wireless service has the second-highest amount of advertising spending, after the automobile industry, on Spanish-language advertising during the first three months of 2009. Wireless service providers increased their Spanish-language advertising nearly five percent during this period from $319 million to $335 million.[389]

130. When looking at the advertising expenditures of individual firms, we see a similar picture: wireless and telecom advertising spending is significant, particularly in relationship to other industries,[390] but has been declining in recent years. According to data from TNS, Verizon and AT&T were the second and fourth largest U.S. advertisers during 2008, spending $2.39 billion and $1.98 billion respectively.[391] However, this was a 2.9 percent drop from the total advertising spending of these two companies in 2007.[392] Advertising spending by Verizon and AT&T declined further in 2009. During the first three quarters of that year, Verizon's advertising spending fell 5.8 percent while AT&T's fell 6.1 percent, versus the same period in 2008.[393] On the other hand, during that period, Sprint Nextel rose to become the seventh largest U.S. advertiser, increasing its advertising spending 51 percent over the first three quarters of 2009.[394]

131. According to Forrester, one reason for the slight decline in advertising spending could be that wireless service providers are focusing their advertising efforts less on the mass market and more on niche segments, with the two key segments being: 1) consumers purchasing unlimited, prepaid service, and 2) higher-ARPU consumers purchasing smartphones.[395] Verizon targets its marketing efforts at various customer segments, including young adults, seniors, families, and small and large businesses.[396] Leap also reports that its customer base is segmented; in Leap's case, it is diversified geographically, ethnically, and demographically.[397] Leap reports that it has decentralized its marketing efforts to customize them for local markets.[398]

b. Marketing Campaigns

132. In addition to investing in network infrastructure and acquiring spectrum, mobile wireless

(Continued from previous page)
http://blog.nielsen.com/nielsenwire/consumer/ad-spending-in-u-s-down-11-5-percent-in-first-three-quarters-of-2009/.

[389] *Nielsen Ad Intelligence Spotlight on Multi-Cultural Advertising*, Nielsen, Oct. 2009, *available at* http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/10/MultiCulturalSpotlight10.23.09.pdf, at 3.

[390] *See* AT&T PN Comments at 49.

[391] *TNS Media Intelligence Reports U.S. Advertising Expenditures Declined 4.1 Percent in 2008*, Press Release, TNS Media Intelligence, May 4, 2009, *available at* http://www.tns-mi.com/news/05042009.htm. The advertising expenditures of Verizon and AT&T include those companies' wireline businesses as well.

[392] *Id.*

[393] *TNS Media Intelligence Reports U.S. Advertising Expenditures Declined 14.7 Percent in First Nine Months of 2009*, Press Release, TNS Media Intelligence, Dec. 9, 2009, *available at* http://www.tns-mi.com/news/2009-Ad-Spending-Q3.htm.

[394] *Id.*

[395] Mike Shields, *Calling on Niche Markets*, BRANDWEEK, June 8, 2009 (citing Charles Golvin, principal analyst at Forrester Research, who stated, "There has been a lot of competition around the low end. Companies have been spending to get that message out, that they offer predictability. No hidden fees, no charges sneaking up," and "At the high end, carriers are willing to spend on advertising. ... It's worth it to get those highly profitable users. These are people who are better insulated against tough times and can handle expensive plans.")

[396] Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 7.

[397] Leap Wireless International, Inc., SEC Form 10-K, filed Feb. 27, 2009, at 4.

[398] *Id.*

service providers have pursued marketing strategies designed to highlight their network quality and to differentiate it from rival offerings. 2008 and 2009 saw a shift in the focus of several providers' marketing campaigns from voice quality and reliability to mobile broadband 3G network quality, coverage, speed, and reliability.

133. As discussed in the *Thirteenth Report*, many mobile wireless service providers have highlighted the quality of their networks in various advertising campaigns in recent years, including Verizon Wireless's "Can You Hear Me Now?" advertisements and "America's most reliable wireless network" slogan, AT&T's "fewest dropped calls of any wireless carrier" claim. While certain service providers continue to emphasize network quality in their marketing and branding efforts, in 2009, the focus of these efforts shifted from voice to 3G mobile broadband services. For example, in July 2008, with the launch of the Apple iPhone 3G, AT&T began claiming in its advertisements that it has the nation's fastest 3G network.[399] Verizon Wireless countered this campaign by launching a series of advertisements, beginning in October 2009, comparing its 3G coverage to that of AT&T, parodying the Apple slogan, "There's an app for that," with its own version, "There's a map for that."[400] In addition, Sprint Nextel claims to have "the most reliable 3G network."[401]

c. Retailing

134. Mobile wireless service providers distribute and sell their products and services through a variety of direct and indirect retail channels in order to increase customer growth and reduce customer acquisition costs.[402] The various distribution channels include: 1) direct retail outlets, such as provider-owned stores and kiosks; 2) indirect retail outlets, including mass-market electronics retailers such as Best Buy, Wal-Mart, Target, Costco, Radio Shack, and Amazon; 3) provider websites; and 4) telemarketers.[403] Service providers report that those customers obtained through direct channels tend to be more loyal and generate higher revenue that those obtained through indirect channels. For instance, Verizon Wireless had approximately 2,500 company-owned and operated stores and kiosks as of December 31, 2008,[404] and reports that the customers obtained through these channels are less likely to cancel their service than those

[399] *AT&T Offers Nation's Fastest 3G Network*, Press Release, AT&T, July 10, 2008 (the claims are based on "data compiled by leading independent wireless research firms"). A 12-city test of 3G network speeds conducted by Gizmodo in December 2009 also found that AT&T had the fastest download speeds. See *Our 2009 12-City 3G Data Mega Test: AT&T Won*, GIZMODO, Dec. 22, 2009, *available at* http://gizmodo.com/5428343/our-2009-12+city-3g-data-mega-test-att-won.

[400] *See* Joshua Topolsky, *Verizon Removes Gloves, Begins 'There's a Map for That' Anti-AT&T Ad Campaign*, ENGADGET MOBILE, Oct. 5, 2009, *available at* http://mobile.engadget.com/2009/10/05/verizon-removes-gloves-begins-theres-a-map-for-that-anti-atand/. In the ads, Verizon Wireless claims it has five times the 3G coverage as AT&T.

[401] *Sprint Named Denver's Most Reliable Network in PC World's 3G Comparison Test*, Press Release, Sprint Nextel, July 15, 2009. Similar press releases were issued for seven other cities and can be found at http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-news_newsroom&nyo=1. *See also*, Mark Sullivan, *A Day in the Life of 3G*, PC WORLD, June 28, 2009, *available at* http://www.pcworld.com/article/167391/a_day_in_the_life_of_3g.html.

[402] Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 7; Leap Wireless International, Inc., SEC Form 10-K, filed Feb. 27, 2009, at 6.

[403] Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 7; Sprint Nextel Corp., SEC Form 10-K, filed Feb. 27, at 3; CTIA PN Comments at 33-34. In addition, service providers use direct sales representatives to sell services to business and government customers. *Id.*

[404] Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 7. This included Verizon Wireless's "store-within-a-store" kiosks within Circuit City and BJ's Wholesale Club stores. On February 19, 2009, Verizon Wireless closed all of its Circuit City kiosks following Circuit City's bankruptcy and liquidation of assets. *Id.*

obtained through mass-market channels.[405] In addition, as of December 31, 1008, Leap had 263 company-owned stores and kiosks, which generated 23 percent of the company's net adds in 2008, as well as 2,826 indirect distributor locations.[406] These indirect distributor locations included 1,036 "premier" dealer stores, which are independently owned but usually sell Cricket products exclusively and look and function similar to company-owned stores.[407] Leap reports that the premier stores tend to generate more sales that the other indirect retail outlets.[408] The company also reports that its Internet and telephone sales are growing.[409]

3. Differentiation in Mobile Wireless Handsets/Devices

135. In addition to network quality and advertising, a third component of non-price rivalry among mobile wireless service providers is the differentiation of the downstream products that they offer or that rely on their networks, including handsets/devices, operating systems, and mobile applications. With respect to handsets and devices, providers compete by introducing new handsets/devices, distinguishing their handset/device offerings from those of their competitors, responding to competitors' handset/device innovations with rival offerings, offering certain handset/device models on an exclusive basis, and allowing handsets/devices that they do not sell directly to be used on their networks.[410] The role of smartphone devices – such as the iPhone, Blackberry, Palm, and Android devices – in competition among mobile wireless service providers is discussed in detail below. The emergence of a handful of smartphone operating systems – Apple, Android, BlackBerry, Palm, and Windows Mobile – represents a shift in the mobile wireless ecosystem and one that is affecting the ability of mobile wireless service providers to differentiate themselves based on handsets and devices.

136. *Smartphones*. As discussed in previous reports, the 2007 launch of the iPhone and 2008 launch of the iPhone 3G catalyzed the development of a new type of device in the mobile wireless ecosystem, the smartphone.[411] Over the past two years, wireless service providers, handset manufacturers, and platform developers have introduced an array of smartphones to respond to consumer demand for devices with advanced data capabilities and to compete with and mimic the features of the iPhone.[412] While there is no industry standard definition of a smartphone, for purposes of this *Report*, we consider the distinguishing features of a smartphone to be an HTML browser that allows easy access to the full, open Internet; an operating system that provides a standardized interface and platform for application developers; and a larger screen size than a traditional handset.[413] Many smartphones also have touch screens and/or a QWERTY keypad, and, as discussed below, run an operating system that

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[405] Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 7.

[406] Leap Wireless International, Inc., SEC Form 10-K, filed Feb. 27, 2009, at 6.

[407] *Id.*

[408] *Id.*

[409] *Id.* at 4.

[410] *See* Verizon Wireless PN Comments at 15; AT&T PN Comments at 34, AT&T NOI Comments at 47; TIA NOI Comments at 8.

[411] *See Thirteenth Report*, 24 FCC Rcd at 6264-65, ¶ 165; *Twelfth Report* 23 FCC Rcd at 2315-16, ¶ 177.

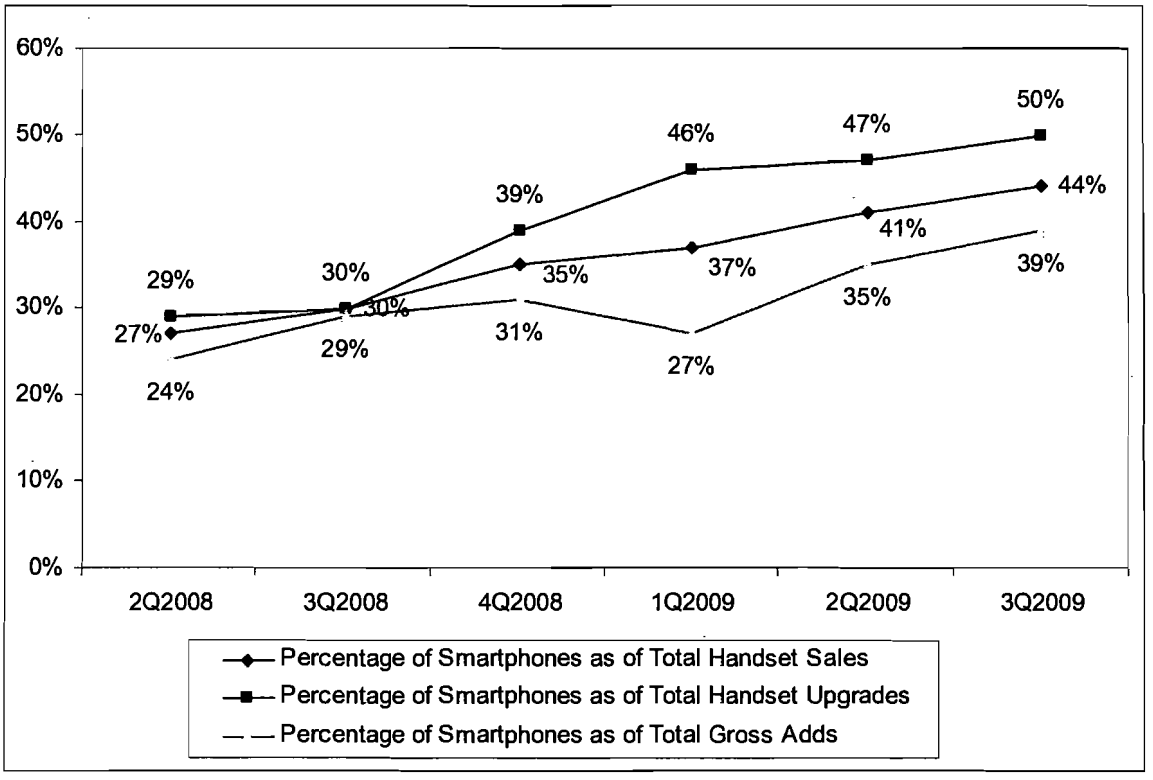
[412] *See* CBW NOI Comments at 3; Bright House Networks NOI Comments at 10.

[413] *See The Mobile Internet Report*, Morgan Stanley, Morgan Stanley Research, Dec. 15, 2009, at 110 (*Morgan Stanley Mobile Internet Report*); Verizon Communications, Inc., SEC Form 10-K, filed Feb. 24, 2009, at 6; Wikipedia, *Smartphone*, http://en.wikipedia.org/wiki/Smartphone (visited Mar. 8, 2010). In addition to smartphones and traditional handsets, the third category of devices, for purposes of this *Report*, is data-centric devices, which includes devices with no inherent voice capability, such as USB wireless modem laptop cards, mobile Wi-Fi devices, and laptops and netbooks with embedded mobile wireless modems. The traditional handset category includes voice-centric handsets that do not allow or are not designed for easy web browsing.

offers a standard platform for application developers to create and sell device software through an application store.

137. Over the past two years, the industry has experienced an increase in smartphone adoption. As shown in Chart 6, smartphones accounted for 44 percent of total handset sales in the third quarter of 2009, up from 27 percent in the second quarter of 2008.[414] CTIA also reports that smartphones represented 23 percent of all U.S. handset sales in the fourth quarter of 2008, up from 12 percent in 2007.[415]

Chart 6
Smartphone Adoption Rates (2Q08-3Q09)[416]



138. AT&T began offering, on an exclusive basis, Apple's iPhone 3G in July 2008. Unlike the first generation iPhone, the iPhone 3G runs on AT&T's faster HSPA network and includes direct access to the Apple App Store, launched at the same time.[417] In June 2009, AT&T began selling the latest iPhone model, the iPhone 3GS.[418] The iPhone 3GS includes a camera, video camera, speaker phone, digital compass, more memory, longer battery life and a new version of the iPhone operating system, OS

[414] *See* Section VII.B.1, Mobile Wireless Handsets/Devices and Operating Systems, *infra*.

[415] CTIA PN Comments at 33. The market shares of the smartphone operating systems in use in the United States in December 2009 are shown in Table 33, *infra*.

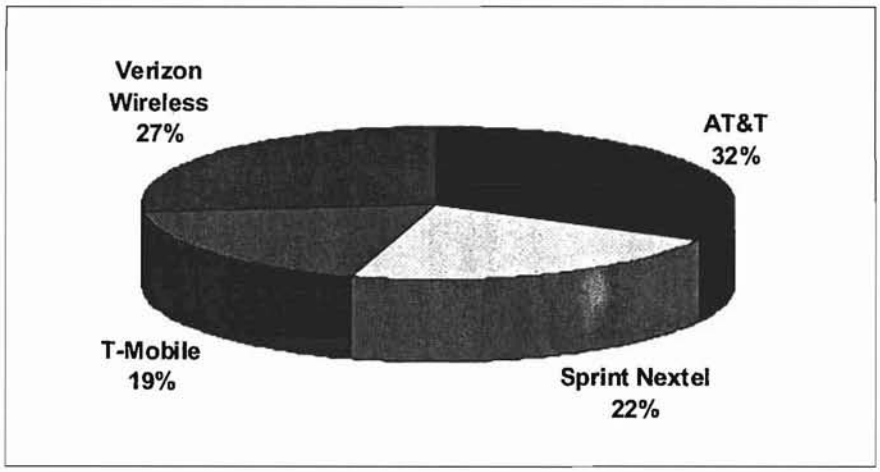
[416] Simon Flannery and Daniel Gaviria, *Survey: Smartphone Adoption Steadily Rising*, Morgan Stanley, Nov. 13, 2009, at 3 (*Smartphone Adoption Steadily Rising*).

[417] *Thirteenth Report*, 24 FCC Rcd at 6265-66, ¶¶ 165-166.

[418] *iPhone 3GS Available at AT&T Tomorrow*, Press Release, AT&T, June 18, 2009.

bandwidth consumption levels, which can strain wireless network capacity.[424]

Chart 8
Share of Smartphone Launches by Four Nationwide Service Providers in 2008-2009[425]



140. Many of the features and capabilities of the smartphones introduced in the past two years – such as touch screens, automatic rotation of images, easy-to-use web browsers, and application stores – can be viewed as an attempt to compete with those features originally introduced on the iPhone. For example, the Motorola DROID automatically rotates images from portrait to landscape and allows users to zoom in on web pages by tapping on the screen. However, several service providers have introduced smartphones that attempt to differentiate themselves based on other functionalities. For example, RIM's BlackBerry devices continue to offer integration with corporate e-mail servers, Palm's devices allow users to multitask among applications and save documents,[426] and Windows Mobile devices have sought to replicate a Windows PC desktop experience on a mobile device.[427] As with the iPhone, a number of these other smartphones were launched subject to exclusive handset arrangements.[428]

141. A notable development in smartphone differentiation in 2008-2009 was the introduction of devices that use Google's Android operating system. As discussed in the *Thirteenth Report,* the first Android device to be made available in the United States was T-Mobile's G1, manufactured by HTC, in October 2008.[429] In 2009, T-Mobile unveiled the Android-based myTouch 3G, myTouch 3G Fender

[424] *Smartphone Adoption Steadily Rising*, at 1, 2.

[425] Based on Table C-5, Appendix C, *infra*.

[426] Steven Levy, *Palm Pre*, WIRED, June 4, 2009, at http://www.wired.com/reviews/product/palmpre; Tom Krazit, *Can a Palm Pre Multitask Better Than an iPhone?*, CNET NEWS, May 6, 2009, at http://news.cnet.com/8301-1035_3-10234043-94.html.

[427] *See Finding Value in Smartphones*, at 25. However, Windows Mobile 7, scheduled to be released later in 2010, will likely include additional features and functionalities, such as a touchscreen system with highly simplified menus, music syncing, and application support. David Liu, *Can Windows 7 Mobile Compete in an iPhone World?*, INFORMATIONWEEK SMB, Mar. 31, 2010, *available at* http://bmighty.informationweek.com/mobile/showArticle.jhtml?articleID=224200868.

[428] *See infra* Appendix C, Table C-5.

[429] *See Thirteenth Report*, 24 FCC Rcd at 6269, ¶ 174.

Limited Edition, Samsung Behold II, and Motorola CLIQ with MOTOBLUR,[430] while Sprint Nextel launched the HTC Hero and Samsung Moment.[431] In late 2009, Verizon Wireless began offering two Android devices: the HTC DROID Eris and Motorola DROID.[432] And in January 2010, Google began selling its own version of an Android-based smartphone, the Nexus One, directly to end users as a reseller of wireless network services.

142. Like Apple, Google has been aiming to create an entire ecosystem of applications and services around its Android operating system.[433] As of December 2009, the Android Market had 15,000 applications and 40 million downloads in 14 months, versus Apple App Store's 100,000 applications and over 2 billion downloads in 17 months.[434] Android is made available free of charge to handset manufacturers and wireless service providers, and is available on multiple devices and multiple service providers.[435] Android is also an open source platform; the launch of applications and content by third-party developers through the Android Market application store requires no approval by either Google or the wireless service provider.[436] In addition, Android combines and supports Google's web-based applications, including its search engine, Gmail e-mail product, web browser, and mapping application, all of which come pre-loaded on Android devices.[437] According to analysts, the Android operating system – because of the characteristics described above – is likely to compete more effectively with the Apple iPhone than handset manufacturers and mobile wireless service providers acting alone.[438]

143. As mobile operating systems and the functionalities they enable play a more prominent role in a consumer's mobile wireless experience, consumers are showing an increasing loyalty to particular operating systems or device platforms. In cases where a particular mobile operating system is developed by a device manufacturer or vendor and available only on the devices produced by (or under contract for) that manufacturer or vendor, as with the Apple iPhone, a service provider can respond to demand for this consumer experience by making an arrangement with the manufacturer to be the exclusive network provider for those devices. AT&T's arrangement to be the exclusive service provider

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[430] *T-Mobile myTouch 3G with Google Now Available for Pre-Sale for Current T-Mobile Customers*, Press Release, T-Mobile, July 8, 2009; *T-Mobile Unveils Holiday Handsets Including Broadest Selection of Android-Powered Devices*, Press Release, T-Mobile, Oct. 7, 2009.

[431] *Samsung's First Android-Powered Phone, Samsung Moment with Google, Coming to America's Most Dependable 3G Network*, Press Release, Sprint Nextel, Oct. 7, 2009; *The Innovation and Openness of a True Mobile Internet Experience Coming Soon to America's Most Dependable 3G Network from Sprint on HTC Hero with Google*, Press Release, Sprint Nextel, Sept. 3, 2009; Sprint Nextel NOI Comments at 14..

[432] *Bring an Android Device Home for the Holidays with DROID ERIS by HTC, Exclusively from Verizon Wireless*, Press Release, Verizon Wireless, Nov. 5, 2009; *Hello Humans: Droid by Motorola Arrives Next Week*, Press Release, Verizon Wireless, Oct. 28, 2009. AT&T has announced plans to begin selling five Android devices during the first half of 2010. *AT&T Announces Major Initiative to Bring 'Apps to All' Company Also Plans to Launch Five Android-Based Devices in First Half of 2010*, Press Release, AT&T, Jan. 6, 2010.

[433] *See Finding Value in Smartphones*, at 9.

[434] *Morgan Stanley Mobile Internet Report*, at 157.

[435] *See Thirteenth Report*, 24 FCC Rcd at 6269, ¶ 172; *Morgan Stanley Mobile Internet Report*, at 158. Wireless service providers are able to customize elements of the platform to promote their own services and content. *Thirteenth Report*, 24 FCC Rcd at 6269, ¶ 172. While it makes the operating system available for free, Google has focused on bringing in revenue through advertising and monetizing user usage information.

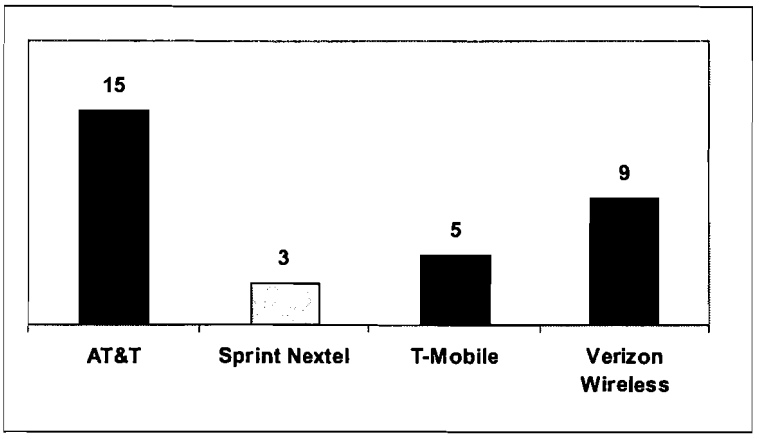
[436] *Morgan Stanley Mobile Internet Report*, at 156. Customers are still subject to the terms and conditions of their contracts with wireless service providers.

[437] *Thirteenth Report*, 24 FCC Rcd at 6269, ¶ 172; *Morgan Stanley Mobile Internet Report*, at 155; *Finding Value in Smartphones*, at 9-10.

[438] *See Finding Value in Smartphones*, at 9-10; *Morgan Stanley Mobile Internet Report*, at 159.

for the Apple iPhone is the most notable example of such conduct. Of the 67 selected smartphone launches in 2008-2009, shown in Table C-5 in Appendix C, 32, including some of the most popular (*e.g.*, Apple iPhone, Motorola DROID, Palm Pre), were launched on an exclusive basis from one of the four largest service providers, nearly half of which were by AT&T (see Chart 9).

Chart 9
Exclusive Smartphone Launches by Four Nationwide Service Providers in 2008-2009[439]



144. In some cases, service providers offer a device exclusively, yet the operating system on that device is available on other devices available from other operators. For example, the Android-based Motorola DROID is offered exclusively from Verizon Wireless, yet several other Android devices are available from T-Mobile and Sprint Nextel. In addition, with the RIM Blackberry devices, the operating system and device are bundled and made by the same company, yet several different BlackBerry device models are available from a range of service providers. In cases where a popular platform is not offered exclusively but is available from multiple providers, operators may focus on differentiating the features of a particular device, which the provider does offer exclusively, from the other devices with the same OS.[440]

145. *Data-Only Devices.* In addition to launching new smartphone devices during 2008 and 2009, several service providers began offering a range of new devices to facilitate mobile broadband access on computers, including netbook computers with embedded modems, wireless data cards, and mobile Wi-Fi hotspots.[441] AT&T, Verizon Wireless, and Sprint Nextel began offering netbook computers with embedded mobile broadband modems during 2009.[442] The netbooks have typically been offered at a slightly lower upfront price than when purchased through an electronics retailer, but with the requirement that the customer purchase a $39.99-per-month or $59.99-per-month mobile broadband access plan with a two-year contract.[443] In addition to netbooks, certain service providers began offering mobile Wi-Fi, or

[439] Based on Table C-5, Appendix C, *infra.*

[440] Service providers may also focus on competing based on other factors, as described above: price, coverage, and network quality. *See* Sections IV.A, Price Rivalry: Developments in Mobile Service Pricing Plans and IV.B.1, Network Coverage and Technology Upgrades, *supra. See also* Niraj Sheth, *AT&T Prepares Network for Battle*, WALL STREET JOURNAL, Mar. 31, 2010, at B1.

[441] *See* Section V.A, Subscribership Levels, *infra*, for data on the number of mobile wireless subscribers by device type.

[442] *AT&T to Offer New Suite of Mobile Broadband Netbooks Online and in Stores Nationwide*, Press Release, AT&T, July 20, 2009; *Stay Connected in More Places with Wireless Access on PC Cards, Mifi, Netbooks and More from Verizon Wireless*, Press Release, Verizon Wireless, May 14, 2009.

[443] Marguerite Reardon, *Sprint Sells Netbooks for a Buck*, CNET NEWS, July 7, 2009, *available at* http://news.cnet.com/8301-1035_3-10280886-94.html. Sprint Nextel and Best Buy sold the HP Mini for 99 cents as a promotion in July 2009, while the same netbook was offered through Verizon Wireless and AT&T for $199. In all (continued....)

"Mi-Fi," devices during 2009, which are credit card-sized, mobile Wi-Fi routers with mobile broadband wide-area connections that allow up to five Wi-Fi-enabled devices in short range to connect to the Internet via a Wi-Fi connection. Finally, most of the major mobile wireless service providers offer wireless data cards that can be attached to a desktop, laptop, or netbook computer through a USB port and provide mobile broadband connectivity for the computer.

146. In addition, certain mobile wireless service operators provide data connections for electronic reading devices.[444] These devices, including the Amazon Kindle, are some of the most popular third-party, data-only devices used by U.S. consumers. Estimates of the number of Kindles sold as of January 2010 range from 2.5 million to 3 million.[445] Data access for the Kindle was originally provided by Sprint Nextel. However, in October 2009, Amazon switched to AT&T as the data connection provider for the Kindle 2.[446]

147. *Machine-to-Machine (M2M) Devices.* Related to service providers' launch of data-only devices are their efforts to differentiate themselves by opening their networks to outside devices that they do not brand or sell directly. In 2008 and 2009, several mobile wireless service providers launched initiatives that create a streamlined process for data-only mobile computing and M2M devices to be certified for use on their networks. For instance, in July 2009, Sprint Nextel announced that it had certified 300 third-party mobile computing and machine-to-machine devices for use on its network through its Open Device Initiative.[447] In addition, as noted in the *Thirteenth Report*, Verizon Wireless began its Open Development Initiative in 2008 following its 2007 announcement to open its network to a wider array of devices and applications.[448] The first third-party device was certified in July 2008, and several other devices have since been certified for use on the network and made commercially available, including data-only, M2M, and telemetry devices, as well as traditional handsets.[449] In April 2009, Verizon Wireless released the initial set of technical specifications for devices seeking certification on the

(Continued from previous page)
cases, the service providers required the purchase of a two-year service contract. The non-bundled price for the netbook at that time was $389.99 from Best Buy. *Id.*

[444] *See* CTIA NOI Comments at 21-22.

[445] Douglas MacMillan, *Amazon CEO: "Millions" of Kindles Sold*, The Tech Beat, BUSINESSWEEK, Jan. 28, 2010, *available at* http://www.businessweek.com/the_thread/techbeat/archives/2010/01/amazon_ceo_mill.html.

[446] Priya Ganapati, Gadget Lab – *Amazon Dumps Sprint for Kindle 2, Embraces AT&T*, WIRED, Oct. 23, 2009, *available at* http://www.wired.com/gadgetlab/2009/10/sprint-kindle-att/. Analysts believe Amazon switched to AT&T because AT&T's network uses the same technology standard (GSM/WCDMA) used in many other countries, and the per-unit equipment costs for Amazon are lower if the company can produce a single Kindle model that can be sold in multiple countries. *Id* (citing Forrester Research analyst, Charles Golvin).

[447] *Sprint Certifies 300th Embedded Device on the Now Network*, Press Release, Sprint Nextel, July 23, 2009; Sprint Nextel NOI Comments at 13-14.

[448] *See Thirteenth Report*, 24 FCC Rcd at 6267, ¶ 168.

[449] *Verizon Open Network Gets First, Unsexy Device*, Press Release, Verizon Wireless, July 16, 2008. The device was a modem that connects to a sensor that dips into large storage containers, such as diesel tanks at construction sites. *See* Verizon Wireless, *Open Development – Latest News Headlines*, https://www22.verizon.com/opendev/media_room.aspx (visited Feb. 19, 2010). Verizon Wireless also has certified three labs for the testing of third party devices. *Id; A Look Back at 2008: Open Development at Verizon Wireless*, Press Release, Verizon Wireless, Jan. 5, 2009; Rajani Baburajan, *Verizon Wireless Approves Intertek as the Testing Lab for Open Development Initiative*, TMCNET.COM, Oct. 22, 2008, *available at* http://www.astricon.net/topics/broadband-mobile/articles/43611-verizon-wireless-approves-intertek-as-testing-lab-open.htm. Some of the devices certified include tablet PCs, routers, SmartGrid equipment, Mobile Clinical Assistants, and the Jitterbug phone. *See* Verizon Wireless, *Open Development – Latest News Headlines*, https://www22.verizon.com/opendev/media_room.aspx (visited Feb. 19, 2010).

company's LTE network to be deployed using 700 MHz Band spectrum,[450] and in October 2009, the company opened its LTE Innovation Center lab for the design and testing of products – such as consumer electronics, appliances, healthcare devices, and telematics – that would rely on the LTE network for data connections.[451] While service providers have undertaken programs to allow third-party devices to be used on their networks,[452] M2M devices still account for a relatively small percentage of all mobile wireless devices. According to one analyst, 4.3 percent of all mobile network connections in the United States were used for M2M communications at the end of 2009.[453]

4. Differentiation in Mobile Data Applications

148. As mentioned above, one way mobile wireless service providers compete is by differentiating from their rivals the applications that they provide and allow on their networks.[454] Service providers offer applications both directly and indirectly to mobile customers: directly by having applications pre-loaded on the devices they sell or through provider-branded, "walled garden" mobile platforms, and indirectly by allowing applications to be downloaded via web browsers or application stores.[455] In recent years, there has been a shift from the former to the latter within the mobile wireless ecosystem.[456] The ability to access a wider variety of applications and content and to browse the web more openly has become increasing popular with consumers. Recognizing and capitalizing on this trend, service providers have made their networks more open to third-party applications and have begun selling devices, smartphones in particular, that allow easier web browsing and the downloading of applications through web browsers and applications stores.[457]

149. Many of the open network initiatives launched by service providers, described above,[458] extend to applications as well as devices, and several mobile service providers have launched websites, testing labs, developer conferences, and other initiatives or efforts designed to assist application developers in creating products for the devices and platforms that run on their networks.[459] In addition to Verizon Wireless's LTE Innovation Center described above,[460] AT&T has created a Developer Program

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[450] *Verizon Wireless Drives 4G LTE Innovation with Open Device Development Specifications*, Press Release, Verizon Wireless, Apr. 17, 2009.

[451] *Developers: The Verizon Wireless LTE Innovation Center Lab Opens*, Press Release, Verizon Wireless, Oct. 5, 2009.

[452] *See* CTIA NOI Comments at 55-56.

[453] *Berg Insight Says Machines Account for 1.4 Percent of Mobile Network Connections Worldwide*, Press Release, Berg Insight, Dec. 14, 2009.

[454] Applications can be narrowly defined as a software program that runs on a mobile device, or more broadly defined as any functionality on a mobile device, such as text messaging, voice, etc. *Morgan Stanley Mobile Internet Report*, at 134.

[455] CTIA NOI Comments at 28.

[456] *Morgan Stanley Mobile Internet Report*, at 5, 185, 214-215.

[457] *See* Mercatus NOI Comments at 17. Mobile wireless service providers often require that customers comply with terms and conditions of service, and may approve or reject certain applications developed by third-party application developers for certain devices or operating systems.

[458] *See* Section IV.B.3, Differentiation in Mobile Wireless Handsets/Devices, *infra*.

[459] Sprint Nextel NOI Comments at 13; CTIA NOI Comments at 56.

[460] The LTE Innovation Center lab and online portal are designed to facilitate the creation of non-traditional devices, as well as applications for those devices. Verizon Wireless, *LTE Innovation Center – Frequently Asked Questions*, https://www.lte.vzw.com/NewsResources/FrequentlyAskedQuestions/tabid/5780/Default.aspx#LTETIT1 (visited Feb. 21, 2010); *Developers: the Verizon Wireless LTE Innovation Center Lab Opens*, Press Release, Verizon Wireless, Oct. 5, 2009. As stated in the *Thirteenth Report*, Verizon Wireless is the licensee for the 700 MHz Upper (continued....)

to assist application developers in getting their products to market.[461] In addition, in December 2008, Sprint Nextel launched an open software platform designed to extend desktop computing and "Web 2.0" capabilities to mobile devices operating on its mobile broadband network, and has been hosting annual developer conferences.[462]

150. The emergence of web-friendly smartphones and a handful of smartphone operating systems with application stores have influenced the ability of mobile wireless service providers to differentiate themselves based on mobile applications. Competing less on the basis of exclusive content or applications available from a provider-branded platform or walled garden, operators instead are competing to a greater extent on, among other factors, the devices they sell and the types and quantity of applications that can be easily accessed on those devices via the web or application stores.[463] According to CTIA, application stores allow consumers to have a direct role in the functionality of their handsets and devices.[464]

151. Many service providers have imposed certain restrictions on the types of mobile applications that consumers can access on their networks. For example, AT&T prohibits, as part of the terms and conditions of its wireless data service plans, the downloading of movies using peer-to-peer file sharing services because such applications can cause extreme network capacity issues and interference with the network.[465] In addition, Verizon Wireless states that the downloading of applications with its data plans is subject to certain terms related to protecting the network and maintaining the quality of service to all users. However, in recent months, providers have announced that certain high-bandwidth, and in some cases previously-prohibited, applications could be used on their networks. For example, AT&T reported in August 2009 that Apple had agreed not to allow the iPhone to use AT&T's 3G network for VoIP calling without first obtaining AT&T's consent.[466] However, in October 2009, AT&T reversed this decision and announced that it would allow iPhone customers to make VoIP calls on its 3G network.[467] AT&T also announced, in February 2010, that its mobile broadband network would support the video streaming application, SlingPlayer Mobile.[468] In February 2010, Verizon Wireless announced that all of its smartphone customers with a data plan would be able to use their device for unlimited Skype

(Continued from previous page)
C Block license and is therefore required to allow third-party application developers to develop applications of their choosing for networks in that band. *Thirteenth Report*, 24 FCC Rcd at 6267, ¶ 169

[461] AT&T, *Why AT&T Developer Program?*, http://developer.att.com/developer/index.jsp?page=why (visited Feb. 21, 2010).

[462] *Sprint Launches Open Software Platform at Eighth Annual Application Developer Conference to Help Millions More Developers Create Products for Sprint Customers*, Press Release, Sprint Nextel, Dec. 9, 2008. In October 2009, Sprint outlined the tenets of its open approach: let consumers determine application winners, be easy to do business with, create a developer's "garage," use the proven open Internet model as a guide, and open networks still require management. *Sprint Outlines "Open" Approach at Ninth Annual Developer Conference*, Press Release, Sprint Nextel, Oct. 27, 2009.

[463] *See* T-Mobile NOI Comments at 15; Verizon Wireless NOI Comments at 127-132; Mercatus NOI Comments at 17.

[464] CTIA NOI Comments at 57.

[465] AT&T, *Wireless Data Service Terms and Conditions*, http://www.wireless.att.com/cell-phone-service/legal/plan-terms.jsp (visited Apr. 9, 2010).

[466] Letter from James W. Cicconi, Senior Executive Vice President – External and Legal Affairs, AT&T, to Ruth Milkman, Chief, Wireless Telecommunications Bureau, FCC, R-11361, RM-11497 (filed Aug. 21, 2009), at 6.

[467] *AT&T Extends VoIP to 3G Network for iPhone*, Press Release, AT&T, Oct. 6, 2009.

[468] *AT&T and Sling Media Collaborate on SlingPlayer Mobile App for 3G Mobile Broadband Network*, Press Release, AT&T, Feb. 4, 2010.

VoIP calling.[469]

152. Even in cases where service providers have taken steps to open their networks to a wider array of third-party applications, mobile operating system/platform developers may control consumer access to applications, particularly those available through their application stores. We note that the issues of consumer access to applications and content via mobile wireless Internet access and the application of nondiscrimination principles to mobile wireless broadband providers are the subject of another Commission proceeding.[470]

[469] *Verizon Wireless and Skype Join Forces to Create a Global Mobile Calling Community*, Press Release, Verizon Wireless, Feb. 16, 2010.

[470] Preserving the Open Internet, Broadband Industry Practices, GN Docket No. 09-191, WC Docket No. 07-52, *Notice of Proposed Rulemaking*, 24 FCC Rcd 13064 (2009).

V. MOBILE WIRELESS SERVICES: PERFORMANCE

153. 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. To determine if the market is producing these kinds of positive outcomes, 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.

154. As in previous reports, the market performance section of this *Report* tracks the pricing of mobile wireless services using various pricing measures or proxies, including RPM and average revenue per message. In addition, the market performance section of this *Report* supplements the analysis of pricing trends with an analysis of measures of subscribership, net adds, output/usage, revenue, profitability, and the economic impact of mobile wireless service. The analysis of revenue decomposes total service revenue into three segments: voice, messaging, and other data service revenue. The analysis of profitability uses measures of profitability that account for cost data that are not reflected in pricing and revenue data.

A. Subscribership Levels

155. Mobile wireless subscribership can be measured and segmented in various ways, including by type of service and device, by type of pricing plan, by age, and by geographic area. In looking at the number of subscribers using any type of mobile wireless device, we find that mobile wireless subscribership increased six percent in 2008 to 277.6 million subscribers, which translates into a nationwide penetration rates of 90 percent. Other sources indicate that there were 25 million subscribers to mobile high-speed services (Internet access at speeds over 200 kbps in at least one direction) and 86 million mobile high-speed devices in service in the United States at the end of 2008. Prepaid and wholesale subscribers as a percentage of all mobile wireless subscribers increased slightly in 2008 from 19.1 percent to 20.2 percent, and increased further in 2009 to 21.5 percent as of mid-2009. Mobile wireless penetration rates are high among nearly every age group in United States, but are highest among young adults (96 percent) and lowest among adults over 65 (89 percent). Finally, we have analyzed sub-national mobile wireless subscribership by estimating penetration rates by EAs. EA penetration rates range from a low of 68 percent in the La Crosse, WI-MN EA to a high of over 100 percent in six EAs.[471]

1. Mobile Wireless Subscribers by Type of Service

156. Mobile wireless subscribership increased in 2008. According to the year-end 2008 NRUF data, we estimate that there were 277.6 million mobile wireless subscribers at the end of 2008,[472] which translates into a nationwide penetration rate of 90 percent.[473] This addition of 14.6 million subscribers from 263 million at the end of 2007 represents a 5.6 percent growth in the number of subscribers during 2008. Between 2005 and 2008, mobile wireless service subscribership has increased over 30 percent. We estimate the number of mobile wireless subscribers using NRUF data. NRUF tracks the number of phone numbers that have been assigned to mobile wireless devices and therefore serves as

[471] *See* Section V.B, Penetration Rates Across Economic Areas (EAs), *infra.*

[472] Commission estimate, based on preliminary year-end 2008 NRUF filings, adjusted for porting.

[473] The nationwide penetration rate is calculated by dividing total mobile wireless 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, 2008 was estimated to be 308.3 million. *See* U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2009*, http://www.census.gov/popest/states/tables/NST-EST2009-01.xls (visited Feb. 24, 2010).

a proxy for mobile wireless subscribers.[474] With the increase in the use of mobile wireless devices – particularly the number of non-voice devices, such as access devices (*e.g.*, wireless modem cards, mobile broadband-enabled laptops and netbooks, and mobile Wi-Fi hotspots), e-readers such as the Kindle, and telematics systems such as OnStar – many consumers have more than one mobile wireless device with a phone number assigned to it.[475] Therefore, the mobile wireless penetration rate is overstated in terms of the number of individuals that have at least one mobile wireless device. It is possible for the maximum national penetration rate to exceed 100 percent, and, indeed, it does currently exceed 100 percent in certain EAs, as discussed below.[476] The value of the calculated wireless penetration rate as a measure of subscribership lies more in the change observed from year to year, rather than the absolute value.

Table 14
NRUF and CTIA - Estimated Mobile Wireless Subscribers[477]

	NRUF			CTIA
	Subscribers (millions)	*Increase from previous year (millions)*	*Penetration Rate*	*Subscribers (millions)*
2001	128.5	n/a	45 %	128.4
2002	141.8	13.3	49 %	140.8
2003	160.6	18.8	54 %	158.7
2004	184.7	24.1	62 %	182.1
2005	213.0	28.3	71 %	207.9
2006	241.8	28.8	80 %	233.0
2007	263.0	21.2	86 %	255.4
2008	277.6	14.6	90 %	270.3

157. CTIA reported similar growth in mobile wireless subscribership during 2008.[478] CTIA's estimate for year-end 2008 was 270.3 million subscribers, a 5.8 percent increase over its estimate of 255.3

[474] In NRUF, carriers do not report numbers that have been ported to them. Therefore, in order to develop an estimate of mobile wireless subscribership, it is necessary to adjust the raw NRUF data to account for mobile wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting databases managed by Neustar, acting as the administrator of the regional Number Portability Administration Centers (NPACs). The databases contain all ported numbers currently in service. They also contain 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.

[475] *See* Section III.A, Introduction, *supra*.

[476] *See* Section V.B, Penetration Rates Across Economic Areas (EAs), *infra*.

[477] Commission estimates based on NRUF data. Robert F. Roche and Lesley O'Neill, *CTIA's Wireless Industry Indices, Semi-Annual Data Survey Results: A Comprehensive Report from CTIA Analyzing the U.S. Wireless Industry, Year-End 2008 Results*, May 2009, at 26-27 (*CTIA Year-End 2008 Wireless Indices Report*). *See also*, CTIA PN Comments at 42.

[478] While the Commission now uses NRUF data as the basis for its estimate of mobile wireless subscribership for the purposes of this *Report*, we continue to report the CTIA data as a benchmark for comparison because these figures are readily available and are used widely by industry analysts. A detailed explanation of the differences between the NRUF data and CTIA's survey can be found in the *Seventh Report*, 17 FCC Rcd at 13004.

million subscribers as of year-end 2007.[479] According to CTIA, since the end of 2005, mobile wireless subscribers increased by approximately 30 percent.[480]

158. The Commission's Form 477 data collection provides data on both the number of mobile wireless high-speed Internet access subscribers and the number of mobile high-speed-capable devices (those capable of sending or receiving information at speeds greater than 200 kbps in at least one direction) in service on a nationwide and state-by-state basis.[481] Under the Commission's revised Form 477 data collection adopted in 2008, terrestrial mobile wireless providers are required to report, on a state-by-state basis and by speed tier, their number of subscribers whose device and subscription permit them to access the lawful Internet content of their choice at data rates exceeding 200 kbps in at least one direction.[482] In addition, mobile broadband providers report, on a state-by-state basis, their number of devices in service that are capable of sending or receiving information at speeds greater than 200 kbps in at least one direction, regardless of whether the user subscribes to a mobile Internet access plan.[483] As of the end of 2008, the Commission reported that there were about 25 million mobile wireless high-speed Internet access service subscribers and 86 million mobile high-speed capable devices in service in the United States (see Chart 10).[484] Because reporting practices previously varied among providers to a largely unknown degree, neither of the December 2008 figures is directly comparable to mobile wireless high-speed connections reported for earlier dates.

[479] *See* Appendix A, Table A-1, *infra*.

[480] *Id.*

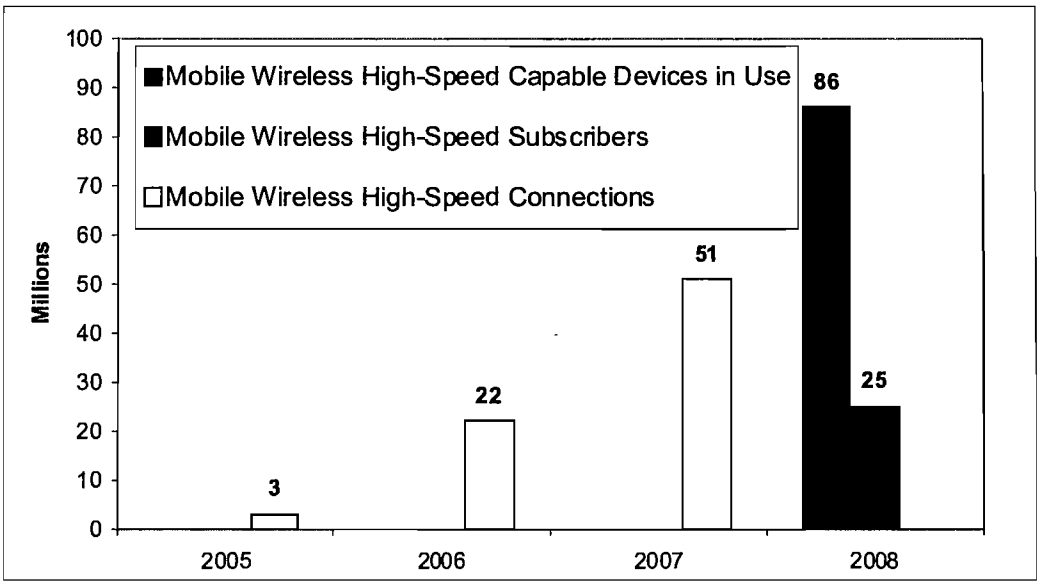
[481] *See* Table C-6, Appendix C, *infra*.

[482] Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership, WC Docket No. 07-38, *Report and Order and Further Notice of Proposed Rulemaking*, 23 FCC Rcd 9691, 9700, ¶ 20 (2008) (*Broadband Data Order*).

[483] *Broadband Data Order*, 23 FCC Rcd at 9703, ¶ 23. In addition, mobile wireless broadband providers are required to report the percentage of the total subscribers in each state that are residential (not billed to a corporate, business, government, or institutional account). *Broadband Data Order*, 23 FCC Rcd at 9703 ¶ 24. Terrestrial mobile wireless providers are not required to submit their number of mobile high-speed Internet access subscribers broken down on a Census Tract basis, as other broadband providers are required to do. *Broadband Data Order*, 23 FCC Rcd at 9698, ¶ 16. We note that the Form 477 mobile wireless broadband subscriber data do not capture those mobile data users who access the mobile Internet on a casual or *a la carte* basis but do not have a monthly or longer-term subscription to a mobile wireless Internet access service.

[484] For the year-end 2007 and prior reporting periods, mobile wireless broadband providers were instructed to report only "the number of subscribers whose mobile device was capable of sending or receiving data at speeds above 200 kbps," and not whether their subscriptions permitted broadband Internet access. *High-Speed Services for Internet Access: Status as of December 31, 2008*, Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, Feb. 2010, at 3, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296239A1.pdf.

Chart 10
Mobile Wireless High-Speed Subscribers and Devices in Use[485]



159. In addition to the Form 477 data on mobile high-speed Internet access subscribership, CTIA estimates that, at the end of 2008, there were 228 million data-capable handsets in service, 227 million SMS-capable handsets, 203 million web-enabled handsets, and 7.2 million wireless laptops/aircards (see Chart 11).[486] In 2009, CTIA began reporting data on the number of smartphones in use and reported that, as of June 30, 2009, there were 40.7 million smartphones in service.[487] According to a survey from ChangeWave Research, an estimated 42 percent of U.S. consumers owned a smartphone in December 2009, up from 32 percent in December 2008 and 21 percent in October 2007 (see Chart 12).

[485] Commission estimates based on Form 477 data.

[486] *CTIA Year-End 2008 Wireless Indices Report*; CTIA PN Comments at 48.

[487] *CTIA Mid-Year 2009 Wireless Indices Report.*

Chart 11
Mobile Wireless Subscriber Metrics by Source

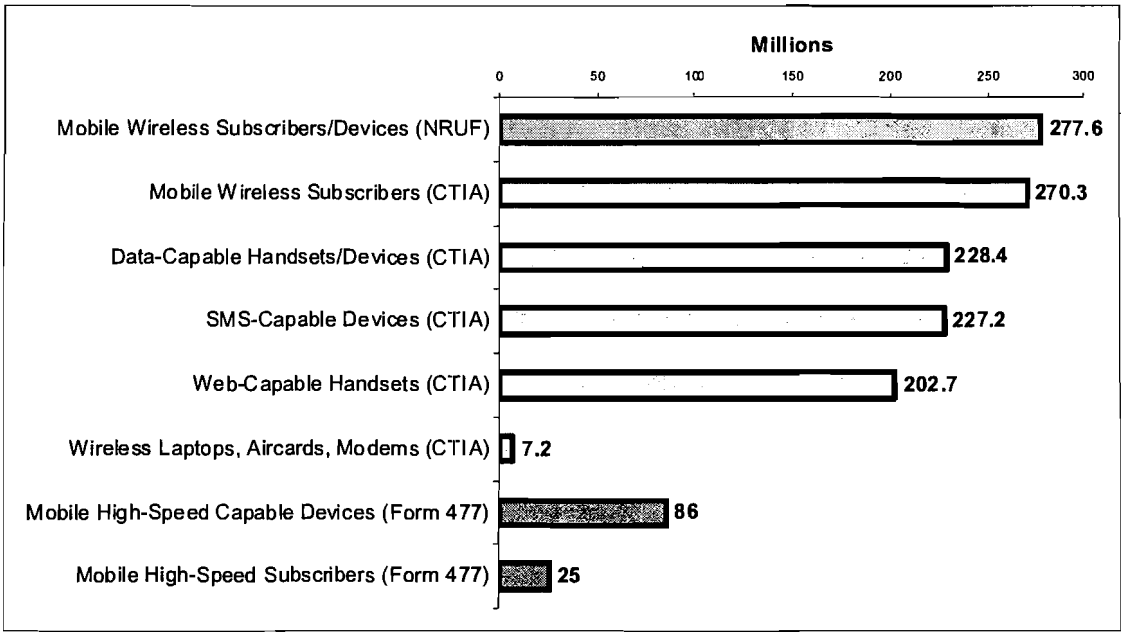
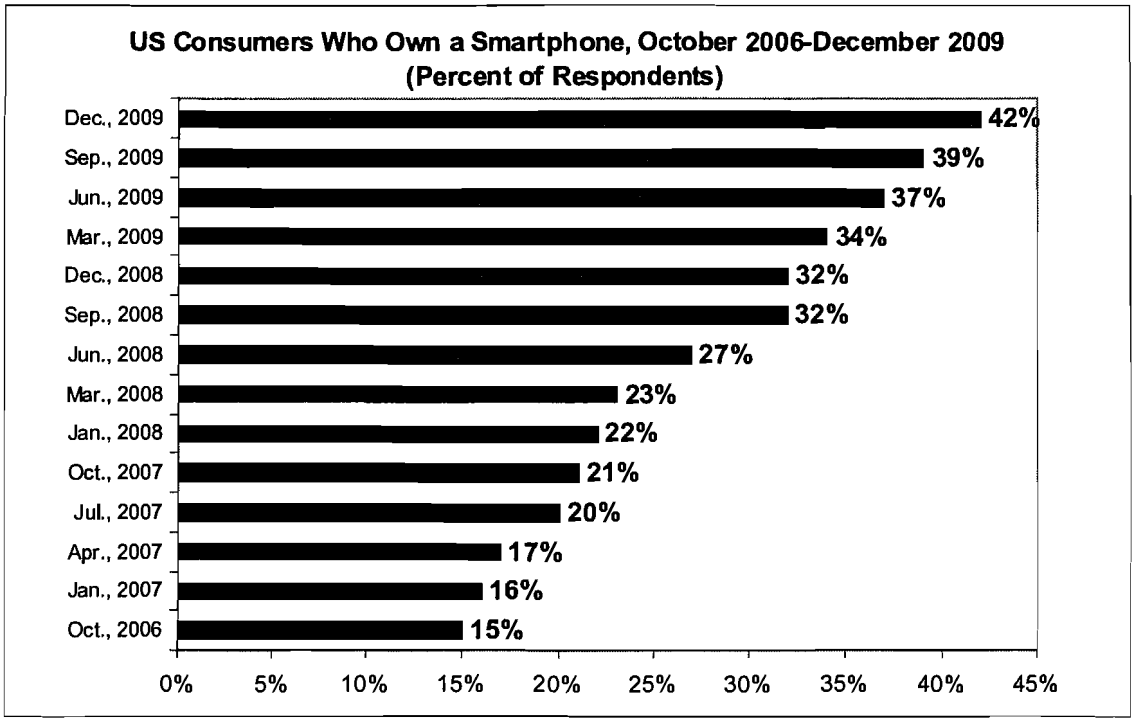


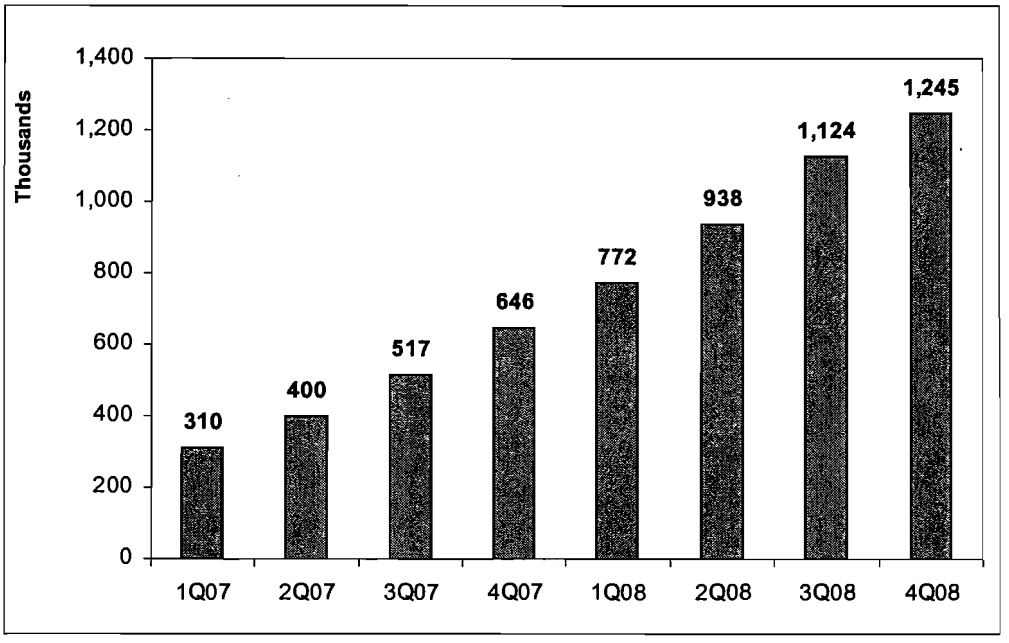
Chart 12
Smartphone Penetration Rates[488]



[488] Paul Carton and Jean Crumrine, *New Survey Shows Android OS Roiling the Smartphone Market*, ChangeWave Research, Jan. 4, 2010, *available at* http://www.changewaveresearch.com/articles/2010/01/smart_phone_20100104.html.

160. Certain individual service providers have reported data on the number of data-capable devices in use by their subscribers. For instance, Verizon Wireless reported that, at the end of 2009, 15 percent of its postpaid subscribers had a smartphone and 11 percent had a multimedia device.[489] In addition, AT&T has reported its number of 3G laptop connect cards in service for several quarters, as shown in Chart 13. The number of laptop cards increased significantly during 2007 and 2008, nearly doubling from 646,000 at the end of 2007 to 1.2 million at the end of 2008.

Chart 13
AT&T 3G Laptop Connect Cards[490]



161. In addition to the data on the number of subscribers by type of device, the Pew Internet & American Life Project (Pew) has released data on the percentage of mobile wireless subscribers who use different types of mobile wireless services and applications. Pew estimated that 69 percent of American adults used some type of non-voice, mobile data service in April 2009, up from 58 percent in December 2007.[491] Among the mobile data services used, Pew estimates that 43 percent of subscribers used text messaging, 15 percent used e-mail, 14 percent accessed the Internet, 10 percent used instant messaging, 9 percent used games, 3 percent obtained maps or directions, and 3 percent watched a video. Texting remains one of the highest use activities, with 74 percent of 18- to 29-year-olds and 51 percent of 30-49 year olds using it on a typical day.[492]

162. Analysts at Credit Suisse have also estimated the number of mobile wireless data subscribers and the mobile wireless data penetration rates (see Chart 14). According to these estimates,

[489] Phil Goldstein, *Verizon Benefits from Droid Momentum*, FIERCEWIRELESS, Jan. 26, 2010, *available at* http://www.fiercewireless.com/story/verizon-notches-2-2m-subs-q4/2010-01-26#ixzz0h2Sz4kWV (citing Verizon CFO Jon Killian). Verizon noted that all of these devices now require a subscription to a data plan. The company expects to continue to see strong growth in wireless data. *Id.*

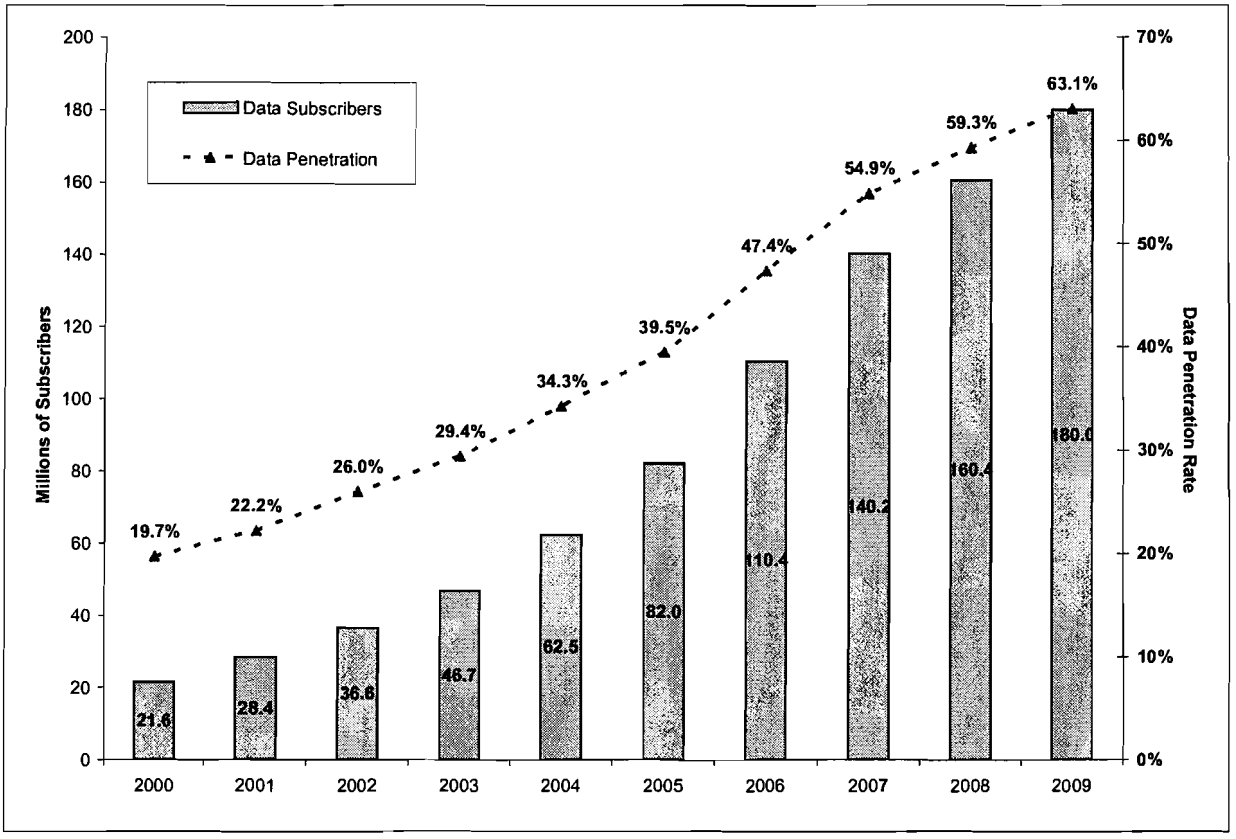
[490] AT&T Fourth Quarter 2008 Earnings Release.

[491] John Horrigan, *Wireless Internet Use, More Than Half of Americans – 56% - Have Accessed the Internet Wirelessly on Some Device, Such as a Laptop, Cell Phone, MP3 Player, or Game Console*, Pew Internet & American Life Project, July 2009 (survey conducted March 26 - April 19, 2009), at 21-22.

[492] *Id.*

there were 180 million mobile data subscribers at the end of 2009, which translates into a penetration rate of 63 percent. The number of mobile data subscribers has increased 11 percent from 160 million at the end of 2008, and 22 percent from 140 million at the end of 2007.

Chart 14
Mobile Data Subscribers and Penetration Rates[493]



2. Mobile Wireless Subscribers by Pricing Plan

163. As previously noted, prepaid subscribers as a percentage of total subscribers has been increasing over the past few years.[494] While the majority of subscribers in the United States today are in postpaid plans, the prepaid and resale/wholesale subscriber segments have been growing much faster than the postpaid segment. As shown in Chart 15, the postpaid subscribers as a percentage of total wireless subscribers decreased from 81.9 percent in the second quarter of 2007, to 78.5 percent in the second quarter of 2009. During this same period, the number of prepaid subscribers increased 37.6 percent, while the number of wholesale subscribers increased 32.5 percent.[495] As discussed above, increased prepaid subscribership levels may be a reflection of the lower prices and an increasing number of prepaid service plans, as well as a response to the economic recession.[496] One analyst has noted that consumers are purchasing prepaid plans "as a way to cut costs and avoid the lengthy contracts and occasional billing

[493] Data provided by Credit Suisse First Boston.

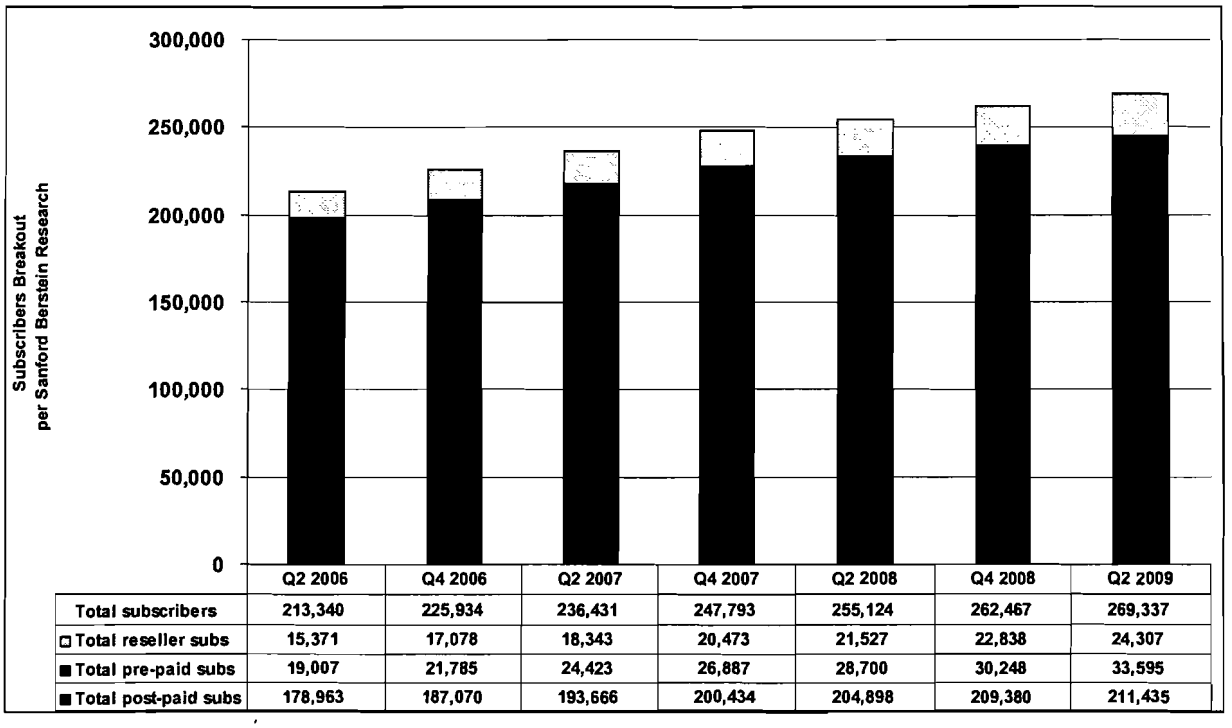
[494] *See* Section V.A.2, Mobile Wireless Subscribers by Pricing Plan, *supra*.

[495] *US Wireless 411 3Q09*, at 4.

[496] *See* Section V.A.2, Mobile Wireless Subscribers by Pricing Plan, *supra*.

surprises that come with traditional cellphone plans."[497] The increase in wholesale/reseller subscribers may indicate that the use of devices that use mobile wireless data service on a wholesale basis, such as e-readers, is growing as well. While these devices as a percentage of all mobile wireless devices is growing, the overall ARPU for these subscribers is often substantially lower than for postpaid subscribers. For example, average revenue per Kindle device is estimated at $2 per month.[498]

Chart 15
Mobile Wireless Subscribers by Type of Pricing Plan[499]



	Q2 2006	Q4 2006	Q2 2007	Q4 2007	Q2 2008	Q4 2008	Q2 2009
Total subscribers	213,340	225,934	236,431	247,793	255,124	262,467	269,337
□ Total reseller subs	15,371	17,078	18,343	20,473	21,527	22,838	24,307
■ Total pre-paid subs	19,007	21,785	24,423	26,887	28,700	30,248	33,595
■ Total post-paid subs	178,963	187,070	193,666	200,434	204,898	209,380	211,435

164. Mobile wireless service providers also offer family plans that give discounted rates for households with multiple handsets as a way to increase penetration on a household basis.[500] Most family plans include one line at an average of $45 per month for voice service for the first line and additional lines for approximately $10 per month per line, for up to four more lines.[501] As shown in Chart 16, Credit Suisse estimates that 67 percent of all mobile wireless subscribers were part of a family plan in 2009, up

[497] Jenna Wortham, *More Customers Give Up the Cellphone Contract*, NEW YORK TIMES, Feb. 20, 1009, *available at* http://www.nytimes.com/2009/02/21/technology/21prepaid.html.

[498] Lynnette Luna, *Kindle May Generate $2 ARPU, But Is It Really That Bad?*, FIERCE BROADBAND WIRELESS, May 28, 2009, *available at* http://www.fiercebroadbandwireless.com/story/arpu/2009-05-28.

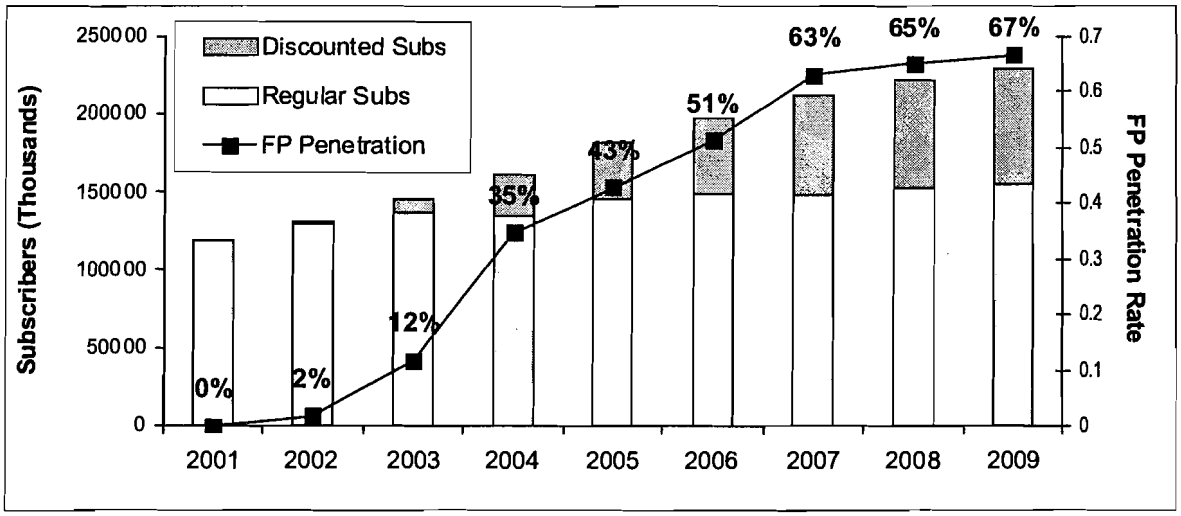
[499] *US Wireless 411 3Q09*, at 4.

[500] *See* Section IV.A, Price Rivalry: Developments in Mobile Service Pricing Plans, *supra.*

[501] John C. Hodulik, *et al.*, *MetroPCS - Growth Stays Strong, +CF on the Way*, UBS, UBS Investment Research, May 8, 2009, at 2.

from just 35 percent in 2004.[502] In addition, Nielsen estimates that the 66 percent of all non-corporate wireless subscribers were family plan subscribers in the third quarter of 2009, up from 63 percent in the third quarter of 2008.[503] Family plan subscriber uptake is typical during non-promotional periods[504] when, for example, couples or parents upgrade their handsets or children come of age. Family plans allow service providers to increase their subscribership levels to other members of the same household or family, such as children, grandparents, or other relatives. According to one analyst, in the second quarter of 2008, Sprint Nextel and T-Mobile made an effort to restructure their family plan pricing options in order to align them with their unlimited plans and to allow family groups to realize some of the value of unlimited plans.[505] Verizon Wireless and AT&T have not adopted this approach, requiring unlimited plan customers to take individual plans.[506]

Chart 16
Family Plan Subscribers and Penetration of Postpaid Base[507]



3. Mobile Wireless Subscribers by Age

165. Morgan Stanley provides data on mobile wireless subscribership by age (see Chart 17). While penetration rates are high at nearly every age group, they are highest among 18- to 24-year-olds, where penetration has reached 96 percent. The only age group with a penetration rate less than 90 percent is the 65 and over age range, where penetration is 89 percent.

[502] In addition, UBS estimates that roughly two-thirds of AT&T's and Verizon Wireless's postpaid customers subscribe to family plans. John C. Hodulik, *et al.*, *Telecommunications - Prepaid Will Set the Pace in Wireless*, UBS, UBS Investment Research, Mar. 23, 2009, at 6.

[503] The Nielsen Company: Mobile Insights 2009.

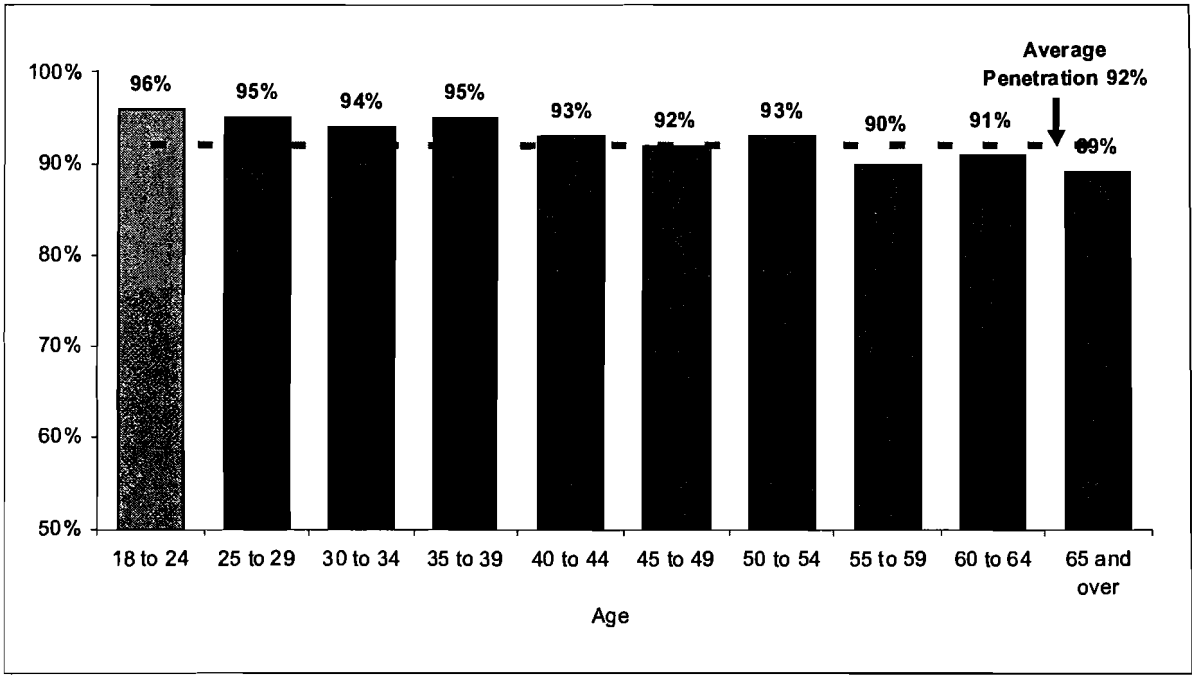
[504] Non-promotional periods occur when service providers are not running promotions, such as during the holiday season.

[505] Jonathan Epstein and Stephen Douglas, *Wireless Service and Handset Pricing Analysis – Sprint-T-Mobile Reset Family Plans, iPhone Subsidy Not Huge in Context*, Bank of America, June 19, 2008.

[506] *Id.*

[507] Data provided by Credit Suisse First Boston.

Chart 17
Mobile Wireless Penetration by Age[508]



166. In addition, a recent Pew study provides data on mobile wireless subscribership among teenagers (see Table 15). According to the Pew study, which reports data as of September 2009, age is an important factor in predicting mobile wireless subscribership. As the following table indicates, there is a substantial difference in mobile wireless penetration between 12-year-olds and 17-year-olds.[509] Among the 12- to 17-year-old age group as a whole, mobile wireless subscribership has increased from 45 percent in 2004 to 75 percent in 2009.[510] Pew found that, beyond age, there were differences in mobile wireless subscribership among demographic groups of teens, such as gender and race/ethnicity.[511] The one area where penetration rates varied was household income; 59 percent of teens in households earning less than $30,000 per year had a cell phone, as compared to more than 75 percent of teens from families with higher incomes.[512]

[508] Data provided by Morgan Stanley Research, Morgan Stanley AlphaWise.

[509] Amanda Lenhart, *et al.*, *Social Media & Mobile Internet Use Among Teens and Young Adults,* Pew Internet & American Life Project, Feb. 3, 2010, at 9.

[510] *Id.*

[511] *Id.*

[512] *Id.*

Table 15
Mobile Wireless Penetration Among Teenagers

Age	Penetration Rate
12 yrs	58%
13 yrs	73%
14 yrs	76%
15 yrs	79%
16 yrs	82%
17 yrs	83%

167. The Pew study also indicates that young adults are more likely than older adults to own a cell phone, with 93 percent of adults in the 18- to 29-year-old age group owning a cell phone compared to 83 percent of all adults over 18 years old owning a cell phone.[513] This compares to penetration figures in 2004 of 71 percent and 65 percent, respectively, for these age groups.[514]

168. Also, one marketing analyst has reported that advanced mobile technology that enables web browsing, e-mail and use of applications is more frequently adopted by users in the 18 to 24 and 25 to 44 year old age groups than by older users.[515] The smartphone ownership rate of mobile users by age group is shown in Table 16 below. This marketing analyst also reports that adoption of SMS is highest among users in the 18 to 24 year old age group, but that this adoption is reaching a plateau (see Table 16 below). In addition, older age groups continue to show an increase in SMS adoption.[516]

Table 16
Smartphone and SMS Adoption by Age Group[517]

Age Range	Smartphone Ownership Rate	SMS Adoption Rate
18 to 24 year-olds	29%	83%
25 to 44 year-olds	29%	65%
45 to 54 year-olds	24%	52%
55 to 64 year-olds	13%	33%

B. Penetration Rates Across Economic Areas (EAs)

169. To analyze mobile wireless subscribership across geographic areas, we have estimated mobile wireless penetration rates in the EAs of the United States using NRUF data.[518] As discussed

[513] *Id.* at 17.

[514] *Id.*

[515] Marketing Sherpa, *Consumer Behavior in the Mobile Channel: 4 Trends Marketers Should Note,* Dec. 22, 2009, *available at* https://www.marketingsherpa.com/sample.cfm?ident=31481.

[516] *Id.*

[517] Marketing Sherpa, *Consumer Behavior in the Mobile Channel: 4 Trends Marketers Should Note,* Dec. 22, 2009, *available at* https://www.marketingsherpa.com/sample.cfm?ident=31481.

[518] NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile wireless subscribership across different areas within the United States. NRUF data is collected by the area code and prefix (NXX) level for each provider, which enables the Commission to approximate the number of subscribers that each provider has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally (continued....)

above, we use EAs as the geographic unit for measuring the level of concentration in the mobile wireless services industry in order to maintain continuity with past *Reports*[519] and ensure that we do not compromise the confidential information found in the NRUF data.[520]

170. Regional penetration rates for the 172 EAs covering all 50 states, as of December 2008, can be seen in Appendix C, Table C-3. In addition, a map showing regional penetration rates by EAs can be found in Appendix D.[521] Several EAs – including Detroit, MI; Birmingham, AL; Farmington, NM; Washington, DC; San Diego, CA; and Beaumont, TX – had penetration rates exceeding 100 percent, which is likely due to subscribers having more than one device.[522] In 53 of the 160 EAs, the penetration rates exceeded 90 percent, up from 24 EAs at the end of 2007. Only two EAs, with a combined population of just 415,000, had penetration rates under 70 percent. The EA with the lowest reported penetration rate was La Crosse, WI-MN (EA 105), with a penetration rate of 68 percent.[523] The EA with the lowest population density, Anchorage, AK (EA 171), had a penetration rate of 86 percent, while the EA with the highest density, Tampa-St. Petersburg-Clearwater, FL (EA 34), had a penetration rate of 92

(Continued from previous page)

do not coincide with county boundaries. However, for purposes of geographical analysis, rate centers (including those that cross county boundaries) can be associated with the county that contains the (usually) centralized geographic point for that rate center. Counties, for which population and other data exist, can be aggregated together and associated with several larger geographic areas based on counties, such as EAs and Cellular Market Areas (CMAs). Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining non-coterminous areas such as rate center areas and counties.

[519] There are 172 EAs, each of which is an aggregation of counties. 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. *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 Commission 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 (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. As noted above, the Commission typically has used smaller geographic areas, such as CMAs, for analyzing mobile wireless transactions. *See, e.g., Sprint Nextel-Clearwire Order*, 23 FCC Rcd at 17591, ¶¶ 51-52; *Verizon Wireless-Alltel Order*, 23 FCC Rcd at 17472-73, ¶ 52.

[520] Wireless providers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas and, according to one analyst, assign numbers so as to minimize the access charges paid to local wireline companies. *See* Linda Mutschler *et al.*, *Wireless Number Portability*, Merrill Lynch, Equity Research, Jan 9, 2003, at 8 ("For wireless operators, the standard practice is to aggregate phone numbers within the same area code onto the same or several rate centers, whose physical locations would result in the least amount of access charges paid to ILECs. Therefore, in each market, wireless operators are present in only a small number of rate centers. According to our industry sources, this percentage is probably below 20%, and could be meaningfully lower than 20%"). Therefore, a mobile wireless subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage, but generally still in the same EA. *See* Linda Mutschler, *et al.*, *US Wireless Services: Wireless Number Portability – Breaking Rules*, Merrill Lynch, Equity Research, Feb. 28, 2003, at 3 ("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").

[521] *See* Map D-30, Appendix D, *infra*.

[522] We excluded New Orleans, LA-MS (EA 83) from this analysis due to what we believe to be an aberration with the statistics. See Appendix C, Table C-3: Economic Area Penetration Rates, note 1 infra.

[523] In seven EAs, the penetration rate could not be reported for confidentiality reasons because the number of competing providers in the EA is less than four.

percent. As previously stated, based on an analysis of NRUF data, the national penetration rate at the end of 2008 was 90 percent.

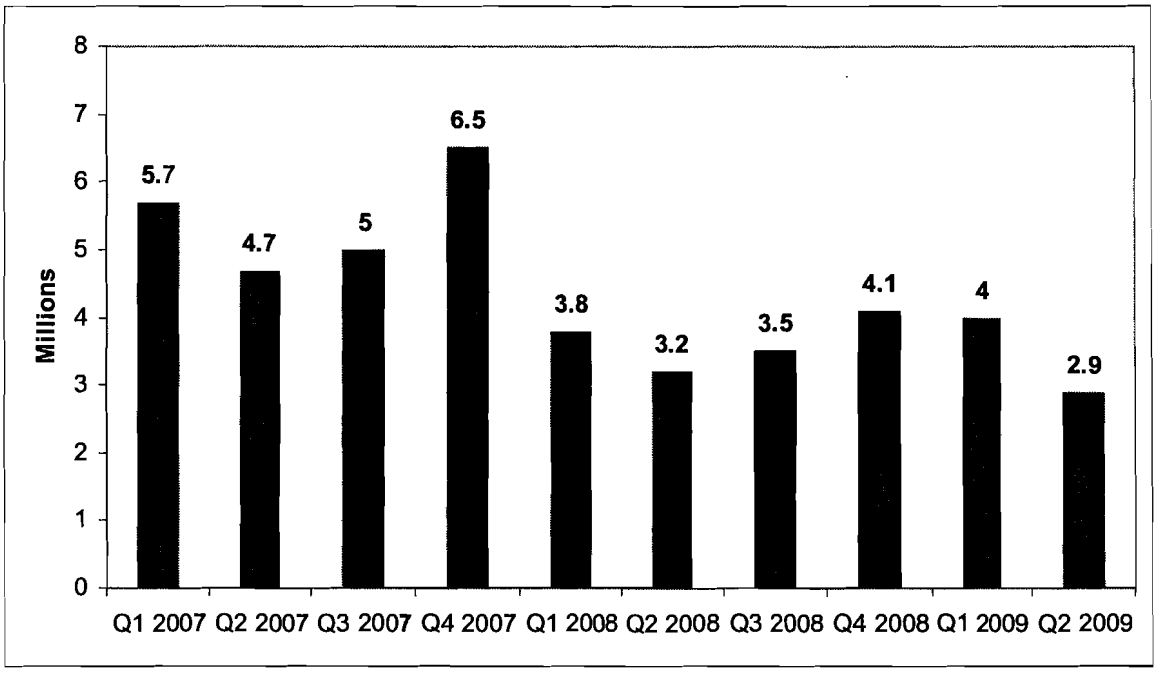
C. Net Adds/Subscriber Growth

1. Industry-Wide Subscriber Net Adds

171. As the wireless industry has reached penetration levels nearing 90 percent of the US population, the growth of net new subscribers has decelerated. Mobile wireless service providers are reporting that net adds have slowed on both a quarterly and an annual basis.

172. According to data from Bernstein Research, "2008 marked a new low in the wireless industry's net additions and percentage growth."[524] Total mobile wireless subscriber growth in 2008 was 5.9 percent, down from 9.8 percent growth in 2007 and 12 percent growth in 2006.[525] According to the Commission's NRUF data, there were 14.6 million mobile wireless subscriber net adds in 2008, compared to 21.2 million in 2007, which represents a 31 percent decline.[526] Quarterly net adds are shown in Chart 18 below.

Chart 18
Total Mobile Wireless Subscriber Quarterly Net Adds[527]



2. Mobile Wireless Net Adds by Pricing Plan

173. In recent years, net adds have varied by type of pricing plan, as shown in Chart 19 below. The number of unlimited prepaid plan net adds has grown in recent quarters, both in terms of absolute numbers and as a percentage of total net adds. During the fourth quarter of 2007, unlimited prepaid subscribers accounted for 10.5 percent of total net adds. This figure grew to 21.1 percent in the fourth

[524] *A Recipe for Disaster.*

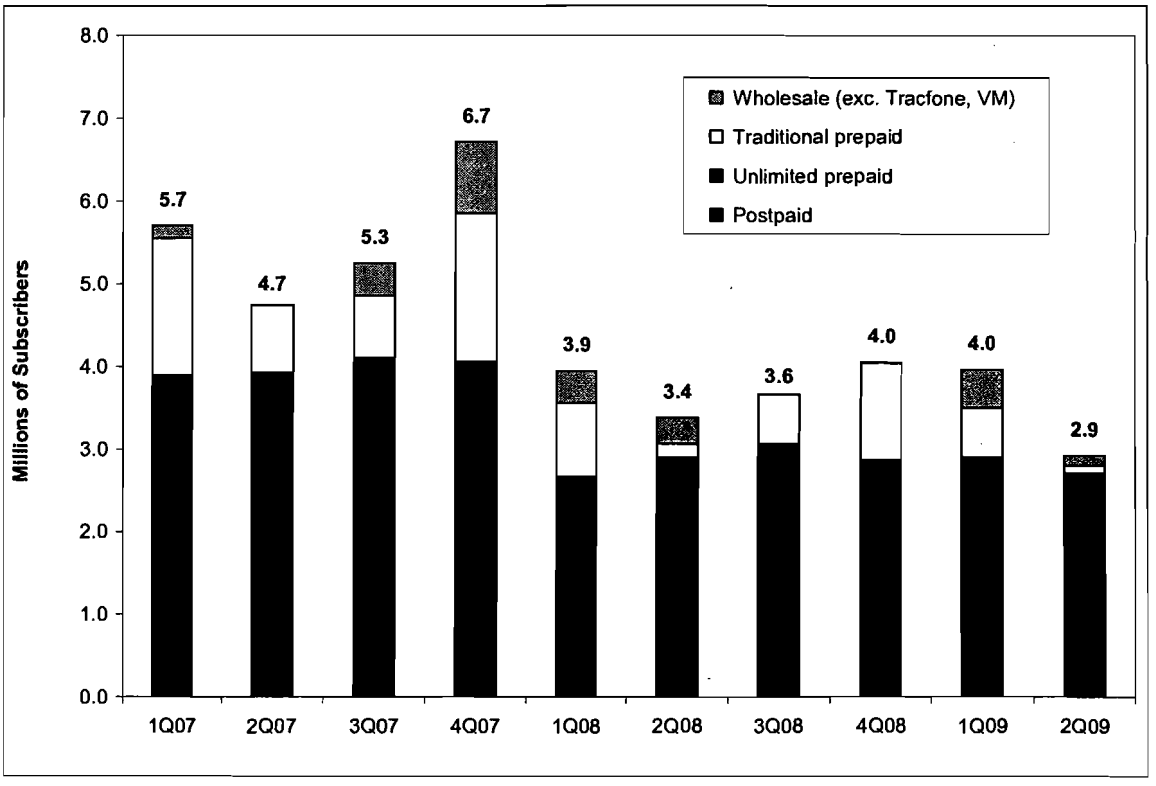
[525] *Id.*

[526] *See* Table 14, *supra.*

[527] Data provided by Bernstein Research.

quarter of 2008 and to 50.1 percent in the second quarter of 2009. The number of unlimited prepaid net adds increased from 708,000 in the fourth quarter of 2007 to 854,000 in the fourth quarter of 2008, and to 1.5 million in the second quarter of 2009. This trend may be a reflection of the lower prices and increased number of offerings for prepaid plans, as discussed above, and of the economic recession, which may have moved consumers to seek lower-priced, higher-value mobile wireless service with no long term contracts.[528]

Chart 19
Mobile Wireless Net Adds by Pricing Plan[529]



174. The number of postpaid subscribers continued to grow during 2008 and the first half of 2009, but at a slower rate than in previous years. There were 3.3 million postpaid net adds in the fourth quarter of 2007 versus just 2 million in the fourth quarter of 2008, a 39 percent decrease. Postpaid net adds also dropped from 2.4 million in the second quarter of 2008 to 1.2 million in the second quarter of 2009. Postpaid net adds accounted for 70.6 percent of total net adds in the second quarter of 2008, versus just 43 percent in the second quarter of 2009, when unlimited prepaid dominated the net add mix.

3. Mobile Wireless Net Adds by Service Provider

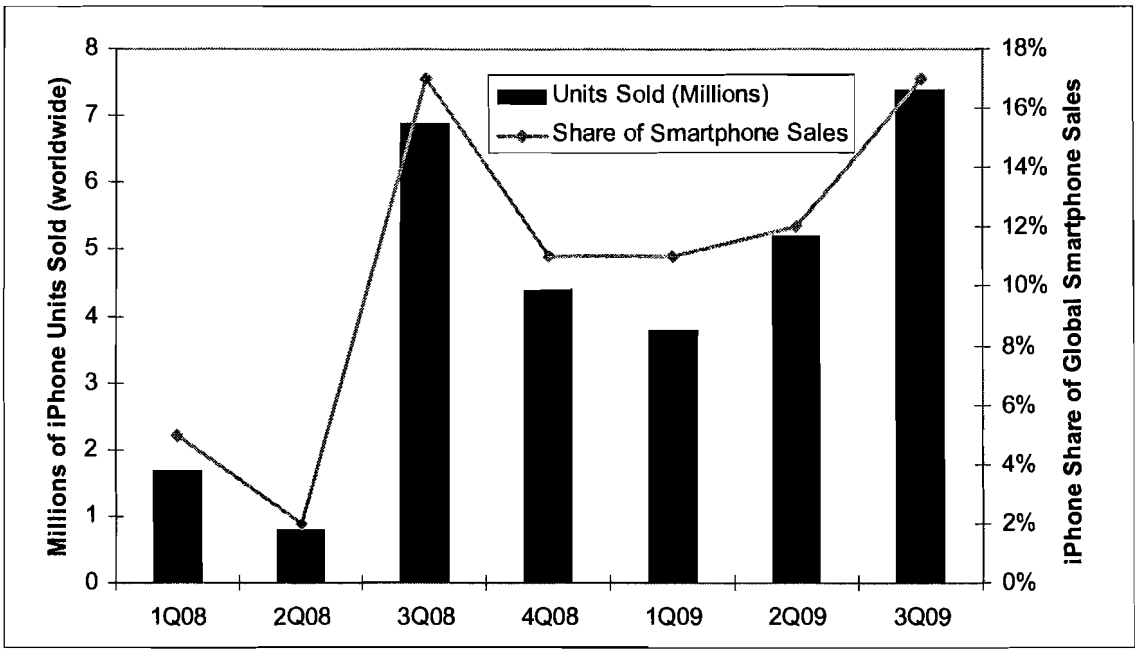
175. As shown in Chart 20 below, the net subscriber additions have not been evenly distributed across all service providers. During 2009, AT&T and Verizon Wireless gained 8.1 million and 6 million net adds, respectively, while T-Mobile had just over 1 million net adds and Sprint Nextel had a 205,000 net subscriber loss. MetroPCS and Leap, while smaller than the top four providers, increased their subscriber bases by about 24 and 29 percent, respectively during 2009.

[528] *See* Section IV.A, Price Rivalry: Developments in Mobile Service Pricing Plans, *supra*.

[529] *US Wireless 411 2Q09*, at 4.

3.0.[419] The 3GS is also able to connect to AT&T's HSPA 7.2 Mbps network.[420] As a sign that certain mobile consumers have switched to AT&T primarily to access an iPhone, AT&T reports that 40 percent of its iPhone customers switched to AT&T from another service provider.[421] iPhone's share of smartphone business has grown as well from 5 percent in the first quarter of 2008 to 17 percent in the third quarter of 2009 (see Chart 7).

Chart 7
Apple iPhone Sales (1Q08-3Q09)[422]



139. To capitalize on the growing consumer demand for smartphones and to compete with the functionalities offered by the iPhone, several wireless service providers, equipment manufacturers, and mobile platform developers introduced new smartphone devices in 2008 and 2009. Table C-5 in Appendix C shows selected smartphones launched over the past two years, and Chart 8 below shows the number of smartphone launches by the four largest service providers, based on the information in Table C-5. These launches represent not only an attempt by service providers to prevent their subscribers from switching to the iPhone, and hence to AT&T, but also an effort to migrate their traditional handset customers to smartphones. Smartphone users typically have lower churn rates and generate higher data ARPU, which can, from the service provider's perspective, offset the slowing growth in subscriber penetration and declining voice ARPU.[423] On the other hand, smartphone users also typically have higher

[419] *Apple Announces the New iPhone 3GS – The Fastest, Most Powerful iPhone Yet*, Press Release, Apple, June 8, 2009.

[420] *Id.* The iPhone 3.0 OS on the 3GS also includes automatic authentication at AT&T's Wi-Fi hotspots, allowing customers to move seamlessly from AT&T's 3G network to its Wi-Fi network without a call or data connection being dropped. *iPhone 3GS Available at AT&T Tomorrow*, Press Release, AT&T, June 18, 2009.

[421] Roger Entner, *Is Handset Exclusivity Really the Issue of the Day?*, NIELSEN WIRE, Aug. 27, 2009, *available at* http://blog.nielsen.com/nielsenwire/online_mobile/handset-exclusivity/.

[422] *See* Tal Liani, *et al.*, *Finding Value in Smartphones*, Bank of America/Merrill Lynch, Dec. 14, 2009, at 15 (*Finding Value in Smartphones*).

[423] *See Finding Value in Smartphones*, at 7, 26; *Smartphone Adoption Steadily Rising*, at 1, 2.