless.att.com> (search “Messaging and Media (TM) Bundles”) (last visited Dec. 16, 2008); Sprint, *Data Service Packs*, available at <http://www.sprint.com> (search “Data Service Packs”) (last visited Dec. 16, 2008); Verizon Wireless, *Data Plans*, available at <http://www.verizonwireless.com> (hyperlink “Plans;” hyperlink “Voice and Email Plans” or “Internet Plans”) (last visited Dec. 15, 2008).

<sup>306</sup> See Section IV.A.1, Developments in Mobile Telephone Pricing Plans, *supra*.

<sup>307</sup> David W. Barden, *et al.*, *Wireless Services and Handset Pricing Analysis*, *supra* note 275, at 7, 10-12.

<sup>308</sup> See, e.g., T-Mobile, *Services*, available at <http://www.t-mobile.com/shop/addons/> (last visited Dec. 16, 2008) (explaining that subscribers can download various types of games and ringtones for a range of flat fees apiece); AT&T Wireless, *Messaging FAQs*, available at <http://www.wireless.att.com/learn/messaging-internet/messaging/faq.jsp> (last visited Dec. 16, 2008) (noting that AT&T customers with text-messaging capable phones are pre-activated to send and receive messages for \$0.20 per message); Sprint, *Music*, available at [http://www.nextel.com/en/services/power\\_vision/music.shtml](http://www.nextel.com/en/services/power_vision/music.shtml) (last visited Dec. 16, 2008) (noting that the price for downloading music from the Sprint Music Store is \$0.99 per song with the purchase of various monthly data plans or packages).

packages allow high-volume users to save on data services by subscribing to monthly data packages. For example, volume discounts applied to monthly messaging packages result in a lower unit price per message than the flat pay-as-you-go rate for messaging services.<sup>310</sup>

122. Nielsen Mobile reports that a growing number of consumers are turning to unlimited (“all-you-can-eat”) data plans that allow them to access the mobile Internet as frequently as they’d like for a fixed cost.<sup>311</sup> In particular, Nielsen Mobile estimates that 14 percent of U.S. wireless subscribers had a wireless plan that provided unlimited access to the mobile Internet as of the first quarter of 2008, up from 10 percent in the first quarter of 2007.<sup>312</sup> In addition, Nielsen Mobile finds that fixed-fee, unlimited data use is the preferred subscription model for mobile data users, with 50 percent of such users saying they would prefer such a model in the fourth quarter of 2007, much higher than the percentages of those users who favored alternative pricing models such as fixed-fee limited use (2 percent) or pay-per-use (1 percent).<sup>313</sup> As noted in previous reports, monthly data packages are particularly popular among subscribers who access the Web via their mobile phones because consumers perceive mobile web browsing to be too expensive without using monthly data packages, and want to avoid being surprised by additional charges billed to their monthly mobile phone invoices.<sup>314</sup>

123. As discussed in the *Twelfth Report*, advertising on mobile phones has the potential to become a significant alternative revenue source, and U.S. wireless providers have begun to sell advertising on mobile phones, or made plans to do so, with a view towards using advertising revenues to subsidize mobile data services and thereby stimulate greater consumer uptake and usage of mobile video, Internet access and other content.<sup>315</sup> Nielsen Mobile reports that, by the end of 2007, 29 percent of U.S. mobile data users recalled seeing some form of advertising on their phone, including not only mobile Internet advertising, but also shortcode advertising via text messaging, mobile video advertising, mobile game advertising and other forms of mobile marketing.<sup>316</sup> The *Twelfth Report* identified consumers’ lukewarm response to mobile advertising in surveys as a potential stumbling block to the advertising

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<sup>309</sup> See, e.g., AT&T Wireless, *MEDia™ Net*, available at <http://www.wireless.att.com> (last visited Oct. 7, 2008) (noting that the pricing options available for MEdia Net wireless data services include pay-as-you-go for \$0.01 per kilobyte); Sprint, *Data Packs*, available at <http://www.sprint.com> (last visited Oct. 7, 2008) (noting that customers will be charged \$0.03 per kilobyte for usage of Sprint Vision data services unless they purchase a monthly data package for Sprint Vision); Verizon Wireless, *Data Services: V CAST Music*, available at <http://www.verizonwireless.com> (last visited Oct. 7, 2008) (noting that purchasing and downloading music from the V CAST Music store may be billed at 1.5 cents per kilobyte if the customer does not subscribe to a data plan or feature).

<sup>310</sup> See, e.g., T-Mobile, *Messaging*, available at <http://www.t-mobile.com> (last visited Oct. 7, 2008) (offering subscribers the option of purchasing volume-discount priced monthly messaging bundles as an alternative to sending and receiving messages on a pay-as-you-go basis for \$0.15 each); AT&T Wireless, *Messaging FAQs*, available at <http://www.wireless.att.com> (last visited Oct. 7, 2008) (stating that a messaging package is an allotment of messages that are priced lower than the per message charge). See also *Twelfth Report*, 23 FCC Rcd at 2295-96, ¶ 120.

<sup>311</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 4.

<sup>312</sup> *Id.*

<sup>313</sup> *Id.*

<sup>314</sup> See, e.g., *Twelfth Report*, 23 FCC Rcd at 2296, ¶ 120.

<sup>315</sup> *Id.* at 2296-2297, ¶ 122. See also Sharon Armbrust, *Wireless Investor: U.S. Mobile Wireless Projections: Data Dollars Outgrow Voice 8-to-1*, WIRELESS INVESTOR, SNL Kagan, July 15, 2008, at 4.

<sup>316</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 8.

model.<sup>317</sup> More recent survey evidence from Nielsen Mobile indicates that consumers may be becoming somewhat more receptive to marketing on mobile phones in exchange for receiving free applications. Specifically, while just 14 percent of U.S. mobile data users say they do not mind relevant mobile advertising, 23 percent of such users expect to see more of it, and 32 percent are open to mobile advertising if it helps to lower their wireless bill.<sup>318</sup> Nielsen Mobile also finds that mobile Internet users and mobile video users tend to be more open to mobile advertising than users of some other forms of mobile content, and in particular estimates that mobile Internet users are 60 percent more likely than the average data user to find mobile advertising acceptable.<sup>319</sup> Based on such findings, Nielsen Mobile believes that “mobile advertising is most acceptable to consumers via media types with which they are accustomed to receiving advertising messages in the non-mobile world.”<sup>320</sup>

124. The mobile search advertising market is one promising source of ad revenue. Although this market is currently still small, with only an estimated \$244 million in spending expected in 2008, wireless providers and Internet companies expect the market to grow rapidly in the future.<sup>321</sup> Wireless service providers will split revenue with other parties from ads that come up in response to the keywords subscribers use to conduct searches.<sup>322</sup> For example, it is reported that Sprint Nextel recently entered into a deal with Google under which Sprint Nextel added Google as the default Web search bar on browsers in more than 40 of its handsets, and as part of that deal Sprint Nextel shares revenue from ads Google displays in response to searches.<sup>323</sup>

## **B. Non-Price Rivalry**

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

### **1. Technology Deployment and Upgrades**

#### **a. Market-Based Versus Mandated Standards**

126. The subject of technology deployment and upgrades by U.S. mobile telecommunications providers is properly analyzed under the heading of provider conduct because of the Commission’s market-oriented approach to managing spectrum for commercial mobile voice and data services. The Commission has adopted flexible licensing policies instead of mandating any particular technology or network standard. Mobile telephone service providers have the flexibility to deploy the network technologies and services they choose as long as they abide by certain technical parameters designed to avoid radiofrequency interference with adjacent licensees. In contrast, the European Community mandated a single harmonized standard for second-generation mobile telecommunications services

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<sup>317</sup> *Twelfth Report*, 23 FCC Rcd at 2296-97, ¶ 122. (citing a survey conducted in August 2006 that asked participants “How willing would you be [on a scale of 1 to 7] to watch advertising on your cell phone if in return you were to receive free applications for your cell phone?,” in which 51 percent responded that they were not willing at all [rating 1], 12 percent were neutral [4], and only 10 percent responded that they were very willing [7].)

<sup>318</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 8.

<sup>319</sup> *Id.*

<sup>320</sup> *Id.*

<sup>321</sup> Amol Sharma, *Verizon, Google Close to Mobile Search Deal*, WALL STREET JOURNAL, Aug. 22, 2008, at A1.

<sup>322</sup> *Id.*

<sup>323</sup> *Id.*

(GSM<sup>324</sup>), and also has adopted a single standard for third-generation services (WCDMA<sup>325</sup>).<sup>326</sup> As a result of the flexibility afforded by the Commission's market-based approach, different U.S. providers have chosen to deploy a variety of different technologies with divergent technology migration paths. Competition among multiple incompatible standards has emerged as an important dimension of non-price rivalry in the U.S. mobile telecommunications market and a distinctive feature of the U.S. mobile industry model.

127. The main advantage of compatibility between competing wireless networks is that greater economies of scale in the production of both terminals and network infrastructure equipment tend to lower the unit cost of handsets, chipsets, and other network equipment.<sup>327</sup> Lower equipment costs, in turn, may promote more rapid adoption of mobile telephone services.<sup>328</sup> In addition, standardization tends to produce greater variety of handsets.<sup>329</sup> However, it has been argued that the Commission's market-based approach to wireless network standards helped encourage the emergence of a promising new wireless network technology (CDMA<sup>330</sup>) that ultimately proved to be superior to the European second-generation wireless standard for high-speed mobile data services.<sup>331</sup> In addition, competition between mobile telephone providers using incompatible wireless network technologies has other advantages that can benefit consumers, including greater product variety and differentiation of services,<sup>332</sup> more technological competition,<sup>333</sup> and greater price competition.<sup>334</sup>

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<sup>324</sup> See Section IV.B.1.b, Background on Network Design and Technology, *infra*.

<sup>325</sup> *Id.*

<sup>326</sup> Neil Gandal, David Salant, and Leonard Waverman, *Standards in Wireless Telephone Networks*, TELECOMMUNICATIONS POLICY, Vol. 27, No. 5-6, June-July 2003, at 325 (“Standards in Wireless Telephone Networks”). The authors note that, although the European Community backed away from mandating a single standard for third-generation services, the absence of a mandate has had little practical effect as all European mobile operators have opted for the same standard and migration path. *Id.* at 330.

<sup>327</sup> *Id.* at 329.

<sup>328</sup> See Carl Shapiro and Hal R. Varian, *INFORMATION RULES*, Harvard Business School Press, 1999, at 264 (noting that “the Europeans managed to adopt new digital wireless telephone technology more rapidly than in the United States”) (“INFORMATION RULES”); Stephen C. Littlechild, *Mobile Termination Charges: Calling Party Pays Versus Receiving Party Pays*, TELECOMMUNICATIONS POLICY, Vol. 30, No. 5-6, June-July 2006, at 242-77 (finding that “technical concentration,” measured as the percent of subscribers on GSM networks, increases mobile penetration).

<sup>329</sup> *Standards in Wireless Telephone Networks*, at 329.

<sup>330</sup> See Section IV.B.1.b, Background on Network Design and Technology, *infra*.

<sup>331</sup> *Standards in Wireless Telephone Networks*, at 328-30; *INFORMATION RULES*, at 264; Section IV.B.1.b, Background on Network Design and Technology, *infra*.

<sup>332</sup> *Standards in Wireless Telephone Networks*, at 329-330 (noting, for example, that CDMA networks “have offered more and better data services than were available on GSM networks”).

<sup>333</sup> *Id.* at 330. See also *Eleventh Report*, 21 FCC Rcd at 10993, ¶ 113 (noting that the former Cingular was pressured to upgrade its network to WCDMA/HSDPA, rather than the slower, interim WCDMA technology, in an effort to compete with Verizon Wireless's EV-DO network, which offers speeds similar to WCDMA/HSDPA and faster than WCDMA) and at 11025-26 (arguing that this technological competition helped give the United States an edge over Europe with regard to the deployment of high-speed wireless data networks).

<sup>334</sup> *Standards in Wireless Telephone Networks*, at 330. Technological competition may pressure providers to cut rates and provide larger handset subsidies to attract a sufficiently large customer base to ensure their chosen technology survives as a standard. See Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 11 (“3G Economics a Cause for Concern”). In addition, use of multiple (continued....)

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

#### **b. Background on Network Design and Technology**

129. Cellular, PCS, and digital SMR networks use the same basic design. All use a series of low-power transmitters to serve relatively small areas (“cells”), and reuse spectrum to maximize efficiency.<sup>335</sup> In the past, cellular and SMR networks used an analog technology, while PCS and AWS networks were designed from the start to use a digital format. Digital technology provides better sound quality and increased spectral efficiency than analog technology. From a customer’s perspective, digital service in the cellular band or SMR bands is virtually identical to digital service in the PCS and AWS bands. Digital technology is now dominant in the mobile telephone sector, with almost all wireless subscribers using digital service.<sup>336</sup>

130. The two main digital technologies used in the United States are Code Division Multiple Access (“CDMA”) and Global System for Mobile Communications (“GSM”). In addition, there are two other, less-widely used (by subscribers), technologies: integrated Digital Enhanced Network (“iDEN”) and the once-common Time Division Multiple Access (“TDMA”). These four technologies are commonly referred to as Second Generation, or “2G,” because they succeeded the first generation of analog cellular technology, Advanced Mobile Phone Systems (“AMPS”).<sup>337</sup> As discussed in previous reports, in light of industry developments, this *Report* no longer distinguishes between TDMA and GSM networks in its analysis of digital coverage, but considers the two as one migration path towards more advanced digital capabilities. U.S. carriers have been phasing out TDMA.<sup>338</sup> Maps showing mobile

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incompatible wireless network standards may act as a constraint on providers’ ability to engage in explicit or tacit coordination that would impair price competition. *See* Horizontal Merger Guidelines, U.S. Department of Justice and Federal Trade Commission, Apr. 2, 1992, revised Apr. 8, 1997, § 2.11 (noting that standardization of pricing and product variables on which firms could compete may facilitate reaching terms of coordination that would harm consumers).

<sup>335</sup> PCS, digital SMR, and cellular networks are all “cellular” systems since all divide service regions into many small areas called “cells.” Cells can be as small as an individual building or as large as 20 miles across. Each cell serves as a base station for mobile users to obtain connection to the fixed network and is equipped with its own radio transmitters/receivers and associated antennas. Service regions are divided into cells so that individual radio frequencies may be reused in different cells (“frequency reuse”), in order to enhance frequency efficiency. When a person makes a call on a wireless phone, the connection is made to the nearest base station, which connects with the local wireline phone network or another wireless operator. When a person is using a wireless phone and approaches the boundary of one cell, the wireless network senses that the signal is becoming weak and automatically hands off the call to the base station in the next cell. *See Sixth Report*, 16 FCC Rcd at 13361, n.55.

<sup>336</sup> *See* Section VI.B.1, Subscriber Growth, *infra*.

<sup>337</sup> *See infra* note 354 for a discussion of the cellular analog requirement and its sunset.

<sup>338</sup> AT&T, for example, discontinued TDMA service on February 18, 2008, and on Mar. 1, 2008 TDMA service was discontinued on the former Dobson TDMA network. AT&T, *Answer Center*, <http://wireless.att.com/answer-center> (last visited Sept. 19, 2008). Cincinnati Bell Wireless discontinued its TDMA service in June 2006. Cincinnati Bell, Inc., SEC Form 10-K, filed Mar. 1, 2007, at 5.

telephone digital coverage can be found in Appendix B.

131. Beyond the 2G digital technologies, mobile telephone providers have been deploying next-generation or third generation (“3G”) network technologies<sup>339</sup> that allow them to offer mobile data services at higher data transfer speeds and, in some cases, to increase voice capacity.<sup>340</sup> For GSM/TDMA providers, the first step in the migration to next-generation network technologies is General Packet Radio Service (“GPRS” or “GSM/GPRS”), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.<sup>341</sup> Beyond GPRS, many U.S. GSM/TDMA providers have deployed Enhanced Data Rates for GSM Evolution (“EDGE”) technology, which offers average data speeds of 100-130 kbps. Wideband CDMA (“WCDMA,” also known as Universal Mobile Telecommunications System, or “UMTS”) is the next migration step for GSM providers beyond EDGE and allows maximum data transfer speeds of up to 2 Mbps and average user speeds of 220-320 kbps.<sup>342</sup> Finally, deployment of WCDMA with HSDPA (High Speed Data Packet Access) technology allows average download speeds of 400-700 kbps with burst rates of up to several Mbps,<sup>343</sup> while the addition of HSUPA (High Speed Uplink Packet Access) technology allows average upload speeds of 500-800 kbps.<sup>344</sup> Although WCDMA and WCDMA/HSDPA are not backwards compatible with GPRS/EDGE, wireless modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE, and enable handoff between the two types of networks, are available for use with laptop computers.<sup>345</sup>

132. Many CDMA providers have upgraded their networks to CDMA2000 1xRTT (also referred to as “CDMA2000 1X” or “1xRTT”), CDMA2000 EV-DO (evolution-data optimized, “EV-DO”) Revision 0, and EV-DO Revision A (“Rev. A”) technologies. 1xRTT doubles voice capacity and delivers peak data rates of 307 kbps in mobile environments and typical speeds of 40-70 kbps.<sup>346</sup> EV-DO allows maximum data throughput speeds of 2.4 Mbps, while EV-DO Rev. A increases maximum data throughput speeds to 3.1 Mbps.<sup>347</sup> Whereas WCDMA and WCDMA/HSDPA are incompatible with earlier technologies on the GSM migration path, the more advanced technologies on the CDMA migration path are backwards compatible.<sup>348</sup> Deployment of these various technologies is discussed

<sup>339</sup> For purposes of this *Report*, all of the network technologies beyond 2G that carriers have deployed, as well as those that they plan to deploy in the future, are generally referred to as “next-generation network technologies.” The International Telecommunication Union (“ITU”) has defined 3G network technologies as those that can offer maximum data transfer speeds of 2 megabits per second (“Mbps”) from a fixed location, 384 kbps at pedestrian speeds, and 144 kbps at traveling speeds of 100 kilometers per hour. See *Fifth Report*, 15 FCC Rcd at 17695. There is ambiguity among other industry players, however, as to which network technologies constitute 3G and which constitute interim technologies, often labeled “2.5G.” See *Seventh Report*, 17 FCC Rcd at 12990 and 13038. Therefore, this *Report* uses a more general label to describe all of the technologies beyond 2G.

<sup>340</sup> See Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Providers, *infra*.

<sup>341</sup> See *Seventh Report*, 17 FCC Rcd at 12990. This upgrade is also labeled GSM/GPRS because many GSM/TDMA carriers are upgrading their TDMA markets with GSM and GPRS simultaneously.

<sup>342</sup> *Tenth Report*, 20 FCC Rcd at 15951, ¶ 111.

<sup>343</sup> *Id.*

<sup>344</sup> *AT&T Nears Completion of 3G Wireless Technology Deployment that Delivers Broadband Wireless Speeds – For Downloads and Uploads*, Press Release, AT&T, May 21, 2008.

<sup>345</sup> See, e.g., Novatel Wireless, *Products: Merlin U730 Wireless PC Modem Card*, available at [www.novatelwireless.com](http://www.novatelwireless.com) (last visited Oct. 8, 2008).

<sup>346</sup> See *Seventh Report*, at 12990; *Ninth Report*, 19 FCC Rcd at 20650, ¶ 129.

<sup>347</sup> *Id.*

<sup>348</sup> *Standards in Wireless Telephone Networks*, at 328.

below. Maps showing CDMA and GSM network coverages, as well as Mobile Broadband coverage, can be found in Appendix B.

133. Beyond WCDMA/HSDPA/HSUPA and EV-DO, there are two main competing technologies for next-generation wireless broadband networks: Long Term Evolution (“LTE”) and WiMAX. Both of these technologies, which are often referred to as fourth-generation (“4G”) technologies, are generally based on the Orthogonal Frequency Division Multiple Access (“OFDMA”) modulation technology.<sup>349</sup> LTE can support up to 58 Mbps for upper link transmission and 173 Mbps for downlink transmission with 20 MHz spectrum and a 2x2 Multiple Input Multiple Output (“MIMO”) antenna structure.<sup>350</sup> The Mobile WiMAX technology can support peak downlink data rates up to 63 Mbps and peak upper link data rates up to 28 Mbps in a 10 MHz channel.<sup>351</sup> The major GSM operators in the United States have chosen LTE as their next-generation technology beyond HSDPA/HSUPA-enhanced WCDMA.<sup>352</sup> By contrast, one of the two nationwide CDMA operators in the United States is planning to deploy WiMAX as its 4G wireless broadband network, while the other has announced that it has chosen LTE as its 4G network technology.<sup>353</sup> As a result, although GSM and CDMA operators have been following divergent technological migration paths until now and it is evident that technological competition will remain a characteristic feature of the U.S. wireless market, the future evolution of wireless broadband technologies may ultimately lead to greater technological convergence.

### c. Technology Choices and Upgrades of Mobile Telephone Providers

134. Of the four nationwide mobile telephone operators, AT&T and T-Mobile use GSM/TDMA as their 2G digital technology, Verizon Wireless and Sprint Nextel use CDMA, and Sprint Nextel also uses iDEN on the former Nextel network.<sup>354</sup> The four nationwide mobile operators, together with other U.S. mobile providers, have continued to deploy next-generation network technologies over the past year.

135. The two nationwide CDMA operators, Verizon Wireless and Sprint Nextel, have deployed EV-DO and EV-DO Rev. A network technologies across significant portions of their

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<sup>349</sup> See *EDGE, HSPA and LTE—The Mobile Broadband Advantage*, Rysavy Research and 3G Americas, September 2007, at 16, available at [http://www.3gamericas.com/pdfs/2007\\_Rysavy\\_091007.pdf](http://www.3gamericas.com/pdfs/2007_Rysavy_091007.pdf) (last visited Dec. 15, 2008).

<sup>350</sup> *Id.* at 81.

<sup>351</sup> See *Mobile WiMAX – Part I: A Technical Overview and Performance Evaluation*, Mobile WiMAX Forum, August 2006, at 10, available at [http://www.wimaxforum.org/documents/downloads/Mobile\\_WiMAX\\_Part1\\_Overview\\_and\\_Performance.pdf](http://www.wimaxforum.org/documents/downloads/Mobile_WiMAX_Part1_Overview_and_Performance.pdf) (last visited Dec. 15, 2008).

<sup>352</sup> *EDGE, HSPA and LTE Broadband Innovation*, Rysavy Research and 3G Americas, September 2008. See also, *AT&T Plans Major Expansion of 3G Wireless Broadband Service in 2008*, Press Release, AT&T, Feb. 6, 2008 (asserting that the company’s deployment of HSUPA marks the next step in direction toward LTE).

<sup>353</sup> See Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Providers, and Section IV.B.1.e, Broadband Data Networks and Technology Deployment, *infra*.

<sup>354</sup> In addition, through February 18, 2008, all operators using cellular spectrum must deploy AMPS, an analog technology, throughout the part of their networks using cellular spectrum. 47 C.F.R. § 22.901(b). In 2002, the Commission decided to eliminate the requirement after a five-year transition period, which ended February 18, 2008. 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, ¶ 22 (2002).

networks.<sup>355</sup> Typical, user-experienced download speeds with EV-DO range from 400 to 700 kbps, while upload speeds average 50-70 kbps.<sup>356</sup> The EV-DO Rev. A network upgrade increases average download speeds to 600 kbps to 1.4 Mbps and significantly improves average upload speeds to 350-800 kbps.<sup>357</sup>

136. In the past year, Verizon Wireless has further expanded its EV-DO Rev. A network footprint. As noted in the *Twelfth Report*, by mid-2007 Verizon Wireless had launched EV-DO technology in areas of the country covering approximately 210 million people and had upgraded this entire EV-DO network footprint with EV-DO Rev. A technology.<sup>358</sup> Since then, Verizon Wireless has continued to extend the reach of its EV-DO Rev. A network, making it available in areas of the country covering approximately 240 million people by the end of 2007.<sup>359</sup> With the EV-DO service, subscribers can access the Internet while mobile via a wireless modem card connected to a laptop computer or PDA, or they can download a range of multimedia content and advanced applications on certain mobile handset models. More than half of the company's retail customers had broadband-capable devices by the end of 2007.<sup>360</sup> As also noted in the *Twelfth Report*, Verizon Wireless also has announced that it plans to deploy LTE as its Fourth Generation, or "4G," network technology.<sup>361</sup> LTE will allow faster data rates, lower latency, and global roaming in countries where Vodafone operates.<sup>362</sup>

137. Sprint Nextel has also expanded its EV-DO Rev. A network footprint in the past year. The *Twelfth Report* recorded that Sprint Nextel's EV-DO network covered 209 million people in 219 communities with populations over 100,000 at the end of 2006, and that as of June 2007 this EV-DO network has been upgraded with EV-DO Rev. A in markets covering 203 million people.<sup>363</sup> By the end of 2007, Sprint Nextel's EV-DO network covered nearly 234 million people,<sup>364</sup> and Sprint Nextel had

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<sup>355</sup> The Commission noted in the *Ninth Report* that Sprint Nextel altered its technology upgrade strategy in response to competitive pressures from Verizon Wireless by deploying EV-DO rather than waiting for a successor technology to become commercially available. See *Ninth Report*, 19 FCC Rcd at 20653, ¶ 134.

<sup>356</sup> *Sprint Powers Up Faster Mobile Broadband Network in 10 More Markets, Upgraded Coverage Reaches 60 Million People*, News Release, Sprint Nextel, Dec. 12, 2006; 3G Americas, *3G Technologies*, available at [http://www.3gamericas.com/English/PDFs/3G\\_technology\\_comparison.pdf](http://www.3gamericas.com/English/PDFs/3G_technology_comparison.pdf) (last visited Dec. 15, 2008), ("3G Technology Comparison"). The maximum peak download speed for EV-DO is 2.4 Mbps. *Id.*

<sup>357</sup> *America's Largest and Fastest Mobile Broadband Network Just Got Even Larger – Sprint Customers Can Do More, In More Places, And At Fast Speeds*, News Release, Sprint Nextel, June 19, 2007; *Verizon Wireless: 100 Percent of Wireless Broadband Network Now Enhanced with Faster Speeds*, News Release, Verizon Wireless, June 29, 2007. The maximum peak download speed for EV-DO Rev A is 3.1 Mbps. *3G Technology Comparison*.

<sup>358</sup> *Twelfth Report*, 23 FCC Rcd at 2301, ¶ 134. Verizon Wireless also has deployed 1xRTT technology throughout "virtually all" of its network. Verizon Wireless, SEC Form 10-K, filed Mar. 1, 2007, at 5; *Eleventh Report*, at 10992. When EV-DO subscribers travel to other parts of the country where EV-DO networks have not been deployed, they can seamlessly roam on and access Verizon Wireless's 1xRTT network because the more advanced technologies on the CDMA migration path are backwards compatible. See *Ninth Report*, 19 FCC Rcd at 20652.

<sup>359</sup> *Verizon Caps Successful Year with Strong 4Q Results*, Press Release, Verizon Wireless, Jan. 28, 2008.

<sup>360</sup> *Id.*

<sup>361</sup> *Twelfth Report*, 23 FCC Rcd at 2301-02, ¶ 134.

<sup>362</sup> *Id.*

<sup>363</sup> *Id.* at 2302, ¶ 135. As noted in the *Ninth Report*, Sprint altered its technology strategy by deploying EV-DO, rather than waiting for a successor technology to become commercially available, in response to competitive pressure from Verizon Wireless's deployment of EV-DO. *Ninth Report*, 19 FCC Rcd at 20652-53.

<sup>364</sup> Sprint Nextel, SEC Form 10-K, filed Feb. 29, 2008, at 6.

upgraded this EV-DO network with EV-DO Rev. A technology in areas of the country where 222 million people live and work.<sup>365</sup> Moreover, the company had upgraded over 82 percent of its CDMA network to EV-DO Rev. A technology and planned to incorporate EV-DO Rev. A into all new cell sites added to its CDMA network in 2008.<sup>366</sup> In addition to offering Sprint Nextel-branded wireless services over its CDMA network, Sprint Nextel continues to provide Nextel-branded and Boost Mobile prepaid wireless services over the former Nextel iDEN network, which operates in 355 metropolitan markets covering about 266 million people.<sup>367</sup> In order to offer customers the benefits of both of its networks, and to relieve capacity constraints on its iDEN network, Sprint Nextel continues to offer a line of dual-mode handsets, marketed as PowerSource, that operate on both the CDMA and iDEN platforms.<sup>368</sup> In 2008, Sprint Nextel plans to launch Qualcomm's QChat™ technology, which is designed to provide high performance walkie-talkie services on its CDMA network, and is designing interfaces to provide for interoperability of walkie-talkie services on its CDMA and iDEN networks.<sup>369</sup> The company expects that, upon successful launch of QChat devices, these devices will succeed the PowerSource dual-mode handsets.<sup>370</sup>

138. Apart from the two near-nationwide CDMA mobile providers, some of the regional CDMA operators also have begun to deploy EV-DO, including Alltel, Alaska Communications Systems, and Cellular South.<sup>371</sup> In June 2008, Alltel announced that it would launch EV-DO Rev. A technology with an initial rollout in eighteen market areas and dozens of cities, including Charlotte, New Orleans, Phoenix and Tampa.<sup>372</sup> As of June 2008, Alltel's existing EV-DO network covered 76 percent of its POPs, up from 56 percent of its POPs at the end of 2006.<sup>373</sup> Alltel expects its EV-DO network to cover about 82 percent of its POPs by the end of 2008.<sup>374</sup>

139. AT&T expanded and upgraded its mobile broadband network in the past year. At the time of the *Twelfth Report*, AT&T had expanded its WCDMA/HSDPA network to more than 160 markets, including most of the top 100 cities in the United States, and planned to continue deploying WCDMA/HSDPA technology throughout a majority of the U.S. markets covered by its legacy network footprint.<sup>375</sup> Since then, AT&T has further expanded its WCDMA/HSDPA network to more than 275

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<sup>365</sup> *Sprint Nextel Reports Fourth Quarter and Full-Year 2007 Results*, Press Release, Sprint Nextel, Feb. 28, 2008.

<sup>366</sup> Sprint Nextel, SEC Form 10-K, filed Feb. 29, 2008, at 6, 36.

<sup>367</sup> *Id.* at 6.

<sup>368</sup> *Id.* at 3; *Twelfth Report*, 23 FCC Rcd at 2302.

<sup>369</sup> Sprint Nextel, SEC Form 10-K, filed Feb. 29, 2008, at 3.

<sup>370</sup> *Id.*

<sup>371</sup> *See Twelfth Report*, 23 FCC Rcd at 2302, ¶ 136.

<sup>372</sup> *Alltel Wireless Rolls Out Faster Broadband Network*, Press Release, Alltel Wireless, June 23, 2008.

<sup>373</sup> *Id.*; *Twelfth Report*, 23 FCC Rcd at 2302, ¶ 136.

<sup>374</sup> *Alltel Wireless Rolls Out Faster Broadband Network*, Press Release, Alltel Wireless, June 23, 2008.

<sup>375</sup> *Twelfth Report*, 23 FCC Rcd at 2302, ¶ 137. As noted in the *Tenth Report*, prior to its merger with AT&T Wireless, Cingular had deployed GSM/GPRS technology across its entire network footprint and had upgraded its data network to EDGE with respect to two-thirds of its covered network POPs. *See Tenth Report*, 20 FCC Rcd at 15953, ¶ 116 n.274. In addition, it has been reported that Cingular decided to upgrade its network to WCDMA/HSDPA, rather than the slower, interim WCDMA technology, in an effort to compete with Verizon Wireless's EV-DO network, which offers speeds similar to WCDMA/HSDPA and faster than WCDMA. *Id.* at 15953.

markets, started the first U.S. deployment of HSUPA technology and upgraded its entire WCDMA/HSDPA network footprint with HSUPA technology.<sup>376</sup> WCDMA/HSDPA enables mobile broadband access at average user download speeds of 400-700 kbps. The addition of HSUPA enables average upload speeds of 500-800 kbps.<sup>377</sup> AT&T's WCDMA/HSDPA customers can access the Internet while mobile via a laptop computer or PDA with a wireless modem card, or they can download a range of multimedia content and advanced applications on certain mobile handset models.<sup>378</sup> HSUPA technology initially provides enhanced upload speeds for laptop users.<sup>379</sup> AT&T's new mobile broadband deployments going forward will include both HSDPA and HSUPA technologies, and AT&T plans to extend its mobile broadband network to nearly 350 markets by the end of 2008.<sup>380</sup>

140. Since the *Twelfth Report*, T-Mobile has followed through on its plans to launch a mobile broadband network. In the period covered by the *Twelfth Report*, T-Mobile had a nationwide EDGE network and had announced plans to deploy a 3G next-generation network using the spectrum licenses it acquired in the FCC's 2006 AWS-1 auction (Auction 66).<sup>381</sup> In May 2008, T-Mobile announced that it had taken the first commercial step in the rollout of its 3G wireless network by launching its WCDMA/HSDPA network in New York City.<sup>382</sup> In September 2008, T-Mobile confirmed that the WCDMA/HSDPA network was deployed across 13 major metropolitan markets, such as New York, Boston, Miami, Las Vegas, and Houston, and T-Mobile announced that by the end of 2008 it expected to expand the network to 27 major markets, making T-Mobile 3G services available to more than two-thirds of the company's current data customers.<sup>383</sup>

#### d. Coverage by Technology Type

141. As we did with the number of mobile telephone operators, in this *Report*, we further refine our examination of competition in the mobile telephone sector by compiling a list of census blocks where operators offer digital and next generation technologies. This analysis is performed through a contract with American Roamer, an independent consulting firm that tracks service provision for mobile voice and mobile data services.<sup>384</sup> Under the American Roamer contract, in this *Report* we are able to

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<sup>376</sup> *AT&T Nears Completion of 3G Wireless Technology Deployment that Delivers Broadband Wireless Speeds – For Downloads and Uploads*, Press Release, AT&T, May 21, 2008 (“*AT&T Nears Completion of 3G Wireless Technology Deployment*”); *AT&T Delivers 3G Wireless Broadband Speed Boost with New-Generation Network Technologies and LaptopConnect Card*, Press Release, AT&T, Oct. 18, 2007 (“*AT&T Delivers 3G Wireless Broadband Speed*”).

<sup>377</sup> *AT&T Nears Completion of 3G Wireless Technology Deployment; AT&T Delivers 3G Wireless Broadband Speed*.

<sup>378</sup> *Twelfth Report*, 23 FCC Rcd at 2302-2303, ¶ 137. In markets where WCDMA/HSDPA is not available, laptop modem cards that are compatible with both WCDMA/HSDPA and GPRS/EDGE will seamlessly fall back to AT&T's EDGE and GPRS networks, albeit at lower speeds. *Id.* at 2303, n. 334.

<sup>379</sup> *AT&T Delivers 3G Wireless Broadband Speed Boost with New-Generation Network Technologies and LaptopConnect Card*, Press Release, AT&T, Oct. 18, 2007.

<sup>380</sup> *AT&T Nears Completion of 3G Wireless Technology Deployment; AT&T Delivers 3G Wireless Broadband Speed*.

<sup>381</sup> *Twelfth Report*, 23 FCC Rcd at 2303, ¶ 138.

<sup>382</sup> *T-Mobile USA Begins Commercial 3G Network Rollout*, Press Release, T-Mobile, May 5, 2008.

<sup>383</sup> *T-Mobile USA Announces Commercial 3G Network Availability In 21 Markets By Mid-October*, Press Release, T-Mobile, Sept. 18, 2008.

<sup>384</sup> See American Roamer, available at <http://www.americanroamer.com> (last visited Dec. 16, 2008).

estimate in which of the roughly 8 million census blocks each provider offers services using digital and next generation technologies, compared to just the roughly 3,200 counties in previous reports. As discussed earlier, by utilizing such a relatively small area to analyze technological availability, census blocks eliminate, to a large degree, the concerns regarding overcounting populations and geographic areas.

142. As of July 2008, virtually the entire population of the United States live in census blocks where operators offer digital mobile telephone service, using CDMA, GSM/TDMA, or iDEN (including their respective next generation technologies), or some combination of the three.

**Table 8: Mobile Telephone Digital Coverage by Census Block**

Technology	POPs in Covered Blocks	% of Total POPs	Square Miles Contained in Those Blocks	% of Total Square Miles
CDMA	282,693,989	99.1%	2,546,595	67.0%
GSM/TDMA	279,933,740	98.1%	2,320,964	61.1%
IDen	251,596,508	88.2%	927,423	24.4%
<b>Total Digital</b>	<b>284,153,539</b>	<b>99.6%</b>	<b>2,831,266</b>	<b>74.5%</b>

Source: Federal Communications Commission estimates based on data supplied by American Roamer, July 2008.

Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

143. Both CDMA and GSM/TDMA have been launched in census blocks containing 280 million people, or roughly 98 percent of the U.S. population, while iDEN-based service is available in census blocks containing roughly 164 million people, or approximately 57 percent of the U.S. population.

144. Using data supplied by American Roamer from May 2008, we also have calculated the extent of next generation deployment.

**Table 9: Mobile Telephone NextGen Coverage by Census Block**

Technology	POPs in Covered Blocks	% of Total POPs	Square Miles Contained in Those Blocks	% of Total Square Miles
CDMA Path (1xRTT/EV-DO/EV-DO Rev. A)	281,709,287	98.8%	2,341,275	61.6%
GSM Path (GPRS/EDGE/WCDMA/HSDPA)	277,739,378	97.4%	2,151,354	56.6%
<b>Total NextGen</b>	<b>283,672,514</b>	<b>99.5%</b>	<b>2,635,061</b>	<b>69.4%</b>
WCDMA/HSDPA	153,492,549	53.8%	116,043	3.1%
EV-DO/EV-DO Rev. A	262,904,792	92.2%	1,499,848	39.5%
<b>Total Broadband (EV-DO/WCDMA)</b>	<b>263,138,848</b>	<b>92.3%</b>	<b>1,504,174</b>	<b>39.6%</b>

Source: Federal Communications Commission estimates based on data supplied by American Roamer, May 2008.

Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

145. CDMA 1xRTT and/or EV-DO, has been launched in census blocks containing approximately 281 million people, or 98.8 percent of the U.S. population. Similarly, GPRS, EDGE, and/or WCDMA/HSDPA has been launched in census blocks containing approximately 277 million people, or about 98 percent of the U.S. population. EV-DO is now available in census blocks containing 92 percent of the U.S. population, covering about 40 percent of the total square miles of the United States, while WCDMA/HSDPA is available in census blocks containing approximately 54 percent of the U.S. population, but representing only 3.1 percent of its land area.

146. We also calculated the number of mobile broadband providers competing to offer service by census block.

**Table 10: Estimated Mobile Broadband Providers by Census Block**

Total Number of Providers in a block	Number of Blocks	POPs Contained in Those Blocks	% of Total U.S. POPs	Square Miles Contained in Those Blocks	% of Total U.S. Square Miles
1 or More	6,300,761	263,138,848	92.3%	1,504,174	39.6%
2 or More	3,570,372	206,851,304	72.5%	349,751	9.2%
3 or More	2,004,199	144,723,270	50.7%	88,960	2.3%

Source: Federal Communications Commission estimates based on data supplied by American Roamer, May 2008. (EV-DO/HSDPA Coverage). Notes: POPs are from the 2000 Census, and the square miles include the United States and Puerto Rico.

147. Approximately 206 million people, or 72.5 percent of the U.S. population, live in census blocks with two or more mobile telephone operators offering EV-DO or WCDMA/HSDPA technologies, while approximately 144 million people, or 50.7 percent of the U.S. population, live in census blocks where three or more operators offer such technologies.

#### e. Broadband Data Networks and Technology Deployment

148. In addition to the EV-DO and WCDMA/HSDPA mobile broadband network deployments discussed above, wireless operators in the 2.5 GHz BRS/EBS have begun rolling out, or have announced plans to deploy, wireless broadband services using Orthogonal Frequency Division Multiplexing (“OFDM”) technologies, including WiMAX and similar technologies. Because OFDM allows signals to pass through buildings and trees, providers can use the technology to offer wireless broadband services without a direct line-of-sight between the transmitter and the end user’s receiver.<sup>385</sup> Many of the services offered using OFDM technology allow customers to access the Internet with portable, “plug-and-play” modem devices connected to a personal or laptop computer, rather than a fixed antenna mounted on a rooftop. Customers can transport these devices to other locations within the provider’s coverage area where a network signal is available and in some cases use them while traveling at high speeds.<sup>386</sup>

149. Clearwire offers wireless high-speed Internet access and VoIP services using OFDM and Time Division Duplex (“TDD”) technology, and spectrum in the 2.5 GHz BRS/EBS band. As of March 2008, the company had launched broadband service in 46 markets, mainly smaller towns and cities, covering approximately 13.7 million people in portions of 16 states.<sup>387</sup> Clearwire also offers VoIP telephone service for an additional monthly fee.<sup>388</sup> As of March 31, 2008, the company had 392,000 broadband subscribers. This is a 69 percent increase since March 31, 2007, when there were 232,000 subscribers.<sup>389</sup> Clearwire’s customers can access the Internet at downstream speeds around two Mbps and

<sup>385</sup> *Eleventh Report*, 21 FCC Rcd at 10995, ¶ 119.

<sup>386</sup> *Id.*

<sup>387</sup> Clearwire, SEC Form 10-Q, filed May 12, 2008, at 6, 24; Clearwire, *Interactive Coverage Map*, available at [http://www.clearwire.com/store/service\\_areas.php](http://www.clearwire.com/store/service_areas.php) (last visited Dec. 16, 2008).

<sup>388</sup> Clearwire, SEC Form 10-Q, filed May 12, 2008, at 24.

<sup>389</sup> *Id.* at 25.

upstream speeds around 256 kbps, using a portable wireless modem device or PC card connected to a desktop or laptop computer.<sup>390</sup> Sprint Nextel, another WiMAX service provider in the 2.5 GHz BRS/EBS band, plans to cover 15 million subscribers with its XOHM network by the end of 2008.<sup>391</sup>

150. As we discussed earlier, in May 2008, Clearwire and Sprint Nextel announced an agreement to combine their wireless broadband assets and businesses to form a new company focused on deploying a nationwide mobile WiMAX IEEE 802.16e-2005 network. The companies completed their transaction on November 28, 2008, after receiving Commission approval. The new company is named Clearwire, and includes ownership interests by Sprint Nextel, Clearwire, Intel Corporation, Google Inc., Comcast Corporation, Time Warner Cable Inc., and Bright House Networks. With broadband speeds of up to six Mbps across the country, Clearwire's wireless broadband network will: cover almost one half of the U.S. population in roughly thirty-six months and offer wholesale service to unaffiliated firms to resell directly to consumers.<sup>392</sup>

151. Moreover, AT&T is using its 2.3 GHz WCS spectrum licenses to offer fixed wireless broadband Internet access service, and it has deployed WiMAX technology.<sup>393</sup> Downstream speeds range from 384 kbps to 1.5 Mbps.<sup>394</sup> AT&T also is interested in using WiMAX to extend broadband coverage in rural markets where it would be more expensive to deploy wireline broadband.<sup>395</sup>

152. Some smaller operators have launched WiMAX based networks and services in 2007. DigitalBridge Communications launched the first commercial WiMAX system in the United States in Rexburg, Idaho in June 2007.<sup>396</sup> Towerstream launched its fixed WiMAX service in the Dallas-Forth Worth, Texas metropolitan area on April 1, 2008.<sup>397</sup>

#### **f. Narrowband Data Networks and Technology Deployment**

153. Among the providers of narrowband mobile data services to business customers, several providers use paging spectrum to operate networks that offer traditional one-way paging services. Some paging providers also operate data networks using narrowband PCS spectrum, which allow them to offer two-way messaging services. Narrowband PCS providers use the ReFLEX technology protocol, which

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<sup>390</sup> Clearwire, *Plans – High Speed Internet*, available at <http://www.clearwire.com/products/gallery.php> (last visited Dec. 16, 2008).

<sup>391</sup> Dan Jones, *Sprint Reaffirms WiMax Targets*, available at [http://www.unstrung.com/blog.asp?blog\\_sectionid=244&doc\\_id=162776](http://www.unstrung.com/blog.asp?blog_sectionid=244&doc_id=162776) (last visited Dec. 16, 2008).

<sup>392</sup> Sprint Nextel/Clearwire Description of the Transaction and Public Interest Statement, ULS File No. 0003462540, WT Docket No. 08-94, at 20 (amended Jun. 24, 2008).

<sup>393</sup> *AT&T Alascom Delivers New Broadband Internet Choice for Juneau*, News Release, AT&T, Aug. 6, 2007; Kelly Hill, *Big Players Have Big Plans for WiMAX*, RCR WIRELESS NEWS, Oct. 24, 2007 (citing AT&T spokeswoman Jenny Parker). The company has conducted trials or limited deployments of WiMAX or other fixed wireless broadband technologies in a total of 22 markets. *Id.*

<sup>394</sup> *Eleventh Report*, 21 FCC Rcd at 10996, ¶ 121.

<sup>395</sup> Leslie Cauley, *AT&T's Goal is to Stay Ahead of Tech Curve*, USA TODAY, July 31, 2008, available at [http://www.usatoday.com/tech/products/2008-07-31-att-tries-to-stay-ahead-of-tech\\_N.htm](http://www.usatoday.com/tech/products/2008-07-31-att-tries-to-stay-ahead-of-tech_N.htm) (last visited on Dec. 16, 2008)

<sup>396</sup> DigitalBridge Communications, available at <http://www.digitalbridgecommunications.com/AboutDBC/tabid/84/Default.aspx> (last visited Dec. 16, 2008).

<sup>397</sup> *Towerstream Launches Fixed WiMAX Network In Dallas-Fort Worth, Texas: Dallas-Fort Worth Becomes Ninth Market In National Major Market Rollout*, News Release, April 1, 2008.

can transmit data at speeds ranging from 3.2 to 25 kbps.<sup>398</sup> USA Mobility's narrowband PCS network uses ReFLEX technology developed by Motorola, Inc. ("Motorola"); it covers 90 percent of the U.S. population.<sup>399</sup>

154. In addition, Velocita Wireless operates a two-way data network using 900 MHz SMR spectrum. The network, known as Mobitex, uses packet-switched radio technology to provide always-on, two-way messaging and data delivery, and covers 93 percent of the U.S. business population.<sup>400</sup> Space Data is using narrowband PCS spectrum in the 900 MHz band and balloon-borne platforms, called SkySites™, to offer wireless telemetry services to energy companies and other industrial companies in Texas, Louisiana, Oklahoma, New Mexico, and the Gulf of Mexico.<sup>401</sup>

## 2. Capital Expenditures

155. Capital expenditures, also referred to as "capital spending" and abbreviated as "capex," are funds spent during a particular period to acquire or improve long-term assets such as property, plant, or equipment.<sup>402</sup> In the mobile telephone industry, capex primarily consists 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).<sup>403</sup> One analyst estimated that wireless operators spent approximately \$19.9 billion on capex during 2007,<sup>404</sup> which is less than the approximately \$24.7 billion spent in each of 2006 and 2005, and less than the approximately \$21.4 billion spent in 2004.<sup>405</sup> CTIA reports that the wireless industry spent \$9.71 billion in capital expenditures in the first six months of 2007.<sup>406</sup>

## 3. Roaming

156. All mobile calling plans specify a calling area – such as a particular metropolitan area, a state, a region, the provider's entire network, or the entire United States – within which the subscriber can make a call without incurring additional charges. When a subscriber exits this area, or "roams," he or she may incur additional charges for each minute of use.<sup>407</sup> CTIA reported that "outcollect" roaming

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<sup>398</sup> See *Tenth Report*, 20 FCC Rcd at 15955, ¶ 124.

<sup>399</sup> *Id.*; USA Mobility, *Reliability of ReFLEX*, available at <http://www.usamobility.com/pdf/ReFLEXreliability.pdf> (last visited Dec. 16, 2007).

<sup>400</sup> *United Wireless Acquires Velocita Wireless, L.P.*, News Release, Velocita Wireless, July 2, 2007.

<sup>401</sup> Space Data Corp., *Overview of SkySite Network*, available at <http://www.spacedata.net/technology.htm> (last visited Dec. 16, 2008); *Tenth Report*, 20 FCC Rcd at 15923, ¶ 34.

<sup>402</sup> CNNMoney, *Money 101 Glossary*, available at <http://money.cnn.com/services/glossary/c.html> (last visited Dec. 16, 2008). There are differing opinions on what constitutes capital spending versus non-capital spending.

<sup>403</sup> *Eighth Report*, 18 FCC Rcd at 14818, ¶ 70.

<sup>404</sup> *US Wireless 411*, *supra* note 295, at 53.

<sup>405</sup> *Twelfth Report*, 23 FCC Rcd at 2307, ¶ 154.

<sup>406</sup> *CTIA 2008 Comments*, App. B, at 2. CTIA also states that wireless carriers "reported 12,784 more cell sites as of June 2007 compared to June 2006." *Id.*

<sup>407</sup> The fees that a carrier collects from non-subscribers using its network, including the carriers of such non-subscribers, 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.

revenues<sup>408</sup> for the entire mobile telephone industry increased to \$3.74 billion in 2007 from \$3.5 billion in 2006, but fell below the amount collected in 2005 of \$3.8 billion.<sup>409</sup> The contribution of roaming revenues to total service revenues continued its decline: from 4.1 percent in 2004, to 3.3 percent in 2005, to 2.8 percent in 2006, to 2.7 percent in 2007, down from over ten percent seven years ago.<sup>410</sup> As discussed in the *Twelfth Report*, roaming revenues typically account for a higher percentage of total service revenues for rural and smaller regional providers than for nationwide carriers.<sup>411</sup> The *Twelfth Report* also acknowledged the Commission's Report and Order from August 2007, which clarified that automatic roaming is a common carrier obligation for CMRS providers. In the Report and Order, the Commission held that CMRS carriers must provide automatic roaming services to other technologically compatible carriers outside their home areas upon reasonable request and on a just, reasonable, and nondiscriminatory basis pursuant to Sections 201 and 202 of the Communications Act.<sup>412</sup>

#### 4. Advertising and Marketing

157. Firms may engage in advertising and marketing either to inform consumers of available products or services or to increase sales by changing consumer preferences. Mobile telecommunications service is an "experience good,"<sup>413</sup> and in general, advertising for an experience good tends to be persuasive rather than informational in nature.

158. In 2007, advertising spending for wireless telephone services was \$4.1 billion, an increase of 12 percent over the previous year, according to Nielsen Monitor-Plus.<sup>414</sup> "The top five operators, Verizon Wireless, AT&T, Sprint Nextel, T-Mobile, and Alltel totaled \$3.89 billion – a rise of 16% over 2006, and a higher rise than the overall industry figure of 12%."<sup>415</sup> By comparison, U.S. advertising spending in general only rose 0.6% in 2007. For the top ten companies, advertising spending

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<sup>408</sup> CTIA's measure is one of "outcollect" roamer traffic revenues; in other words, the revenues generated by roamers in the providers' markets. *CTIA's Wireless Industry Indices, Semi-Annual Data Survey Results: A Comprehensive Report From CTIA Analyzing the U.S. Wireless Industry, Year-End 2007 Results*, rel. May 2008, at 88 ("Dec. 2007 CTIA Survey").

<sup>409</sup> See Appendix A, Table A-1, *infra*.

<sup>410</sup> *Id.* This is for the entire 12 month period.

<sup>411</sup> See *Twelfth Report*, 23 FCC Rcd at 2307, ¶ 156.

<sup>412</sup> Roaming Obligations of Commercial Mobile Radio Service Providers, *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 15817, 15818-19 ¶ 2 (2007), petitions for recon. pending. The common carrier obligation to provide roaming extends to real-time, two-way switched voice or data services that are interconnected with the public switched telephone network and utilize an in-network switching facility that enables the provider to reuse frequencies and accomplish seamless hand-offs of subscriber calls. The Commission also extended the automatic roaming requirement to PTT and text messaging services, and in its Further Notice of Proposed Rulemaking sought comment on whether the roaming obligation should be extended to services that are classified as information services and services that are not CMRS. The Further Notice of Proposed Rulemaking remains pending. Nonetheless, as noted in the *Eleventh Report*, some providers already have reached data roaming agreements. *Eleventh Report*, 21 FCC Rcd at 10998, ¶ 127.

<sup>413</sup> An experience good is a product or service that the customer must consume before determining its quality. See Dennis W. Carlton and Jeffrey M. Perloff, *MODERN INDUSTRIAL ORGANIZATION* (3<sup>rd</sup> ed.), Addison, Wellsley, Longman, Inc., 1999, at 484.

<sup>414</sup> *U.S. Operators Ad Spend Passes \$4 Billion in 2007*, Cellular-News, May 26, 2008.

<sup>415</sup> *Id.*

was down an average of four percent from 2006.<sup>416</sup> Bernstein Research reports that:

Verizon Wireless has been the most aggressive of the carriers, steadily increasing its ad spending over the past two years. AT&T Mobility, too, has grown ad spending, albeit more modestly of late. By contrast, T-Mobile has held ad spending almost perfectly flat over the past two years. Only Sprint among the Big Four has sharply *curtailed* ad spending.<sup>417</sup>

Bernstein Research reports that, together, the carriers spent approximately \$5.1 billion in advertising in 2007 for major ad media, including network television, cable television, spot broadcast, newspapers, magazines, radio, outdoor, and Internet, as reported by the media outlets.<sup>418</sup>

## 5. Network Quality

159. Network investment remains a centerpiece of providers' efforts to improve their customers' wireless service experience. Section IV.B.1, *supra*, of this *Report*, as well as similar sections in previous reports, detail the digital and next-generation upgrades that providers have been making to improve the coverage, capacity, and capabilities of their networks, while Section IV.B.2 provides an estimate of total spending by wireless providers on network expansion and improvements. By increasing network coverage and call handling capacity and improving network performance and capabilities, providers' investments in network deployment and upgrades have the potential to result in service quality improvements that are perceptible to consumers, such as better voice quality, higher call-completion rates, fewer dropped calls and deadzones, additional calling features and faster data transfer speeds. As noted in the *Ninth Report*, one of the principal ways providers have improved network coverage and quality is by increasing the number of cell sites.<sup>419</sup> The *Tenth Report* added that carriers have been deploying micro-cell sites, or antennas that provide coverage in highly localized areas, to improve coverage in locations such as tunnels, airports, and certain neighborhoods, while some carriers also have used devices that amplify cellular signals, called repeaters, to improve indoor coverage in office buildings, shopping malls, and convention centers.<sup>420</sup> The *Twelfth Report* highlighted the in-building systems wireless providers are installing to improve the coverage of their networks inside office buildings, as well as the services and devices they are offering to improve indoor coverage within the subscriber's home.<sup>421</sup>

160. Recent analyst reports highlight the importance of next-generation network upgrades in improving network quality and driving the growth of mobile data services. Nielsen Mobile stresses that 3G networks "bring tremendous improvements to the consumer experience of mobile Internet."<sup>422</sup> Based on a drive-testing service used throughout the United States to track network quality for both voice and data services, Nielsen Mobile reports that 3G networks "can improve data transfer throughputs by about

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<sup>416</sup> *US Advertising Spending Up 0.6% in 2007, Internet Ad Spend Up 18.9%*, Marketing Vox, April 2, 2008, available at <http://www.marketingvox.com/us-advertising-spending-up-06-in-07-internet-ad-spend-up-189-037756/> (last visited Dec. 3, 2008).

<sup>417</sup> Craig Moffett, et al., *U.S. Wireless: A Deep Dive Look At Carrier Ad Spending . . . Another Reason the Rich Are Getting Richer*, Bernstein Research, Sept. 19, 2008, at 3.

<sup>418</sup> *Id.* at 1 & 3.

<sup>419</sup> *Ninth Report*, 19 FCC Rcd at 20657-58, ¶ 148.

<sup>420</sup> *Tenth Report*, 20 FCC Rcd at 15958, ¶ 132.

<sup>421</sup> *Twelfth Report*, 23 FCC Rcd at 2309, ¶ 163.

<sup>422</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 7.

six times over 2G and 2.5G networks, on average.”<sup>423</sup> As Nielsen Mobile indicates, this is important because “network satisfaction is the largest driver of overall satisfaction with the mobile Internet.”<sup>424</sup> It further states:

As of Q4 2007, Nielsen Mobile estimates that network quality is the most important driver, accounting for 79 percent of mobile Internet users’ overall satisfaction with the experience as of the fourth quarter of 2007, followed by content at 18 percent. After cost, network quality is the top reason former data users cancel their data services.<sup>425</sup>

161. In addition to investing in their networks, carriers can increase capacity and improve service quality by acquiring additional spectrum. As detailed in Sections III.C and III.D above, carriers have added to their spectrum holdings through the Commission’s spectrum auctions, the purchase of licenses in the secondary market, and mergers and acquisitions. The acquisition of AT&T Wireless by the former Cingular (now AT&T) in October 2004 illustrates the impact transactions can have in improving network quality. After the acquisition, the former Cingular integrated the cell sites in areas where the two GSM networks of Cingular and AT&T Wireless had overlapping coverage, and ultimately credited this network integration with providing “dramatically improved call quality for Cingular customers throughout the nation.”<sup>426</sup> More recently, T-Mobile’s acquisition of AWS spectrum in the Commission’s first AWS auction (Auction 66) enabled it to launch a commercial 3G wireless network using WCDMA/HSDPA technology in New York City in May 2008.<sup>427</sup> According to T-Mobile, “the launch of the 3G network also enables T-Mobile to accommodate and serve more customers more efficiently through the use of its AWS spectrum, effectively doubling T-Mobile USA’s spectrum position.”<sup>428</sup>

162. In addition to investing in network infrastructure and acquiring spectrum, providers continue to pursue marketing strategies designed to differentiate their brand from rival offerings based on dimensions of service quality such as superior network coverage, reliability, and voice quality. Verizon Wireless pioneered this brand differentiation strategy with its “Can You Hear Me Now?” advertising campaign.<sup>429</sup> Verizon Wireless continues to use an advertising slogan describing its network as “America’s most reliable wireless network.” Since March 2007, Verizon Wireless has maintained a 30-day network test-drive pledge that absorbs the cost of calls if a customer is not satisfied and switches to another wireless carrier.<sup>430</sup> AT&T responded to Verizon Wireless with an advertising campaign claiming that it has the fewest dropped calls of any wireless carrier.<sup>431</sup>

163. T-Mobile was the first nationwide provider to differentiate its service through the addition of an interactive “Personal Coverage Check” feature to its web site that enables customers to

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<sup>423</sup> *Id.*

<sup>424</sup> *Id.*

<sup>425</sup> *Id.*

<sup>426</sup> *Twelfth Report*, 23 FCC Rcd at 2310, ¶ 160.

<sup>427</sup> *T-Mobile USA Begins Commercial 3G Network Rollout*, Press Release, T-Mobile, May 5, 2008.

<sup>428</sup> *Id.*

<sup>429</sup> Bruce Mohl, *The Fewest Dropped Calls*, BOSTON GLOBE, Apr. 23, 2006 (“*The Fewest Dropped Calls*”).

<sup>430</sup> Verizon Wireless, *About Us*, available at <http://aboutus.vzw.com/aboutusoverview.html> (last visited Dec. 15, 2008). See also *Twelfth Report*, 23 FCC Rcd at 2310, ¶ 166.

<sup>431</sup> See *Twelfth Report*, 23 FCC Rcd at 2310, ¶ 166.

check the quality of network coverage where they live and work before they purchase service.<sup>432</sup> T-Mobile's computerized mapping tool allows users to search on any street address or intersection in the United States and get a rating of the signal strength at that location and in the surrounding area. For each search, T-Mobile provides a color-coded map with six shades of coverage ranging from no coverage to the best coverage. According to T-Mobile, the top rating means that calls are rarely dropped.<sup>433</sup> T-Mobile also has made its new interactive maps available on computers in its stores. AT&T Wireless's web site also features a very similar mapping tool for checking the quality of its network coverage at particular locations.<sup>434</sup> Like T-Mobile's personal coverage check feature, AT&T Wireless's mapping tool allows users to search on any street address or intersection to get a rating of coverage at that location and the surrounding area, and it provides a color-coded map with five shades of coverage ranging from "no service available" to "best" coverage. Verizon Wireless also has added a network coverage check mapping tool to its web site, but unlike the mapping tools provided by its rivals, Verizon Wireless's mapping tool indicates only whether a location has digital or analog network coverage, rather than the quality of coverage.<sup>435</sup>

## 6. Mobile Data Services and Applications

164. Providers exhibit competitive rivalry with respect to mobile data services by introducing new mobile data offerings, responding to such innovations with rival offerings and differentiating their mobile data offerings from those of rivals. Among the innovations highlighted in the *Twelfth Report* were Verizon Wireless's March 2007 launch of V CAST Mobile TV, the first mobile TV service using Qualcomm's dedicated MediaFLO USA network, and AT&T's June 2007 launch of Apple's iPhone.<sup>436</sup> In the past year, providers have responded to both of these developments by introducing rival offerings. In May 2008, for example, AT&T launched a rival mobile TV service in 58 markets.<sup>437</sup> Like Verizon Wireless's V CAST Mobile TV service, AT&T's Mobile TV uses Qualcomm's MediaFLO USA service, but the service is offered under the AT&T brand and is further differentiated with handsets and channels that are exclusive to AT&T. Similarly, analysts note that mobile telephone providers have pressed their equipment suppliers to respond to the iPhone with new devices that try to look like the iPhone by copying features such as its touch-screen system.<sup>438</sup>

165. In July 2008, AT&T launched a new 3G version of Apple's iPhone.<sup>439</sup> One of the biggest

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<sup>432</sup> See *Tenth Report*, 20 FCC Rcd at 15959, ¶ 135, citing David Kesmodel, *T-Mobile Offers More Details On Coverage to Ease Concerns*, WALL STREET JOURNAL, Apr. 27, 2005; T-Mobile, *Personal Coverage Check*, available at <http://www.t-mobile.com/coverage> (hyperlink "check your coverage now") (last visited Dec. 15, 2008).

<sup>433</sup> *Tenth Report*, 20 FCC Rcd at 15959, ¶ 135. More specifically, the top rating means that customers have a 95 percent chance of making a call without it being dropped.

<sup>434</sup> AT&T Wireless, *AT&T Coverage Viewer*, available at <http://www.wireless.att.com/cell-phone-service/welcome/index.jsp> (hyperlink "Coverage Viewer") (last visited Dec. 15, 2008).

<sup>435</sup> Verizon Wireless, *Coverage Locator*, available at <http://www.verizonwireless.com> (hyperlink "see 3G coverage in your area") (last visited Dec. 15, 2008).

<sup>436</sup> *Twelfth Report*, 23 FCC Rcd at 2312-15, ¶¶ 171-177.

<sup>437</sup> *AT&T to Deliver MediaFLO USA's FLO TV Services in 58 Markets on New AT&T-Exclusive Handsets Designed for Mobile TV Viewing; AT&T Introduces CNN Mobile Live, PIX and CNCRT, a Special Concert Channel*, Press Release, AT&T, May 1, 2008.

<sup>438</sup> See, e.g., Walter S. Mossberg, *Samsung's Instinct Doesn't Ring True as an iPhone Clone*, WALL STREET JOURNAL, June 12, 2008, at D1.

<sup>439</sup> *AT&T Announces iPhone 3G Pricing and Tips to be iReady*, Press Release, AT&T, July 1, 2008.

complaints about the original iPhone was its relatively slow Internet access speeds.<sup>440</sup> Whereas the original version of the iPhone ran on AT&T's slower EDGE network, the 3G iPhone runs on the carrier's mobile broadband network which uses WCDMA/HSDPA technology and allows it to navigate the Internet and load Web pages much faster than its predecessor.<sup>441</sup> The 3G iPhone also features Global Positioning System ("GPS") technology for location-based service applications.<sup>442</sup> At the same time, competition for customers pushed Apple to revamp its business model for marketing the iPhone. When Apple first launched the iPhone in June 2007, it eschewed the standard handset subsidy model in favor of an innovative business model featuring a high upfront price and a relationship with AT&T and foreign operators under which it received an undisclosed portion of the operator's monthly subscriber fees.<sup>443</sup> However, based on evidence from surveys of people who had not purchased iPhones, Apple subsequently determined that the biggest barrier to people buying the initial version of the iPhone was its high upfront price.<sup>444</sup> Resistance to the revenue-sharing arrangements from operators in overseas markets where Apple is putting increased emphasis was another factor in Apple's decision to change its business model.<sup>445</sup> To boost sales and create a mass market for the iPhone, Apple aggressively lowered the price of the new 3G models and discontinued its revenue-sharing arrangements with wireless service providers for the new models.<sup>446</sup> In conjunction with these changes, AT&T has gone back to the traditional handset subsidy model that it uses to attract customers for all its other handsets.<sup>447</sup>

166. On the same day that Apple launched the new 3G version of the iPhone, the company also opened an online software clearinghouse, called App Store, to market applications from software developers for the new 3G iPhone.<sup>448</sup> The App Store is an icon on the home screen of every iPhone.<sup>449</sup> As noted in the *Twelfth Report*, in October 2007 Apple announced that in 2008 the company would release a software development kit that will allow programmers to develop third-party applications for the iPhone.<sup>450</sup> The software development kit is now available free of charge from Apple's web site, and software developers can also pay for a version which includes technical support from Apple.<sup>451</sup>

<sup>440</sup> Nick Wingfield, *Will Masses Embrace Apple's \$199 Handset?*, WALL STREET JOURNAL, June 10, 2008, at B1 ("Will Masses Embrace Apple's \$199 Handset?").

<sup>441</sup> *Id.*; Amol Sharma, *AT&T's Bet on the iPhone*, WALL STREET JOURNAL, June 10, 2008 ("AT&T's Bet on the iPhone"); John Markoff, *Apple Aims for the Masses With a Cheaper iPhone*, NEW YORK TIMES, June 10, 2008 ("Apple Aims for the Masses").

<sup>442</sup> *Will Masses Embrace Apple's \$199 Handset?; AT&T's Bet on the iPhone.*

<sup>443</sup> *Will Masses Embrace Apple's \$199 Handset?; Apple Aims for the Masses.*

<sup>444</sup> *Will Masses Embrace Apple's \$199 Handset?* (noting that, according to Apple Chief Executive Steve Jobs, more than half of the people surveyed said their decision not to buy the iPhone was based on the price of the device); *Apple Aims for the Masses.*

<sup>445</sup> *Id.*

<sup>446</sup> *Id.*

<sup>447</sup> *Id.*; *AT&T's Bet on the iPhone; Wireless Services and Handset Pricing Analysis*, *supra* note 275, at 1, 13-19.

<sup>448</sup> Nick Wingfield, *iPhone Calls on Software Developers*, WALL STREET JOURNAL, July 10, 2008, at B1 ("iPhone Calls on Software Developers"); Nick Wingfield, *iPhone Software Sales Take Off: Apple's Jobs*, WALL STREET JOURNAL, Aug. 11, 2008, at B1 ("iPhone Software Sales Take Off"); Raymund Flandez, *Programmers Jockey for iPhone Users at Apple Site*, WALL STREET JOURNAL, Aug. 5, 2008 ("Programmers Jockey for iPhone Users").

<sup>449</sup> *iPhone Calls on Software Developers.*

<sup>450</sup> *Twelfth Report*, 23 FCC Rcd at 2315-16, ¶ 177.

<sup>451</sup> *Programmers Jockey for iPhone Users.*

According to Apple, there were about 900 applications available on the App Store as of August 2008, and 20 percent of these could be downloaded free of charge.<sup>452</sup> Apple keeps 30 percent of the proceeds from sales of iPhone applications for which customers pay to download, while developers receive the remaining 70 percent.<sup>453</sup> In the first month that the App Store was open, users downloaded more than 60 million programs for the iPhone.<sup>454</sup> Apple Chief Executive Steve Jobs predicts that the mobile phone of the future “will be differentiated by software.”<sup>455</sup>

167. Apple’s release of the software development kit for the iPhone and the opening of the App Store put Apple’s iPhone at the forefront of the mobile service industry’s movement to an open platform model that was highlighted in the *Twelfth Report*.<sup>456</sup> Other ongoing developments provide further evidence that the industry has made significant progress toward the open platform model in the period since the release of the *Twelfth Report*. As documented below, individual wireless providers have taken additional steps to open their networks, leading to jockeying among wireless service providers to demonstrate they offer consumers the most choices with regard to handsets and applications.<sup>457</sup> In addition, three of the four nationwide providers have expressed interest in offering mobile handsets that use an operating system called Android, which is being designed to facilitate access to third-party content providers.

168. In 2008, Verizon Wireless has taken steps to follow through on a commitment it made in 2007 to open up its network to a wider array of wireless devices and applications. As noted in the *Twelfth Report*, in November 2007 Verizon Wireless announced that, by the end of 2008, it would no longer restrict its network only to handsets sold through its retail stores and instead allow any wireless device, software, or application that meets certain technical standards to access its wireless network.<sup>458</sup> In March 2008, Verizon Wireless revealed certain details of its new open-access policy at an “Open Development Conference.”<sup>459</sup> Verizon Wireless reiterated that, under the new policy, any company that wants to make a mobile device for use by Verizon Wireless’s customers will be able to do so provided the device meets the carrier’s minimum technical requirements. The company further indicated that device makers will be responsible for marketing and distributing the new devices on their own, and they will have a choice of options for dealing with customers: they can either allow customers to have a direct relationship with Verizon Wireless, or buy voice minutes and data capacity on a wholesale basis from Verizon Wireless and resell them to customers under their own brands. Verizon Wireless also disclosed that users of devices that the carrier does not offer through its own retail network will not be required to sign service contracts with Verizon Wireless, and will deal with Verizon Wireless online. In particular, users will activate their Verizon Wireless accounts online, get billed online, and have online customer support. Verizon Wireless representatives also stated that users will be able to download any application on the new devices. As noted previously, in September 2008 Verizon Wireless introduced a month-to-month agreement that is available on all its nationwide voice and data plans, and this month-to-month option allows customers to use their own CDMA devices without the commitment of a one- to two-year service

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<sup>452</sup> *Id.*

<sup>453</sup> *iPhone Calls on Software Developers; iPhone Software Sales Take Off; Programmers Jockey for iPhone Users.*

<sup>454</sup> *iPhone Software Sales Take Off.*

<sup>455</sup> *Id.*

<sup>456</sup> *Twelfth Report*, 23 FCC Rcd at 2316-17, ¶¶ 177-179.

<sup>457</sup> Amol Sharma, *Verizon Wireless Details Open-Access Policy*, WALL STREET JOURNAL, Mar. 19, 2008 (“*Verizon Wireless Details Open-Access Policy*”).

<sup>458</sup> *Twelfth Report*, 23 FCC Rcd at 2316, ¶ 179.

<sup>459</sup> *Verizon Wireless Details Open-Access Policy.*

contract.<sup>460</sup>

169. In addition, Verizon Wireless also submitted the winning bids for seven of the 12 licenses offered for the 700 MHz C Block in Auction 73.<sup>461</sup> As mentioned above, to further the open platform model, the Commission required the C Block licensees to allow customers, device manufacturers, third-party application developers, and others to use or develop the devices and applications of their choosing in C Block networks.<sup>462</sup> Verizon Wireless has stated that it intends to use this spectrum in connection with its Open Development Initiative.<sup>463</sup>

170. In response to Verizon Wireless's shift in policy, AT&T emphasizes that it already allows customers to use any GSM handset on its network and therefore does not need to pursue an open-access model similar to Verizon Wireless's.<sup>464</sup> In March 2008, the company announced a new web site, [www.att.com/choice](http://www.att.com/choice), which provides instructions to consumers on how to bring any GSM handset purchased outside of AT&T's retail stores on to its network.<sup>465</sup> Finally, as discussed below, AT&T is one of the U.S. wireless service providers that has shown interest in offering handsets that use the Android operating system.

171. The *Twelfth Report* noted that the development of Android was announced in November 2007 by the Open Handset Alliance – an alliance of 34 handset makers, wireless providers and other technology companies led by Google Inc. (“Google”), T-Mobile, High Tech Computer Corporation (“HTC”), Qualcomm, and Motorola which was formed to accelerate innovation and “openness” in the provision of mobile wireless services.<sup>466</sup> The *Twelfth Report* further noted that Android was intended to be the “first open, complete, and free platform created specifically for mobile devices,” and that it was set to be commercially deployed in the second half of 2008.<sup>467</sup>

172. As revealed in subsequent reports about its development, the Android system is a set of operating software developed by Google that is designed to support several different objectives. First, Android supports and brings together in one package a number of applications Google has developed for mobile handsets, including a search service, Google maps and a new advanced mobile Web browser that is intended to rival the browser on the Apple iPhone.<sup>468</sup> Second, Android provides a platform to support a marketplace for applications made by other companies.<sup>469</sup> Like Apple's software development kit and App Store, Android is designed to make it easier for third-party software developers to make their applications available on mobile handsets and to integrate these applications with handset features such as

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<sup>460</sup> See Section IV.A.1, Developments in Mobile Telephone Pricing Plans, *supra*.

<sup>461</sup> See Section III.D.1.b, Recent Spectrum Auctions, *supra*.

<sup>462</sup> See *700 MHz Second Report and Order*, 22 FCC Rcd at 15365, ¶ 206.

<sup>463</sup> *Verizon Wireless Says Spectrum Additions From FCC's Auction 73 Will Further Company's Broadband Strategy*, Press Release, Verizon Wireless, Apr. 4, 2008.

<sup>464</sup> Amol Sharma, *Verizon Wireless Details Open-Access Policy*, WALL STREET JOURNAL, Mar. 19, 2008.

<sup>465</sup> *Id.*; AT&T, *your device, your way*, available at <http://www.choice.att.com/flash/customersdevices.aspx> (last visited April 22, 2008).

<sup>466</sup> *Twelfth Report*, 23 FCC Rcd at 2316.

<sup>467</sup> *Id.*

<sup>468</sup> Amol Sharma, *AT&T Says it Favors Google Android System*, WALL STREET JOURNAL, Apr. 3, 2008 (“AT&T Says it Favors Google Android”); Amol Sharma, *New Smart Phone Will Showcase Google Brand*, WALL STREET JOURNAL, Sept. 18, 2008 (“New Smart Phone Will Showcase Google Brand”).

<sup>469</sup> *New Smart Phone Will Showcase Google Brand*.

location-sensing technology.<sup>470</sup> Third, despite its use of Google's search service and other Google applications, the Android system allows wireless service providers to customize the Android software to promote their own data services and content.<sup>471</sup> Google is making the Android operating software available free of charge to handset manufacturers and wireless service providers in order to encourage the development and deployment of handsets based on Android.<sup>472</sup>

173. Although Google originally planned to launch the new Android handsets in the second half of 2008, subsequently the company indicated that the handsets would not be commercially available until the fourth quarter of 2008.<sup>473</sup> Several factors contributed to the delays, including: (1) the inherent difficulty of managing a project in which Google had to collaborate with and coordinate the work of many different providers to support its Android technology platform, including handset manufacturers, wireless service providers, software developers and chip set makers;<sup>474</sup> (2) challenges wireless service providers have encountered in their efforts to customize the Android software and brand their own devices;<sup>475</sup> and (3) various challenges that confronted software developers in working with Google's programming tools and creating programs for Android.<sup>476</sup>

174. Google and T-Mobile unveiled the first Android device, the G1, in September 2008,<sup>477</sup> and the following month T-Mobile became the first U.S. provider to launch a handset that uses the Android operating system.<sup>478</sup> The G1 runs on both T-Mobile's mobile broadband WCDMA/HSDPA network, which T-Mobile is still in the early stages of rolling out, and also on slower networks using older GSM-family technologies.<sup>479</sup> In addition to Google's advanced new mobile Web browser, search interface and other Google applications such as maps, Gmail and YouTube, the G1 also features a touch-

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<sup>470</sup> *AT&T Says it Favors Google Android.*

<sup>471</sup> Jessica E. Vascellaro and Amol Sharma, *Google's Mobile-Handset Plans are Slowed*, WALL STREET JOURNAL, June 23, 2008, at B8 ("*Google's Mobile-Handset Plans are Slowed*").

<sup>472</sup> Miguel Helft, *Google Introduces a Phone With PC Features*, NEW YORK TIMES, Sept. 24, 2008 ("*Google Introduces a Phone With PC Features*").

<sup>473</sup> *Google's Mobile-Handset Plans are Slowed.*

<sup>474</sup> *Google's Mobile-Handset Plans are Slowed* (noting the contrast to Apple, which controls most aspects of hardware and software development for the iPhone).

<sup>475</sup> *Id.* (noting that some handset makers were taking longer than the service providers anticipated to integrate Android, test it and build custom user interfaces to meet service providers' specifications).

<sup>476</sup> *Id.* (noting that some software developers said that it is more difficult to work with Google's programming tools than Apple's because no Android devices are available on the market to use in testing software, Apple's guidelines are easier to follow, and developers are already familiar with Apple's Macintosh operating system; other developers emphasized the difficulty of creating programs while Android is still in the process of being completed, while still others were waiting for Google to clarify critical issues such as how applications will be distributed and how developers will earn revenue from their applications).

<sup>477</sup> Roger Cheng, *Google, T-Mobile Unveil New Phone*, WALL STREET JOURNAL, Sept. 23, 2008 ("*Google, T-Mobile Unveil New Phone*"); *Google Introduces a Phone With PC Features*; Miguel Helft and Saul Hansell, *Google Introduces an iPhone Rival Open to Whims*, NEW YORK TIMES, Sept. 24, 2008 ("*Google Introduces an iPhone Rival*"); Walter S. Mossberg, *Google's G1: First Impressions*, WALL STREET JOURNAL, Sept. 23, 2008 ("*Google's G1: First Impressions*"); Walter S. Mossberg, *Google Answers the iPhone*, WALL STREET JOURNAL, Oct. 16, 2008 ("*Google Answers the iPhone*").

<sup>478</sup> *T-Mobile Launches the Highly Anticipated T-Mobile G1*, Press Release, T-Mobile, Oct. 22, 2008.

<sup>479</sup> *Google Introduces a Phone With PC Features; Google, T-Mobile Unveil New Phone.*

screen that slides open to reveal a real physical keypad underneath, a trackball that supplements the touch-screen navigation, GPS navigation, Wi-Fi access and Bluetooth connections, among other gadgets and functions.<sup>480</sup> Although the Google applications come installed on the G1, the G1 has an applications store, called the Android Market, where G1 users will be able to download programs created by third-party developers.<sup>481</sup> However, while Google maintains that the G1 leaves it up to consumers to decide what they want to run on their cellphones,<sup>482</sup> one reviewer points out that the G1 is “tightly tied to Google’s Web-based email, contacts and calendar programs.”<sup>483</sup> Nevertheless, while noting many differences between the G1 and Apple’s iPhone, the same reviewer concludes that, like Apple’s product, Google’s G1 is “a serious handheld computer with a powerful new operating system.”<sup>484</sup>

175. Like T-Mobile, Sprint Nextel has endorsed Android and had also hoped to launch an Android device in 2008, but will not be able to do so due to the aforementioned delays<sup>485</sup> and other internal factors.<sup>486</sup> In April 2008, the chief of AT&T’s wireless unit also expressed interest in offering handsets that use Google Inc.’s Android operating system, but stopped short of committing AT&T to offering Android devices.<sup>487</sup> AT&T’s wireless chief emphasized that one of the key attractions of the Android system is that AT&T would be able to customize the software’s open-source coding to promote the carrier’s own data and content services, rather than having to settle for a product that only promoted Google’s search service and other Google applications such as Google Maps.<sup>488</sup>

176. Beyond differences in handset design and functions, Google’s business model differs fundamentally from that of rivals such as Apple and other industry players. Analysts stress that Google will lose money on Android as an operating system, since as noted above Google is giving the Android

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<sup>480</sup> *Id.*; *Google Introduces an iPhone Rival*; *Google’s G1: First Impressions*; *Google Answers the iPhone*.

<sup>481</sup> *Google Introduces an iPhone Rival*; *Google’s G1: First Impressions*; *Google Answers the iPhone*.

<sup>482</sup> *Google Introduces an iPhone Rival*.

<sup>483</sup> *Google’s G1: First Impressions* (noting further that users must have a Google account to use the G1, and can only synchronize the G1’s calendar and address book with Google online services; also noting that, unlike the iPhone, the G1 does not work with Microsoft Exchange, and it can’t physically be synchronized with a PC-based calendar or contacts program like Microsoft Outlook). *See also*, *Google Answers the iPhone*; Bonnie Cha and Nicole Lee, *HTC Dream T-Mobile G1(black) – CNET Editors’ Review*, CNET, Oct. 22, 2008, available at <http://reviews.cnet.com/htc-dream-t-mobile-g1/?tag=mncol;txt> (last visited Dec. 15, 2008). However, see also, David Pogue, *A First Look at Google’s New Phone*, NEW YORK TIMES, Sept. 23, 2008 (arguing that the G1, the Android operating system and the Android applications store are far more open than Apple’s iPhone, operating system and App Store).

<sup>484</sup> *Google’s G1: First Impressions*. *See also*, *Google Answers the iPhone*.

<sup>485</sup> *Google’s Mobile-Handset Plans are Slowed* (noting that T-Mobile’s launch of an Android device is taking up so much of Google’s attention and resources that Sprint Nextel will not be able to launch an Android device in 2008 as it had originally hoped to do; in addition, Sprint would like to develop its own branded services based on Android, rather than just carrying a device with the built-in features Google plans to offer); *AT&T Says it Favors Google Android*.

<sup>486</sup> *Google’s Mobile-Handset Plans are Slowed* (noting that a management shake-up at Sprint may have contributed to the delay, and that Sprint is considering scrapping plans for an Android device for its existing mobile broadband network in favor of developing an Android device that will work on the faster WiMAX network Sprint Nextel is planning to deploy in partnership with Google and other companies).

<sup>487</sup> *AT&T Says it Favors Google Android*.

<sup>488</sup> *Id.*

software away free to wireless service providers and handset makers.<sup>489</sup> However, Google hopes to earn revenue from advertising, just as it now does on the PC-based Internet.<sup>490</sup> As noted previously in this report, the mobile search advertising market is a promising source of ad revenue.<sup>491</sup> Even before launching the new Android handsets, Google had succeeded in taking an early lead in mobile Web searching. According to M:Metrics, of the 16.7 million users who say they conduct searches on their mobile phones, about 63 percent say they use Google, 34 percent say they use Yahoo, and only 25 percent say they use their wireless providers' search services.<sup>492</sup> Most of these users access the Google search engine by simply typing Google's URL into the browsers on their mobile phone.<sup>493</sup> However, iPhone users can access the Google search engine directly because Apple made Google the default search bar on the iPhone.<sup>494</sup>

## V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

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

### A. Access to Information on Mobile Telecommunications Services

178. Wireless consumers continue to demand information on the availability and quality of mobile telecommunications services. Numerous third parties have been responding to this demand by compiling and reporting such information. The sources of information available to consumers include 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.<sup>495</sup> For example, J.D. Power and Associates' web site posts the results of its annual wireless user surveys, which rate wireless service providers by region based on overall customer satisfaction, call quality and customer service.<sup>496</sup>

179. In addition, the wireless industry itself has responded to this demand by launching various initiatives designed to educate consumers and help them make informed choices when purchasing wireless services. As noted above, for example, in March 2007 Verizon Wireless launched its "30-Day Test Drive" promotion. This promotion allowed customers, who signed up for a Verizon Wireless calling plan, "test drive" the network for 30 days. Verizon Wireless offered to absorb the cost of their calls if customers were not satisfied with their experience and carry their number to another wireless carrier at

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<sup>489</sup> *Google Introduces an iPhone Rival*.

<sup>490</sup> *Id.*

<sup>491</sup> See Section IV.A.4, Mobile Data Pricing, *supra*.

<sup>492</sup> *Verizon, Google Close to Mobile Search Deal*.

<sup>493</sup> *Id.*

<sup>494</sup> *Id.*

<sup>495</sup> See *Eleventh Report*, 21 FCC Rcd at 11004, ¶ 142.

<sup>496</sup> J.D. Power and Associates, *Wireless*, available at [www.jdpower.com](http://www.jdpower.com) (last visited Sept. 5, 2008).

any time during the 30-day period.<sup>497</sup>

## **B. Consumer Ability to Switch Service Providers**

### **1. Churn**

180. Churn refers to the percentage of current customers an operator loses over a given period of time, *i.e.*, a company's gross loss of customers during that time period.<sup>498</sup> 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 two percent in a given fiscal quarter. In other words, on average, the operator lost two percent of its customers in each of the quarter's three months, or approximately six percent for the quarter.

181. Most providers report churn rates between 1.5 percent and 3.0 percent per month.<sup>499</sup> Churn rates have been trending lower for a number of years, with the nationwide carriers averaging a monthly churn rate of 1.9 percent in the first quarter of 2008, trending consistently down from 2.8 percent seven years earlier.<sup>500</sup> However, churn is still a significant challenge for the industry.<sup>501</sup> One analyst described churn as "the biggest issue for all the wireless carriers,"<sup>502</sup> while another wrote that "[i]t's no secret that customer turnover is a major impediment for providers."<sup>503</sup> Lowering churn improves profitability. As one report explained: "Cutting churn by one-fifth can increase operating income by 5% to 15%. In addition to boosting profits, improving customer loyalty allows wireless companies to increase the lifetime value of their voice customers. . . . Improving customer loyalty typically can increase revenues at twice the rate of competitors."<sup>504</sup>

### **2. Local Number Portability**

182. Local number portability ("LNP") refers to the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers when switching from one telecommunications carrier to another.<sup>505</sup> Thus, subscribers can port numbers between two CMRS carriers (intramodal porting) or between a CMRS and wireline carrier (intermodal porting). Under the Commission's rules and orders, covered CMRS carriers operating in the 100 largest MSAs were required

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<sup>497</sup> See Section IV.B.5, Network Quality, *supra*.

<sup>498</sup> CTIA defines it as "a measure of the number of subscribers disconnecting from service during the period." *Dec. 2007 CTIA Survey*, *supra* note 408, at 66.

<sup>499</sup> *US Wireless 411 1Q08*, Table 20: Monthly Churn, at 25.

<sup>500</sup> *Id.* at 6. See also *Eleventh Report*, 21 FCC Rcd at 11005, ¶ 145 for reasons for this decline.

<sup>501</sup> Even if the churn rate stabilizes, it continues to grow as a problem from year to year: "Keep in mind that in a flat churn environment, an increasing number of gross adds is required each year just to keep net adds flat. This is because disconnects continue to climb as the flat churn rate is applied to a larger and larger base." Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007 at 7.

<sup>502</sup> Kenneth Hein, *Carriers Locked in Content Land Grab*, BRANDWEEK.COM, Mar. 12, 2007 (citing John Hadl, CEO of Brand in Hand, a mobile marketing consultancy based in Los Angeles) ("*Carriers Locked in Content Land Grab*").

<sup>503</sup> Rasmus Wegener and Pratap Mukharji, *The Unassured Future of Wireless Data*, BUSINESSWEEK, Apr. 17, 2007.

<sup>504</sup> *Id.* See also *4Q06 Wireless 411*, at 34 ("in general, operators with lower churn rates post the [highest lifetime revenue per subscriber]" and 53 ("We believe that Verizon Wireless' industry leading low monthly churn rate is the primary driver behind its low cost structure and high margins.").

<sup>505</sup> 47 C.F.R. § 52.21(l).

to begin providing number portability by November 24, 2003.<sup>506</sup> CMRS carriers outside of the top 100 MSAs were required to be LNP-capable by May 24, 2004.<sup>507</sup>

183. Wireless number porting activity since the advent of porting has been significant. Overall, approximately 43.93 million wireless subscribers ported their numbers to another wireless carrier from December 2003 through December 2007.<sup>508</sup> About 30 percent of this intramodal porting activity, or approximately 13.3 million wireless-to-wireless ports, took place in 2007.<sup>509</sup> Monthly rates of intramodal porting activity averaged about 1.12 million ports during 2007, up from a monthly average of about 856,000 ports in 2006 and the highest monthly average for intramodal porting activity since the advent of porting.<sup>510</sup>

184. Another 2.98 million subscribers ported their numbers from a wireline carrier to a wireless carrier from December 2003 through December 2007, with about 896,000 of these intermodal ports taking place during 2007.<sup>511</sup> Monthly rates of intermodal porting from wireline carriers to wireless carriers averaged more than 74,600 ports during 2007, up from monthly averages of nearly 37,000 ports in 2006 and about 48,300 ports in 2005 but well short of the highest monthly average of 87,500 ports in 2004.<sup>512</sup> Intermodal porting from wireless to wireline carriers remained relatively low at roughly 2,000-3,000 ports per month during 2007,<sup>513</sup> up from levels in prior years but still a small fraction of wireline-to-wireless porting rates.

### 3. Barriers to Switching

185. The practice of assessing ETFs against postpaid subscribers when they cancel their wireless service agreement or plan before the expiration of its term represents a barrier to consumers' ability to switch service providers. As noted by one Wall Street analyst, however, providers use long-term contracts and ETFs to subsidize handset costs; absent contracts and ETFs, consumers might have to pay higher prices for handsets upfront.<sup>514</sup> Other provider practices also affect consumers' ability to switch service providers. Mobile telephone service providers generally allow new customers to cancel their service for any reason without incurring the early termination fee within a grace period – typically thirty days – of signing the agreement.<sup>515</sup> Consumers also have a choice between postpaid and prepaid service

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<sup>506</sup> 47 C.F.R. § 52.31(a); Verizon Wireless's Petition for Partial Forbearance From Commercial Mobile Radio Services Number Portability Obligation and Telephone Number Portability, *Memorandum Opinion and Order*, 17 FCC Rcd 14972, 14986, ¶ 31 (2002) (“*Verizon Wireless LNP Order*”). In an October 2007 ruling, the Commission also expanded local number portability to VoIP, among other things. Telephone Number Requirements for IP-Enabled Services Providers, *Report and Order, Declaratory Ruling, Order on Remand, and Notice of Proposed Rulemaking*, 22 FCC Rcd 19531 (2007).

<sup>507</sup> *Verizon Wireless LNP Order*, 17 FCC Rcd at 14986, ¶ 31.

<sup>508</sup> Craig Stroup and John Vu, *Numbering Resource Utilization in the United States*, FCC, Mar. 2008, at 35 (“*March 2008 NRUF Report*”). This figure excludes significant porting activity between Cingular and AT&T Wireless following the closing of their merger in October 2004.

<sup>509</sup> *Id.*

<sup>510</sup> *Id.*

<sup>511</sup> *Id.*

<sup>512</sup> *Id.*

<sup>513</sup> *Id.*

<sup>514</sup> *Carriers Relaxing Early Termination Fees to Compete*, COMMUNICATIONS DAILY, Nov. 14, 2007, at 11.

<sup>515</sup> See *Twelfth Report*, 23 FCC Rcd at 2320, ¶ 192.

offerings, and they can avoid ETFs altogether by opting to purchase mobile telephone service on a prepaid basis instead of signing up for a long-term service contract.<sup>516</sup> As noted previously in this *Report*, three of the four nationwide providers have already implemented various new policies to pro-rate ETFs and the remaining nationwide provider has confirmed that it plans to implement a new pro-rated ETF policy before the end of 2008.<sup>517</sup> The introduction and spread of pro-rated ETFs will lower the barrier to consumer switching ability compared to a flat rate by progressively reducing the fee customers pay for canceling their service early. Similarly, Verizon Wireless's recent introduction of a month-to-month agreement for all nationwide pricing plans that allows customers to terminate their agreement at the end of any month without paying an ETF will also lower the barrier to consumer switching.<sup>518</sup> However, customers who choose Verizon Wireless's new month-to-month option must either purchase new devices at the full retail price, or use their own CDMA devices.<sup>519</sup> Finally, as previously noted in this *Report*, the five largest mobile telephone operators have all implemented various policies that allow customers the option of changing elements of their contracts without requiring a contract extension.<sup>520</sup>

186. Apart from the introduction of pro-rated ETFs and a month-to-month service option, the spontaneous emergence of a nascent secondary market for mobile phone service contracts may also help promote competition by facilitating consumers' ability to switch service providers. Although customers who cancel their service before the term of their mobile phone contract expires typically incur ETFs, in most cases providers allow customers to get out of the contract without paying a penalty by transferring the remaining time to someone else who meets the provider's approval through a credit check.<sup>521</sup> A number of new web sites use this contractual loophole to facilitate transfers of mobile phone contracts.<sup>522</sup> In particular, the web sites help mobile phone customers avoid paying penalties for early termination by putting them in touch with people seeking a mobile phone contract. The sites charge existing mobile phone customers a range of fees to transfer or cancel a mobile phone contract, but in general the fees for transferring a contract through these web sites are much lower than the usual fees customers would have to pay for early termination.<sup>523</sup> There is typically no fee for contract buyers to take over a mobile phone contract, and many customers using the web sites offer to transfer their mobile phones free of charge as an incentive to entice buyers to take over their contracts.<sup>524</sup> Apart from a possible free phone and accessories, other potential advantages to contract buyers include avoiding a registration fee and getting a shorter contract than if they had signed with a mobile phone company directly. However, the number of people using these sites is reported to be relatively low, and not all mobile phone customers who visit the sites succeed in finding a buyer willing to take over their contract.<sup>525</sup>

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<sup>516</sup> See Section IV.A.2, Prepaid Service, *supra*.

<sup>517</sup> See Section IV.A.1, Developments in Mobile Telephone Pricing Plans, *supra*.

<sup>518</sup> *Id.*

<sup>519</sup> *Id.*

<sup>520</sup> *Id.*

<sup>521</sup> Lauren Tara Lacapra, *Breaking Free of a Cellular Contract*, WALL STREET JOURNAL, Nov. 30, 2006, at D1 (noting that this "loophole" in mobile phone contracts is available "to nearly all customers with long-term plans")(*"Breaking Free of a Cellular Contract"*).

<sup>522</sup> *Id.* One example of a web-based service that is currently operating is cellswapper, available at [www.cellswapper.com/Buzz.aspx](http://www.cellswapper.com/Buzz.aspx) (last visited Dec. 15, 2008).

<sup>523</sup> *Breaking Free of a Cellular Contract*.

<sup>524</sup> *Id.*

<sup>525</sup> *Id.* See also Suzanne Barlyn, *How to Dump a Cellphone Contract*, WALL STREET JOURNAL, Sept. 6, 2007, at D2.

## VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

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

### A. Pricing Levels and Trends

#### 1. Pricing Trends

##### a. Mobile Telephony

188. Wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephone service; consequently, it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.<sup>526</sup> As documented in previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. After a relatively stable year in 2006,<sup>527</sup> pricing decreased slightly in 2007, which likely reflects continued price competition in the market.

189. Of the three indicators of mobile telephone pricing examined here, all of the indicators show that the cost of mobile telephone service fell in 2007.<sup>528</sup>

190. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities decreased 1.4 percent in 2007,<sup>529</sup> a reversal of the 5.6 percent increase in 2006.<sup>530</sup> The average cost of monthly service<sup>531</sup> – which was calculated across four typical usage plans (200, 500, 800 and 1100 minutes) – decreased from \$47.42 in December 2006 to \$46.74 in December 2007.<sup>532</sup>

191. 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").<sup>533</sup> Cellular CPI data is published on a national basis only.<sup>534</sup> From 2006 to

<sup>526</sup> See *Fourth Report*, 14 FCC Rcd at 10164-10165.

<sup>527</sup> See *Twelfth Report*, 23 FCC Rcd at 2321-2322, ¶ 195.

<sup>528</sup> Fees for actual service are only one element of cost that consumers face. Handset prices, for example, are another. One analyst calculated that the average handset was discounted 60 percent compared to its original price (*i.e.*, the advertised price). The analyst also claimed that, "handsets, and not the [monthly recurring charge], are emerging as the competitive intersection in the wireless industry." David W. Barden, *et al.*, *Wireless Services & Handset Pricing Analysis*, Bank of America, Equity Research, Dec. 19, 2006, at 8-9.

<sup>529</sup> *Econ One Wireless Survey: Wireless Costs Down*, News Release, Econ One, May 22, 2007; *Econ One Wireless Survey: Econ One Wireless Survey: Wireless Service Cost Down*, News Release, Econ One, June 5, 2008. The survey is based on an analysis of pricing plan data collected from carriers' web sites.

<sup>530</sup> See *Twelfth Report*, 23 FCC Rcd at 2322, ¶ 197.

<sup>531</sup> This does not include any additional charges for roaming or long-distance service.

<sup>532</sup> The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used.

<sup>533</sup> See Table 11: Change in CPI, *infra*. The Consumer Price Index ("CPI") is a measure of the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The basket of goods includes over 200 categories including items such as food and beverages, housing, apparel, transportation, medical care, recreation, education, and communications. The CPI provides a way for consumers to compare what (continued...)

2007, the annual Cellular CPI decreased by approximately 0.3 percent while the overall CPI increased by 2.8 percent. The Cellular CPI has declined 35.6 percent since December 1997, when BLS began tracking it.<sup>535</sup>

**Table 11: Change in CPI**

	CPI		Cellular CPI		All Telephone CPI		Local Telephone CPI		Long Distance Telephone CPI	
	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change
Dec 1997	100		100		100		100		100	
1998	101.6		95.1		100.7		101.6		100.5	
1999	103.8	2.2%	84.9	-10.7%	100.1	-0.6%	103.4	1.8%	98.2	-2.3%
2000	107.3	3.4%	76.0	-10.5%	98.5	-1.6%	107.7	4.1%	91.8	-6.5%
2001	110.3	2.8%	68.1	-10.4%	99.3	0.8%	113.3	5.2%	88.8	-3.3%
2002	112.1	1.6%	67.4	-1.0%	99.7	0.4%	118.5	4.5%	84.9	-4.4%
2003	114.6	2.3%	66.8	-0.9%	98.3	-1.4%	123.3	4.1%	77.8	-8.4%
2004	117.7	2.7%	66.2	-0.9%	95.8	-2.5%	125.1	1.5%	70.9	-8.9%
2005	121.7	3.4%	65.0	-1.8%	94.9	-0.9%	128.5	2.7%	67.5	-4.8%
2006	125.6	3.2%	64.6	-0.6%	95.8	0.9%	131.1	2.1%	68.3	1.2%
2007	129.2	2.8%	64.4	-0.3%	98.247	2.6%	136.2	3.8%	71.453	4.6%
Dec 1997 to 2007		29.2%		-35.6%		-1.8%		36.2%		-28.5%

Source: Bureau of Labor Statistics.

192. As a third pricing indicator, some analysts believe average revenue per minute (“RPM”) is a good proxy for mobile pricing.<sup>536</sup> This is calculated by dividing a provider’s estimate of average monthly revenue per subscriber (often referred to as average revenue per unit, or “ARPU”) by its estimate

(Continued from previous page) \_\_\_\_\_

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/wireless telephone services. All CPI figures discussed in this paragraph were taken from BLS databases found on the BLS Internet site available 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*, available at <http://www.bls.gov/cpi/cpifaq.htm> (last visited Aug. 26, 2008). While the CPI-U is urban-oriented, it does include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

<sup>534</sup> *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*, available at <http://www.bls.gov/cpi/cpifact.html> (last visited Sept. 26, 2008).

<sup>535</sup> From December 1997 compared to the annual index.

<sup>536</sup> See *US Wireless Matrix 1Q07*, at 52.

of MOUs, yielding the RPM that the provider is receiving.<sup>537</sup> Using estimates of industry-wide ARPU and MOUs from CTIA's survey, we estimate that RPM was \$.06 in December of 2007, which is a decrease of one percent from December of 2006. In the thirteen years since 1994, RPM has fallen from \$.47 in December of 1994 to \$.06 in December of 2007, which represents a decline of 87 percent.<sup>538</sup>

193. Until the last three years, revenues from wireless data services were a relatively insignificant portion of the average wireless subscriber's bill. However, in the last three years, data has become an ever increasing portion of that bill.<sup>539</sup> RPM becomes an increasingly inaccurate measure of the pricing of mobile voice service as the contribution of data services to total revenues increases. This *Thirteenth Report*, as did the *Twelfth Report*, includes a revised version of RPM, "Voice RPM," which excludes that portion of ARPU generated by data services.<sup>540</sup> While RPM and Voice RPM have been mostly identical over time, in absolute value and trend, in the last four years, they have diverged somewhat, with the decline in Voice RPM steeper, and its absolute value slightly lower, than RPM.

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<sup>537</sup> Note that this version of ARPU is CTIA's "Average Local Monthly Bill" ("ALMB") and does not include toll or roaming revenues where they are not priced into a calling plan. See *infra* note 544.

<sup>538</sup> See Table 12: Average Revenue Per Minute, *infra*.

<sup>539</sup> *Wireless Data: Just Getting Started*, at 10.

<sup>540</sup> To generate Voice RPM, we subtracted wireless data revenues, derived from CTIA's survey, from ALMB (we assumed this was the same percentage of wireless data revenues in CTIA's measure of total service revenues), then we divided that number by CTIA's average MOUs per month. See also *Twelfth Report*, 23 FCC Rcd at 2323-24, ¶ 200.

**Table 12: Average Revenue Per Minute**

	Average Local Monthly Bill	Minutes of Use Per Month	Average Revenue Per Minute	Annual Change in Overall RPM	Wireless Data Revenue as Percent of Total Service Revenues	Average Local Monthly Bill (excl. Data Revenues)	Average Revenue Per Voice Minute	Annual Change in Voice RPM
1993	\$61.49	140	\$0.44		n/a	\$61.49	\$0.44	
1994	\$56.21	119	\$0.47	8%	n/a	\$56.21	\$0.47	8%
1995	\$51.00	119	\$0.43	-9%	n/a	\$51.00	\$0.43	-9%
1996	\$47.70	125	\$0.38	-11%	n/a	\$47.70	\$0.38	-11%
1997	\$42.78	117	\$0.37	-4%	n/a	\$42.78	\$0.37	-4%
1998	\$39.43	136	\$0.29	-21%	n/a	\$39.43	\$0.29	-21%
1999	\$41.24	185	\$0.22	-23%	0.2%	\$41.16	\$0.22	-23%
2000	\$45.27	255	\$0.18	-20%	0.4%	\$45.09	\$0.18	-21%
2001	\$47.37	380	\$0.12	-30%	0.9%	\$46.94	\$0.12	-30%
2002	\$48.40	427	\$0.11	-9%	1.2%	\$47.82	\$0.11	-9%
2003	\$49.91	507	\$0.10	-13%	2.5%	\$48.66	\$0.10	-14%
2004	\$50.64	584	\$0.09	-12%	4.8%	\$48.21	\$0.08	-14%
2005	\$49.98	708	\$0.07	-19%	8.3%	\$45.83	\$0.06	-22%
2006	\$50.56	714	\$0.07	0%	13.5%	\$43.73	\$0.06	-5%
2007	\$49.79	769	\$0.06	-9%	17.9%	\$40.88	\$0.05	-13%

Note: Data covers the last six months of each year. For purposes of this presentation in this table, RPM is rounded to two decimal places, but RPM change is based on absolute RPM.

Source: See Appendix A, Table 1 (ARPU); *Dec 2007 CTIA Survey*, at 110 (Wireless Data as a Percentage of Monthly Subscriber ARPU), and at 198-99 (Table 86: Approximate Billable MOUs per Subscriber).

### b. Mobile Data

194. The average price of text messaging continued to decline in the past year. As noted in the *Twelfth Report*, Morgan Stanley estimated based on CTIA data that the price per text message declined for the first time in 2006 to \$0.036 after rising continuously from \$0.015 in 2002 to \$0.037 in 2005.<sup>541</sup> Based on CTIA estimates of text messaging revenues and the volume of text messaging traffic in 2007, we estimate that the price per text message dropped again in 2007 to \$0.025, about one cent lower than the price per text message in 2006.<sup>542</sup> This decline is attributable to the increased use of volume-discounted monthly text messaging packages and unlimited text messaging plans.<sup>543</sup>

<sup>541</sup> *Id.* at 2324-25, ¶ 202.

<sup>542</sup> *Dec. 2007 CTIA Survey*, *supra* note 408, at 110, 207.

<sup>543</sup> *Twelfth Report*, 23 FCC Rcd at 2324-2325. See also Section IV.A.1, Developments in Mobile Telephone Pricing Plans, *supra*.

**Table 13: Average Revenue Per Text Message**

Year	Text Traffic Volume	Text Messaging Revenues	Average Revenue Per Text Message
2005	81,208,225,767	\$2,991,666,181	\$0.037
2006	158,648,546,798	\$5,672,984,205	\$0.036
2007	362,549,531,172	\$8,976,574,961	\$0.025

Source: CTIA, *CTIA's Wireless Industry Indices – Year-End 2007 Results*.

## 2. Average Revenue Per Unit

195. ARPU is a widely used financial metric in analyzing the mobile telephone sector. Since 1999, following a decade of declines, CTIA's estimate of ARPU began increasing, rising to \$50.64 in December 2004, a 28 percent increase from the low of eight years ago.<sup>544</sup> However, for the past four years, ARPU has remained roughly the same, at around \$50. As seen in the table, declining voice ARPU (due to various factors, including further declines in the per-minute price of mobile calls<sup>545</sup> and an increase in the share of subscribers who typically spend less per month on mobile calls, such as prepaid and family plan customers)<sup>546</sup> continues to be offset by growth in data ARPU.<sup>547</sup> According to CTIA, in the last half of 2007, data revenues made up 17.9 percent of total wireless service revenues, compared to 13.5 percent a year earlier, an increase of 33 percent. For the nationwide operators, in the fourth quarter of 2006, data accounted for 16 percent of service revenues, versus about 10 percent a year earlier.<sup>548</sup>

### B. Quantity of Services Purchased

#### 1. Subscriber Growth

##### a. Mobile Telephony

196. In an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, all *Reports* since the *Seventh Report* have included an analysis of information filed directly with the FCC. This information, the NRUF data,<sup>549</sup> tracks phone number usage information for

<sup>544</sup> See Table 12: Average Revenue Per Minute, *supra*. 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. 2007 CTIA Survey, supra* note 408, at 183. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, see *Dec. 2007 CTIA Survey*, at 185.

<sup>545</sup> See Section VI.A.1, Pricing Trends, *supra*. See also, Simon Flannery *et al.*, *3Q06 Trend Tracker*, Morgan Stanley, Equity Research, Dec. 4, 2006, at 36 ("The challenging ARPUs, despite data, are the result of price cutting in the form of family plans, free in-network calling, free nights and weekends, rollover, free incoming calls, free cell-to-home and the like, as well as the growing mix of prepaid subscribers.")

<sup>546</sup> See, e.g., Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007, at 3 ("a growing portion of these net adds are coming from lower-ARPU family plans, prepaid customers, and others receiving larger buckets of minutes at lower per-minute prices.")

<sup>547</sup> See also *4Q06 Wireless 411*, at 15; and *Eleventh Report*, 21 FCC Rcd at 11008-09, ¶¶ 155-156.

<sup>548</sup> *4Q07 Wireless 411*, at 31.

<sup>549</sup> Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC used to require only mobile wireless carriers with over 10,000 facility-based (continued....)

the United States.<sup>550</sup> All mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end users, thereby permitting the Commission to make more accurate estimates of subscribership.<sup>551</sup> In previous years, for the purposes of this *Report*, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.<sup>552</sup> While we use NRUF data as the basis for our estimate of mobile telephone subscribership for the purposes of this *Report*, we report the CTIA data as a benchmark for comparison.<sup>553</sup>

197. As of December 2007, we estimate that there were 263 million mobile telephone subscribers,<sup>554</sup> up from 241.3 million at the end of 2006, which translates into a nationwide penetration

(Continued from previous page) \_\_\_\_\_  
subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. *See* Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743, ¶ 47 (2000). In 2004, however, the Commission changed the requirement so that all carriers must report the number of their subscribers, regardless of how many they serve, beginning in June 30, 2005. This information is submitted to the FCC on Form 477. *See* Local Telephone Competition and Broadband Reporting, *Report and Order*, 19 FCC Rcd 22340, 22345, ¶ 8 (2004). In their December 2007 filings, operators reported that they served 249.2 million subscribers. *See* Appendix A, Table A-2, *infra*.

<sup>550</sup> When the North American Numbering Plan (“NANP”) was established in 1947, only 86 area codes were assigned to carriers in the United States. Only 61 new codes were added during the next 50 years. But the rate of activation has increased dramatically since then. Between January 1, 1997 and December 31, 2000, 84 new codes were activated in the United States. Because the remaining supply of unassigned area codes is dwindling, and because a premature exhaustion of area codes would impose 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. *See* FCC, *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.*

<sup>551</sup> *See* FCC, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. An assigned number is one that is in use by an end user customer. *Id.* at 3. Carriers also report other phone number categories, including: intermediate – numbers given to other companies; aging – numbers held out of circulation; administrative – numbers for internal uses; reserved – numbers reserved for later activation; and available – numbers available to be assigned. *Id.* Assigned numbers are not necessarily from facilities-based carriers. A reseller can assign a number to an end user. This does not double-count in the assigned total, since the facilities-based carrier only counts that number as an “intermediate” number given to the reseller. *Id.*

<sup>552</sup> *See* Dec. 2007 CTIA Survey, *supra* note 408. The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. *See* *Eighth Report*, 18 FCC Rcd at 14813, n.211.

<sup>553</sup> The advantages of NRUF data over CTIA’s survey are discussed in the *Seventh Report*, 17 FCC Rcd at 13004.

<sup>554</sup> FCC estimate, based on preliminary year-end 2007 filings for Numbering Resource Utilization in the United States, adjusted for porting. In NRUF, carriers do not report numbers that have been ported to them. *See* Section V.B.2, Local Number Portability, *supra*. Therefore, in order to develop an estimate of wireless subscribership, it is necessary to adjust the raw NRUF data to account for wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting database managed by the Local Number Portability Administrator, which is currently NeuStar, Inc. The database contains all ported numbers currently in service. It also contains information about when the number was most recently ported (to a carrier other than the carrier to which the number originally was assigned) or, in some cases, when the database was updated to reflect a new area code. *Trends in Telephone Service*, FCC, Apr. 2005, at 8-2 – 8-3.

rate of 86 percent.<sup>555</sup> This addition of 21.2 million subscribers represented an 8.8 percent subscriber growth during 2007. Together with the largest absolute yearly increase of 28.8 million subscribers in 2006, the total mobile telephone subscriber base has increased 23 percent in the last two years.

**Table 14: NRUF-Estimated Mobile Telephone Subscribers**

	Subscribers (millions)	Increase from previous year (millions)	Penetration Rate
2001	128.5	n/a	45 %
2002	141.8	13.3	49 %
2003	160.6	18.8	54 %
2004	184.7	24.1	62 %
2005	213.0	28.3	71 %
2006	241.8	28.8	80 %
2007	263.0	21.2	86 %

Source: Federal Communications Commission estimates.

198. CTIA's estimate for year-end 2007 was 255.4 million subscribers, a ten percent increase over its estimate of 233.0 million subscribers as of year-end 2006.<sup>556</sup> CTIA's estimate shows a similar trend in subscriber growth, with the increase of 22.3 million subscribers shown by its 2007 survey, about ten percent less than the 25.1 added in 2006.<sup>557</sup>

199. Some analysts attribute this high subscriber growth to the attractiveness of innovative service models, particularly prepaid options. As one analyst wrote, "Our survey suggests that prepaid is playing a major role in growing US wireless penetration."<sup>558</sup>

200. In its *Year 2000 Biennial Regulatory Review*, the Commission established a five-year sunset period (until February 18, 2008) after which cellular service licensees will no longer be required to provide analog service.<sup>559</sup> The *Twelfth Report* estimated that almost all wireless subscribers were digital subscribers at the end of 2006, with approximately one percent or less being analog-only mobile telephone subscribers.<sup>560</sup> In filings made with the Commission in conjunction with the analog sunset, both Verizon Wireless and AT&T reported that 0.5 percent of their respective customer bases were

<sup>555</sup> 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, 2007 was estimated to be 305.6 million. See U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2007*, available at <http://www.census.gov/popest/states/tables/NST-EST2007-01.xls> (last visited Sept. 2, 2008). The number of subscribers refers to the number of phone numbers that have been assigned to mobile wireless devices. A particular individual may have more than one wireless device.

<sup>556</sup> See Appendix A, Table A-1, *infra*.

<sup>557</sup> *Id.*

<sup>558</sup> Simon Flannery *et al.*, *Robust Wireless Quarter as Prepaid Surges*, Morgan Stanley, Equity Research, Jan. 17, 2007, at 13.

<sup>559</sup> 47 C.F.R. § 22.901(b).

<sup>560</sup> *Twelfth Report*, 23 FCC Rcd at 2327, ¶ 209.

analog-only at the end of 2006, while Alltel reported that .96 percent of its customers were analog as of January 31, 2007.<sup>561</sup> Since the sunset period has ended on February 28, 2008 and the analog cellular service is phasing out from the market place, the *Thirteenth Report* no longer provides estimates for analog-only subscribers.

**b. Mobile Broadband and Other Data**

201. The percentage of U.S. mobile telephone subscribers that uses their mobile phone for data services continued to rise in the past year. For example, Nielsen Mobile estimates that 37 percent of U.S. mobile subscribers paid for access to the mobile Internet in the first quarter of 2008, either as part of a subscription or as a result of transactions, and that the number of U.S. subscribers who paid for mobile Internet access increased 28 percent between the first quarter of 2007 and the first quarter of 2008.<sup>562</sup> In addition, Nielsen Mobile estimates that 15.6 percent of subscribers were active users of mobile Internet services in May 2008, defined as those who use such services at least once on a monthly basis, and that the number of such active users of the mobile Internet increased 73 percent from May 2006 to May 2008.<sup>563</sup> Overall, taking into account subscribers who used their phone for any data use, including SMS text messaging and accessing the mobile Internet, Nielsen Mobile estimates that 57 percent of U.S. mobile subscribers were data users in the first quarter of 2008.<sup>564</sup> Similarly, SNL Kagan estimates that about 58 percent of U.S. subscribers use some form of data, but adds that usage is sporadic for most users and limited primarily to texting, including SMS and e-mail.<sup>565</sup>

202. The adoption of mobile data services by U.S. mobile telephone subscribers continues to vary by type of application. Based on a survey<sup>566</sup> of U.S. mobile subscribers for the three-month period ending on March 31, 2008, research firm M:Metrics estimates that 23 percent of U.S. mobile subscribers sent or received photos or videos during this period, 13.7 percent accessed news and information via a browser, 12.6 percent used e-mail, 9.2 percent purchased ringtones, 9 percent played a downloaded mobile game, 7.4 percent listened to music, 6 percent watched video, and 4.8 percent accessed social networking sites.<sup>567</sup>

203. Mobile data penetration is significantly higher among iPhone users than other mobile subscribers. For example, Nielsen Mobile estimates that 82 percent of iPhone users access the mobile

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<sup>561</sup> Verizon Wireless Analog Sunset Report, Mar. 2, 2007, at 3; AT&T Mobility LLC F/K/A Cingular Wireless LLC Second Analog Sunset Report, Feb. 26, 2007, at 11; Alltel Cellular AMPS Report, Mar. 19, 2007, at 1. All of the analog sunset reports are available of the FCC's web site at [http://wireless.fcc.gov/services/index.htm?job=cellular\\_reports&id=cellular](http://wireless.fcc.gov/services/index.htm?job=cellular_reports&id=cellular).

<sup>562</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 3.

<sup>563</sup> *Id.* at 3-4.

<sup>564</sup> *Id.* at 3.

<sup>565</sup> Sharon Armbrust, *Wireless Investor: U.S. Mobile Wireless Projections: Data Dollars Outgrow Voice 8-to-1*, WIRELESS INVESTOR, SNL Kagan, July 15, 2008, at 4.

<sup>566</sup> Since most mobile data services continue to be sold as add-ons to mobile voice services rather than as separate data-only service offerings, measures of the adoption of mobile data services by U.S. mobile telephone subscribers are generally based on indirect methods of gathering evidence such as surveys of mobile subscribers or analysis of their billing records. See *Twelfth Report*, 23 FCC Rcd at 2328, ¶ 211.

<sup>567</sup> *M:Metrics: Americans Spend More than 4.5 Hours Per Month Browsing on Smartphones, Nearly Double the Rate of the British*, Press Release, M:Metrics, May 21, 2008, at 3. The estimates are based on a three-month moving average for the period ending March 31, 2008.

Internet, making them five times more likely to do so as the average mobile consumer.<sup>568</sup> Similarly, data from M:Metrics for the month of January 2008 shows that U.S. consumers who have purchased the iPhone access mobile content at much higher rates than those who own “smartphones” and U.S. mobile phone subscribers in general (see Table 15 below).<sup>569</sup> For example, M:Metrics found that nearly 85 percent of iPhone users accessed news and information via a browser in the month of January, as compared with about 58 percent of “smartphone” users and a market average of about 13 percent.<sup>570</sup> M:Metrics also found that nearly 31 percent of iPhone users watched mobile TV or video, versus a market average of 4.6 percent and more than double the rate for all “smartphone” users (14.2 percent).<sup>571</sup> In addition, nearly 50 percent of iPhone users accessed a social networking site or blog, versus 19.4 percent of “smartphone” users and a 4.2 percent market average.<sup>572</sup> The data also reveal that two of the iPhone’s featured “widgets,” YouTube and Google Maps, are very popular among iPhone users, as is Facebook, one of the first Web properties to customize its content for the iPhone.<sup>573</sup> M:Metrics argues that the dramatic increase in mobile content consumption among iPhone users is due not only to the attributes of the device itself, but also the fact that all iPhones on the AT&T network are attached to an unlimited data plan, which eliminates “the fear of surprise data charges.”<sup>574</sup>

**Table 15: Mobile Content Consumption: iPhone, Smartphone and Total Market (January 2008)**

Activity	iPhone	Smartphone	Market
Any news or info via browser	84.8%	58.2%	13.1%
Accessed web search	58.6%	37.0%	6.1%
Watched mobile TV and/or video	30.9%	14.2%	4.6%
Watched on-demand video or TV programming	20.9%	7.0%	1.4%
Accessed social networking site or blog	49.7%	19.4%	4.2%
Accessed Facebook	20.0%	NA	1.5%
Accessed YouTube	30.4%	NA	1.0%
Used Google Maps	36.0%	NA	2.6%
Listened to music on mobile device	74.1%	27.9%	6.7%

Source: *M:Metrics*

204. With the launch of wireless broadband services based on EV-DO or WCDMA/HSDPA technologies by all four nationwide providers and some smaller regional providers, the number of subscribers capable of accessing mobile data services at broadband-like speeds also has been growing.

<sup>568</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 5.

<sup>569</sup> *M:Metrics: iPhone Hype Holds Up*, Press Release, M:Metrics, Mar. 18, 2008. M:Metrics defines smartphones to include devices running Windows, Symbian, RIM or Apple operating systems.

<sup>570</sup> *Id.*

<sup>571</sup> *Id.*

<sup>572</sup> *Id.*

<sup>573</sup> *Id.*

<sup>574</sup> *Id.*

The Commission estimates that high-speed Internet-access connections using mobile wireless technology increased by more than 18 million in 2006, from 3.128 million connections to 21.910 million connections.<sup>575</sup> Mobile wireless connections represented approximately 26 percent of the more than 82.547 million high-speed lines in the United States at the end of 2006.<sup>576</sup>

205. A study of U.S. Internet usage via mobile broadband conducted by comScore, Inc. (“comScore”) found that the number of computers and other mobile devices using mobile broadband technology to access the Internet grew by 154 percent in 2007, from 854,000 in the fourth quarter of 2006 to 2.168 million in the fourth quarter of 2007.<sup>577</sup> The same study also found that work computers accounted for the majority (59 percent) of these mobile broadband connections, with home or personal computers accounting for the remaining 41 percent.<sup>578</sup> ComScore estimates that mobile broadband access is currently being used by about 1 percent of the total U.S. Internet population.<sup>579</sup>

206. In another more recent study, comScore estimated that the number of U.S. mobile subscribers with 3G enabled devices grew to 64.2 million in mid-2008, up by 80 percent from 35.65 million in mid-2007.<sup>580</sup> Using these estimates, comScore also found that the penetration rate for 3G devices rose from 16.7 percent of U.S. mobile subscribers in mid-2007 to 28.4 percent of subscribers in mid-2008.

207. In contrast with text messaging and other handset-based mobile data applications, subscriber numbers for paging continue to drop. Using NRUF data, the Commission estimates there were 5.85 million paging units in service as of the end of 2007, down from 6.1 million paging units at the end of 2006, 8.3 million units at the end of 2005, 8.5 million units at the end of 2004, 11.2 million units at the end of 2003, and 14.1 million units at the end of 2002.<sup>581</sup>

## 2. Minutes of Use

208. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones, although at a slower rate than in the years prior to 2006. According to CTIA, average minutes-of-use per subscriber per month (“MOUs”) reached 769 between June and December 2007, an eight percent increase from the average of 714 MOUs reported during the same period in

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<sup>575</sup> *High-Speed Services for Internet Access: Status as of December 31, 2006*, FCC, Oct. 2007, Table 1. High-speed lines or wireless channels connect homes and businesses to the Internet at speeds that exceed 200 kbps in at least one direction. *Id.* at 2.

<sup>576</sup> *Id.* at 5.

<sup>577</sup> *Number of U.S. Computers Accessing the Internet Via Mobile Broadband Soars 154 Percent in 2007*, Press Release, comScore, Mar. 4, 2008. The study examined the usage and characteristics of mobile broadband users through data collected from computers where Internet access via mobile broadband Internet service providers occurred. The study defines mobile broadband as a service that “employs cellular networks, where users pay subscriptions for access” and “the connection is made with a PC card, built-in adapter, or connections can be tethered via a cellphone or PDA,” as distinct from Wi-Fi access via “hot spots.” According to comScore, Verizon and Sprint accounted for the majority of the mobile broadband market in 2007. *Id.*

<sup>578</sup> *Id.*

<sup>579</sup> *Id.*

<sup>580</sup> *Comscore Reports that the U.S. Catches Up With Western Europe in Adoption of 3G Mobile Devices*, Press Release, comScore, Sept. 4, 2008 (“*U.S. Catches Up With Western Europe in Adoption of 3G Mobile Devices*”). These estimates are based on a three-month average for the period ending June 2008 and June 2007.

<sup>581</sup> Craig Stroup and John Vu, *Numbering Resource Utilization in the United States*, FCC, Aug. 2008, at 14; *Twelfth Report*, 23 FCC Rcd at 2330, ¶ 216.

2006.<sup>582</sup> Although the average monthly MOUs per subscriber for the four nationwide operators climbed up only slightly from 892 minutes in the first quarter of 2007 to 898 minutes in the first quarter of 2008,<sup>583</sup> some regional operators showed significant monthly MOU increases over the same period. Alltel and US Cellular saw their monthly MOUs increase by 18% and 21%, respectively.<sup>584</sup> MetroPCS and Leap Wireless, both offering unlimited local callings in smaller cities, averaged over 1,450 MOUs per month per subscriber for the entire year.<sup>585</sup>

### 3. Mobile Broadband and Other Data Usage

209. Data on the use of mobile data applications are fragmentary and their availability varies with the particular type of application. By a number of indicators, however, mobile data applications have continued to gain popularity among U.S. mobile subscribers. For example, the volume of SMS traffic continued to increase at a rapid pace in the past year. According to CTIA, more than 48.1 billion text messages were reported for the month of December 2007, up 66.7 percent from 28.88 billion text messages for the month of June 2007, and up 157 percent from the more than 18.7 billion messages reported for the month of December 2006.<sup>586</sup> Based on CTIA's data, we estimate that the average number of text messages sent per subscriber was 182.9 per month in December 2007 and 77.3 per month in December 2006. The additional 105 text messages per subscriber in December 2007 represents an increase of almost 120 percent as compared to December 2006.<sup>587</sup>

210. In addition, the reported text/SMS traffic volume grew to 146.99 billion in the first six months of 2007 and again to 215.56 billion in the second half of 2007, up from 93.8 billion messages in the second half of 2006.<sup>588</sup> For 2007 as a whole, total reported text/SMS traffic volume rose to more than 362 billion messages, more than double the total of more than 158 billion messages reported in 2006 (see Table 13: Average Revenue Per Text Message).<sup>589</sup> While text messaging remains the most widely used type of messaging service, the volume of photo messaging and other multimedia messaging services also has continued to grow. In particular, the volume of MMS messages reported to CTIA more than doubled in the past year, rising from 2.7 billion messages in 2006 to 6.1 billion messages in 2007.<sup>590</sup>

211. M:Metrics estimates that "smartphone" users spend an average of four hours and 38 minutes per month browsing the mobile Web in the United States.<sup>591</sup> M:Metrics also estimates that mobile browsing has increased 89 percent year over year among "smartphone" users in the United States,

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<sup>582</sup> See Table 12: Average Revenue Per Minute, *supra*. 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.

<sup>583</sup> Morgan Stanley *Telecom Services IQ08 Trend Tracker*, at 45.

<sup>584</sup> *Id.*

<sup>585</sup> *Id.*

<sup>586</sup> *Dec. 2007 CTIA Survey*, *supra* note 408, at 205-206.

<sup>587</sup> Our calculations do not take into account that not all mobile telephone subscribers may use or have access to text messaging.

<sup>588</sup> *Id.* at 207.

<sup>589</sup> *Id.*

<sup>590</sup> *Id.* at 207-208

<sup>591</sup> *M:Metrics: Americans Spend More than 4.5 Hours Per Month Browsing on Smartphones, Nearly Double the Rate of the British*, Press Release, M:Metrics, May 21, 2008, at 1. The estimate is based on on-device metering of actual user behavior of those with Windows, Symbian and Palm handsets in March 2008.

and that pageviews have increased 27 percent.<sup>592</sup> M:Metrics concludes that social networking and Internet commerce are drawing consumers into the mobile Web, finding that, on the days they visited each site, U.S. consumers spent an average of 22 minutes on Craigslist, 29 minutes on eBay, 16 minutes on MySpace, 14 Minutes on Facebook and 18 minutes on Go.com.<sup>593</sup> M:Metrics also emphasizes that one of the primary factors explaining the duration of time spent browsing on the mobile Web is the relative popularity of flat-rate unlimited data plans in the United States, where an estimated 10.9 percent of users have an unlimited data plan.<sup>594</sup>

#### 4. Sub-National Penetration Rates

212. NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile telephone subscribership across different areas within the United States.<sup>595</sup> EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are reasonably suited for comparing regional mobile telephone penetration rates.<sup>596</sup> First, the defining aspect of mobile telephone is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far as possible, the place of work and the place of residence of its labor force.<sup>597</sup> Thus, an EA would seem to include in virtually all instances the market where the average person would shop for and purchase his or her mobile phone most of the time – near home, near the workplace, and all of the places in between.<sup>598</sup> Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas.<sup>599</sup> In other words, a mobile telephone subscriber can be assigned a

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<sup>592</sup> *Id.*

<sup>593</sup> *Id.* at 1-2.

<sup>594</sup> *Id.* at 2.

<sup>595</sup> NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

<sup>596</sup> There are 172 EAs, each of which is an aggregation of counties. See Kenneth P. Johnson, *Redefinition of the EA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75 (“*Redefinition of the EA*”). For its spectrum auctions, the FCC has defined four additional EAs: Guam and the Northern Mariana Islands (173); Puerto Rico and the U.S. Virgin Islands (174); American Samoa (175); and Gulf of Mexico (176). See FCC, *FCC Auctions: Maps*, available at <http://wireless.fcc.gov/auctions/data/maps.html> (last visited Dec. 15, 2008). In November 2004, the Bureau of Economic Analysis released updated definitions of EAs; however, for consistency, we use the previous release of definitions. See *New BEA Economic Areas For 2004*, Bureau of Economic Analysis, Nov. 17, 2004.

<sup>597</sup> *Redefinition of the EA*, at 75.

<sup>598</sup> See *supra* note 87 for a discussion of the reasons why we use EAs to measure market concentration in this *Report*, including for example, to maintain confidential information we maintain. We note, however, that the Commission typically has used CMAs as the geographic market for analyzing mobile wireless transactions. See, e.g., *Sprint Nextel/Clearwire Order*, FCC 08-259, at ¶¶ 51-52; *Verizon Wireless/Alltel Order*, FCC 08-258, ¶ 52.

<sup>599</sup> According to one analyst's report in 2003, 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 (continued....)”).

phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage (but generally still in the same EA).<sup>600</sup>

213. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA penetration rate, can be seen in Appendix A, Table A-3.<sup>601</sup> In addition, a map showing regional penetration rate by EAs can be found in Appendix B. The rates range from a high of 99 percent<sup>602</sup> in the Biloxi-Gulfport-Pascagoula, Mississippi EA (EA 82) to a low of 61 percent in the Aberdeen, South Dakota EA (EA 114).<sup>603</sup> There are 160 EAs, with a combined population of 298.5 million, in which penetration rates exceed 70 percent, and 24 EAs, with a combined population of 105 million, in which penetration rates exceed 90 percent. Not only do no EAs have penetration rates under 60 percent, only 12 EAs, with a combined population of just 3 million, have penetration rates under 70 percent. The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 70 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 89 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 86 percent.

### C. Network Quality

214. A semi-annual study conducted by J.D. Power and Associates measures wireless call quality performance in terms of the number of problems per 100 calls (PP100), where a lower score reflects fewer problems and higher wireless call quality performance.<sup>604</sup> The overall industry score in the J.D. Power and Associates 2008 Wireless Call Quality Performance Study (Volume 2) is 15 problems per 100 calls.<sup>605</sup> This is the same as the overall industry score in the J.D. Power and Associates 2007 Wireless Call Quality Performance Study (Volume 2).<sup>606</sup> Prior to the 2008 study, the number of reported

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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%.")

<sup>600</sup> "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. As described above, however, EAs in some respects may not accurately represent market share. *See supra* note 87.

<sup>601</sup> *See also* Appendix B, Map B-44: Mobile Wireless Penetration Estimated by Economic Area, *infra*.

<sup>602</sup> Penetration rates close to, and over, 100 percent may be due to subscribers having more than one mobile phone line.

<sup>603</sup> We excluded New Orleans, LA-MS (EA 83) from this analysis due to what we believe to be an aberration with the statistics. *See* note 1 at the end of Table A-3: Economic Area Penetration Rates, Appendix A.

<sup>604</sup> *J.D. Power and Associates Reports: Alltel, Sprint Nextel, U.S. Cellular and Verizon Wireless Each Rank Highest in Wireless Call Quality Performance in Their Respective Regions*, Press Release, J.D. Power and Associates, Sept. 4, 2008 ("2008 Wireless Call Quality Performance Study—Volume 2"). The study measures wireless call quality based on seven customer-reported problem areas that impact overall carrier performance: dropped/disconnected calls; static/interference; failed connection on first try; voice distortion; echoes; no immediate voice mail notification; and no immediate text message notification. The 2008 Wireless Call Quality Performance Study (Volume 2) is based on responses from 22,407 wireless users, and the results are from the fielding period between February and June 2008.

<sup>605</sup> *Id.*; e-mail communication with Kirk Parsons, Senior Director, Wireless Services, J.D. Power and Associates, Sept. 5, 2008.

<sup>606</sup> *Twelfth Report*, 23 FCC Rcd at 2332, ¶ 223.

wireless call quality problems declined for three consecutive reporting periods, reaching the lowest levels in the five-year history of the study.<sup>607</sup>

215. While the overall industry score for wireless call quality performance in the 2008 study remained the same as in the 2007 study, the study found that the rate of call quality problems among customers who say they “definitely will” switch wireless providers in the next 12 months increased by 16 percent over the previous year.<sup>608</sup> The study concluded that dropped calls are primarily driving the increase in PP100 rates among this group of customers. In particular, customers who say they “definitely will” switch carriers within the next year and also said they had at least one dropped call experienced an average of 22 dropped calls per 100 calls, a 47 percent increase compared with the same reporting period in 2007 (15 PP100).<sup>609</sup> In addition, the average number of call quality problems reported by wireless subscribers who say they “definitely will” switch their current wireless provider is 51 PP100, which is five times higher than the problem rates of customers who report they “definitely will not” switch providers in the next 12 months (9 PP100).<sup>610</sup> At the same time, the study found that only 14 percent of customers say they “definitely/probably will” switch wireless providers in the next 12 months.<sup>611</sup>

216. In Volume 1 of the J.D. Power and Associates 2008 Wireless Call Quality Performance Study, the company also found that there is a lower rate of call quality problems with certain network technologies used by wireless providers.<sup>612</sup> In particular, the study found that the average number of call quality problems reported by customers using CDMA technology is 14 PP100, while the average for wireless customers using GSM networks is 17 PP100.<sup>613</sup> In addition, customers using iDEN network technology reported an average of 23 PP100.<sup>614</sup> The study also found wireless customers who use third-generation enabled mobile devices that support higher data speeds experience fewer problems than customers who do not use these 3G devices. For example, problems occur at a 12 percent lower rate when calls are placed or received using a 3G-enabled mobile device compared with calls placed or received using earlier-generation devices.<sup>615</sup>

## **D. International Comparisons**

### **1. Mobile Voice**

217. This section compares mobile market performance in the United States, Western Europe and Asia-Pacific countries of comparable income levels with regard to mobile penetration, usage, and pricing.<sup>616</sup> To ensure that a consistent methodology is used to compile the data for different countries, the

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<sup>607</sup> *Id.*

<sup>608</sup> *2008 Wireless Call Quality Performance Study—Volume 2.*

<sup>609</sup> *Id.*

<sup>610</sup> *Id.*

<sup>611</sup> *Id.*

<sup>612</sup> *J.D. Power and Associates Reports: Alltel, T-Mobile, U.S. Cellular and Verizon Wireless Each Make a Sound Connection with Wireless Users and Rank Highest in Customer Satisfaction with Call Quality*, Press Release, J.D. Power and Associates, Mar. 27, 2008.

<sup>613</sup> *Id.*

<sup>614</sup> *Id.*

<sup>615</sup> *Id.*

<sup>616</sup> In accordance with established practice in using international benchmarking to assess effective competition in mobile markets, the comparison of mobile market performance is restricted to Western Europe and parts of the Asia-Pacific in order to ensure that the countries being compared are roughly similar to the United States with regard to (continued....)

comparison is based on international cross-section data compiled by Merrill Lynch.<sup>617</sup> Consequently, the estimates of mobile penetration, MOUs, and revenue per minute for the U.S. mobile market cited in this section differ somewhat from estimates provided in previous sections of the *Report* because they come from different sources.<sup>618</sup>

218. As in the *Twelfth Report*<sup>619</sup> and previous reports, this comparison shows that U.S. mobile subscribers continue to fare extremely well relative to mobile subscribers in Western Europe and comparable Asia-Pacific countries. In particular, mobile calls continue to be significantly less expensive on a per minute basis in the United States than in Western Europe and Japan, and U.S. mobile subscribers continue to lead the world in average voice usage by a wide margin.

**Table 16: Mobile Market Performance in Selected Countries**

Country	Penetration (% of Pops)	Prepaid (% of Subs)	MOUs	Revenue per Minute (\$)	Data (% of ARPU)
<b>Receiving Party Pays</b>					
USA	84.4	16.1	812	0.06	19.8
Canada	60.9	22.1	439	0.11	12.5
Hong Kong	138.3	40.8	510	NA	NA
Singapore	125.0	46.4	349	0.08	24.5
<b>Calling Party Pays</b>					
UK	121.7	64.6	185	0.19	26.4
Germany	118.2	55.2	102	0.21	23.3
Italy	152.8	89.5	139	0.18	21.9
Sweden	115.1	50.4	191	0.15	13.0
France	89.0	36.7	249	0.17	15.6
Finland	122.4	19.0	307	0.12	16.8
Japan	82.3	2.0	138	0.26	34.4
South Korea	89.9	3.0	319	0.11	18.6
Australia	104.3	48.0	208	0.16	25.2

Source: *Interactive Global Wireless Matrix 4Q07*.

219. As noted above, some analysts regard average revenue per minute as a good proxy for mobile pricing.<sup>620</sup> Revenue per minute in Western Europe averaged about \$0.20 in the fourth quarter of

(Continued from previous page) \_\_\_\_\_

their level of economic and telecommunications infrastructure development. *See, for example*, UK regulator Oftel's review of effective competition in the mobile market: *Effective Competition Review: Mobile*, Office of Telecommunications, Feb. 2001, at 7.

<sup>617</sup> *Interactive Global Wireless Matrix 4Q07*.

<sup>618</sup> In addition, Merrill Lynch has noted that these data have certain limitations for comparing countries that use calling party pays ("CPP") versus mobile party pays (also known as receiving party pays). For reasons explained below, the figures for minutes of use may be somewhat understated, and the revenue figures used to calculate average revenue per minute may be somewhat overstated, in markets where CPP is used relative to non-CPP markets.

<sup>619</sup> *Twelfth Report*, 23 FCC Rcd at 2334, ¶ 229.

<sup>620</sup> *See* Section VI.A.1, Pricing Trends, *supra*. Average revenue per minute ("RPM") is calculated by dividing monthly voice-only ARPU by MOUs. Service revenues included in ARPU reflect the fees mobile operators collect from other network operators for terminating incoming calls on their networks as well as monthly service charges and usage fees paid by mobile subscribers. As noted above, MOUs figures may be somewhat understated in CPP (continued....)

2007, and ranged from a low of \$0.12 in Finland to a high of \$0.32 in Switzerland.<sup>621</sup> At \$0.06, average revenue per minute in the United States during the same period remained less than one-third of the European average.<sup>622</sup> Revenue per minute in Japan, at \$0.26, was more than four times the U.S. figure at the end of 2007.<sup>623</sup>

220. Merrill Lynch estimates that U.S. mobile subscribers talked an average of 812 minutes per month on their mobile phones in the fourth quarter of 2007.<sup>624</sup> This compares with 138 MOUs in Japan and an average across Western Europe of 161 MOUs, with estimated MOUs in individual European countries ranging from a low of 102 in Germany to a high of 307 in Finland.<sup>625</sup>

221. Mobile penetration averaged an estimated 118.7 percent in Western Europe at the end of 2007.<sup>626</sup> In most West European countries, estimated mobile penetration exceeded 100 percent at the end of 2007, due in part to greater use of prepaid service plans and ownership of multiple devices or subscriber identity module (“SIM”) cards.<sup>627</sup> As in years past, France finished 2007 with the lowest mobile penetration rate in Western Europe at 89 percent.<sup>628</sup>

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markets relative to non-CPP markets (due to the aforementioned double-counting of on-net mobile-to-mobile minutes in non-CPP markets), and the revenue figures used to calculate ARPU may be somewhat overstated in CPP markets relative to non-CPP markets (due to double-counting of mobile termination revenues for off-net mobile-to-mobile calls in CPP markets). Consequently, the RPM figures (ARPU divided by MOUs) probably overstate the difference between RPM in the United States and CPP markets. The potential for service revenues to be somewhat overstated in CPP markets was brought to the Commission’s attention by Professor Stephen Littlechild, and confirmed by Merrill Lynch through e-mail correspondence.

<sup>621</sup> *Interactive Global Wireless Matrix 4Q07*.

<sup>622</sup> *Id.* In e-mail correspondence, Merrill Lynch has indicated that RPM figures may overstate the difference between RPM in CPP and non-CPP markets by about 15 percent due to the two factors mentioned above.

<sup>623</sup> *Id.*

<sup>624</sup> *Id.* For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing minutes, and usually exclude traffic related to mobile data services. Figures for MOUs are potentially somewhat understated in markets that employ CPP as compared to the U.S. mobile market and other non-CPP markets due to double-counting of same-network (“on-net”) mobile-to-mobile minutes under the mobile party pays system used in the U.S. and other non-CPP markets. The double counting occurs because each minute of an on-net call is billed to both the caller and the receiver under the mobile party pays system, whereas under CPP each on-net minute is billed only to the calling party, and therefore counted only once. *See Tenth Report*, 20 FCC Rcd at 15976, n.457.

<sup>625</sup> *Interactive Global Wireless Matrix 4Q07*.

<sup>626</sup> *Interactive Global Wireless Matrix 4Q07*.

<sup>627</sup> *Id.* Reported mobile subscriber figures and therefore penetration may be overstated in some countries, particularly those with a high percentage of prepaid subscribers, due to a combination of factors: (1) slow clearing out of inactive users (for example, subscribers who have switched service providers) from their former provider’s subscriber base; (2) multiple device ownership (for example, users of a Blackberry plus a mobile phone); and (3) multiple SIM card ownership (for example, users who switch between operators in order to take advantage of different tariffs at different times of the day or week). *See* Jeff Kvaal *et al.*, *Wireless Equipment Industry Update: Strong Net Adds Drive Higher Phone Units*, Lehman Brothers, Equity Research, Jan. 16, 2007, at 4. As noted in previous reports, carriers have widely different policies to determine when to cut off inactive subscribers and to remove them from their reported subscriber base. In addition, it is becoming more prevalent for people to subscribe to multiple mobile service providers. *See, e.g., Eleventh Report*, 21 FCC Rcd at 11021, ¶ 190 n.506; *Tenth Report*, 20 FCC Rcd at 15976, n.452; *Seventh Report*, 17 FCC Rcd at 13033, and *Sixth Report*, 16 FCC Rcd at 13391.

<sup>628</sup> *Interactive Global Wireless Matrix 4Q07*.

222. Japan finished 2007 with a mobile penetration level of 82.3 percent.<sup>629</sup> In the *Twelfth Report*, we found that the increase in the number of U.S. mobile telephone subscribers in 2006 raised the nationwide penetration rate to a level that is virtually on a par with the mobile penetration level in Japan.<sup>630</sup> In light of both the Merrill Lynch estimate of the U.S. mobile penetration level (84.4 percent) and the Commission's own estimate based on NRUF (86 percent), in this *Report* we find that the U.S. mobile penetration rate has now surpassed the mobile penetration rate in Japan.

223. As noted in the *Twelfth Report*<sup>631</sup> and previous reports, one of the reasons revenue per minute is higher in Western Europe and Japan than in the United States is that the calling party pays system used throughout Western Europe and in Japan tends to give mobile operators the ability and the incentive to set mobile termination charges that are high relative to those in the United States and other countries that use the mobile party pays system.<sup>632</sup> In addition, because these higher mobile termination charges are absorbed by the calling party, the calling party pays system may also reduce usage relative to mobile party pays system by increasing the cost of calls to mobile phones.<sup>633</sup> Based on a regression analysis of international cross-section data for countries with high per capita income, economist Stephen Littlechild finds that a mobile party pays system significantly reduces average revenue per minute (by about twelve cents per minute compared to a calling party pays system), while significantly increasing average usage (by about 143 minutes per month).<sup>634</sup>

224. Apart from the effects of a calling party pays system on mobile termination charges, analysts have argued that intense competition led U.S. mobile operators to price aggressively through bucket plans and various promotions, driving prices down well below levels in Western Europe and Japan.<sup>635</sup> Accordingly, the results of this international comparison can be interpreted as evidence that the U.S. mobile market is effectively competitive relative to mobile markets in Western Europe and also Japan.

## 2. Mobile Data

225. The *Twelfth Report* and previous reports found that the percentage of mobile service revenues from data services was higher in Western Europe and parts of Asia than in the United States.<sup>636</sup>

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<sup>629</sup> *Id.*

<sup>630</sup> *Twelfth Report*, 23 FCC Rcd at 2336, ¶ 231

<sup>631</sup> *Id.* at 2337, ¶ 235.

<sup>632</sup> See, for example, Robert W. Crandall and J. Gregory Sidak, *Should Regulators Set Rates to Terminate Calls on Mobile Networks?*, YALE JOURNAL ON REGULATION, Vol. 21, No. 2, Summer 2004, at 1-46, at 6-8; Stephen C. Littlechild, *Mobile Termination Charges: Calling Party Pays Versus Receiving Party Pays*, TELECOMMUNICATIONS POLICY, Vol. 30, No. 5-6, June-July 2006, at 242-277, at 244-245, 253-254 (“*Calling Party Pays Versus Receiving Party Pays*”).

<sup>633</sup> *Calling Party Pays Versus Receiving Party Pays*, at 255. While theory also suggests the possibility that mobile party pays may lead mobile subscribers to switch off their phones or withhold their mobile phone numbers to avoid paying for incoming calls, in practice U.S. mobile operators have overcome the disincentive to receive calls under mobile party pays through the introduction of bucket plans with low per-minute rates and other schemes for stimulating usage, such as free night and weekend minutes. *Id.* at 254, 268.

<sup>634</sup> *Id.* at 259. Littlechild also concludes there is no evidence that mobile party pays lowers the mobile penetration rate compared to calling party pays. *Id.*

<sup>635</sup> See, e.g., Timothy Horan *et al.*, *International Wireless Trends Reinforce Our Bullish View On U.S. Wireless*, CIBC World Markets, Equity Research, June 6, 2005, at 4-6.

<sup>636</sup> See *Twelfth Report*, 23 FCC Rcd at 2337, ¶ 237.

In this *Report* we find that the percentage of mobile service revenues from data services is still higher in parts of Western Europe and Asia than in the United States, but on average there is no longer much difference between the U.S. and Western Europe with regard to this metric. In the fourth quarter of 2007 revenues from mobile data services contributed an estimated 20.4 percent of European mobile carriers' service revenues on average, and ranged from a low of 12.2 percent of service revenues in Greece to a high of 26.4 percent of service revenues in the UK.<sup>637</sup> This compares with 19.8 percent of U.S. mobile carriers' service revenues in the same period.<sup>638</sup> The percentage of service revenues derived from mobile data services was significantly higher in Japan (34.4 percent) than in Western Europe or the United States.<sup>639</sup>

226. ComScore recently reported that, after a slower start, the United States has caught up with Western Europe in the adoption of 3G enabled devices.<sup>640</sup> As noted previously, comScore has estimated that 28.4 percent of U.S. mobile subscribers had 3G devices in mid-2008.<sup>641</sup> This compares with an average of 28.3 percent of mobile subscribers in the five largest West European countries (Germany, Spain, France, Italy and the United Kingdom).<sup>642</sup> ComScore also reported that the only individual major European countries exceeding the United States in penetration of 3G enabled devices are Italy (38.3 percent) and Spain (37.2 percent). In mid-2007, penetration of 3G enabled devices was 16.7 percent of U.S. mobile subscribers, as compared with an average of 20.3 percent of mobile subscribers in the five largest European countries.<sup>643</sup>

227. Penetration of mobile data services among mobile telephone subscribers varies by country and by type of application. For example, Nielson Mobile finds that the United States leads among 16 countries in mobile Internet penetration with 15.6 percent of wireless subscribers, followed by, among others, the United Kingdom (12.9%), Italy (11.9%), Spain (10.8%), France (9.6%), and Germany (7.4%).<sup>644</sup> Similarly, M:Metrics finds that the percentage of mobile subscribers who use their mobile phones for certain content and applications – in particular, accessing news and information via a browser, accessing downloaded applications, purchasing ringtones, using e-mail, and accessing social networking sites – is somewhat higher in the United States than in other Western European countries included in the M:Metrics survey with the exception, in the case of some of these applications, of the United Kingdom.<sup>645</sup> However, other mobile data applications continue to be more widely used by mobile subscribers in Western Europe than in the United States, including photo and video messaging, watching video, and

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<sup>637</sup> *Interactive Global Wireless Matrix 4Q07*.

<sup>638</sup> *Id.*

<sup>639</sup> *Interactive Global Wireless Matrix 4Q06*.

<sup>640</sup> *Comscore Reports that the U.S. Catches Up With Western Europe in Adoption of 3G Mobile Devices*, Press Release, comScore, Sept. 4, 2008 (“*U.S. Catches Up With Western Europe in Adoption of 3G Mobile Devices*”).

<sup>641</sup> See Section VI.B.1.b, *Subscriber Growth – Mobile Data*, *supra*.

<sup>642</sup> *U.S. Catches Up With Western Europe in Adoption of 3G Mobile Devices*.

<sup>643</sup> *Id.*

<sup>644</sup> *Critical Mass – The Worldwide State of the Mobile Web*, Nielsen Mobile, July 2008, at 3. The remaining countries are Russia (11.2%), Thailand (10.0%), China (6.8%), Philippines (3.4%), Singapore (3.0%), Brazil (2.6%), Taiwan (1.9%), India (1.8%), New Zealand (1.6%), and Indonesia (1.1%).

<sup>645</sup> *M:Metrics: Americans Spend More than 4.5 Hours Per Month Browsing on Smartphones, Nearly Double the Rate of the British*, Press Release, M:Metrics, May 21, 2008, at 3. The estimates are based on a three-month moving average for the period ending March 31, 2008.

listening to music.<sup>646</sup>

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<sup>646</sup> *Id.*

**Table 17: Mobile Data Penetration in the United States and Europe**

	U.S.	EU	France	Germany	Italy	Spain	UK
	(percent of total mobile subscribers)						
Watched video	6.0	9.2	7.3	6.2	11.2	12.8	9.4
Listened to music	7.4	17.9	16.1	17.6	14.7	22.5	19.9
Accessed news/info via browser	13.7	9.5	10.1	5.7	7.8	7.2	16.3
Received SMS ads	19.2	49.6	63.5	29.7	53.9	73.0	35.4
Played downloaded game	9.0	8.3	4.4	7.3	9.0	11.4	10.3
Accessed downloaded application	4.9	2.9	1.8	2.6	4.1	2.5	3.4
Sent/received photos or videos	23.0	27.6	25.0	20.9	32.0	31.0	30.2
Purchased ringtones	9.2	3.8	4.1	3.6	4.0	4.1	3.2
Used e-mail	12.6	8.6	6.5	7.2	11.2	9.1	9.1
Accessed social networking sites	4.8	2.8	2.4	1.3	2.7	2.5	4.9

Source M:Metrics.

## VII. INTERMODAL ISSUES

### A. Wireless – Wireline Competition

228. Once solely a business tool, wireless phones are now a mass-market consumer device.<sup>647</sup> As one journalist reported in early 2008:

There is now one cellphone for every two humans on earth. From essentially zero, we've passed a watershed of more than 3.3 billion active cellphones on a planet of some 6.6 billion humans in 26 years. This is the fastest global diffusion of any technology in human history – faster even than the polio vaccine.<sup>648</sup>

Indeed, one analyst noted in early 2007 that in the U.S.: “Cellphones rank just behind keys when it comes to items that Americans do not leave home without.”<sup>649</sup> The overall wireless penetration rate in the United States is now at 86 percent.<sup>650</sup> Mobile phones are an integral part of American culture; they are everywhere. As stated in the *Twelfth Report*, virtually everyone in the United States between the ages of 15 and 69 has a wireless phone, and even among the very young, an estimated 51 percent of children aged

<sup>647</sup> See *Sixth Report*, 16 FCC Rcd at 13381. See also *10-Year Wireless Projections*, KAGAN WIRELESS TELECOM INVESTOR, June 6, 2005, at 2 (estimating that, in 2004, only 25 percent of wireless users were business customers, with the remaining 75 percent being ordinary consumers).

<sup>648</sup> Joel Garreau, *Our Cells, Ourselves*, washingtonpost.com, Feb. 24, 2008, available at [http://www.washingtonpost.com/wp-dyn/content/article/2008/02/22/AR2008022202283\\_pf.html](http://www.washingtonpost.com/wp-dyn/content/article/2008/02/22/AR2008022202283_pf.html) (last visited Sept. 9, 2008) (“*Our Cells, Ourselves*”).

<sup>649</sup> Marguerite Reardon, *Will 'Unlocked' Cellphones Consumers?*, USATODAY.COM (citing Albert Lin, an analyst with American Technology Research).

<sup>650</sup> See Section VI.B.1, Subscriber Growth, *supra*.

10 to 14 years old, and 25 percent of children aged 5 to 9 years old, have mobile phones.<sup>651</sup> One reporter commented in early 2007, “Cell phones are the most pervasive media device, beating out computers and televisions, as consumers keep their mobile phones at their side nearly every moment of the day.”<sup>652</sup> As observed in the *Twelfth Report*, wireless phones have become a fashion accessory, and CTIA hosts fashion shows at its conventions.<sup>653</sup> As one analyst has noted: “Mobile phones are more than utilitarian. They are an important means of self-expression.”<sup>654</sup> For example, there are many colors of phones from which consumers may choose, or phones can be bejeweled with crystals or rubies. In addition, there are many types of accessories for phones, such as Hello Kitty® charms.<sup>655</sup>

### 1. Wireless Substitution

229. While exact percentages are difficult to determine, wireless substitution has grown significantly in recent years. Between the end of 2001 and 2006, total RBOC access lines dropped 23 percent, from 161 million to 124 million lines.<sup>656</sup> In 2006 alone, the RBOCs lost almost 7 percent of their wireline access lines, with wireless substitution being a significant reason.<sup>657</sup> According to the 2007 National Health Interview Survey (“NHIS”), 14.5 percent of adults, or one out of every 7, lived in households with only wireless phones in the second half of 2007, up from 11.8 percent in 2006, 7.8 percent in the second half of 2005, and more than quadruple the percentage (3.5 percent) in the second half of 2003.<sup>658</sup> The survey also found that wireless-only households are more prevalent among younger adults, with one-half of all wireless-only adults under 30 years of age. One in three adults aged 18-24 years (31 percent) lived in households with only wireless telephones, and nearly 34.5 percent of adults aged 25-29 years lived in households with only wireless telephones. Above 30 years old, as age increased, the survey found that the percentage of adults living in households with only wireless telephones decreased: 15.5 percent for adults aged 30-44 years; 8.0 percent for adults aged 45-64 years; and 2.2 percent for adults aged 65 years or over.

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<sup>651</sup> *Twelfth Report*, 23 FCC Rcd at 2340, ¶ 244 (citing Simon Flannery *et al.*, *Deteriorating Wireless Trends, Revisited*, Morgan Stanley, Equity Research, Jan. 18, 2007, at 5.)

<sup>652</sup> Louise Story, *Cell Phone Carriers Planning Screen Ads*, CHICAGO TRIBUNE ONLINE, Jan. 22, 2007.

<sup>653</sup> *Twelfth Report*, 23 FCC Rcd at 2340, ¶ 245 (citing Edward C. Baig, *Cellphones Hit Fashion's Runway As Accessories*, USA TODAY, May 3, 2007).

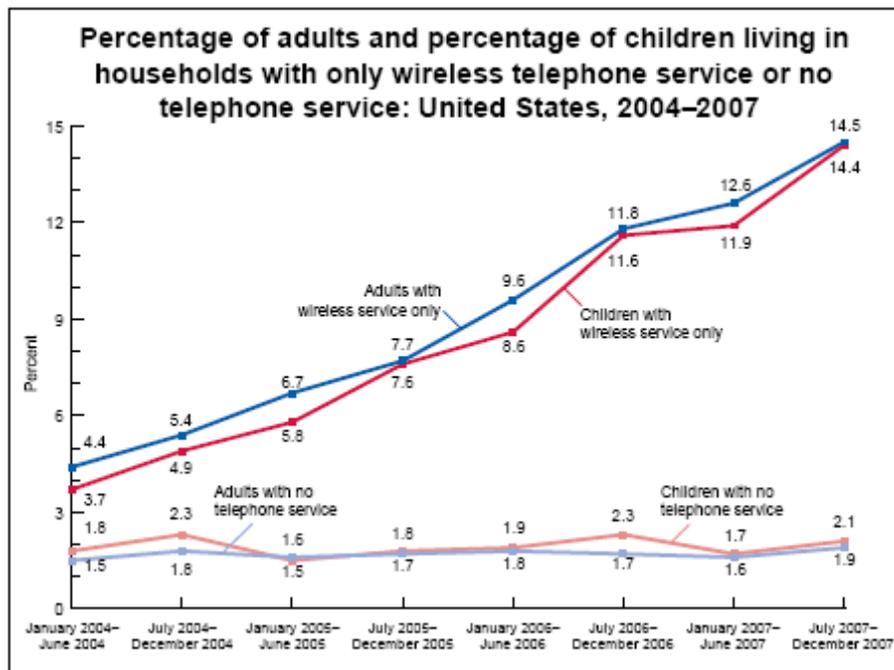
<sup>654</sup> *Our Cells, Ourselves*, at 5-6.

<sup>655</sup> *Id.*

<sup>656</sup> Simon Flannery, *et al.*, *Telecom Services 4Q06 Preview/2007 Outlook: Is Telecom Back for Good?*, Morgan Stanley, Equity Research, Jan. 24, 2007, at 7-8.

<sup>657</sup> Jason Armstrong, *et al.*, *The Quarter in Pictures: 3Q2006 US Telecom Services Review*, Goldman Sachs, Equity Research, Nov. 2006, at 6 (wireless substitution being a key reason for many companies line losses); Simon Flannery, *et al.*, *Telecom Services 4Q06 Preview/2007 Outlook: Is Telecom Back for Good?*, Morgan Stanley, Equity Research, Jan. 24, 2007, at 7 (percent of line loss).

<sup>658</sup> Stephen J. Blumberg, Ph.D., and Julian V. Luke, *Wireless Substitution: Early Release of Estimates From The Data from the National Health Interview Survey, July – December 2007*, National Center for Health Statistics, Centers for Disease Control, available at <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200805.pdf> (last visited Sept. 8, 2008).

Chart 2: Wireless-Only Households<sup>659</sup>

230. In the last half of 2007, according to the NHIS survey, 15.8 percent of households (as opposed to adults) were wireless-only, up from 12.8 percent at the end of 2006, 8.4 percent at the end of 2005, and 4.2 percent at the end of 2003.<sup>660</sup> The *Trends in Telephone* Report published in August 2008 by the Industry Analysis and Technology Division of the Federal Communication Commission’s Wireline Competition Bureau states that as of year end 2006, there were 108.8 million households in the U.S. with telephone service, and of those households, 19.3 million were “wireless only”;<sup>661</sup> thus, approximately 18% of households are “wireless only”.<sup>662</sup> Similarly, Nielsen Mobile reports that more than 20 million U.S. telephone households, or approximately 17 percent, rely solely on mobile phones.<sup>663</sup> It appears that customers are switching to wireless from wireline because of wireless’s relatively low cost and widespread availability. As discussed in past *Reports*, a number of analysts have argued that wireless service is competitive or cheaper than wireline, particularly if one is making a long-distance call or when

<sup>659</sup> *Id.*

<sup>660</sup> *Id.*

<sup>661</sup> The number of households with wireless only is calculated as a difference between households with telephone service and primary residential lines. As such, the estimate may include some VoIP customers.

<sup>662</sup> *Trends in Telephone*, Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, at 7-6, Aug. 2008, [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-284932A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-284932A1.pdf) (last visited Sept. 9, 2008).

<sup>663</sup> *Nielsen: Wireless Households On The Rise; One In Five U.S. Households Could Be Cordless-Only By Year’s End*, Adweek.com, Sept. 17, 2008. Nielsen Mobile also found that wireless only households tend to have lower income levels. Fifty-nine percent of household incomes were \$40,000 or less per year. *Id.* In addition, it found that “[t]en percent of landline phone customers have experimented with wireless-only in their household, but then returned to landlines. Nielsen found that needing a landline for other services (satellite TV, pay-per-view, etc) is the primary reason people mend the cord.” *Id.*

traveling.<sup>664</sup> With the introduction of the unlimited calling option plans (*see* Section IV.A.1 for discussion of these plans), one analyst believes that consumers are more likely to discontinue their landline phone service.<sup>665</sup> Moreover, according to an analyst at Morgan Stanley, by 2012 almost one-third of households will be wireless only – “This phenomenon is driven by improved wireless coverage and better pricing and will be supported by new handsets and new wireless technologies.”<sup>666</sup>

## 2. Wireless Alternatives

231. A number of mobile wireless providers offer service plans with a price point designed to compete directly with wireline local telephone service. Many of these providers offer plans with unlimited local calling for around \$30 to \$40 a month. The two largest such providers, Leap, under its “Cricket” brand, and MetroPCS, served a combined total of 6.9 million customers at the end of 2007.<sup>667</sup> Leap offers service in markets in 23 states,<sup>668</sup> while MetroPCS offers service in certain major metropolitan areas in California, Florida, Georgia, Texas, and Michigan.<sup>669</sup>

232. In addition to unlimited local wireless calling plans, many operators, including the nationwide carriers, offer plans of large buckets of minutes, with around 900 to 1,000 “anytime” minutes and unlimited night and weekend minutes (some with free “in-network” calling), for around \$60 per month.<sup>670</sup> In June 2008, T-Mobile announced that it was launching a \$10 home phone service, featuring unlimited domestic calling, call waiting, caller ID, three-way conferencing, voicemail, call forwarding, and ringback tones. Customers can keep their home numbers with T-Mobile’s @Home@ service. “To use the service, customers simply need the touch-tone corded or cordless phone they currently use, an existing broadband Internet connection, and the T-Mobile @Home HiPort™ Wireless Router with Home Phone Connection, available from T-Mobile for just \$49.99 with a two-year service agreement.”<sup>671</sup> The calls are transmitted from the home phone handsets to the T-Mobile router (which uses Wi-Fi technology)

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<sup>664</sup> See *Eighth Report*, 18 FCC Rcd at 14832-14833, ¶¶ 102-104; *Ninth Report*, 19 FCC Rcd at 20684-20685, ¶¶ 213-214; *Tenth Report*, 20 FCC Rcd at 15980, ¶¶ 196-198; *Eleventh Report*, 21 FCC Rcd at 11027-11028, ¶¶ 205-207.

<sup>665</sup> Marguerite Reardon, *Cutting The Cord For All-You-Can-Eat Wireless Plans*, CNET News, Mar. 4, 2008, [http://news.cnet.com/8301-10784\\_3-9884689-7.html](http://news.cnet.com/8301-10784_3-9884689-7.html) (last visited Sept. 8, 2008) (*citing* Roger Etner, Senior Vice President at IAG Research, “[t]hese new voice plans give consumers a much more realistic option for cutting the cord . . . .”)

<sup>666</sup> CTIA Comments at 7 (*citing* Simon Flannery, *et. al.*, *Cutting the Cord: Wireless Substitution Accelerating*, Morgan Stanley Telecom Services (Sept. 27, 2007)).

<sup>667</sup> In Leap’s Annual Report for 2007, it reported that Cricket had 2.9 million customers as of December 31, 2007. Leap Wireless International Inc. - Leap, SEC Form 10-K, at 2, filed Feb. 29, 2008 (“*Leap’s 2007 Annual Report*”). MetroPCS reported approximately 4 million customers as of December 31, 2007. MetroPCS Communications, Inc., SEC Form 10-K, at 2, filed Feb. 29, 2008 (“*MetroPCS’s 2007 Annual Report*”).

<sup>668</sup> See *Leap’s 2007 Annual Report*, at 2.

<sup>669</sup> See *MetroPCS’s 2007 Annual Report*, at 2.

<sup>670</sup> See, e.g., T-Mobile, *All Plans*, available at <http://www.t-mobile.com/shop/plans/> (last visited Dec. 15, 2008); AT&T, *Cell Phone Plans*, available at <http://www.wireless.att.com/cell-phone-service/cell-phone-plans/> (last visited Dec. 15, 2008); Verizon Wireless, *Voice Plans*, available at <http://www.verizonwireless.com/> (hyperlink “Plans”) (last visited Dec. 15, 2008); and, Sprint Nextel, *Plans*, available at <http://www.sprintnextel.com/> (hyperlink “Plans”) (last visited Dec. 15, 2008).

<sup>671</sup> *T-Mobile To Launch \$10 Home Phone Service*, News Release, T-Mobile (June 25, 2008).

onto the Internet which is then routed to the T-Mobile network.<sup>672</sup> As discussed below, both T-Mobile and Cincinnati Bell have introduced unlimited domestic calls from a consumer's cell phone through a Wi-Fi connection at home for \$10 per month.

## B. Wireless Local Area Networks and Wireless-Wireline Convergence

233. Wireless local area networks ("WLANs") are playing an increasingly important role as a competitor and supplement to the services offered by the CMRS industry.<sup>673</sup> WLANs are widely deployed and enable consumers to obtain high-speed wireless Internet connections within a range of 150 to 250 feet from a wireless access point. The most prevalent WLAN technology is equipment manufactured in accordance with the IEEE 802.11 family of standards, commonly known as "Wi-Fi," short for wireless fidelity. Basic WLAN data transfer rates range from speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g.

234. WLAN users can access high-speed Internet connections at so-called "hot spots," including locations such as restaurants, coffee shops, hotels, airports, convention centers, and city parks.<sup>674</sup> Estimates of the number of public Wi-Fi hot spots in the United States vary considerably, and there are a number of WiFi directories available on-line for consumers to find public Wi-Fi hot spots.<sup>675</sup> In addition to public hot spots, WLANs are also proliferating in homes and businesses.<sup>676</sup>

235. Several mobile telephone providers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments.<sup>677</sup> For instance, T-Mobile offers Wi-Fi access at more than 8,900 HotSpot-branded locations in the United States,<sup>678</sup> while Sprint Nextel's Wi-Fi network includes more than 8,000 hot spot locations across North America.<sup>679</sup> AT&T offers Wi-Fi connectivity at over 17,000 hot spot locations in the United States as well.<sup>680</sup> In February 2008, Starbucks announced

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<sup>672</sup> COMMUNICATIONS DAILY, June 26, 2008, at 10. See also Walter S. Mossberg, *T-Mobile Service Ties Cellphones to Home, With Some Sacrifices*, THE WALL STREET JOURNAL, B1 (Feb. 28, 2008). The service is not VoIP, and the service works even if a consumer's home is not covered by T-Mobile's cell phone network. Consumers must be a T-Mobile wireless customer to purchase the @Home@ service.

<sup>673</sup> Services provided over WLANs are not CMRS services. See 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services. WLANs are permitted to operate on an unlicensed basis under Part 15 of the FCC's rules. See 47 C.F.R. §15, et seq.

<sup>674</sup> See *Seventh Report*, 17 FCC Rcd at 13062-13063. Hot spots typically rely on high-speed landline technologies, such as T-1 lines, DSL, or cable modems, to connect to the Internet.

<sup>675</sup> See Hotspotr, *Find WiFi Hotspots*, <http://hotspotr.com/wifi> (14,546 hot spots) (last visited Sept. 10, 2008); Jiwire, *Wi-Fi Hot Spot Directory*, available at [http://www.jiwire.com/hot-spot-directory-browse-by-state.htm?country\\_id=1&provider\\_id=0](http://www.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1&provider_id=0) (60,551 hot spots) (last visited Sept. 10, 2008).

<sup>676</sup> Off-the-shelf, "plug-and-play" WLAN network equipment sold by companies such as Linksys and Netgear has allowed consumers to easily extend the reach of their wireline broadband connections and enabled portability within and around the home.

<sup>677</sup> *Ninth Report*, 19 FCC Rcd at 20687, ¶ 221.

<sup>678</sup> T-Mobile Hot Spot, *U.S. Locations*, <https://selfcare.hotspot.t-mobile.com/locations/viewLocationMap.do> (last visited Sept. 10, 2008).

<sup>679</sup> Sprint Nextel, *Unlimited WiFi HotSpot Plan*, available at [http://www.nextel.com/en/solutions/dataaccess/wifi\\_hotspot\\_plan.shtml?id16=unlimited\\_wifi\\_hotspot\\_plan](http://www.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml?id16=unlimited_wifi_hotspot_plan) (last visited Sept. 10, 2008).

<sup>680</sup> AT&T, *AT&T WiFi & Hotspots*, available at <http://www.wireless.att.com/businesscenter/solutions/wireless-laptop/wifi-hotspots.jsp;dsessionid=55WT00NARGSHRB4R0ENCFFQ> (last visited Sept. 10, 2008). For customers (continued....)

that it was switching Wi-Fi network operators – from T-Mobile to AT&T.<sup>681</sup> Starbucks now offers complimentary two-hours per day of Wi-Fi access for Starbucks' customers when they register a Starbucks' Card and use it once a month, and AT&T's Wi-Fi customers have complimentary access to the Starbucks' hot spots.<sup>682</sup> T-Mobile's WiFi customers also continue to have access to the hot spots in Starbucks' stores through a roaming agreement between AT&T and T-Mobile.<sup>683</sup>

236. According to ABI Research, there is significant growth in Wi-Fi hot spots globally, and it predicts that in 2008, global hot spots will grow by 40 percent over 2007.<sup>684</sup> ABI Research Vice President and Research Director, Stan Schatt stated:

Starbucks' decision to go to a virtually free Wi-Fi hotspot model is having a profound impact. Hotspot owners are beginning to see Wi-Fi as a cost of doing business and an operation expense, rather than as a profit center.<sup>685</sup>

Mr. Schatt expects that major retailers will begin offering free service in phases. "The first phase is likely to be a free or almost free service for good customers, those who have signed up for loyalty cards."<sup>686</sup>

237. To augment their wide-area data service offerings, mobile telephone providers have typically offered WLAN services for high-speed, in-building data access.<sup>687</sup> Certain providers – including T-Mobile, Sprint Nextel, and AT&T – offer at least dual-mode handsets that operate on both cellular and Wi-Fi networks. For example, T-Mobile currently offers several devices that can connect to either the company's GPRS/EDGE network or Wi-Fi network.<sup>688</sup> Sprint Nextel also offers numerous devices that operate on its Wi-Fi network in addition to its EV-DO network,<sup>689</sup> and the iPhone launched by Apple and AT&T in June 2007 runs on AT&T's EDGE network and can connect to any Wi-Fi hot spot for Internet

(Continued from previous page) \_\_\_\_\_

who purchase AT&T's DataConnect plans of \$59.99 or more, they now have access to AT&T's Wi-Fi hot spots free of charge. "The company plans to expand free Wi-Fi access to additional wireless customers in the future." *AT&T Launches Free Wi-Fi For LapTopConnect Customers*, News Release, AT&T, May 20, 2008.

<sup>681</sup> Glenn Fleishman, *T-Mobile Loses Starbucks; AT&T Becomes Wi-Fi Hotspot Giant*, WNN Wi-Fi Net News (Feb. 11, 2008).

<sup>682</sup> Starbucks, *Highspeed Wireless Internet Access*, available at <http://www.starbucks.com/retail/wireless.asp> (last visited Sept. 10, 2008).

<sup>683</sup> *Id.*

<sup>684</sup> *Wi-Fi Hotspots Stay Hot In 2008*, CELLULAR-NEWS.COM, July 17, 2008.

<sup>685</sup> *Id.*

<sup>686</sup> *Id.*

<sup>687</sup> See *Tenth Report*, 20 FCC Rcd at 15983, ¶ 203. Carriers offer a range of WLAN Internet access service plans, typically designed for use with laptop computers with Wi-Fi modems, including annual access, month-to-month access, daily access, and metered access.

<sup>688</sup> T-Mobile, *HotSpot Phones : Talk Away !*, available at [http://www.t-mobile.com/templates/ListAllPhones.aspx/?features=4ce9c948-6b53-4b76-a3f7-9116f33bd25b&WT.mc\\_n=TMHSDevice\\_WiFiLP&WT.mc\\_t=Offsite](http://www.t-mobile.com/templates/ListAllPhones.aspx/?features=4ce9c948-6b53-4b76-a3f7-9116f33bd25b&WT.mc_n=TMHSDevice_WiFiLP&WT.mc_t=Offsite) (last visited Sept. 10, 2008).

<sup>689</sup> Sprint Nextel, *Unlimited WiFi HotSpot Plan*, available at [http://www.nextel.com/en/solutions/dataaccess/wifi\\_hotspot\\_plan.shtml?id16=unlimited\\_wifi\\_hotspot\\_plan](http://www.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml?id16=unlimited_wifi_hotspot_plan) (last visited Sept. 10, 2008). Under "What You Need," click on "Internet ready phone with data cable" for a list of devices available in a specified zip code.

access service.<sup>690</sup>

238. In addition to using Wi-Fi as a means of data access, certain mobile operators use WLANs to augment their CMRS-based voice services with voice connections at Wi-Fi hot spots. As discussed above, T-Mobile has introduced a Wi-Fi-enabled service @Home® for consumers' home phones for \$10 per month. T-Mobile and Cincinnati Bell also offer Wi-Fi-based services – “HotSpot@Home” and “Home Run,” respectively – featuring dual-mode mobile handsets that offer seamless voice connections on both Wi-Fi and the operators' GSM cellular networks for about \$10 per month.<sup>691</sup> These services offer improved, in-building coverage, unlimited calling through a specified home or office Wi-Fi router or at carrier-branded hot spot locations. Through these services, consumers can avoid using their GSM voice minutes from their monthly service plans when they use service through a Wi-Fi hot spot.<sup>692</sup>

239. Sprint Nextel also offers a similar service, called Airave™, which allows subscribers to make unlimited wireless calls from their homes without deducting minutes from their monthly service plans.<sup>693</sup> However, instead of connecting calls through a home Wi-Fi router, Airave™ relies on a femtocell device.<sup>694</sup> A femtocell is a miniature base station that transmits in the licensed spectrum of the wireless operator offering the device and provides improved coverage within a subscriber's home. It uses the subscriber's home broadband connection for backhaul. The Airave™ service was first made available in Indianapolis and Denver in late 2007.<sup>695</sup> Sprint Nextel began offering the service nationwide on August 17, 2008.<sup>696</sup>

## VIII. MOBILE SATELLITE SERVICES

### A. Introduction

240. Any mobile satellite service (MSS) that involves the provision of CMRS directly to end

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<sup>690</sup> Walter S. Mossberg and Katherine Boehret, *Testing Out the iPhone*, WALL STREET JOURNAL, June 27, 2007, at D1. The iPhone can seamlessly switch from an EDGE to a Wi-Fi connection, and will automatically display a list of new Wi-Fi networks in range as the user moves to a new location.

<sup>691</sup> Cincinnati Bell, *CB Home Run*, available at [http://www.cincinnati-bell.com/business/soho/wireless/home\\_run/](http://www.cincinnati-bell.com/business/soho/wireless/home_run/) (last visited Sept. 10, 2008); HotSpot @Home by T-Mobile, *T-Mobile Unlimited Hot Spot Calling*, [http://www.onlyphoneyouneed.com/?WT.srch=2&Result\\_Inq=Link\\_Title\\_AtHome&Inq\\_Source=TMO](http://www.onlyphoneyouneed.com/?WT.srch=2&Result_Inq=Link_Title_AtHome&Inq_Source=TMO) (last visited Sept. 10, 2008).

<sup>692</sup> *Id.* Unlicensed Mobile Access (UMA) technology enables the seamless mobility afforded by these services, in which calls are automatically switched or handed off from a Wi-Fi to a cellular network, or vice versa, without interruption as a subscriber moves from one location to another. Glenn Fleishman, *T-Mobile Might Make Home VoIP Play on Top of Converged Calling*, WI-FI NET NEWS, Aug. 10, 2007.

<sup>693</sup> Sprint Nextel, *Sprint Airave™*, available at <http://www.nextel.com/en/services/airave/index.shtml> (last visited Sept. 12, 2008). See also Sprint Nextel, *Airave™ Frequently Asked Questions*, at 3, available at [http://www.nextel.com/assets/pdfs/en/services/sprint\\_airave\\_faqs.pdf](http://www.nextel.com/assets/pdfs/en/services/sprint_airave_faqs.pdf) (last visited Sept. 10, 2008). The Airave™ includes voice, not data, services. *Id.* at 3.

<sup>694</sup> *Sprint Customers Nationwide Can Soon Get Enhanced Coverage, Unlimited Calling in Homes, Offices With The Award-Winning Sprint AIRAVE™ By Samsung*, Press Release, Sprint Nextel (July 30, 2008) (“*Sprint Nextel Airave™ Press Release*”).

<sup>695</sup> See *Twelfth Report*, 23 FCC Rcd at 2345, ¶ 258.

<sup>696</sup> See *Sprint Nextel Airave™ Press Release*.

users is by definition, CMRS.<sup>697</sup> Therefore, the Commission has included MSS in its analysis of competitive market conditions with respect to CMRS since the *First Report*.<sup>698</sup> Similar to the discussion of the terrestrial CMRS market, this section discusses spectrum bands available for MSS, product and geographic markets, market structure, provider conduct, and performance.

### B. Spectrum Bands Potentially Available for MSS

241. To date, the Commission has approved satellite systems for operation in four MSS spectrum bands. The bands include the L-Band, Big LEO,<sup>699</sup> Little LEO, and 2 GHz bands. Voice and data services are permitted in the L-band, Big LEO and 2 GHz bands. The Little LEO band is limited to non-voice services only (and is not depicted in the band plans below).

**Table 18: Spectrum Bands Potentially Available for MSS**

Spectrum Band	Megahertz
L-Band	68.0
Big LEO	45.7
Little LEO	4.0
2 GHz	40.0
Total	157.7

242. *L-band* – In the United States, the Commission has allocated spectrum for MSS downlinks in the 1525-1559 MHz bands and for MSS uplinks in the 1626.5-1660.5 MHz bands.<sup>700</sup> This MSS spectrum, first used by the Inmarsat system, is often referred to as the L-Band.<sup>701</sup> This band was the first one that was used for extensive commercial MSS offerings; it was the first band used for maritime mobile uses, including safety communications, and it was later used for aeronautical mobile and land mobile satellite services.

243. *Big LEO* – The Big LEO band refers to the 1.6/2.4 GHz bands. The Big LEO band MSS allocation consists of an uplink at 1610-1626.5 MHz and downlinks at 1613.8-1626.5 and 2483.5-2500 MHz. The Commission allocated this spectrum in 1993 to permit two-way voice and data communications anywhere in the world.

<sup>244.</sup> *Little LEO* – The Little LEO bands are located below 1 GHz. The Little LEO band MSS allocation consists of an uplink at 148-150 MHz and downlinks at 137-138 and 400-401 MHz. This spectrum was allocated by the Commission in 1993. Little LEO services include a variety of non-voice, data communications services; this includes, but is not limited to, remote meter reading, vehicle tracking

<sup>697</sup> 47 C.F.R. § 20.9(a)(10). This rule section also contains an exception for “mobile satellite licensees and other entities that sell or lease space segment capacity, to the extent that it does not provide commercial radio service directly to end users.” The exception permits such entities to provide space segment capacity to commercial mobile radio service providers on a non-common carrier basis, if authorized by the Commission.

<sup>698</sup> See *First Report*, 10 FCC Rcd at 8858, ¶¶ 42-44. See also Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communication Services, *First Report*, 22 FCC Rcd 5954 (2007).

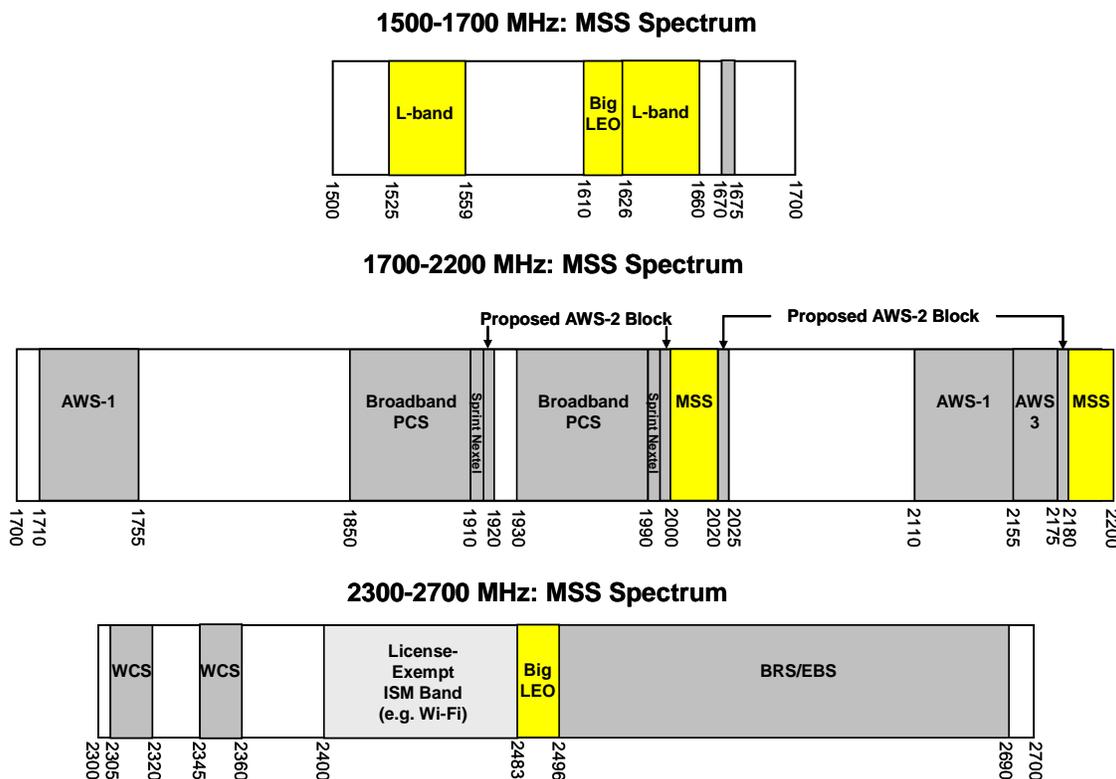
<sup>699</sup> LEO refers to “Low-Earth Orbit.”

<sup>700</sup> See 47 C.F.R. § 2.106.

<sup>701</sup> The term “L-Band” refers generally and more broadly to the frequency band between 1 and 2 GHz.

and two-way data messaging services to customers anywhere in the world.<sup>702</sup>

245. 2 GHz – The 2 GHz MSS band allocation consists of an uplink at 2000-2020 MHz and a downlink at 2180-2200 MHz. The Commission allocated this spectrum in 1997 for the provision of new and expanded regional and global data, voice and messaging MSS.<sup>703</sup>



## C. Product and Geographic Markets

### 1. Product Market

246. Mobile satellite services range from voice-based applications, fax and paging to highly customized data services for tailored enterprise applications. Retail MSS for individual consumers include offerings such as voice and Internet access for travelers seeking remote connectivity. Wholesale services include both voice and data applications. These services are often customized for specific customer groups.

247. In the past, the Commission has recognized the importance of satellite services in the provision of mobile communications services to remote areas stating, “[W]e believe satellites are an excellent technology for delivering basic and advanced telecommunications services to unserved, rural,

<sup>702</sup> *In re* Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service, *Report and Order* 8 FCC Rcd 8450 (1993).

<sup>703</sup> Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, 12 FCC Rcd 7388 (1997).

insular or economically isolated areas[.]”<sup>704</sup> The Commission also recognized that terrestrial and satellite MSS are not fully interchangeable and serve separate markets. In particular, while terrestrial and satellite CMRS operators provide wireless mobile voice and data connectivity, the *Satellite Flexibility Order* noted in 2003 that, because terrestrial CMRS and MSS are expected to have different prices, coverage, product acceptance and distribution, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments.<sup>705</sup> In a different proceeding, the Commission observed that MSS data services are not substitutes for other terrestrially-delivered mobile data services.<sup>706</sup> SIA, in its comments filed in this proceeding, concurred with this, stating “... although MSS providers continue to adopt innovative technologies to make their equipment more user friendly and cost effective, the current MSS services and products nevertheless remain harder to use and more expensive than the products offered by terrestrial CMRS operators. For these reasons, the current service offerings of MSS providers typically focus on a different market segment than terrestrial mobile services.”<sup>707</sup>

## 2. Geographic Market

248. The Commission considers that MSS is provided on a nationwide basis.<sup>708</sup> This implies that United States consumers face the choice of the same competitive alternatives with respect to MSS; therefore, the relevant geographic market is nationwide.

### D. Market Structure

#### 1. Number of Carriers

249. As of year-end 2007, there were five MSS systems operating in the United States. There are two MSS systems that provide service in the United States using L-Band spectrum. They are the Mobile Satellite Ventures (“MSV”) and Inmarsat<sup>709</sup> systems. Two other systems, Globalstar and Iridium, provide mobile voice and data services using Big LEO spectrum.<sup>710</sup> Lastly, the Orbcomm system

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<sup>704</sup> See Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, *Report and Order*, 15 FCC Rcd 16127, ¶ 35 (2000).

<sup>705</sup> See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962, 1984, ¶ 39 (2003) (“*Satellite Flexibility Order*”), *modified sua sponte, Order on Reconsideration*, 18 FCC Rcd 13590 (2003), *on reconsideration, Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005), *further recon pending*.

<sup>706</sup> Prior to introduction of commercial Little LEO service, the Commission noted that such services are “expected to be more oriented towards non-voice communications for businesses and government entities.” See *First Report*, 10 FCC Rcd at 8858.

<sup>707</sup> See Satellite Industry Association Comments, at 4-5 (filed Mar. 26, 2008) (“SIA Comments”).

<sup>708</sup> See *First Report*, at 8866.

<sup>709</sup> Inmarsat is based in the United Kingdom.

<sup>710</sup> The two-way capabilities of Globalstar’s first generation system are impaired by technical problems. Globalstar can provide two-way voice and data services at least 95 percent of the time in the United States, except in the area of Alaska above 64° North latitude, and can provide one-way, transmit-only data service all of the time throughout the fifty states, Puerto Rico, and the U.S. Virgin Islands. See Letter dated Jan. 4, 2008, to Helen Domenici, Chief, International Bureau, from William F. Adler, Secretary, Globalstar Licensee LLC, Vice President, Legal and Regulatory Affairs, Globalstar Inc., at 3. To minimize the adverse impact of the malfunctions pending launch of second-generation replacement satellites, Globalstar has apprised dealers and customers of the unavailability of two- (continued....)

provides non-voice data services, which includes tracking, monitoring and two-way messaging, using Little LEO spectrum.

250. Two additional systems using 2 GHz spectrum, the ICO Global Communications (“ICO”) and TerreStar Networks (“TerreStar”) systems, have been under development. ICO launched its G1 satellite from Cape Canaveral on April 14, 2008,<sup>711</sup> and TerreStar awaits the launch of its geostationary spacecraft to begin commercial service.<sup>712</sup>

## 2. Privatization, Consolidation and Exit

251. Today’s MSS market reflects a number of significant changes in organizational structure that occurred over the past eight years. One significant change involved the privatization of the commercial satellite operations of the International Maritime Satellite Organization, an intergovernmental treaty-based organization created in 1978. The commercial satellite assets of that organization were transferred to a private company in 1999. In addition, several MSS companies reorganized out of bankruptcy in the early 2000s. They include: ICO (2000); Iridium (2002); Orbcomm (2002); and Globalstar (2004). Lastly, the MSV system has evolved through a series of transactions in which MSV, and its predecessor in interest, Motient Services Inc. (“Motient”), joined with Canadian satellite company, TMI Communications and Company LP (“TMI”). These companies joined together to combine certain aspects of their respective U.S. and Canadian operations. TerreStar is a product of this series of transactions, and as a result of recent transactions, MSV and TerreStar are now owned by substantially different investor groups.<sup>713</sup>

252. On July 25, 2008, SkyTerra Communications, Inc. (Sky Terra) and MSV announced that the Harbinger Capital Partners Funds (Harbinger) had agreed to provide \$500 million of debt financing to fund SkyTerra’s business plan through the third quarter of 2010. Additionally, the board of directors of SkyTerra and the management of SkyTerra’s largest shareholder, Harbinger, announced their intention to make an offer to acquire the entire issued and to be issued share capital of Inmarsat plc, a U.K. company, not already held by SkyTerra and Harbinger, on terms to be announced following the satisfactory outcome of certain regulatory approvals.<sup>714</sup>

### E. Provider Conduct

253. The following is a brief description of the services offered by facilities-based MSS providers in the United States. The descriptions include both satellite CMRS and non-CMRS offerings.

254. *Inmarsat* – Inmarsat acts as wholesaler of satellite airtime, with services sold through partner vendors in over 80 countries worldwide.<sup>715</sup> Inmarsat services for the land mobile sector have been enhanced by their Broadband Global Area Network (BGAN) and handheld voice services. BGAN offers

(Continued from previous page) \_\_\_\_\_

way service at certain times in certain locations and has developed a web-based software tool that customers can use to identify optimum calling periods. *Id.* at 6.

<sup>711</sup> See, e.g., ICO Files Final Milestone Certification With FCC, *Satellite System Declared Operational, Company Selects its Spectrum Position*, (release dated May 12, 2008), <http://investor.ico.com/releasedetail.cfm?ReleaseID=309568>.

<sup>712</sup> TerreStar Networks Inc., *available at* <http://www.terrestar.com> (last visited Sept. 8, 2008)

<sup>713</sup> MSV is a subsidiary of MSV L.P, which is a wholly-owned subsidiary of SkyTerra.

<sup>714</sup> See SkyTerra Communications Inc., SEC Form 8-K, filed July 25, 2008.

<sup>715</sup> Inmarsat PLC, SEC Form 10-K (“*Inmarsat 2007 10-K*”).

simultaneous broadband data speeds and voice connectivity.<sup>716</sup> The service is marketed through Inmarsat's reseller network. Inmarsat resellers also offer LandPhone, satellite-based connectivity for fixed phones for private or business applications or as a payphone for remote communities.<sup>717</sup> In addition, in July 2007 Inmarsat introduced a dual-mode satellite-GSM handheld phone, IsatPhone, for the users within Asia, Africa, and Middle Eastern markets, using Inmarsat's latest generation I-4 satellite over the Indian Ocean Region.<sup>718</sup> For the maritime community, Inmarsat services include voice telephony, such as crew-calling and payphone applications, Internet, and data services, such as position reporting, weather and navigational chart updates.<sup>719</sup> For the aeronautical sector, Inmarsat resellers offer specialized services, such as in-flight voice and data communications. SwiftBroadband offers enhanced capabilities for the aeronautical customers; it was launched in October 2007.<sup>720</sup>

255. *MSV* – MSV offers a full range of mobile satellite services, including voice and data, using both its own U.S.-licensed satellite and the Canadian-licensed L band satellite licensed to Mobile Satellite Ventures (Canada) Inc. (“MSV Canada”).<sup>721</sup> MSV currently provides switched and packet data services to approximately 33,000 units (including 12,363 mobile data units) through wholesale and retail sales channels that includes a direct sales force, dealers, and resellers.<sup>722</sup> Their customers include federal, state and local government agencies involved in public safety and security that depend on the MSV system for redundant and ubiquitous wireless services during daily operations and in the case of emergencies.<sup>723</sup> In addition, MSV sells bulk satellite capacity on a wholesale basis for specialized networks, such as fleet management and asset tracking services.<sup>724</sup>

256. *Globalstar* – The Globalstar Big LEO system offers mobile and fixed two-way voice and data services using CDMA handsets in over 120 countries worldwide. Globalstar's voice telephony products include both Handheld Phone, a Car Kit for hands-free use while driving, and fixed satellite antennas for remote offices or dwellings.<sup>725</sup> The company also offers specialized data modems to send and/or receive information from remote jobsites through Internet applications or fax capabilities, and to track and monitor company assets.<sup>726</sup> Globalstar sells its products and services directly through its own sales force, on-line and through subsidiaries. In the fourth quarter of 2007, Globalstar introduced the SPOT satellite messenger, aimed at attracting both the recreational and commercial markets that require

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<sup>716</sup> Inmarsat describes the BGAN service, which is available in over 175 countries, as simultaneous voice and data using a single portable terminal. Inmarsat PLC, *Land Mobile*, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008).

<sup>717</sup> Inmarsat PLC, *LandPhone*, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008).

<sup>718</sup> Inmarsat PLC, *IsatPhone*, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008).

<sup>719</sup> Inmarsat PLC, *Maritime Services*, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008).

<sup>720</sup> Inmarsat PLC, *Aeronautical Service*, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008). This service is not yet authorized for U.S. operations.

<sup>721</sup> MSV Comments at 1 (filed Mar. 26, 2008).

<sup>722</sup> *Id.* at 2.

<sup>723</sup> *Id.* at 2.

<sup>724</sup> *Id.* at 2.

<sup>725</sup> Globalstar, *Products*, available at <http://www.globalstarusa.com> (last visited Sept. 8, 2008).

<sup>726</sup> Globalstar, *Services*, available at <http://www.globalstarusa.com> (last visited Sept. 8, 2008).

personal tracking, emergency location and messaging solutions.<sup>727</sup>

257. *Iridium* – The Iridium Big LEO system offers global satellite voice and data communications solutions with complete coverage of the entire Earth including oceans, airways and Polar Regions.<sup>728</sup> Iridium’s services and products are sold through authorized service providers, resellers, manufacturers and developers.<sup>729</sup> Terrestrial-based Iridium services include a prepaid land-mobile telephony service, paging and other data or machine-to-machine (“M2M”) services, such as asset tracking.<sup>730</sup> Additionally, Iridium offers a variety of maritime services including crew calling, a networked ship-to-ship calling service called “InNetwork,” maritime data services, which includes vessel monitoring and tracking, ship safety and alert systems and fax.<sup>731</sup> For the aviation sector, Iridium offers cockpit flight communications, tracking and monitoring services.<sup>732</sup>

258. *ORBCOMM* – ORBCOMM’s Little LEO system provides narrowband two-way M2M data communications services on a global basis, including digital messaging, data communications, and geo-positioning and weather services.<sup>733</sup> ORBCOMM serves customers through resellers who provide whole product solutions and customer support to end users, including the following services: monitoring and controlling assets; fleet tracking and management; and, messaging and remote data for various customer groups, including transportation (trucks, trailers, railcars, containers, heavy equipment), natural resources (fluid tanks, utility meters, pipelines, and oil wells), and marine vessels.<sup>734</sup> Orbcomm’s hardware, software and airtime are sold directly to equipment manufacturers and government customers. These sales are through value-added resellers and representatives.

#### **F. Pricing**

259. Pricing for MSS varies considerably among MSS providers and resellers, and the services are often bundled with MSS equipment purchases. Similar to terrestrial CMRS services, retail consumers of satellite CMRS services typically purchase a handset bundled with a service plan. While prices for satellite phone handsets have fallen, they still exceed most terrestrial CMRS equipment. The prices for MSS handsets range between \$500 and \$4,000 or more. MSS retail service plans vary greatly and typically include monthly or annual plans with a specific number of minutes per month or year, additional minutes starting at \$0.99 per minute, with additional roaming charges.

260. In 2007, Globalstar introduced a new pricing structure when it launched a promotional satellite airtime rate plan for both new and existing customers in the United States. The “Unlimited Loyalty” rate plan includes a \$39.99 per month charge for Globalstar satellite network access and unlimited home minutes for calls to the United States, Canada and the Caribbean. The advertised monthly fee will be reduced at the completion of each calendar year, falling to \$19.99 per month in 2009 and 2010.<sup>735</sup> For the international travelers, Globalstar offers two plans, Emergency Plan and Global

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<sup>727</sup> Globalstar, Inc. SEC Form 10-K, filed Mar. 17, 2008 (“*Globalstar 2007 10-K*”).

<sup>728</sup> Iridium Satellite LLC, *Company Profile*, available at <http://www.iridium.com> (last visited Sept. 8, 2008).

<sup>729</sup> Iridium Satellite LLC, *Where to Buy*, available at <http://www.iridium.com> (last visited Sept. 8, 2008).

<sup>730</sup> Iridium Satellite LLC, *Solutions*, available at <http://www.iridium.com> (last visited Sept. 8, 2008).

<sup>731</sup> Iridium Satellite LLC, *Solutions*, available at <http://www.iridium.com> (last visited Sept. 8, 2008).

<sup>732</sup> *Id.*

<sup>733</sup> ORBCOMM, *Company Information*, available at <http://www.orbcomm.com> (last visited Sept. 8, 2008).

<sup>734</sup> *Id.*

<sup>735</sup> Globalstar, *Airtime Pricing*, available at <http://www.globalstarusa.com> (hyperlink “United States,” then hyperlink “Air Time Pricing”) (last visited Dec. 15, 2008).

Traveler Plan. Emergency Plan offers an annual or monthly system access fee with per-minute fees based on usage,<sup>736</sup> combined with \$1.39 international roaming rates.<sup>737</sup> Global Traveler Plan offers an annual pre-paid plan that costs \$750 for up to 750 minutes.<sup>738</sup> The annual service fees for Globalstar's SPOT products and services range from \$99.99 for the basic level plan, with the option of additional tracking capability for \$149.98. The maximum suggested retail price for the SPOT equipment is \$169.00 per unit.<sup>739</sup>

261. In April 2007, Iridium also introduced a new pricing plan for calls originating in or coming to United States, Canadian and Caribbean customers. Under the new structure, Iridium will offer prepaid airtime packages for six months of service for as low as 30 to 40 cents per minute. Additional discounted packages for higher use customers begin at rates below 15 cents per minute.<sup>740</sup> Iridium also offers a network quality guarantee program, providing credits of up to 100 minutes of airtime and three months of free subscription fees if the Iridium network fails to complete properly initiated voice calls. Iridium's service plans are often bundled with equipment sales. One user estimated a 96-handset system would cost between \$300,000 to \$400,000.<sup>741</sup>

262. Examples of other MSS voice pricing plans being offered to retail consumers include MSV's mobile telephony and PTT services. MSV's mobile telephony prices average approximately \$1.00 per minute for monthly contracts, while the PTT plans offer unlimited dispatch calling within the PTT access group with additional charges of \$1.19 per minute for mobile telephony charges. Also, MSAT-G2 Mobile Satellite Radio, MSS handset offered by MSV, costs \$4,800.<sup>742</sup> Lastly, Inmarsat currently offers MSS voice service using its recently introduced BGAN service at \$0.99 per minute.

## **G. Technology Deployment and Upgrades**

### **1. Ancillary Terrestrial Component**

263. In 2003, the Commission released a Report and Order that permitted MSS licensees to provide ATC to their satellite systems.<sup>743</sup> In future MSS systems with ATC, a terrestrial base station may be sited within the much larger footprint of a satellite beam to extend communications to indoor or urban areas where the satellite signal may be blocked by buildings and other infrastructure. The Commission permits MSS providers in the 2 GHz, Big LEO, and L-Band frequency bands to implement ATC, provided that the MSS licensee: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated ATC; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite

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<sup>736</sup> E-Star Liberty plan offers \$359.88 annual access fee plus \$1.39-\$4.99 rate per minute, \$95.40 for voice mail, and \$119.40 for E-mail/Internet Express Data. E-Star Monthly plan offers \$29.99 monthly access fee plus \$1.39-\$4.99 per minute, \$7.95 voice mail, \$9.95 for E-mail/Internet data. *Id.* (hyperlink "Global Traveler").

<sup>737</sup> *Id.*

<sup>738</sup> *Id.*

<sup>739</sup> *Globalstar 2007 10-K*, at 10.

<sup>740</sup> *Iridium Satellite Announces New North American Pricing Plan*, News Release, Iridium Satellite, LLC, Apr. 25, 2007.

<sup>741</sup> Chris Kirkham, *Satellite Phone Firm Focuses on Crisis Network*, WASHINGTON POST, June 26, 2006, at D1.

<sup>742</sup> See MSV Comments at 4, filed Mar. 26, 2008.

<sup>743</sup> See generally *Satellite Flexibility Order*, 18 FCC Rcd 1962 (2003), *modified sua sponte*, 18 FCC Rcd 13590 (2003), *rev'd*, 20 FCC Rcd 4616 (2005), *further recon pending*.

footprint.<sup>744</sup>

264. The Commission has granted ATC authorizations to MSV for its operations in the L-Band<sup>745</sup> and to Globalstar for its operations in the Big LEO band.<sup>746</sup> Two other companies – ICO and TerreStar – have applied for ATC authority.<sup>747</sup> Both the authorized and prospective MSS/ATC operators are actively planning for the deployment of their ATC systems. They anticipate that MSS/ATC will prove to be a valuable enhancement to their MSS systems by improving their ability to provide service in urban and other areas where MSS signals are blocked, expanding the variety of services they are able to provide to both urban and unserved and underserved areas. This would enable them to make more efficient and intensive use of their assigned spectrum.<sup>748</sup>

265. Although no ATC service is currently being provided, the satellite industry is optimistic about the potential positive effects of the ATC Order. The Comments filed jointly by five satellite companies stated that “[o]nce deployed, MSS/ATC systems will dramatically enhance MSS carriers’ service offerings and expand their customer base.”<sup>749</sup> In addition, the commenters stated that:

[O]nce deployed, MSS/ATC systems will be poised to bring to the marketplace the high-quality, affordable mobile services for their current and future public safety and commercial customers – no matter where they are located – that the Commission envisioned when it decided to permit MSS providers to incorporate ATC into their MSS systems. Furthermore, because MSS/ATC providers will offer user equipment that resembles traditional mobile consumer devices, they will be able to take better advantage of economies of scale for equipment, making it possible for them to offer high quality voice, broadband, and other services to their subscribers at prices that more closely approximate those of cellular and PCS operators. Moreover, some MSS/ATC operators will be able to offer smaller, less expensive handsets comparable to those offered by terrestrial providers.<sup>750</sup>

## 2. Satellite System Deployment Plans

266. The two 2 GHz MSS licensees, ICO and TerreStar, were scheduled to launch new spacecraft in 2008. While ICO’s first satellite was successfully launched in April 2008, TerreStar has postponed its TerreStar-1 satellite’s launch to 2009. In addition, several current MSS operators have announced plans to replace or augment their existing constellations.

267. *ICO* – In a letter dated May 9, 2008, New ICO Satellite Services, G.P. (“New ICO”) gave the Commission notice that the ICO G1 satellite reached its intended orbit on April 25, 2008 and that New ICO has chosen the 2010-2020 MHz and 2180-2190 MHz frequency bands as its Selected

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<sup>744</sup> *Satellite Flexibility Order*, at 1965, ¶ 3.

<sup>745</sup> Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1, *Order and Authorization*, 19 FCC Rcd 22144 (2004).

<sup>746</sup> Globalstar LLC Request for Authority to Implement an Ancillary Terrestrial Component for the Globalstar Big LEO Mobile Satellite Service (MSS) System, *Order and Authorization*, 21 FCC Rcd 398 (2006).

<sup>747</sup> See Mobile Satellite Service Providers Comments (“MSS Providers Comments”) (ICO, MSV, Inmarsat, Globalstar, TerreStar) at 7 (filed Mar. 26, 2008) (*citing* File No. SAT-AMD-20071130-00167; File No. SES-AMD-20070907-01253).

<sup>748</sup> See *id.* at 7.

<sup>749</sup> See *id.* at 8.

<sup>750</sup> See *id.* at 10.

Assignment.<sup>751</sup> The Commission has determined that New ICO has met the launch and operation milestones associated with its reservation of spectrum in the 2 GHz frequency band for the ICO-G1 satellite.<sup>752</sup> New ICO is a subsidiary of ICO. Market trials of ICO service offerings were planned for mid-2008 in Las Vegas and Raleigh-Durham, North Carolina.<sup>753</sup> ICO is developing and deploying a next-generation multimedia service known as ICO mim. ICO mim will combine ICO's interactive satellite capability with nationwide coverage to deliver an interactive navigation, enhanced roadside assistance and mobile video service, with 10-15 channels of television content.<sup>754</sup> ICO's Car TV service, expected to launch in 2010, also offers navigation and emergency services, and ICO is experimenting with delivering Internet to the car.<sup>755</sup> In addition, ICO signed an agreement with Space Systems Loral to design additional MEO<sup>756</sup> spacecraft.<sup>757</sup> In September 2008, ICO and SkyTerra announced that they had entered into an agreement with Qualcomm, wherein Qualcomm agreed to "integrate satellite and cellular communication technology in select multi-mode mobile baseband chips."<sup>758</sup> Accordingly, the companies report that satellite connectivity will be enabled in mass market wireless handsets and devices which will permit them to benefit from the economies of scale enjoyed by other mobile phone providers.

268. *Inmarsat* – Over the past several years, Inmarsat has invested well over \$1.5 billion in the deployment of its fourth-generation, Inmarsat 4 ("I-4") satellite network, which is today providing innovative MSS services to the United States and globally.<sup>759</sup> Inmarsat successfully launched the third of its fourth generation satellites, the I4F3, on August 18, 2008, completing world-wide coverage for their broadband capabilities, including BGAN.<sup>760</sup> Inmarsat will also introduce world-wide Global Satellite Phone Service (GSPS) over its I4 geostationary fleet with a modernized handset. This device is being optimized to operate over the I-4 network, and it will support both MSS and GSM service. Inmarsat indicates that it expects service to be available in the United States by 2009.<sup>761</sup>

269. *TerreStar* – TerreStar is constructing two Space Systems Loral-built geostationary spacecraft – TerreStar-I (TS-1), which was initially scheduled for launch in 2008, and TerreStar-II, which is a ground spare. TS-1 has successfully completed its Thermal Vacuum (TVAC) testing, and High Power and Passive Intermodulation (PIM) testing on the flight model S Band feed array for its 2 GHz

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<sup>751</sup> Policy Branch Information, Report No., *Public Notice*, SAT-00526, DA No. 08-1265 (May 30, 2008).

<sup>752</sup> *Id.*

<sup>753</sup> MSS Providers Comments at 2 (filed Mar. 26, 2008).

<sup>754</sup> ICO Global Communications, Overview, available at <http://www.ico.com> (last visited Sept. 8, 2008)

<sup>755</sup> *ICO Car TV Service Launches in 2010*, TWICE, Sept. 4, 2008, available at <http://www.wtice.com/article> (last visited Sept. 8, 2008)

<sup>756</sup> MEO refers to "Medium-Earth Orbit."

<sup>757</sup> *ICO Signs Design/Option Agreement with Space Systems/Loral for MEO Satellites*, News Release, ICO Global Holdings, July 3, 2007.

<sup>758</sup> *SkyTerra's Mobile Satellite Ventures, ICO Global Communications, and Qualcomm Sign Groundbreaking Technology Agreement Enabling First-Ever Integration Of Satellite Communications Into Mass Market Cellular Handsets And Devices*, Press Release, Skyterra Communications, ICO, and Qualcomm, Sept. 22, 2008, at 1.

<sup>759</sup> MSS Providers' Comments at 2 (filed Mar. 26, 2008).

<sup>760</sup> *Successful Launch for third Inmarsat-4 satellite*, Inmarsat PLC, Aug. 19, 2008.

<sup>761</sup> MSS Providers' Comments at 3 (filed Mar. 26, 2008).

MSS satellite. TS-1 is now in the final stages of construction,<sup>762</sup> but due to an accident involving the satellite's reflector antenna, the launch of TS-1 has been postponed from the fourth quarter of 2008 to the second quarter of 2009.<sup>763</sup>

270. *MSV* – MSV is ahead of Commission's milestone schedule and is planning to launch two Boeing-built second generation geostationary satellites in September 2009 and July 2010, respectively.<sup>764</sup> The satellites will have ten times the capacity of MSV's existing fleet and will be optimized for mobile broadband services. MSV envisions offering its new satellite infrastructure as a "carrier's carrier" wholesale model to strategic partners and other wholesale customers for differentiated broadband services.<sup>765</sup>

271. *Globalstar* – Globalstar has invested an estimated \$120 million to launch eight satellites in 2007, to augment its existing constellation of LEO satellites.<sup>766</sup> Additionally, the company contracted with Alcatel Alenia, now Thales Alenia Space ("Thales Alenia") to build a next-generation LEO network of 48 spacecraft for an estimated \$868 million.<sup>767</sup> The construction of the second generation constellation has begun. These satellites will be backward compatible with Globalstar's existing satellite constellation and with its global gateways, and they will have an expected lifespan to at least 2025.<sup>768</sup>

272. *Iridium* – In February 2007, Iridium announced that it was planning for the future sustainability of its constellation, making major investment in network enhancements and launching the Iridium NEXT initiative, its next generation satellite constellation, which is planned to be fully operational by 2016.<sup>769</sup> The company estimates it will spend \$2 billion to construct and deploy the new network, which could launch as early as 2013 and may include enhanced capabilities such as imaging.<sup>770</sup>

## H. Market Performance

273. As discussed in *the Twelfth Report*, based on a 2007 study prepared by Futron Corporation (the "SIA/Futron study"), SIA estimates that the world mobile satellite services industry had 1.5 million end-user terminals.<sup>771</sup> As shown in the table below, MSS providers active in the United States

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<sup>762</sup> TerreStar Networks Inc. *TerreStar Announces Satellite Update Satellite Main Body in Final Phase; Reflector Delayed*, June 30, 2008, [www.terrestar.com/news/press](http://www.terrestar.com/news/press) (last visited Sept. 8, 2008); see also IBFS File No. SAT-MOD-20080718-00143 (requesting extension of launch milestone).

<sup>763</sup> TerreStar Networks Inc. *TerreStar Announces Satellite Update Satellite Main Body in Final Phase; Reflector Delayed*, June 30, 2008, available at <http://www.terrestar.com/news/press> (last visited Sept. 8, 2008).

<sup>764</sup> MSS Providers Comments at 5 (filed Mar. 26, 2008).

<sup>765</sup> *MSV Note to Shareholders*, at 38.

<sup>766</sup> *Globalstar Announces Successful Launch of Four Satellites*, News Release, Globalstar, Inc., May 30, 2007.

<sup>767</sup> *Globalstar, Inc. Signs Contract with Alcatel Alenia Space for Second-Generation LEO Satellite Constellation*, News Release, Globalstar, Inc., Dec. 4, 2006. See also MSS Providers Comments at 6 (filed Mar. 26, 2008).

<sup>768</sup> MSS Providers Comments at 6 (filed at Mar. 26, 2008).

<sup>769</sup> Iridium Satellite LLC, *What's Next?*, available at <http://www.iridium.com/about/about.php> (last visited Sept. 8, 2008).

<sup>770</sup> Andy Pasztor, *Iridium Weighs Upgrade of Satellites*, WALL STREET JOURNAL, Feb. 17, 2007, at 1.

<sup>771</sup> Satellite Industry Association and Futron Corporation, *State of the Satellite Industry Report*, 2007, at 21 ("SIA Futron Report"). The SIA Futron Report does not include mobile services in the FSS frequency range in these statistics. *Id.*

market consisted of over 1.1 million subscribers, based on year-end 2007 company reports.<sup>772</sup> Compared to 2006, the industry added approximately 209,800 subscribers by the end of 2007, which represents a 23 percent increase in subscribers.

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<sup>772</sup> Due to the inherently global nature of many of the mobile satellite networks, many companies do not disaggregate United States subscriber terminal numbers from worldwide subscriber terminal data.

**Table 19: Number Of Subscribers<sup>773</sup>  
For Major United States Mobile Satellite Service Providers**

	Year-End 2005	Year-End 2006	Year-End 2007
Inmarsat <sup>774</sup>	199,500	220,300	233,400
Globalstar <sup>775</sup>	196,000	262,800	284,126
MSV <sup>776</sup>	19,854	19,201	19,581
Iridium <sup>777</sup>	142,000	175,000	234,000
Orbcomm <sup>778</sup>	113,000	225,000	351,000
TOTAL	670,354	902,301	1,112,107

## IX. CONCLUSION

274. U.S. consumers continue to benefit from effective competition in the CMRS marketplace. During 2007, the CMRS industry experienced another year of strong growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2007, we estimate there were approximately 263 million mobile telephone subscribers, which translates into a nationwide penetration rate of approximately 86 percent.<sup>779</sup> Consumers continue to increase their use of mobile telephones for both voice and data services. Partly because of the prevalence of mobile service packages with large buckets of inexpensive minutes, the average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to approximately 769 minutes per month in the second half of 2007, an increase of 55 minutes from a year earlier and more than quadruple the average usage of mobile subscribers in Western Europe and Japan.<sup>780</sup> Survey evidence also indicates that U.S. mobile subscribers have experienced an improvement in call quality in the past year. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, they sent 362.5 billion text messages and 6.1 billion photo messages or other types of multimedia messages in 2007, more than double the volume of text messages and more than double the volume of multimedia messages in the same period of 2006.<sup>781</sup> Relatively low prices on mobile voice and data services appear to have been a key factor stimulating subscriber growth and usage. While the average price of a mobile call as measured by an estimate of average revenue per minute in December 2007 decreased by one percent from the

<sup>773</sup> Number of subscribers provided in the company's *Annual Reports* is listed below, except where noted.

<sup>774</sup> *Inmarsat 2007 Annual Report* at 15, available at <http://www.inmarsat.com> (last visited Sept. 8, 2008). Inmarsat's Annual Report indicates the number of *terminals*, instead of subscribers.

<sup>775</sup> *Globalstar 2007 10-K*, at 50 (filed Mar. 17, 2008).

<sup>776</sup> *MSV Report to Noteholders*, at 46, *Financial Statements for the Period Ended Dec. 31, 2007* ("MSV 2007 10-K") (filed Mar. 4, 2008).

<sup>777</sup> *Iridium Announces Q4 and Full-Year 2007 Results*, News Release, Iridium Satellite LLC, Feb. 25, 2008. ("*Iridium 2007 Results*").

<sup>778</sup> *Orbcomm Announces 2007 Net Additions of More Than 126,000 Billable Subscriber Communicators*, News Release, ORBCOMM, Jan. 04, 2008.

<sup>779</sup> See Section VI.B.1, Subscriber Growth, *supra*.

<sup>780</sup> See Section VI.B.2, Minutes of Use, *supra*, and VI.D, International Comparisons, *supra*.

<sup>781</sup> See Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Broadband and Other Data Usage, *supra*.

previous year,<sup>782</sup> mobile telephone service in the United States remains relatively inexpensive on a per minute basis compared with that in Western Europe and Japan.<sup>783</sup>

275. In addition to the indicators of mobile market performance cited in the preceding paragraph, a wide variety of indicators of provider conduct and market structure also show that competition in mobile telecommunications markets is flourishing. For example, mobile telephone providers continued to build out their networks and expand service availability during 2007.<sup>784</sup> Providers also continued to deploy networks based on EV-DO Rev. A or WCDMA/HSDPA technologies that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and laptops at speeds comparable to what many users get from fixed broadband connections, such as DSL. With respect to market structure, there was an approximate eight percent increase in the percentage of the U.S. population living in census blocks with access to five or more different mobile telephone operators in one year, from nearly 57 percent at the end of 2006 to almost 65 percent at the end of 2007. Moreover, approximately 96 percent of the total U.S. population continues to live in census blocks where three or more different operators compete to offer mobile telephone service in some parts of those counties, while nearly 91 percent of the U.S. population continues to live in counties with four or more mobile telephone operators competing to offer service.<sup>785</sup>

276. In addition, a growing number of wireless customers have “cut the cord” in the sense of canceling their subscription to wireline telephone service. According to one 2007 survey, 14.5 percent of adults, or one out of every seven, lived in households with only wireless phones in the second half of 2007, up from 11.8 percent in 2006, 7.8 percent in the second half of 2005, and more than quadruple the percentage (3.5 percent) in the second half of 2003.

277. Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services,<sup>786</sup> and conclude that the CMRS marketplace is effectively competitive.

## X. PROCEDURAL MATTERS

278. This *Thirteenth Report* is issued pursuant to authority contained in Section 332(c)(1)(C) of the Communications Act of 1934, as amended, 47 U.S.C. § 332(c)(1)(C).

279. It is ORDERED that copies of this *Report* be sent to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

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<sup>782</sup> See Section VI.A.1, Pricing Trends, *supra*.

<sup>783</sup> See Section VI.D, International Comparisons, *supra*.

<sup>784</sup> See Section IV.B.1, Technology Deployment and Upgrades, *supra*.

<sup>785</sup> See Table 1: Estimated Mobile Telephone Rollouts, *supra*.

<sup>786</sup> See Section II.A, Background, *supra*.

280. It is FURTHER ORDERED that the proceeding in the WT Docket No. 08-27 IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

James D. Schlichting  
Acting Chief  
Wireless Telecommunications Bureau

**APPENDIX A**

**Mobile Telephony**

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

Date	Estimated Total Subscribers	Year End over Year End Subscriber Increase	12-Month Total Service Revenues (in \$000s)	12-Month Roamer Services Revenues (in \$000s)	Cell Sites	Direct Service Provider Employees	Average Local Monthly Bill (Dec. Survey Periods)
1985	340,213	248,613	\$482,428	N/A	913	2,727	N/A
1986	681,825	341,612	\$823,052	N/A	1,531	4,334	N/A
1987	1,230,855	549,030	\$1,151,519	N/A	2,305	7,147	\$96.83
1988	2,069,441	838,586	\$1,959,548	N/A	3,209	11,400	\$98.02
1989	3,508,944	1,439,503	\$3,340,595	\$294,567	4,169	15,927	\$83.94
1990	5,283,055	1,774,111	\$4,548,820	\$456,010	5,616	21,382	\$80.90
1991	7,557,148	2,274,093	\$5,708,522	\$703,651	7,847	26,327	\$72.74
1992	11,032,753	3,475,605	\$7,822,726	\$973,871	10,307	34,348	\$68.68
1993	16,009,461	4,976,708	\$10,892,175	\$1,361,613	12,805	39,775	\$61.48
1994	24,134,421	8,124,960	\$14,229,922	\$1,830,782	17,920	53,902	\$56.21
1995	33,785,661	9,651,240	\$19,081,239	\$2,542,570	22,663	68,165	\$51.00
1996	44,042,992	10,257,331	\$23,634,971	\$2,780,935	30,045	84,161	\$47.70
1997	55,312,293	11,269,301	\$27,485,633	\$2,974,205	51,600	109,387	\$42.78
1998	69,209,321	13,897,028	\$33,133,175	\$3,500,469	65,887	134,754	\$39.43
1999	86,047,003	16,837,682	\$40,018,489	\$4,085,417	81,698	155,817	\$41.24
2000	109,478,031	23,431,028	\$52,466,020	\$3,882,981	104,288	184,449	\$45.27
2001	128,374,512	18,896,481	\$65,316,235	\$3,752,826	127,540	203,580	\$47.37
2002	140,766,842	12,392,330	\$76,508,187	\$3,895,512	139,338	192,410	\$48.40
2003	158,721,981	17,955,139	\$87,624,093	\$3,766,267	162,986	205,629	\$49.91
2004	182,140,362	23,418,381	\$102,121,210	\$4,210,331	175,725	226,016	\$50.64
2005	207,896,198	25,755,836	\$113,538,221	\$3,786,331	183,689	233,067	\$49.98
2006	233,040,781	25,144,583	\$125,456,825	\$3,494,294	195,613	253,793	\$50.56
2007	255,395,599	22,354,818	\$138,869,304	\$3,742,014	213,299	266,782	\$49.79

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

<[http://files.ctia.org/pdf/CTIA\\_Survey\\_Year\\_End\\_2007\\_Graphics.pdf](http://files.ctia.org/pdf/CTIA_Survey_Year_End_2007_Graphics.pdf)> (Annualized Wireless Industry Survey Results – December 1985 To December 2007: Reflecting Domestic U.S. Commercially-Operational Cellular, ESMR and PCS Providers).

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

State	Dec 2007		Subscribers								
	Carriers <sup>1</sup>	Percent Resold <sup>2</sup>	2001	2002	2003	2004	2005	2006		2007	
			Dec	Dec	Dec	Dec	Dec	Jun	Dec	Jun	Dec
Alabama	12	6 %	1,979,075	1,987,254	2,242,108	2,580,810	3,104,664	3,275,933	3,374,701	3,605,490	3,765,194
Alaska	8	12	240,216	267,630	303,184	321,152	376,695	397,429	412,112	431,653	459,703
American Samoa	*	*	0	0	0	"	"	"	"	"	"
Arizona	9	10	2,171,021	2,520,058	2,843,061	3,299,222	3,844,357	4,153,491	4,405,032	4,637,471	4,799,648
Arkansas	6	7	970,127	1,156,345	1,296,901	1,458,673	1,780,621	1,924,313	2,044,217	2,149,312	2,288,049
California	12	5	15,052,203	17,575,105	20,360,454	23,457,761	25,537,232	27,496,682	29,717,334	30,203,842	32,247,015
Colorado	10	10	2,145,816	2,358,748	2,554,731	2,808,195	3,246,994	3,428,381	3,608,209	3,756,215	3,967,902
Connecticut	4	6	1,639,914	1,694,110	1,928,988	2,181,133	2,463,249	2,582,367	2,705,023	2,786,594	2,883,780
Delaware	4	8	412,611	438,196	543,526	646,064	618,165	650,328	682,636	724,342	750,793
Dist. of Columbia	4	7	404,489	472,832	513,102	657,774	825,195	878,846	880,077	965,816	935,808
Florida	10	7	8,937,063	9,482,349	10,855,430	13,169,278	12,568,133	14,176,756	14,761,666	15,255,433	15,604,856
Georgia	10	6	4,149,717	4,497,576	4,940,091	5,730,223	6,079,022	6,865,466	7,281,724	7,598,387	7,940,514
Guam	*	*	"	"	"	"	"	"	"	"	"
Hawaii	4	5	595,721	689,857	771,023	880,965	983,227	1,010,341	1,034,788	1,066,608	1,096,181
Idaho	17	8	444,864	536,064	605,488	705,948	834,219	901,455	972,825	1,018,617	1,078,387
Illinois	9	7	5,631,172	6,476,683	7,183,989	8,075,938	8,654,888	9,147,657	9,588,517	9,949,126	10,330,274
Indiana	10	11	1,921,356	2,390,567	2,642,810	3,158,002	3,715,504	3,972,560	4,271,412	4,448,186	4,675,372
Iowa	61	9	1,087,608	1,239,384	1,342,931	1,557,542	1,811,400	1,867,015	2,009,826	2,058,022	2,165,772
Kansas	11	12	956,050	1,117,277	1,261,242	1,454,087	1,794,268	1,905,342	2,046,542	2,133,399	2,261,455
Kentucky	10	10	1,405,043	1,456,705	1,812,657	2,189,345	2,662,278	2,820,938	2,966,195	3,101,267	3,241,920
Louisiana	8	7	1,920,740	2,190,613	2,470,146	2,834,716	3,191,583	3,355,503	3,492,358	3,611,553	3,764,592
Maine	6	16	427,313	466,896	568,159	662,623	746,141	786,811	844,537	882,039	940,914
Maryland	5	6	2,614,216	2,913,943	3,319,605	3,900,172	4,239,259	4,470,542	4,691,026	4,818,275	5,023,573
Massachusetts	5	6	2,996,816	3,375,726	3,741,975	4,042,592	4,727,742	4,916,500	5,128,860	5,289,432	5,469,503
Michigan	11	8	4,238,399	4,674,980	5,114,259	5,766,616	6,603,942	6,862,582	7,093,721	7,333,242	7,608,420
Minnesota	8	11	2,153,857	2,415,033	2,677,472	2,973,126	3,379,832	3,542,865	3,701,515	3,833,826	4,048,413
Mississippi	9	8	1,048,061	1,112,765	1,324,160	1,517,702	1,821,087	1,923,365	2,029,916	2,069,897	2,196,392
Missouri	11	8	2,106,599	2,289,831	2,691,255	3,109,167	3,853,072	4,067,585	4,322,458	4,480,384	4,673,889
Montana	7	7	279,349	315,512	373,947	"	525,003	575,034	619,620	650,381	693,507
Nebraska	10	5	791,799	867,810	937,184	1,045,810	1,160,062	1,198,714	1,272,067	1,325,131	1,387,022
Nevada	8	8	842,155	984,486	1,216,838	1,463,370	1,777,387	1,883,273	1,990,215	2,092,872	2,166,680
New Hampshire	6	11	492,390	525,689	648,788	727,985	849,344	896,661	943,330	973,105	1,022,406
New Jersey	4	5	4,283,643	4,587,640	5,799,417	7,388,722	6,616,560	6,953,528	7,207,018	7,419,289	7,654,173
New Mexico	9	10	660,849	780,855	859,408	987,813	1,170,186	1,252,770	1,333,210	1,415,726	1,489,120
New York	8	7	7,429,249	8,937,683	9,453,613	10,834,741	13,804,502	14,573,548	15,261,760	15,901,378	16,395,371
North Carolina	13	8	3,767,598	4,094,715	4,554,723	5,363,630	5,791,947	6,209,483	6,626,582	6,961,656	7,305,964
North Dakota	7	6	"	"	"	"	431,675	456,806	472,799	492,101	513,238
Northern Mariana Isl.	*	*	"	"	"	"	"	"	"	"	"
Ohio	10	8	4,739,795	5,212,204	5,817,211	6,627,910	7,503,673	7,939,126	8,380,138	8,722,523	9,098,920
Oklahoma	14	9	1,288,357	1,440,970	1,614,191	1,760,122	2,188,590	2,317,197	2,479,877	2,571,878	2,706,620
Oregon	11	9	1,399,279	1,682,343	1,778,936	2,029,224	2,339,414	2,484,176	2,655,905	2,781,196	2,931,472
Pennsylvania	9	9	4,849,085	5,258,844	6,073,573	7,037,296	7,942,340	8,348,713	8,831,238	9,200,793	9,615,349
Puerto Rico	5	7	1,128,736	1,516,808	1,631,266	2,076,698	2,110,798	2,170,540	2,301,275	2,322,737	2,410,503
Rhode Island	4	8	456,059	515,547	567,331	607,489	749,091	765,355	797,603	828,969	848,249
South Carolina	12	8	1,752,457	1,896,369	2,149,480	2,369,252	2,783,511	3,000,861	3,208,504	3,339,733	3,500,297
South Dakota	9	6	278,646	325,114	365,211	428,513	481,404	513,850	547,812	569,513	596,562
Tennessee	10	8	2,510,978	2,674,566	2,974,512	3,531,286	4,417,140	4,730,704	5,126,510	4,970,756	5,245,513
Texas	27	6	9,156,187	10,133,280	11,327,700	13,092,007	15,644,066	16,927,880	17,822,230	18,792,225	19,646,758
Utah	11	8	919,002	1,052,522	1,154,992	1,345,205	1,529,501	1,649,265	1,774,755	1,874,345	1,970,501
Vermont	4	16	"	"	"	"	314,325	333,551	358,052	374,984	402,173
Virgin Islands	*	*	"	"	"	"	"	"	"	"	"
Virginia	8	7	3,270,165	3,753,106	4,147,182	4,240,462	5,072,921	5,325,173	5,607,350	6,148,261	6,415,881
Washington	11	10	2,706,030	2,869,784	3,377,193	3,770,602	4,249,357	4,494,964	4,799,143	5,034,885	5,291,131
West Virginia	8	15	498,811	576,503	675,257	761,658	858,310	964,649	1,040,224	1,095,038	1,172,699
Wisconsin	10	9	2,229,389	2,396,562	2,723,985	2,997,029	3,366,332	3,517,283	3,509,528	3,641,432	3,841,745
Wyoming	10	9	194,665	191,939	295,706	302,203	342,008	358,668	387,164	410,464	441,161
Nationwide	177	7 %	123,990,857	138,878,293	157,042,082	181,105,135	203,667,474	217,418,404	229,619,397	238,315,850	249,235,715

\* Data withheld to maintain firm confidentiality.

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

<sup>2</sup> Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

Source: Local Telephone Competition: Status as of Dec. 31, 2007, Federal Communications Commission, September 2008 (Table 14: Mobile Wireless Telephone Subscribers).

**Table A-3: Economic Area Penetration Rates**

EA	EA Name	Subscribers	2007 Estimated EA Population	2007 Penetration Rate	2007 HHI	2006 HHI	EA density
83	New Orleans, LA-MS (see note 1)	1,538,443	1,470,467	105%	3038	3011	171.93
57	Detroit-Ann Arbor-Flint, MI	7,021,660	7,013,036	100%	2822	2926	364.07
161	San Diego, CA	2,972,182	2,974,859	100%	2605	2725	660.48
82	Biloxi-Gulfport-Pascagoula, MS	379,413	383,558	99%	2255	2130	143.45
13	Washington-Baltimore, DC-MD-VA-WV-PA	9,025,962	9,155,458	99%	2734	2739	402.76
78	Birmingham, AL	1,585,947	1,649,607	96%	2714	2631	137.13
155	Farmington, NM-CO	203,903	212,248	96%	3817	3495	16.04
160	Los Angeles-Riverside-Orange County, CA-AZ	18,217,695	19,585,261	93%	2542	2633	286.10
81	Pensacola, FL	635,347	687,831	92%	2085	2077	154.06
10	New York-North New Jersey-Long Island, NY-NJ-CT-PA	24,389,516	26,446,042	92%	2632	2651	890.56
172	Honolulu, HI	1,179,112	1,283,388	92%	2369	2394	187.20
85	Lafayette, LA	571,569	625,686	91%	4436	4338	99.99
87	Beaumont-Port Arthur, TX	406,449	445,024	91%	3094	3125	89.20
12	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	6,885,256	7,550,516	91%	2652	2739	778.84
29	Jacksonville, FL-GA	1,950,606	2,139,928	91%	2228	2317	112.52
40	Atlanta, GA-AL-NC	6,065,926	6,664,345	91%	2342	2360	246.04
170	Seattle-Tacoma-Bremerton, WA	4,096,592	4,513,097	91%	2571	2585	190.45
131	Houston-Galveston-Brazoria, TX	5,966,229	6,585,373	91%	2278	2349	169.25
132	Corpus Christi, TX	505,137	558,325	90%	2850	2984	46.47
80	Mobile, AL	638,255	706,200	90%	2801	2727	74.75
20	Norfolk-Virginia Beach-Newport News, VA-NC	1,639,592	1,816,024	90%	2058	2057	289.89
22	Fayetteville, NC	490,391	545,754	90%	1988	1967	164.57
122	Wichita, KS-OK	1,052,998	1,174,261	90%	1967	1716	20.49
30	Orlando, FL	3,934,649	4,397,664	89%	2539	2829	265.84
34	Tampa-St. Petersburg-Clearwater, FL	2,433,976	2,723,949	89%	1801	1863	890.99
26	Charleston-North Charleston, SC	595,726	669,003	89%	1961	2035	149.80
97	Springfield, IL-MO	457,763	514,372	89%	3800	3717	58.20
163	San Francisco-Oakland-San Jose, CA	8,466,625	9,514,955	89%	2526	2585	271.07
135	Odessa-Midland, TX	354,468	399,292	89%	3512	3531	10.13
133	McAllen-Edinburg-Mission, TX	1,046,868	1,180,070	89%	3803	3637	221.96
153	Las Vegas, NV-AZ-UT	2,005,432	2,274,898	88%	2517	2515	23.74
42	Asheville, NC	426,857	484,698	88%	3930	3690	128.63
79	Montgomery, AL	434,744	494,311	88%	1838	1847	66.86
127	Dallas-Fort Worth, TX-AR-OK	7,665,033	8,771,941	87%	2479	2560	119.00
15	Richmond-Petersburg, VA	1,379,469	1,579,419	87%	2355	2335	124.03
90	Little Rock-North Little Rock, AR	1,466,440	1,679,886	87%	4044	4563	46.09
35	Tallahassee, FL-GA	677,120	775,755	87%	2287	2253	63.51
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH	7,096,846	8,146,812	87%	2700	2700	421.83
25	Wilmington, NC-SC	873,485	1,002,746	87%	1910	1903	107.39
70	Louisville, KY-IN	1,302,825	1,497,970	87%	2534	2433	180.92
84	Baton Rouge, LA-MS	698,173	803,294	87%	4686	4531	140.30
23	Charlotte-Gastonia-Rock Hill, NC-SC	2,093,738	2,411,666	87%	2273	2245	240.50
141	Denver-Boulder-Greeley, CO-KS-NE	3,875,792	4,466,904	87%	2326	2341	52.02
28	Savannah, GA-SC	647,709	747,104	87%	1795	1609	91.95

EA	EA Name	Subscribers	2007 Estimated EA Population	2007 Penetration Rate	2007 HHI	2006 HHI	EA density
86	Lake Charles, LA	464,766	536,830	87%	3154	3087	52.41
130	Austin-San Marcos, TX	1,476,566	1,710,522	86%	2632	2705	156.06
99	Kansas City, MO-KS	2,271,304	2,631,408	86%	2237	2243	88.73
143	Casper, WY-ID-UT	371,806	432,103	86%	5031	4801	5.17
64	Chicago-Gary-Kenosha, IL-IN-WI	9,284,982	10,812,904	86%	2151	2155	556.54
89	Monroe, LA	282,284	329,450	86%	4271	4237	56.12
59	Green Bay, WI-MI	582,409	681,486	85%	2708	2311	34.15
134	San Antonio, TX	2,110,444	2,472,903	85%	2481	2793	82.99
55	Cleveland-Akron, OH-PA	3,931,761	4,607,309	85%	2641	2371	427.84
73	Memphis, TN-AR-MS-KY	1,664,886	1,953,453	85%	2593	2678	102.99
24	Columbia, SC	852,012	1,000,368	85%	2235	2221	125.95
39	Columbus, GA-AL	432,484	507,899	85%	2122	1997	84.08
19	Raleigh-Durham-Chapel Hill, NC	1,846,675	2,173,275	85%	2141	2174	188.38
128	Abilene, TX	184,144	216,830	85%	3371	3407	20.35
41	Greenville-Spartanburg-Anderson, SC-NC	1,133,163	1,344,731	84%	2792	2785	183.62
50	Dayton-Springfield, OH	938,418	1,116,575	84%	2590	2644	318.52
51	Columbus, OH	2,096,741	2,496,958	84%	2839	2827	190.40
71	Nashville, TN-KY	2,303,310	2,747,911	84%	2699	2666	105.12
93	Joplin, MO-KS-OK	231,792	276,668	84%	3404	3377	74.68
69	Evansville-Henderson, IN-KY-IL	717,375	859,059	84%	4340	4256	75.31
44	Knoxville, TN	896,105	1,078,226	83%	2739	2658	165.64
37	Albany, GA	407,162	491,409	83%	2228	2163	62.74
167	Portland-Salem, OR-WA	2,674,607	3,241,023	83%	2315	2401	76.01
33	Sarasota-Bradenton, FL	720,949	874,670	82%	2074	2148	273.56
43	Chattanooga, TN-GA	640,767	777,737	82%	3294	3066	145.32
142	Scottsbluff, NE-WY	73,141	88,890	82%	5666	6258	7.81
96	St. Louis, MO-IL	3,013,666	3,669,964	82%	2708	2736	127.01
77	Jackson, MS-AL-LA	1,207,670	1,472,744	82%	3225	3276	49.67
159	Tucson, AZ	932,979	1,137,800	82%	2006	2005	60.03
67	Indianapolis, IN-IL	2,657,062	3,243,769	82%	2983	3005	171.37
137	Lubbock, TX	314,954	385,295	82%	2878	2853	27.17
164	Sacramento-Yolo, CA	2,172,296	2,659,155	82%	2600	2534	188.08
98	Columbia, MO	320,614	392,739	82%	3843	3898	58.00
136	Hobbs, NM-TX	158,273	194,012	82%	3548	3516	11.21
38	Macon, GA	661,281	811,622	81%	2958	2594	62.88
36	Dothan, AL-FL-GA	280,049	344,187	81%	2080	2062	53.70
107	Minneapolis-St. Paul, MN-WI-IA	3,904,230	4,800,023	81%	2061	1983	82.98
18	Greensboro-Winston-Salem-High Point, NC-VA	1,608,530	1,978,667	81%	1985	1990	189.09
124	Tulsa, OK-KS	1,170,276	1,441,867	81%	3227	2925	72.44
53	Pittsburgh, PA-WV	2,341,070	2,896,267	81%	3079	2914	284.77
103	Cedar Rapids, IA	335,921	415,734	81%	2600	2728	101.33
31	Miami-Fort Lauderdale, FL	4,929,653	6,109,424	81%	2557	2279	483.20
158	Phoenix-Mesa, AZ-NM	3,495,935	4,335,584	81%	2108	2091	93.91
49	Cincinnati-Hamilton, OH-KY-IN	1,863,462	2,315,671	80%	2225	2283	294.08
21	Greenville, NC	696,971	866,589	80%	2235	2398	87.74
88	Shreveport-Bossier City, LA-AR	465,855	579,692	80%	3374	3469	57.96
151	Reno, NV-CA	614,709	765,074	80%	2282	2263	7.56

EA	EA Name	Subscribers	2007 Estimated EA Population	2007 Penetration Rate	2007 HHI	2006 HHI	EA density
154	Flagstaff, AZ-UT	378,246	472,365	80%	2835	2731	8.24
156	Albuquerque, NM-AZ	818,456	1,023,969	80%	2103	2039	20.89
27	Augusta-Aiken, GA-SC	501,644	629,509	80%	2203	2063	89.79
126	Western Oklahoma, OK	107,718	135,675	79%	3110	2366	12.04
45	Johnson City-Kingsport-Bristol, TN-VA	472,515	595,261	79%	2293	2190	144.51
125	Oklahoma City, OK	1,423,515	1,798,740	79%	3486	2926	65.04
11	Harrisburg-Lebanon-Carlisle, PA	949,470	1,201,777	79%	3130	3175	292.42
5	Albany-Schenectady-Troy, NY	948,813	1,202,737	79%	3289	3170	134.71
63	Milwaukee-Racine, WI	1,828,910	2,321,587	79%	2200	2222	366.88
102	Davenport-Moline-Rock Island, IA-IL	437,956	556,617	79%	2548	2601	108.27
101	Peoria-Pekin, IL	412,266	524,449	79%	3366	3308	90.99
138	Amarillo, TX-NM	384,970	490,174	79%	2644	2309	11.79
95	Jonesboro, AR-MO	239,327	304,949	78%	4778	5195	51.30
152	Salt Lake City-Ogden, UT-ID	1,916,057	2,448,334	78%	2226	2206	35.68
148	Idaho Falls, ID-WY	267,684	343,546	78%	2388	2415	10.85
75	Tupelo, MS-AL-TN	487,767	626,217	78%	5275	5418	49.76
56	Toledo, OH	995,020	1,278,090	78%	3258	3181	163.94
2	Portland, ME	606,679	782,159	78%	2493	2488	98.56
120	Grand Island, NE	219,818	284,318	77%	5989	6418	11.56
118	Omaha, NE-IA-MO	843,909	1,094,029	77%	2128	2146	62.40
111	Minot, ND	81,125	105,378	77%	4117	3977	7.00
106	Rochester, MN-IA-WI	257,296	334,227	77%	2799	3058	55.65
166	Eugene-Springfield, OR-CA	648,151	842,355	77%	1850	1858	43.10
150	Boise City, ID-OR	537,005	699,836	77%	2703	2679	13.69
8	Buffalo-Niagara Falls, NY-PA	1,114,362	1,452,472	77%	3222	3052	212.89
157	El Paso, TX-NM	792,413	1,035,466	77%	2050	2106	33.04
66	Fort Wayne, IN	566,761	740,697	77%	3088	3161	158.50
108	Wausau, WI	372,745	488,870	76%	2371	2221	34.13
68	Champaign-Urbana, IL	477,710	626,590	76%	3265	3095	73.47
139	Santa Fe, NM	207,326	272,119	76%	2806	2904	13.06
149	Twin Falls, ID	132,534	174,057	76%	2232	2302	14.08
72	Paducah, KY-IL	174,050	228,983	76%	5846	5631	70.02
17	Roanoke, VA-NC-WV	648,196	852,903	76%	1831	1892	97.83
119	Lincoln, NE	302,751	400,610	76%	4251	4469	50.24
7	Rochester, NY-PA	1,114,202	1,476,375	75%	4247	4187	167.21
6	Syracuse, NY-PA	1,424,523	1,889,593	75%	3884	3771	104.74
100	Des Moines, IA-IL-MO	1,290,969	1,718,453	75%	2679	2789	47.32
169	Richland-Kennewick-Pasco, WA	560,628	747,448	75%	2516	2537	27.68
94	Springfield, MO	704,420	942,029	75%	3514	3510	48.14
60	Appleton-Oshkosh-Neenah, WI	340,737	456,991	75%	1927	1895	143.62
32	Fort Myers-Cape Coral, FL	675,051	906,403	74%	2515	2189	234.27
46	Hickory-Morganton, NC-TN	404,938	544,205	74%	2646	2542	131.90
147	Spokane, WA-ID	671,368	903,621	74%	3076	2931	23.63
144	Billings, MT-WY	320,711	435,548	74%	5062	4826	4.89
65	Elkhart-Goshen, IN-MI	702,441	954,092	74%	2332	2335	185.73
123	Topeka, KS	338,006	459,542	74%	1850	1757	35.62
165	Redding, CA-OR	264,723	360,546	73%	2273	2347	14.36

EA	EA Name	Subscribers	2007 Estimated EA Population	2007 Penetration Rate	2007 HHI	2006 HHI	EA density
62	Grand Rapids-Muskegon-Holland, MI	1,438,580	1,962,008	73%	2709	2832	206.76
14	Salisbury, MD-DE-VA	296,424	405,167	73%	5263	5018	111.17
91	Fort Smith, AR-OK	252,934	346,163	73%	4114	4053	46.51
140	Pueblo, CO-NM	210,769	289,294	73%	2646	2583	8.71
104	Madison, WI-IA-IL	720,379	996,238	72%	3530	3515	71.33
117	Sioux City, IA-NE-SD	179,224	248,545	72%	4025	3911	39.51
116	Sioux Falls, SD-IA-MN-NE	394,386	549,186	72%	4288	4174	15.11
4	Burlington, VT-NY	443,543	619,733	72%	4776	4893	57.62
9	State College, PA	571,149	799,734	71%	4238	4152	92.41
162	Fresno, CA	1,152,858	1,616,289	71%	2932	2988	98.64
129	San Angelo, TX	145,888	205,600	71%	2464	3290	10.05
61	Traverse City, MI	213,446	300,996	71%	4178	4390	50.67
146	Missoula, MT	305,627	431,128	71%	6043	5276	10.79
110	Grand Forks, ND-MN	157,004	221,855	71%	3848	3880	10.16
47	Lexington, KY-TN-VA-WV	1,352,022	1,910,776	71%	3683	2958	80.39
16	Staunton, VA-WV	246,324	349,424	70%	2093	1974	50.99
52	Wheeling, WV-OH	216,331	307,676	70%	4436	4113	124.54
48	Charleston, WV-KY-OH	825,722	1,178,717	70%	2999	2655	85.35
171	Anchorage, AK	478,203	683,478	70%	3873	3925	1.07
1	Bangor, ME	374,086	535,048	70%	4365	4693	20.94
109	Duluth-Superior, MN-WI	242,638	348,448	70%	3504	3440	18.53
92	Fayetteville-Springdale-Rogers, AR-MO-OK	344,496	498,022	69%	4629	4316	88.43
113	Fargo-Moorhead, ND-MN	262,770	382,242	69%	3286	3145	16.40
121	North Platte, NE-CO	40,782	59,604	68%	6272	6551	4.95
115	Rapid City, SD-MT-ND-NE	149,991	222,452	67%	4952	4850	5.04
112	Bismarck, ND-MT-SD	119,027	177,872	67%	4891	4819	6.26
54	Erie, PA	340,107	510,487	67%	4120	4037	116.41
58	Northern Michigan, MI	175,682	269,983	65%	4270	4637	28.53
76	Greenville, MS	148,143	227,678	65%	3491	3540	40.96
168	Pendleton, OR-WA	129,670	203,776	64%	2150	2472	8.67
145	Great Falls, MT	103,313	163,495	63%	4685	4602	4.23
105	La Crosse, WI-MN	157,072	250,723	63%	3815	3551	53.67
114	Aberdeen, SD	47,602	78,108	61%	4983	*	5.39
74	Huntsville, AL-TN (see note 2)	*	1,054,137	*	*	2307	119.14

\*Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on preliminary year-end 2007 filings for Numbering Resource Utilization in the United States. Density is persons per square mile. EA populations are based on Census estimates as of July 1, 2007. EA penetration rates are not directly comparable with previous year reports since, in previous years, EA populations were based on Census 2000.

Note 1: As discussed in the *Twelfth Report*, the penetration rate in EA83 (New Orleans) appears to be an aberration. That EA lost over 260,000 people between 2000 and 2006, while its subscriber count remained relatively unchanged, creating a large increase in its penetration rate. One explanation for this may be that, after the flooding, people leaving the area took their cell phones (and cell phone numbers) with them. Thus, those numbers may still be associated with New Orleans rate centers, even though the people actually no longer live anywhere near there.

Note 2: We believe there was a discrepancy in the data for this EA, making the subscriber data and HHI for this

market unreliable.

**Table A-4: Top 20 Mobile Telephone Operators by Subscribers  
(with publicly-available subscriber counts, in thousands)**

Year-End 2006			Year-End 2007	
	Operator	Total	Operator	Total
1	AT&T/Cingular Wireless	60,962	AT&T	70,052
2	Verizon Wireless	59,052	Verizon Wireless	65,707
3	Sprint Nextel	52,175	Sprint Nextel (1)	45,329
4	T-Mobile	25,041	T-Mobile	28,685
5	Alltel	11,824	Alltel (2)	13,400
6	US Cellular	5,815	US Cellular	6,122
7	MetroPCS	2,941	MetroPCS	3,963
8	Leap	2,229	Leap	2,864
9	Dobson Comm. (3)	1,667	SunCom (4)	1,100
10	SunCom	1,087	Centennial	1,093
11	Centennial	1,059	Rural Cellular (5)	791
12	Rural Cellular	706	América Móvil / Claro (6)	786
13	iPCS	562	iPCS	630
14	América Móvil / Claro	554	Cincinnati Bell Wireless	571
15	Cincinnati Bell Wireless	528	Ntelos	407
16	Ntelos	367	SouthernLINC (7)	300
17	SouthernLINC	300	Corr Wireless (8)	300
18	Shenendoah Telecomm.	203	Shenendoah Telecomm. (SHENTEL)	187
19	Pocket Comm.	175	Pocket Comm. (9)	175
20	Edge Wireless	172	Edge Wireless (9, 10)	172

Sources: For 2006, see *Twelfth Report*, at 2362. For 2007, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. *AT&T purchases Edge Wireless*, TELEPHONY ONLINE, Dec. 4, 2007 (Edge Wireless); *T-Mobile agrees to Acquire SunCom Wireless*, SMARTBRIEF, September 17, 2007 (SunCom); Sanford Nowlin, *New Executive Revamps Pocket*, SAN ANTONIO EXPRESS NEWS, Nov. 14, 2007, available at <<http://www.mysanantonio.com/business/stories/MYSA111507.01E.pocket.1ee720b.html>> (visited Dec. 4, 2007) (Pocket Comm.); *CORR WIRELESS DEPLOYS INTEROP TECHNOLOGIES SMS CENTER*, INTEROP TECHNOLOGIES, August 30, 2007 (Corr Wireless), available at <[http://www.interoptechnologies.com/news/2007/07\\_08-30\\_corrwireless.php](http://www.interoptechnologies.com/news/2007/07_08-30_corrwireless.php)> (visited November 13, 2008).

#### Notes

- (1) This includes direct and wholesale subscribers (including Boost subscribers), but not affiliate company subscribers.
- (2) On June 5, 2008, Verizon Wireless announced that it was acquiring Alltel.
- (3) On November 15, 2007, AT&T completed its acquisition of Dobson Communications.
- (4) On February 22, 2008, T-Mobile completed its acquisition of SunCom.
- (5) On August 7, 2008, Verizon Wireless completed its acquisition of Rural Cellular.
- (6) This includes Claro subscribers in Puerto Rico and Jamaica. Puerto Rico consolidated with América Móvil on April 1, 2007 and Jamaica on December 1, 2007. No separated subscriber counts were reported.
- (7) The subscriber count from the *Twelfth Report* is used for 2007 as an estimate because no publicly available data was found.
- (8) As of end of August 2007, Corr Wireless had more than 300,000 subscribers using its SMS service. The total subscriber number maybe higher than 300,000.
- (9) The subscriber counts are as of late 2007.
- (10) On April 18, 2008, AT&T completed its acquisition of Edge Wireless.

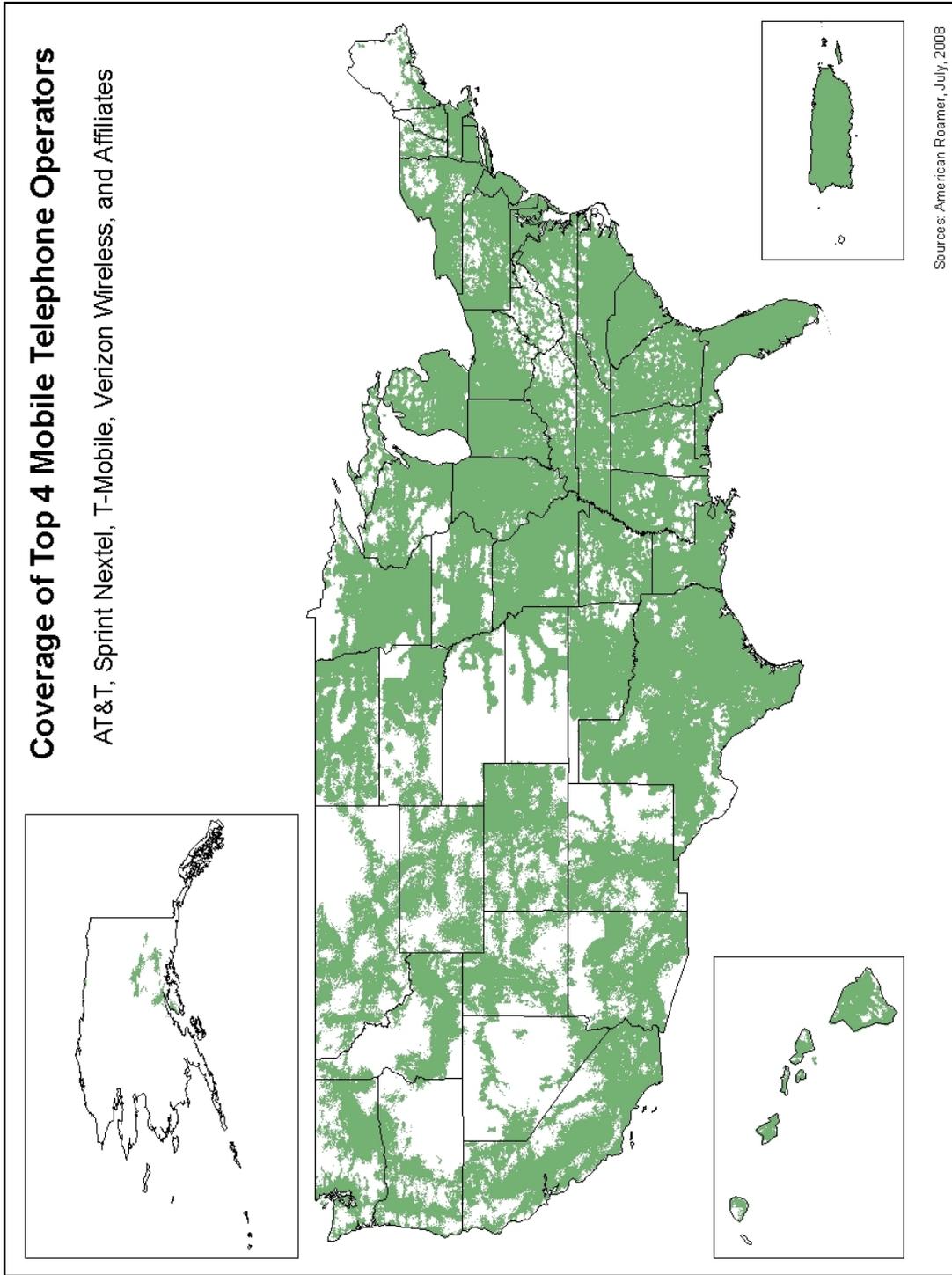
## APPENDIX B

### Maps

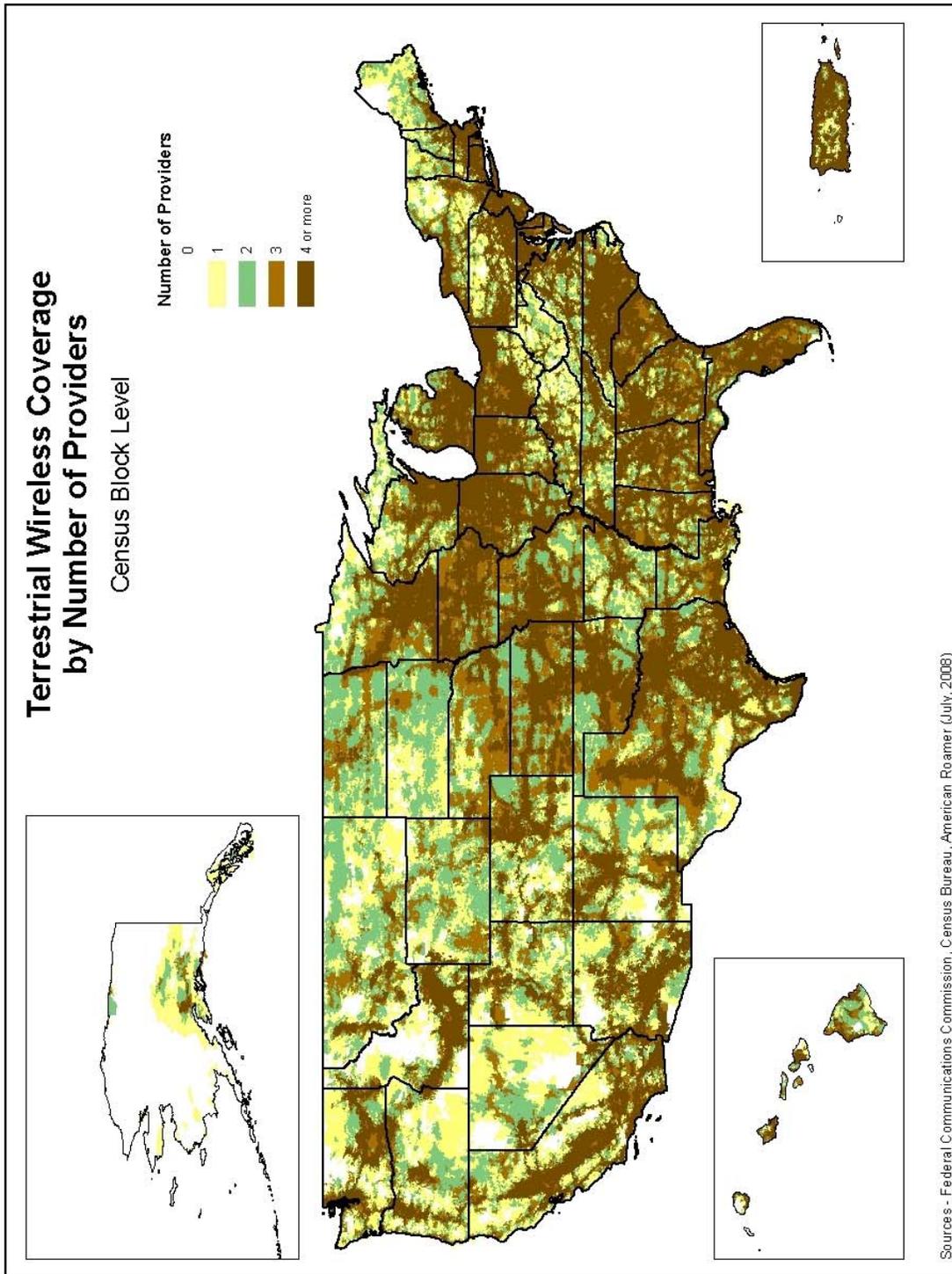
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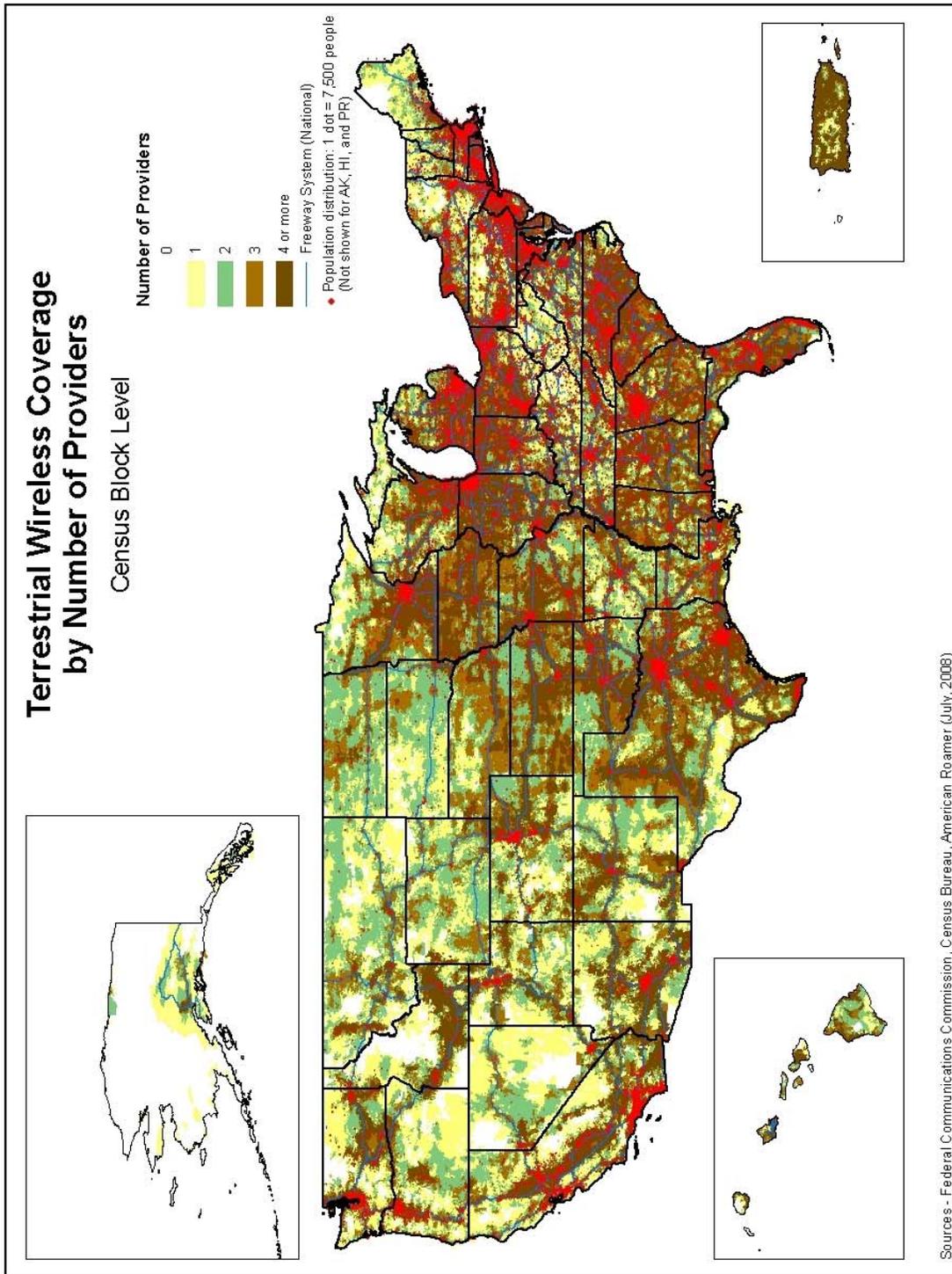
Map B-1: Coverage of Top 4 Mobile Telephone Operators



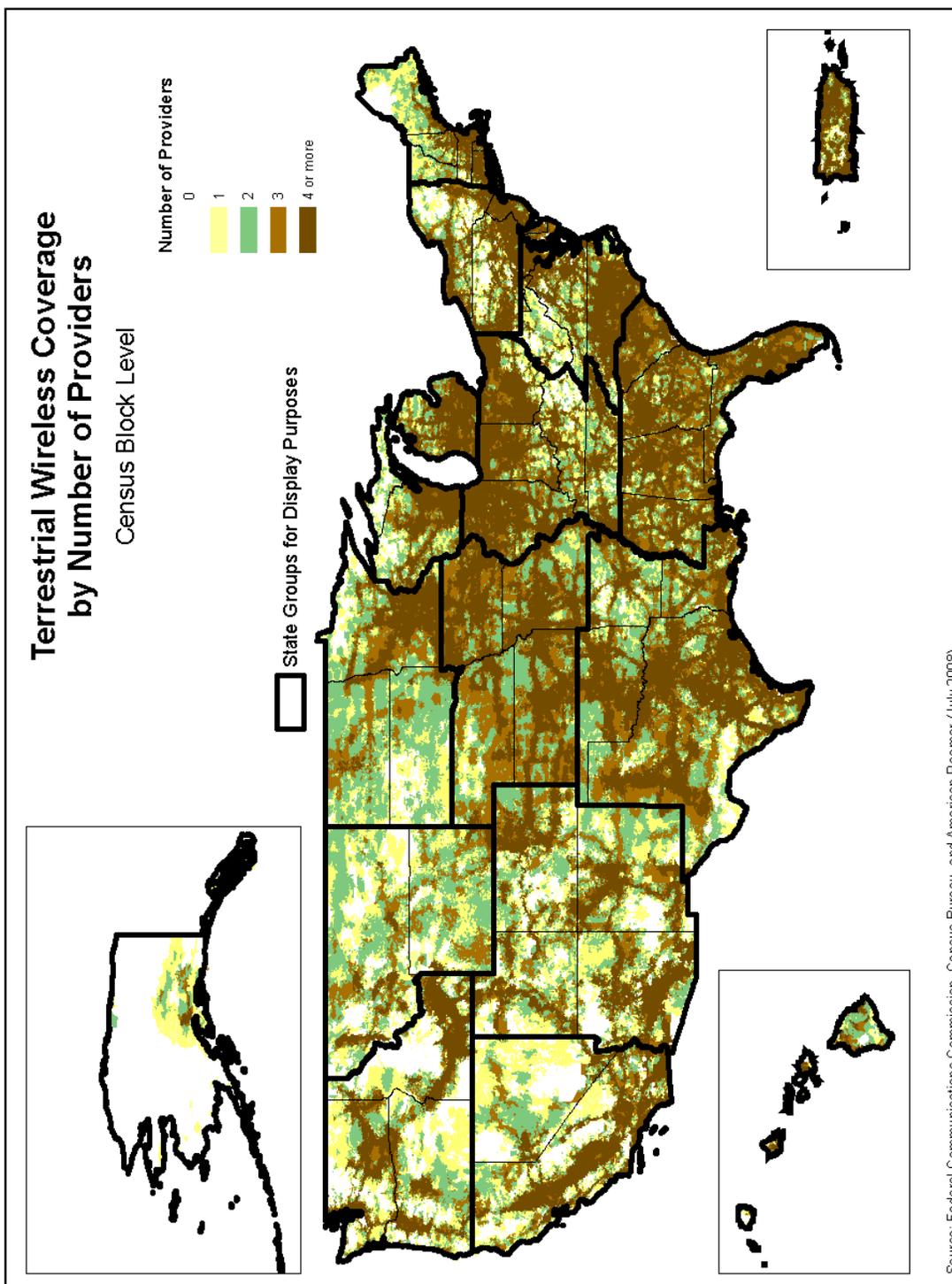
Map B-2: Wireless Coverage by Number of Providers



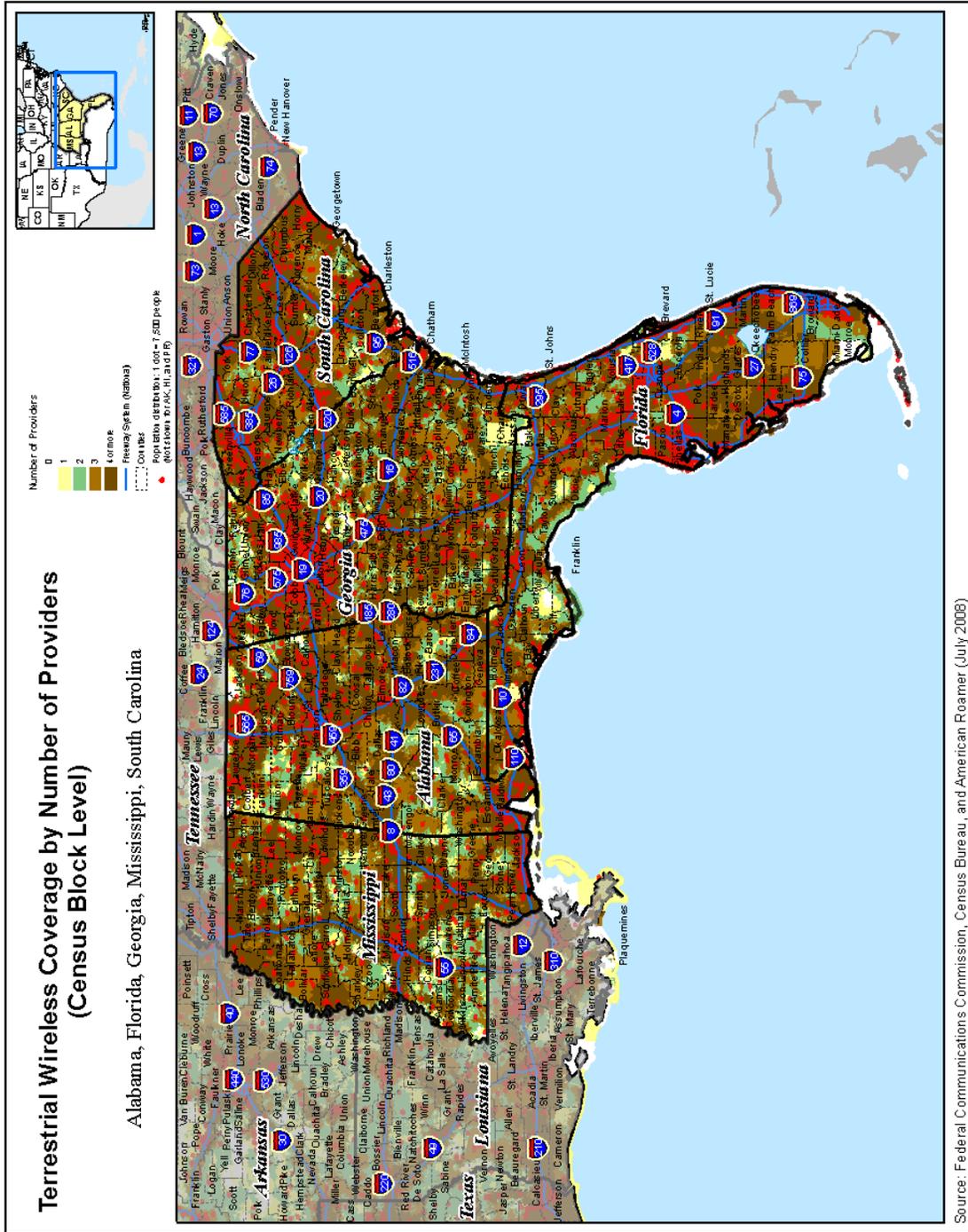
Map B-3: Wireless Coverage by Number of Providers (2)



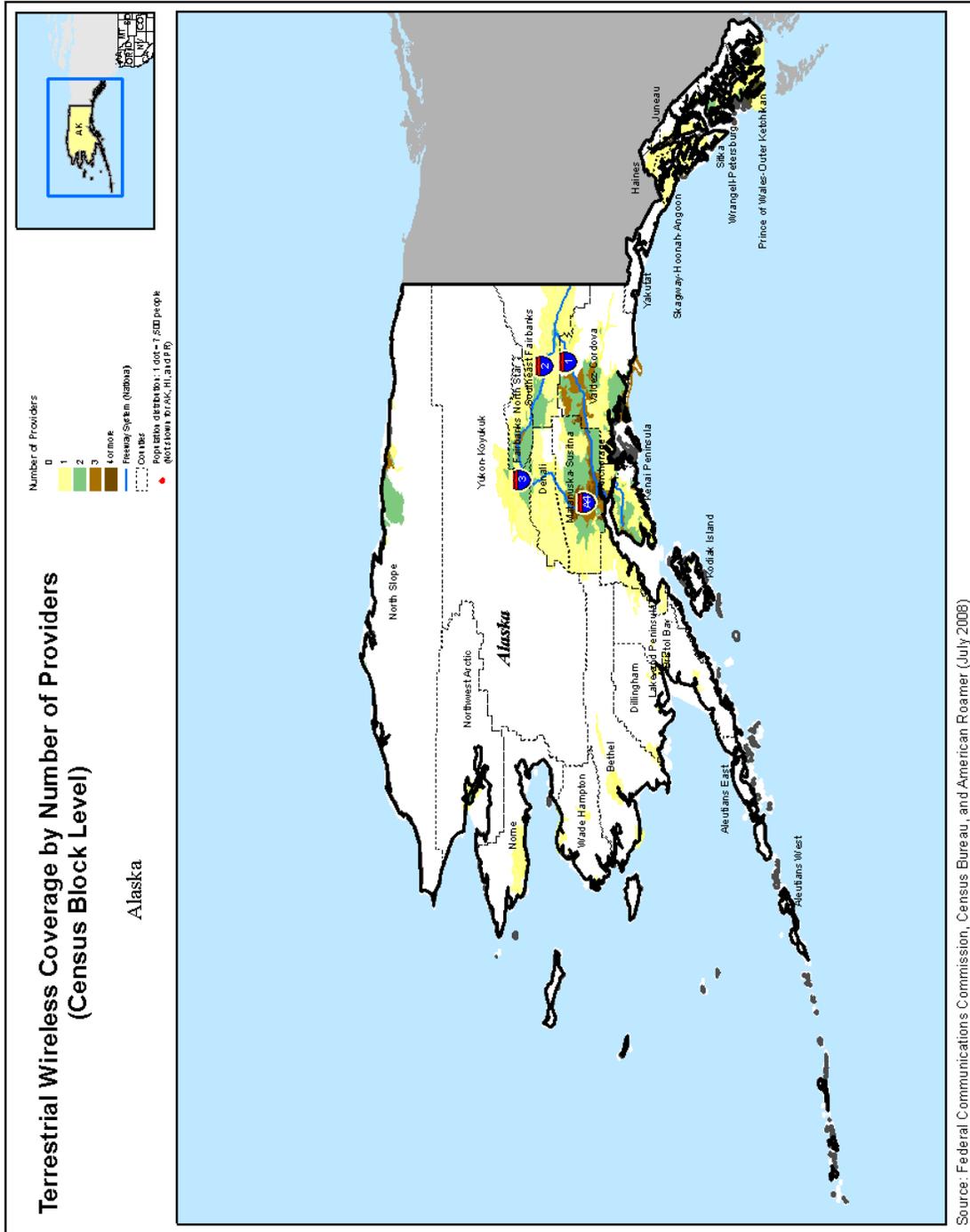
Map B-4: Wireless Coverage by Number of Providers By Region (overview)



Map B-5: Wireless Coverage by Number of Providers By Region (1)



Map B-6: Wireless Coverage by Number of Providers By Region (2)



Source: Federal Communications Commission, Census Bureau, and American Roamer (July 2008)

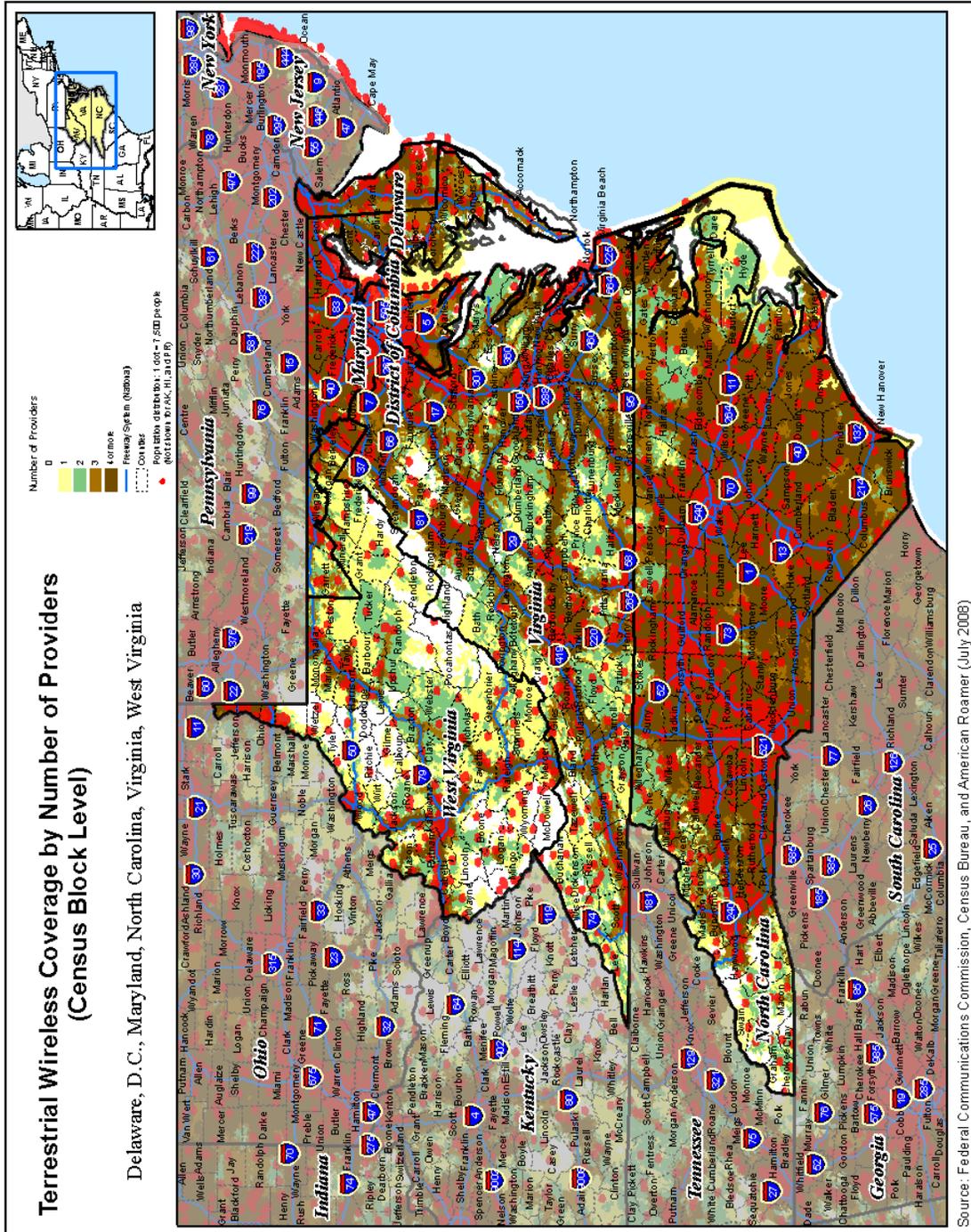






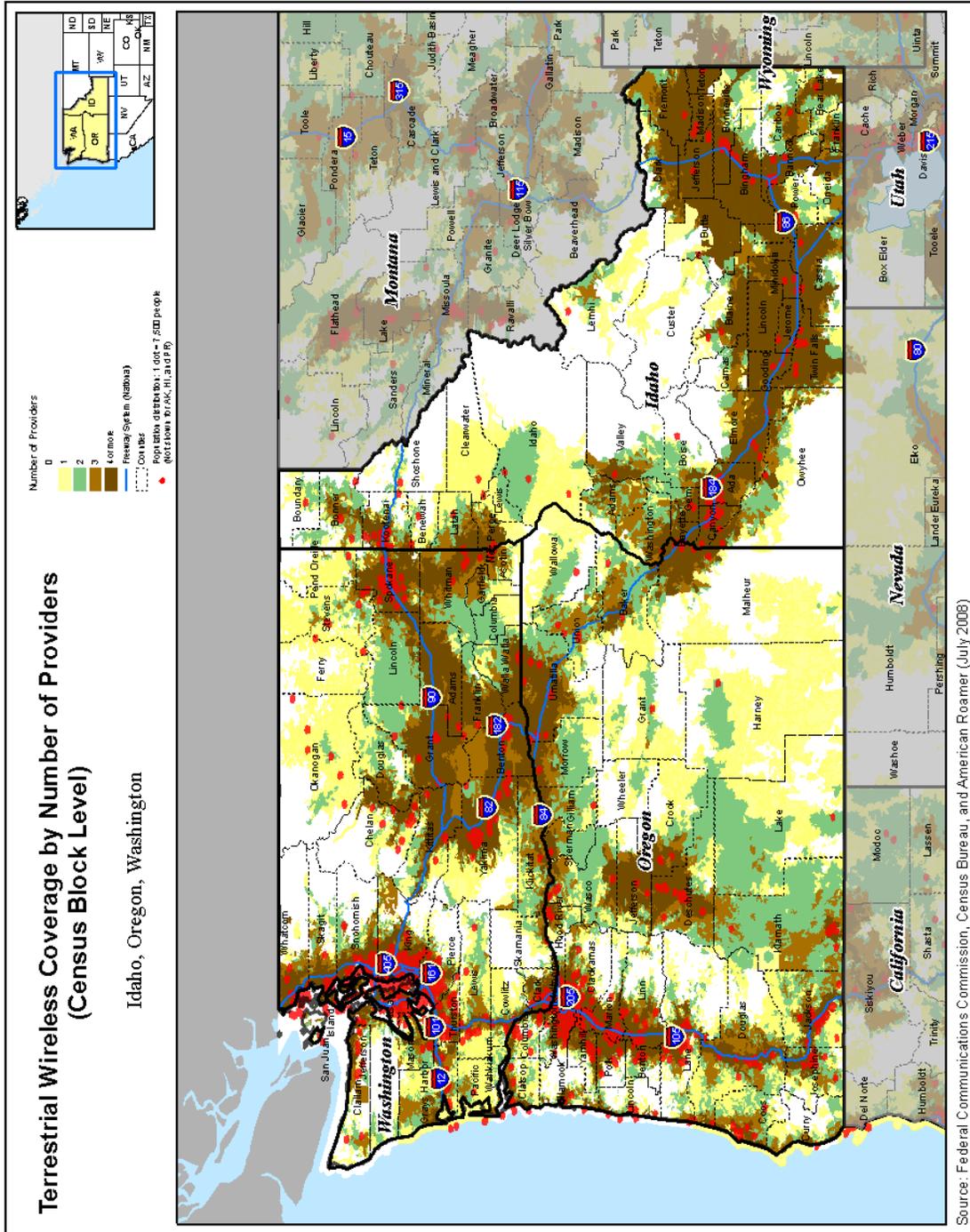


Map B-11: Wireless Coverage by Number of Providers By Region (7)

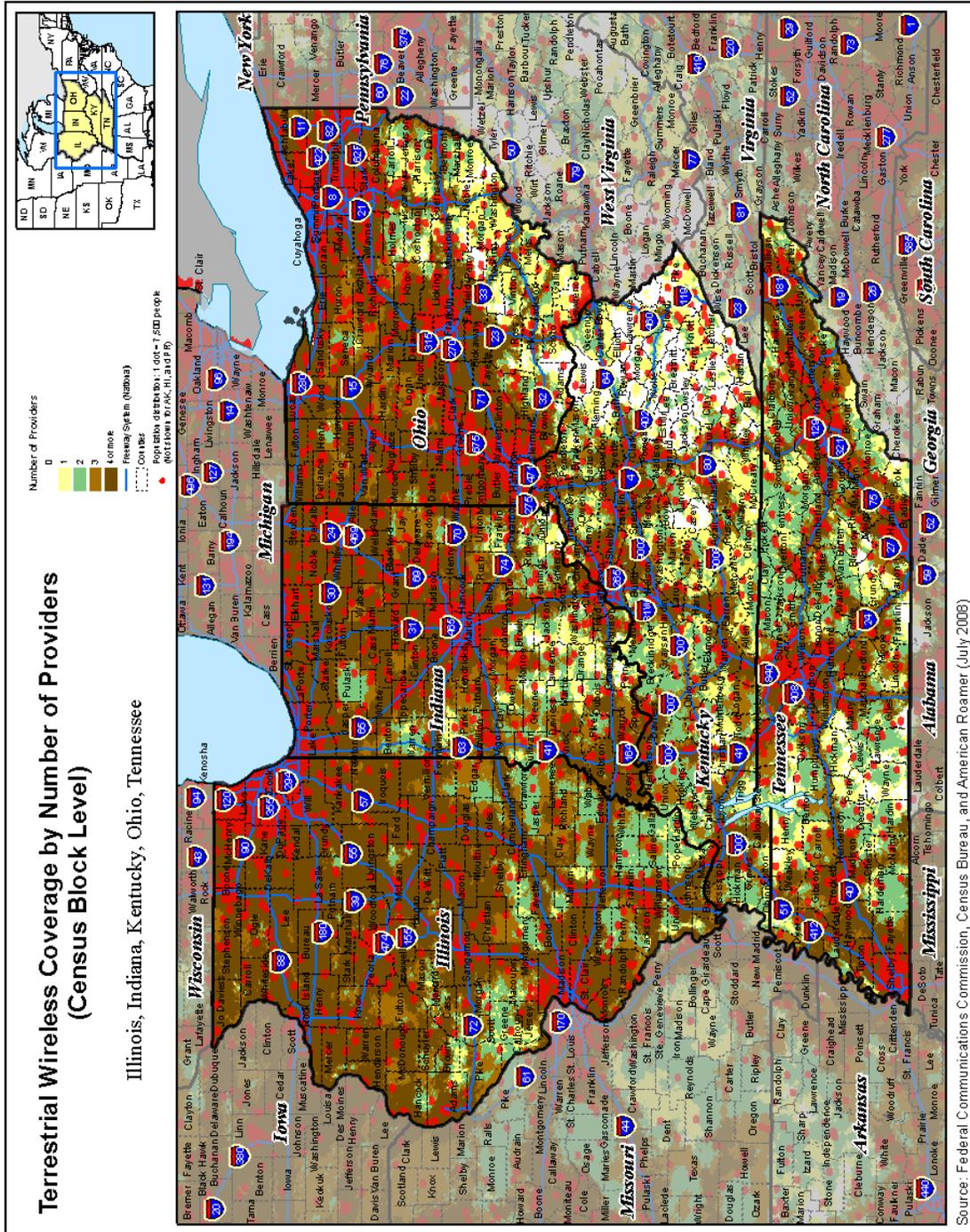




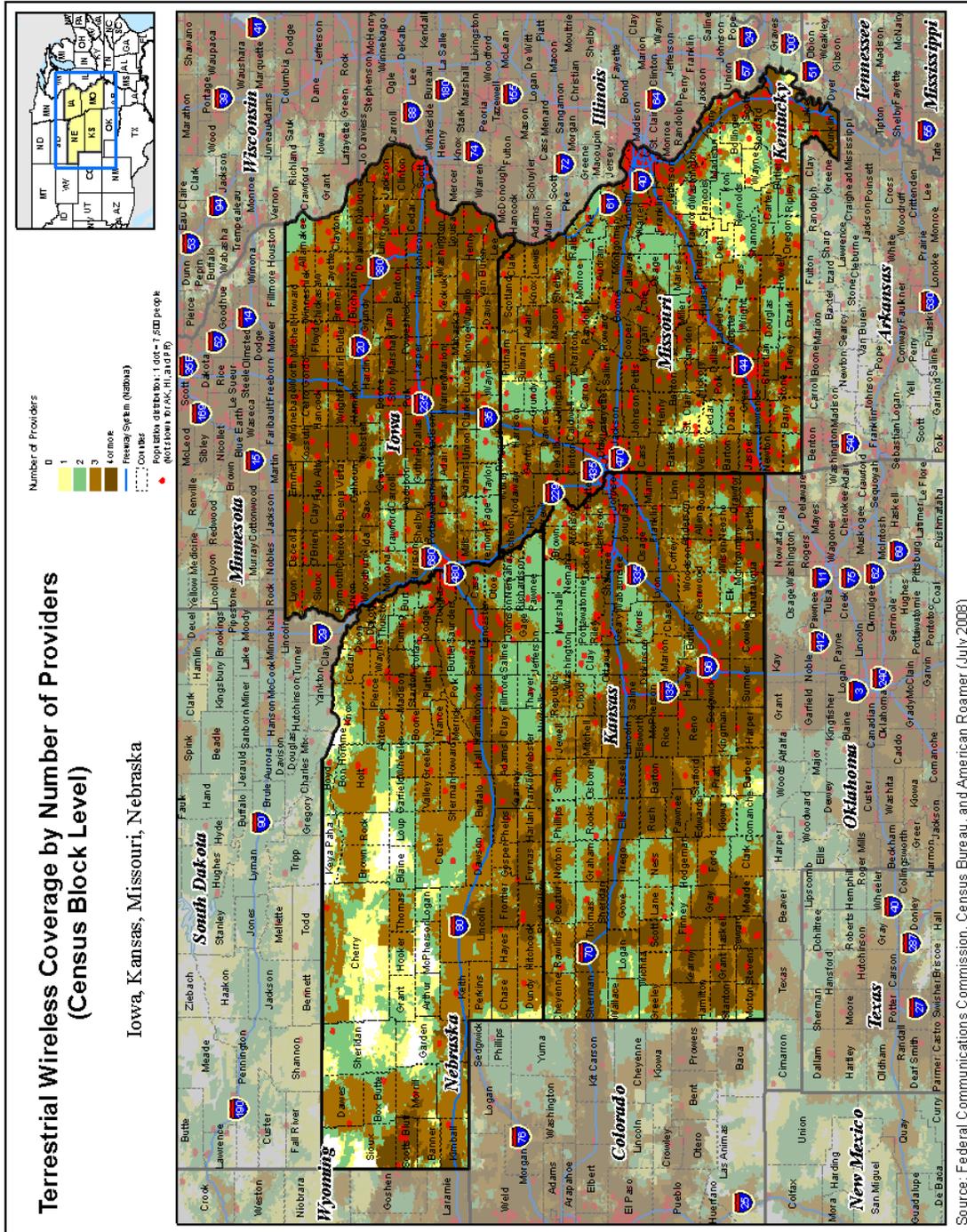
Map B-13: Wireless Coverage by Number of Providers By Region (9)



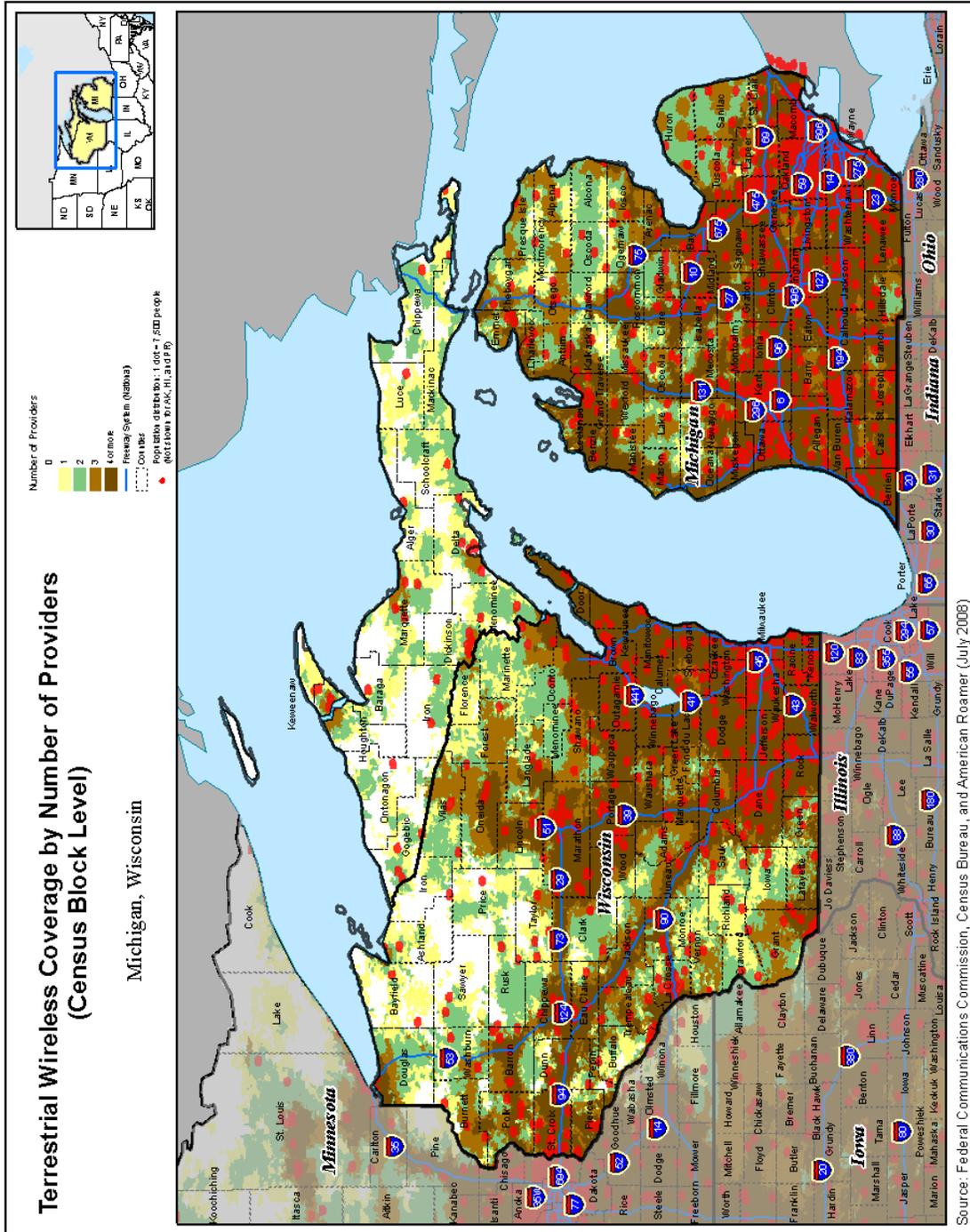
Map B-14: Wireless Coverage by Number of Providers By Region (10)



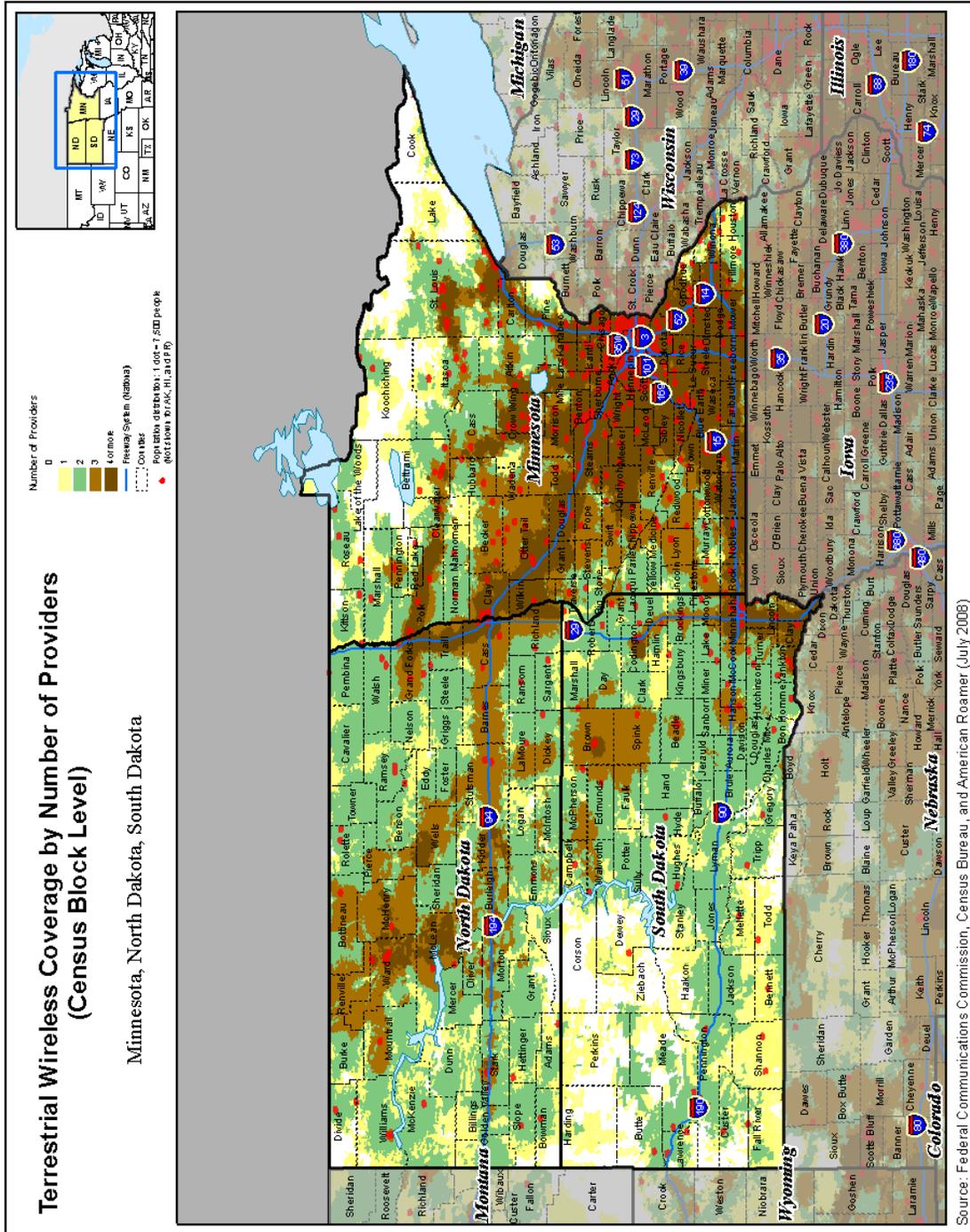
Map B-15: Wireless Coverage by Number of Providers By Region (11)



Map B-16: Wireless Coverage by Number of Providers By Region (12)

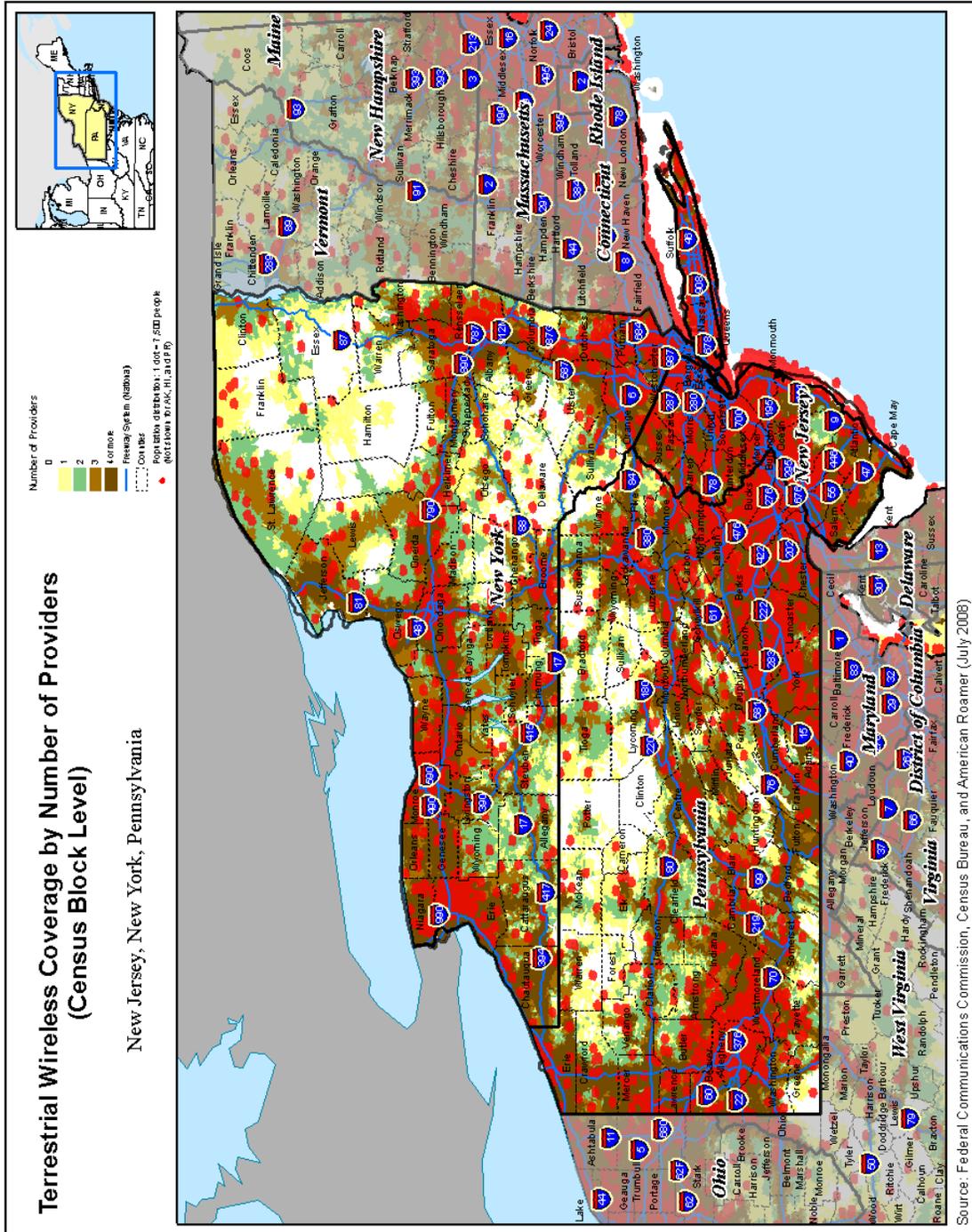


Map B-17: Wireless Coverage by Number of Providers By Region (13)

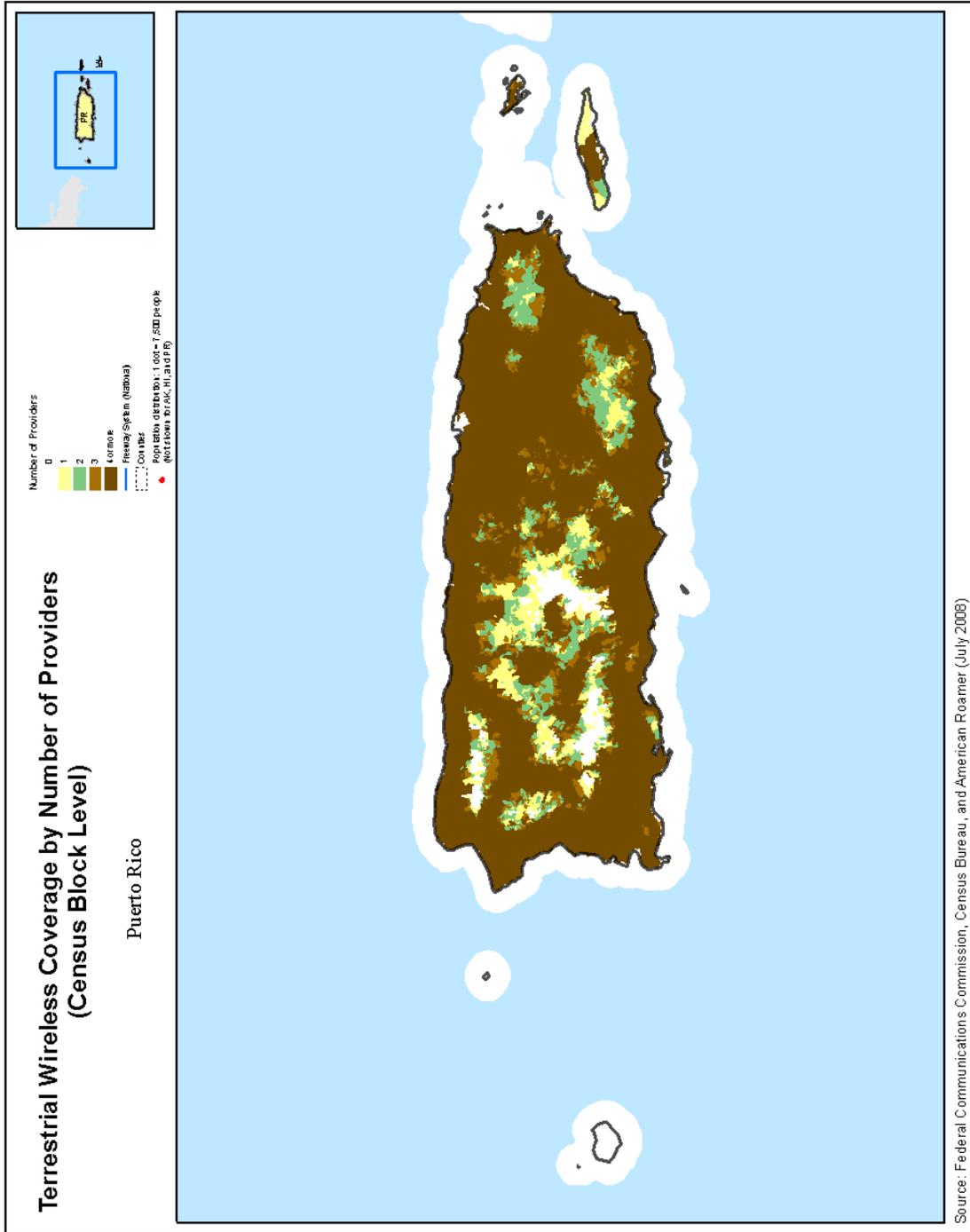




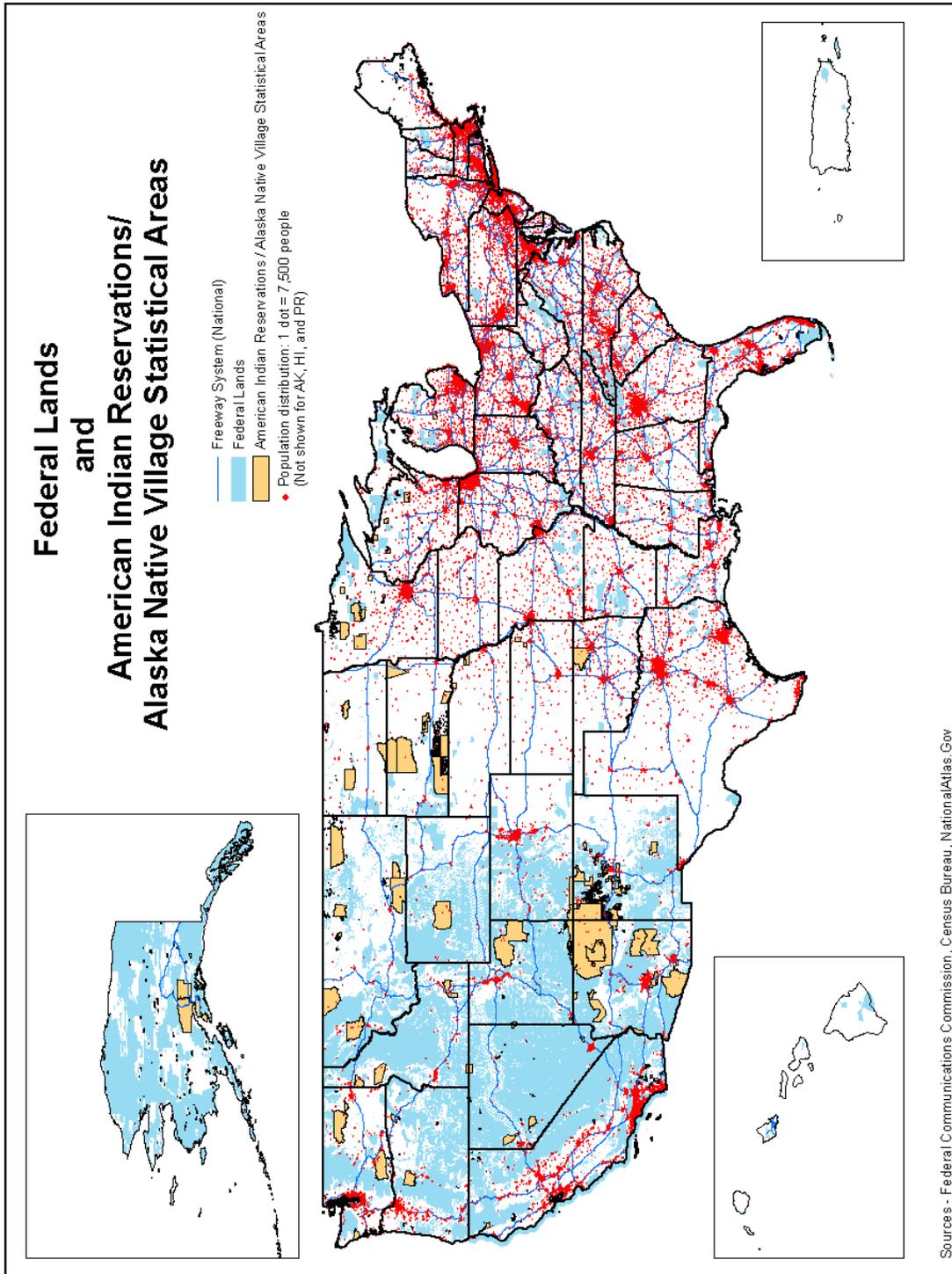
Map B-19: Wireless Coverage by Number of Providers By Region (15)



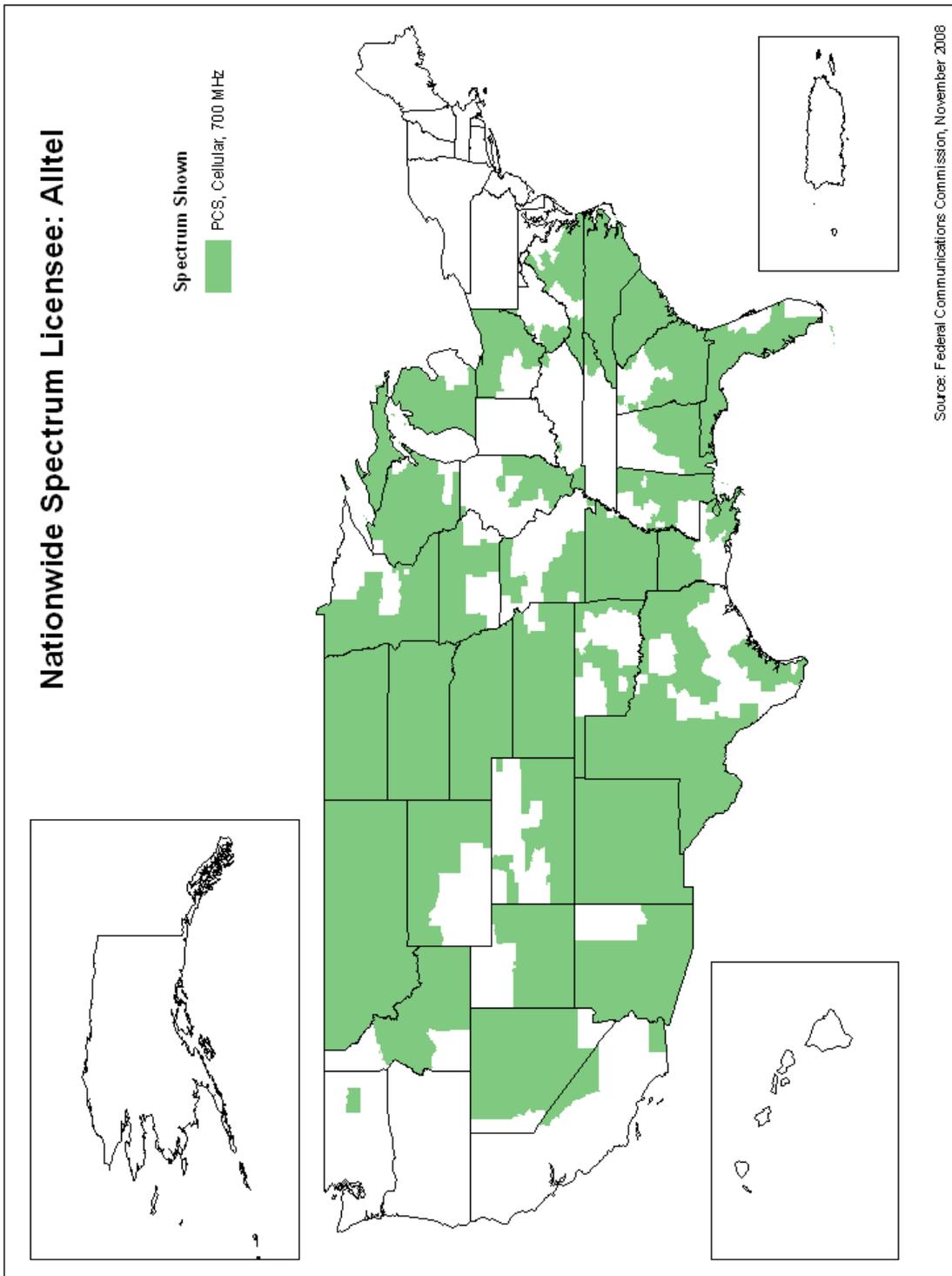
Map B-20: Wireless Coverage by Number of Providers By Region (16)



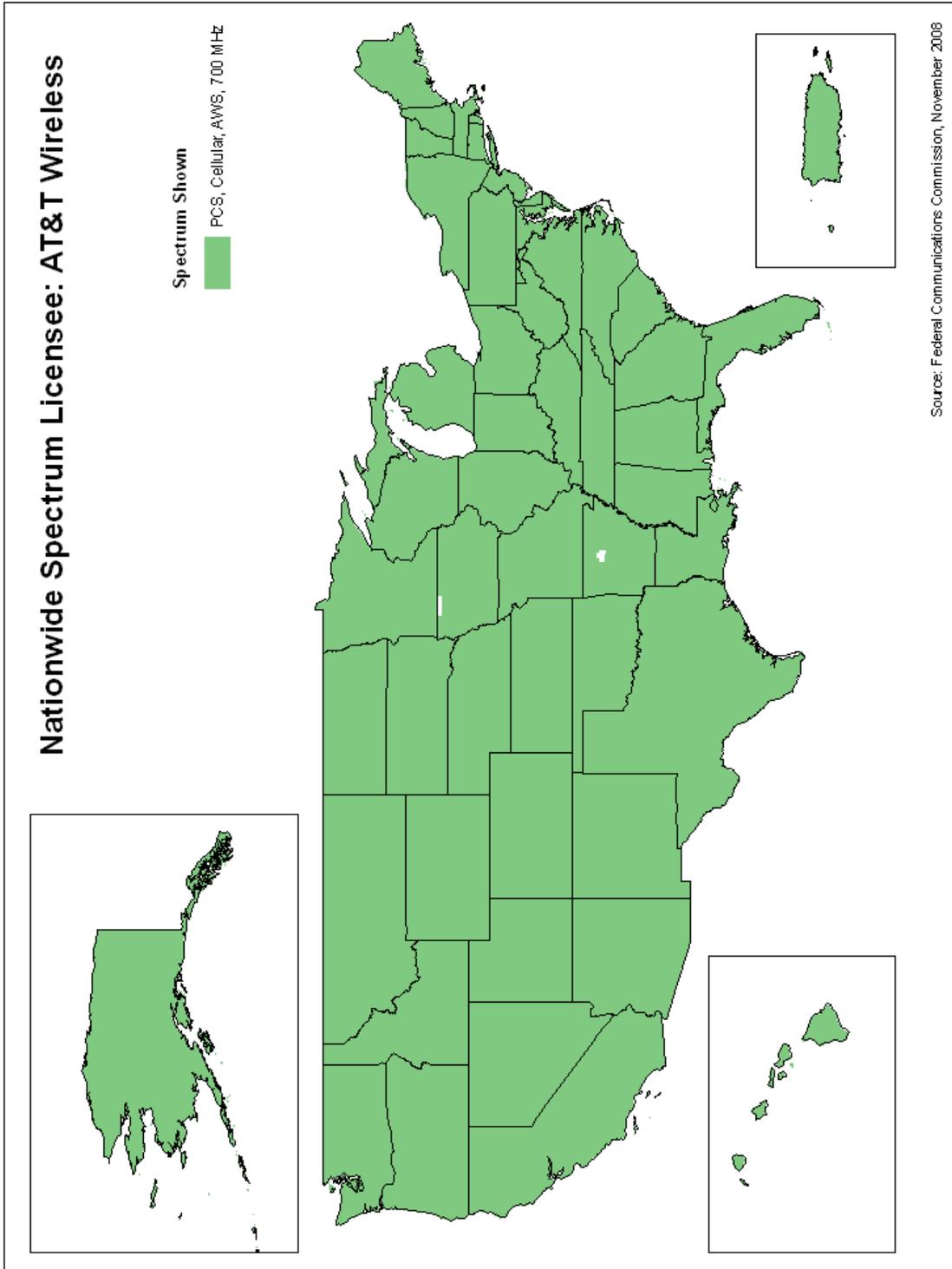
Map B-21: U.S. Federal Lands



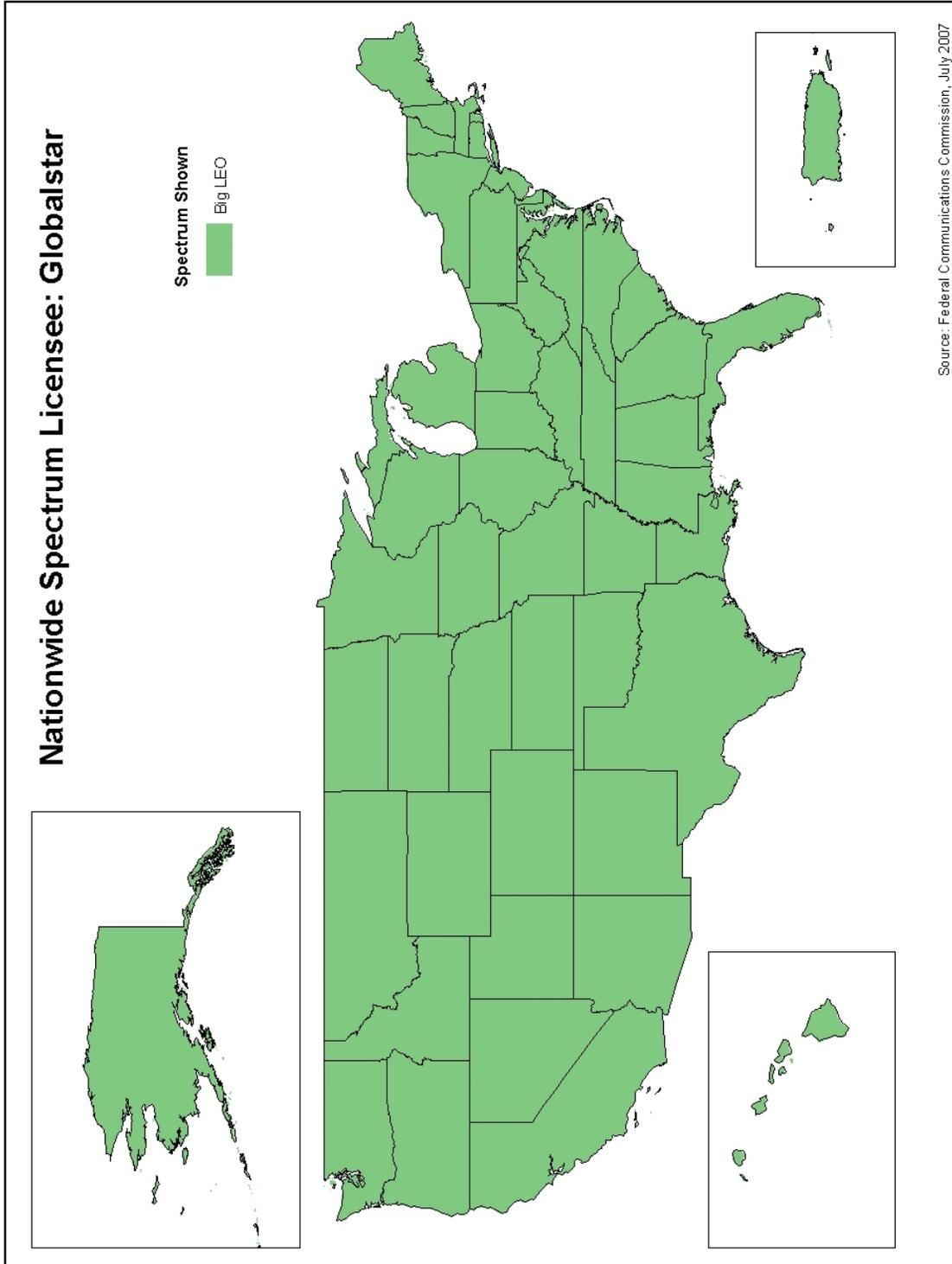
Map B-22: Nationwide Spectrum Licensee: Alltel



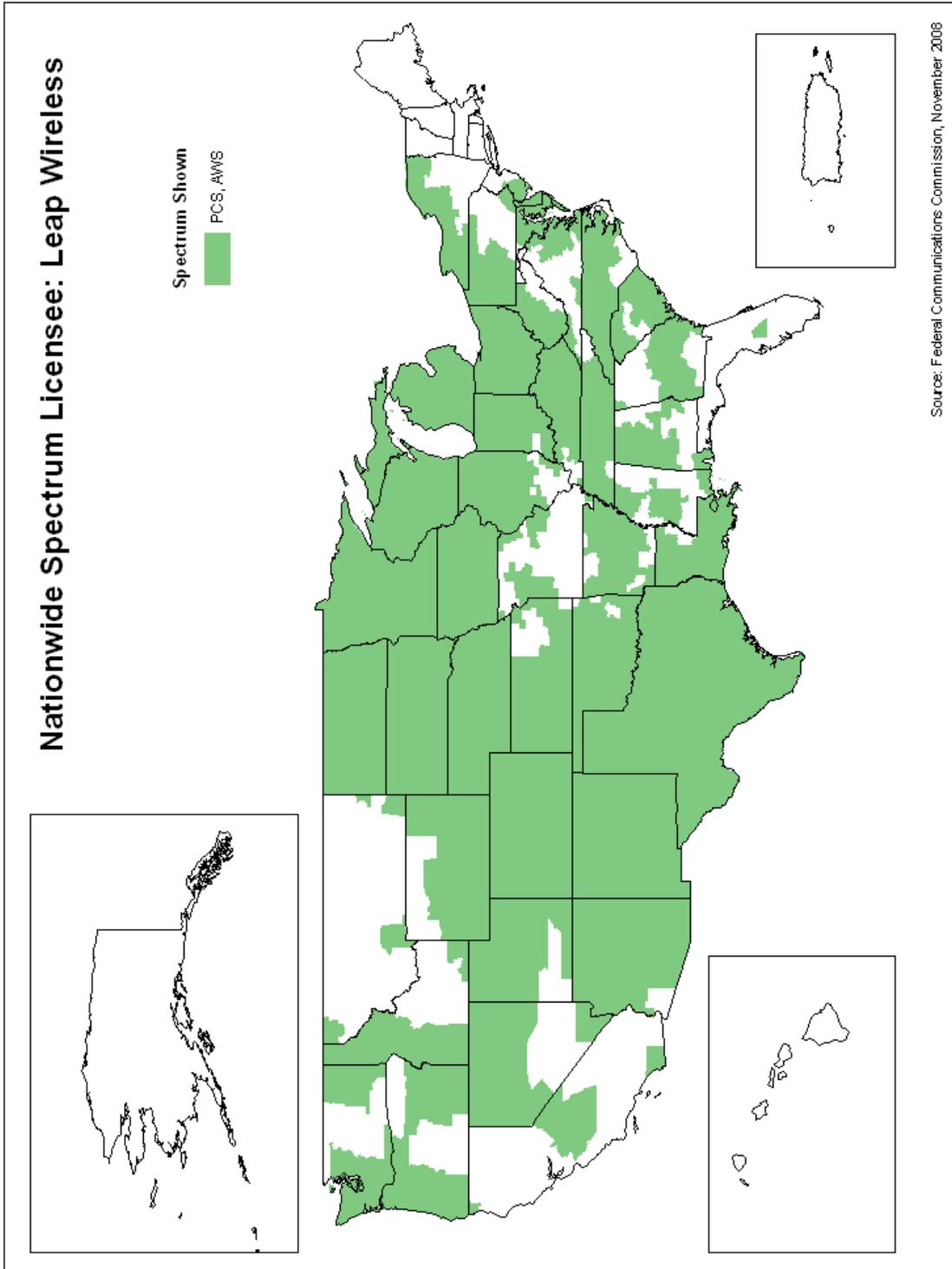
Map B-23: Nationwide Spectrum Licensee: AT&T



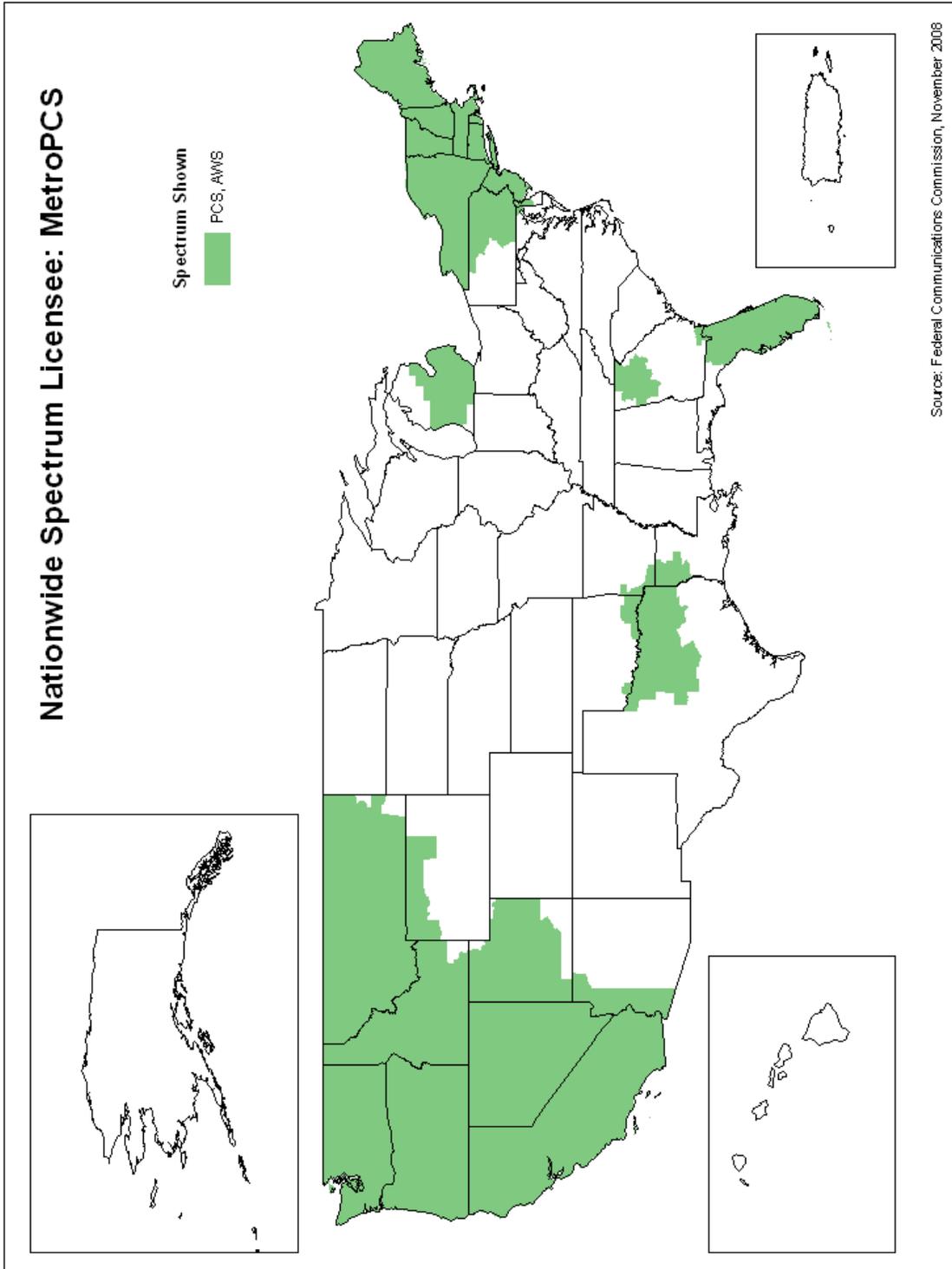
Map B-24: Nationwide Spectrum Licensee: Globalstar



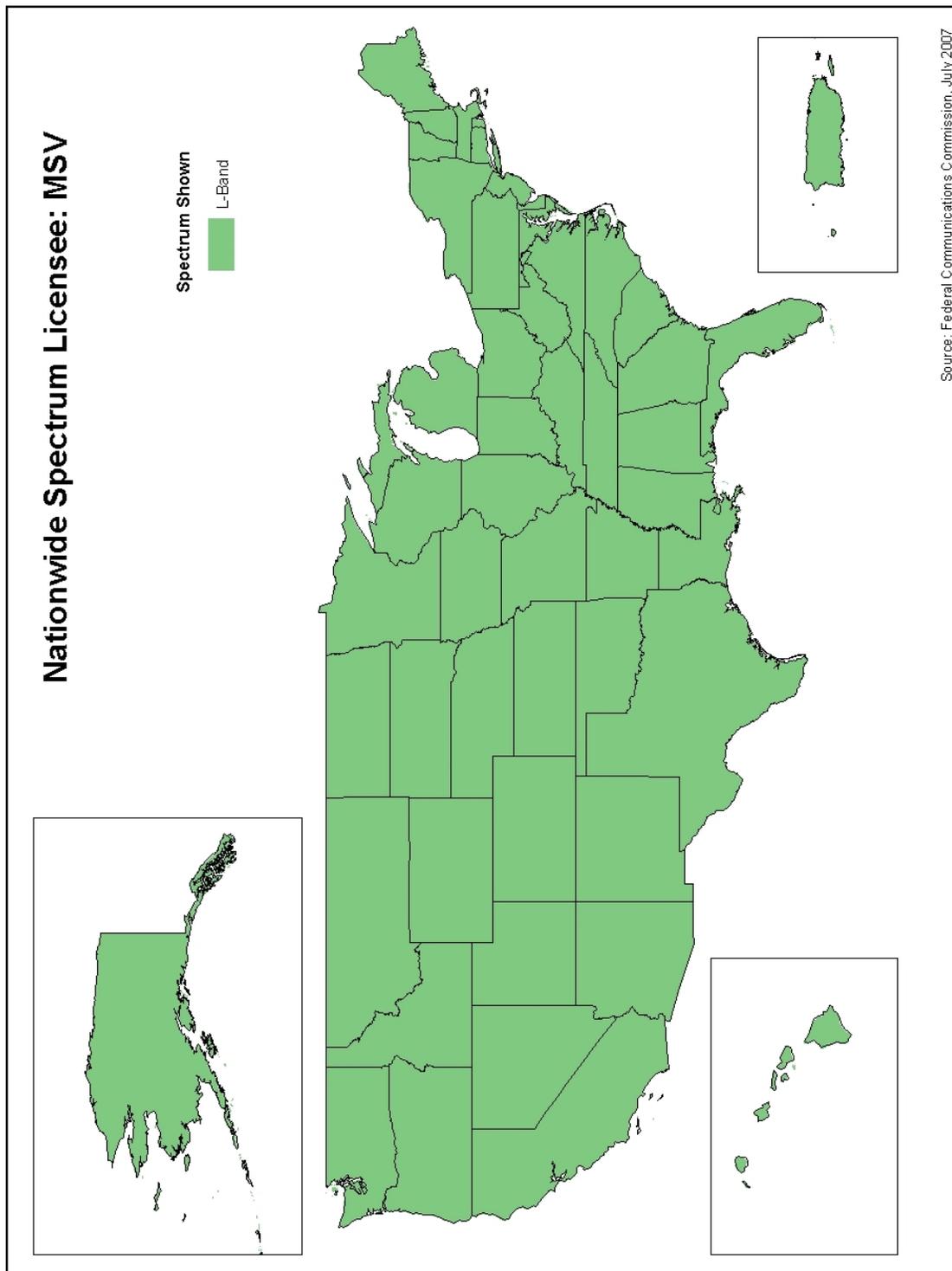
Map B-25: Nationwide Spectrum Licensee: Leap



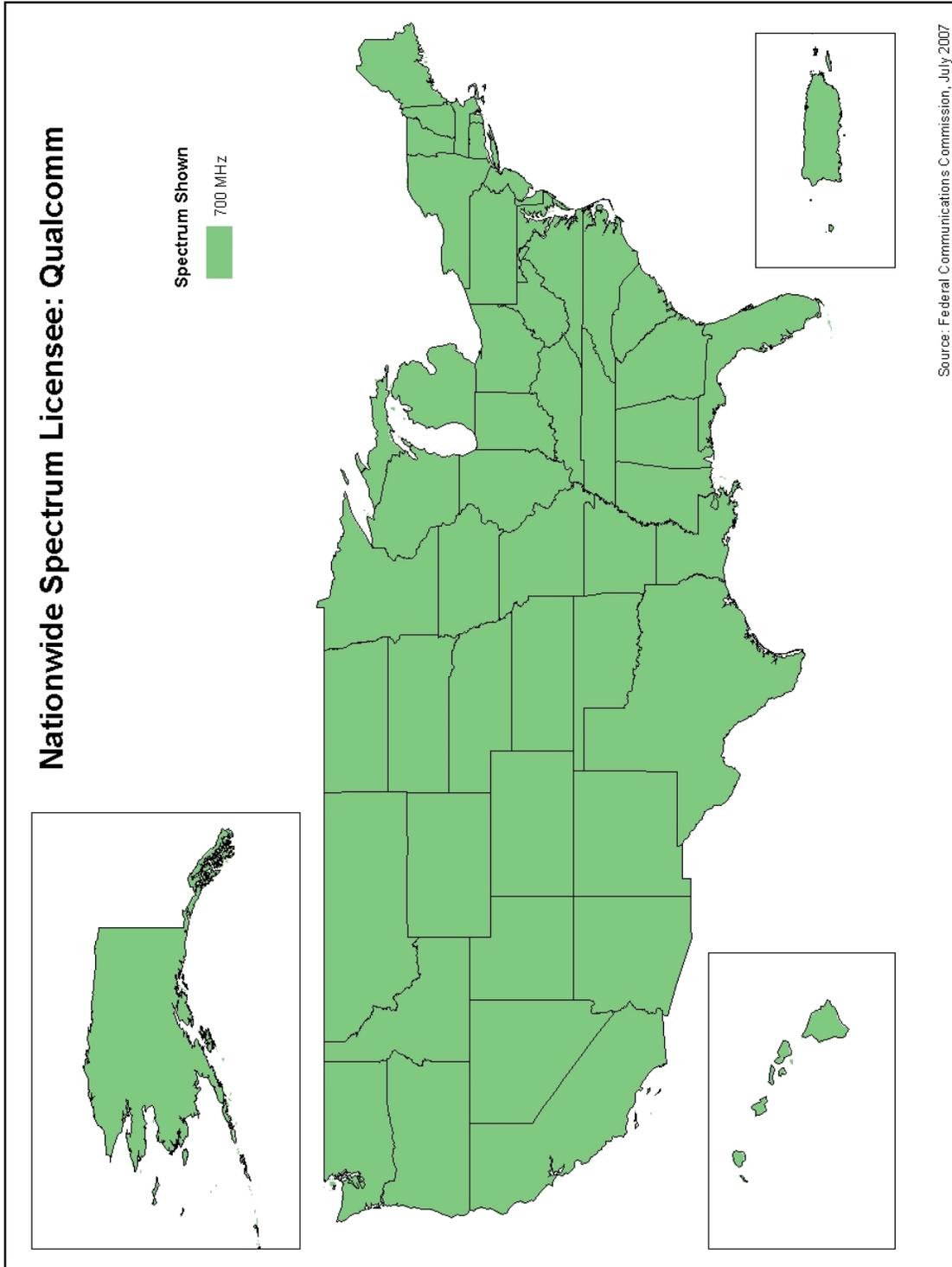
Map B-26: Nationwide Spectrum Licensee: MetroPCS



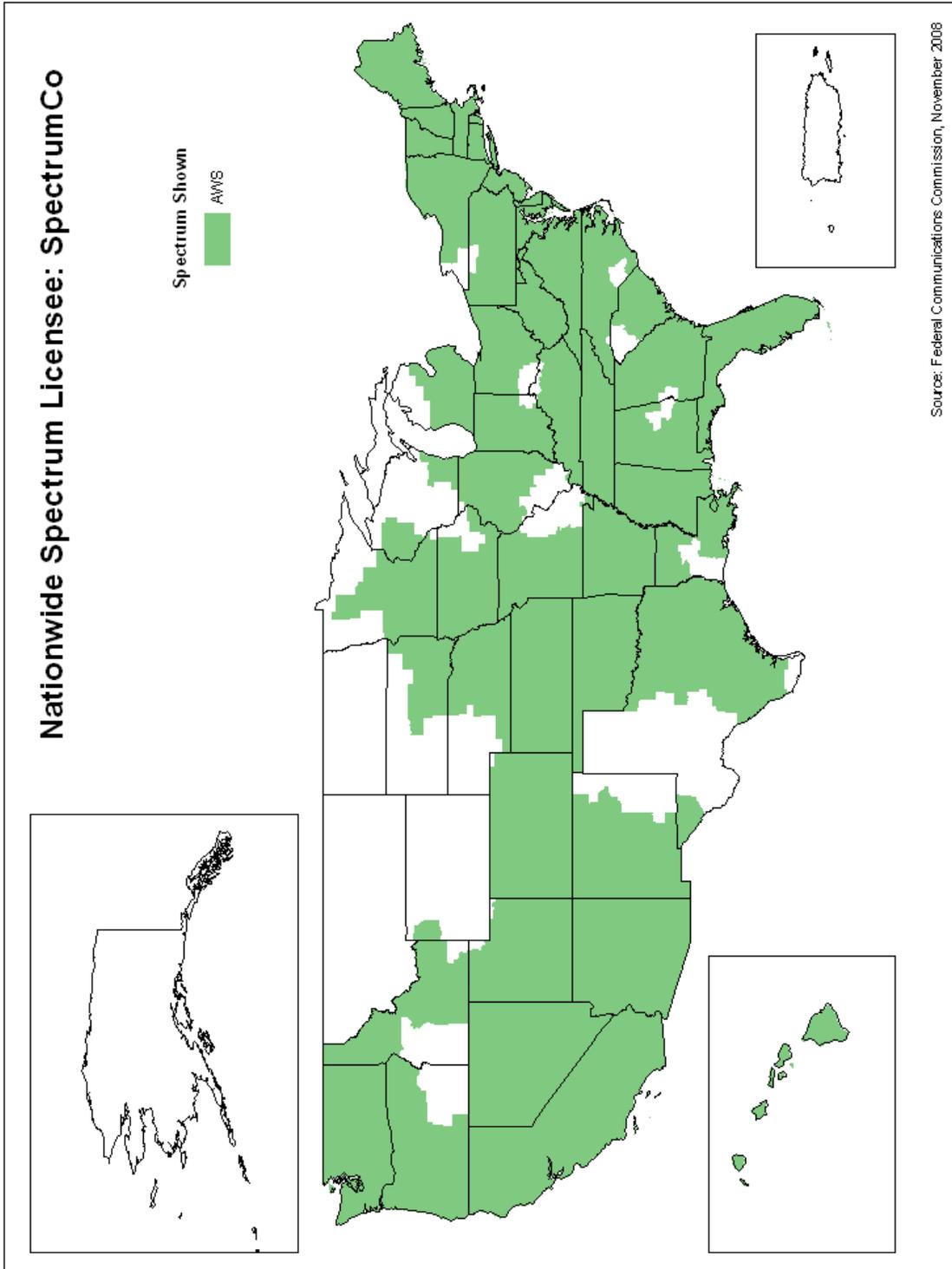
Map B-27: Nationwide Spectrum Licensee: MSV



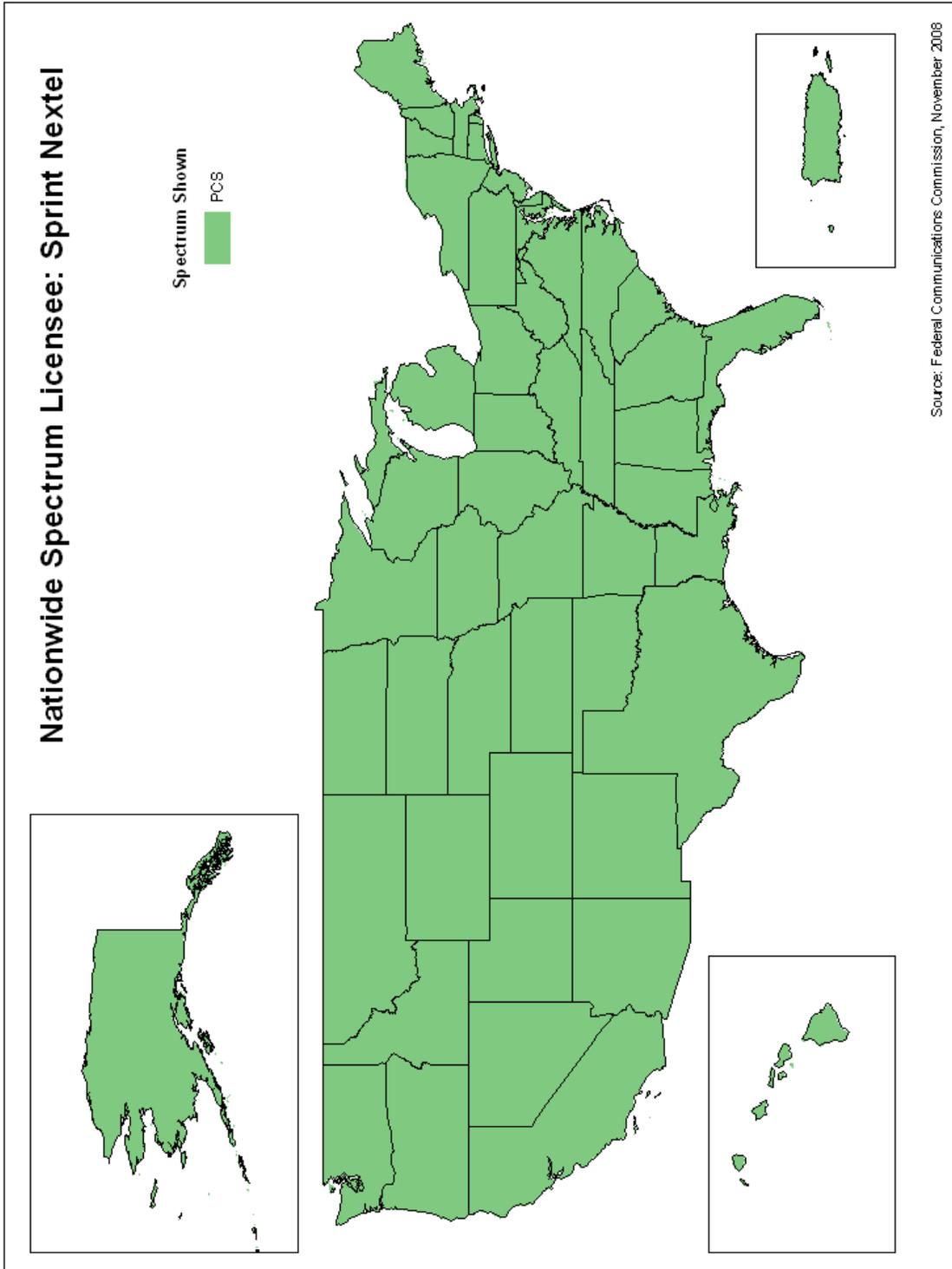
Map B-28: Nationwide Spectrum Licensee: Qualcomm



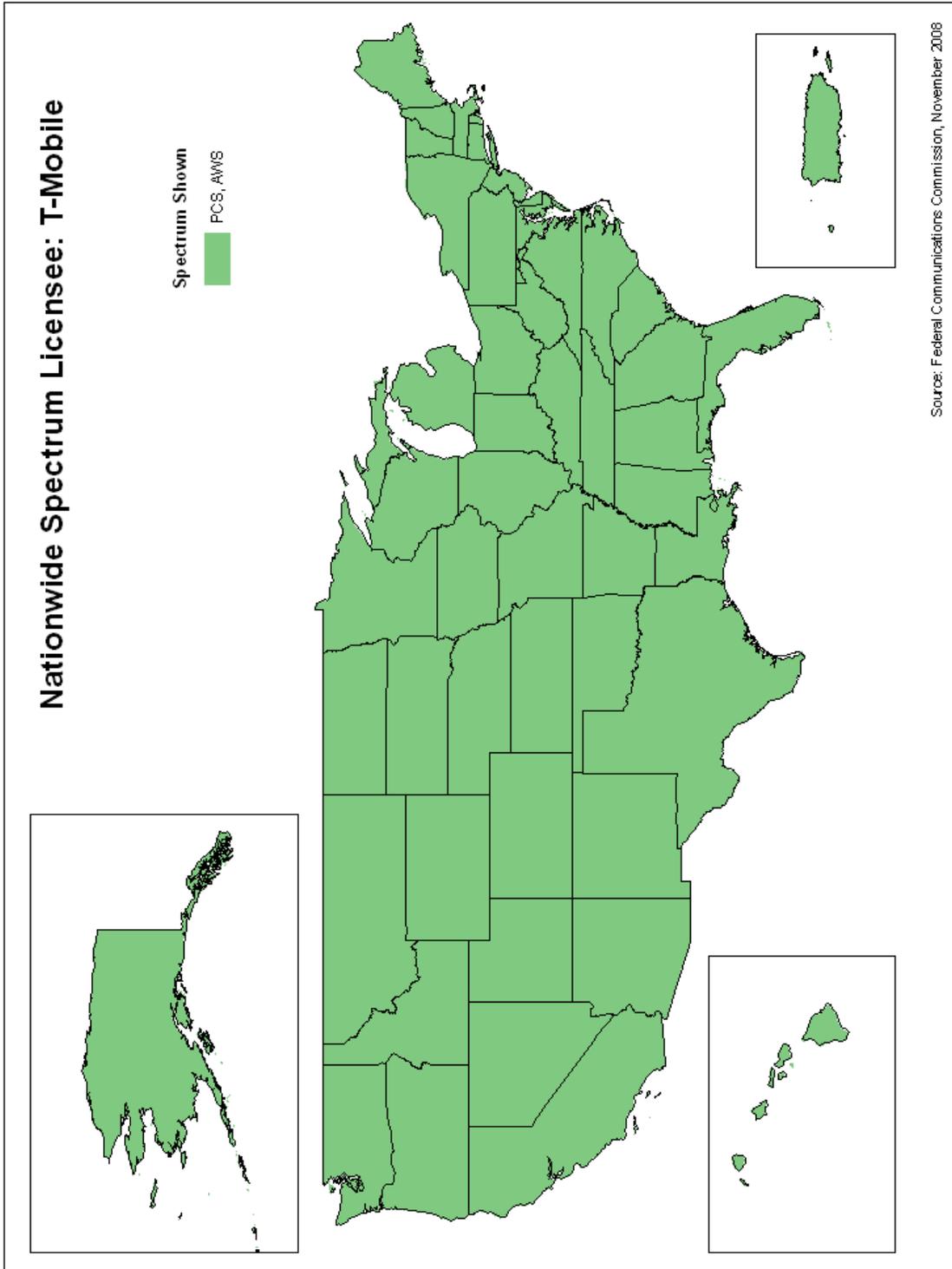
Map B-29: Nationwide Spectrum Licensee: SpectrumCo



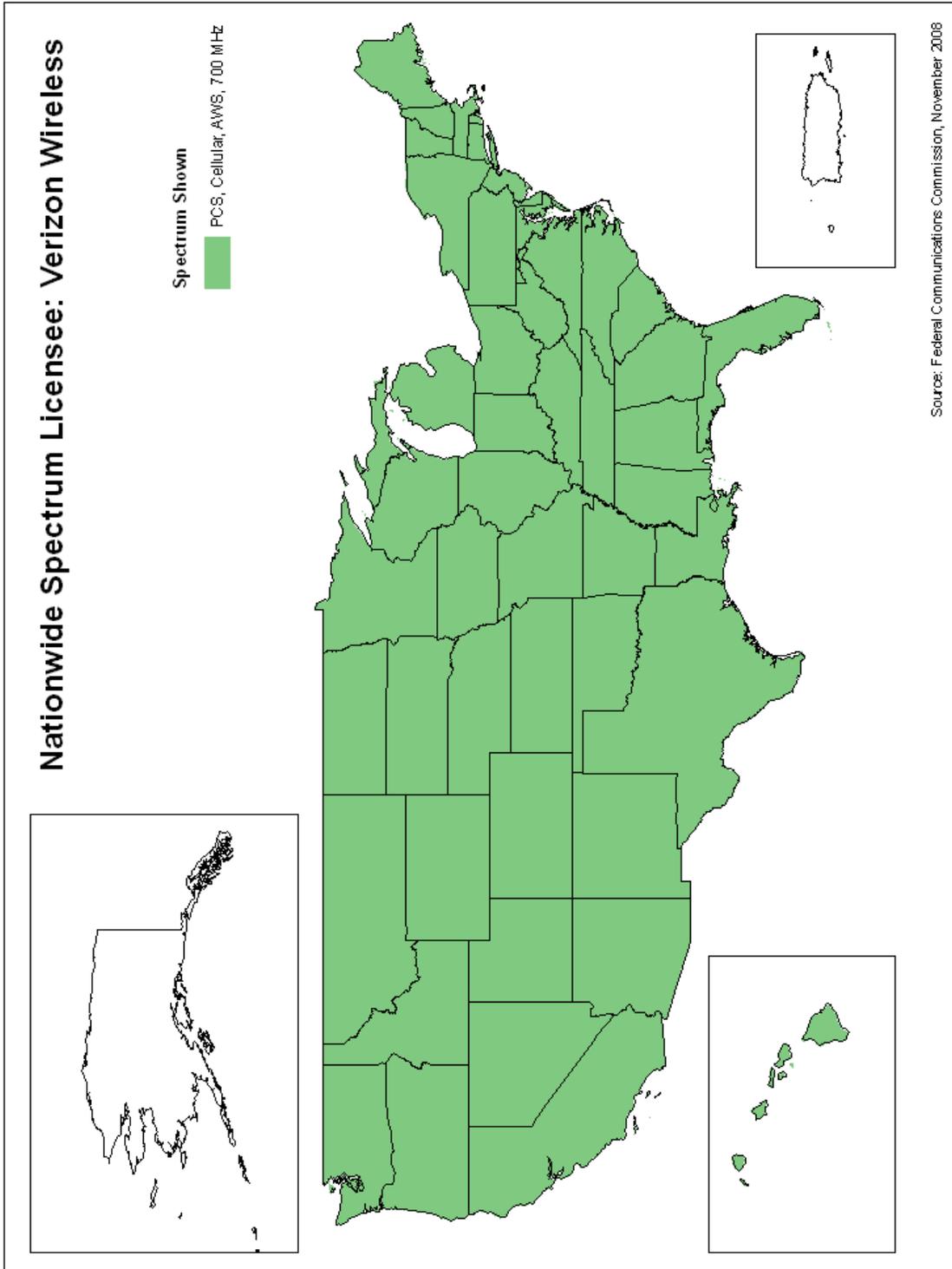
Map B-30: Nationwide Spectrum Licensee: Sprint Nextel



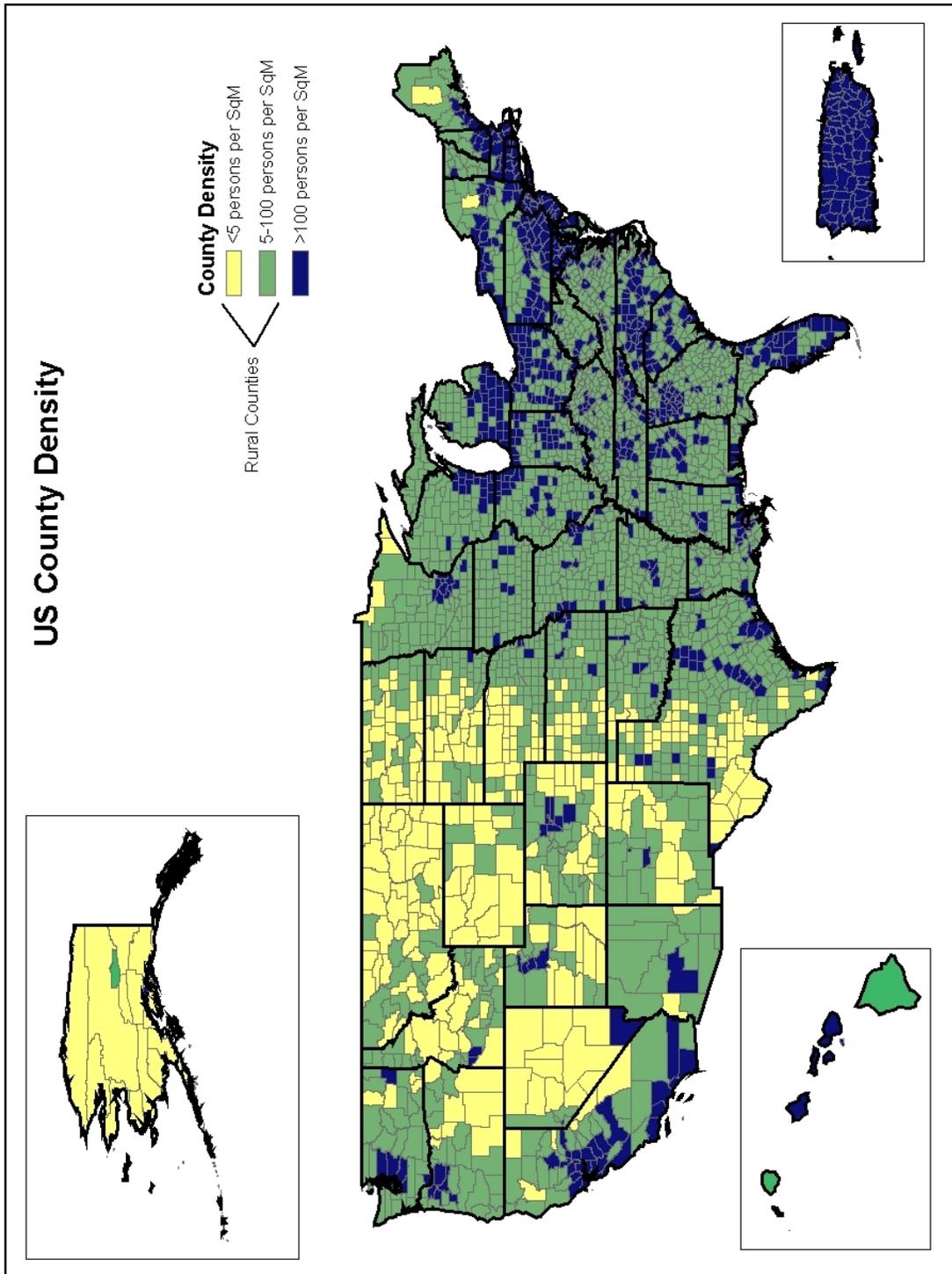
Map B-31: Nationwide Spectrum Licensee: T-Mobile



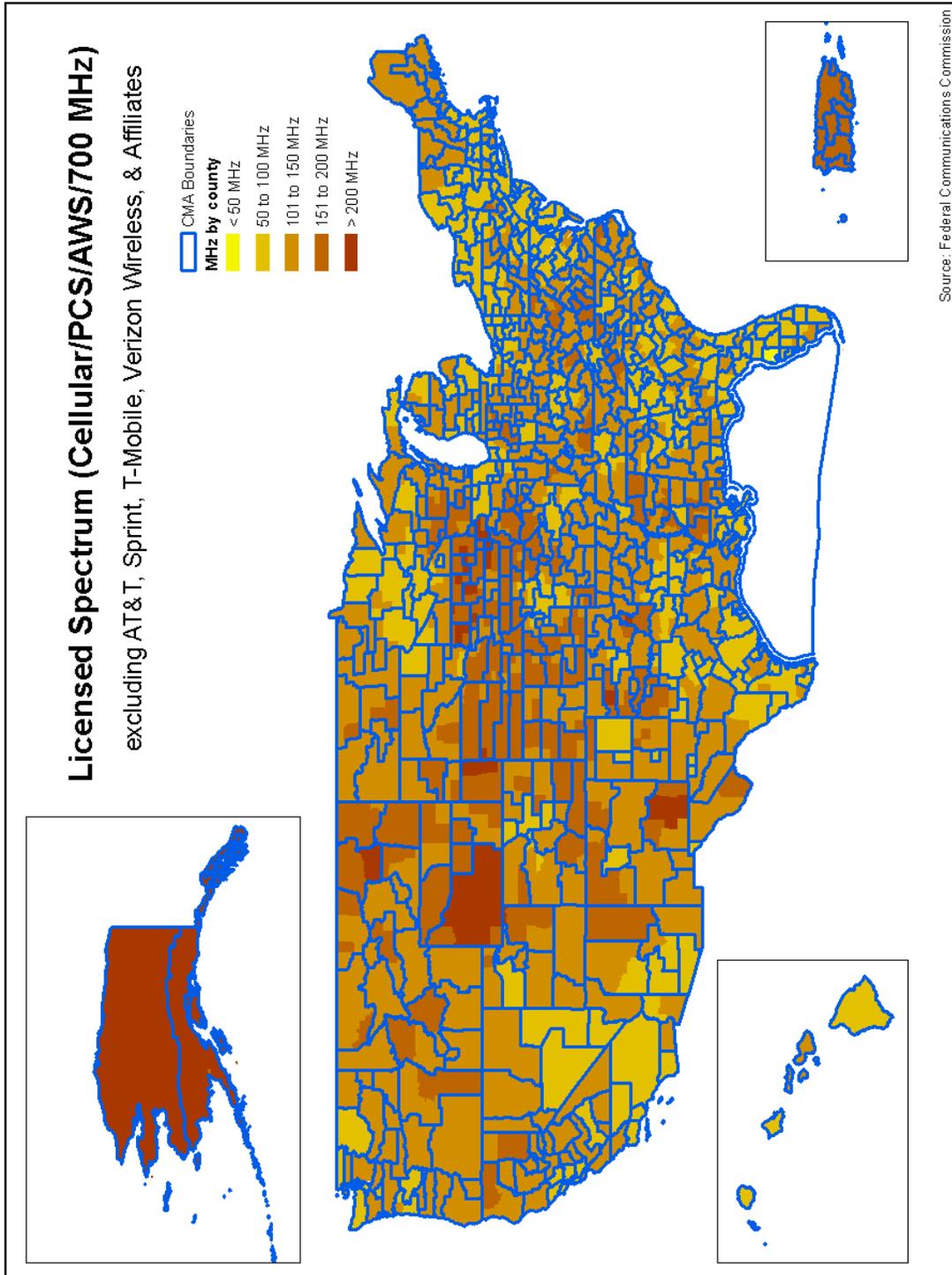
Map B-32: Nationwide Spectrum Licensee: Verizon Wireless



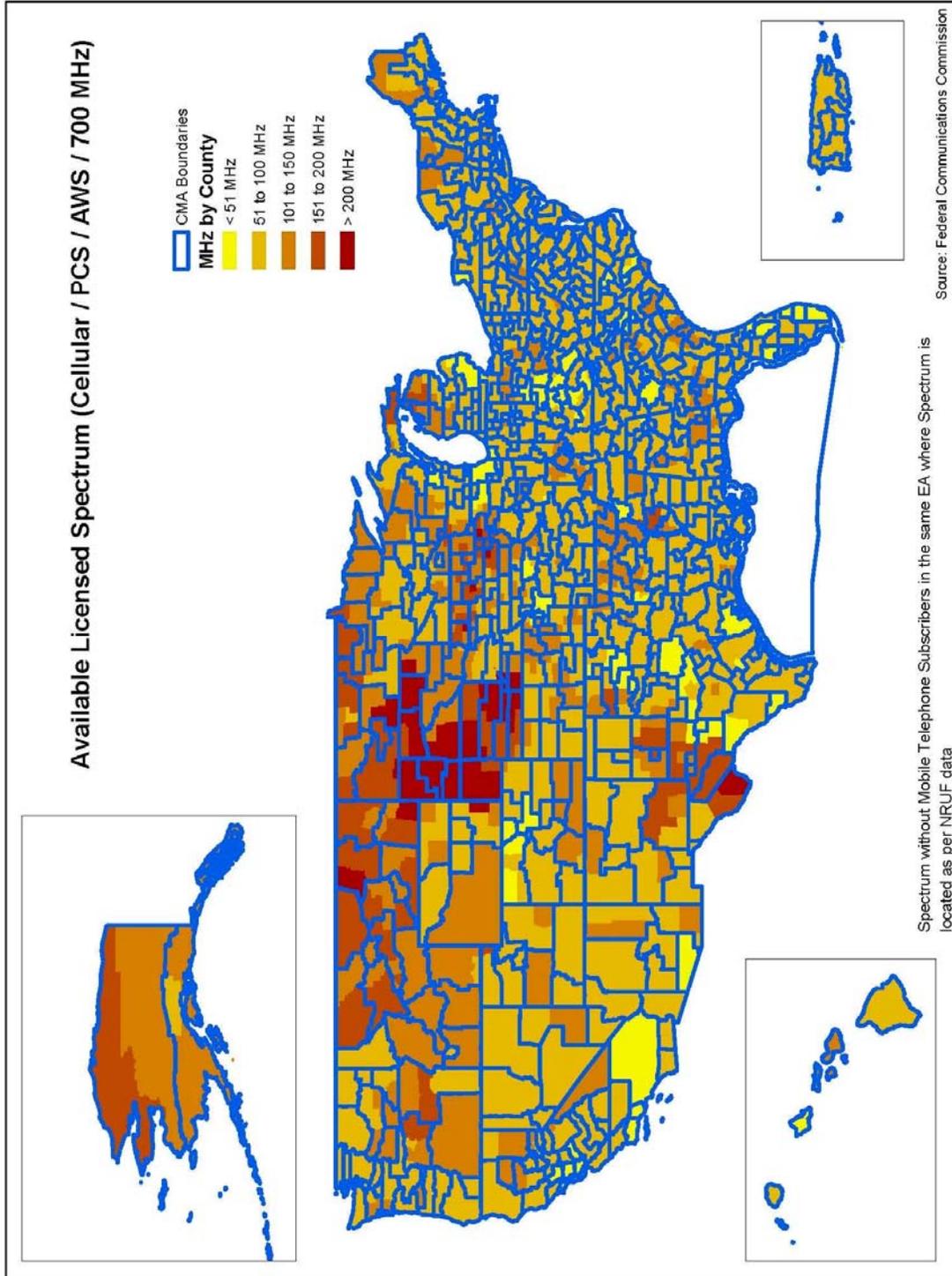
Map B-33: U.S. County Density



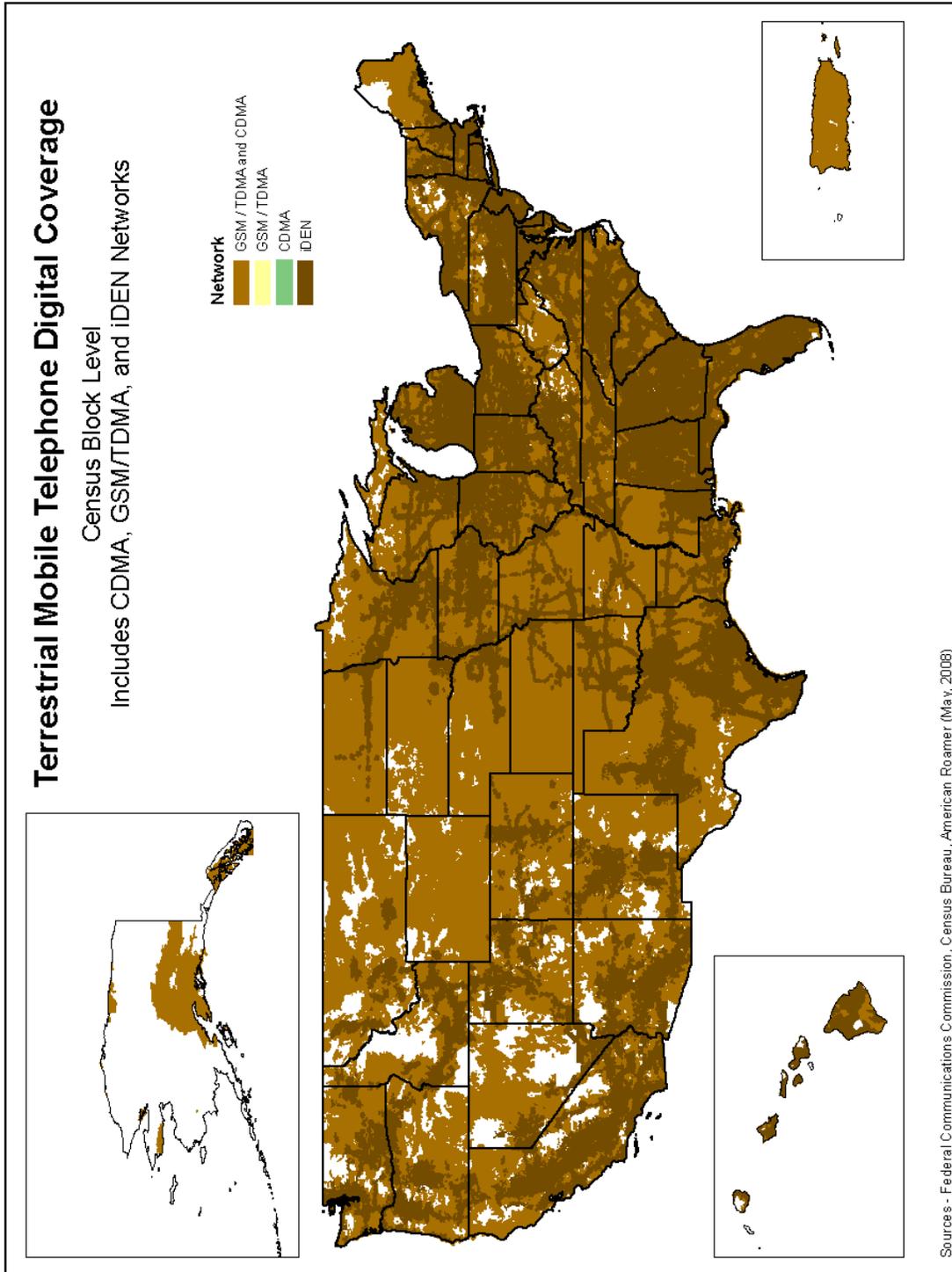
Map B-34: Spectrum Not Licensed to the Nationwide Carriers & Their Affiliates



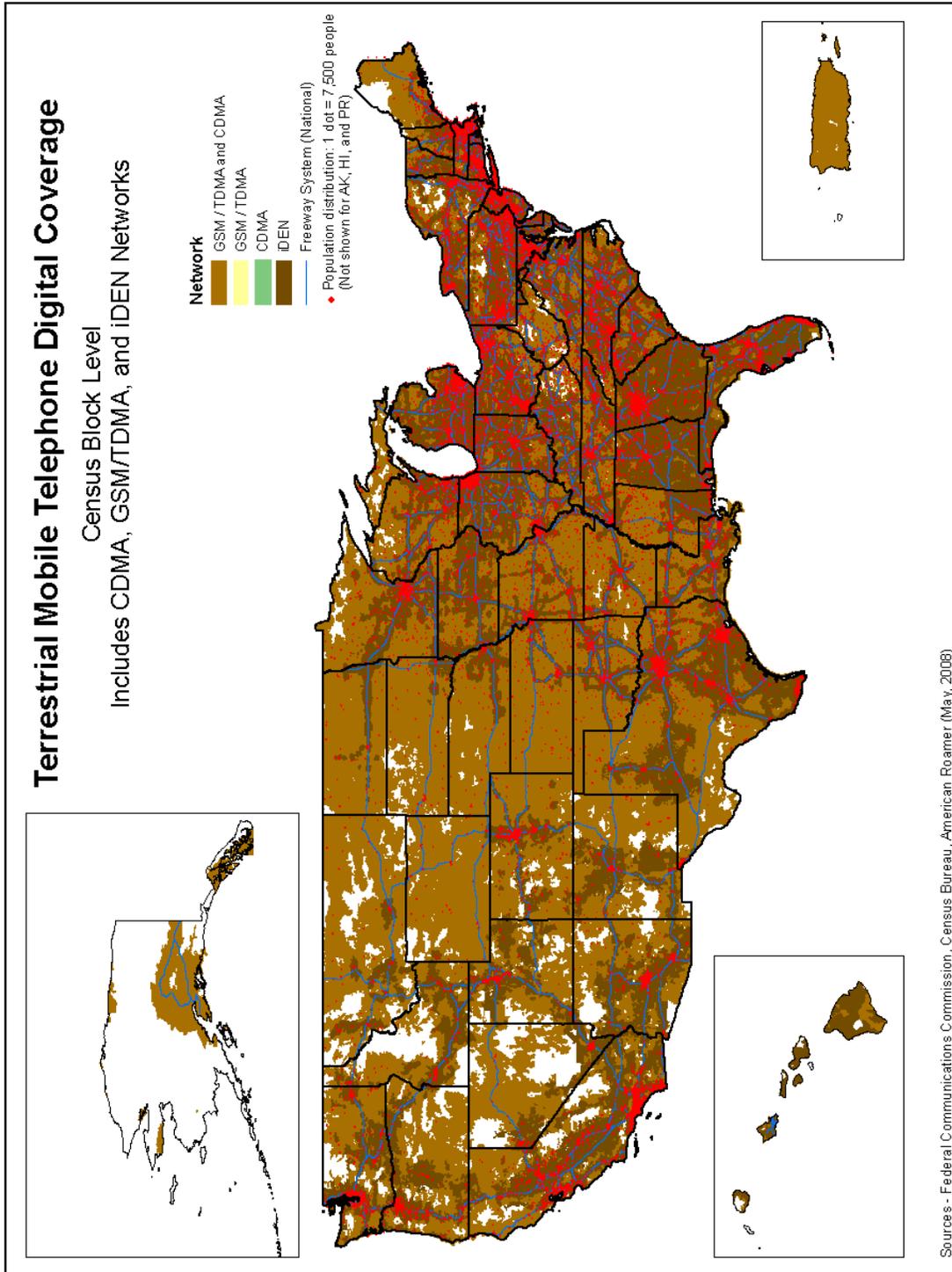
Map B-35: Available Licensed Spectrum



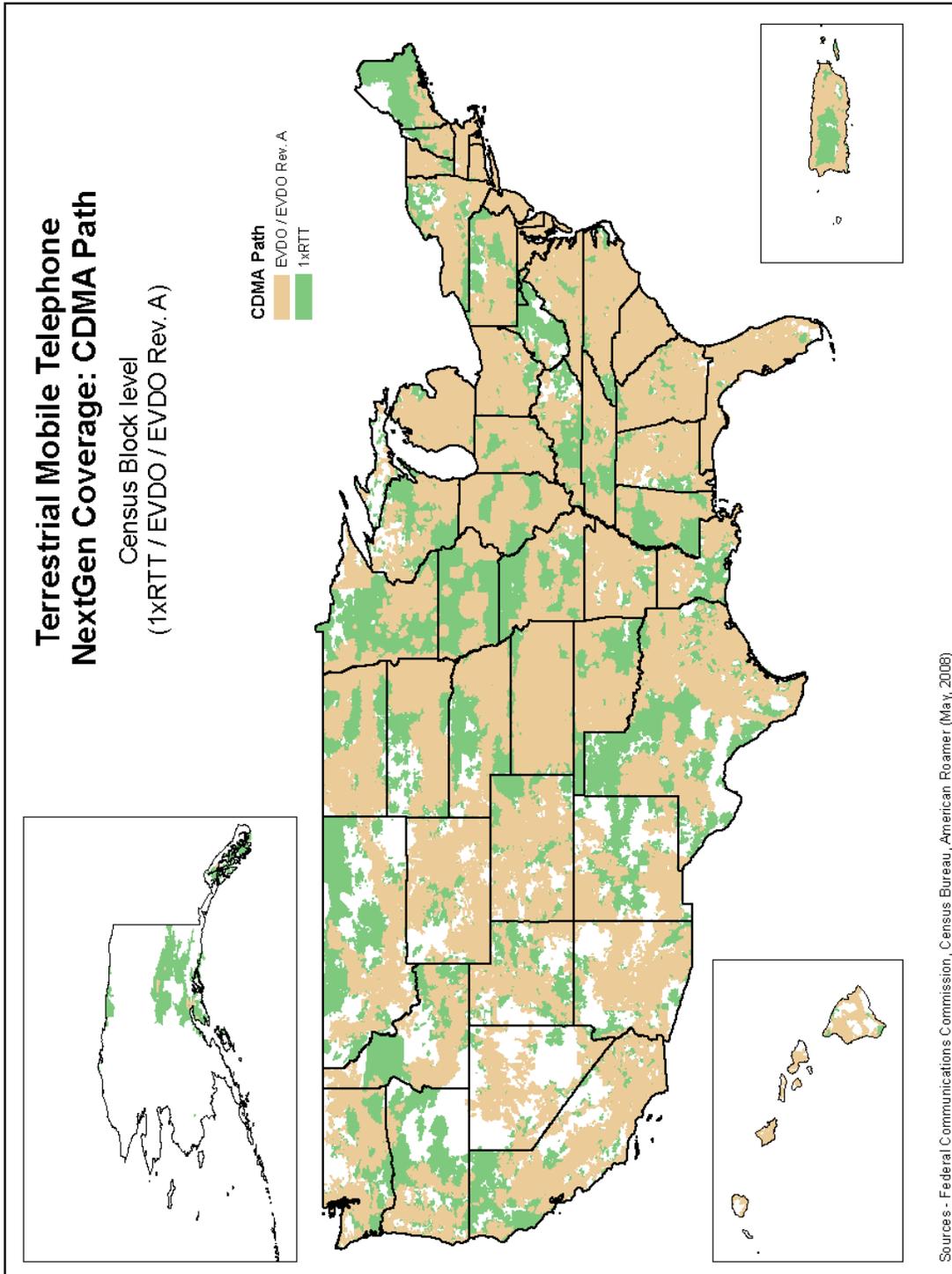
Map B-36: Mobile Telephone Digital Coverage



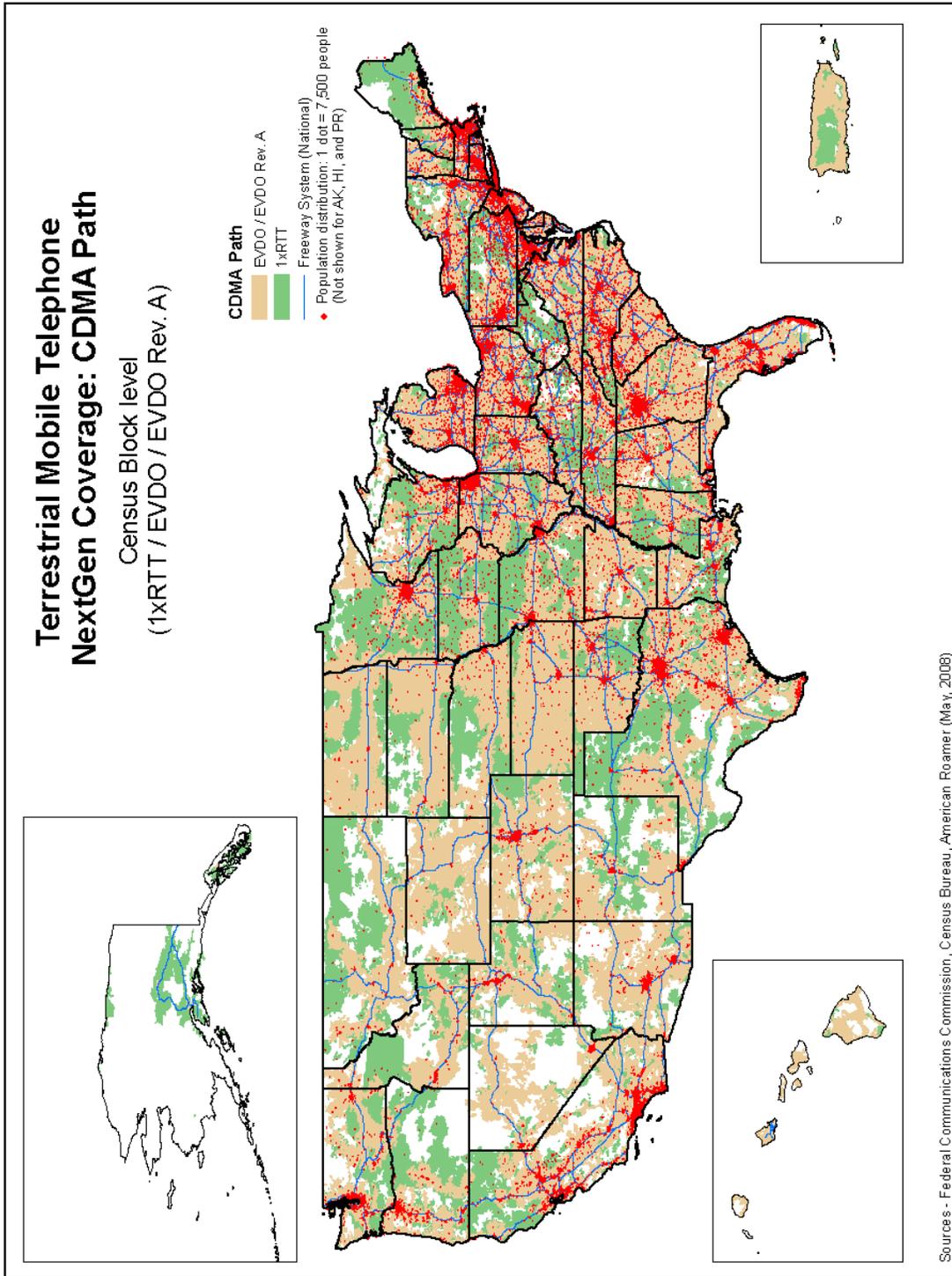
Map B-37: Mobile Telephone Digital Coverage (2)



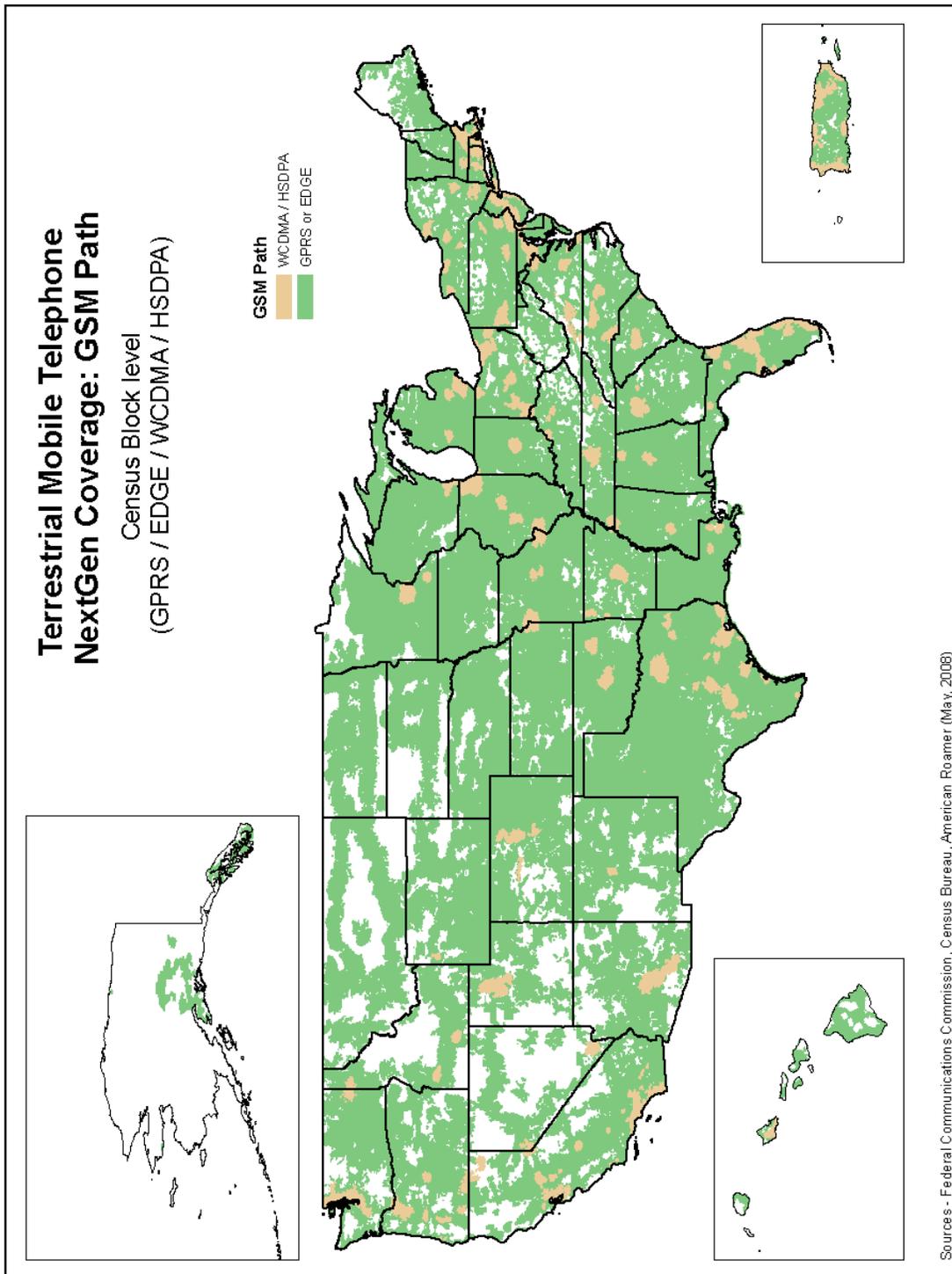
Map B-38: Mobile Telephone NextGen Coverage: CDMA Path



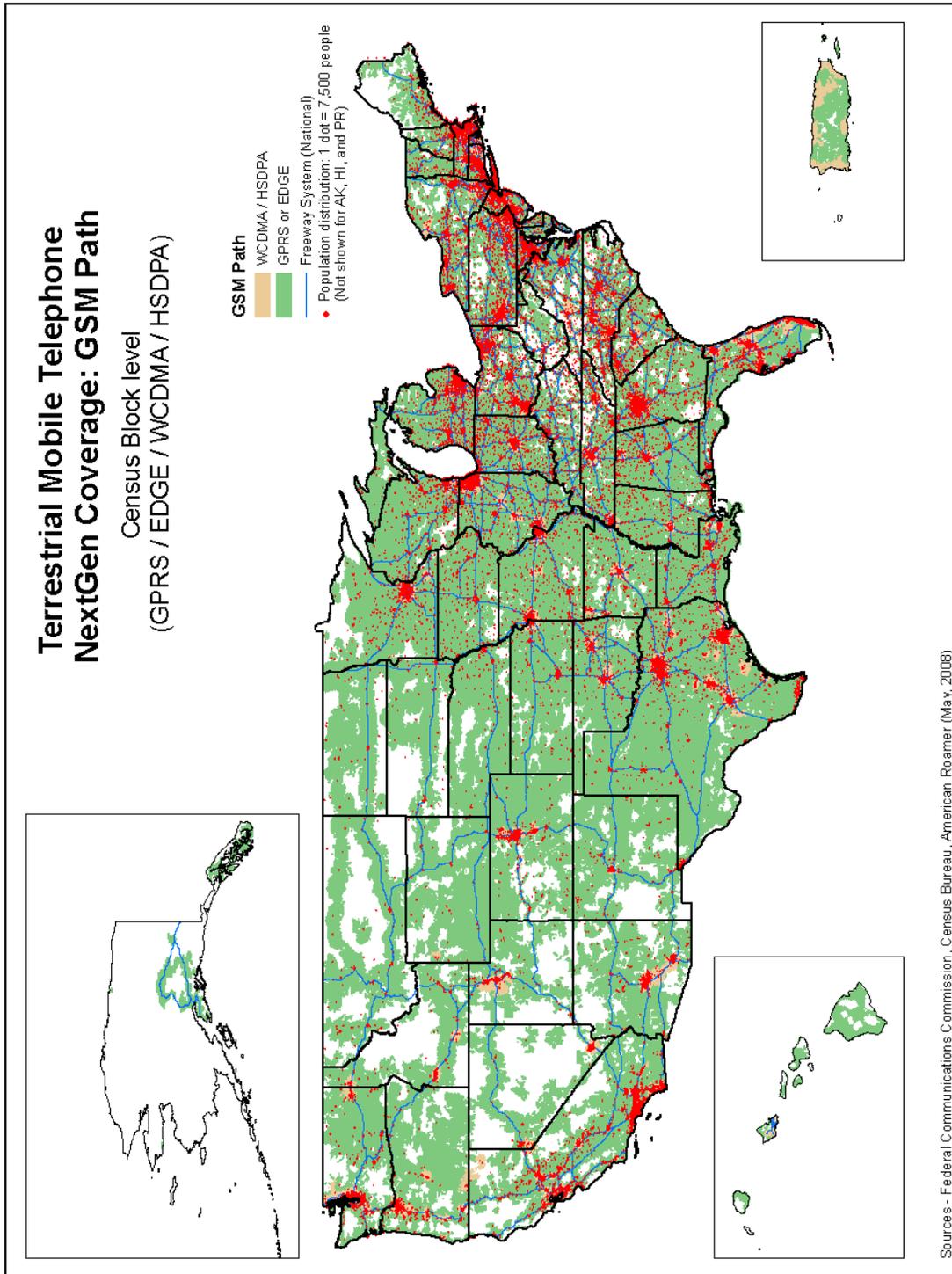
Map B-39: Mobile Telephone NextGen Coverage: CDMA Path (2)



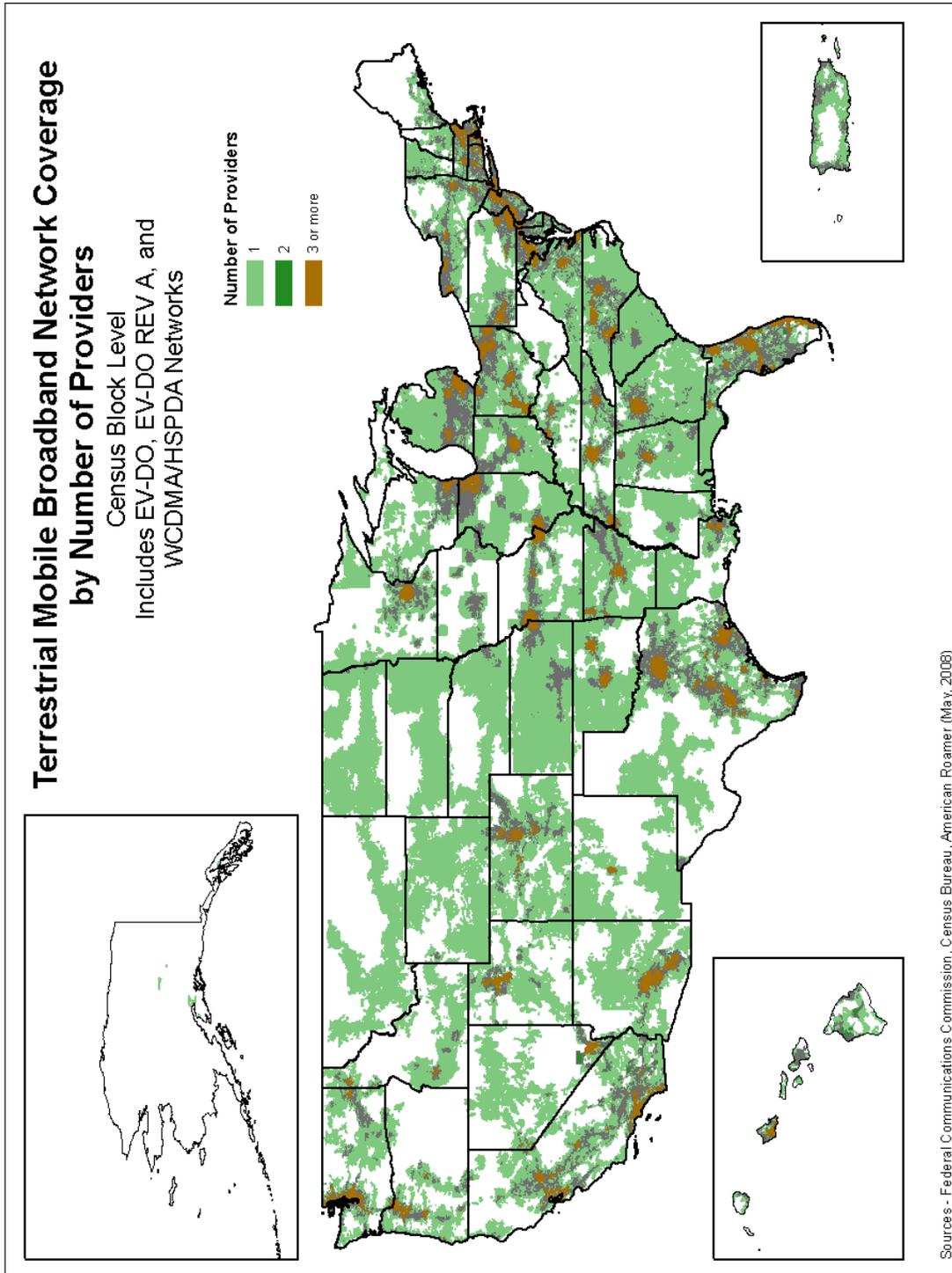
Map B-40: Mobile Telephone NextGen Coverage: GSM Path



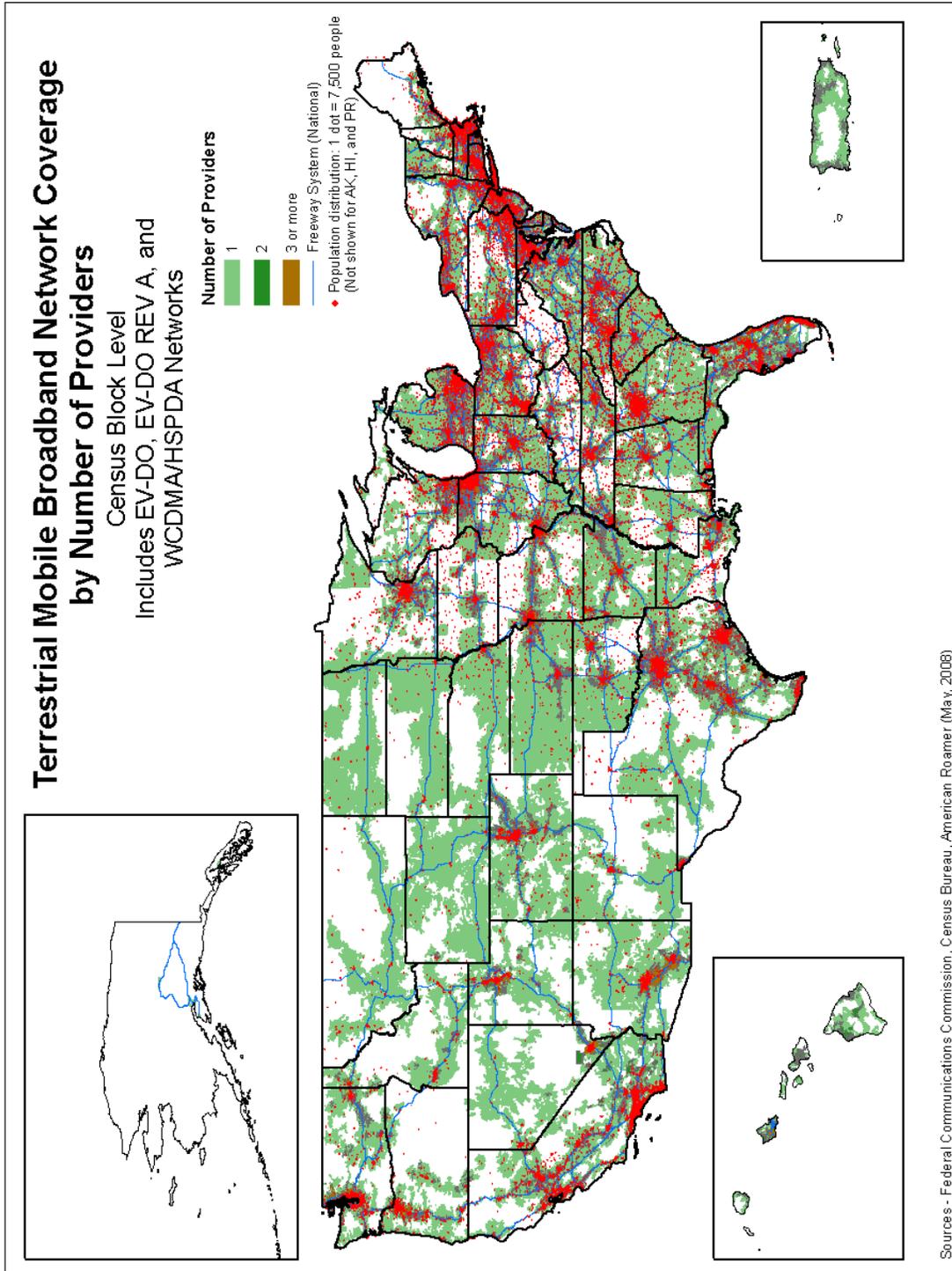
Map B-41: Mobile Telephone NextGen Coverage: GSM Path (2)



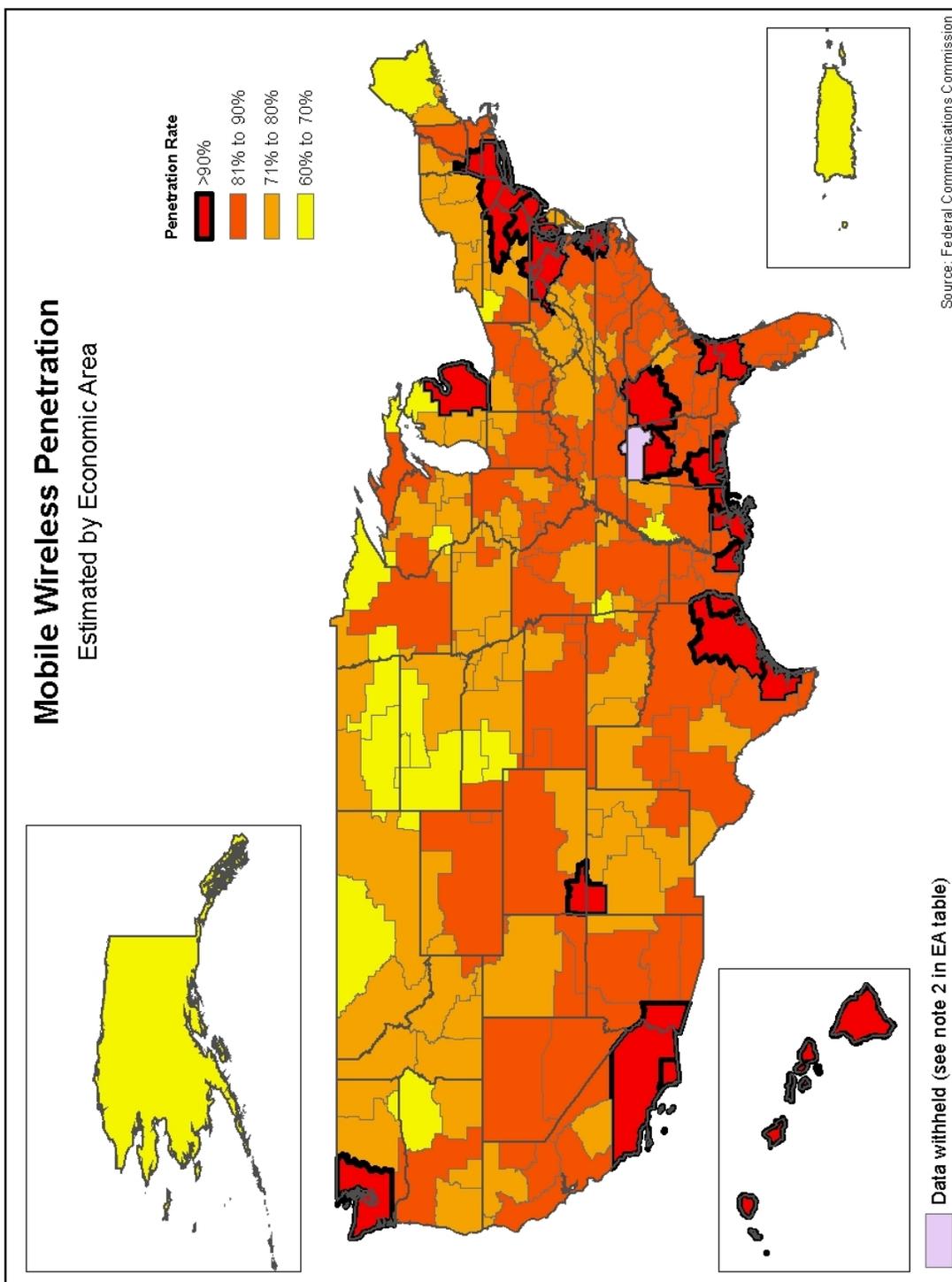
Map B-42: Mobile Broadband Network Coverage



Map B-43: Mobile Broadband Network Coverage (2)



Map B-44: Mobile Wireless Penetration

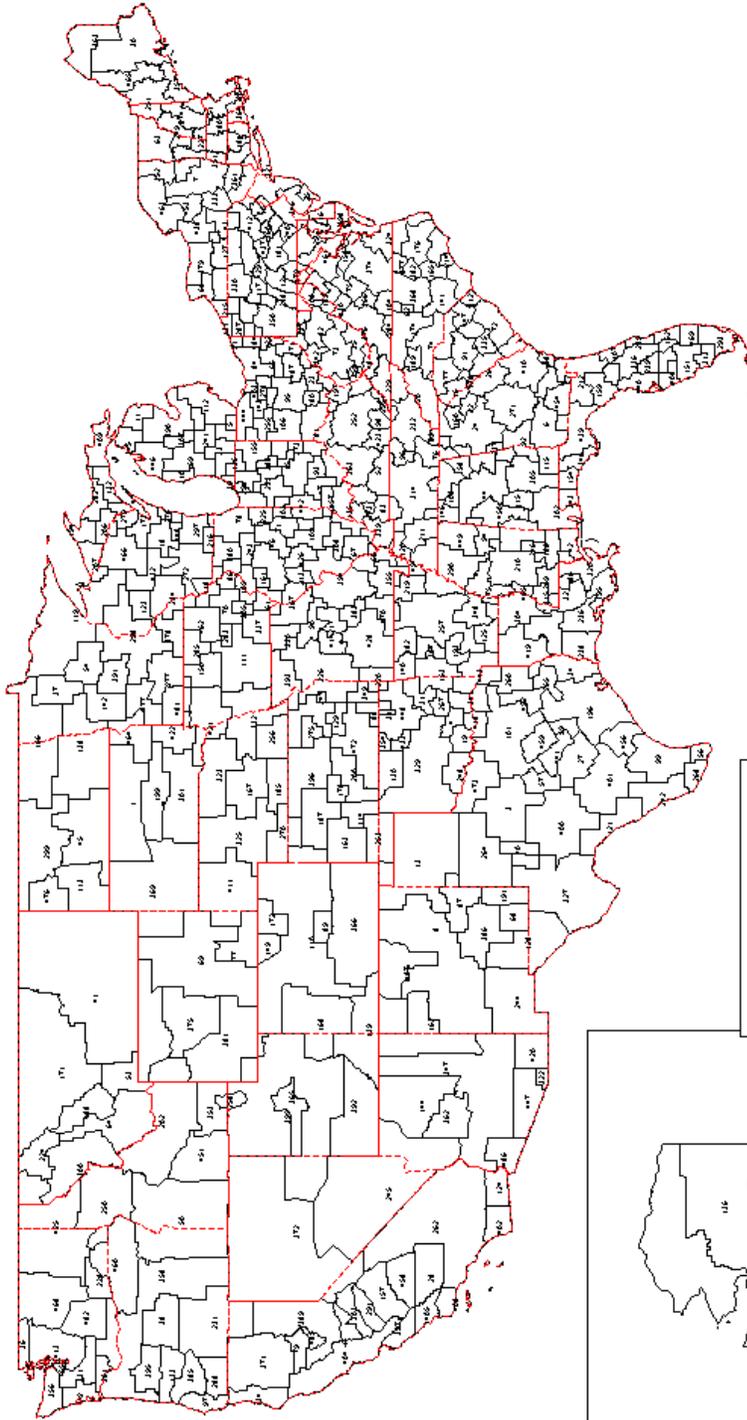


**Table B-1: Geographic Licensing Schemes**

<b>Geographic Licensing Schemes</b>	<b>Number of Market Areas</b>	<b>Note</b>
Basic Trading Areas (BTAs)	493	BTAs make up MTAs
Major Trading Areas (MTAs)	51	
Cellular Market Areas (CMAs)	734	Also known as MSAs and RSAs
Economic Areas (EAs)	175	
Regional Economic Area Groupings (REAGS)	12	

Map B-45

# The 493 Basic Trading Areas (BTAs)

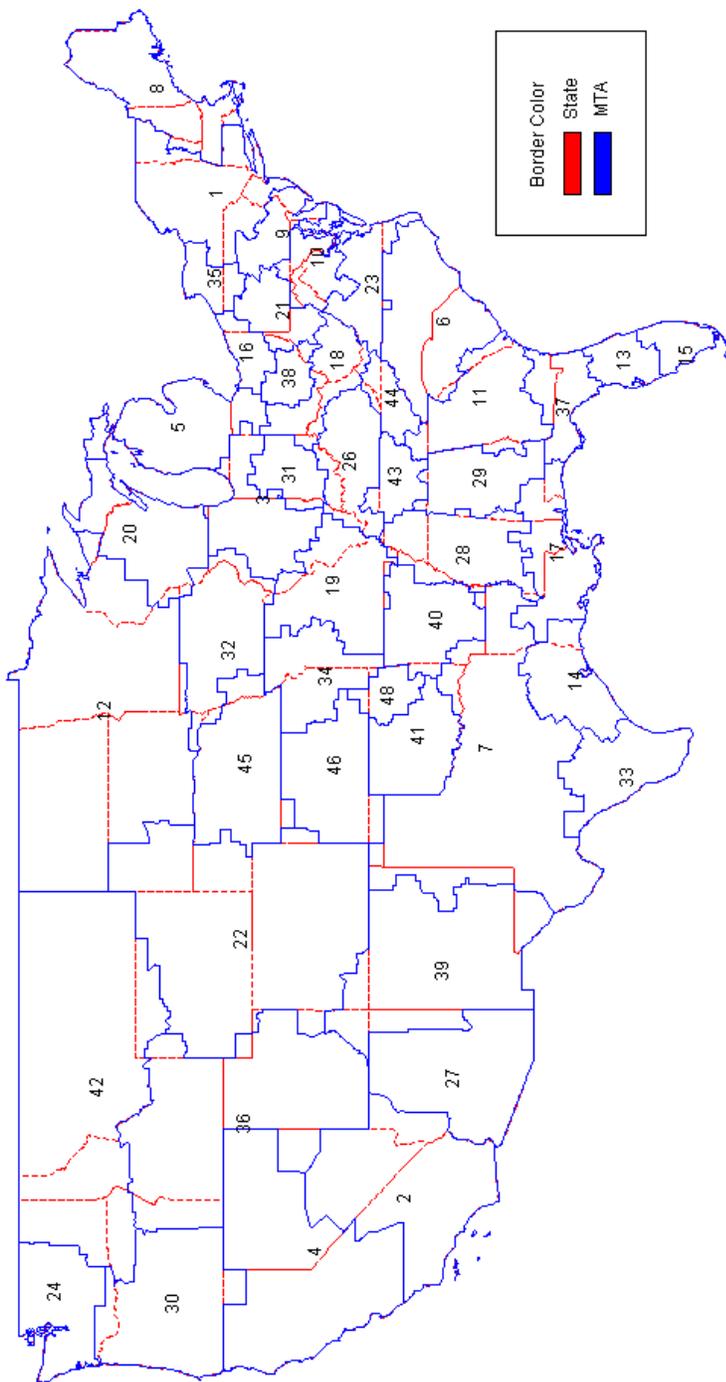


- BTA-Like areas not shown:
- B488 San Juan, PR
- B489 Mayaguez, PR
- B490 Guam
- B491 US Virgin Islands
- B492 American Samoa
- B493 Northern Mariana Islands

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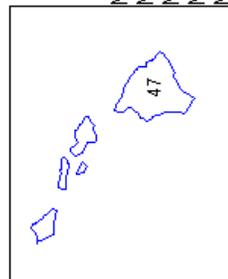
Map B-46

# The 51 Major Trading Areas (MTAs)

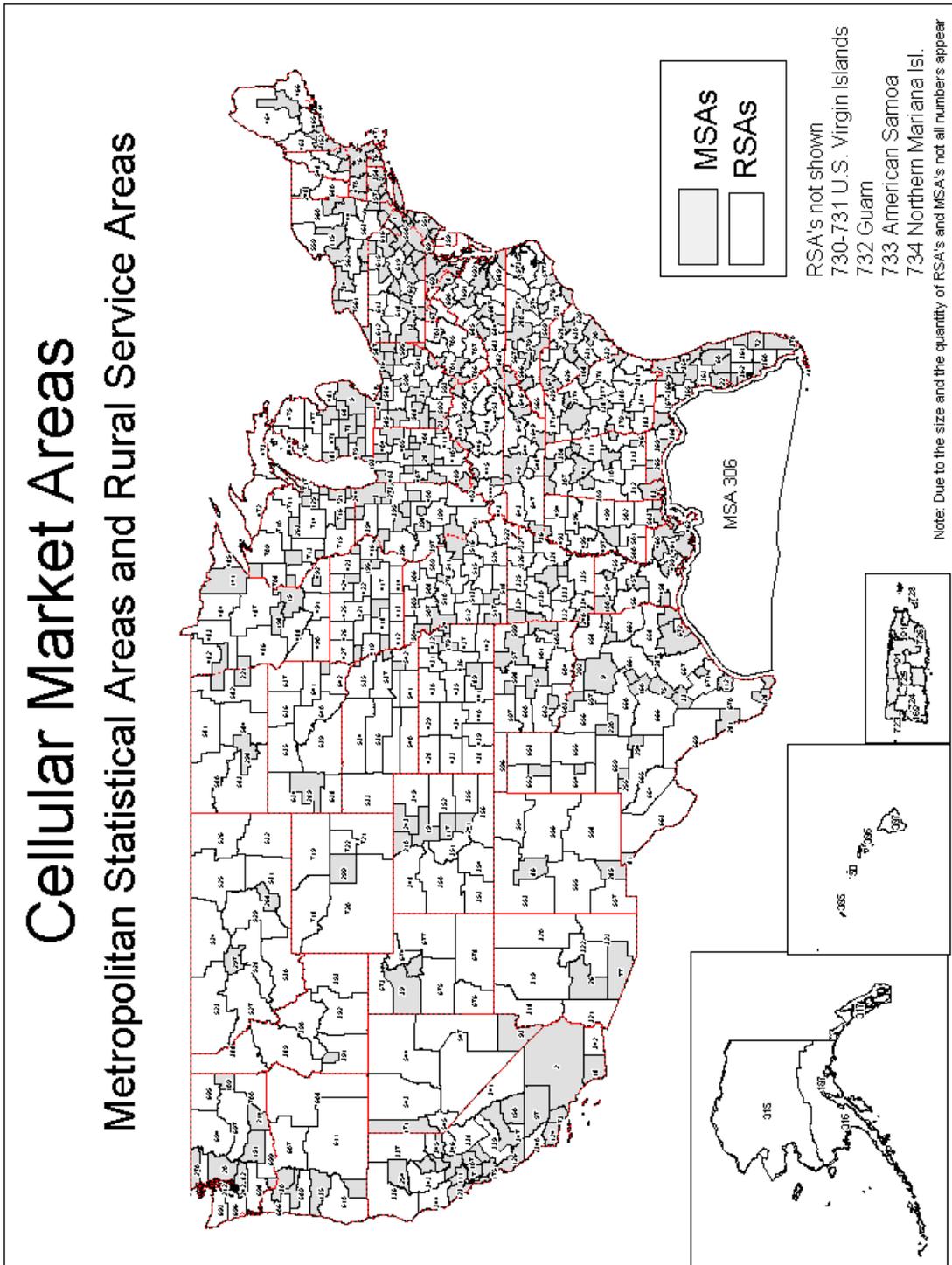


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Association.

MTA-Like areas not shown:  
M25 Puerto Rico & US Virgin Islands  
M48 Alaska  
M50 Guam and Northern Mariana Islands  
M51 American Samoa

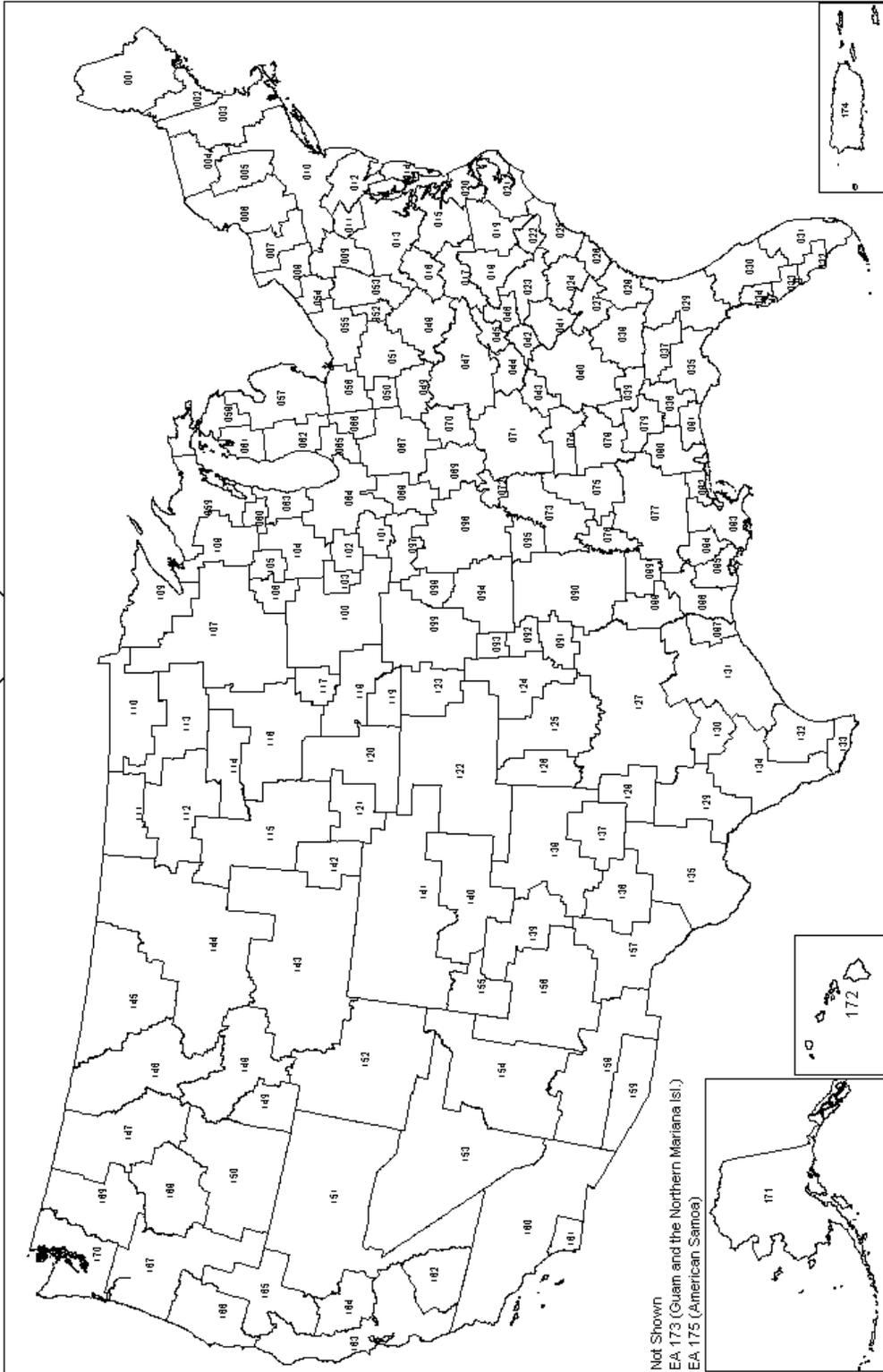


Map B-47



Map B-48

Economic Areas (EAs)

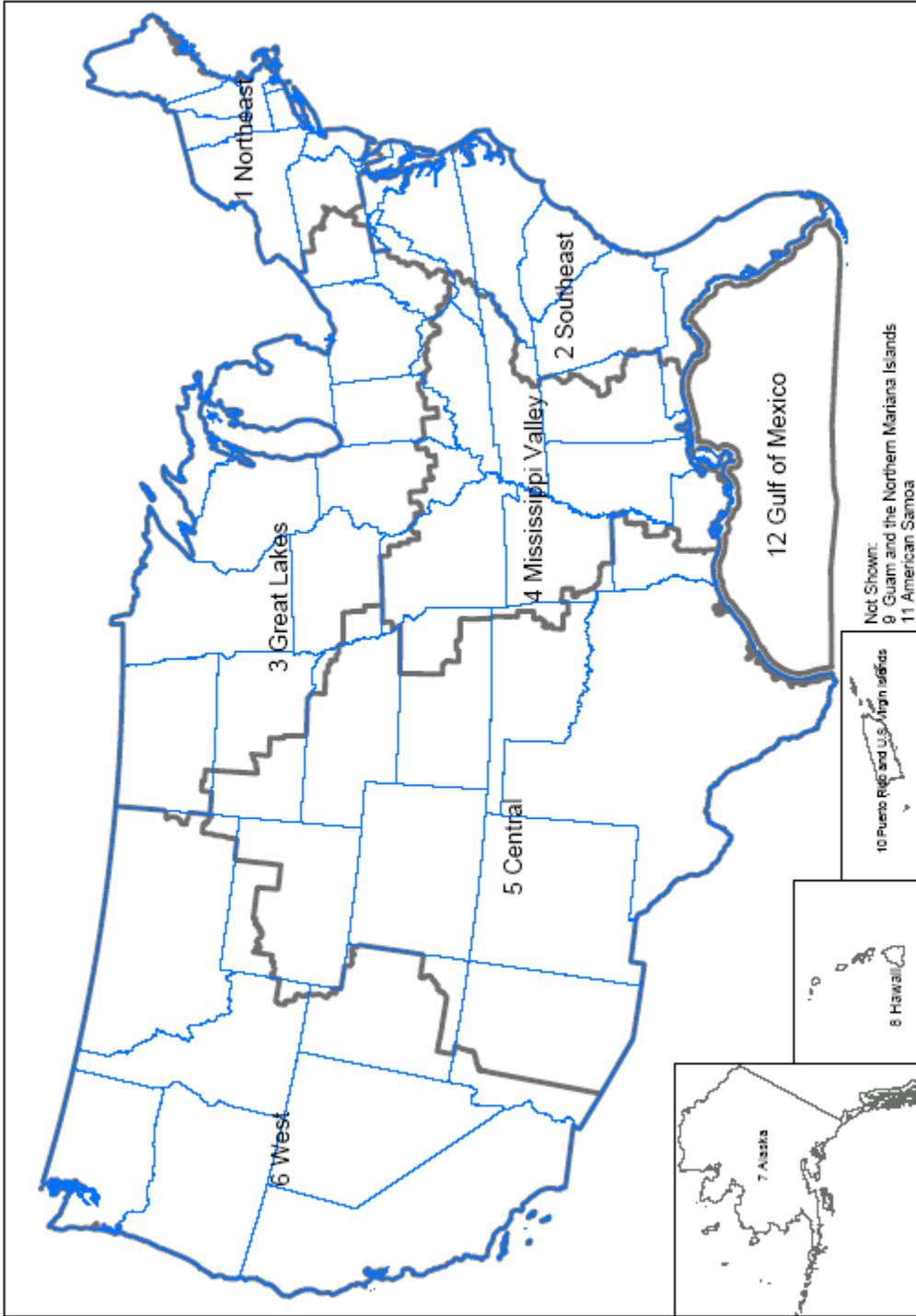


Not Shown  
EA 173 (Guam and the Northern Mariana ISL)  
EA 175 (American Samoa)

EAs delineated by the Regional Economic Analysis Division  
Bureau of Economic Analysis, U.S. Department of Commerce  
January 1995

Map B-49

Regional Economic Area Groupings (REAGs)



**APPENDIX C****List of Commenters**Comments

CTIA – The Wireless Association®

Comnet Wireless, LLC

Mobile Satellite Service Providers

Mobile Satellite Ventures Subsidiary LLC

National Telecommunications Cooperative Association (“NTCA”)

National Tribal Telecommunications Association

Satellite Industry Association

Sprint Nextel Corporation

Russ Ward

Replies to Comments

3G Americas

CTIA – The Wireless Association®

Ericsson Inc.

T-Mobile USA, Inc.

National Emergency Number Association