

**Before The
Federal Communications Commission
Washington DC 20554**

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In the Matter Of)	
)	
A National Broadband Plan for Our Future)	GN Docket No. 09-51
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COMMENTS OF QUALCOMM INCORPORATED

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SUMMARY

Qualcomm is pleased to submit these Comments in response to the Commission's Notice of Inquiry, which seeks input for the development of a national broadband plan, as required by the American Recovery and Reinvestment Act of 2009 ("ARRA"), Pub. L. No. 111-5.

Qualcomm wholeheartedly agrees with the statements in the Commission's Notice that "(h)igh speed ubiquitous broadband can help to restore America's economic well-being and open the doors of opportunity for more Americans, no matter who they are, where they live, or the particular circumstances of their lives," and that broadband "intersects with just about every great challenge facing our nation." Notice of Inquiry at Pg. 2.

Qualcomm believes that the national broadband plan should be based on the following fundamental point: mobile broadband is, and will continue to be, essential for the delivery of high speed ubiquitous broadband throughout the country for all Americans. In virtually every aspect of American life, ranging from education to health care to energy to public safety and more, mobile broadband networks and devices are essential today and will become increasingly so in the future. Furthermore, the fast-paced, never-ending innovation here in the United States in mobile broadband technology, networks, devices, and applications continues to serve as an engine for economic growth. That engine needs to operate in the entire nation and for the benefit of every American.

To that end, in crafting the national broadband plan, it is important for the Commission to recognize that the laws of economics cannot be repealed. Wireline, cable or fiber-based solutions will be too expensive to deploy in many rural areas in the US. Mobile broadband is the most cost-effective way to bring broadband to unserved or underserved areas, and the new generation of mobile broadband computing devices—smartbooks, smartphones, and the like—

are the most cost-effective way for Americans to gain high speed access to the Internet wherever they happen to be.

The national broadband plan will not be written on a blank slate. Just a few weeks ago, the Commission found that 95.6% of the US population is covered by a mobile broadband network, and that 99% of the non-rural US population and 82.8% of the rural US population is so covered.¹ The nation is clearly making rapid progress in achieving greater penetration of mobile broadband. Two years ago, the FCC found that 63% of all Americans are covered by a mobile broadband network, and last year, the figure in the FCC's annual report was 82%.² In January 2009, the FCC reported that the figure was 92%, and now, the FCC puts the figure at 95.6%.³ Moreover, earlier this year, the Commission found that 72.5% of Americans are covered by two or more mobile broadband networks, and 50.7% of Americans are covered by three or more mobile broadband networks. These statistics are quite impressive, but the national broadband plan should set a clear national goal: every American should have access to several mobile broadband networks and to a wide variety of mobile broadband devices and services.

To ensure that the nation continues to make progress toward achieving that goal, Qualcomm respectfully submits that a cornerstone of the national broadband plan should be a commitment that the Commission will adopt and maintain policies that promote the rapid

¹ See Bringing Broadband to Rural America, Report on a Rural Broadband Strategy, released May 22, 2009, at Pgs. 12-13.

² Twelfth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 07-71, released Feb. 4, 2008, at Pgs. 8, 68-69; Eleventh Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 06-17, released Sept. 29, 2006, at Pg. 54.

³ See Thirteenth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, DA 09-54, released January 16, 2009 at Pg. 74; Bringing Broadband to Rural America at Pgs. 12-13.

proliferation of mobile broadband. Such policies should include: auctioning more licensed spectrum, which is the mother's milk of mobile broadband networks and devices; ensuring that the bulk of the funds appropriated in the ARRA are used to bring mobile broadband networks to unserved and underserved areas and to subsidize mobile broadband devices for low income Americans; modifying the Lifeline and Link Up program to provide subsidies for low income Americans to purchase wireless broadband devices and services; establishing a framework to ensure that, once and for all, our nation's first responders have access to mobile broadband as well; and, continuing a light-touch regulatory regime that fosters, not deters, the deployment and expansion of mobile broadband.

Just as important as what the national broadband plan contains is what the plan does not contain. In this regard, Qualcomm does not believe that it is productive to spawn a new debate over the definition of "broadband." Today and tomorrow's 3G and 4G mobile broadband networks all deliver "broadband." For the past several years, the Commission has reported on mobile broadband network coverage.⁴ The Commission is correctly defining mobile broadband; there is no need for any debate on this point. The national broadband plan should not alter the Commission's definition.

Furthermore, there is no basis for the Commission to treat 3G technology, networks, and devices any differently than 4G technology, networks, and devices. As shown herein, at the same time that 4G technology is being refined, 3G technology continues to be upgraded. Carriers will simultaneously upgrade 3G networks and begin the testing and deployment of 4G

⁴ See Thirteenth Report, supra; Twelfth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 07-71, released Feb. 4, 2008, at Pgs. 8, 68-69. Eleventh Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 06-17, released Sept. 29, 2006, at Pg. 54.

networks. The US wireless market has thrived precisely because of the Commission's strict policy of technology neutrality. The Commission should continue this highly successful policy, and in crafting the national broadband plan, the Commission should not favor or disfavor any mobile broadband technology.

There is no need for the Commission or any other US governmental agency to attempt to micro-manage or over-regulate the US wireless industry. As the Commission has found repeatedly, each year in its annual competition report, the US wireless market is robustly competitive.⁵ The proper role for the Commission and the government at large is to set a clear national goal, as set forth above; to collect data to measure progress made toward meeting the goal; to provide funding, where necessary, through the ARRA and other federal programs, focused on unserved and underserved areas and subsidies for low income Americans; to continue auctioning a steady stream of licensed spectrum on which these mobile networks can operate; and, to remove any regulatory barriers that could impede or delay the continued, rapid proliferation of mobile broadband as widely as possible throughout the nation.

Qualcomm looks forward to working with the Commission both as it proceeds to formulate the national broadband plan and as it implements the plan.

⁵ See n.4, supra.

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QUALCOMM Incorporated (“Qualcomm”), by its attorneys, hereby submits these Comments in response to the Commission’s Notice of Inquiry, FCC 09-51, released April 8, 2009. The Notice of Inquiry seeks input for development of a national broadband plan, which the Commission is required to deliver to Congress by February 10, 2010, pursuant to the ARRA. The Notice of Inquiry is a far-reaching document, asking questions on many different topics relating to broadband. In these Comments, Qualcomm provides the Commission with important factual background on mobile broadband technologies and devices and with Qualcomm’s views on important policy questions for the Commission’s consideration as it formulates the national broadband plan.

I. Background

A. Qualcomm’s Mobile Broadband Initiatives

Qualcomm is a world leader in developing innovative digital wireless communications technologies and enabling products and services based on the digital wireless communications technologies that it develops. Qualcomm is the pioneer of code division multiple access (“CDMA”) technology, which is utilized in the 3G CDMA family of wireless technologies. These technologies include CDMA2000 and HSPA/WCDMA, which are technologies used in today’s so-called third generation (“3G”) wireless networks and devices, which enable tens of

millions of Americans, in rural, suburban, and urban areas alike, to enjoy advanced, high speed, and ubiquitous mobile broadband services. Qualcomm broadly licenses its technology to over 160 handset and infrastructure manufacturers around the world, who make infrastructure equipment, handsets and other consumer devices, and develop applications, all based on the CDMA2000 and/or HSPA air interfaces.

Qualcomm CDMA Technologies (“QCT”), a division of Qualcomm, is the world’s largest provider of wireless chipset technology. QCT has helped lead the diversification of mobile broadband into many new types of mobile broadband-enabled devices, ranging from smartphones, mobile broadband PC cards and USB dongles, mobile broadband-embedded laptops and netbooks, and a wide variety of pocketable computing devices with mobile broadband capability. These types of mobile broadband devices are already used today by millions of Americans, and they provide low-cost, mobile access to the internet and broadband applications.

Qualcomm has undertaken several initiatives to drive mobile broadband technology into a wide variety of mobile computing devices. Each initiative has spawned broad eco-systems of device manufacturers, software developers, and others, all working on truly innovative, breakthrough categories of devices which will allow tens of millions of Americans to enjoy mobile broadband in countless ways that will improve the quality of their lives.

The first initiative is a platform Qualcomm developed by the name of Snapdragon. Snapdragon, which consists of a single chip with integrated wireless modem, applications processor, multimedia, GPS and other features, enables a new generation of mobile computing devices with embedded support for mobile broadband. These new mobile broadband computing devices are much smaller, thinner, and less expensive than traditional notebook and mini-

notebook PCs and with longer battery life that provides day-long availability. They feature always-on mobile broadband connections similar to mobile phones with everyday computing functionality in sub-compact, ultra-thin, and highly portable devices. At present, 15 major manufacturers are developing more than 30 Snapdragon-based mobile broadband devices. The first Snapdragon-based mobile broadband smartphone was introduced in February 2009 by Toshiba, and other Snapdragon-based devices for mobile broadband computing will be introduced throughout this year.

Just this week, Qualcomm announced a new category of mobile broadband devices called “smartbooks.” Smartbooks bridge the functional divide between smartphones and laptops, delivering the best aspects of a smartphone experience on a larger display form factor. Constantly connected to a 3G mobile broadband network (as well as Wi-Fi and GPS), smartbooks are ultra-portable, personalizable, easy-to-use, and last all day on a single battery charge. These smartbooks will deliver a unique mobile broadband experience different from any type of device on the market today.

Qualcomm has a second initiative to drive another new category of low-cost, low power devices that use mobile broadband networks for wireless internet access and support e-mail, social networking, e-commerce, and distance learning applications. Late last year, Qualcomm formally announced the introduction of a new low cost PC alternative by the name of “Kayak.” See www.qualcomm.com/news/releases/2008/081112_qct_kayak.html. Kayak consists of a reference design and recommended software specifications, which device manufacturers are using to bring to market a variety of Kayak-based devices.

These Kayak-based devices use mobile broadband technology to fill the niche between desktop computers, which normally require wireline or cable for internet access, which is often

unavailable in rural areas, and internet-capable mobile broadband-enabled smartphones. Kayak-based devices include embedded mobile broadband capability, a full featured Web 2.0 browser, and access via the browser to Web 2.0 productivity and other broadband applications. In addition, Kayak supports both television sets and computer monitors for displays and/or built-in displays. Kayak-based devices are compatible with a standard keyboard and a mouse for input, and they will include a music player and/or 3D gaming console functionality.

The Kayak reference design uses a Qualcomm Mobile Station Modem, which enables the user to access the internet by using a standardized web browser running at desktop resolutions and mobile broadband networks which employ 3G wireless broadband technology, either EV-DO Revision A or HSPA. Thus, Kayak-based devices use built-in cellular connectivity and an inherently low-cost platform based on high-volume wireless chipsets. Kayak-based devices enable affordable mobile broadband Internet access. Kayak-based devices will be introduced commercially in the second half of 2009.

Qualcomm introduced a third mobile broadband initiative in 2007, when it announced Gobi, its global mobile broadband and GPS embedded solution for notebook computers. Notebooks containing Gobi can operate on mobile broadband networks in the United States and around the world. The original Gobi solution included a Qualcomm chipset, associated software and API, and a reference design for a data module supporting both the EV-DO Revision A and HSPA mobile broadband air interfaces as well as GPS. This solution allowed notebook manufacturers to deliver products offering mobile broadband capability wherever the user may happen to be. Earlier this year, Qualcomm announced its second generation embedded Gobi module. This module, which will launch commercially in the second half of 2009, provides a

wide range of enhancements, including support for additional frequencies, increased data speeds, enhanced GPS functionality, and additional operating systems, such as Windows 7 and Linux.

Also of note, Qualcomm has undertaken several initiatives in providing mobile broadband services. The Qualcomm service perhaps most well known to the Commission is FLO TV (formerly called MediaFLO). Qualcomm acquired Lower 700 MHz licenses covering the entire nation on Channel 55 (716 to 722 MHz), and Qualcomm built and operates a mobile television network, which delivers fifteen channels of high quality video content from some of the nation's top brands to a variety of mobile phones sold to Verizon Wireless and AT&T subscribers. At present, the FLO TV network covers over 68 markets across the country, in which 142 million Americans live. However, Qualcomm is poised to launch a major expansion of its FLO TV network on June 13th, when the DTV transition will have ended, and Qualcomm will finally have unfettered access to its spectrum. By the end of 2009, Qualcomm will have a nationwide network, providing mobile TV to a footprint of over 200 million people.

Another Qualcomm initiative relates to the delivery of software applications to mobile phones, taking advantage of the tremendous capabilities of mobile phones and the ingenuity of software developers. Many years ago, Qualcomm invented BREW, a thin software middleware layer supported by an end-to-end system, which allows the downloading of applications into mobile phones. More recently, Qualcomm introduced Plaza Mobile Internet, a platform which allows mobile devices to access widgets, thereby bringing the features and interactivity of Web 2.0 applications to mobile devices. Finally, just a few weeks ago, Qualcomm announced Plaza Retail, which: allows mobile operators to present subscribers with an easy and uniform app store experience on any mobile device; gives mobile publishers and developers the ability to make their content available to multiple retailers instantly, regardless of development platform; gives

consumers access to the wide variety of applications being developed for mobile broadband devices, regardless of which device a consumer owns and which software platform the device uses. All of these initiatives should fuel substantial growth in mobile broadband adoption and use.

Finally, Qualcomm is heavily involved in mobile banking, mobile health, and mobile education. For example, Qualcomm's Firethorn subsidiary offers mobile banking through many of the nation's top financial institutions to subscribers of several of the nation's top wireless carriers. As a pioneer in mobile banking, Firethorn is transforming the traditional wallet into a secure, streamlined, and efficient mobile revenue channel that will bridge the relationships among financial institutions, retailers, wireless carriers, and consumers. Firethorn's innovative technology creates easily accessible, branded, and personalized mobile commerce channels that will give consumers secure access to their accounts, offers, and transactions on the go.

In the mobile health area, Qualcomm provides services to CardioNet, a company which uses 3G connectivity for cardiac monitoring. In addition, Qualcomm recently joined with the Gary and Mary West Foundation and Scripps Health to create the West Wireless Health Institute. The Institute is the one of the world's first medical research organizations dedicated to advancing health and well-being through the use of wireless technologies.

Moreover, in the area of education, Qualcomm's Wireless Reach Initiative, an initiative designed to promote the socially beneficial uses of mobile broadband technology, supports Project K-Nect, a project in rural North Carolina which used smartphones operating on a mobile broadband network to teach math to at-risk high school students. This first phase of this project had dramatically positive results, with one participating class scoring 30 percent higher on their end of course exam than a class of their peers not participating in Project K-Nect, but taught by

the same teacher. Likewise, the Amazon Kindle, which is an e-book reader with an embedded mobile broadband connection powered by Qualcomm mobile station modems serviced by Qualcomm to enable the wireless downloading of books, has tremendous potential to improve education. Several major universities and textbook manufacturers are partnering with Amazon to make the Kindle available to college students, who will download and read their textbooks via the device.

Qualcomm and its many partners (wireless carriers, device manufacturers, infrastructure suppliers, software developers, etc.) are all working in countless ways on mobile broadband technology, devices, and services so that they are all available as broadly as possible throughout the United States and around the world at affordable price points.

B. The Rapid Proliferation of Mobile Broadband Based on CDMA2000 and HSPA

The CDMA2000 and HSPA mobile broadband technologies continue to proliferate rapidly all over this country and, indeed, all around the world. To date, there are 564 wireless carriers in 161 countries who have deployed one of the 3G CDMA technologies. Of those 564 carriers around the world, 106 have deployed EV-DO, 62 of whom have deployed EV-DO Revision A. Another 267 of the 564 carriers have deployed HSDPA, 72 of whom have deployed HSUPA. These broad deployments create enormous demand for EV-DO Revision A and HSDPA equipment, thereby creating economies of scale which bring down prices for carriers and ultimately consumers.

Worldwide, there are over 780 million subscribers using a 3G device. By 2013, the number of 3G subscribers is projected to reach approximately 2.4 billion, and at that time, most 3G subscribers will be using an EV-DO or HSPA-based device. This strong demand creates an ever-expanding market for 3G-based devices, including 3G phones, smartphones, PDAs,

consumer electronics devices, and laptops. These devices include more than 646 EV-DO-based devices (118 of which incorporate EV-DO Revision A) and more than 1,470 HSDPA-based devices (260 of which incorporate HSUPA). The sheer number and wide variety of these devices is increasing every day.

Here in the United States, there is fierce competition among the carriers in the provision of mobile broadband services, which has gone hand-in-hand with the rapid deployment and expansion of these mobile broadband networks across the country. Indeed, American consumers in urban, suburban, and rural areas are enjoying mobile broadband service at ever-increasing penetration rates and data speeds. Moreover, as the Commission found in its annual reports on the US wireless market, carriers have deployed competing mobile broadband technologies, which has only intensified the competition as the carriers seek to differentiate their networks by providing what each claims to be the best and most advanced high speed mobile broadband network and by offering the most robust and compelling mobile broadband services to consumers.⁶

Accordingly, Verizon Wireless, Sprint, US Cellular, Leap Wireless, and Cellular South, among other carriers, have deployed the CDMA2000 (EV-DO) mobile broadband technology, and their deployments are expanding every day. Overall, according to the Commission's latest report, EV-DO is available in over 1.5 million square miles across the country.⁷

On the other hand, AT&T has deployed the alternative WCDMA/HSDPA technology, and it is expanding the footprint of its WCDMA/HSDPA network at a very rapid rate. AT&T provides mobile broadband across much of the United States. Initially, AT&T deployed HSDPA, and subsequently, AT&T completed deploying HSUPA, thereby supporting higher

⁶ See Thirteenth Report at Pg. 66.

⁷ Id. at Pg. 73.

speed uploads and downloads. For its part, T-Mobile USA has also launched HSPA on its AWS-1 spectrum in major markets around the country and now provides this mobile broadband service to an ever-increasing footprint. Thus, the mobile broadband networks based on HSPA/WCDMA technology are also expanding rapidly.

Mobile broadband networks based on these technologies are also operated by many smaller carriers. For example, Stelera Wireless provides mobile broadband service via HSPA to rural areas in Texas. Prior to Stelera's launch, these areas either had no broadband service of any kind or very limited service. Earlier this year, Cellular South announced a major expansion of its mobile broadband service, provided via EV-DO, in Mississippi to cover the Mississippi Delta region and as well as counties in Southwest and Eastern Mississippi. Mississippi has the lowest broadband penetration among the 50 states—mobile broadband is critical for that state and the others.

All told, in January 2009, the Commission found in the Thirteenth Report that approximately 263 million Americans live within a census block in which one carrier provides mobile broadband service, as defined by the FCC to include EV-DO or WCDMA/HSPA; 207 million Americans live in a census block in which two or more carriers provide such mobile broadband; and, 145 million Americans live within a block in which three or more carriers offer mobile broadband. Thirteenth Report at para. 145. These numbers are literally increasing every day as the carriers constantly expand and enhance their mobile broadband networks.

In addition, the number and variety of devices, including handsets, PDAs, smartphones, and other consumer electronic devices, which incorporate EV-DO or HSPA is also growing by leaps and bounds every single day. As already noted, these technologies are now embedded in numerous laptop models sold by the major laptop vendors offering consumers another way to

access mobile broadband services. Mobile broadband via EV-DO or HSPA is or will soon be available in a whole variety of exciting new consumer electronic devices--this new category called smartbooks. These mobile broadband computing devices will be tremendously beneficial for residents of urban, suburban, and rural areas.

C. The Constant Push to Upgrade and Enhance Mobile Broadband Technology

As operators began deploying EV-DO and HSPA in its initial forms—EV-DO Release 0 and HSDPA—the ecosystem of vendors who develop and support these technologies were simultaneously working on upgrades to these mobile broadband technologies, and there is a constant and never-ending drive to enhance these technologies which continues to the present and shows no sign of slowing down into the future. The networks rapidly migrated to the first upgrade—EV-DO Revision A and HSUPA, which is widely deployed today throughout the United States.

Today, as noted supra and as the FCC found in its recent annual report on the competitive conditions in the US wireless industry, Verizon Wireless, Sprint, Leap Wireless and others provide mobile broadband service to areas in which over 92% of Americans live via EV-DO Revision A, which supports peak data speeds of 3.1 megabits per second (“Mbps”) on the downlink and 1.8 Mbps on the uplink.

Likewise, AT&T is concluding its network upgrade to HSUPA, which will support peak data speeds of up to 1.8 Mbps to 5.6 Mbps on the uplink. Just last week, AT&T announced that it will begin upgrading its HSPA network to support peak speeds of 7.2 Mbps. This upgrade will begin later this year. AT&T also announced that they are adding additional capacity to thousands of cell sites to support higher mobile broadband speeds. Likewise, T-Mobile USA is moving forward rapidly with its HSPA deployment on the AWS-1 spectrum.

All of the mobile broadband technologies described above are available today. But, the EV-DO and HSPA technologies are not standing still. Both EV-DO and HSPA technology are being enhanced substantially, and these enhancements will all be backwards compatible—carriers who use EV-DO and HSPA do not require new spectrum to upgrade their networks to the next version of these technologies. The next upgrades to EV-DO and HSPA will result in dramatically faster data rates. EV-DO Revision B enables the aggregation of three EV-DO carriers in one 5 MHz channel. In its Phase I, EV-DO Rev. B will support downloads at a peak rate of 9.3 Mbps and eventually, in Phase II, at 14.7 Mbps, while supporting uploads at up to 5.4 Mbps. This technology will undergo an additional upgrade, now known as EV-DO Advanced, which, if implemented with four carriers, will support downloads of up to 34.4 Mbps and uploads of 12.4 Mbps. These upgrades are all backwards compatible, meaning that they will not require any new infrastructure. The net result of these upgrades to CDMA2000 will be wireless broadband service with data rates that are ten times faster than even today's fastest EV-DO-based networks achieve.

Likewise, there are substantial upgrades for HSPA technology on its roadmap. The initial version of the technology known as HSPA + (also called HSPA Evolved—HSPA Release 7) will support peak downloads of 28 Mbps and uploads of 11 Mbps. Future releases of HSPA, Releases 8 and 9, will increase the peak downlink speeds, first to 42 Mbps and then to 84 Mbps.

Moreover, Qualcomm and many other vendors around the world are working on LTE, a so-called fourth generation OFDM-based technology. This technology is not yet available, but is under active development. It does require new spectrum, but by auctioning the 700 MHz spectrum last year, the Commission has filled that need. Both Verizon and AT&T have publicly stated their intention to deploy LTE.

Finally, these mobile broadband technologies are not limited to terrestrial wireless networks. Last year, Qualcomm announced that it would develop a satellite-based broadband protocol and include it in the firmware of select Qualcomm multi-mode chips, thereby integrating satellite and cellular technology for use pursuant to the Commission's ATC (ancillary terrestrial component) rules. In addition, Qualcomm will support the L and S-band mobile satellite frequencies in select RF processors. This technology will add satellite connectivity in mass market wireless handsets and devices to fill coverage holes in terrestrial mobile broadband networks. This technology adds yet another dimension to mobile broadband.

The foregoing establishes that there is a constant push to develop and deploy both short term and longer term enhancements to mobile broadband technology. These efforts continue to accelerate in the United States and around the world, and there is no end in sight. The national broadband plan should reflect this inexorable drive to enhance mobile broadband technologies as much as possible and to deploy the enhancements as quickly as possible. The government should not favor or disfavor any of these technologies, and the government should not adopt rules which are based on any given technology since these technologies are constantly being upgraded, enhanced, and refined.

D. The Deep CDMA2000 & HSPA Ecosystems

As noted supra, Qualcomm licenses its technology to over 160 companies, who manufacture infrastructure and subscriber devices (including phones, smartphones, smartbooks, consumer electronic devices, and the like). These companies span the entire wireless industry. In particular, the number of companies manufacturing devices based on mobile broadband technologies, such as CDMA2000 and HSPA, continues to increase, along with the different types of devices themselves. At last count, 111 companies have manufactured at least one

CDMA2000 device, and more than 169 companies have manufactured at least one WCDMA or HSPA device. These devices span all price points—from low end 3G phones to very high end smartphones and other consumer electronics devices.

In particular, eighteen laptop manufacturers now offer at least one laptop model with a form of embedded mobile broadband technology, and more than 400 such laptop models have been brought to market. It is becoming increasingly common for Americans, in urban, suburban, or rural areas, to access the Internet and a plethora of mobile broadband services through these mobile broadband-embedded laptops or by using a PC card or USB device with 3G mobile broadband connectivity.

Also, as noted supra, whole new categories of devices employing mobile broadband are now available. One example is the Amazon Kindle, an e-book reader which has revolutionized the way that consumers access books, newspapers, and magazines. Other examples are smartbooks, Kayak-based devices, and other different kinds of devices with embedded mobile broadband connectivity. The central premise of the national broadband plan should be that consumers want broadband wherever they are—at home, at work, in school, while travelling, etc. The nation's mobile broadband networks are delivering, and will continue to deliver, a service which is simply essential for all Americans in the 21st Century.

Qualcomm now turns to the national broadband plan itself and presents below its input as to the contents of the plan, in response to questions raised in the Notice of Inquiry.

II. The Central Goal of the National Broadband Plan Should Be to Ensure That Every American Has Access to Multiple Mobile Broadband Networks and to a Wide Variety of Mobile Broadband Devices & Services

These Comments and the Commission's own data published in its past reports on the US

wireless industry establish that mobile broadband is growing at dramatic rates—mobile broadband networks are expanding every day; a wide variety of new mobile broadband devices, and indeed new categories of mobile broadband devices, are coming to market every day; and, new mobile broadband services and service platforms are launching all the time. During the current sharp recession, on the heels of a global economic crisis, the US mobile broadband market stands out for its tremendous growth rates and the ever-increasing popularity of the devices and services.

As a result, Qualcomm respectfully submits that in drafting the national broadband plan, the Commission should recognize the pivotal role that mobile broadband is playing in providing ubiquitous high speed access to the Internet for millions of Americans every day and can play in the future for every American. Mobile broadband will be the means by which most Americans obtain ubiquitous high speed Internet access and the attendant services which can only be enjoyed with such access. Therefore, the central goal in the national broadband plan should be to ensure that every American has access to multiple mobile broadband networks and a wide variety of mobile broadband devices and services.

The nation is well on its way to achieving that goal. The Commission's most recent data shows that over 50% of Americans are covered today by three or more mobile broadband networks, a remarkable fact given that the first mobile broadband deployments in the US began just seven years ago. Nevertheless, Qualcomm respectfully submits that the Commission should set the clear national goal stated above to ensure universal mobile broadband coverage by multiple networks, and dedicate its resources to working with all affected stakeholders—carriers, vendors, and the public at large—to reach that goal.

III. The National Broadband Plan Should Provide That the Commission Will Auction a Steady Supply of Licensed Spectrum for Mobile Broadband

The provision of ubiquitous high speed Internet access, the very objective set forth in the Notice of Inquiry, requires licensed spectrum. See Notice of Inquiry at Pg. 2. Stated differently, licensed spectrum is the mother's milk of mobile broadband. Qualcomm, as a technology developer, is committed to designing technologies with the greatest degree of spectral efficiency. Spectrum is a precious, expensive resource—too scarce to waste. Nevertheless, as mobile broadband networks and devices continue to proliferate, as the services continue to gain in popularity, and as the bandwidth demands continue to escalate, there will be a constant, continuous need for additional licensed spectrum. Only the Commission can satisfy that need by using its highly successful auction program to make additional licensed spectrum available.

As Qualcomm has shown in many filings over the years, to provide wide area wireless service requires relatively higher power levels and, therefore, protection from interference. For this reason, mobile broadband requires licensed, not unlicensed, spectrum. By contrast, local area wireless coverage (in a home, for example) requires much lower power levels, and there is much less need to protect local area devices from interfering with one another. Therefore, unlicensed spectrum is well suited to local area, but not wide area, coverage.

Qualcomm demonstrated these fundamental principles most vividly in the Commission's TV white space proceeding. There, Qualcomm showed that a licensed transmitter in the 700 MHz licensed band operating under the Commission's rules for that licensed band would cover twenty times the area of a fixed unlicensed transmitter operating under the Commission's rules

for the unlicensed TV White Space.⁸ As a result, there is no business case for an unlicensed wide area service. Furthermore, because unlicensed operations are not subject to interference protection, the quality of service in an wide area unlicensed deployment would be vastly inferior to that of a licensed deployment. Rural areas should not be left with an inferior quality of service.

For these reasons, in response to the statements made and questions posed in the Notice of Inquiry about the TV White Space, Wi-Fi, or other unlicensed forms of broadband,⁹ the national broadband plan should not rely upon an unlicensed technology or unlicensed spectrum to deliver broadband to wide areas. Rather, the plan should provide that wide area mobile broadband service requires licensed spectrum, and, as a result, the plan should also provide that the Commission will continue its program of auctioning licensed spectrum on a regular basis to provide more spectrum for mobile broadband.

Of course, most recently, the Commission auctioned off 62 MHz of spectrum in the 700 MHz band, garnering the staggering sum of over \$19 billion. In just a few days, that spectrum will be clear of TV stations and fully available for deployment of mobile broadband. But, the process by which the 700 MHz spectrum was made available began in 1987. In other words, 22 years after the first filing was made relating to what was then called advanced TV and is now called DTV, the process will be complete, and our digital dividend will be reaped. Similarly, it took over a decade to reallocate and auction the AWS-1 band, and that spectrum is still not fully clear of incumbents. The public cannot afford to wait another decade, much less another 22 years, for another major licensed spectrum band to be made available. Qualcomm respectfully

⁸ See Charles L. Jackson, “Unlicensed TV White Space Cannot Provide Substantial Rural Broadband Access,” Ex Parte Filing in Dockets 04-186 & 02-380, filed October 22, 2008 at Pg. 3.

⁹ See, e.g., Notice of Inquiry at Paras. 21, 45.

submits that the public interest demands that the national broadband plan provide for the speedy, continuous identification and reallocation of additional spectrum bands and, once identified and reallocated, the prompt auction of such bands.

IV. The National Broadband Plan Should Provide that ARRA Broadband Programs Should Be Used to Fund the Construction of Mobile Broadband Networks in Unserved & Underserved Areas and to Subsidize Mobile Broadband Devices

It is unfortunate that at least the initial batch of grant awards under the ARRA broadband programs will be made, and the funds disbursed, prior to issuance of the national broadband plan. It would be far more rational to adopt the plan first and then to start making awards and issuing funds. Be that as it may, hopefully, the lion's share of the funds under the ARRA programs will not be spent prior to issuance of the national broadband plan. While it is true that, as the Notice of Inquiry states, \$7.2 billion is not sufficient to support nationwide, universal broadband deployment, much less multiple nationwide universal broadband networks, it is equally true that, again as the Notice of Inquiry states, \$7.2 billion is no small sum for this effort. Notice of Inquiry at Para. 6. While the Commission is responsible for drafting the national broadband plan, but NTIA and RUS are responsible for the ARRA broadband grant and loan programs, every possible effort should be made to achieve interagency coordination and to ensure that the bulk of the funds under the ARRA programs are spent in a manner that is fully consistent with, and that advances the goals of, the national broadband plan.

To that end, Qualcomm believes that the bulk of the funds under the ARRA programs should be used to fund construction of mobile broadband networks in unserved and underserved areas and to subsidize mobile broadband devices for low income Americans. Spending the ARRA funds in that manner will stimulate the economy, create jobs, and bring enormous social and consumer welfare benefits. Qualcomm respectfully submits that there should not be any

extraordinary regulatory conditions imposed on recipients of funds, and the funds should be spent on truly “shovel ready” projects which seek to deploy currently available 3G mobile broadband technologies and devices.

V. The National Broadband Plan Should Provide That the Lifeline/Link Up Program Be Used to Subsidize Mobile Broadband Devices and Services

In the Notice of Inquiry, the Commission noted that the low income programs funded under the universal service program, i.e., the Lifeline and LinkUp programs, do not currently support broadband, and that in the omnibus proceeding over reform of the universal service fund, the Commission recently sought comment on a pilot program designed to make broadband more affordable to low-income consumers. Notice of Inquiry at Para. 39. Qualcomm fully supports a fully funded pilot program to provide subsidized 3G-based devices and 3G broadband service initially to at least one million participants all over the US. See Comments of Qualcomm Incorporated, Docket Nos. 01-92, 99-200, 99-68, 96-98, 96-45, 06-122, 05-337, 04-36, 03-109, 08-262 (filed Nov. 26, 2008). The national broadband plan should provide for initiation of such a pilot program and that, if the pilot is successful, as it should be, the program would become permanent. As the Commission itself found in the Order & Further Notice in the omnibus universal service proceeding, according to the Pew Internet & American Life Project, only 25 percent of households with incomes under \$25,000 have broadband service. It is entirely appropriate and necessary that the national broadband plan address how this problem can be cured. The Lifeline and LinkUp programs are well suited to do so.

Devices based on Qualcomm’s Kayak, i.e., low-cost, low-power PC alternatives with embedded wireless broadband access, are well suited for such a program. Kayak-based devices will use built-in cellular connectivity and an inherently low cost platform based on high volume

chipsets. These devices should enable affordable broadband Internet access in homes across the country for people who could not otherwise afford a computer or broadband service.

For these reasons, the national broadband plan should endorse creation of a fully funded pilot program under Lifeline and LinkUp to subsidize 3G service and devices for low income Americans.

VI. The National Broadband Plan Should Provide for Interoperable, Dedicated Public Safety Mobile Broadband Service for the Nation's First Responders

Ever since September 11th, there have been calls for a national interoperable public safety mobile broadband network or interconnected regional or state and/or local networks. The Commission has been studying this matter since at least 2004, when it was required to submit a report to Congress, pursuant to the Intelligence Reform and Terrorism Prevention Act of 2004. Qualcomm has submitted numerous filings on this matter, and, of course, Qualcomm was the only bidder in the failed D block auction.

Qualcomm has repeatedly stated its view that all affected stakeholders—including Congress, the Commission, the relevant federal government agencies, the national, regional, and state and local public safety groups, carriers, vendors, and others—need to be brought together to reach a consensus on how to solve this vexing problem. Ensuring that public safety has dedicated, interoperable mobile broadband service requires financing, spectrum, technology and operational expertise, and governance—just to name a few of the requirements. The fact that some major public safety groups recently came together to reach a consensus is very promising, but by itself insufficient.

The national broadband plan represents yet another opportunity to solve this problem and, once and for all, establish a framework for how to establish dedicated, nationwide interoperable mobile broadband service for public safety. History proves that the Commission

cannot devise a solution on its own, nor should the Commission try to do so again. Once again, Qualcomm suggests that the Commission convene all affected stakeholders in an effort to reach true consensus on how to ensure that public safety agencies and officers will finally have dedicated, nationwide interoperable mobile broadband.

VII. The National Broadband Plan Should Advocate the Continuation of the Commission's Light Touch Regulation of Mobile Broadband

The dramatic expansion of mobile broadband networks over the past three years, verified by the Commission's own data, as well as the remarkable, non-stop growth in devices, services, and applications suggests that, as the Commission has consistently found, the US wireless market (and particularly the US mobile broadband market) is robustly competitive. Thirteenth Report at Para. 1; Twelfth Report at Para. 1; Eleventh Report at Para. 1. The national broadband plan cannot ignore or jettison these findings or the data which formed the basis for the Commission's findings. There is no need for sweeping new regulation of mobile broadband. Competition works. The Commission should continue to make additional spectrum available and remove any regulatory obstacles which hamper the rapid construction or expansion of mobile broadband networks or which hamstring operation of such networks.

The national broadband plan should not advocate sweeping new regulation of mobile broadband for another reason. Qualcomm believes that if the plan is to be most useful, it should set a long-term vision for the nation. The plan should not and cannot dictate the details for how the Commission should rule in each or any of its individual proceedings. Regulation works best when it's flexible, when it responds quickly to market conditions. The plan should concentrate on the long term; particular Commission regulation should focus on the short term. To be sure, there is no long term need for sweeping new regulation of mobile broadband, and, thus, the plan should not call for any.

VIII. The National Broadband Plan Should Advocate Continuation of the Commission’s Highly Successful Technology Neutrality Policy

The national broadband plan should reaffirm the Commission’s policy of technology neutrality vis-à-vis wireless. That policy has played a large role in establishing the conditions for the vibrant, highly competitive US wireless market. See FCC Eleventh Report at Para. 102. The policy has allowed different carriers to deploy different technologies, setting up a virtuous cycle of innovation as each carrier rushes to deploy the next network upgrade to compete against one another. Technology neutrality has been a bedrock principle of FCC wireless policy for the past two decades. Regulators around the world have drawn from and followed the success in the US of this policy. Moreover, without question, both 3G and 4G technologies enable the provision of high speed mobile broadband service.

The Commission’s recently issued report on rural broadband strategy reaffirmed technology neutrality. See Bringing Broadband to Rural America at Pgs. 6, 34. Likewise, the national broadband plan should reaffirm this important principle.

IX. The National Broadband Plan Should Not Redefine “Mobile Broadband”

The Notice of Inquiry acknowledges that “broadband can be defined in myriad ways,” but goes on to seek comment on how the national broadband plan should define “broadband” and, specifically, whether the plan should adopt a new definition based on a new data rate requirement. To be sure, broadband via satellite delivers data at different rates than broadband via fiber to the home. In the case of mobile broadband, for several years now, in its annual reports on the state of competition in the US wireless industry, the Commission has defined “mobile broadband” as including the 3G and 4G technologies (i.e., EV-DO, HSPA/WCDMA, WiMAX and LTE.) See Thirteenth Report at Pgs. 69, 73-74; Twelfth Report at Pgs. 68-69.

