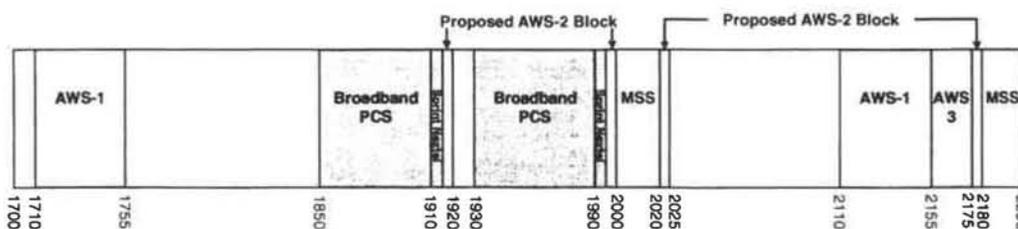


Plan report to Congress recommended that the D Block should be auctioned for commercial use with limited technical requirements that would ensure technical compatibility between the D Block and the adjacent public safety broadband spectrum block. The Plan also contended that the commercial D Block should enable, but not obligate, the licensee to enter into a spectrum-sharing partnership with the neighboring Public Safety Broadband Licensee.<sup>41</sup>

**E. 1710 – 2180: Advanced Wireless Services**

15. 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>42</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 (AWS-1) bands that can be used to offer advanced wireless services, including mobile broadband services.<sup>43</sup>

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



16. Subsequently, the Commission completed the process of establishing service rules for the 1710-1755 MHz and 2110-2155 MHz bands. This included a 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>44</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>45</sup>

17. The Commission held Auction 66 in 2006.<sup>46</sup> Of the 1,122 licenses offered, 104 winning bidders won 1,087 licenses, with net bids of more than \$13.7 billion,<sup>47</sup> and all 1,087 licenses were

(Continued from previous page) \_\_\_\_\_  
 Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, PS Docket No. 06-229, *Third Further Notice of Proposed Rulemaking*, 23 FCC Rcd 14301 (2008).

<sup>41</sup> See *National Broadband Plan*, at 86, 315-316.

<sup>42</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>43</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>44</sup> *Eleventh Report*, 21 FCC Rcd at 10977-10978, ¶ 74; 47 C.F.R. Part 27.

<sup>45</sup> *Eleventh Report*, 21 FCC Rcd at 10978, ¶ 74.

<sup>46</sup> 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).

<sup>47</sup> *Id.*

awarded in 2007. In August 2008 the Commission's Auction 78 included the 35 AWS-1 licenses for which no winning bids were submitted in Auction 66.<sup>48</sup> Winning bids were submitted for all 35 AWS-1 licenses, with net winning bids for those licenses of \$13,372,850.<sup>49</sup> As of early November 2010, the Commission has granted licenses to 9 out of 14 AWS applicants.

18. 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>50</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.

19. 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>51</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>52</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>53</sup> In October 2008, the Commission's Office of Engineering and Technology released the *Advanced Wireless Service Interference Tests Results and Analysis*, which analyzed data from earlier laboratory bench tests performed by FCC staff together with interested parties.<sup>54</sup>

#### **F. Broadband Radio Service**

20. The Commission has transformed the 2496-2690 MHz band by providing licensees with

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<sup>48</sup> See "Auction of AWS-1 and Broadband PCS Licenses Rescheduled for August 13, 2008," *Public Notice*, 23 FCC Rcd 7496 (2008).

<sup>49</sup> See "Auction of AWS-1 and Broadband PCS Licenses Closes," *Public Notice*, 23 FCC Rcd 12749 (2008).

<sup>50</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).

<sup>51</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).

<sup>52</sup> Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, *Notice of Proposed Rulemaking*, 22 FCC Rcd 17035 (2007).

<sup>53</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>54</sup> See *Advanced Wireless Service Interference Tests Results and Analysis*, October 10, 2008 (WT Docket Nos. 07-195 and 04-356). See also "The FCC's Office of Engineering and Technology Releases Analysis of AWS-3 Interference Tests," WT Docket Nos. 07-195 and 04-356, *Public Notice*, 23 FCC Rcd 14669 (OET 2008).

greater flexibility and establishing a more functional band plan.<sup>55</sup> The Commission has taken several steps to restructure the BRS/EBS band and facilitate more efficient use of the spectrum. First, 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.

21. 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.

22. 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>56</sup> BRS and EBS licensees have largely completed the process of transitioning the 2.5 GHz band to the new band plan. As of November 4, 2010, the transition had been completed in 471 out of 493 BTAs.<sup>57</sup> In the remaining BTAs, virtually all other licensees are subject to a pending transition plan or have filed self-transition plans.

23. The Commission has continued to revise the rules relating to the 2.5 GHz band in 2008 and 2009 by clarifying its policies concerning leasing of EBS stations, setting forth auction rules for unassigned BRS spectrum, seeking further comment on how to license the available and unassigned "white spaces" in the EBS spectrum band, and issuing 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.<sup>58</sup> In 2010, the Commission gave new BRS licensees four years from the date of initial license grant to demonstrate substantial service.<sup>59</sup> The Commission held Auction 86, the auction of available BRS licenses, in the fourth quarter of 2009.<sup>60</sup> Of the 78 licenses

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<sup>55</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.

<sup>56</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>57</sup> See WT Docket No. 06-136.

<sup>58</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); *Fifth Memorandum Opinion and Order and Third Further Notice of Proposed Rulemaking and Declaratory Ruling*, 24 FCC Rcd 12558 (2009).

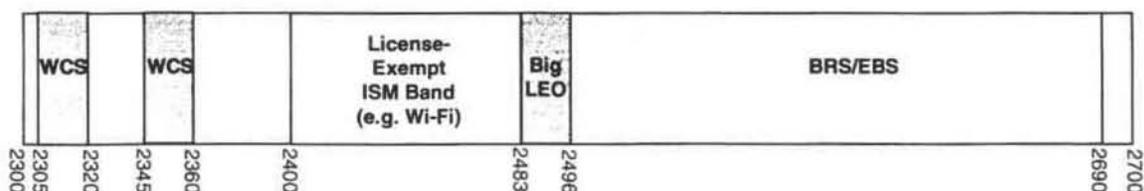
<sup>59</sup> Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Third Report and Order*, 25 FCC Rcd 7743 (2010).

<sup>60</sup> The auction started on October 27, 2009 and closed on October 30, 2009. See "Auction of Broadband Radio Service Licenses Closes; Winning Bidders Announced for Auction No. 86," *Public Notice*, 24 FCC Rcd 13572 (WTB 2009).

offered in Auction 86, ten winning bidders won 61 licenses, with net bids of \$19,426,600.<sup>61</sup>

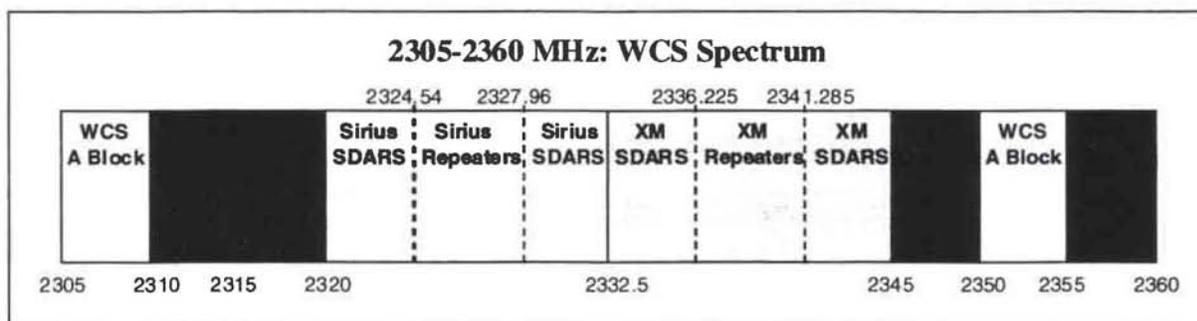
24. The changes made to the 2496-2690 MHz band, together with technological and business developments, is facilitating the development of a nationwide WiMAX network by Clearwire that has the potential to compete with cable and DSL broadband providers. The 2496-2690 MHz band can speed the arrival of a 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.

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



#### G. Wireless Communications Service (WCS)

25. 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 WCS spectrum was auctioned in 1997 and licensed on a Major Economic Area (MEA) and Regional Economic Area Grouping (REAG) basis. 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. While the service rules governing WCS allow for both fixed and mobile applications, the technical limits imposed to protect adjacent SDARS operations had not permitted the development of mobile equipment for the band. In May 2010, the Commission updated the service rules governing WCS to enable licensees to provide mobile broadband services in 25 megahertz of the WCS band without risking harmful interference to neighboring SDARS operations. WCS mobile and portable devices are not permitted to operate in the 2.5-megahertz portions of the WCS C and D blocks closest to the SDARS band (*i.e.*, 2317.5-2320 and 2345-2347.5 MHz).<sup>62</sup>



<sup>61</sup> *Id.*

<sup>62</sup> See Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, WT Docket No. 07-293, *Report and Order*, para. 3, released May 20, 2010.

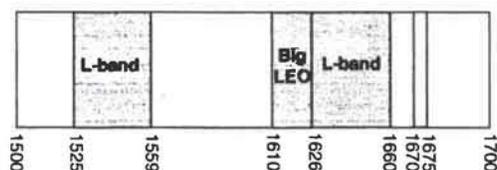
## H. 1.4 GHz Bands

26. The Commission completed the auction of licenses in the paired 1392-1395 MHz and 1432-1435 MHz bands and in the unpaired 1390-1392 MHz band.<sup>63</sup> The paired spectrum was offered as two 3-megahertz blocks in the six REAGs.<sup>64</sup> The unpaired spectrum was auctioned as one 2-megahertz block in each MEA.<sup>65</sup> Like other spectrum bands under Part 27 of the Commission's rules, the service rules for the 1.4 GHz band are flexible. In the auction, two winning bidders won a total of 64 licenses, raising a total of \$123,599,000.<sup>66</sup>

## I. 1670-1675 MHz

27. 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>67</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>68</sup>

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



## J. 3650-3700 MHz

28. The Commission adopted service rules for the 3650 – 3700 MHz band in June 2007<sup>69</sup> and began accepting applications licenses in the service in November 2007.<sup>70</sup> Terrestrial operations in the band are licensed on a nationwide, non-exclusive basis, with all licensees registering their fixed and base stations in a common data base (ULS) prior to operation. Licensees are subject to restrictions on their operations in geographic areas occupied by grandfathered Fixed Satellite Service (FSS) and Federal Government stations. The rules also provide that terrestrial licensees have the mutual obligation to cooperate and avoid harmful interference to one another, and are required to use one of two types of “contention-based” technologies (restricted or unrestricted) that accommodate shared use of the band by multiple users. Equipment using “restricted” contention-based protocols (i.e., equipment capable of

<sup>63</sup> See “Auction of 1.4 GHz Band Licenses Closes,” *Public Notice*, 22 FCC Rcd 4714 (2007).

<sup>64</sup> See “Auction of 1.4 GHz Bands Licenses Scheduled for February 7, 2007,” *Public Notice*, 21 FCC Rcd 9494 (2006)

<sup>65</sup> *Id.*

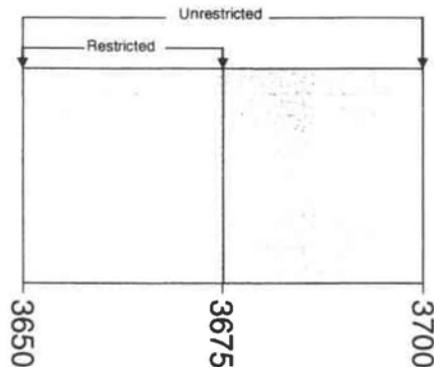
<sup>66</sup> See “Auction of 1.4 GHz Band Licenses Closes,” *Public Notice*, 22 FCC Rcd 4714 (2007).

<sup>67</sup> Long-Term *De Facto* Transfer Lease Application, File No. 0003108073 (filed July 17, 2008). *Crown Castle Announces Long-Term Modeo Spectrum Lease*, Press Release, Crown Castle, July 23, 2007; ULS Lease ID L000002305.

<sup>68</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). In April 2010, a further lease application was approved. *De Facto* Transfer Lease, File No. 0004205653 (filed Apr. 13, 2010).

avoiding interference only to other devices using the same protocol) is allowed to operate only on the lower 25 megahertz portion of the band (3650 – 3675 MHz). Unrestricted equipment (i.e., equipment capable of avoiding interference to other devices, even those that use a different protocol) is allowed to operate within the entire 50 megahertz of the band. Mobile stations are required to positively receive and decode an enabling signal transmitted by a base station. Devices certified by the FCC as mobiles or portables do not require a separate license or registration.<sup>71</sup>

### 3650 - 3700 MHz Service



### K. MSS Spectrum Bands

29. The Commission has approved mobile satellite systems for operation in four MSS spectrum bands—the L-Band, Big LEO,<sup>72</sup> Little LEO, and 2 GHz bands—totaling 157.7 megahertz of spectrum. 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 A-1: Spectrum Bands 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

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

<sup>69</sup> See *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, Rules for Wireless Broadband Services in the 3650-3700 MHz Band, WT Docket No. 05-96, *Report and Order*, 20 FCC Rcd 6502 (2005) (*3650 MHz Order*), recon. granted in part, *Memorandum Opinion and Order*, 22 FCC Rcd 10421 (2007).

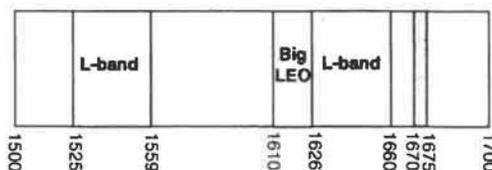
<sup>70</sup> See “Wireless Telecommunications Bureau Announces Start State for Licensing and Registration Process for the 3650 – 3700 MHz Band,” *Public Notice*, 22 FCC Rcd 19802 (WTB 2007).

<sup>71</sup> See 47 C.F.R. § 90.1307. Mobile and portable stations that operate with a peak EIRP of 1 Watt/25 megahertz and receive and decode an enabling signal from a base station are not required to be registered even if used in a fixed mode. See *3650 MHz Order*, 20 FCC Rcd at 6513, ¶ 31, n.54; 47 C.F.R. § 90.1333.

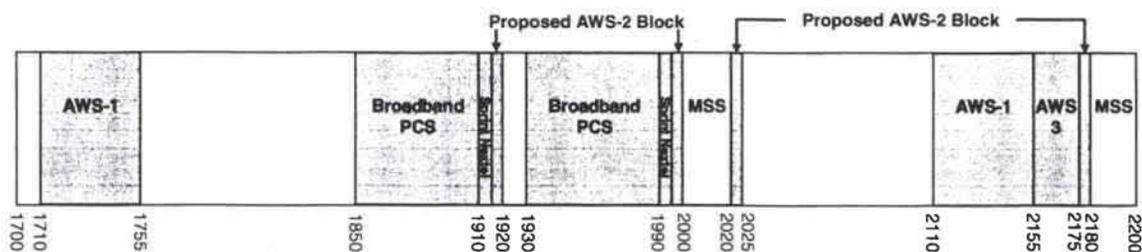
<sup>72</sup> LEO refers to “Low-Earth Orbit.”

30. *MSS Allocations.* In the United States, MSS L-Band allocation consists of downlinks in the 1525-1559 MHz bands and uplinks in the 1626.5-1660.5 MHz bands.<sup>73</sup> The L-Band was the first MSS band that was used for extensive commercial MSS offerings. The MSS Big LEO band refers to the 1.6/2.4 GHz bands, consisting of an uplink at 1610-1626.5 MHz and downlinks at 1613.8-1626.5 and 2483.5-2500 MHz.<sup>74</sup> The Commission allocated this spectrum in 1993 to permit two-way voice and data communications anywhere in the world. The MSS 2 GHz band allocation consists of an uplink at 2000-2020 MHz and a downlink at 2180-2200 MHz.<sup>75</sup> The Commission allocated this spectrum in 1997 for the provision of new and expanded regional and global data, voice and messaging MSS.<sup>76</sup>

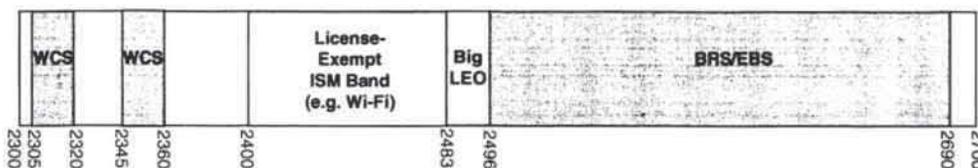
#### 1500-1700 MHz: MSS Spectrum



#### 1700-2200 MHz: MSS Spectrum



#### 2300-2700 MHz: MSS Spectrum



31. *Ancillary Terrestrial Component (ATC) and Terrestrial Broadband.* In 2003, the Commission adopted a Report and Order that permits MSS licensees (except in the Little LEO band) to provide ATC to their mobile satellite systems using spectrum in certain portions of the MSS bands.<sup>77</sup>

<sup>73</sup> See 47 C.F.R. § 2.106.

<sup>74</sup> See 47 C.F.R. § 2.106.

<sup>75</sup> See 47 C.F.R. § 2.106.

<sup>76</sup> Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, RM-7927, PP-28, *First Report and Order and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 7388 (1997). In April 2011, the Commission added Fixed and Mobile as co-primary allocations in the band. See *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, Report and Order*, ET Docket No. 10-142, *Report and Order*, FCC 11-57 (rel. Apr. 6, 2011).

<sup>77</sup> See generally *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, Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962 (2003) (*ATC Report and Order*), modified sua sponte by *Order on Reconsideration*, 18 FCC Rcd 13590 (continued....)

ATC consists of terrestrial base stations and mobile terminals that re-use frequencies assigned for MSS operations. To obtain ATC authority, an MSS operator must first satisfy certain gating criteria.<sup>78</sup> To date, four MSS operators have obtained ATC authority.<sup>79</sup> Ninety (90) megahertz of MSS spectrum has been identified as potentially available for terrestrial broadband use.<sup>80</sup>

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

(2003), *reconsidered in part in Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005), *further recon. pending*.

<sup>78</sup> *ATC Report and Order*, 18 FCC Rcd at 1965, ¶ 3. The gating criteria require that the MSS licensee: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated satellite/terrestrial service; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite footprint. *Id.*

<sup>79</sup> *See Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, Notice of Proposed Rulemaking and Notice of Inquiry*, ET Docket No. 10-142, 25 FCC Rcd 9481, 9483-85, at ¶¶ 6-8 (2010). Part of Big LEO operator Globalstar's ATC authority has been suspended. Globalstar Licensee LLC Application for Modification of License to Extend Dates for Coming into Compliance with Ancillary Terrestrial Component Rules and Open Range Request for Special Temporary Authority, File No. SAT-MOD-20091214-00152, Call Sign: S2115; File No. SAT-STA-20100625-00147, *Order*, 25 FCC Rcd 13114-13115, 13112, at ¶¶ 1, 18 (IB, WTB, OET 2010).

<sup>80</sup> *National Broadband Plan* at 87. The 90 megahertz is comprised of 40 megahertz from each of the L-Band and 2 GHz MSS allocations, and 10 megahertz from the Big LEO allocations. *Id.*

## APPENDIX B

## Mobile Wireless Network Technologies

1. 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>1</sup> In the past, cellular and SMR networks have used both analog and digital cellular technologies, 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. After the sunset of analog cellular service in February 2008, only digital cellular technologies are used in the mobile wireless industry.

2. 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). U.S. service providers have been phasing out TDMA service over the past several years.<sup>2</sup>

3. Beyond the 2G digital technologies, mobile wireless providers have been deploying network technologies<sup>3</sup> that allow them to offer mobile data services at higher data transfer speeds and, in some cases, to increase voice capacity.<sup>4</sup> For GSM/TDMA providers, the first step in the migration to next-generation network technologies is General Packet Radio Service (GPRS), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.<sup>5</sup> Beyond GPRS, many U.S. GSM/TDMA providers deployed Enhanced Data Rates for GSM Evolution (EDGE)

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<sup>1</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>2</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> (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.

<sup>3</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 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>4</sup> See Section IV.B.1, Network Coverage and Technology Upgrades, *supra*.

<sup>5</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.

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>6</sup> Finally, deployment of WCDMA with HSPA (High Speed Packet Access, which includes both High Speed Downlink Packet Access, HSDPA, and High Speed Uplink Packet Access, HSUPA) technology allows average download speeds of 400-700 kbps with burst rates of up to several Mbps,<sup>7</sup> average upload speeds of 500-800 kbps, when HSUPA technology is deployed.<sup>8</sup> Some service providers have deployed, or announced plans to deploy, additional HSPA upgrades that allow for faster peak and average data transfer speeds, such as HSPA 7.2 Mbps and HSPA+, which allows peak download speeds of 14.4 Mbps or 21 Mbps.<sup>9</sup>

4. 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>10</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>11</sup> Typical, user-experienced download speeds with EV-DO range from 400 to 800 kbps, while upload speeds average 50-70 kbps.<sup>12</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>13</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>14</sup> Deployment of these various technologies by service providers is discussed above. Maps showing CDMA and GSM network coverage, as well as mobile broadband coverage, can be found in Appendix D.

5. Beyond WCDMA, HSPA, HSPA+, and EV-DO, there are two main technologies for the next generation of mobile wireless broadband networks: Long Term Evolution (LTE) and mobile WiMAX. Both of these technologies are generally based on the Orthogonal Frequency Division Multiple

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<sup>6</sup> *Tenth Report*, 20 FCC Rcd at 15951, ¶ 111. Although WCDMA and WCDMA/HSPA are not backwards compatible with GPRS/EDGE, wireless modem cards that are compatible with both WCDMA/HSPA and GPRS/EDGE, and enable handoff between the two types of networks, are available for use with laptop computers. See, e.g., Novatel Wireless, *Products: Merlin U730 Wireless PC Modem Card*, available at [www.novatelwireless.com](http://www.novatelwireless.com) (visited Oct. 8, 2008).

<sup>7</sup> *Tenth Report*, 20 FCC Rcd at 15951, ¶ 111.

<sup>8</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>9</sup> See Section IV.B.1, *Network Coverage and Technology Upgrades*, *supra*.

<sup>10</sup> See *Seventh Report*, at 12990; *Ninth Report*, 19 FCC Rcd at 20650, ¶ 129.

<sup>11</sup> *Id.* See also, CDMA Development Group NOI Comments at 3-4.

<sup>12</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) (visited Dec. 15, 2008), (*3G Technology Comparison*). The maximum peak download speed for EV-DO is 2.4 Mbps. *Id.*

<sup>13</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>14</sup> *Standards in Wireless Telephone Networks*, at 328.

Access (OFDMA) modulation technology.<sup>15</sup> LTE can support theoretical peak speeds of 58 Mbps for upper link transmission and 173 Mbps for downlink transmission with 20 megahertz of spectrum and a 2x2 Multiple Input Multiple Output (MIMO) antenna structure.<sup>16</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>17</sup>

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<sup>15</sup> See *EDGE, HSPA and LTE—The Mobile Broadband Advantage*, Rysavy Research and 3G Americas, Sept. 2007, at 16, available at [http://www.3gamericas.com/pdfs/2007\\_Rysavy\\_091007.pdf](http://www.3gamericas.com/pdfs/2007_Rysavy_091007.pdf). 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. *Eleventh Report*, 21 FCC Rcd at 10995, ¶ 119.

<sup>16</sup> See *EDGE, HSPA and LTE—The Mobile Broadband Advantage*, Rysavy Research and 3G Americas, Sept. 2007, at 81, available at [http://www.3gamericas.com/pdfs/2007\\_Rysavy\\_091007.pdf](http://www.3gamericas.com/pdfs/2007_Rysavy_091007.pdf).

<sup>17</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).



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Table C-1: CTIA's Semi-Annual Mobile Wireless 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
2008	270,333,881	14,938,282	\$148,084,170	\$3,739,274	242,130	268,528	\$50.07
2009	285,646,191	15,312,310	\$152,551,854	\$3,061,344	247,081	248,247	\$48.16

Source: CTIA, *Background on CTIA's Semi-Annual Wireless Industry Survey*  
[http://files.ctia.org/pdf/CTIA\\_Survey\\_Midyear\\_2010\\_Graphics.pdf](http://files.ctia.org/pdf/CTIA_Survey_Midyear_2010_Graphics.pdf) (visited Nov. 30, 2010).

**Table C-2: FCC's Semi-Annual Local Telephone Competition Data Collection:  
Mobile Telephone Subscribership, in Thousands**

State	Dec 2009									
	Carriers	% Resold	2006		2007		2008		2009	
			Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Alabama	13	9 %	3,276	3,375	3,605	3,765	3,887	3,960	4,003	4,228
Alaska	11	6	397	412	432	460	480	383	544	586
American Samoa	*	*	*	*	*	*	*	*	*	*
Arizona	11	5	4,153	4,405	4,637	4,800	4,936	4,983	5,005	5,101
Arkansas	8	10	1,924	2,044	2,149	2,288	2,446	2,530	2,576	2,519
California	15	7	27,497	29,717	30,204	32,247	31,946	32,177	32,215	32,938
Colorado	11	8	3,428	3,608	3,756	3,968	4,066	4,311	4,357	4,503
Connecticut	7	6	2,582	2,705	2,787	2,884	2,959	3,030	3,047	3,123
Delaware	8	6	650	683	724	751	775	778	779	803
District of Columbia	8	7	879	880	966	936	1,047	1,096	1,116	1,183
Florida	11	10	14,177	14,762	15,255	15,605	15,809	16,158	16,425	16,744
Georgia	14	7	6,865	7,282	7,598	7,941	8,142	8,322	8,562	8,863
Guam	*	*	*	*	*	*	*	*	*	*
Hawaii	7	3	1,010	1,035	1,067	1,096	1,115	1,184	1,196	1,216
Idaho	14	5	901	973	1,019	1,086	1,125	1,167	1,180	1,221
Illinois	14	7	9,148	9,589	9,949	10,330	10,634	10,919	11,070	11,523
Indiana	12	8	3,973	4,271	4,448	4,675	4,824	4,956	4,983	5,205
Iowa	71	7	1,867	2,010	2,058	2,166	2,245	2,319	2,336	2,432
Kansas	15	11	1,905	2,047	2,133	2,261	2,326	2,421	2,430	2,466
Kentucky	12	10	2,821	2,966	3,101	3,291	3,343	3,445	3,439	3,631
Louisiana	10	7	3,356	3,492	3,612	3,765	3,896	4,012	4,053	3,993
Maine	8	17	787	845	882	941	972	1,012	1,006	1,065
Maryland	10	5	4,471	4,691	4,818	5,024	5,124	5,234	5,260	5,338
Massachusetts	8	9	4,917	5,129	5,289	5,470	5,624	5,749	6,027	6,171
Michigan	12	12	6,863	7,094	7,333	7,608	7,821	8,027	8,171	8,576
Minnesota	11	6	3,543	3,702	3,834	4,048	4,164	4,345	4,254	4,439
Mississippi	10	7	1,923	2,030	2,070	2,196	2,252	2,312	2,361	2,345
Missouri	12	8	4,068	4,322	4,480	4,674	4,835	4,940	4,985	5,129
Montana	9	8	575	620	650	694	723	748	707	802
Nebraska	11	5	1,199	1,272	1,325	1,387	1,451	1,496	1,508	1,515
Nevada	12	8	1,883	1,990	2,093	2,167	2,249	2,268	2,325	2,393
New Hampshire	8	10	897	943	973	1,022	1,045	1,080	1,075	1,125
New Jersey	8	5	6,954	7,207	7,419	7,654	7,834	8,008	8,036	8,158
New Mexico	10	5	1,253	1,333	1,416	1,489	1,555	1,536	1,550	1,624
New York	11	10	14,574	15,262	15,901	16,395	17,260	16,702	18,193	18,882
North Carolina	12	9	6,209	6,627	6,962	7,306	7,428	8,024	8,193	8,108
North Dakota	9	6	457	473	492	513	541	581	562	618
Northern Mariana Isl.	*	*	*	*	*	*	*	*	*	*
Ohio	12	10	7,939	8,380	8,723	9,099	9,357	9,565	9,456	10,059
Oklahoma	17	6	2,317	2,480	2,572	2,723	2,808	2,889	2,988	3,077
Oregon	11	6	2,484	2,656	2,781	2,923	3,007	3,084	3,112	3,235
Pennsylvania	14	10	8,349	8,831	9,201	9,615	9,895	10,214	10,455	10,867
Puerto Rico	6	2	2,171	2,301	2,323	2,411	2,502	2,624	2,706	2,807
Rhode Island	7	6	765	798	829	848	874	888	880	893
South Carolina	13	8	3,001	3,209	3,340	3,500	3,573	3,323	3,374	3,896
South Dakota	8	7	514	548	570	596	611	631	613	681
Tennessee	13	10	4,731	5,127	4,971	5,246	5,791	5,518	5,676	5,914
Texas	26	6	16,928	17,822	18,792	19,677	20,390	21,008	21,403	21,849
Utah	13	5	1,649	1,775	1,874	1,971	2,046	2,095	2,109	2,166
Vermont	7	15	334	358	375	402	421	435	398	463
Virgin Islands	*	*	*	*	*	*	*	*	*	*

Virginia	10	8	5,325	5,607	6,148	6,416	6,242	6,856	6,596	7,250
Washington	11	6	4,495	4,799	5,035	5,292	5,461	5,624	5,671	5,816
West Virginia	11	16	965	1,040	1,095	1,173	1,236	1,295	1,315	1,386
Wisconsin	13	9	3,517	3,510	3,641	3,842	3,966	4,265	4,317	4,546
Wyoming	13	9	359	387	410	441	457	484	429	517
Nationwide	180	8 %	217,418	229,619	238,316	249,332	255,729	261,284	265,332	274,283

Source: FCC Form 477.

\* = Data withheld to maintain firm confidentiality. Some data for June 2008 have been revised.

% Resold reflects the percentage of mobile telephony subscribers purchasing their service subscriptions from a mobile wireless reseller.

Table C-3: Economic Area Penetration Rates

EA	EA Name	Subscribers	2009 Estimated EA Population	2009 Penetration Rate	2009 HHI	2008 HHI	EA Density
57	Detroit-Ann Arbor-Flint, MI	7,882,122	6,915,601	114%	2815	3049	364.1
78	Birmingham, AL	1,862,516	1,679,665	111%	2568	2542	137.1
155	Farmington, NM-CO	233,710	215,888	108%	4008	6536	16.0
13	Washington-Baltimore, DC-MD-VA-WV-PA	9,888,125	9,367,024	106%	2683	2731	402.8
22	Fayetteville, NC	579,042	558,549	104%	2826	2980	164.6
87	Beaumont-Port Arthur, TX	459,993	447,070	103%	3303	3184	89.2
83	New Orleans, LA-MS (see note 1)	1,666,503	1,636,225	102%	3188	3261	171.9
10	New York-North New Jersey-Long Island, NY-NJ-CT-PA	27,018,157	26,752,421	101%	2556	2640	890.6
20	Norfolk-Virginia Beach-Newport News, VA-NC	1,859,299	1,835,017	101%	2760	2775	289.9
37	Albany, GA	504,963	500,752	101%	2985	4165	62.7
71	Nashville, TN-KY	2,877,422	2,835,094	101%	2562	2679	105.1
79	Montgomery, AL	501,498	494,140	101%	2654	3006	66.9
82	Biloxi-Gulfport-Pascagoula, MS	398,813	394,375	101%	2545	2465	143.5
85	Lafayette, LA	636,775	632,979	101%	4703	6497	100.0
122	Wichita, KS-OK	1,202,862	1,190,209	101%	2943	3011	20.5
161	San Diego, CA	3,071,856	3,053,793	101%	2543	2574	660.5
31	Miami-Fort Lauderdale, FL	6,253,316	6,252,464	100%	2238	2250	483.2
81	Pensacola, FL	690,312	688,680	100%	2732	2657	154.1
97	Springfield, IL-MO	514,352	513,449	100%	3824	3910	58.2
44	Knoxville, TN	1,089,348	1,100,819	99%	2713	2816	165.6
80	Mobile, AL	710,187	719,848	99%	3148	3106	74.8
90	Little Rock-North Little Rock, AR	1,677,439	1,700,495	99%	4174	4210	46.1
121	North Platte, NE-CO	58,221	59,033	99%	5304	5577	5.0
12	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	7,522,039	7,713,384	98%	2498	2614	778.8
29	Jacksonville, FL-GA	2,122,948	2,175,495	98%	2342	2540	112.5
132	Corpus Christi, TX	548,067	559,067	98%	2144	2471	46.5
135	Odessa-Midland, TX	405,305	412,858	98%	3521	3671	10.1
141	Denver-Boulder-Greeley, CO-KS-NE	4,545,023	4,623,277	98%	2387	2370	52.0
172	Honolulu, HI	1,268,715	1,295,178	98%	2372	2365	187.2
15	Richmond-Petersburg, VA	1,558,242	1,608,573	97%	3216	3366	124.0
73	Memphis, TN-AR-MS-KY	1,923,617	1,977,533	97%	2585	2709	103.0
86	Lake Charles, LA	526,662	543,482	97%	3397	5327	52.4
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH	7,923,813	8,278,493	96%	2752	2800	421.8
35	Tallahassee, FL-GA	758,243	791,953	96%	3116	3772	63.5
45	Johnson City-Kingsport-Bristol, TN-VA	578,094	601,030	96%	3801	3936	144.5
51	Columbus, OH	2,443,296	2,545,136	96%	3157	3135	190.4
55	Cleveland-Akron, OH-PA	4,411,646	4,592,908	96%	3763	3959	427.8
89	Monroe, LA	318,653	330,757	96%	4386	4364	56.1
131	Houston-Galveston-Brazoria, TX	6,572,649	6,840,330	96%	2268	2281	169.3
133	McAllen-Edinburg-Mission, TX	1,168,451	1,220,589	96%	2758	3025	222.0
34	Tampa-St. Petersburg-Clearwater, FL	2,607,865	2,747,272	95%	2257	2291	891.0
36	Dothan, AL-FL-GA	332,880	351,564	95%	2709	4613	53.7
38	Macon, GA	782,385	821,390	95%	3884	4197	62.9
39	Columbus, GA-AL	496,486	522,421	95%	3063	2911	84.1

EA	EA Name	Subscribers	2009 Estimated EA Population	2009 Penetration Rate	2009 HHI	2008 HHI	EA Density
50	Dayton-Springfield, OH	1,059,551	1,115,251	95%	2607	2615	318.5
93	Joplin, MO-KS-OK	265,187	278,248	95%	3464	3584	74.7
127	Dallas-Fort Worth, TX-AR-OK	8,609,409	9,107,967	95%	2614	2623	119.0
143	Casper, WY-ID-UT	429,532	449,779	95%	5350	7653	5.2
170	Seattle-Tacoma-Bremerton, WA	4,409,480	4,643,110	95%	2702	2615	190.5
27	Augusta-Aiken, GA-SC	597,328	638,707	94%	3249	3960	89.8
28	Savannah, GA-SC	731,409	777,504	94%	2450	3312	92.0
40	Atlanta, GA-AL-NC	6,459,664	6,886,313	94%	2452	2409	246.0
42	Asheville, NC	463,902	493,170	94%	4273	4132	128.6
64	Chicago-Gary-Kenosha, IL-IN-WI	10,268,875	10,875,669	94%	2070	2146	556.5
70	Louisville, KY-IN	1,426,145	1,525,268	94%	2471	2520	180.9
84	Baton Rouge, LA-MS	766,799	819,964	94%	4896	5007	140.3
111	Minot, ND	101,445	107,605	94%	4360	7745	7.0
128	Abilene, TX	205,186	217,433	94%	3539	3457	20.4
23	Charlotte-Gastonia-Rock Hill, NC-SC	2,353,511	2,524,998	93%	3044	3097	240.5
24	Columbia, SC	959,242	1,030,810	93%	3218	3692	126.0
30	Orlando, FL	4,146,283	4,464,397	93%	2426	2486	265.8
53	Pittsburgh, PA-WV	2,681,258	2,898,241	93%	3185	3157	284.8
99	Kansas City, MO-KS	2,531,126	2,719,973	93%	2289	2290	88.7
125	Oklahoma City, OK	1,707,641	1,838,406	93%	3100	3444	65.0
142	Scottsbluff, NE-WY	83,114	88,945	93%	6572	6973	7.8
153	Las Vegas, NV-AZ-UT	2,189,513	2,347,051	93%	2137	2341	23.7
8	Buffalo-Niagara Falls, NY-PA	1,324,113	1,446,063	92%	3240	3324	212.9
88	Shreveport-Bossier City, LA-AR	533,512	581,587	92%	3871	3957	58.0
130	Austin-San Marcos, TX	1,669,505	1,818,555	92%	2633	2640	156.1
134	San Antonio, TX	2,372,703	2,566,061	92%	2162	2220	83.0
5	Albany-Schenectady-Troy, NY	1,091,428	1,205,523	91%	3435	3352	134.7
17	Roanoke, VA-NC-WV	781,545	862,958	91%	2384	2439	97.8
25	Wilmington, NC-SC	941,677	1,032,795	91%	2837	2760	107.4
26	Charleston-North Charleston, SC	639,035	698,437	91%	3011	2969	149.8
43	Chattanooga, TN-GA	722,276	792,821	91%	3719	3494	145.3
49	Cincinnati-Hamilton, OH-KY-IN	2,134,182	2,353,401	91%	2287	2247	294.1
69	Evansville-Henderson, IN-KY-IL	788,971	862,384	91%	4380	4590	75.3
95	Jonesboro, AR-MO	280,812	307,391	91%	5041	5032	51.3
96	St. Louis, MO-IL	3,358,878	3,691,421	91%	2669	2733	127.0
124	Tulsa, OK-KS	1,339,303	1,466,450	91%	3080	3222	72.4
137	Lubbock, TX	356,776	392,653	91%	2750	2832	27.2
163	San Francisco-Oakland-San Jose, CA	8,812,967	9,683,498	91%	2662	2610	271.1
41	Greenville-Spartanburg-Anderson, SC-NC	1,250,088	1,389,094	90%	3367	4097	183.6
77	Jackson, MS-AL-LA	1,332,856	1,485,097	90%	3451	3534	49.7
103	Cedar Rapids, IA	381,493	424,398	90%	2588	2561	101.3
107	Minneapolis-St. Paul, MN-WI-IA	4,387,117	4,867,600	90%	2689	2735	83.0
171	Anchorage, AK	614,485	683,946	90%	3604	3865	1.1
6	Syracuse, NY-PA	1,669,807	1,885,052	89%	4033	3986	104.7
7	Rochester, NY-PA	1,310,404	1,480,252	89%	4368	4389	167.2
18	Greensboro-Winston-Salem-High Point, NC-VA	1,812,660	2,025,527	89%	2751	3155	189.1
19	Raleigh-Durham-Chapel Hill, NC	2,038,630	2,286,793	89%	2859	2965	188.4

EA	EA Name	Subscribers	2009 Estimated EA Population	2009 Penetration Rate	2009 HHI	2008 HHI	EA Density
67	Indianapolis, IN-IL	2,934,533	3,296,788	89%	3135	3118	171.4
98	Columbia, MO	353,160	397,345	89%	3991	4082	58.0
101	Peoria-Pekin, IL	468,350	529,129	89%	3512	3424	91.0
126	Western Oklahoma, OK	122,783	137,861	89%	2306	3170	12.0
160	Los Angeles-Riverside-Orange County, CA-AZ	17,471,704	19,686,186	89%	2365	2488	286.1
9	State College, PA	700,119	798,328	88%	4116	4204	92.4
21	Greenville, NC	776,939	887,786	88%	2599	2641	87.7
56	Toledo, OH	1,135,873	1,295,678	88%	4739	5360	163.9
118	Omaha, NE-IA-MO	981,985	1,111,783	88%	2950	3537	62.4
136	Hobbs, NM-TX	176,578	199,640	88%	3144	3896	11.2
138	Amarillo, TX-NM	434,607	493,283	88%	2681	2668	11.8
156	Albuquerque, NM-AZ	923,994	1,047,578	88%	2943	2845	20.9
157	El Paso, TX-NM	928,888	1,060,233	88%	2278	2433	33.0
167	Portland-Salem, OR-WA	2,932,146	3,328,126	88%	2546	2469	76.0
2	Portland, ME	685,209	784,721	87%	2852	2812	98.6
32	Fort Myers-Cape Coral, FL	787,851	905,445	87%	2403	2429	234.3
63	Milwaukee-Racine, WI	2,042,368	2,342,714	87%	2100	2123	366.9
66	Fort Wayne, IN	648,222	745,537	87%	3563	3543	158.5
72	Paducah, KY-IL	200,125	230,246	87%	5457	5945	70.0
102	Davenport-Moline-Rock Island, IA-IL	488,549	559,146	87%	2640	2585	108.3
110	Grand Forks, ND-MN	191,816	219,646	87%	4824	*	10.2
115	Rapid City, SD-MT-ND-NE	196,370	226,418	87%	4954	9658	5.0
119	Lincoln, NE	349,974	404,463	87%	4825	4909	50.2
154	Flagstaff, AZ-UT	417,045	480,160	87%	4202	3893	8.2
11	Harrisburg-Lebanon-Carlisle, PA	1,053,716	1,221,803	86%	3297	3235	292.4
75	Tupelo, MS-AL-TN	541,245	628,046	86%	5319	5403	49.8
91	Fort Smith, AR-OK	298,891	349,542	86%	4084	4121	46.5
106	Rochester, MN-IA-WI	291,097	337,571	86%	3528	3267	55.7
120	Grand Island, NE	245,267	284,811	86%	6209	6672	11.6
144	Billings, MT-WY	383,959	446,354	86%	5408	8486	4.9
148	Idaho Falls, ID-WY	308,716	358,114	86%	4512	4472	10.9
16	Staunton, VA-WV	300,630	352,381	85%	2886	2881	51.0
68	Champaign-Urbana, IL	535,129	629,446	85%	3546	3434	73.5
94	Springfield, MO	815,858	957,072	85%	3662	3690	48.1
100	Des Moines, IA-IL-MO	1,465,413	1,727,660	85%	2998	2967	47.3
123	Topeka, KS	398,302	468,159	85%	2665	2623	35.6
129	San Angelo, TX	175,256	207,355	85%	2049	2237	10.1
140	Pueblo, CO-NM	247,638	290,867	85%	3202	3850	8.7
149	Twin Falls, ID	152,964	179,994	85%	4400	4175	14.1
151	Reno, NV-CA	655,836	774,965	85%	2624	2910	7.6
33	Sarasota-Bradenton, FL	740,325	880,375	84%	2676	2733	273.6
52	Wheeling, WV-OH	255,721	304,530	84%	4446	4538	124.5
62	Grand Rapids-Muskegon-Holland, MI	1,655,384	1,966,438	84%	2817	3384	206.8
139	Santa Fe, NM	232,137	275,290	84%	4258	4676	13.1
159	Tucson, AZ	1,004,865	1,193,489	84%	2732	2622	60.0
166	Eugene-Springfield, OR-CA	717,806	849,683	84%	2454	2322	43.1
169	Richland-Kennewick-Pasco, WA	658,922	780,554	84%	2757	2723	27.7

EA	EA Name	Subscribers	2009 Estimated EA Population	2009 Penetration Rate	2009 HHI	2008 HHI	EA Density
48	Charleston, WV-KY-OH	976,545	1,180,068	83%	3575	3442	85.4
61	Traverse City, MI	249,511	299,280	83%	2951	4365	50.7
112	Bismarck, ND-MT-SD	148,846	180,389	83%	5047	*	6.3
116	Sioux Falls, SD-IA-MN-NE	467,241	560,434	83%	5160	8893	15.1
117	Sioux City, IA-NE-SD	207,352	249,101	83%	4209	5777	39.5
146	Missoula, MT	367,196	439,819	83%	6359	*	10.8
147	Spokane, WA-ID	767,173	926,112	83%	3553	3356	23.6
150	Boise City, ID-OR	594,114	718,161	83%	3050	2912	13.7
1	Bangor, ME	439,606	533,580	82%	4015	4250	20.9
46	Hickory-Morganton, NC-TN	451,236	550,763	82%	2795	4160	131.9
59	Green Bay, WI-MI	560,681	681,951	82%	2476	2837	34.2
113	Fargo-Moorhead, ND-MN	318,935	387,284	82%	4470	6536	16.4
152	Salt Lake City-Ogden, UT-ID	2,126,109	2,581,642	82%	2333	2408	35.7
158	Phoenix-Mesa, AZ-NM	3,709,196	4,523,383	82%	2792	2734	93.9
14	Salisbury, MD-DE-VA	334,084	414,004	81%	5769	5507	111.2
65	Elkhart-Goshen, IN-MI	779,351	958,250	81%	3022	3158	185.7
104	Madison, WI-IA-IL	818,458	1,009,469	81%	3316	3442	71.3
108	Wausau, WI	395,982	488,995	81%	1903	2477	34.1
109	Duluth-Superior, MN-WI	285,429	350,305	81%	4179	*	18.5
60	Appleton-Oshkosh-Neenah, WI	370,326	461,535	80%	2545	2618	143.6
165	Redding, CA-OR	290,625	362,225	80%	3036	2888	14.4
47	Lexington, KY-TN-VA-WV	1,538,900	1,943,408	79%	3406	3869	80.4
54	Erie, PA	403,388	509,887	79%	4196	4241	116.4
58	Northern Michigan, MI	206,918	265,214	78%	4229	*	28.5
145	Great Falls, MT	127,452	163,968	78%	5104	8303	4.2
162	Fresno, CA	1,279,408	1,642,331	78%	2926	2962	98.6
76	Greenville, MS	170,285	222,248	77%	3941	3575	41.0
92	Fayetteville-Springdale-Rogers, AR-MO-OK	404,378	527,035	77%	4654	4729	88.4
114	Aberdeen, SD	59,321	77,157	77%	4914	*	5.4
168	Pendleton, OR-WA	153,760	205,791	75%	3068	2894	8.7
4	Burlington, VT-NY	450,191	619,614	73%	5443	8263	57.6
105	La Crosse, WI-MN	185,357	253,647	73%	3863	3823	53.7
164	Sacramento-Yolo, CA	1,927,296	2,698,718	71%	2831	2621	188.1
74	Huntsville, AL-TN (see note 2)	*	1,082,680	*	*	*	119.1

\* = Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on year-end 2009 filings for Numbering Resource Utilization in the United States, adjusted for porting. Density is persons per square mile. EA populations are based on Census estimates as of July 1, 2009.

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 C-4: Selected Smartphone Launches in 2009

<b>Smartphone</b>	<b>Date Launched</b>	<b>Wireless Service Provider(s)</b>	<b>Offered Exclusively at Launch?<sup>1</sup></b>	<b>Handset Manufacturer</b>	<b>Platform/ Operating System</b>
E63 <sup>2</sup>	Jan. 2009	Unlocked	No	Nokia	Symbian OS 9.2, S60 v. 3.1 UI
5800 Xpress Music <sup>3</sup>	Feb. 2009	Unlocked	No	Nokia	Symbian OS 9.4, S60 rel. 5
BlackBerry Curve 8900 <sup>4</sup>	Feb. 2009	AT&T T-Mobile Cellular One (Montana) Cellular One of East Texas Corr Long Lines MTPCS/Cellular One/Chinook Viaero West Central	No	RIM	BlackBerry
E75 <sup>5</sup>	Apr. 2009	Unlocked	No	Nokia	Symbian OS 9.3, S60 rel. 3.2
Propel Pro <sup>6</sup>	Apr. 2009	AT&T	Yes	Samsung	Windows Mobile 6.1
Nokia E71x <sup>7</sup>	May 2009	AT&T	Yes	Nokia	Symbian OS 9.2, S60 rel. 3.1 UI
Jack <sup>8</sup>	May 2009	AT&T	Yes	Samsung	Windows Mobile 6.1

<sup>1</sup> Based on reviewing company websites and press releases.

<sup>2</sup> *Messaging made simple – the Nokia E63 heads to the United States*, Press Release, Nokia, Jan. 7, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1280903>.

<sup>3</sup> *Nokia 5800 XpressMusic hits shelves in the United States*, Press Release, Nokia, Feb. 27, 2009, available at <http://www.nokia.com/press/press-releases/archive/archiveshowpressrelease?newsid=1293991>.

<sup>4</sup> *T-Mobile USA to Offer Customers the Thinnest and Lightest Full-QWERTY BlackBerry Smartphone*, Press Release, RIM, Jan. 7, 2009, available at <http://press.rim.com/release.jsp?id=1984>. U.S. providers carrying the Curve 8900 listed on RIM's page for the device at [http://na.blackberry.com/eng/devices/blackberrycurve8900/curve\\_wherebuy.jsp](http://na.blackberry.com/eng/devices/blackberrycurve8900/curve_wherebuy.jsp).

<sup>5</sup> *Email the way you want it – Nokia E75 begins shipping*, Press Release, Nokia Apr. 6, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1303620>.

<sup>6</sup> *AT&T Unveils New Integrated Devices for Texting, Email and More*, Press Release, AT&T, Mar. 30, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26664>. U.S. exclusivity through AT&T indicated by Samsung's website at [http://www.samsung.com/us/consumer/mobile/mobile-phones/at-t-phones/SGH-I627MAAATT/index.idx?pagetype=prd\\_detail](http://www.samsung.com/us/consumer/mobile/mobile-phones/at-t-phones/SGH-I627MAAATT/index.idx?pagetype=prd_detail) (identifying the Propel Pro as an AT&T device).

<sup>7</sup> *Nokia E71x with AT&T in stores across the U.S. today*, Press Release, Nokia, May 4, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1310666>. Exclusivity indicated by AT&T's page for the device at <http://www.wireless.att.com/businesscenter/NokiaE71x/index.jsp>.

<sup>8</sup> *AT&T Completes Its Full House of Smart Devices with the New Samsung Jack*, Press Release, AT&T, May 14, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26818&mapcode> (indicates exclusivity).

<u>Smartphone</u>	<u>Date Launched</u>	<u>Wireless Service Provider(s)</u>	<u>Offered Exclusively at Launch?</u> <sup>1</sup>	<u>Handset Manufacturer</u>	<u>Platform/ Operating System</u>
Pre <sup>9</sup>	June 2009	Sprint Nextel Verizon Wireless	No	Palm	Palm OS
iPhone 3G S <sup>10</sup>	June 2009	AT&T	Yes	Apple	iPhone OS
BlackBerry Pearl Flip 8230 <sup>11</sup>	June 2009	Verizon Wireless ACS Alltel Appalachian Bluegrass Carolina West Cellcom Cellular One of NEPA Cellular South Inland Nex-Tech/United nTelos Panhandle/PTCI US Cellular	No	RIM	BlackBerry
Snap <sup>12</sup>	June 2009	Sprint Nextel US Cellular	No	HTC	Windows Mobile 6.1
Ozone <sup>13</sup>	June 2009	Verizon Wireless	Yes	HTC	Windows Mobile 6.1
N97 <sup>14</sup>	June 2009	Unlocked	No	Nokia	Symbian OS 9.4, S60 rel. 5
N86 <sup>15</sup>	July 2009	Unlocked	No	Nokia	Symbian OS 9.3, S60 rel. 3.2

<sup>9</sup> Charlie Sorrel, *It's Official: Palm Pre to Launch June 6<sup>th</sup> for \$300*, Gadget Lab Blog, WIRED, May 19, 2009, at <http://www.wired.com/gadgetlab/2009/05/boom-palm-pre-to-launch-june-6th-300>.

<sup>10</sup> *iPhone 3G S Available at AT&T Tomorrow*, Press Release, AT&T, June 18, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26868&mapcode>. U.S. exclusivity with AT&T of the iPhone 3G S indicated in the fine print/footnote on Apple's iPhone purchase page at <http://www.apple.com/iphone/buy>.

<sup>11</sup> *Verizon Wireless Customers Will Flip For The New 3G-Enabled BlackBerry Pearl Flip Smartphone*, Press Release, RIM, June 4, 2009, available at <http://press.rim.com/release.jsp?id=2345>. U.S. providers carrying the Pearl Flip 8230 listed on RIM's page for the device at <http://na.blackberry.com/eng/devices/blackberrypearl8200>.

<sup>12</sup> *Sprint Strengthens Social Network Connections with Customers*, Press Release, Sprint Nextel, June 22, 2009, available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1300933&highlight](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1300933&highlight)). US Cellular subsequently made the HTC Snap available on its network and for purchase on its website at <http://www.uscellular.com/uscellular/cell-phones/phoneDetailsPopup.jsp?IDparam=prod680004>.

<sup>13</sup> *HTC Ozone Brings Verizon Wireless' Smartphone Lineup to New Heights*, Press Release, Verizon Wireless June 25, 2009, available at <http://news.vzw.com/news/2009/06/pr2009-06-25.html>. Exclusivity indicated by Verizon Wireless's webpage at <http://www.verizonwireless.com/b2c/store/controller?item=phoneFirst&action=viewPhoneDetail&selectedPhoneId=4848&cmp=KNC-PaidSearch>.

<sup>14</sup> *Nokia N97 mobile computer to begin selling worldwide in June*, Press Release, Nokia, June 2, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1319081>.

<sup>15</sup> *The ultimate imaging device – the Nokia N86 8MP – coming to the United States*, Press Release, Nokia, July 17, 2009, available at <http://pressbulletinboard.nokia.com/2009/07/17/the-ultimate-imaging-device-%E2%80%93-the-nokia-n86-8mp-%E2%80%93-coming-to-the-united-states/>.

<u>Smartphone</u>	<u>Date Launched</u>	<u>Wireless Service Provider(s)</u>	<u>Offered Exclusively at Launch?<sup>1</sup></u>	<u>Handset Manufacturer</u>	<u>Platform/ Operating System</u>
Dash 3G <sup>16</sup>	July 2009	T-Mobile	Yes	HTC	Windows Mobile 6.1
Surge <sup>17</sup>	July 2009	AT&T	Yes	Nokia	Symbian OS, S60 3.2 Edition
myTouch 3G <sup>18</sup>	Aug. 2009	T-Mobile	Yes	HTC	Google Android
BlackBerry Curve 8520 <sup>19</sup>	Aug. 2009	AT&T T-Mobile Iowa Wireless Long Lines MTPCPS/Cellular One/Chinook	No	RIM	Blackberry
Touch Pro 2 <sup>20</sup>	Aug. 2009	T-Mobile Sprint Nextel Verizon Wireless US Cellular	No	HTC	Windows Mobile 6.1 Professional

<sup>16</sup> *T-Mobile USA To Offer New 3G-Enabled Smartphone*, Press Release, T-Mobile, June 17, 2009, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs Prs 20090618&title=T-Mobile%20USA%20To%20Offer%20New%203G-Enabled%20Smartphone](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs Prs 20090618&title=T-Mobile%20USA%20To%20Offer%20New%203G-Enabled%20Smartphone). T-Mobile's U.S. exclusivity indicated by name being "T-Mobile Dash 3G" and by the Dash 3G being a new generation of the T-Mobile Dash, which was exclusively available through T-Mobile. See *T-Mobile Unveils a New Full-Featured Smartphone, the T-Mobile Dash*, Press Release, T-Mobile, Oct. 11, 2006, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs Prs 20061011&title=T-Mobile%20Unveils%20a%20New%20Full-Featured%20Smartphone,%20the%20T-Mobile%20Dash](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs Prs 20061011&title=T-Mobile%20Unveils%20a%20New%20Full-Featured%20Smartphone,%20the%20T-Mobile%20Dash).

<sup>17</sup> *AT&T and Nokia ride a social wave into summer with Nokia Surge*, Press Release, Nokia, July 13, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1328505>. Exclusivity indicated by AT&T's page for the device at <http://www.wireless.att.com/businesscenter/nokia-surge/index.jsp>.

<sup>18</sup> *T-Mobile myTouch 3G Available in Stores Nationwide Beginning Today*, Press Release, T-Mobile, Aug. 5, 2009, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs Prs 20090805&title=T-Mobile%20myTouch%203G%20Available%20in%20Stores%20Nationwide%20Beginning%20Today](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs Prs 20090805&title=T-Mobile%20myTouch%203G%20Available%20in%20Stores%20Nationwide%20Beginning%20Today). Exclusivity indicated by full name being "T-Mobile® myTouch 3G" and HTC's site referring to it as a T-Mobile device at <http://www.htc.com/us/products/t-mobile-mytouch-3g?view=1-2&sort=0>.

<sup>19</sup> *T-Mobile USA and RIM Introduce the New BlackBerry Curve 8520*, Press Release, RIM, July 27, 2009, available at <http://press.rim.com/release.jsp?id=2437>. U.S. providers carrying the Curve 8520 listed on RIM's webpage at <http://na.blackberry.com/eng/devices/blackberrycurve8500>.

<sup>20</sup> *T-Mobile USA Debuts HTC Touch Pro2 in the U.S.*, Press Release, T-Mobile, July 29, 2009, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs Prs 20090729&title=T-Mobile%20USA%20Debuts%20HTC%20Touch%20Pro2%20in%20the%20U.S.](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs Prs 20090729&title=T-Mobile%20USA%20Debuts%20HTC%20Touch%20Pro2%20in%20the%20U.S.). U.S. providers carrying the Touch Pro2 identified on HTC's webpage at <http://www.htc.com/us/products>.

<b>Smartphone</b>	<b>Date Launched</b>	<b>Wireless Service Provider(s)</b>	<b>Offered Exclusively at Launch?<sup>1</sup></b>	<b>Handset Manufacturer</b>	<b>Platform/ Operating System</b>
BlackBerry Tour <sup>21</sup>	Aug. 2009	Sprint Nextel Verizon Wireless ACS Alltel Appalachian Bluegrass Carolina West Cellcom Cellular South Credo Mobile Inland nTelos Panhandle/PTCI Pioneer US Cellular	No	RIM	BlackBerry
Touch Diamond <sup>22</sup>	Sept. 2008	Sprint Nextel Verizon Wireless	No	HTC	Windows Mobile 6.1 Professional
Pure <sup>23</sup>	Oct. 2009	AT&T	Yes	HTC	Windows Mobile 6.5
Imagio <sup>24</sup>	Oct. 2009	Verizon Wireless	Yes	HTC	Windows Mobile 6.5
Hero <sup>25</sup>	Oct. 2009	Cellular South Sprint Nextel	No	HTC	Google Android
BlackBerry Storm 2 <sup>26</sup>	Oct. 2009	Verizon Wireless	Yes	RIM	BlackBerry

<sup>21</sup> *RIM Introduces the BlackBerry Tour Smartphone*, Press Release, RIM, June 16, 2009, available at <http://press.rim.com/release.jsp?id=2393>. U.S. providers carrying the Tour listed on RIM's page for the device at [http://na.blackberry.com/eng/devices/blackberrytour/tour\\_wherebuy.jsp](http://na.blackberry.com/eng/devices/blackberrytour/tour_wherebuy.jsp).

<sup>22</sup> *Sprint Gives the Gift of Choice with a Diverse Holiday Lineup for Consumers and Businesses Offering the Benefits of the Now Network™ - Speed, Ease of Use, Exclusive Content and Worry-Free Pricing*, Press Release, Sprint Nextel, Sep. 10, 2008, available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1195804&highlight=diamond](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1195804&highlight=diamond). Verizon Wireless subsequently offered the Touch Diamond for its network. See *HTC Touch Diamond Available On Nation's Most Reliable Wireless Network*, Press Release, Verizon Wireless, Apr. 9, 2009, available at <http://news.vzw.com/news/2009/04/pr2009-04-09.html>.

<sup>23</sup> *AT&T and HTC Debut HTC Tilt 2 and HTC Pure Windows Phones*, Press Release, AT&T, Oct. 5, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27204&mapcode>. Exclusivity of Pure indicated by AT&T's product page for the device at <https://www.wireless.att.com/businesscenter/HTC-PURE/index.jsp>.

<sup>24</sup> *Imagine The Possibilities For Work And Play With The HTC Imagio Exclusively From Verizon Wireless*, Press Release, Verizon Wireless, Oct. 1, 2009, available at <http://news.vzw.com/news/2009/10/pr2009-09-30b.html> (indicates exclusivity).

<sup>25</sup> *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, Sep. 3, 2009, available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1327394&highlight=](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1327394&highlight=). Cellular South subsequently began offering the Hero on its network, as indicated at [https://www.cellularsouth.com/cscommerce/products/phones/product\\_phone\\_detail.jsp?navAction=push&navCount=0&id=prod26560022](https://www.cellularsouth.com/cscommerce/products/phones/product_phone_detail.jsp?navAction=push&navCount=0&id=prod26560022).

<sup>26</sup> *A Powerful New Storm Rolls Onto Verizon Wireless' Network on Oct. 28*, Press Release, RIM, Oct. 26, 2009, available at <http://press.rim.com/release.jsp?id=2590>. U.S. exclusivity of Storm2 indicated on RIM's page for the device at [http://na.blackberry.com/eng/devices/blackberrystorm/storm\\_wherebuy.jsp](http://na.blackberry.com/eng/devices/blackberrystorm/storm_wherebuy.jsp) (Verizon Wireless only U.S. provider listed).

<u>Smartphone</u>	<u>Date Launched</u>	<u>Wireless Service Provider(s)</u>	<u>Offered Exclusively at Launch?<sup>1</sup></u>	<u>Handset Manufacturer</u>	<u>Platform/ Operating System</u>
N97 Mini <sup>27</sup>	Oct. 2009	Unlocked	No	Nokia	Symbian OS 9.4, S60 rel. 5
Tilt 2 <sup>28</sup>	Oct. 2009	AT&T	Yes	HTC	Windows Mobile 6.5
Moment <sup>29</sup>	Nov. 2009	Sprint Nextel	Yes	Samsung	Google Android
CLIQ <sup>30</sup>	Nov. 2009	T-Mobile	Yes	Motorola	Google Android
DROID <sup>31</sup>	Nov. 2009	Verizon Wireless	Yes	Motorola	Google Android
DROID Eris <sup>32</sup>	Nov. 2009	Verizon Wireless	Yes	HTC	Google Android
Pixi <sup>33</sup>	Nov. 2009	Sprint Nextel	Yes	Palm	Palm OS
E72 <sup>34</sup>	Nov. 2009	Unlocked	No	Nokia	Symbian OS 9.3, S60 v. 3.2 UI
N900 <sup>35</sup>	Nov. 2009	Unlocked	No	Nokia	Maemo 5 Linux
Behold II <sup>36</sup>	Nov. 2009	T-Mobile	Yes	Samsung	Google Android

<sup>27</sup> *Nokia N97 gets even better with a new software update; Nokia N97 mini now available in stores*, Press Release, Nokia, Oct. 28, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1350820>.

<sup>28</sup> *AT&T and HTC Debut HTC Tilt 2 and HTC Pure Windows Phones*, Press Release, AT&T Oct. 5, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27204&mapcode>. Exclusivity of Tilt2 indicated by AT&T's product page for the device at <https://www.wireless.att.com/businesscenter/HTC-Tilt-2/index.jsp>.

<sup>29</sup> *Samsung's First Android-Powered Phone, Samsung Moment with Google, Coming Soon to America's Most Dependable 3G Network*, Press Release, Sprint Nextel, Oct. 7, 2009, available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1339737&highlight](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1339737&highlight). Exclusivity indicated by the Moment's fact sheet available at <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTgwMzZ8Q2hpbGRJRDR0tMXxUeXBIPtM=&t=1>.

<sup>30</sup> *T-Mobile USA Launches Motorola CLIQ with MOTOBLUR In Stores Beginning Today*, Press Release, T-Mobile, Nov. 2, 2009, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs\\_Prs\\_20091102&title=T-Mobile%20USA%20Launches%20Motorola%20CLIQ%20with%20MOTOBLUR%20In%20Stores%20Beginning%20Today](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20091102&title=T-Mobile%20USA%20Launches%20Motorola%20CLIQ%20with%20MOTOBLUR%20In%20Stores%20Beginning%20Today) (indicates exclusivity).

<sup>31</sup> *Hello Humans: Droid by Motorola Arrives Next Week*, Press Release, Verizon Wireless, Oct. 28, 2009, available at <http://news.vzw.com/news/2009/10/pr2009-10-27.html> (indicates exclusivity).

<sup>32</sup> *Bring An Android Device Home For The Holidays With DROID ERIS By HTC, Exclusively From Verizon Wireless*, Press Release, Verizon Wireless, Nov. 5, 2009, available at <http://news.vzw.com/news/2009/11/pr2009-11-05.html> (indicates exclusivity).

<sup>33</sup> *Palm Pixi Available Nov. 15 for Just \$99.99 Exclusively from Sprint*, Press Release, Sprint Nextel, Oct. 26, 2009, available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1346184&highlight=pixi](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1346184&highlight=pixi) (indicates exclusivity).

<sup>34</sup> *Nokia E72 in stores now*, Press Release, Nokia, Nov. 16, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1355243>.

<sup>35</sup> *The Nokia N900 is now available to US consumers*, Press Release, Nokia, Nov. 18, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1355897>.

<sup>36</sup> *T-Mobile USA Launches the Samsung Behold II on November 18*, Press Release, T-Mobile, Nov. 13, 2009, available at [http://www.t-mobile.com/company/PressReleases\\_Article.aspx?assetName=Prs\\_Prs\\_20091113&title=T-Mobile%20USA%20Launches%20the%20Samsung%20Behold%20II%20on%20November%2018](http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20091113&title=T-Mobile%20USA%20Launches%20the%20Samsung%20Behold%20II%20on%20November%2018) (indicates exclusivity).

<u>Smartphone</u>	<u>Date Launched</u>	<u>Wireless Service Provider(s)</u>	<u>Offered Exclusively at Launch?</u> <sup>1</sup>	<u>Handset Manufacturer</u>	<u>Platform/ Operating System</u>
BlackBerry Curve 8530 <sup>37</sup>	Nov. 2009	Sprint Nextel Verizon Wireless Alltel US Cellular	No	RIM	BlackBerry
BlackBerry Bold 9700 <sup>38</sup>	Nov. 2009	AT&T T-Mobile	No	RIM	Blackberry
IPaq <sup>39</sup>	Nov. 2009	AT&T	Yes	HP	Windows Mobile 6.5
Omnia 2 <sup>40</sup>	Dec. 2009	Verizon Wireless	Yes	Samsung	Windows Mobile 6.5
eXpo <sup>41</sup>	Dec. 2009	AT&T	Yes	LG	Google Android
5800 Navigation Edition <sup>42</sup>	Dec. 2009	Unlocked	No	Nokia	Symbian OS 9.4, S60 rel. 5
Nexus One <sup>43</sup>	Jan. 2010	T-Mobile (locked or unlocked) Unlocked (other GSM providers)	No	HTC	Google Android

<sup>37</sup> Verizon Wireless Introduces the BlackBerry Curve 8530 Smartphone, Press Release, RIM, Nov. 5, 2009, available at <http://press.rim.com/release.jsp?id=2686>. U.S. providers carrying the Curve 8530 listed on RIM's page at <http://na.blackberry.com/eng/devices/blackberrycurve8500>.

<sup>38</sup> RIM Introduces the New BlackBerry Bold 9700 Smartphone, Press Release, RIM, Oct. 21, 2009, available at <http://press.rim.com/release.jsp?id=2567>. U.S. providers carrying the Bold 9700 listed on RIM's page at [http://na.blackberry.com/eng/devices/blackberrybold9700/bold\\_wheretobuy.jsp](http://na.blackberry.com/eng/devices/blackberrybold9700/bold_wheretobuy.jsp).

<sup>39</sup> AT&T and HP Introduce HP IPaq Glisten, 3G World Phone for Mobile Professionals, Press Release, AT&T, Nov. 24, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27587&mapcode>. U.S. exclusivity of the iPaq through AT&T indicated at <http://www.wireless.att.com/businesscenter/hp-ipaq-glisten/index.jsp>.

<sup>40</sup> Verizon Wireless Announces The Availability Of The Samsung Omnia II, Press Release, Verizon Wireless, Nov. 23, 2009, available at <http://news.vzw.com/news/2009/11/pr2009-11-23a.html>. U.S. exclusivity of the Omnia II through Verizon Wireless indicated at <http://phones.verizonwireless.com/samsung/omnia2>.

<sup>41</sup> AT&T and LG Mobile Phones Announce the First 1 GHz Smartphone in the United States, the LG Expo, Press Release, AT&T, Nov. 30, 2009, available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27621&mapcode> (indicates exclusivity).

<sup>42</sup> Over the river and through the woods, Nokia knows the way, Press Release, Nokia, Dec. 8, 2009, available at <http://www.nokia.com/press/press-releases/showpressrelease?newsid=1359877>.

<sup>43</sup> Google Offers New Model for Consumers to Buy a Mobile Phone, Press Release, Google, Jan. 5, 2010, available at [http://www.google.com/intl/en/press/pressrel/20100105\\_phone.html](http://www.google.com/intl/en/press/pressrel/20100105_phone.html). The device must be purchased through Google's webstore at <http://www.google.com/phone>. It can be purchased either unlocked for use on any GSM network at a higher cost (\$529) or for a significantly reduced amount (\$179) if bundled with a two-year T-Mobile service contract.