

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

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In the Matter Of	)	
	)	
Health Care Delivery Elements	)	GN Docket Nos. 09-47, 09-51, 09-137
Of National Broadband Plan	)	
	)	WC Docket No. 02-60
A National Broadband Plan for Our Future	)	
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**COMMENTS OF QUALCOMM INCORPORATED  
ON HEALTH CARE DELIVERY ELEMENTS  
IN RESPONSE TO NBP PUBLIC NOTICE #17**

Dean R. Brenner  
Vice President, Government Affairs

Robert Jarrin  
Director, Government Affairs

QUALCOMM Incorporated  
1730 Pennsylvania Ave., N.W.  
Suite 850  
Washington, D.C. 20006  
(202) 263-0020

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## **SUMMARY**

Qualcomm is pleased to respond to the Public Notice to discuss how broadband infrastructure and services will advance healthcare delivery and to identify concrete steps the Commission can take to support and encourage healthcare delivery in the United States. As the Commission states in the Public Notice broadband, and especially mobile broadband, has the power to enable extensive use of health IT, unlocking “the potential to improve population health, expand access to affordable care, increase the efficiency of care provision, reduce unnecessary healthcare costs, prevent medical errors, increase administrative efficiencies and decrease paperwork” NBP Public Notice #17 at 1.

Qualcomm spends billions of dollars annually to develop innovative technologies extending to every aspect of wireless, including the healthcare field. Today, Qualcomm’s innovative technologies enable the use of 3G mobile broadband connectivity for chronic disease management, remote monitoring of diagnostic care, health and wellness, and fitness and aging. In addition, Qualcomm has partnerships with foundations, health institutions, medical device manufacturers, health alliances, associations and firms engaged in clinical trials to assist all facets of the healthcare ecosystem to leverage mobile broadband to improve healthcare for all Americans. Qualcomm and its partners are working to bring about an unprecedented convergence of science, medicine, engineering and technology to enable dramatic improvements in the quality of healthcare and to reduce healthcare costs and inefficiencies.

Qualcomm’s innovations in mobile broadband include inventing: upgrades to existing air interfaces and new air interfaces for mobile broadband networks; network capacity enhancements to ensure that carriers can use their valuable licensed spectrum as efficiently as

possible; integrated support within mobile broadband chipsets for an ever-increasing number of technologies (licensed for wide areas and unlicensed for local areas) and operating systems; chipsets which incorporate a new low power processor creating whole new categories of mobile broadband devices, spurring exponential growth in the use of today's mobile broadband networks; support for all forms of machine to machine communications also on a ubiquitous basis; and socially beneficial applications which will drive further demand for mobile broadband networks operating on licensed spectrum.

Qualcomm has a long track record of investment and innovation and is ready to work with the Commission and other stakeholders to realize the potential of healthcare delivery through mobile broadband. As has been our practice in other Comments filed with the Commission, we respectfully submit the following recommendations for public policies to facilitate far greater use of mobile broadband to improve healthcare:

First, as Qualcomm has consistently argued elsewhere, the Commission should set a central national goal in the National Broadband Plan: universal mobile broadband coverage. No American should be left without access to mobile broadband precisely because this technology has tremendous potential to improve every facet of American life, including healthcare. Today, based on the most recently available FCC data, over 95.6% of all Americans live within the coverage of one mobile broadband network, as the FCC has defined mobile broadband, that is EV-DO or HSPA.<sup>1</sup> Within a few years or even less, this nation can achieve 100% mobile broadband coverage if we have a national commitment to do so, along with the targeted use of public funds for this purpose. Until all Americans have access to mobile broadband, its potential to improve healthcare can never be realized. We urge the Commission to set a national goal of

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

universal mobile broadband coverage. No single step that the Commission could take would do more to facilitate innovation in wireless health. Patients, doctors and hospitals all need ubiquitous mobile broadband coverage if wireless health is to deliver on its potential.

Second, the Commission should convert the universal service program into a broadband program, and in particular, the Commission should establish a program to provide mobile broadband devices and service at subsidized rates under the Lifeline/LinkUp programs. This new program would ensure that low income Americans have access to mobile broadband devices and services that could provide telehealth services and healthcare functionality. Lifeline provides qualified consumers with a discount on monthly charges for their primary home phone line, even if it's a cell phone, and Link-Up lowers the cost eligible consumers pay for setting up new phone service at their home, including cell phone service.<sup>2</sup> By providing direct discounts to low income Americans, such a program would go far in the proliferation of mobile broadband in addition to other services such as telehealth and healthcare.

Third, as Qualcomm has explained in other filings, the demand for mobile broadband is growing at exponential rates and with that, the need for more licensed spectrum to accommodate that demand. As the Commission and many stakeholders from every aspect of mobile broadband has maintained, there is a drastic need for additional licensed spectrum for mobile broadband. The increasing use of this technology for the delivery of healthcare purposes is just one more factor which warrants the allocation and auction of more licensed spectrum for mobile broadband.

Fourth, the Commission has a rural healthcare pilot program that while well intentioned, is not funding the tools necessary to spur innovation in wireless health. The Commission should

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<sup>2</sup> See Lifeline Across America, "Lifeline Across America," [http://www.lifeline.gov/lifeline\\_Consumers.html](http://www.lifeline.gov/lifeline_Consumers.html).

convert this program into a mobile broadband program. As already noted, wireless healthcare will be provided over commercial mobile broadband networks, devices, and applications. We recommend that the Commission consider refocusing the rural healthcare pilot program to provide funds for the use of commercial mobile broadband networks, rather than funding the construction of dedicated, single-use wireline networks. The use of commercially available devices on commercially available mobile broadband networks will ensure the widest possible broadband access and coverage at the lowest possible costs. For the rapid and cost-effective proliferation of health related mobile broadband applications and services, the immense and constant investment in multi-purpose commercial mobile broadband networks should be leveraged. Dedicated networks are costly, inefficient, and can never achieve the coverage or reliability of the commercial mobile broadband networks.

Fifth, we believe that federal funding under the American Recovery and Reinvestment Act (“ARRA”) or other health-related programs should be made available to subsidize mobile broadband devices and telehealth software and applications for healthcare professionals and patients. Such devices, software, and applications are critical building blocks for achieving the full potential of mobile broadband to improve healthcare.

Sixth, Qualcomm encourages the Commission to collaborate with the Centers for Medicare and Medicaid Services (“CMS”) to explore the creation of new approaches to ensure that reimbursement is provided for telehealth services using mobile broadband. A critical component to the adoption of telehealth in the U.S. is whether new models of healthcare delivery are covered and payable under CMS coverage criteria. Adoption of reasonable, valid reimbursement criteria will require close cooperation by the Commission, the CMS, other offices

within the Department of Health and Human Services (“HHS”), and other interested stakeholders like Qualcomm.

Qualcomm looks forward to working with the Commission and with all other public and private sector stakeholders to ensure that mobile broadband technologies, devices, services, and applications are used to improve the delivery of healthcare in the U.S. as much as possible, as quickly as possible, and to the greatest extent possible. Qualcomm believes that improving healthcare delivery in America should be a national priority and one that can be achieved through mobile broadband technology.

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IN RESPONSE TO NBP PUBLIC NOTICE #17**

QUALCOMM Incorporated (“Qualcomm”), by its attorneys, hereby submits these Comments in response to NBP Public Notice #17, DA 09-2413, released November 12, 2009, in which the Commission sought comment on healthcare delivery elements of the National Broadband Plan.

**I. Introduction**

The United States spent approximately \$2.2 trillion on healthcare in 2007, or \$7,421 per person.<sup>3</sup> Americans spend more on healthcare than on housing or food, and if the escalating costs of healthcare continue, the Congressional Budget Office estimates that by 2025, one out of

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<sup>3</sup> See: The White House, President Barack Obama, “Health Care: The Presidents Plan,” <http://www.whitehouse.gov/issues/health-care>.

every four dollars in the U.S. national economy will be tied up in the health system. Healthcare spending has become a national concern and identified as a top priority by President Obama.

A large part of healthcare spending is accounted by the delivery of care. In September 2009, the Executive Office of the President's National Economic Council released its Strategy for American Innovation which included the expanded use of advanced health information technology (e.g. electronic medical records, mobile health applications, sensors for monitoring chronic diseases) to help prevent medical errors, improve health care quality, to modernize the American health care system and reduce costs.

Today, innovative digital wireless communications technologies are enabling products and services that have become a key component in the delivery of health services and the provision of care in the U.S. Medical devices, health sensors and their applications are increasingly relying on wireless broadband functionality and interoperability to transmit raw data, diagnostic health information, critical aspects of care, emergency services and personalized information. These services are at the forefront of a revolution in the provision and delivery of care in America; a revolution which collapses time and space and distance to more effectively monitor patients, develop analytical trends and save lives while maximizing efficiency and keeping down costs. More and more devices utilize broadband technologies over mobile wide area networks or wireless local area networks to seamlessly provide important patient information to healthcare professionals, clinicians or loved ones, at fractional costs and in secure real-time usable formats.

Qualcomm is a world leader in developing innovative digital wireless communications technologies and enabling products and services that touch upon every aspect of life, including healthcare. 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 and depend on advanced, high speed, and ubiquitous mobile broadband services. Qualcomm broadly licenses its technology to over 165 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.

The Public Notice is a far-reaching document, asking questions on many different topics relating to healthcare delivery elements and broadband. In these Comments, Qualcomm provides the Commission with important factual and contextual background on mobile broadband technologies and devices, with Qualcomm's views on important policy questions for the Commission's consideration as it formulates the national broadband plan.

Qualcomm is committed to working with its many partners in the area of wireless health and life sciences as well as the mobile broadband ecosystem to deliver mobile broadband technologies, devices, services, and applications that aim to improve the delivery of healthcare on many levels. In these Comments, Qualcomm first provides a snapshot of Qualcomm's pioneering work on mobile broadband technologies, applications, and services. We then discuss 3G and preventable diseases as well as aging, and the aging of America's healthcare workforce. We also touch upon topics such as healthcare and mobile broadband, the ubiquity of wireless broadband for telehealth and examples of 3G in healthcare. Finally, Qualcomm lists a series of policy initiatives and recommendations for the Commission to undertake in order to facilitate greater use of mobile broadband for healthcare.

## **II. Qualcomm's Pioneering Work on New Mobile Broadband Technologies,**

### **Applications, & Services**

The Department of Health and Human Services, through its Office of the National Coordinator for Health Information Technology (“ONC”), has stated that improved patient care requires new efficiencies related to administrative tasks which will allow for more interaction and transfer of information between patients, caregivers, and care coordinators monitoring patient care.<sup>4</sup> Increased efficiencies and the transfer of data are core elements to Qualcomm’s innovation and technological evolution.

Advancements in today’s mobile broadband networks have come at a tremendous cost in investment and innovation. In fiscal 2009 alone, Qualcomm spent \$2.4 billion, or approximately 23% of its revenues on research and development. Since Qualcomm’s inception in 1985, it has invested a total of approximately \$12.8 billion in R & D.

These enormous expenditures enabled Qualcomm to make many inventions. Today, Qualcomm holds or has applied for approximately 11,600 U.S. patents (3,600 issued and 8,000 applied) and 54,100 foreign patents (18,500 issued and 35,600 applied for). Every division and subsidiary of Qualcomm has multiple research and development teams working on projects which may ultimately lead to patentable inventions. This work occurs in many offices and labs around the U.S. and the world. In addition, Qualcomm has a Corporate Research and Development group, which has its own Research Center in San Diego and other offices and labs in the U.S. and abroad.

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<sup>4</sup> See Office of the National Coordinator for Health Information Technology, “Why health IT?” <http://healthit.hhs.gov/portal/server.pt>.

Qualcomm broadly licenses its technology to over 165 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 also licenses technology it developed for orthogonal frequency division multiple access (“OFDMA”), which will be used in wireless networks based on the so-called Long Term Evolution (“LTE”) air interface.

Qualcomm CDMA Technologies (“QCT”), a division of Qualcomm, is the world’s largest provider of wireless chipset technology. QCT’s chipsets provide a high degree of integration and support all the major frequency bands, the full gamut of wide area cellular technologies, Assisted GPS, Bluetooth, Wi-Fi, and many different operating systems, including Android, Windows Mobile, Symbian, and Qualcomm’s Brew Mobile Platform.

Moreover, 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, Mi-Fi devices which provide a 3G mobile broadband connection to up to five devices, mobile broadband-embedded laptops and netbooks, and a wide variety of pocketable computing devices with mobile broadband capability. Many of these broadband-enabled devices are used by healthcare professionals in the healthcare field. 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.

Other divisions and subsidiaries of Qualcomm develop innovations in other aspects of wireless. FLO TV, Incorporated, a wholly-owned subsidiary, operates the world’s largest mobile TV network, which delivers 15 channels of high quality video content to AT&T and Verizon Wireless subscribers, on Channel 55 spectrum licensed to Qualcomm. Qualcomm MediaFLO

Technologies is bringing this same mobile TV technology to market with partners based around the world. Qualcomm MEMS Technologies, Inc. (“QMT”), also a wholly-owned subsidiary, has developed the world’s first MEMS display for mobile devices—a new display technology which offers dramatically lower power consumption and superb viewing quality in a wide range of environmental conditions, including bright sunlight. Qualcomm Ventures makes strategic investments in early stage, high technology companies which span the gamut of the wireless industry.

Qualcomm Internet Services offers software platforms which aim to bring any application to any device on any network in any location. These platforms began with BREW, a thin software layer which was the first platform which enabled the downloading of applications into wireless phones. More recently, Qualcomm Internet Services began offering 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, and Plaza Retail, which provides support for multiple app stores, which give wireless subscribers a uniform and easy shopping experience on a wide variety of wireless devices.

Finally, Qualcomm recently formed a joint venture with Verizon Wireless by the name of nPhase. The joint venture will provide machine to machine communications and smart service offerings across a wide variety of market segments including healthcare, manufacturing, utilities, distribution, and consumer products over 3G mobile broadband networks. nPhase enables telehealth solutions to communicate seamlessly with back-end enterprise systems for a more secure and efficient exchange of health information. nPhase provides simple and secure services that allow healthcare companies to outsource the delivery of machine communications and account for the complex needs of their enterprise, and deliver reliable, cost-effective services.

nPhase services include store-and-forward messaging, persistent closed-loop acknowledgement, status tracking, and message-delivery, at the heart of which resides a secure, cellular 3G network.

### **III. The Proliferation of Innovative Mobile Broadband Networks & Devices**

In the United States, as the Commission itself has found in May of this year, 95.6% of the US population is covered by a mobile broadband network (defined as a network based on EV-DO or WCDMA/HSPA), and 99% of the non-rural US population and 82.8% of the rural US population is so covered.<sup>5</sup> Worldwide, there are 578 wireless carriers in 157 countries that have deployed one of the 3G CDMA technologies. Of those 578 carriers around the world, 108 have deployed EV-DO, 70 of whom have deployed EV-DO Revision A. Another 274 of the 578 carriers have deployed HSDPA, 87 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.

Currently, approximately 830 million people around the world use 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.<sup>6</sup> This strong

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<sup>5</sup> See Bringing Broadband to Rural America, Report on a Rural Broadband Strategy, released May 22, 2009, at Pgs. 12-13. In making that finding, the Commission defined networks based on EV-DO and WCDMA/HSPA as constituting mobile broadband. The Commission used the same definition of mobile broadband in its annual reports on the state of competition in the US wireless market in 2009, 2008, and 2007. See Thirteenth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 08-27, DA 09-54, released January 16, 2009 at Pgs. 69, 73-74; 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

<sup>6</sup> The source of the data on subscribers is Wireless Intelligence, a database which collects such information. Wireless Intelligence defines a subscriber (actually a “connections” as a

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 1,910 HSDPA-based devices (305 of which incorporate HSUPA). The number and variety of these devices is increasing every day.

As noted above, Qualcomm licenses its technology to over 165 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. Products such as Panasonic's Toughbook® H1, mobile clinical assistant ("MCA"), which is designed specifically for healthcare professionals which boasts wide-area global 3G connectivity. 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.

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“unique SIM, or where SIM cards do not exist, a unique telephone number, which has access to the network for any purpose (including data-only usage), but excluding telemetric applications.”

There is fierce competition in the U.S. among the wireless carriers in the provision of mobile broadband services, which has brought substantial benefits to consumers and has spurred 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 U.S. 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.<sup>7</sup>

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.<sup>8</sup>

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 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.

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<sup>7</sup> See Thirteenth Report at Pg. 66.

<sup>8</sup> Id. at Pg. 73.

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. Mobile broadband deployment is especially critical in Mississippi, which has the lowest overall broadband penetration among the 50 states.

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 Pg.73. The Commission's May 2009 Rural Broadband Report included a more recent statistic—now, over 95.6% of all Americans, i.e., approximately 272.55 million Americans, now 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. These numbers are 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.

#### **IV. Upgraded 3G Technologies and LTE Technology**

As operators began deploying the first mobile broadband technologies, EV-DO and HSPA in their initial forms—EV-DO Release 0 and HSDPA—the ecosystem of vendors that develop and support these technologies were simultaneously working on upgrades to the technologies for deployment in existing spectrum, and the new LTE mobile broadband technology, which was designed for deployment in new spectrum and which was optimized for wider bandwidths than the 3G technologies.

Today, as noted supra and as the FCC recently found, Verizon Wireless, Sprint, Leap Wireless and others provide mobile broadband service to areas in which over 95% of Americans live via EV-DO Revision A, which supports peak data speeds of 3.1 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, and is already in the midst of upgrading its HSPA network to support peak speeds of 7.2 Mbps. Likewise, T-Mobile USA is moving forward rapidly with its HSPA deployment and will migrate to HSPA+ on its AWS-1 spectrum.

The EV-DO and HSPA technologies are not standing still. Both are being enhanced substantially, and these enhancements will all be backwards compatible. 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 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, an OFDM-based technology, which achieves higher data rates and is optimized for wider bandwidths— a minimum of 20 MHz of paired spectrum, and ideally at least 40 MHz of paired spectrum per operator, for initial deployments. But, over the longer term, as data traffic moves to LTE and as mobile broadband use continues to explode, far more licensed spectrum, hundreds of MHz, needs to be identified, allocated, and auctioned for mobile broadband.

Until more spectrum is made available, technologies can be deployed to increase the capacity of existing networks, such as interference cancellation. In addition, operators can use femtocells to enhance the overall capacity and coverage of their networks. Finally, networks which use the 3G technologies or LTE can all be deployed in a more dense topology to increase frequency reuse and achieve greater capacity. All of these techniques are important and very helpful, but they are not substitutes for more licensed spectrum. At the end of the day, in order

for the American public to enjoy the full range of benefits from mobile broadband, substantially more licensed spectrum must be identified, allocated, and auctioned.

## **V. New Categories of Mobile Broadband Devices**

As noted supra, QCT is the world's largest provider of chipsets for mobile broadband devices. QCT constantly develops new chipsets incorporating more functionality and lower power to drive mobile broadband into an ever increasing variety of devices at all price points. In particular, QCT is in the midst of four important initiatives to expand the scope and use of mobile broadband devices by creating new categories of mobile broadband devices. These new categories of devices are another important factor causing the need for additional licensed spectrum for mobile broadband.

QCT's first mobile broadband initiative is a platform 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, known as smartbooks, are much smaller, thinner, and less expensive than traditional notebook and mini-notebook PCs and with longer battery life that provides day-long availability.<sup>9</sup> Smartbooks feature always-on mobile broadband connections similar to mobile phones with everyday computing functionality in sub-compact, ultra-thin, and highly portable devices. (For more information on smartbooks, see [www.hellosmartbook.com](http://www.hellosmartbook.com).)

At present, 15 major manufacturers are developing more than 40 Snapdragon-based mobile broadband devices. The first Snapdragon-based mobile broadband smartphone was

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<sup>9</sup> In the territory of the Federal Republic of Germany, the use of the term "smartbook" in connection with portable computers is reserved exclusively to Smartbook AG, Germany.

introduced in February 2009 by Toshiba, and other Snapdragon-based devices for mobile broadband computing are coming to market. The first smartbook will be manufactured by Lenovo and will run on AT&T's mobile broadband network.

A second QCT mobile broadband initiative involves 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](http://www.qualcomm.com/news/releases/2008/081112_qct_kayak.html). Kayak consists of a reference design and recommended software specifications that device manufacturers are using to bring to market a variety of innovative wireless devices.

These Kayak-based devices use mobile broadband technology to fill the niche between desktop computers, which typically require wireline or cable connections for internet access, which is often unavailable in rural areas, and internet-capable mobile broadband-enabled smartphones. Kayak-based devices include embedded 3G voice and data broadband capability, a full featured Web 2.0 browser, and support 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 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 via standardized web browser offering desktop resolutions and supported by 3G mobile broadband networks employing 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.

QCT's third mobile broadband initiative consists of a global mobile broadband and GPS embedded solution for notebook computers and other wireless devices. This solution is called Gobi. Gobi-enabled notebooks 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 that provide mobile broadband connectivity wherever the user may happen to be. Earlier this year, Qualcomm announced its second generation embedded Gobi module. This module, which will launch commercially this year, 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. While Gobi was initially deployed in notebooks, it is now being embedded into other devices to provide worldwide mobile broadband connectivity.

QCT's fourth mobile initiative is a platform by the name of inGeo. The inGeo platform provides a complete end-to-end solution for personal location devices and services. It currently uses CDMA2000 and Assisted GPS and is optimized for extremely small form factors and long battery life using Qualcomm's low duty cycle technology. (A next generation inGeo could be based on WCDMA.) The inGeo solution and associated server control technology provide accurate near real time location data that can be used for wireless tracking, safety and monitoring applications, including many Smart Grid-related applications. At less than 1,000 mm<sup>2</sup> in area, the inGeo module offers one of the industry's smallest form factors, and it incorporates a 2.4 GHz ZigBee transceiver and a Bosch SMB380 3-axis accelerometer to limit power consumption and provide short range connectivity.

## **VI. Improvements to the Mobile Broadband User Experience**

In addition to developing new technology to enable faster mobile broadband networks and new chips to power new categories of mobile broadband devices, Qualcomm is developing technologies to improve the mobile broadband user experience in several ways which will be of tremendous use for healthcare related applications. These new technologies range from: improving the displays used on wireless devices so they consume less power, need to be charged less frequently, and can be viewed in broad daylight; enabling the wireless charging of multiple devices simultaneously, which will eliminate the need for separate chargers and connectors for every wireless device and, therefore, are much more environmentally friendly than today's wired chargers; and, improving the voice reception of mobile broadband devices so that calls can be heard even in noisy environments.

The Wall Street Journal recently gave Qualcomm's wireless display technology, known as mirasol, its award for 2009 Technology Innovation in Semiconductors. See Michael Totty, "The Wall Street Journal 2009 Technology Innovation Awards," Wall Street Journal, Sept. 14, 2009. This innovative MEMS (micro-electrical-mechanical systems)-based technology reflects light so that specific wavelengths interfere with each other to create color, the same phenomenon which makes a butterfly's wings shimmer. Displays based on mirasol increase the capabilities of the device because the device can be seen in full sunlight, while dramatically reducing the power consumed by the display. Devices using mirasol will be of great use for health care applications since they can be used in any environment and need to be charged less often.

In addition, the Wall Street Journal recognized another innovative Qualcomm technology which will revolutionize wireless charging. See "The Wall Street Journal 2009 Technology

Innovation Awards,” supra. This technology, known as eZone, provides a universal charging platform that can charge multiple devices simultaneously and wirelessly. eZone eliminates the need for each device to have its own battery charger and its own connector. Users will benefit because they will not need to carry a charger for each device, and the user experience will be far more convenient than today because they will be able to charge any number of devices easily.

Finally, Qualcomm has developed technology to improve vastly the quality of reception in wireless devices. Qualcomm’s technology, known as Fluence, uses dual microphone noise cancellation in a handset, which provides higher noise suppression of approximately 25 to 30 dB. Fluence allows a user to hear the other end of a call with great clarity even in the most noisy of environments. In addition, Fluence can be used in conjunction with a new wideband vocoder to provide true high definition voice with unprecedented mobile voice quality.

All three of these innovations—mirasol, eZone, and Fluence—will vastly improve the wireless user’s experience and drive even further growth in the use of mobile broadband networks and concomittant need for additional licensed spectrum for such networks.

## **VII. Healthcare and Mobile Broadband**

### **a. Mobile Broadband Technology and Preventable Disease in the U.S.**

The burden of preventable illness in the U.S. is large and growing. Chronic diseases, such as heart disease, cancer, and diabetes are the leading causes of death and disability in the U.S., according to the Center for Disease Control (“CDC”).<sup>10</sup> Chronic diseases account for 7 out of 10 deaths among Americans each year, while also causing major limitations in daily living for

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<sup>10</sup> See Centers for Disease Control and Prevention, “Chronic Disease Prevention and Health Promotion,” <http://www.cdc.gov/nccdphp/index.htm>.

25 percent of people with chronic conditions.<sup>11</sup> In the U.S., the care of chronic illness accounts for almost 75 percent of total healthcare costs.<sup>12</sup> Chronic diseases are generally found among older adults, but they affect people of all ages and are now recognized as a leading health concern of the nation.<sup>13</sup> Although chronic diseases are among the most common and costly health problems, the CDC states that they are also among the most preventable. Thus, the most preventable diseases are of the greatest cost in the U.S. annually.

According to a 2008 study, the U.S. could cut some \$197 billion from its healthcare bill over the next 25 years by implementing widespread use of remote monitoring technologies. These technologies could track vital signs of patients with chronic diseases such as congestive heart failure and diabetes.<sup>14</sup> Remote patient monitoring uses medical devices and sensors to remotely collect and send data to a monitoring station for interpretation. Such "home telehealth" applications might include a specific vital sign, such as blood glucose or heart ECG or a variety of indicators for homebound patients.<sup>15</sup> These services can be used to augment the work of visiting nurses, clinicians and doctors. For example, a telehealth EEG device monitors the

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<sup>11</sup> See Centers for Disease Control and Prevention, "Chronic Disease Overview," <http://www.cdc.gov/nccdphp/overview.htm>.

<sup>12</sup> See J. Geyman "Disease management: Panacea, another false hope, or something in between?", *Annals of Family Medicine* 5(3):257-260 (2007).

<sup>13</sup> See Chronic Diseases: The Power to Prevent, the Call to Control, at Pages 1-2 (2009).

<sup>14</sup> See "Vital Signs via Broadband: Remote Health Monitoring Transmits Savings, Enhances Lives," October 24, 2008, Page 2.; <http://www.medicalnewstoday.com/articles/127982.php>

<sup>15</sup> See American Telemedicine Association, "Telemedicine Defined," <http://www.americantelemed.org/i4a/pages/index.cfm?pageid=3333>.

electrical activity of a patient's brain and then transmits that data to a specialist.<sup>16</sup> This could be done in either real-time, or the data could be stored and then forwarded.

Today, mobile broadband already plays a role in healthcare. From the cell phones used by care providers to communicate between professionals and their patient's, to the field laptops utilized by emergency management responders to keep track of patient information and records, to the handheld devices like PDA's or smartphones that specialist's use to download diagnostic data or drug information, ubiquitous high-speed 3G wireless broadband data networks are at the heart of making telehealth a vivid reality.

**b. Mobile Broadband and America's Shrinking Healthcare Workforce**

America's healthcare industry is in the middle of a workforce crisis, where hospitals nationwide are facing clinical workforce shortages due to an aging healthcare workforce. Many nurses and physicians are among the baby boomers that are set to retire in the next three to five years.<sup>17</sup> The federal government is predicting that by 2020, nurse and physician retirements will contribute to a shortage of approximately 24,000 doctors and nearly 1 million nurses.<sup>18</sup> While hospital leaders voice concerns over possible shortages, the implications are greater as they extend well into the healthcare delivery system and into the quality of care in America. It's

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<sup>16</sup> Id.

<sup>17</sup> See Isgur, Benjamin, "Healing the Health Care Staffing Shortage," Trustee, ABI/INFORM, Health Forum Inc., Pg. 18 (February 2008).

<sup>18</sup> See Health Resources and Services Administration, "Exhibit A-5. Baseline FTE RN Supply and Demand, 2020"  
<http://bhpr.hrsa.gov/healthworkforce/reports/behindrnprojections/6.htm>; See PriceWaterhouseCoopers "Healthcare Practice: Workforce,"  
<http://www.pwc.com/us/en/healthcare/workforce.jhtml>.

expensive to educate new nurses and doctors and taxpayer-funded Medicare spends \$8 billion a year for residency training of physicians alone.<sup>19</sup>

While the U.S. has more physicians and nurses than ever before, they are not distributed or deployed efficiently, underscoring the problems faced with the delivery of quality and timely healthcare in America. Underserved patients are not just those typically found in rural America or in geographic areas of low population density, but now with an aging baby boomer demographic more and more people will continue to place greater demands on the nation's healthcare infrastructure everywhere. In the U.S. alone, the population of those 65 and older will more than double by 2050, rising from 39 million in 2009 to 89 million.<sup>20</sup> This is a global phenomenon, with the world's 65-and-older population projected to triple by midcentury, from 516 million in 2009 to 1.53 billion in 2050, according to the US Census Bureau.<sup>21</sup>

Quite simply, the U.S. population is aging. An aging population creates a demand for health services. At the same time, our nation is already facing a shortage of healthcare providers from nurses to primary care providers. The healthcare labor shortage coupled by an increasingly older population will exponentially increase healthcare disparities in urban, suburban and rural America all the same. Logistical burdens – be it 5 miles or 500 miles -- impede access to healthcare by the elderly, infirmed and chronically ill.

America has gone beyond traditional methods of delivering health services. Telehealth enabled by powerful mobile broadband networks exist and are available today to supplement America's healthcare delivery.

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<sup>19</sup> Id. PriceWaterHouseCoopers.

<sup>20</sup> See U.S. Census Bureau, "Census Bureau Reports World's Older Population Projected to Triple by 2050," (released June 23, 2009), [http://www.census.gov/Press-Release/www/releases/archives/international\\_population/013882.html](http://www.census.gov/Press-Release/www/releases/archives/international_population/013882.html).

<sup>21</sup> Id.

**c. Ubiquitous Mobile Broadband for Telehealth**

In a speech offered at the Commission on September 15, 2009, the U.S. Federal Chief Technology Officer, Aneesh Chopra acknowledged, “We cannot move forward in advancing our nation's healthcare reform goals without the appropriate use of technology in health care and telemedicine is a key component.”<sup>22</sup> Likewise, according to the Department of Health and Human Services, health information technology (“HIT”) allows for the comprehensive management of medical information and its secure exchange between health care consumers and providers. Broad use of HIT has the potential to improve health care quality, prevent medical errors, increase the efficiency of care provision and reduce unnecessary health care costs, increase administrative efficiencies, decrease paperwork, expand access to affordable care, and improve population health.<sup>23</sup>

Central to advancing our nation’s healthcare reform goals through the use of technology and the broad use of HIT, are wireless broadband technologies and interfaces such as Qualcomm’s. As noted supra, cost savings in the U.S. would be maximized through the accelerated use of remote monitoring telemedicine. In particular, the long-term success of remote monitoring requires widespread deployment of wireless broadband.<sup>24</sup> These technologies enabled by widespread ubiquitous high-speed networks, help diagnose health problems sooner,

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<sup>22</sup> See Federal Communications Commission, Health Care Workshop Audio Transcript (Aneesh Chopra Testimony), <http://www.fcc.gov/realaudio/mt091509.ram>; Communications Daily, Vol. 29, No. 178, at Pgs. 1-2 (September 16, 2009).

<sup>23</sup> See Office of the National Coordinator for Health Information Technology, “Why health IT?” <http://healthit.hhs.gov/portal/server.pt>.

<sup>24</sup> See Vital Signs via Broadband: Remote Health Monitoring Transmits Savings, Enhances Lives, Page 3 (October 24, 2008).

thus reducing or avoiding costly hospitalizations, while improving overall quality of life and care.

Telehealth and remote patient monitoring are not substitutes for direct patient care but meant to enhance patient care as part of a broader solution for advancing healthcare in America. These technologies offer healthcare professionals, providers, caregivers and loved one's real-time information and critical data to monitor patients with far more frequency and accuracy (by the second, minute, hour, daily or as needed) without the need to make an aged senior citizen or ill patient leave the comfort of their homes for routine diagnostic monitoring that can be done anywhere, anytime. The American Association of Retired People (AARP) has been advocating for long-term care provisions to be included as part of the 2009 legislative healthcare reform efforts to include home and community-based services as well as to expand Medicaid services, so people could choose those options over nursing homes.<sup>25</sup>

Mobile broadband enabled telehealth technologies go a long way in helping to accomplish those goals. Mobile vital signs monitors, wireless Personal Emergency Response Systems ("PERS"), internet-enabled medication reminders, compliance sensors, remote trending analysis services, gas alerts, mobile accelerometers, are but a few examples of some of the available technologies that help care providers to better monitor patients in non-disruptive ways. Mobile broadband technologies allow healthcare professionals to focus on the health and well being of their patients while maximizing their valuable human resources in cost-effective and efficient ways.

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<sup>25</sup> See American Association of Retired Persons, "Little-Known Provisions in Health Care Reform Bills Would Offer Help With Long-Term Care; Americans could enroll in a new federal plan and receive cash benefits to help them age in place," (released November 10, 2009) [http://bulletin.aarp.org/yourhealth/policy/articles/little\\_known\\_provisions\\_in\\_health\\_care\\_reform\\_bills\\_offer\\_help\\_with\\_long\\_term\\_care.2.html](http://bulletin.aarp.org/yourhealth/policy/articles/little_known_provisions_in_health_care_reform_bills_offer_help_with_long_term_care.2.html).

In a New England Healthcare Institute study from 2009, it was determined that a 60% reduction in hospital readmissions were realized using remote patient monitoring compared to traditional care. Moreover, the study found a 50% reduction in hospital admissions using remote patient monitoring compared to disease management programs without remote monitoring. In addition, this study found remote patient monitoring has the potential to prevent between 460,000 and 627,000 heart failure related hospital admissions each year.

One of the most widely accepted government studies is one conducted by the Veteran's Administration titled "Care Coordination/Home Telehealth: The Systemic Implementation of Health Informatics, Home Telehealth and DM to support the Coordination of Veteran Patients with Chronic Conditions." It showed a reduction of bed days of care by 25% and a reduction in hospital admissions by 25% by using remote monitoring technologies. This means that patients were able to avoid readmissions and improve their health status faster through telehealth services while staying in their homes.

### **VIII. Examples of the Use of 3G in Healthcare**

The communications industry and in particular, Qualcomm, are at the forefront of helping to address the concerns of chronic diseases, aging and our aging healthcare workforce. By providing robust broadband technologies and fast data networks, the medical and health industries now harness the power of wireless to provide patient care through remote monitoring and telehealth. The following are a few of those examples:

CardioNet®, uses 3G connectivity to provide next-generation ambulatory cardiac monitoring service with beat-to-beat, real time analysis, automatic arrhythmia detection and

wireless ECG transmission.<sup>26</sup> CardioNet is the world's leading supplier of Mobile Cardiac Outpatient Telemetry™ (MCOT™). CardioNet prides itself with helping clinicians prevent morbidity, mortality and disability with rapid diagnosis and treatment of patients with cardiovascular disease.

Myca Health™ offers a 3G powered, fully integrated, customizable web-based application that combines an electronic medical record, a comprehensive administrative system with built-in scheduling and diagnostic tools with the ability for doctors to communicate with patients and each other through multiple channels, from email and instant messaging to video.<sup>27</sup> Myca Health™ is designed to simplify and streamline the engagement between health care providers and those in need of care.

Epocrates, Inc., is a developer of comprehensive drug guides for handheld 3G based Palm, Windows Mobile, iPhone, and BlackBerry mobile phones and PDA's.<sup>28</sup> Users can select from several available platforms for their specific mobile phone or PDA to download free Epocrates mobile drug software which includes a drug guide, formulary information, drug interaction checker and medical news.

Jitterbug (a GreatCall company), offers easy-to-use 3G CDMA wireless cell phone services that are targeted to accommodate the needs of elderly and disabled persons with unique

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<sup>26</sup> See CardioNet, "Medical Professionals: CardioNet Comprehensive," <http://www.cardionet.com/>.

<sup>27</sup> See Myca Health Inc., "What is MycaHub™?" <http://www.myca.com/mycahub-technology/what-it-is>.

<sup>28</sup> See Epocrates, "Epocrates Products," <http://www.epocrates.com/>

and intuitive, life-enhancing cell phones. The Jitterbug service runs over the Verizon Wireless network through Verizon's open development program offering nation-wide 3G coverage.<sup>29</sup> Jitterbug's phones offer larger keypads and a patented ear cushion, for comfort and adaptability. Jitterbug offers a variety of targeted services including the "Jitterbug LiveNurse™", which provides users 24-hour access to live, registered nurses anytime a caller may need to ask health-related questions.<sup>30</sup> Jitterbug recently announced the acquisition of MobiWatch, a company focused on developing Mobile Personal Emergency Response Services (M-PERS) in order to expand its customer offerings to personal safety services that will be delivered through the Jitterbug cell phone.

AirStrip Technologies offers a suite of products for remote healthcare surveillance to be used on Apple's 3G UMTS iPhone. AirStrip's signature product is AirStrip OB, which delivers vital patient waveform data including fetal heartbeat and maternal contraction patterns in virtual real-time directly from the hospital labor and delivery unit to a doctor's mobile wireless device.<sup>31</sup> The application gives physicians the ability to closely monitor patients twenty-four hours a day or review nursing notes, vital signs and order results, when the demands of their practice necessitate their absence from the labor and delivery unit.

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<sup>29</sup> See Verizon Wireless, "Jitterbug's Easy-To-Use Services Are Now Available On The Verizon Wireless Network" (Released August 8, 2009) <http://news.vzw.com/news/2009/08/pr2009-08-26d.html>

<sup>30</sup> See Jitterbug, "Services for Health and Wellness," <http://www.jitterbug.com/ServicesStore/health-and-wellness.aspx>

<sup>31</sup> See Airstrip, "AIRSTRIP OB™," <http://www.airstrip.tech.com/TheAirStripOBSERVERSuittrade/AirStripOBtrade/tabid/61/Default.aspx>

The InTouch Health RP-7® mobile robotic platform integrates a number of key technologies including 3G mobile broadband to power its Remote Presence Robotic System which can effectively extend a physician's reach to better manage a patient's care. The RP-7, and RP-7i are the first and only FDA-cleared Remote Presence devices that allow direct connection to Class II medical devices.<sup>32</sup> Devices such as electronic stethoscopes, otoscopes and ultrasound's can be connected to the Expansion Bay of the Robot, to transmit medical data to a remote physician.

Qualcomm through its Wireless Reach Initiative (an initiative designed to promote the socially beneficial uses of mobile broadband technology in the U.S. and around the world), supports a project featuring the use of an RP-7 robot. Wireless Reach and its partners are working with the US Army Trauma Training Center to explore the use of 3G mobile technology in a busy trauma setting.<sup>33</sup> The project is identifying the potential use of a robot in supporting trauma care in a battlefield hospital. Using a laptop with special controls and a wireless broadband connection, doctors are providing guidance to an attending remote medical team on how best to treat injuries. With EV-DO Rev. A connectivity, physicians are treating patients anywhere, anytime by extending the reach of trauma surgeons. The robot's two-way audio-video capabilities allow physicians to check vitals, zoom in on the patient and provide advice to attending doctors, nurses or clinicians. Enabling surgeons to instantly connect to the ICU through high-speed wireless technology can help lower the preventable death rate by speeding up the delivery of trauma care during the 'golden hour,' the critical 60 minutes after an injury.

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<sup>32</sup> See InTouch Health®, “Explore Remote Presence,” [http://www.intouchhealth.com/products\\_rp7robot.html](http://www.intouchhealth.com/products_rp7robot.html).

<sup>33</sup> See Qualcomm Incorporated, “United States: Trauma Surgeons Using Robot to Reach Patients in Need,” [http://www.qualcomm.com/citizenship/wireless\\_reach/projects/health\\_care.html](http://www.qualcomm.com/citizenship/wireless_reach/projects/health_care.html)

Those are just a few examples of how companies are harnessing the power of 3G wireless broadband to offer mobile healthcare.

**IX. 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, & Applications**

The Commission's own data on the U.S. wireless industry establish that mobile broadband is growing at dramatic rates. Literally every day, mobile broadband networks are expanding; a wide variety of new mobile broadband devices come to market; and, many new mobile broadband services and applications are launched.

In May 2009, 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.<sup>34</sup> 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%.<sup>35</sup> In January 2009, the FCC reported that the figure was 92%, and now, the FCC puts the

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<sup>34</sup> See Bringing Broadband to Rural America, Report on a Rural Broadband Strategy, released May 22, 2009, at Pgs. 12-13.

<sup>35</sup> 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.

figure at 95.6%.<sup>36</sup> 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. Even during the sharp recession our nation has gone through, 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.

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. In particular, as shown herein, mobile broadband, with ubiquitous high speed wireless connectivity, is an essential and growing means of providing and delivering healthcare in the U.S. For that reason and others set forth in Qualcomm's companion filings, Qualcomm believes that 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 U.S. 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,

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<sup>36</sup> 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.

vendors, and the public at large—to reach that goal. Within a few years or even less, this nation can achieve 100% mobile broadband coverage if we have a national commitment to do so, along with the targeted use of public funds for this purpose.

#### **X. The Commission’s Should Modernize the Rural Health Pilot Program**

As we’ve presented supra, mobile broadband networks and devices offer tremendous potential to improve healthcare delivery in this nation. Achieving the goal of universal mobile broadband coverage in the near future will greatly facilitate the use of wireless devices and services for healthcare, but there is more that the Commission can do.

The Commission has a well-intentioned rural health care pilot program. The program is designed “to provide funding to support the construction of state or regional broadband networks and services provided over the networks,” and applicants can seek funding “to construct a dedicated broadband network that connects health care providers in a state or region.” Order, 21 FCC Rcd 11111 (2006). But, the pilot program only funds dedicated networks. The pilot program does not provide any funding for the use of commercially available mobile broadband networks, which already cover over 95% of the US population. In addition, the pilot program does not provide any funding for wireless devices, telemedicine applications and software, or personal computers. See <http://www.fcc.gov/cgb/rural/rhcp.html#orders>. Moreover, although the pilot program includes funding of up to \$400 million per year, almost no funds have been paid out, and the program will soon expire.

The pilot program should be modernized so that it provides funds for the use of commercially available mobile broadband networks. Wireless healthcare will be provided over commercial mobile broadband networks, rather than over dedicated networks constructed by

hospitals, which can never truly attain the wide coverage of commercial mobile broadband networks. Doctors and patients will use commercially available mobile broadband devices to access these networks for wireless health services. Qualcomm respectfully submits that the Commission should consider expanding the pilot program to fund the use of commercially available mobile broadband networks.

#### **XI. The Universal Service Program Should Provide Funding for Mobile Broadband**

The Commission needs to consider reforming the universal service program as it has the potential of being far more effective and productive. In particular, one aspect of universal service reform could be put in place quickly. As Qualcomm and a host of other companies have argued, a pilot program could be put in place under Lifeline and LinkUp to provide subsidized mobile broadband devices and mobile broadband service initially to at least one million low income participants all over the nation. 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). Such a pilot program should be fully funded and put in place quickly, and if the pilot is successful, as it is expected to be, the program should 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. See Order on Remand and Further Notice of Proposed Rulemaking, FCC 08-262, released November 5, 2008, A-35, C-34. It is essential that this problem be cured quickly. The Lifeline and LinkUp programs are well suited to do so.

The Commission should convert the universal service program into a broadband program. That conversion will take time to complete. In the meantime, the Commission should authorize and fund a mobile broadband pilot program under the existing Lifeline and LinkUp programs.

**XII. The Commission Should Identify, Allocate, and Auction More Licensed Spectrum for Mobile Broadband**

As Qualcomm has urged in other filings concerning the National Broadband Plan, and as Chairman Genachowski has himself stated, our nation needs more licensed spectrum for mobile broadband to meet the burgeoning demand for mobile broadband devices and the wide variety of services and applications. See Comments of Qualcomm filed on June 8, 2009 at 15-17, Reply Comments of Qualcomm filed on July 21, 2009 at 1-2; Comments of Qualcomm filed September 30, 2009 at 27-28; Comments of Qualcomm filed on October 23, 2009 at 23-25; Reply Comments of Qualcomm filed on November 13, 2009 at 2-5. The mobile devices, services, and applications that will be used to improve healthcare delivery will be an important component of the exponential growth in overall mobile broadband demand. More licensed spectrum for mobile broadband – hundreds of MHz – is essential to meet this ever-growing demand, in particular, to ensure that our nation’s healthcare system will have access to the tremendous range of mobile broadband services and applications that are being developed, which as shown supra, will improve healthcare delivery in the U.S. to the greatest extent possible.

**XIII. The Commission Should Help to Make Additional Funding Available for Broadband devices, services and software applications through the ARRA**

More federal funding should be identified and made available from the ARRA or other sources to subsidize mobile broadband devices and telehealth software and applications for healthcare professionals and patients. With the expected growth of broadband services, any broadband policy should include additional monies to promote the adoption of telehealth services, wireless broadband healthcare devices and related software.

As outlined by the Office of the National Coordinator (“ONC”) for Health Information Technology, broad use of HIT has the potential to improve health care quality, prevent medical errors, increase the efficiency of care provision and reduce unnecessary health care costs, while increasing administrative efficiencies, decreasing paperwork, expanding access to affordable care, and improving population health.<sup>37</sup> ONC is tasked with the development and nationwide implementation of an interoperable health information technology infrastructure. It is expected that use of this infrastructure will improve the quality, safety and efficiency of healthcare and the ability of patients to better manage their health information and healthcare.

Broadband is the keystone for real-time, secure, reliable data exchange everywhere. With an eye to ONC’s efforts, new innovative healthcare products are being developed for the home, hospital, clinic or mobile setting, and many of those products will rely on wireless broadband for their connectivity.

The inevitability of the use of mobile broadband for healthcare is obvious. Federal funding should be made available to subsidize the entire infrastructure ecosystem of interoperable HIT. Mobile broadband devices, telehealth software and related applications will

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<sup>37</sup> See Office of the National Coordinator for Health Information Technology, “Why health IT?” <http://healthit.hhs.gov/portal/server.pt>.

serve as the foundational generators of the health information exchange that is envisioned by the ONC. We respectfully urge that more funding for wireless broadband devices and telehealth will jump start the adoption of new and innovative ways to offer care.

**XIV. The Commission Should Explore Ways in Which to Collaborate with the Centers for Medicare and Medicaid Services to Foster Wireless Broadband Telehealth Reimbursement**

The Commission notes in the Public Notice that reimbursement issues are frequently cited as a barrier to the adoption of health IT. NBP Public Notice #17 at 5. The Centers for Medicare and Medicaid Services (“CMS”) define telehealth services as the use of medical information exchanged from one site to another via electronic communications to improve a patient's health.<sup>38</sup> Electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment permitting two-way, real-time (with limited exceptions) interactive communication between the patient, and the physician or practitioner at the distant site.<sup>39</sup> The definition includes limitations on the types of originating sites of care that can be used, in addition to the requirement that an originating site must be located in either a health professional shortage area (“HPSA”) or in a county not classified as a metropolitan statistical area (“MSA”).<sup>40</sup>

Quite simply telehealth reimbursement should be permitted anywhere, anytime and not limited to geographically rural areas. The limitations on which types of originating institutions

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<sup>38</sup> See Centers for Medicare and Medicaid Services, “Telemedicine and Telehealth,” <http://www.cms.hhs.gov/Telemedicine/>.

<sup>39</sup> See 42 CFR 410.78. Note that the Federal Medicaid statute (Title XIX of the Social Security Act) does not recognize telemedicine as a distinct service.

<sup>40</sup> Id. at (b)(3) and (b)(4).

and which fields of healthcare are eligible for telehealth reimbursement are also outdated, as eligible healthcare providers and professionals should be allowed to practice medicine anywhere. Healthcare management should not be limited to only live encounters, where store-and-forward technologies are perfectly capable of providing reliable, consistent, diagnostic care.

Interoperable personal telehealth systems harness technological innovations that allow individuals to better manage their healthcare. Central to personal telehealth is remote monitoring of data that can be used for disease management, safety, health and wellness. If a Medicare benefit plan covers a service, then that plan should also cover the same service when it is performed via telehealth.

That is why we respectfully recommend that the Commission take-up these prohibitive, restrictive policies with the CMS to expand, not limit, the established standards for Medicare services to include broadband wireless telehealth services and devices.

