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**Submission from Qualcomm Incorporated to the Department of Broadband, Communications and the Digital Economy consultation paper, “*Digital Economy Future Directions.*”**

Qualcomm welcomes the opportunity to provide comments on the Department of Broadband, Communications and the Digital Economy (DBCDE) consultation paper on the future direction of the digital economy.

Qualcomm applauds the DBCDE’s efforts to increase the effective use of networked information and communication technologies (ICTs) by consumers and businesses to drive higher productivity growth and community participation in the digital economy. We are pleased to share our views, in particular, on the vital role played by advanced mobile communications in expanding the digital economy and making technologies and services more useful to government, business and end-users.

Qualcomm believes successful markers of a digital economy are predicated on a connected, equitable, ubiquitous method of communicating and we encourage the Government to consider the many ways in which mobile technologies and services are expanding the digital economy and creating new opportunities today in urban and suburban areas and importantly in rural and remote premises.

Advanced 3G mobile networks currently provide access to ninety-eight percent of the Australian population, and have effectively enabled the creation of new industries and societal opportunities. Apart from achieving economic and productivity gains, mobile

convergence now accounts for improvements in access and services available within a number of sectors, including education, healthcare, and business.

The ubiquitous nature of mobile technologies also makes associated services an ideal facilitator of government-listed priorities such as digital sector confidence, digital literacy, access to public sector information and mobile business services, as well as business-to-business (B2B) and machine-to-machine (M2M) activity.

This submission focuses on the economic benefits of next generation mobile wireless broadband platforms and services, the role of convergence in driving a range of innovative new mobile services and the need for the Australian government to make additional spectrum available for such services particularly the ‘digital dividend’ spectrum and the 2.6 GHz band.

Of interest to the DBCDE, the United Kingdom’s Minister for Communications, Technology and Broadcasting and Secretary of State for Culture, Media and Sport recently released an interim report entitled, “*Digital Britain*,” which defined some short term actions that could help to foster the digital economy in the UK. In particular, the report specified a “Wireless Radio Spectrum Modernisation Programme” which outlined a number of important steps to encourage the use of advanced mobile services to enhance the digital economy. The report recognises the importance of:

- accelerating the migration of second generation mobile networks to next generation mobile services so that mobile broadband replicates the coverage of second generation networks;
- making available more radio spectrum suitable for next generation mobile services in particular the release of the “3G expansion band” at 2.5-2.69 GHz;
- freeing up the digital dividend spectrum for next generation mobile services;
- investment certainty for existing 3G operators;
- network sharing particularly where commercial agreements between operators can lead to greater coverage.

With a well defined roadmap and commitment to foster the sector without imposing onerous regulatory burdens, the Australian Government’s commitment to facilitate the digital economy can be successfully realised. Industry leadership with input from key stakeholders will be essential in maximizing the benefits and opportunities and enable the mobile industry as well as various other associated industries to evolve dynamically and rapidly to best meet changing technological and business needs.

Ensuring that there is certainty of access to public resources provides a secure environment for investment and enables evolution and maximises the benefits, and opportunities for industry, and the wider digital economy. With regard to the mobile industry, certainty of access to the radio spectrum resource is of prime importance.

## **About Qualcomm Incorporated**

As the DCBDE may already be aware, Qualcomm is a leading innovator and developer of advanced wireless communications technologies and services including those based on Code Division Multiple Access (CDMA) and Orthogonal Frequency Division Multiplexing (OFDM). These solutions are available today for a number of communications applications, including mobile cellular, fixed wireless access, broadband wireless access, trunking and satellite services. Qualcomm broadly licenses its technologies to over 160 device, infrastructure, application-specific integrated circuit (ASIC) and test equipment vendors around the world.

Qualcomm is also at the forefront of mobile multimedia broadcast technology development and has been instrumental in the development of MediaFLO™, an end-to-end solution that enables broadcasting of high-quality video streams, audio channels, as well as other multimedia applications (video clips, IP datacasting applications, etc.) to mobile devices.<sup>1</sup>

As a leading developer of technology used for advanced wireless communication services in metropolitan, regional and rural Australia, Qualcomm plays an important role in the Australian telecommunications industry and is highly supportive of the Government's encouragement for increased access to technology. In Australia, Qualcomm technology forms the basis for commercial wireless networks deployed by Telstra, Optus, Vodafone and Hutchison. Additionally, Qualcomm is an Australian licensed spectrum holder via 3G Investments (Australia) Pty Limited, having purchased 2 x 10 MHz of spectrum in the 2.1 GHz band in major Australian cities for AUD\$159 million in 2001.

Qualcomm currently operates two offices in Australia. Qualcomm's Melbourne office is the local marketing and sales centre for the company's development activities for 3G CDMA and other advanced digital solutions. In Sydney, Qualcomm operates a development office focused on mobile phone encryption solutions.

## **Economic Benefits of 3G Mobile Communications**

Today, mobile penetration in Australia is over 105 %, representing one of the highest levels in the world, surpassing that of Japan, Korea and the United States.<sup>2</sup> The penetration rate of 3G in Australia is now over 50 % with more than 11 million 3G subscribers at the end of 2008 compared with just over 7 million a year earlier representing a year-on-year growth rate of 57%.<sup>3</sup> Australia is a global leader with a competitive market in 3G mobile broadband, with current networks providing access to over 98 % of the population. Across the country, 3G mobile broadband networks have been operated for many years by Telstra, Optus, Vodafone and Hutchison using CDMA 2000/EV-DO and WCDMA/HSPA technologies. These networks are well suited to the

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<sup>1</sup> [www.qualcomm.com/mediaflo](http://www.qualcomm.com/mediaflo)

<sup>2</sup> Wireless Intelligence database as of 4<sup>th</sup> quarter 2008.

<sup>3</sup> Wireless Intelligence as of 4<sup>th</sup> quarter 2008.

Australian geographical landscape, enabling multi-megabit and fully mobile broadband services across very large land areas.

In a highly convergent and mobile world, 3G wireless communications networks will drive substantial economic growth and underpin greater productivity gains for the country. In Australian towns and communities with limited fixed line infrastructure, 3G is an ideal high speed broadband solution because of its greater coverage range and mobility benefits. Even when fixed-line options are available, 3G mobile broadband can offer high speed connectivity to a wider coverage area. With 3G mobile broadband connectivity, many Australians can now benefit from more flexible work practices, making processes more-timely and productive creating new areas of economic activity. Consumers can also enjoy faster and easier access to healthcare providers, financial institutions and emergency services as well as a wide variety of multimedia applications and services.

The economic contribution of the mobile telecommunications industry encompasses both direct and indirect contributions. Direct economic gains include sales revenue, employment, capital and operating investment, service provision and the purchase of intermediate inputs in manufacture. Indirect benefits include productivity benefits and cost reductions accruing to users of mobile phones that facilitate activity across all sectors in the economy. Based upon data from the ITU and the Telecommunications Management Group, every 1% increase in mobile penetration leads to a 4.7% increase in average per capita income, while every 1% increase of Internet penetration leads to a 10.5% increase in average per capita income.<sup>4</sup>

Furthermore these indirect benefits in terms of productivity increases can also reduce carbon emissions, representing an added benefit which transcends economic gains. According to a study by the American Council for an Energy-Efficient Economy, the positive economic feedback generated by most ICT innovations have stimulated higher levels of economic productivity and driven net gains in cost effective energy savings throughout the U.S. economy. In particular, for every extra kilo-watt hour of electricity that has been demanded by ICT the U.S. economy increased its overall energy savings by a factor of about 10. Thus, ICT provides a net savings of energy across the U.S. economy.<sup>5</sup>

In the often referenced economic study undertaken by Access Economics for the Australian Mobile Telecommunications Association, the direct and indirect contribution of the mobile industry to the Australian economy was measured.<sup>6</sup> The total economic impact of the industry was estimated to be \$AUD 14.2 billion in 2006-07. Of this, the

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<sup>4</sup> Telecommunications Management Group, Inc (TMG) and ITU World Telecommunications Database Statistics; 2007

<sup>5</sup> American Council for an Energy-Efficient Economy, *“Information and Communication Technologies: the Power of Productivity: how ICT Sectors are Transforming the Economy While Driving Gains in Energy Productivity,”* February 2008.

<sup>6</sup> Access Economics, *“Australian Mobile Telecommunications Industry: Economic significance and Contribution,”* June 2008;  
[http://www.amta.org.au/amta/site/amta/downloads/pdfs\\_2008/AE%20AMTA%20Final.pdf](http://www.amta.org.au/amta/site/amta/downloads/pdfs_2008/AE%20AMTA%20Final.pdf)

direct contribution to the economy of the mobile industry in Australia was \$AUD 6.5 billion. Mobile carriers and resellers employed more than 22,000 workers and paid \$AUD 1.8 billion in wages. The indirect benefits in terms of cost improvements and productivity benefits associated with mobile phone usage contributed an additional \$AUD 7.7 billion. By 2010, the study estimated that the increased uptake of 3G and the consequent increase in mobile data traffic will contribute \$AUD 2.1 billion towards this figure, in additional GDP (over and above the gains from mobile voice).

Additionally, results from a study by Econtech, a local Australian economic consultancy, indicate that Australian businesses using 3G HSPA are seeing productivity gains averaging 9.3%.<sup>7</sup> A survey of fifteen industries found that the highest productivity gains are being achieved by businesses operating in rural and remote areas and with staff working out of the office. A consistent theme identified in the study is that the advanced 3G network provided greater access to the internet and enabled respondents to work while travelling. This allowed employees to reduce the number of return trips to the office and cut travel expenses. Respondents also reported benefiting from faster mobile internet access, which was a particular benefit for customers who needed to access large amounts of data when out of the office.

The rapid adoption of 3G-enabled devices is spurring the growth of data revenues. Even in the midst of the current economic downturn, mobile data services play an increasingly important role in driving the digital economy. In the United States, revenue at Verizon Wireless grew 12.3 % for the fourth quarter of 2008 as subscribers increased their spending on text messaging and Internet services by 41 % compared within the same period a year earlier.<sup>8</sup> In the fourth quarter, data revenues were 26.8 % of all service revenues, up from 21.3 % in the fourth quarter 2007. This indicates a strong growth in mobile data services despite economic uncertainty.

Similarly, driven by subscriber gains and data growth, AT&T's total wireless revenues increased 13.2 %, year over year.<sup>9</sup> AT&T's fourth quarter wireless data revenues grew 51.2 % year-on-year to \$3.1 US billion. Data represented 26.6 % of AT&T's fourth-quarter wireless service revenues, up from 19.9 % in the year-earlier quarter. Additionally, the number of 3G devices in service and 3G active data users on AT&T's network more than doubled within one year.

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<sup>7</sup> Econtech Pty Ltd, "*PRODUCTIVITY GAINS OF NEXT G™: RESULTS ON THE CUSTOMER SURVEY*," December 2007,

[http://www.econtech.com.au/information/Industry/Telstra%20Survey%20Results\\_report\\_4%20Dec.pdf](http://www.econtech.com.au/information/Industry/Telstra%20Survey%20Results_report_4%20Dec.pdf)

<sup>8</sup> "Verizon Reports Sustained Revenue Growth and Continued Strong Cash Flows for 4Q and Full-Year 2008", January 27, 2009, <http://investor.verizon.com/news/view.aspx?NewsID=961>

<sup>9</sup> "AT&T Reports Fourth-Quarter and Full-Year Results Highlighted by Robust Wireless Data Growth, Accelerated U-verse TV Ramp, Continued Double-Digit Growth in IP Data Services," January 29, 2009. <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26502>; also see Investor briefing, [http://www.att.com/Investor/Financial/Earning\\_Info/docs/4Q\\_08\\_slide\\_c.pdf](http://www.att.com/Investor/Financial/Earning_Info/docs/4Q_08_slide_c.pdf)

One 3G mobile technology variant called ‘HSPA’ (High Speed Packet Access<sup>10</sup>) has been deployed in Australia since 2006. HSPA provides very fast wireless broadband speeds of up to 14.4 Mbps on the downlink and 5.76 Mbps on the uplink that allow increased connectivity for users. HSPA is becoming increasingly popular across the globe with more than 78 million HSPA-based mobile broadband connections worldwide at the end of 2008, compared with just over 3 million at the beginning of 2007.<sup>11</sup> Moreover, there are currently over 247 commercial HSPA networks in 110 countries.<sup>12</sup> In Australia, HSPA mobile broadband services are available through Telstra, Optus, Vodafone, Hutchison and Virgin.

HSPA+, also known as evolved or enhanced HSPA, can achieve peak data rates of up to 42 Mbps in a single 5 MHz carrier. With support from Qualcomm, Australia will be the first country in the world to have a nationwide HSPA+ network.<sup>13 14</sup>

Importantly, HSPA mobile broadband networks have the versatility to deliver next-generation services to consumers in both urban and rural areas and they are scalable to accommodate ongoing enhancements as the technology evolves. For example, 3G mobile phone operators in Australia and across the world are already upgrading their HSPA networks to HSPA+ that will substantially increase the data capacity with peak speeds of up to 42 Mbps on the downlink and 11 Mbps on the uplink. These speeds will further drive productivity gains and enable new innovative services to be deployed throughout Australia.

### **The Role of Mobile Convergence in Enabling the Digital Economy**

As noted in DBCDE’s paper, the convergence of consumer electronic devices that transform mobile phones into music or video players, cameras or other multimedia devices, has already taken place. Convergence is now occurring between the mobile device and the computer – creating a new industry and societal opportunities. Devices such as pocketable computing devices (4” – 6” display) and mobile computing devices (9”-12” display) allow laptop users to conveniently access the Internet wherever there is cellular coverage. These devices are one-third the size of a laptop and will soon be powered by processing platforms that incorporate advanced communications capabilities with a computer processor on a single chip. Similarly, embedded communications modules are increasingly available on PC laptops, enabling users to be connected most anywhere and anytime.

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<sup>10</sup> Here HSPA refers to both High Speed Downlink Packet Access (HSDPA) and High Speed Uplink Packet Access (HSUPA)

<sup>11</sup> Wireless Intelligence, as of 4<sup>th</sup> quarter, 2008.

<sup>12</sup> Global Mobile Suppliers Association as of January 2009, <http://gsacom.com>

<sup>13</sup> Release 7 of HSPA+ can achieve peak speeds of up to 21 and then 28 Mbps; Release 8 of HSPA+ peak speeds of up to 42 Mbps.

<sup>14</sup> Citibank EMT Conference, Sol Trujillo speech, January 2009:

[http://telstra.com.au/abouttelstra/media/speeches\\_article.cfm?ObjectID=781](http://telstra.com.au/abouttelstra/media/speeches_article.cfm?ObjectID=781) and “Telstra boosts network speeds, unveils world’s fastest mobile device,” Nov. 2008

[http://www.telstra.com.au/abouttelstra/media/announcements\\_article.cfm?ObjectID=43863](http://www.telstra.com.au/abouttelstra/media/announcements_article.cfm?ObjectID=43863)

Qualcomm is unique in that it is capable of bringing a legacy of mobile communications experience to new market segments. Qualcomm is enabling and improving wireless connectivity to the notebook market, by taking embedded cellular broadband in notebook computers to the next level with a global mobile Internet solution called **Gobi**.<sup>15</sup> Gobi also includes GPS functionality and is available today. Qualcomm is driving the convergence of PC and mobile communications with its **Snapdragon**<sup>16</sup> processor platform. Snapdragon is designed to bridge the divide between the processing capabilities of laptop computers and the universal connectivity of mobile handsets by providing unsurpassed mobile processing capabilities with ubiquitous mobile broadband access and superior power savings.

Qualcomm is also working with Internet and PC companies who are entering the wireless communications sector. For example, Qualcomm is a founding member of the Open Handset Alliance (OHA) launched in 2007.<sup>17</sup> Qualcomm works closely with OHA members to assist them to integrate the **Android** software platform with wireless devices using Qualcomm chipsets including the first Android-powered handset – HTC's G1, which was recently launched in the U.S. market and is expected to arrive in Australia soon. Commitment to the OHA, mobile operating systems such as Windows Mobile and BREW Mobile Platform among others is another way Qualcomm spurs rapid innovation which ultimately provides additional mobile application choices to consumers that make their lives more productive and enjoyable.

Another area where convergence is evident is in the area of broadcasting and mobile communications. Qualcomm views mobile video and other forms of wireless multimedia as an avenue towards creating new revenue opportunities for the entire value chain – including mobile operators, broadcasters, handset manufacturers, content owners and providers and application developers – while meeting a growing demand amongst consumers. As with all new technologies, innovation fuels competition and new market entrants in the mobile multimedia space will help to drive new revenue opportunities, large scale commercial deployments and mass adoption. Mobile broadcasting constitutes a cost and power efficient delivery pipe for a large variety of new applications not limited to multimedia services, such as e-government or e-learning applications.

As mentioned in the introductory section, Qualcomm's MediaFLO technology is designed specifically for the mobile environment and delivers high-quality video streams, audio-only streams, Clipcasting<sup>TM</sup>, IP data services as well as integration of interactive applications. In the United States, MediaFLO technology has been deployed commercially in the U.S. by **MediaFLO USA**<sup>18</sup>, a wholly owned subsidiary of Qualcomm. MediaFLO USA offers an end-to-end high-quality mobile entertainment service called FLO TV which delivers a wholesale service to U.S. wireless operators. FLO TV was launched by Verizon Wireless in March 2007 and AT&T in May 2008 and is currently available in 65 major metropolitan areas nationwide and aims to be in 110

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<sup>15</sup> <http://gobianywhere.com/>

<sup>16</sup> <http://www.qctconnect.com/products/snapdragon.html>

<sup>17</sup> [http://www.openhandsetalliance.com/oha\\_members.html](http://www.openhandsetalliance.com/oha_members.html)

<sup>18</sup> <http://www.mediaflousa.com/content/index.shtml>

markets by the end of 2009. FLO TV features 15 channels with premium content including news, sports, children's and entertainment programming that consumers love from the television industry's best content brands.

3G mobile communications platforms enable convergence between different business sectors, and in the future we will see more convergence in the areas of healthcare, education, commerce, transportation, agriculture, the environment and public-safety. Machine-to-machine communications is another emerging arena where mobile technologies will provide the platform of choice. Below are a few examples of innovative services using wireless technology.

### Education

Wireless technology can be coupled with education to better engage students both in and outside of the classroom. One example of such learning is **Project K-Nect**<sup>19</sup>, a two-year educational technology pilot program designed to use 3G smartphones in the classroom to create additional learning resources for at-risk students - specifically to focus on improving math skills.

Qualcomm partnered with the North Carolina Department of Education to equip one hundred 14-15 year-old students with 3G HTC smartphones, which access the 3G network with connection speeds of up to 3.1 Mbps, to improve the students' proficiency in algebra. With the smartphones, students were able to gain access to additional math content aligned with the teacher's lesson plans and course objectives. The system combines social networking, Internet access, tailored supplemental curriculum and technology training to help improve math scores by using a device familiar and exciting to students.

Project K-nect is being trialled to determine the practicality and effectiveness of combining mobile phone technology with social networking software to improve test scores for students who have limited or no computer and Internet access at home. While Internet access may not always be available to students at home, access to the internet via a cellular network is almost ubiquitous, and most 15 – 18 year olds own Internet capable cell phones<sup>20</sup>. Hence, the mobile phone is an ideal tool for enabling and increasing students' access to digital teaching resources.

Using their smartphones, Project K-nect students access supplementary problems and online resources such as blogs and videos that outline the problems and their solutions and are posted by students from other participating high schools. Students also network across schools to work on problem sets together. The result is a body of knowledge and resources, much like that of a college study group. Students can also stay in contact with their teachers and tutors using the phones and they are allowed to take them home with them at night. The system will only allow authorised users to communicate electronically

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<sup>19</sup> <http://www.projectknect.org>

<sup>20</sup> research indicates that almost three-quarters of 15 to 18-year-olds own cell phones and 97% have access to Internet via their cell phones.

within the system and will be monitored to ensure acceptable use policies are not violated.

The **Amazon Kindle**<sup>21</sup> is a dedicated 3G mobile broadband device with great educational potential. The Kindle combines electronic paper technology, Internet access and 3G communications technology to allow users to download books, newspapers and magazines directly through a 3G network connection known as *Whispernet*. There are no hidden network or subscription charges.

Australia's Momentum Technologies Group<sup>22</sup> develops the **m-View**<sup>TM</sup> technology that enables live mobile video to be both transmitted from and viewed on wireless laptops, PDAs, smartphones as well as on 3G enabled mobile phones. In one of the initial applications, Momentum partnered with Queensland University to launch the eWorld Adventures website that runs remote, real-time, interactive classes for schools around Australia. By virtue of 3G wireless capability, schools in outlying areas where high-speed Internet connections are unavailable can now receive the same live video feeds as their wired counterparts.

Applications like project K-nect and m-View and devices like the smartphone and Kindle have the potential to radically transform education. No longer would students need to haul school bags with a multitude of books around, and no longer would those books need to be reprinted and distributed in hardcopy - one connected device would contain all the most up-to-date teaching and reading materials. Students would not need to be located in the same area or even attend the same school to collaborate and interact with one another, get help from teachers and turn in their assignments.

### Healthcare

Qualcomm believes wireless connectivity is essential to the future of healthcare. Today's high-speed devices and networks have the power to overcome the difficulties of distance, by transmitting health related data in real-time thus enabling communications between patients and their health care teams, reducing the need for travel and direct clinical contact, reducing the time to, and accuracy of diagnosis. There is enormous potential to save lives by enabling healthcare with wireless communications.

A challenge facing the healthcare industry is to keep health care costs under control while at the same time improving access to and quality of that care. Qualcomm is working to leverage wireless devices and services to improve wellness and make healthcare providers more productive.

For the past five years, Qualcomm has worked with companies that represent industries atypical of its traditional partners —including medical device manufacturers, health information technology enterprises, pharmaceutical corporations and clinical trial firms.

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<sup>21</sup> <http://www.amazon.com/>

<sup>22</sup> <http://www.momentumgroup.com.au/menu.asp?id=5&cType=full&cID=42#>

For example, **CardioNet**<sup>23</sup> and Qualcomm pioneered the wireless healthcare market in 2003, partnering to introduce a fully mobile, continuous cardiac monitoring service for diagnostics.

3G technologies are currently innovatively utilised in a number of other pioneering healthcare solutions including:

- Remote patient doctor contact, the **InTouch Health RP-7** system<sup>24</sup> is a mobile robotic platform that enables a physician to be remotely present allowing healthcare to happen anywhere and anytime by integrating display, robotics, and communications technologies;
- Managing diabetes, the **HealthPia Glucophone**<sup>25</sup> allows glucose meter information to be uploaded to an online medical management system via a cell phone, and
- Remote patient monitoring, **Triage Wireless**<sup>26</sup> is developing a Rapid Response Monitor wireless platform for continuous vital signs monitoring that keeps clinicians connected to their by integrating medical data acquisition, communications and analysis technologies.
- Mobile mammography, in April 2008 **BreastScreen Tasmania** launched a new telehealth initiative powered by Telstra's Next G™ network. By combining wireless broadband and digital mammography technology, images previously couriered in hard form can now be emailed to the radiology reading facility in Hobart. The time taken for individual mammogram files to be transferred from the mobile screening unit to the Hobart reading facility has been reduced from as much as five days, to just four minutes.

Combined factors of ageing global population, increasing prevalence of chronic diseases, higher number of environmental problems and national disasters and the increasing public expectation for higher standards of healthcare are all making mobile health services more essential for patients and healthcare providers. Through regular monitoring and shifting of the treatment of many chronic conditions from medical institutions into patients' homes, 3G technologies can help doctors manage patient care more efficiently.

### Machine-to-Machine

There are six billion people in the world today and estimates indicate that there are 50 billion machines.<sup>27</sup> Thanks to increasing consolidation, falling technology costs and lower network charges, the mobile machine-to-machine (M2M) communications market is set to grow. According to Strategy Analytics, M2M will expand from less than \$16 billion in 2008 to over \$57 billion in 2014 globally.<sup>28</sup> When considering the fact that

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<sup>23</sup> <http://www.cardionet.com/>

<sup>24</sup> [http://www.intouchhealth.com/products\\_rp7robot.html](http://www.intouchhealth.com/products_rp7robot.html)

<sup>25</sup> <http://healthpia.us/>

<sup>26</sup> <http://www.triagewireless.com/main/>

<sup>27</sup> <http://knowledge.wpcarey.asu.edu/article.cfm?articleid=1658>

<sup>28</sup> Strategy Analytics, "A Brave New World in Mobile Machine-to-Machine (M2M) Communications," Jul 2008. <http://www.strategyanalytics.com/default.aspx?mod=PressReleaseViewer&a0=4072>

virtually any electric or electro-mechanical device in any business sector can be managed over wireless networks, one might forecast even higher growth.

M2M communications benefits the development of power reticulation at the infrastructure level. Many countries are implementing energy efficiency initiatives that require the use of **smart-metering** technologies to better facilitate near real-time electricity supply and load balancing. Currently, there exist multiple solutions that combine 3G communications and electricity metering technologies. A well balanced electricity supply and load maximises power generation and network efficiency while minimizing wastage, thereby reducing the need to increase generation capabilities in response to societies' increasing power usage, with the added advantage of minimizing environmental impact.

M2M communications has the potential to create opportunities at the consumer level as well; for example imagine a car fitted with 3G chipsets that can alert you when your car is due for its next service check-up, or envisage your automaker transmitting the latest computer software directly to your car without having to visit a service centre. And, if telematics, GPS and communications technologies are integrated, a technician could be instantly dispatched to your location to assist you should your car break down or in the unfortunate case of an accident, emergency services could reach you with immediately.

### Environment

There is great potential for mobile communications technologies to minimise environmental impacts and previous mention has been made of the productivity benefits and cost savings generated from information and communication technologies as well as the advantage of combining 3G communications and power generation to increase efficiency. These advantages are noted in the Global e-Sustainability Initiative<sup>29</sup> report entitled "SMART 2020: Enabling the low carbon economy in the information age". Other areas where mobile communications technologies may be used to minimise and reduce environmental impact are;

- to monitor environmental impacts; for example, the **Australian Institute of Marine Science** is using 3G to monitor the health of the Great Barrier Reef<sup>30</sup>
- to enable digital distribution of education and media content
- to enable more efficient road transportation by disseminating real-time traffic congestion reports enabling more efficient route planning reduce travel and idling times thereby minimizing unnecessary carbon emissions; and
- to enable travel substitution by facilitating virtual meetings, flexible work arrangements, eHealth services, mobile banking and other online public services

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<sup>29</sup> <http://www.gesi.org/>

<sup>30</sup> <http://www.telstraenterprise.com/Pages/tagresults.aspx?Type=CaseStudyListing&TagField=Keyword%20Tags&TagValue=Next%20G>

<sup>31</sup> The United States Report Addendum to the SMART 2020 report predicts that more efficient road transportation would save 240–440 MMT of CO<sub>2</sub> emissions in 2020 in the US alone, which equates to saving \$65–115 billion, and travel substitution could reduce CO<sub>2</sub> by 70–130 MMT and save \$20–40 billion in 2020.

## Public Safety

Public safety is a Government and industry sector that benefits greatly from the application of mobile communications technologies, such as; routine work of public safety agencies, widespread disaster response, and localised emergency notification and response. The following paragraphs outline a few instances where Qualcomm's mobile technologies are being used to support public safety initiatives:

- **eCall** is a European Commission project designed to improve transportation safety by providing rapid assistance to motorists involved in a collision anywhere in the European Union (EU). A collision activates on-vehicle sensors causing an emergency voice call (E112) to be established via the cellular network to local emergency agencies via a Public-Safety Answering Point (PSAP). In addition to enabling two-way speech communications between the motorist and the PSAP, eCall employs an in-band voice-channel modem to transmit position location, airbag deployment, Vehicle Identification Number and other relevant information over existing cellular networks to the operator. The European Commission's objective is to introduce eCall as a standard option in all type-approved vehicles in the EU from 1 Sept. 2010 onwards. An engineering team in Qualcomm Germany has been leading the system development for an in-band voice-channel modem eCall solution that meets the European Commission's requirements. At the end of January 2009, the 3GPP standards working group in charge of codecs approved Qualcomm's eCall in-band modem design. Qualcomm's solution is expected to become the European standard for the interface and the transport between the eCall generator and the PSAP by March 2009.
- **E9-1-1**<sup>32</sup>: 911 is the phone number used by Americans to call for emergency services. When an individual dials 911 from a wireline phone, the location of the phone is automatically delivered with the call to the public safety call center which receives the call and dispatches police, fire, and other first responders. With the increased popularity of wireless phones in the United States, more than half of the calls to 911 come from cell phones. As a result, beginning in 1996, the U.S. Federal Communications Commission ("FCC") imposed a set of regulations known as E9-1-1 or enhanced 911 to ensure that precise information on the location of a wireless caller to 911 is transmitted with the call. Qualcomm's advanced and widely adopted (multimode) GPS position-location technology referred to as gpsOne®<sup>33</sup> is the world's most accurate and precise technology to enable transmission of location information with a call to 911. It has been deployed in more than 300 million handsets worldwide and is used by many wireless operators in the United States to meet their E9-1-1 requirements.

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<sup>32</sup> <http://www.fcc.gov/pshs/services/911-services/enhanced911/Welcome.html>

<sup>33</sup> <http://www.qctconnect.com/products/gpsone.html#Overview>

- **AMBER Alerts**<sup>34</sup> are issued by U.S. law-enforcement agencies in the most serious child abduction cases. The goal of an AMBER Alert is to instantly galvanise the entire community to assist in the search. In 2003, Qualcomm partnered with Wal-Mart to distribute AMBER Alerts to its drivers. Qualcomm extended the arrangement to its customer network of thousands of trucks using the OmniTRACS® mobile communications system, and in 2006, Qualcomm launched the AMBER Alert Highway Network (AAHN), an initiative created in partnership with the National Center for Missing & Exploited Children and supported by the American Trucking Associations.
- Days after Hurricane Katrina hit the Southeast Louisiana coast of the U.S., the Federal Emergency Management Agency requested Qualcomm's support to deploy emergency cell service in the affected region. The **Qualcomm Deployable Base Station**<sup>35</sup> (QDBS) portable cellular system was paired with transportable ViaSat LinkWay® Ku-band satellite terminals for backhaul. Relief workers could access the QDBS either through, commercial CDMA2000 phones, or by using QSec®-2700 secure phones from Qualcomm (for mobile to mobile calls only). For Internet access and high-speed data services, the workers were issued wireless datacards to fit PDAs or laptop computers.

#### Small and Medium Sized Enterprises

Mobile communications are a useful tool for modern businesses of any size, but are essential for many small and medium sized enterprises (SMEs) without resources to staff back office operations, carry large inventory stocks, or travel to remote locations. There are many examples of mobile communications assisting SMEs and as the functionality of 3G networks and converged devices increase, more and more innovative solutions are being implemented. Examples of these innovative solutions, including farm based applications, can be found on the websites of Qualcomm's operator partners<sup>36</sup>.

#### Importance of Privacy and Data Security

To fully realise the economic and social benefits of the "future digital economy", as envisioned in this consultation, users of the digital services must be confident that their personal information will not be used inappropriately and, when retained, will be kept secure from unauthorised access. With advances in technologies, such as GPS, RFID and powerful data mining techniques, it becomes critical that users can influence the degree to which such information about their behaviour is collected, shared, retained and

<sup>34</sup> <http://www.amberalert.gov/>

<sup>35</sup> <http://www.pressreleasepoint.com/katrina-disaster-relief-%E2%80%93-new-portable-hybrid-cellularsatellite-system-viasat-amp-qualcomm-aids-effo>

<sup>36</sup> For examples specific to the Australian environment please refer to Vodafone Australia: <http://www.vodafone.com.au/business/plans/studies/index.htm>, Three Australia: <http://www.three.com.au/cs/ContentServer?c=Page&pagename=Three%2FPage%2FBusinessVideoCallingTemplate&cid=1155886581658>, Telstra: <http://www.telstrabusiness.com/business/portal/online/site/businesscentre/wirelessolutions.19397> Optus: [http://smb.optus.com.au/web/ocaportal.portal?nfpb=true&pageLabel=Template\\_wRHS&FP=/smallbusiness/internet/wireless&site=smallbusiness](http://smb.optus.com.au/web/ocaportal.portal?nfpb=true&pageLabel=Template_wRHS&FP=/smallbusiness/internet/wireless&site=smallbusiness)

secured. For instance, GPS enables the offering of location based services to mobile users as they travel to different parts of the country. These location based services can further be enhanced if the user is willing to share information (e.g. in the form of Internet cookies) about his preferences. These services all rely on the user's confidence that his or her privacy will be respected. If users cannot have that confidence, there will be resistance to the adoption of such devices and services.

The OECD guidelines and Australia's Privacy Act provide a good basis for the building of such consumer privacy confidence. In addition, the ICT industry has a number of joint industry efforts that are promulgating industry guidelines and best practices to protect user privacy and data security. Qualcomm, in the domain of mobile digital services, supports such joint and responsible industry approaches through its memberships in organizations such as the Mobile Marketing Association and CTIA- the International Association for the Wireless Telecommunications Industry.

Qualcomm's office in Sydney is dedicated to Qualcomm's Product Security Initiative and supports our efforts in this area.

### **Digital Dividend Spectrum for Innovative Mobile Services to Drive Digital Economy**

The digital dividend, or the UHF spectrum that will be released as a result of analogue to digital TV switchover, offers excellent opportunities for wireless innovation and new services thus valuably contributing to the digital economy. Since digital broadcasting is more spectrally efficient than analogue broadcasting, the same number of television channels can be transmitted within a narrower bandwidth, thereby freeing up the remaining spectrum in the process. The digital dividend spectrum can enable the cost efficient deployment of a range of innovative and convergent audiovisual and telecommunication services and public safety applications.

Using the digital dividend spectrum for new mobile services, such as; mobile broadband, mobile broadcast and multimedia transmission will support the growth of the digital economy. New mobile services that could be introduced include mobile multimedia services such as news, sports, movies and music broadcasts and downloads, as well as valuable e-learning, e-health, e-government and time-sensitive emergency and safety information. As multimedia to mobile devices represents a new media outlet, such services would create new revenue opportunities for the content industry that will benefit from a growing ecosystem of interactive applications and new audiovisual programs that promote quality brands and reach new audiences.

Additionally, because of good signal propagation characteristics, the digital dividend spectrum is particularly suitable for low cost, wider-area coverage. Less infrastructure would be required to provide wider mobile coverage meaning remote and rural areas of Australia can be better connected to advanced wireless services at a lower cost.

According to the GSM Association (GSMA), allocating some of the digital dividend spectrum for mobile services would have a significant positive global economic impact,

driving innovation, job creation, productivity and competitiveness. To illustrate its point, the GSMA estimates that allocating up to 100MHz of UHF spectrum to mobile (representing 25% of the digital dividend in Europe) would generate between €63bn and €165bn in extra economic value (in addition to the estimated €2.5 + trillion of value that mobile generates for the European economy without any UHF spectrum).

Qualcomm encourages the DBCDE to continue to prioritise the digital switchover so that new spectrum can be freed up for innovative mobile services which will help drive economic growth and productivity gains especially in rural and hard to serve areas. We strongly support the statement made by Minister Conroy in a recent press release, "Digital switchover is important for all Australians as it not only provides access to better picture and sound quality, and additional channels, but it will also free-up spectrum which can be used for the delivery of new and improved broadcasting and communications services."<sup>37</sup>

Australia should seek to complete its digital dividend spectrum planning and schedule the spectrum auction for the newly available spectrum within the 2010/2011 timeframe in order to allow new networks to be built prior to, and services to be launched on, January 1, 2014.

## **2.6 GHz Band Needed to Support Growth of 3G and Future 4G Services**

As stated in Qualcomm's response to the Australian Communications and Media Authority's (ACMA) Wireless Access Services consultation and its Five Year Spectrum Outlook consultation,<sup>38</sup> Qualcomm strongly believes that the 2500 – 2690 MHz band ("2.6 GHz"), and in particular 2500 – 2570 MHz paired with 2620 – 2690 MHz, is needed to sustain the fast market growth of 3G services and future 4G services. Importantly, 3G technologies are continuing to evolve towards higher data rate capabilities (such as HSPA+ and Long Term Evolution – LTE) that will benefit from the globally harmonized 2.6 GHz spectrum which also offers the unique opportunity of wider bandwidths up to 20 MHz. 3G wireless is currently providing advanced broadband data and voice services to more than 735 million subscribers worldwide.<sup>39</sup> Global subscriber projections indicate that by 2012 there will be more than 1.6 billion 3G subscribers globally.<sup>40</sup>

Irrespective of what technologies or services may be deployed, a common and harmonized band plan reduces the risks of interference and facilitates economies of scale, which in turn brings benefits to consumers. Qualcomm supports two possible band segmentation plans for Australia, both of which support the use of the outer 70 MHz of the 2.6 GHz band for FDD:

1. 70 MHz FDD / 50 MHz TDD / 70 MHz FDD

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<sup>37</sup> Ministry of Broadband Communications and the Digital Economy, "Package to drive digital television transition," January 28, 2009. [http://www.minister.dbcde.gov.au/media/media\\_releases/2009/003](http://www.minister.dbcde.gov.au/media/media_releases/2009/003)

<sup>38</sup> See [http://www.acma.gov.au/WEB/STANDARD/pc=PC\\_100536](http://www.acma.gov.au/WEB/STANDARD/pc=PC_100536) and <http://www.acma.gov.au/webwr/assets/main/lib310714/qualcomm.pdf>

<sup>39</sup> Wireless Intelligence as of January 2009.

<sup>40</sup> Ibid.

## 2. 70 MHz FDD / 50 MHz ENG OB / 70 MHz FDD

The advantages to these band segmentation plans are; that they provide separate band segments for FDD and TDD operations, maintain the 120 MHz duplex separation required by 3GPP/3GPP2 standards body specifications and ITU-R Recommendation M.1036-3, and would be consistent with the 2.6 GHz plan expected to be used by many other countries around the world. Other options, which entail a flexible FDD/TDD block assignment scheme, would not provide the expected benefits to either paired or un-paired operations. The other options will also negatively impact Australian consumers as they may lead to expensive Australia-specific handsets which will be difficult, if not impossible, to be used to roam with other countries. Sweden and Germany, recently acknowledged these advantages and decided to adopt the European Electronic Communications Committee's ECC(05)05 harmonized band plan for the 2.6 GHz band, i.e., 70 MHz FDD / 50 MHz TDD / 70 MHz FDD .

TeliaSonera, who purchased 2 x 20 MHz of FDD spectrum in the 2.6 GHz band in the Swedish auction held in May 2008 and in Norway in November 2007 via its subsidiary Netcom, announced in January that it awarded contracts for LTE equipment to both Huawei and Ericsson.<sup>41</sup> Commercial launch in Oslo and Stockholm is forecasted for 2010. Ericsson, Huawei and Nokia Siemens Networks have announced that network equipment is available for the 2.6 GHz band, and Qualcomm has a range of chipset solutions for use in this range.

Hong Kong's recent auction for the 2.6 GHz band ended with the three winning bidders only opting to bid on FDD blocks in line with the internationally endorsed band plan.<sup>42</sup> The Hong Kong government raised just over \$200 million USD for the three licenses of 2 x 15 MHz. Various TDD blocks were also auctioned at 2.3 GHz and 2.5 GHz, but there were no successful bids for this spectrum.

In summary, the 2.6 GHz band represents an opportunity for the first truly harmonized global IMT band and Australia has an ideal opportunity to realise the full benefits of international harmonisation in this band. These benefits include:

- maximizing the availability and choice of equipment, and equipment vendors;
- ensuring efficient competition among equipment vendors leading to lower equipment costs;
- maximizing the economies of scale for available equipment and devices thereby minimizing equipment cost;
- facilitating global roaming by ensuring the cross border compatibility of handsets;
- assisting the mitigation of interference within and across national boundaries; and
- allowing for the evolution of IMT-2000 to provide for future broadband wireless access capability e.g. HSPA+/LTE.

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<sup>41</sup> <http://www.networkworld.com/news/2009/011509-ericsson-huawei-to-build-lte.html?hpgl=bn>

<sup>42</sup> See: [http://www.ofta.gov.hk/en/press\\_rel/2009/Jan\\_2009\\_r1.html](http://www.ofta.gov.hk/en/press_rel/2009/Jan_2009_r1.html)

Qualcomm encourages DBCDE to work closely with ACMA and ensure this band is made available to the market in an expedited manner.

## **Conclusion**

In closing, the next few years bring only the beginning of a true wireless transformation. With a well-entrenched ecosystem of operators, vendors, developers and service providers, 3G technologies are well positioned to capitalise on the near- and long-term opportunities that await us - humans and machines alike.

Qualcomm encourages the DBCDE to continue to prioritise innovation in the digital economy and the development of new mobile platforms and services which can fuel economic growth while also meeting the various societal needs of consumers, governments and businesses. In order to support the additional capabilities and services being offered over mobile devices, additional spectrum will be required in the marketplace. The timely release of the 2.6 GHz band and the 'digital dividend' spectrum represent short and medium term opportunities which the Government can take advantage of to ensure that Australia remains at the world's forefront of advanced wireless technology development.

Qualcomm appreciates the opportunity to provide comments on the DBCDE's paper, "*Digital Economy Future Directions*." Should you have any questions or comments on this submission, please do not hesitate to contact me at +852 6348 0729 (mobile) or [mgavin@qualcomm.com](mailto:mgavin@qualcomm.com).

Yours sincerely,



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