

# WIRELESS TECHNOLOGIES:

## Making a Difference

As the world leader in developing next-generation mobile broadband technologies, Qualcomm Incorporated has invented many of the wireless technologies at the center of the unprecedented growth in mobile voice, data and Internet services. The company's technologies are integral to mobile phones, tablets, e-readers, mobile applications and other wireless devices and services used by billions of people worldwide. **Donald J. Rosenberg**, Executive Vice President & General Counsel for Qualcomm, discusses the importance of intellectual property (IP) to Qualcomm and how the company is working with local partners in many countries to foster entrepreneurship and social goals through its Wireless Reach initiative.

### Patents create opportunities and drive growth

Founded in 1985 by seven people in San Diego, California, Qualcomm began without a specific product in mind but with the determination to innovate in digital and wireless communications. That innovation came in the form of a mobile technology called Code Division Multiple Access (CDMA) which, at the time, was widely perceived as promising but risky. To cover the costs of commercializing CDMA, Qualcomm began licensing its growing portfolio of patents to cellular phone and equipment manufacturers.

The promise of CDMA technology combined with the strength of the company's steadily expanding patent portfolio, helped drive Qualcomm's rapid rise from a startup with a handful of employees to the world's largest supplier of chips for cell phones. Today, the company has more than 18,500 employees in 146 offices around the world and annual revenues of US\$11 billion. The bulk of revenues are derived from the sale of chips and related software, but a sizeable proportion is generated through royalty-bearing licensing agreements to use Qualcomm's inventions.

Innovations and technology advancements in mobile broadband have enabled the wireless industry to impact almost every aspect of people's lives. More than 5 billion people now own a mobile device and of those, more than 1.2 billion have a third-generation (3G)-enabled<sup>1</sup> device using Qualcomm's patented technology. The mobile phone has become the largest information platform in the history of humankind.

The ability to broadly license the technology worldwide to more than 190 suppliers of wireless devices, equipment and related software applications and to earn a reasonable return on investment from licensing the



Photo: Qualcomm Inc.

patents is critical for Qualcomm. The royalty revenues generated by these activities allow the company to sustain high levels of investment in research and development (R&D) – approximately 20 percent of global revenues (chip sales and patent licensing combined) – and drive new innovation. This uninterrupted cycle of investment in R&D, securing patents for new inventions, licensing patents and reinvesting revenues has been called a “virtuous cycle” of risk, innovation and reward.

Qualcomm's business model – broadly licensing our technology and reinvesting in R&D – is enabling the success of many other companies in the wireless value chain. As a consequence, an increasing number of wireless devices and applications with ever-expanding functionality are commercially available at lower cost. This makes these cutting-edge technologies and the services they empower accessible to an ever-growing number of the global population. The wide diffusion of Qualcomm's inventions has generated competition among service providers and device suppliers, enhancing consumer choice and unleashing new economic opportunities for down-stream enterprises, as well as fostering the achievement of social goals, particularly in price-sensitive developing economies. For example, India is enjoying some of the lowest prices for 3G service in the world, at less than 2 euros per month for a 100MB

**In his role as General Counsel, Mr. Rosenberg is responsible for overseeing Qualcomm's worldwide legal affairs including litigation, IP and corporate matters.**

1. 3G – a generation of standards for mobile phones and mobile telecommunications services fulfilling the International Mobile Telecommunications-2000 (IMT – 2000) specifications which include a range of application services such as wide-area wireless voice telephony, mobile Internet access, video calls and mobile TV, in a mobile environment.

voice and data package. The proliferation of 3G networks in India has led to the availability of affordable and highly capable smartphones that were previously considered a premium device for a select few.

## Improving people's lives

In emerging markets, mobile devices are often the only way for people to access the Internet. The convergence of Internet access and mobile connectivity is immense, and the momentum behind mobile broadband will help it to surpass the total number of fixed broadband subscribers in the world in a relatively short time. By 2014, it is estimated that more than 75 percent of broadband connections globally will be through mobile wireless services.<sup>2</sup>

This is attractive for developing markets in particular, because countries adopting mobile broadband technologies experience higher levels of gross domestic product (GDP) per capita. According to the World Bank, a 10 percent increase in mobile penetration increases per capita GDP in developing countries by 0.8 percent. A 10 percent increase in Internet penetration increases per capita GDP in these countries by 1.4 percent.

The belief that access to 3G and next-generation mobile technologies can improve people's lives prompted Qualcomm to develop Wireless Reach™,<sup>3</sup> a strategic initiative that brings wireless technology to underserved and "underconnected" communities globally.

Working with local partners in a wide range of countries, Wireless Reach invests in projects that foster entrepreneurship, support public safety, enable the delivery of quality and efficient health care, enrich teaching and learning and improve environmental sustainability.

## Helping fishermen in India

Fishermen in Puducherry, a coastal state in southeast India, have practised and perfected their craft for generations. However, changing environmental conditions and the devastating impact of the 2004 Indian Ocean tsunami on the local economy have given rise to a new generation of fishermen who are using wireless technology to improve their businesses.

In 2007, fishermen in Puducherry and neighboring Tamil Nadu received mobile phones preloaded with a software application called Fisher Friend. Based on Qualcomm's Brew® operating system, Fisher Friend provides instant access to helpful information such as weather conditions, fishing locations and real-time market prices – in the local language.

Project participants using Fisher Friend said the application made them feel safer on the water, has allowed them to be more efficient, and has improved their daily revenue. Devanathan, a fisherman in Puducherry, said thanks to Fisher Friend there are days when the value of his catch rises from an average Rs 200-300 a day (approximately US\$3 to \$6) to Rs 500-800 a day (approximately US\$10 to \$16).

The next phase of the project, to be launched later this year, will enable fishermen to benefit from a stand-alone GPS application, designed to ensure greater safety and quicker search and rescue in the event of a crisis.

The success of the Fisher Friend initiative in India has led to a similar project in Brazil. The aim is to promote economic development, enhance the safety of fishermen and help to bolster Brazil's fishing industry which has suffered from over-fishing and lack of investment in recent years.

Wireless Reach is working with the *Instituto Ambiental Brasil Sustentável*, a Brazilian non-governmental organization that manages projects in support of sustainable development, to create a system that integrates mobile and web-based applications on handheld devices. Fishermen in Santa Cruz Cabrália have been provided with devices that allow them to connect directly, via voice and data, from offshore to consumers and business partners on land. In addition to valuable business information – direct sales, data collection and technical support – the customized software provides information about navigation and weather conditions for improved safety.

## Boosting public safety in El Salvador

Wireless Reach is working with RTI International, the United States Agency for International Development (USAID), the Municipality of Santa Tecla and the National

2. Wireless Intelligence, ABI and the Yankee Group.

3. [http://www.qualcomm.com/citizenship/wireless\\_reach/](http://www.qualcomm.com/citizenship/wireless_reach/)



Civilian Police in El Salvador, to support a project called Seguridad Inalámbrica (Wireless Security). This new system uses 3G technology to collect and instantly share vital public safety information.

The project provides a potential solution to a pressing crime problem. Central America registers the world's highest rates of non-political violence and has an overall homicide rate that is over three times the world average.

Law enforcement officers have been equipped with 3G-enabled mobile devices and applications that allow them to report crime from the nearest possible location to the crime scene, and to immediately transmit the data to a crime-mapping database. This enables the multiple enforcement organizations that operate in Santa Tecla to coordinate their response. For example, the National Civilian Police force often works with the Corps of Metropolitan Agents. As each has different responsibilities and jurisdictions, sharing information is critical. Data are also displayed on detailed maps, and analyzed by officials to identify high-risk locations and changes in crime patterns allowing the police to track the impact of prevention programs and the prompt allocation of resources.

The partner organizations hope to improve public safety in Santa Tecla and, eventually, to expand the new crime reduction solution to other municipalities in El Salvador.

## Assisting nurses in South Africa

In South Africa, where access to relevant health information and broadband Internet connectivity is limited, nurses at the Port Elizabeth Hospital Complex on the eastern cape of South Africa are using 3G wireless technology to provide better care for patients.

The Mobile Health Information System (MHIS) project is designed to improve the ability of health workers in urban and rural settings to care for their patients by providing locally relevant, reliable and accurate clinical information at the point of care using smartphones preloaded with relevant resources. Nurses are trained to use the smartphones to access and share information with colleagues. A comprehensive evaluation of the system by the Nelson Mandela Metropolitan University showed that enabling nurses to access health resources in this way significantly improved their ability to care for their patients.

4. ARVs – Antiretroviral drugs used for the treatment of HIV/AIDS.

"I found the device most valuable when we did not have a doctor for months at a time in our clinic. As some of the clients have chronic conditions such as hypertension, diabetes, and epilepsy, I used the device to check if prescribed chronic medication is not contraindicated when using ARVs<sup>4</sup>. On many occasions I have had to advocate for patients regarding drugs prescribed by our doctor who was new to the HIV program," said Rochelle Gelandt, Registered Nurse at the Livingstone Hospital Wellness Clinic, a comprehensive care and management facility for HIV/AIDS infected clients (adults and children).

## Transforming the workforce in Nepal and Viet Nam

To better prepare the future work forces of Viet Nam and Nepal, Wireless Reach supports two projects that aim to improve education through wireless Internet access.

In collaboration with Room to Read (a global nonprofit organization committed to promoting literacy and gender equality in education), Nepal Telecom (the country's largest telecommunications company) and S-Fone (a local 3G network operator in Viet Nam), Wireless Reach is supporting projects that have established five wireless computer labs in the Kaski and Kavre regions of Nepal and six others in secondary schools in the Can Tho province of southern Viet Nam. The computer labs are equipped with 20 to 25 computers and high-speed 3G network connectivity using wireless modems.

Training sessions were held for teachers, and students are now able to attend classes where they can access educational content on the Internet, learn how to use various computer applications and acquire basic information technology skills. Each school has been raising money for a Computer Lab Development Fund to support lab management and maintenance of equipment after the pilot ends. This gives the community a sense of ownership and offers participating schools an opportunity to develop sustainability plans for the labs. The computer labs and the Internet access they provide have been life-changing for students from low-income families attending the participating schools in locations without landline connectivity.

"In this increasingly connected world, providing the opportunity for students to have dependable access

Photos: Qualcomm Inc.



## PCT passes 2 million mark

In April 2011, Qualcomm filed the two millionth international patent application under the PCT, a mechanism that makes it easier for companies and inventors to seek patent rights in the 143 countries bound by the Treaty. The PCT consolidates and streamlines patenting procedures, postponing the payment of sizeable costs and providing applicants with a sound basis for important decision-making. Qualcomm has been using the PCT system since 1988 and has since filed nearly 9,000 PCT applications – making it one of the PCT's most active users.

The two millionth international application is a Qualcomm invention that helps emergency responders to locate victims through wireless navigation in areas where traditional GPS signal reception is more difficult.

It took 26 years to reach the millionth international patent application under the PCT, which was filed in January 2005, and just 6 further years to reach the 2 million mark. This, WIPO Director General Francis Gurry said, "reflects continuously increasing investments in innovation and the growing importance of protecting innovation outputs in international markets."

In 2010, international patent filings under the PCT increased by 4.8% with strong growth from China (56.2%), the Republic of Korea (20.5%) and Japan (7.9 %).

to the Internet in their early school life initiates a completely new dimension in providing basic schooling needs to children," said Amar Nath Singh, managing director of Nepal Telecom.

The four cases mentioned above are examples of the 64 projects in 27 countries that Qualcomm's Wireless Reach initiative has implemented since 2006 to demonstrate the ways in which mobile broadband technology can improve people's lives.

### Enabling economic opportunity – the PCT route

Qualcomm's experience in using WIPO's Patent Cooperation Treaty (PCT) illustrates the close relationship between innovation, patent protection and enabling economic opportunity and growth – not just for the benefit of the inventor, but also for entire industries, communities and nations.

All stakeholders – governments, industry, NGOs, academia and other international institutions – have a shared interest in preserving incentives to innovate and diffuse new and useful inventions. As Qualcomm's founder Dr. Irwin Jacobs once said: "Without such incentives, we will measure the cost by the bells that don't ring, the cures that are not developed and the technologies that are not invented. In the long run, society will be the poorer for it."

Qualcomm applauds WIPO's global efforts to promote the proliferation of technical innovation through effective IP rights. An effective patent system is a critical component of the information age which has been flourishing for over half a century. It is vital to ensuring access to the latest inventions that drive economic development throughout the world.