

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of  
  
Rural Health Care Support Mechanism

WC Docket No. 02-60

**COMMENTS OF QUALCOMM INCORPORATED**

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## SUMMARY

Qualcomm strongly supports the continued efforts of the Federal Communications Commission (“FCC”) to reform the Universal Service Program in accordance with the recommendations in the National Broadband Plan. Timely reform of the Rural Health Care Support Mechanism should be undertaken to speed up broadband deployment and, in particular, to make universal service support available so rural clinics and health care professionals can use mobile broadband as proposed in the *NPRM*. These measures are especially critical, for, as Chairman Genachowski notes, it can be “a matter of life or death” for patients in presently underserved areas who require medical treatment, but lack the ability to communicate effectively with health care professionals. *See NPRM*, Supporting Statement of Chairman Julius Genachowski.

Both the *NPRM* and the Health Care Broadband in America Technical Paper issued last month by FCC’s Omnibus Broadband Initiative (the “OBI Technical Paper”) cogently explain how providing broadband connectivity to health care professionals and patients in the farthest reaches of our country can reduce health care costs and improve the quality of care. Importantly, the OBI Technical Paper assesses the bandwidth requirements for a number of health care delivery settings and effectively demonstrates that rural health clinics, nursing homes, as well as solo and small primary care medical facilities, which are prevalent in rural areas, may be best supported via mobile broadband. *See OBI Technical Paper* at 6.

In fact, cellular wireless networks have some important advantages over wired solutions, for mobile broadband connectivity can “leverage[] consumer devices such as smartphones, allowing health care to travel with the patient and clinician.” *Id.* at 5. In this way, today’s 24/7 wireless medical monitoring tools can give the rural patient freedom of movement, the attending

physician access to real-time patient data, and the patient's loved ones peace of mind.

In these comments, Qualcomm explains that commercial cellular technologies and the rapidly developing enhancements to these technologies – areas in which Qualcomm is playing a key role – can readily meet the communications requirements of rural health care providers and their patients. Today, Qualcomm-enabled devices are supporting remote monitoring of vital signs, secure transmission of patient medical data, video consultations, near-real-time analysis of diagnostic test results, and, in critical situations, the automatic alerting of emergency responders where patient medical devices sense a life-threatening event, such as cardiac arrest.

For more than two decades, Qualcomm's innovations have fueled the successful development of wireless cellular networks and countless mobile devices that are used today by health care providers and their patients. By broadly licensing its technology innovations and providing equipment vendors with complete chipset and software solutions, Qualcomm enables both new and established companies to bring wireless infrastructure, mobile devices, and associated health care applications to market more quickly and at lower cost. Qualcomm CDMA Technologies ("QCT") is the world's largest provider of wireless chipset technology that is integrated into hundreds of millions of mobile phones, smartphones, and other mobile broadband devices, such as USB-dongles, Mi-Fi devices, and broadband-embedded laptops, netbooks, and pocketable computing devices. Also, Qualcomm's mobile broadband initiatives, namely, the Snapdragon, Gobi, Kayak, Wearable Mobile Device, and mirasol platforms, are powering the next generation of mobile devices that can readily support the timely and cost-effective delivery of health care to remote regions of the United States.

Wireless broadband technologies, which are already in heavy use in much of America, in many cases offer the most cost-effective means of deploying broadband connectivity to rural

health care providers. The OBI Technical Paper establishes that today's wireless technologies can meet the broadband needs of most rural medical facilities, *i.e.*, solo and small primary medical care practices, nursing homes, and rural health clinics. And, as the broadband needs of these rural medical facilities expand, next generation wireless technologies will support increased capacity to meet those needs.

Qualcomm commends the FCC for its timely *NPRM* and respectfully requests that the agency promptly issue its proposed regulations, with modifications set forth herein that account for the rapidly advancing capabilities of today's wireless broadband technologies.

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Qualcomm is pleased to provide these comments on the Federal Communications Commission's ("FCC's") *Notice of Proposed Rulemaking* in the above-referenced proceeding that proposes to expand the reach of broadband connectivity to public and non-profit health care providers in currently underserved areas.<sup>1</sup> Qualcomm strongly supports the FCC's timely proposals following up on the National Broadband Plan's recommendations to increase broadband connectivity for rural health care providers so they will have "access to state-of-the-art diagnostic tools that typically are available only in the largest and most sophisticated medical centers."<sup>2</sup>

As explained below, Qualcomm-enabled mobile devices and associated broadband connectivity can help these health care providers and their patients to realize the full potential of "eCare" and health care information technology by expanding access to better and more cost-

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<sup>1</sup> See Rural Health Care Support Mechanism, *Notice of Proposed Rulemaking*, 25 FCC Rcd 9371 (2010) ("*NPRM*").

<sup>2</sup> See *id.* at ¶ 2; see also FCC National Broadband Plan: Connecting America (rel. Mar. 16, 2010) ("FCC NBP") at 215 ("Recommendation 10.7: The FCC should establish a health Care Broadband Infrastructure Fund to subsidize network deployment to health care delivery locations where existing networks are insufficient.").

effective means of medical care.<sup>3</sup> The benefits of marrying broadband connectivity and health care delivery are well documented. The *NPRM* quotes a New England Healthcare Institute Study that found remote patient monitoring for heart failure alone can save up to \$6.4 billion annually through reduced hospital admissions.<sup>4</sup> The *NPRM* astutely acknowledges that the level of patient care and the monetary benefits achievable through remote monitoring and treatment of other medical conditions, such as renal and kidney disease, asthma, hypertension, obesity, and diabetes, could be exponentially greater.<sup>5</sup>

To realize these benefits, the FCC’s revamped Rural Health Care Support Mechanism should provide funding for mobile broadband service and devices so that rural health care providers and their patients can take full advantage of such life-saving and cost-effective remote monitoring capabilities. Allowing rural patients to be monitored while at home and away from the health care center will lower costs “by shortening average hospital stays, reducing the need for tests, and increasing administrative efficiencies.”<sup>6</sup>

Accordingly, Qualcomm strongly supports the Commission’s proposals: (1) for areas either not presently or currently inadequately served by broadband networks, to create a health infrastructure program that supports up to 85 percent of the costs of constructing new regional or statewide broadband networks to serve public and non-profit health care providers;<sup>7</sup> (2) to

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<sup>3</sup> See FCC National Broadband Plan: Connecting America (rel. Mar. 16, 2010) (“FCC NBP”) at 200 (defining “eCare” as “[t]he electronic exchange of information—data, images and video—to aid in the practice of medicine and advanced analytics. Encompasses technologies that enable video consultation, remote monitoring and image transmission (“store-and-forward”) over fixed or mobile networks”).

<sup>4</sup> See *NPRM* at ¶ 2, n.5.

<sup>5</sup> *Id.*

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

<sup>7</sup> See *NPRM* at ¶ 13 and Proposed Rule Section 54.650(b).

establish a health broadband services program for qualified rural health care providers that subsidizes 50 percent of the monthly recurring costs for broadband services for such providers;<sup>8</sup> and (3) to expand the Commission’s interpretation of “eligible health care provider” to include skilled nursing facilities, renal dialysis centers and facilities, and administrative offices and data centers that support but are not co-located with the clinical offices of a health care provider.

For the reasons set forth below, the deployment of wireless cellular network architectures and associated end-user devices in the hands of the clinician and on the body of the patient will in most instances be the most cost-effective and quickest means of providing broadband access in areas that currently lack such connectivity.<sup>9</sup> As the FCC’s Manager of the Rural Health Care Pilot Program recently wrote in a post on the Commission’s Broadband.gov blog, because “30 percent of rural clinics don’t have adequate broadband technology” deploying broadband networks to areas “where they are lacking and provid[ing] ongoing support where there is a need for it ... is critical.”<sup>10</sup>

## **BACKGROUND**

### **A. Qualcomm Innovations Are Fueling The Rapid Growth Of Today’s Wireless Medical Services, Devices, Applications, and Supporting Cellular Networks**

It should not be surprising that Qualcomm’s technology underlies many of today’s wireless medical devices and applications given that the company has played an integral role for more than two decades in the development and evolution of wireless networks and countless

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<sup>8</sup> See *NPRM* at ¶ 93 and Proposed Rule Section 54.631.

<sup>9</sup> “70 percent of those small providers lacking access to mass-market broadband services – approximately 2,500 providers – are located in areas that the Commission defines as rural.” *NPRM* at ¶ 12.

<sup>10</sup> Thomas Buckley, *Our Role in the Broadband Health Care Revolution*,” broadband – Broadband.gov blog (Aug. 17, 2010) available at <http://blog.broadband.gov/?entryId=670901>.

mobile devices. Indeed, Qualcomm is a world leader in developing innovative wireless communications technologies and enabling products and services based on those technologies.

Since its inception in 1985, Qualcomm has invested more than \$13 billion in R & D. In fiscal 2009 alone, Qualcomm spent \$2.4 billion, or approximately 23% of its revenues, on R & D. These enormous expenditures enabled Qualcomm to invent many of the wireless technologies fueling the mobile broadband boom. Qualcomm holds or has applied for approximately 12,600 U.S. patents (3,900 issued and 8,700 pending) and 59,200 foreign patents (20,700 issued and 38,500 pending). Every division and subsidiary of Qualcomm in the U.S. and around the world has multiple R & D teams working on projects with the expectation that their original work will lead to patentable inventions.

1. **Qualcomm Is Playing A Key Role In The Mobile Broadband Revolution**

Qualcomm pioneered code division multiple access (“CDMA”) technology, which is utilized in the 3G CDMA family of wireless technologies. These technologies include CDMA2000 and HSPA/WCDMA interfaces used in today’s 3G wireless networks and devices to enable tens of millions of Americans to enjoy advanced, high speed, and ubiquitous mobile broadband services. Qualcomm also is working on the development and launching of Long Term Evolution (“LTE”) technology, which many carriers in the U.S. and around the world currently are deploying.

Qualcomm broadly licenses its technology worldwide to over 180 handset and infrastructure manufacturers that make wireless network equipment, handheld and other consumer devices, and develop applications based on the CDMA2000, HSPA, and LTE air interfaces. Qualcomm CDMA Technologies (“QCT”), the world’s largest provider of wireless chipset technology, has led the diversification of mobile broadband into new types of wireless devices, including those used by physicians, nursing staff, and specialists, as well as patients and

their loved ones. These devices include wireless monitoring devices, smartphones, mobile broadband PC cards and USB dongles, Mi-Fi devices (which can connect five Wi-Fi devices to a 3G mobile broadband connection), mobile broadband-embedded laptops and netbooks, and a wide variety of handheld computing devices equipped with mobile broadband connectivity.

QCT's chipsets provide a high degree of integration and support all the major frequency bands, the full gamut of wide-area-licensed cellular technologies as well as unlicensed Bluetooth and Wi-Fi technologies, assisted GPS, and multiple operating systems, including Android, Windows Mobile, and Symbian. QCT's chips also support Qualcomm's BREW<sup>11</sup> Mobile Platform ("Brew MP"), a mobile operating system that delivers high-end features across all 3G technologies and virtually all market tiers of mobile devices, including the emerging low-cost smartphone category. By enabling low-cost smartphones and related data devices, Brew MP is giving wireless service providers and device manufacturers – including medical device makers and application developers – the ability to differentiate services and monetize innovative wireless health care systems for the mass consumer market.

## 2. **Wireless Technology Is Continually Being Upgraded To Deliver Faster Data Rates, Lower Latency, And More Capacity**

Qualcomm and other companies are constantly working on upgrades and enhancements to the EV-DO and HSPA technologies that power today's commercial wireless networks as well as new fourth generation ("4G") LTE technology. Wireless carriers are continually expanding the coverage and capacity of such networks. Wireless medical applications, including those used in rural areas, can take advantage of continued innovations that deliver mobile broadband over a wider area and at faster and faster data rates with low latency,

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<sup>11</sup> BREW stands for Binary Runtime Environment for Wireless.

***Faster Data Rates.*** The next upgrades to the EV-DO and HSPA 3G technologies will result in dramatically faster wireless uploads and downloads. EV-DO Revision B will initially support downloads at a peak rate of 9.3 Mbps and, in Phase II, 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 will support downloads of up to 34.4 Mbps and uploads of 12.4 Mbps (if implemented with four carriers). The next upgrade to HSPA is called HSPA+ (also called HSPA Evolved – HSPA Release 7). This upgrade supports peak downloads of 28 Mbps and uploads of 11 Mbps. HSPA Releases 8 and 9 will further increase the peak downlink speeds, first to 42 Mbps and then to 84 Mbps.

The net result of these upgrades will be wireless broadband service with data rates that can support many of the health care facilities located in rural areas, namely solo and small primary medical care practices, nursing homes, and rural health clinics,<sup>12</sup> that currently lack adequate broadband access.

Qualcomm and many other vendors around the world also are actively working on the 4G technology, LTE, which will achieve even greater data rates in part because it uses wider bandwidths than EV-DO or HSPA. LTE will begin to be deployed in the U.S. this fall. QCT's chips will support both LTE and 3G interfaces so that devices can use either technology to support a carrier's staged network build-out.

***Low Latency.*** Broadband data rate, by itself, only deals with one aspect of the user experience. Latency, which measures the time delay a user experiences in waiting to communicate via a network, or, in the case of a medical data application, the time it takes for

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<sup>12</sup> See Health Care Broadband in America, Early Analysis and a Path Forward, Omnibus Broadband Initiative Technical Paper No. 5 (Aug. 2010) (the "OBI Technical Paper") available at [http://download.broadband.gov/plan/fcc-omnibus-broadband-initiative-\(obi\)-working-reports-series-technical-paper-health-care-broadband-in-america.pdf](http://download.broadband.gov/plan/fcc-omnibus-broadband-initiative-(obi)-working-reports-series-technical-paper-health-care-broadband-in-america.pdf).

patient data to be communicated to a monitoring physician or specialist, is another important factor in a broadband communications network. Medical data applications that require real-time data communications will need low latency, which current mobile wireless technology supports on a routine basis. Improving data rates and reducing latency are effectively a unified concept in broadband networks, and continuing such improvements is an important aspect of Qualcomm's R & D efforts.

***Improved Capacity & Performance.*** While allocating additional spectrum for mobile broadband is one means of providing improved capacity and network performance, allocating and auctioning new spectrum takes at least several years time. Therefore, Qualcomm has developed several technologies, such as advanced interference cancellation techniques, that significantly increase data throughput and expand the capacity of mobile broadband networks in existing spectrum allocations.

Further improvements to wireless networks also will come from optimizing the topology (or layout) of such networks. Femtocells allow wireless networks to deliver faster download and upload speeds by moving base station transmitters closer to the users. Femtocells are mini-base stations that use a wireline connection to extend the reach of 3G mobile broadband service within a small area, such as within a home or physician's office. Operators can use femtocells as well as signal repeaters to enhance the overall capacity and coverage of their mobile broadband networks. In this way, physicians can have reliable connectivity while indoors and when away from the office.

***Improved Security & Reliability.*** Wireless cellular 3G technologies and LTE technology are highly reliable and secure. Indeed, the wireless industry takes very seriously its responsibility to provide continued service during times of emergency and heightened demand.

Network survivability, service continuity, and emergency preparedness are core design principles of wireless broadband infrastructure at every step in the deployment process, including network design, procurement, technology selection, standards development, and business practices.<sup>13</sup>

In addition, given that so many Americans rely upon 3G-based mobile broadband service to connect to the Internet and that 23% of Americans now rely on commercial wireless service as their sole source of telephone service and another 17% make most of their calls via their mobile phone<sup>14</sup> demonstrates the high degree of reliability and security that public commercial wireless networks have achieved.

**Full Mobility.** As noted above, once a rural area is served via a cellular wireless architecture, health care facilities, medical professionals, and patients can communicate freely on an entirely untethered basis. Such freedom of movement offers enhanced remote patient monitoring capabilities and allows medical professionals to simultaneously monitor any number of patients around the clock.

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<sup>13</sup> See, e.g., Comments of AT&T at 11-16; Comments of MetroPCS Communications; Comments of Sprint Nextel at 5-7; Comments of Verizon and Verizon Wireless at 3-5 (each filed June 25, 2010 in response to the FCC's Notice of Inquiry in Public Safety Docket No. 10-92, Effects on Broadband Communications Networks Of Damage to or Failure of Network Equipment Or Severe Overload.

<sup>14</sup> See Amanda Lenhart, *Cell Phones and American Adults*, Pew Research Center at 13 (Sept. 2, 2010) available at [http://pewinternet.org/~media/Files/Reports/2010/PIP\\_Adults\\_Cellphones\\_Report\\_2010.pdf](http://pewinternet.org/~media/Files/Reports/2010/PIP_Adults_Cellphones_Report_2010.pdf) (“23% of Americans have only a cell phone available for making calls and another 17% have a landline but receive most of their calls on their mobile phone. For some subgroups, the findings are even more dramatic; ... 30% of Hispanics and 49% of adults 25-29 are cell-only.”).

Also, a May 2010 study by the Centers for Disease Control and Prevention found 24.5% of American households used only wireless telephones and that 14.9% of American households had a landline yet received all or nearly all calls on wireless telephones. See Stephen J. Blumberg and Julian Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey*, National Center for Health, Centers for Disease Control and Prevention (May 2010) available at <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201005.pdf>.

3. **QCT Mobile Broadband Technology Initiatives Can Support The Growing Number Of Wireless Medical Communications Devices**

As illustrated above, QCT continually develops new chipsets incorporating more functionality and lower power to drive mobile broadband into an increasing variety of devices at all price points. As described below, QCT is in the midst of four important mobile broadband initiatives – namely, the Snapdragon, Gobi, Kayak and Wearable Mobile Device – that are enabling new classes of mobile devices for use by medical professionals, patients, and other health care stakeholders. A fifth initiative, the highly power efficient mirasol display, also described below, spans all classes of mobile broadband devices.

***Snapdragon.*** QCT's first mobile broadband initiative is a platform called Snapdragon. Snapdragon, which is a single chip solution with integrated wireless modem, application processor, multimedia, GPS and other features, enables a new generation of smartphones and other mobile computing devices with embedded broadband connectivity. 20 manufacturers are presently developing more than 60 Snapdragon-based mobile broadband-enabled smartphones and smartbooks, which will support wireless medical services and related applications.

***Gobi.*** Qualcomm's second QCT mobile broadband initiative, Gobi, consists of a global mobile broadband and GPS-embedded solution for notebook computers and other wireless devices. Gobi-enabled notebooks can operate on mobile broadband networks throughout the United States and around the world. The original Gobi solution included a Qualcomm chipset, associated software and API, GPS functionality, and a reference design for a data module supporting both the EV-DO Revision A and HSPA mobile broadband air interfaces. Gobi2000, the second generation embedded Gobi module that Qualcomm announced last year, provides many enhancements, including support for additional frequency bands, increased data speeds, enhanced GPS functionality, and additional operating systems, such as Windows 7 and Linux.

**Kayak** is QCT's third mobile initiative and offers a 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, distance learning as well as telehealth applications. Kayak-based devices thus offer a low-cost PC alternative and use wireless broadband technology to fill the niche between mobile broadband-enabled smartphones and desktop computers, which typically access the Internet via wireline or cable connections that are often unavailable in rural areas. There is no question that Snapdragon-, Gobi-, and Kayak-based modules will power wireless devices that enable communications between physicians and other medical professionals and their patients.

**Wearable Mobile Device** is QCT's fourth mobile initiative that offers a low power, compact wireless module to enable a new wave of highly personalized mobile experiences and services.<sup>15</sup> The Wearable Mobile Device module enables ubiquitous 3G connectivity by supporting multiple 3G interfaces in a variety of devices, including: advanced mobile phones, consumer electronics, and machine-to-machine ("M2M") devices. Its compact size allows it to be easily integrated into next-generation wearable medical devices and comes with integrated GPS, an accelerometer, as well as Bluetooth and other standardized interfaces.

**Mirasol.** Finally, Qualcomm MEMS Technologies, Inc. ("QMT"), has developed a product that spans each of the foregoing classes of mobile broadband devices, a dramatically lower power consumption display with greatly enhanced viewing quality in a wide range of ambient light conditions, including direct sunlight. The mirasol display is the world's first reflective, Microelectromechanical Systems or MEMS-based, mobile device display that uses interferometric modulation ("IMOD") technology. Depending on the nature of the usage,

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<sup>15</sup> Qualcomm's Wearable Mobile Device specifications are available at [http://www.qualcomm.com/products\\_services/consumer\\_electronics/wearable\\_mobile\\_device/](http://www.qualcomm.com/products_services/consumer_electronics/wearable_mobile_device/).

mirasol display technology consumes one-tenth to one-hundredth of the power of a traditional e-reader display, allowing up to nine times more use between charges.

A key differentiator between currently available e-readers and mirasol-based e-readers is the mirasol device's ability to display content in color and in video form. Whereas currently available e-readers generally have moved content from print to digital, e-readers and other mobile handheld devices with mirasol displays can support advanced levels of engagement with color and video interactivity. Mobile devices equipped with mirasol displays also will allow medical professionals to work long shifts without having to recharge the devices.

**B. Qualcomm Is Partnering With The Medical Community To Develop Many Innovative Wireless Health Care Services and Products.**

Wireless health care is a field of great emphasis for Qualcomm, as demonstrated via the following examples of the company's constant, ongoing interactions with the health care community. By funding wireless broadband deployments to serve rural health care providers as proposed in the *NPRM*, the Commission will enable the rollout across the country of each of the following mobile medical services and products.

*CardioNet.* Qualcomm provides services to CardioNet, one of the world's leading suppliers of Mobile Cardiac Outpatient Telemetry™, which uses 3G connectivity to provide ambulatory cardiac monitoring service with real-time beat-to-beat analysis, automatic arrhythmia detection, and wireless electrocardiography ("ECG") transmission.<sup>16</sup> The CardioNet system is helping clinicians prevent disability, morbidity, and mortality with rapid diagnosis and treatment of patients with cardiovascular disease.

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<sup>16</sup> See CardioNet, "Medical Professionals: CardioNet Comprehensive," available at <http://www.cardionet.com/>.

*Triage Wireless*, a medical device company in which Qualcomm has invested, has developed an innovative solution for the wireless monitoring of a patient's vital signs, and the company is developing a product to continuously measure blood pressure and other vital signs using a "wireless band-aid," comprised of an arm-worn transceiver that sends data to a monitor via short range, unlicensed technology and then from the monitor to a medical professional or facility via a cellular communications module.

*MedApps* offers a Mobile Health Monitoring System that connects health care providers to patients and their families using wireless technology to remotely collect, store, and report timely health information anywhere patients may be.<sup>17</sup> A key component of the MedApps System is the MA106 CDMA HealthPAL, a lightweight 3G mobile device that automatically collects readings from glucose meters, blood pressure monitors, scales and pulse oximeters and then wirelessly transmits their data into the MedApps System. Readings from the device are accessed through the MedApps web-based care-provider portal, HealthCOM, which provides clinicians with the ability to monitor and manage medical information collected through the MedApps System. Readings can be stored in an online personal health record as well.

*Myca Health* offers a 3G-powered, fully integrated, customizable web-based application that streamlines the engagement between health care providers and patients. The Myca Health system combines an electronic medical record and a comprehensive administrative system with scheduling and diagnostic tools that allows physicians to interface with patients and other medical professionals through email, instant messaging, and video.<sup>18</sup>

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<sup>17</sup> See "The MedApps Remote Health Monitoring Solution begins with HealthPAL," available at <http://www.medapps.com/HealthPAL.html#>

<sup>18</sup> See Myca Health Inc., "What is MycaHub™?" available at <http://www.myca.com/mycahub-technology/what-it-is>.

*Epocrates* is a developer of comprehensive drug guides for handheld 3G based Palm, Windows Mobile, iPhone, and BlackBerry devices and other smartphones.<sup>19</sup> Users are able to download via multiple platforms the free Epocrates application that includes a drug guide, formulary information, drug interaction checker and medical news.

*Jitterbug* offers a very user-friendly 3G CDMA wireless cell phone services that are targeted to accommodate the needs of elderly and disabled persons with unique and intuitive, life-enhancing cell phones. Jitterbug's phones, which operate nationwide via the Verizon Wireless network, have larger keypads that are easier to read and operate along with a patented ear cushion for comfort and adaptability.<sup>20</sup> Jitterbug offers a variety of targeted services, including the "Jitterbug LiveNurse™", which provides users with 24/7 access to live, registered nurses that address health-related questions.<sup>21</sup>

*AirStrip Technologies* offers a suite of products for remote health care surveillance supported by Apple's 3G UMTS iPhone. AirStrip's signature product is AirStrip OB, which is now installed in nearly 200 U.S. hospitals with several thousand physician users, delivers vital patient waveform data such as fetal heartbeat and maternal contraction patterns in virtual real-time directly from the hospital labor and delivery unit to a physician's mobile device.<sup>22</sup> In this

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<sup>19</sup> See Epocrates, "Epocrates Products," available at <http://www.epocrates.com/>.

<sup>20</sup> See Verizon Wireless, "Jitterbug's Easy-To-Use Services Are Now Available On The Verizon Wireless Network" (Released August 8, 2009) available at <http://news.vzw.com/news/2009/08/pr2009-08-26d.html>

<sup>21</sup> See Jitterbug website, "Services for Health and Wellness – Jitterbug LiveNurse" available at <http://www.jitterbug.com/ServicesStore/health-and-wellness.aspx>. Jitterbug has announced that it will launch a Personal Emergency Response Services (M-PERS) this fall using technology that it acquired from MobiWatch. See Brian Dolan, Jitterbug: 12K Live Nurse customers, *MobiHealthNews* (June 9, 2010) available at <http://mobihealthnews.com/7883/jitterbug-12k-live-nurse-customers/>.

<sup>22</sup> See Airstrip, "AIRSTRIP OB™," available at <http://www.airstriptechnology.com/TheAirStripOBSERVERSuitetrad/AirStripOBtrade/tabid/61/Default.aspx>

way, the system allows physicians to monitor multiple patients outside the labor and delivery unit.

*Vocel Pill Phone* is a patented mobile medication reminder software that is available for download on many 3G wireless phones.<sup>23</sup> The Pill Phone application incorporates an electronic version of the best selling guide, The Pill Book, and helps ensure that patients take the appropriate medication at the right time. To track patient pill-taking, the application provides visual/audible prompts, displays an image of the appropriate medication (along with potential side effects), and provides confirmation to patients and attending physicians.

Qualcomm is also directly involved in several innovative wireless health care initiatives. Through its Wireless Reach program, an initiative designed to promote the socially beneficial uses of mobile broadband technology in the U.S. and around the world, Qualcomm is working with the U.S. Army Trauma Training Center to implement 3G mobile technology in a busy trauma setting.<sup>24</sup> The project uses an InTouch Health RP-7 Robot for trauma care in a battlefield hospital.<sup>25</sup> With a laptop equipped with special controls and an EV-DO Rev. A wireless broadband connection, physicians use the robot's two-way audiovisual capabilities to check vitals, zoom in on the patient, and provide advice to attending doctors, nurses and clinicians.

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[lt.aspx](#). See also Testimony of William Cameron Powell, AirStrip President, before U.S. House Committee on Veterans' Affairs, Health Subcommittee Hearing (June 24, 2010).

<sup>23</sup> See The Pill Phone: Mobile medication reminder and guide, available at <https://www.pillphone.com/PillLogin.htm>.

<sup>24</sup> See Qualcomm Press Release, "United States: Trauma Surgeons Using Robot to Reach Patients in Need," available at [http://www.qualcomm.com/citizenship/wireless\\_reach/projects/health\\_care.html](http://www.qualcomm.com/citizenship/wireless_reach/projects/health_care.html).

<sup>25</sup> The InTouch Health RP-7® Robot allows a physician to connect remotely to stethoscopes, otoscopes, and ultrasounds and other Class II medical devices via a 3G mobile broadband connection. The InTouch Remote Presence Robotic Systems are the first and only FDA-cleared remote presence medical devices. See InTouch Health®, "Explore Remote Presence," available at [http://www.intouchhealth.com/products\\_rp7robot.html](http://www.intouchhealth.com/products_rp7robot.html).

Allowing surgeons to instantly connect to the field ICU through high-speed wireless technology can help lower mortality rates by speeding up the delivery of trauma care during the “golden hour,” that is, the critical 60 minutes after an injury.

In addition, Qualcomm has formed a joint venture with the American Medical Alert Corporation and Hughes Telematics, Inc., called Lifecomm, LLC.<sup>26</sup> Lifecomm will provide mobile Personal Emergency Response Service (“PERS”) focused on seniors and their caregivers. Whereas most PERS systems in use today allow patients to call for help within a single location, such as a home or assisted living facility, the new mobile PERS solution will provide patients with one-touch access to an emergency assistance call center via a wearable pendant wherever they may be. A wireless modem inside the patient device will enable wireless voice and data communications, and an embedded GPS combined with other sensors will enable location-based tracking and monitoring of the person wearing the device. The PERS solution also offers patients and caregivers a personalized web portal that provides information on patient activity and location.

Qualcomm also has teamed with the Gary and Mary West Foundation and Scripps Health to create the West Wireless Health Institute, which is one of the world’s first medical research organizations dedicated to advancing health and well-being through wireless technology. The Institute has teamed with Corventis to conduct its first clinical research of the benefits of wireless health – a multi-center, randomized trial to validate remote wireless monitoring technology by proactively managing heart failure patients in order to lower hospital

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<sup>26</sup> See Hughes Telematics, Qualcomm and American Medical Alert Corporation Announce Joint Venture to Create Lifecomm, New company to offer mobile Personal Emergency Response products and services (May 12, 2010) *available at* <http://www.qualcomm.com/news/releases/2010/05/12/hughes-telematics-qualcomm-and-american-medical-alert-corporation-announce->.

readmissions. Such clinical research is vitally important to improving patient care and accurately quantifying the cost savings from wireless health services.

Qualcomm also is a member of the Continua Health Alliance, a non-profit, open industry coalition of healthcare and technology companies collaborating to improve the quality of personal health care. With approximately 230 member companies around the world, Continua is dedicated to establishing a system of interoperable eCare personal health solutions with the understanding that extending those solutions into the home fosters independence, empowers individuals, and offers the opportunity for truly personalized health and wellness management. Qualcomm along with the members of Continua, envision a marketplace of personal interoperable devices that support improved care and connect health care providers to patients by focusing on three key categories: fitness, chronic disease management, and aging independently.

As demonstrated above, Qualcomm and its communications and medical industry partners are at the forefront of helping to address medical well-being, chronic diseases, and the aging population by providing robust broadband technologies and data networks. As explained below, the Commission should take action in this proceeding to provide funding for mobile broadband infrastructure and services to rural health care facilities that currently lack such essential connectivity.

## **DISCUSSION**

### **I. Mobile Broadband Networks Can Support Many Rural Health Care Providers And With Universal Service Funding Can Be Deployed Reliably, Quickly and Cost-Effectively.**

Qualcomm strongly supports the Commission's proposed actions: (1) for areas either not presently or currently inadequately served by broadband networks, to create a health infrastructure program that supports up to 85 percent of the costs of constructing new regional or

statewide broadband networks to serve public and non-profit health care providers;<sup>27</sup> and (2) to create a health broadband services program for qualified rural health care providers that subsidizes 50 percent of the monthly recurring costs for broadband services for such health care providers.<sup>28</sup> Qualcomm submits that mobile broadband networks in many cases will be the most cost-effective and timely means of providing such connectivity.

As explained in the Background section of these Comments, commercial wireless carriers design their networks to be highly resilient so they continue to operate reliably during emergencies and periods of high demand. Indeed, these carriers invest billions of dollars each year to maintain and improve network resiliency and reliability.<sup>29</sup> Patient needs and the public interest demands that life-critical “medical-grade” applications take advantage of the exceedingly high quality of service that commercial wireless service providers offer via licensed spectrum.

The fact that roughly 40% of Americans now rely primarily on commercial wireless technology as their sole source of telephone service<sup>30</sup> – something that was unthinkable a few years ago – shows further the high degree of reliability and security that cellular wireless networks have achieved. Each day, more and more Americans conduct financial transactions and communicate sensitive personal and business information via their mobile devices, further demonstrating the high level of security that these systems support. And, because of the

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<sup>27</sup> See *NPRM* at ¶ 13 and Proposed Rule Section 54.650(b).

<sup>28</sup> See *NPRM* at ¶ 93 and Proposed Rule Section 54.631.

<sup>29</sup> Thus, it is not at all surprising that public safety agencies, which previously relied on narrowband land mobile radio technology, now acknowledge the need for ubiquitous wireless broadband service and are turning to wireless cellular architecture technology. See Public Safety Spectrum Trust Website, available at <http://www.psst.org/index.jsp>, for information on the Public Safety Spectrum Trust, which is advocating creation of a nationwide wireless broadband network based on cellular technology.

<sup>30</sup> See n.14, *supra*.

ubiquitous nature of commercial cellular networks once they are deployed, they are uniquely suited to support a whole host of applications, including anywhere/anytime access by medical professionals and the remote monitoring of patients as they go about their daily routines.<sup>31</sup>

**A. The OBI Technical Paper Demonstrates That Mobile Broadband Can Support Many Rural Medical Practices, Health Clinics, And Nursing Homes.**

Following up on the health care recommendations in the National Broadband Plan,<sup>32</sup> the FCC Omnibus Broadband Initiative team recently issued a technical paper, entitled Health Care Broadband in America, which assesses the bandwidth requirements for a cross section of health care delivery settings, from a solo primary care practice all the way to a large metropolitan area medical center.<sup>33</sup> The OBI Technical Paper's bandwidth assessment demonstrates that solo primary care practices can be supported by 4 Mbps speeds, and that two to four physician primary care practices, rural health clinics, and nursing homes can be supported by 10 Mbps speeds.

Each of these speeds can be supported via today's mobile broadband technologies, which, in general, can be more rapidly and cost-effectively deployed to rural areas than wired solutions. Moreover, as explained above, as the broadband needs of these rural medical facilities grow, next generation wireless technologies will meet those needs via technology enhancements and increased broadband speeds.

Therefore, Qualcomm recommends that the FCC not set 10 Mbps or in fact any particular data rate as the minimum broadband speed for infrastructure deployment under the health

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<sup>31</sup> See n.26, *supra*. The Lifecomm mobile PERS device would not be possible without commercial wireless networks that operate via licensed spectrum.

<sup>32</sup> See FCC NBP, Chapter 10 – Health Care.

<sup>33</sup> See n.12, *supra*; OBI Technical Paper at 6.

infrastructure program, as proposed in the *NPRM*.<sup>34</sup> The *NPRM*'s 10 Mbps proposal is not supported by the OBI Technical Paper that identifies 4 Mbps as the minimum speed for solo physician offices, which are quite common in rural areas. According to the OBI Technical Paper, 4 Mbps service can successfully support remote monitoring of patients, non real-time image downloads, simultaneous use of electronic health records and standard definition video consultations, as well as typical medical practice management needs.<sup>35</sup> Indeed, today's mobile broadband networks offer reliable, high quality connectivity to support these same applications for use by medical professionals and their patients.

**B. Mobile Broadband Furthers Other Key Goals Of The *NPRM*.**

Universal service support for establishing mobile broadband connectivity to currently underserved or unserved medical facilities will allow the FCC to meet other goals of the *NPRM*. For example, to the extent the FCC's action in this proceeding encourages commercial wireless providers to deploy broadband networks to underserved or unserved areas, community and civic organizations, residents, businesses, and non-profits located within the coverage area of the covered medical facility will all benefit through such access.<sup>36</sup> The Commission also proposes to provide funding for broadband connectivity to skilled nursing facilities, administrative offices, renal dialysis centers and facilities, and data centers that are separately housed from a covered medical facility. To the extent one or more of these facilities are located within the wireless

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<sup>34</sup> See *NPRM* at ¶ 20. See also *NPRM* at ¶ 97 (asking whether the agency should define a minimum level of broadband capability for purposes of support under the new health broadband services program).

<sup>35</sup> See OBI Technical Paper at 6.

<sup>36</sup> See *NPRM* at ¶ 78 (asking whether the agency should allow excess capacity to be used for non-health care purposes). Thus, such deployment would in turn support the overall purposes of the broadband initiatives contained in the American Recovery and Reinvestment Act, which were the bases for the National Broadband Plan.

coverage area of a covered medical facility, connectivity to multiple locations can be funded at substantially less cost.

**II. An Increasing Number Of Medical Professionals And Their Patients Rely Upon Wireless Connectivity To Support Medical Monitoring, Diagnostic, Therapeutic, and Emergency Communications Needs.**

Wireless medical technology is beginning to play a major role in the health care delivery ecosystem particularly in urban and suburban areas of the country because it enables improved medical care at lower cost, and allows medical professionals to closely monitor vitals for a large number of patients. Therefore, the FCC should provide funding for mobile broadband networks in rural areas, so that medical professionals in remote locations that currently lack such connectivity can provide a similar level of support for their patients.

As explained in the background section above, Qualcomm spends billions of dollars annually to develop innovative technologies that extend into every aspect of wireless, including mobile health care technologies. Along with its many partners, Qualcomm is working hard to bring about an unprecedented convergence of science, engineering and technology to enable dramatic improvements in the quality and delivery of health care. 3G mobile broadband technologies support connectivity for chronic disease management, remote monitoring of medical diagnoses, as well as general health and wellness.

Medical devices, health sensors and their applications are increasingly relying on wireless 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 that will collapse space, time, and distance to more effectively monitor patients and improve care while keeping down costs. More and more devices will utilize mobile broadband technologies to

seamlessly present important medical information to health care professionals, clinicians, patients and their loved ones, in a timely, low-cost, and secure manner.

As the Commission recently observed in working with the Food and Drug Administration to help streamline the introduction of new and important medical technologies: “There have been significant developments in recent years in medical and health care devices using radio technology to monitor various body functions and conditions, including critical elements, and to deliver treatment and therapy. ... Mobile devices like smartphones and personal digital assistants (PDAs) are transforming the transmission of information used by physicians to help manage patient care, including communication networks to relay information for patient health monitoring and decision support.”<sup>37</sup> Qualcomm expects that the remote collection and analysis of critical patient data will become routine in major metropolitan areas. The Commission should ensure that these same tools are available to patients and physicians in rural areas, which currently are underserved or unserved.

Mobile-broadband-enabled telehealth and remote patient monitoring are not substitutes for direct patient care, but they will enhance patient care by serving as part of a broader solution for advancing health care throughout America, as recognized in the *NPRM*. Mobile wireless technologies offer health care professionals, providers, caregivers and loved ones real-time information and critical data to monitor patients with far more frequency and accuracy without the need to make an aged senior citizen or ill patient leave the comfort of their homes.

Telehealth technologies, such as vital signs monitors, mobile PERS devices, Internet-enabled medication reminders, compliance sensors, remote trending analysis services, gas alerts,

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<sup>37</sup> FCC Public Notice, FCC and Food and Drug Administration (FDA) to Hold Public Meeting on Regulatory Issues Arising from Health Care Devices that Incorporate Radio Technology Wireless Communications Networks, DA 10-1071 (June 15, 2010).

mobile accelerometers, will help health care professionals to better monitor patients in reliable, secure, and non-disruptive ways. In this way, health care professionals can focus on the health and well being of their patients and maximize their own valuable human resources in much more cost-effective and efficient ways.

mHealth also offers substantial economic benefits. A report recently issued by the Deloitte Center for Health Solutions found that a patient's health record embedded in mobile communication devices to be the "killer app" that could change the game for providers, consumer, and insurers by reducing the costs of managing chronic medical conditions, such as obesity and diabetes.<sup>38</sup> In addition, the New England Healthcare Institute determined that a 60% reduction in hospital readmissions could be realized using remote patient monitoring compared to traditional care.<sup>39</sup> The study also 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.

In sum, America is moving quickly beyond traditional methods of delivering health care. mHealth and eCare solutions enabled by secure, reliable and robust mobile broadband networks

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<sup>38</sup> See Paul Keckley and Bianca Chung, *The Mobile Personal Health Record: Technology-enabled self-care*, Deloitte Center for Health Solutions (2010) available at [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Health%20Reform%20Issues%20Briefs/US\\_CHS\\_2010mPHR\\_082610.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Health%20Reform%20Issues%20Briefs/US_CHS_2010mPHR_082610.pdf); see also Brian Horowitz, *Deloitte Report Finds Major Role for Mobile Devices in Health Care*, eWeek.com (Sept. 3, 2010).

<sup>39</sup> See New England Healthcare Institute, *Remote Physiological Monitoring: Research Update* (Jan. 21, 2009) available at [http://www.nehi.net/publications/36/remote\\_physiological\\_monitoring\\_research\\_update](http://www.nehi.net/publications/36/remote_physiological_monitoring_research_update) (estimating an annual national cost savings of \$6.4 billion dollars based on the reduction in hospital readmissions). See also Testimony of Kerry McDermott, Expert Advisor, FCC, before U.S. House Committee on Veterans' Affairs, Health Subcommittee Hearing (June 24, 2010).

are already supplementing traditional health care delivery, and they will continue to play an increasing role in providing care to the ill and the aged, no matter where they live. Qualcomm has a long track record of wireless innovation and investment in mobile technologies and is ready to work with the FCC and other wireless health care stakeholders to improve health care delivery to rural America as proposed in the *NPRM*.

**CONCLUSION**

The Commission should ensure that mobile broadband technologies are fully covered by the Rural Health Care Support Mechanism. These technologies will support the broadband communications needs of many underserved and unserved medical facilities in rural America, particularly offices with less than four physicians, rural health clinics, and nursing homes, as recognized in the OBI Technical Paper that analyzed the needs of a variety of health care delivery settings. Also, wireless broadband networks typically can be built more quickly and less expensively than wireline networks. Moreover, mobile broadband connectivity is the only technology that provides reliable anywhere/anytime medical connectivity for health care professionals, patients, and their loved ones.

Respectfully submitted,

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